Planning Department Development Application Form

Complete Application

A complete development application consists of the following:

1. A completed, signed, and notarized application form
2. Supporting information adequate to illustrate your proposal as indicated in **Section H** of this application form
3. Written authorization from the registered owner of the subject lands where the applicant is not the owner as per Section N
4. Cash, debit, credit or cheque payable to Norfolk County in the amount set out in the user fees By-Law that will be accepted and deposited once the application has been deemed complete.

Pre-Submission Consultation:

Norfolk County requires a Pre-Consultation Meeting for all applications; however, minor applications may be exempted depending on the nature of the proposal. The purpose of a Pre-Consultation Meeting is to provide the applicant with an opportunity to present the proposed application, discuss potential issues, and for the Norfolk County and Agency staff to identify the application requirements. Application requirements, as detailed in the Pre-Consultation Meeting Comments, are valid for one year after the meeting date.

Development Application Process

Once an application has been deemed complete by a Planner, Norfolk County staff will circulate the application to adjacent landowners, public agencies, and internal departments for comment. The time involved in application processing varies depending on its complexity, acceptability to the other agencies, and statutory Planning Act decision time-frames.

Payment is required once your application is deemed complete. Pre-payments will not be accepted.

Norfolk County collects personal information submitted through this form under the Municipal Freedom of Information and Protection Act's authority. Norfolk County will use this information for the purposes indicated or implied by this form. You can direct questions about collecting personal information to Norfolk GIS Services at NorfolkGIS@norfolkcounty.ca.

Additional studies required for the complete application shall be at the applicant's sole expense. Sometimes, peer reviews may be necessary to review particular studies at the applicant's expense. In these caseds, Norfolk County staff will select the company to complete the peer review.

Norfolk County will refund the original fee if applicants withdraw their applications before circulation. If Norfolk County must recirculate your drawings, there will be an additional fee. If Norfolk County must do more than three reviews of engineering drawings due to revisions by the owner or failure to revise engineering drawings as requested, Norfolk County will charge an additional fee. Full refunds are only available before Norfolk County has circulated the application.

Notification Sign Requirements

For public notification, Norfolk County will provide you with a sign to indicate the intent and purpose of your development application. It is your responsibility to:

1. Post one sign per frontage in a conspicuous location on the subject lands.
2. Ensure one sign is posted at the front of the subject lands at least three feet above ground level and not on a tree.
3. Notify the Planner when the sign is in place.
4. Maintain the sign until the development application is finalized and, after that, remove it.

Contact Us

For additional information or assistance completing this application, please contact a Planner at 519-426-5870 or 519-875-4485 extension 1842 or planning@norfolkcounty.ca. Please submit the completed application and fees to the attention of the Planning Department at 185 Robinson Street, Suite 200, Simcoe, ON N3Y 5L6.

For Office Use Only:

File Number	_____	Public Notice Sign	_____
Related File Number	_____	Application Fee	_____
Pre-consultation Meeting	_____	Conservation Authority Fee	_____
Application Submitted	_____	Well & Septic Info Provided	_____
Complete Application	_____	Planner	_____

Check the type of planning application(s) you are submitting.

- ☐ Official Plan Amendment
- ☐ Zoning By-Law Amendment
- ☐ Temporary Use By-law
- ☐ Draft Plan of Subdivision/Vacant Land Condominium
- ☐ Condominium Exemption
- ☒ Site Plan Application
- ☐ Extension of a Temporary Use By-law
- ☐ Part Lot Control
- ☐ Cash-in-Lieu of Parking
- ☐ Renewable Energy Project or Radio Communication Tower

Please summarize the desired result of this application (for example, a special zoning provision on the subject lands to include additional use(s), changing the zone or official plan designation of the subject lands, creating a certain number of lots, or similar)

Site plan approval application for proposed addition (Warehouse / Storage) to existing industrial building

Property Assessment Roll Number: 4010540630

A. Applicant Information

Name of Owner VanAmerongen & Son Inc. Klassic Coconut

Address 14 Boswell St.

Town and Postal Code Simcoe, ON N3Y 4KA

Phone Number (905) 768-1152

Cell Number

Email

Name of Applicant Kalos Engineering

Address 300 York Blvd

Town and Postal Code Hamilton, ON L8R 3K6

Phone Number 905-333-9119

Cell Number 905-521-2619

Email

Name of Agent Same as Applicant

Address

Town and Postal Code

Phone Number

Cell Number

Email

Unless otherwise directed, Norfolk County will forward all correspondence and notices regarding this application to both owner and agent noted above.

☐ Owner ☐ Agent ■ Applicant

Names and addresses of any holder of any mortgagees, charges or other encumbrances on the subject lands:

B. Location, Legal Description and Property Information

1. Legal Description (include Geographic Township, Concession Number, Lot Number, Block Number and Urban Area or Hamlet):

   Lot 3, Concession 5 in the geographic Township of Woodhouse in Norfolk County

   Municipal Civic Address: 14 Boswell Street

   Present Official Plan Designation(s): Protected Industrial

   Present Zoning: MG - General Industrial

2. Is there a special provision or site specific zone on the subject lands?

   ☐ Yes ☒ No If yes, please specify corresponding number:

3. Present use of the subject lands:

   Industrial - Process & production

4. Please describe **all existing** buildings or structures on the subject lands and whether they will be retained, demolished or removed. If retaining the buildings or structures, please describe the type of buildings or structures, and illustrate the setback, in metric units, from the front, rear and side lot lines, ground floor area, gross floor area, lot coverage, number of storeys, width, length, and height on your attached sketch which must be included with your application:

   The existing concrete block building will be retained. Refer to sketch attached.

5. If an addition to an existing building is being proposed, please explain what it will be used for (for example: bedroom, kitchen, or bathroom). If new fixtures are proposed, please describe.

   The additional will be a 4721 m² warehouse & storage for the existing business. No additional plumbing fixtures will be added.

6. Please describe **all proposed** buildings or structures/additions on the subject lands. Describe the type of buildings or structures/additions, and illustrate the setback, in metric units, from front, rear and side lot lines, ground floor area, gross floor area, lot coverage, number of storeys, width, length, and height on your attached sketch which must be included with your application:

   The additional will be a single storey, 4721 m² floor area of steel construction. Refer to sketch attached.

7. Are any existing buildings on the subject lands designated under the *Ontario Heritage Act* as being architecturally and/or historically significant? Yes ☐ No ☒

   If yes, identify and provide details of the building:

8. If known, the length of time the existing uses have continued on the subject lands:

9. Existing use of abutting properties:
   To the east & west are industrial uses. The property to the rear is institutional (juvenial detention centre)

10. Are there any easements or restrictive covenants affecting the subject lands?

    ☐ Yes ☒ No If yes, describe the easement or restrictive covenant and its effect:

C. Purpose of Development Application

Note: Please complete all that apply.

1. Please explain what you propose to do on the subject lands/premises which makes this development application necessary:
   An addition to the existing building is proposed to provide additional warehouse and storage space for the existing business.
   The additional space is needed so that the business can increase and add to their existing product lines.

2. Please explain why it is not possible to comply with the provision(s) of the Zoning By-law/and or Official Plan:
   N/A

3. Does the requested amendment alter all or any part of the boundary of an area of settlement in the municipality or implement a new area of settlement in the municipality? ☐ Yes ☒ No If yes, describe its effect:

4. Does the requested amendment remove the subject land from an area of employment? ☐ Yes ☒ No If yes, describe its effect:

5. Does the requested amendment alter, replace, or delete a policy of the Official Plan? ☐ Yes ■ No If yes, identify the policy, and also include a proposed text of the policy amendment (if additional space is required, please attach a separate sheet):

_____

_____

_____

6. Description of land intended to be severed in metric units:
   Frontage: N/A
   Depth: _____
   Width: _____
   Lot Area: _____
   Present Use: _____
   Proposed Use: _____
   Proposed final lot size (if boundary adjustment): _____
   If a boundary adjustment, identify the assessment roll number and property owner of the lands to which the parcel will be added: _____

   _____

   Description of land intended to be retained in metric units:
   Frontage: _____
   Depth: _____
   Width: _____
   Lot Area: _____
   Present Use: _____
   Proposed Use: _____
   Buildings on retained land: _____
7. Description of proposed right-of-way/easement:
   Frontage: N/A
   Depth: _____
   Width: _____
   Area: _____
   Proposed use: _____
8. Name of person(s), if known, to whom lands or interest in lands to be transferred, leased or charged (if known):

   _____

9. **Site Information**	**Zoning**	**Proposed**
Please indicate unit of measurement, for example: m, m^2 or %		
Lot frontage	30 m	133.45 m
Lot depth		208.43 m
Lot width		133.20 M
Lot area	1855 m²	27844 m²
Lot coverage		34%
Front yard	6 m	12.09 m
Rear yard	9 m	63.19 m
Left Interior side yard	3 m	53.24 m
Right Interior side yard	3 m	6.19 m
Exterior side yard (corner lot)	N/A	N/A
Landscaped open space		7757 m²
Entrance access width		7.3m (existing)
Exit access width		N/A
Size of fencing or screening		2m high (existing)
Type of fencing		Chain link (existing)

10. Building Size

Number of storeys		1
Building height		8.44
Total ground floor area		9487 m²
Total gross floor area	5170 m²	9891 m²
Total useable floor area		

11. Off Street Parking and Loading Facilities

Number of off street parking spaces	55	55
Number of visitor parking spaces		
Number of accessible parking spaces	3	3
Number of off street loading facilities		

12. Residential (if applicable)

Number of buildings existing: _____

Number of buildings proposed: _____

Is this a conversion or addition to an existing building? ☐ Yes ☐ No

If yes, describe: _____

Type	Number of Units	Floor Area per Unit in m2
Single Detached		
Semi-Detached		
Duplex		
Triplex		
Four-plex		
Street Townhouse		
Stacked Townhouse		
Apartment - Bachelor		
Apartment - One bedroom		
Apartment - Two bedroom		
Apartment - Three bedroom		

Other facilities provided (for example: play facilities, underground parking, games room, or swimming pool):

13. Commercial/Industrial Uses (if applicable)

Number of buildings existing: 1

Number of buildings proposed: 0

Is this a conversion or addition to an existing building? ☒ Yes ☐ No

If yes, describe:

4721 m², single storey addition for warehouse & storage space

Indicate the gross floor area by the type of use (for example: office, retail, or storage):

Existing Office area including change rooms = 857 m²

Existing Warehouse 4313 m² + New Warehouse 4721m² = 9034 m²

Seating Capacity (for assembly halls or similar): _____

Total number of fixed seats: _____

Describe the type of business(es) proposed: Production & distribution of coconut products

Total number of staff proposed initially: 30

Total number of staff proposed in five years: 30

Maximum number of staff on the largest shift: 30 (one shift)

Is open storage required: ☐ Yes ☒ No

Is a residential use proposed as part of, or accessory to commercial/industrial use?

☐ Yes ☐ No If yes please describe:

_____

_____

14. Institutional (if applicable)

Describe the type of use proposed: _____

Seating capacity (if applicable): _____

Number of beds (if applicable): _____

Total number of staff proposed initially: _____

Total number of staff proposed in five years: _____

Maximum number of staff on the largest shift: _____

Indicate the gross floor area by the type of use (for example: office, retail, or storage):

_____

_____

_____

15. Describe Recreational or Other Use(s) (if applicable)

_____

_____

_____

_____

_____

D. Previous Use of the Property

1. Has there been an industrial or commercial use on the subject lands or adjacent lands? ☒ Yes ☐ No ☐ Unknown
   If yes, specify the uses (for example: gas station or petroleum storage):
   Existing industial use on subject lands. Adjacent properties (east & west) are existing industrial (fabrication facility & Hydro One)
2. Is there reason to believe the subject lands may have been contaminated by former uses on the site or adjacent sites?☐ Yes ☒ No ☐ Unknown
3. Provide the information you used to determine the answers to the above questions:
   General knowledge - Owner purchased the site with existing industrial warehouse.
4. If you answered yes to any of the above questions in Section D, a previous use inventory showing all known former uses of the subject lands, or if appropriate, the adjacent lands, is needed. Is the previous use inventory attached? ☐ Yes ☒ No

E. Provincial Policy

1. Is the requested amendment consistent with the provincial policy statements issued under subsection 3(1) of the *Planning Act, R.S.O. 1990, c. P. 13*? ☒ Yes ☐ No

   If no, please explain:

2. It is owner's responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals, including the Endangered Species Act, 2007. Have the subject lands been screened to ensure that development or site alteration will not have any impact on the habitat for endangered or threatened species further to the provincial policy statement subsection 2.1.7? ☒ Yes ☐ No

   If no, please explain:

3. Have the subject lands been screened to ensure that development or site alteration will not have any impact on source water protection? ☐ Yes ☒ No

   If no, please explain:

   Subject lands are not in an area where it would impact source water

   Note: If in an area of source water Wellhead Protection Area (WHPA) A, B or C please attach relevant information and approved mitigation measures from the Risk Manager Official.

4. Are any of the following uses or features on the subject lands or within 500 metres of the subject lands, unless otherwise specified? Please check boxes, if applicable.

   Livestock facility or stockyard (submit MDS Calculation with application)

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Wooded area

   ☐ On the subject lands or ☐ within 500 meters – distance 200 m

   Municipal Landfill

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Sewage treatment plant or waste stabilization plant

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Provincially significant wetland (class 1, 2 or 3) or other environmental feature

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Floodplain

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Rehabilitated mine site

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Non-operating mine site within one kilometre

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Active mine site within one kilometre

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Industrial or commercial use (specify the use(s))

   ☒ On the subject lands or ☒ within 500 meters – distance adjacent

   Active railway line

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Seasonal wetness of lands

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Erosion

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Abandoned gas wells

   ☐ On the subject lands or ☐ within 500 meters – distance _____

F. Servicing and Access

1. Indicate what services are available or proposed:

Water Supply

- ☒ Municipal piped water
- ☐ Communal wells
- ☐ Individual wells
- ☐ Other (describe below)

_____

Sewage Treatment

- ☒ Municipal sewers
- ☐ Communal system
- ☐ Septic tank and tile bed in good working order
- ☐ Other (describe below)

_____

Storm Drainage

- ☒ Storm sewers
- ☐ Open ditches
- ☐ Other (describe below)

_____

2. Existing or proposed access to subject lands:

- ☒ Municipal road
- ☐ Provincial highway
- ☐ Unopened road
- ☐ Other (describe below)

Name of road/street: _____

G. Other Information

1. Does the application involve a local business? ☒ Yes ☐ No

   If yes, how many people are employed on the subject lands?

   30 persons

2. Is there any other information that you think may be useful in the review of this application? If so, explain below or attach on a separate page.

   No

H. Supporting Material to be submitted by Applicant

In order for your application to be considered complete, **folded** hard copies (number of paper copies as directed by the planner) and an **electronic version (PDF) of the properly named site plan drawings, additional plans, studies and reports** will be required, including but not limited to the following details:

1. Concept/Layout Plan
2. All measurements in metric
3. Key map
4. Scale, legend and north arrow
5. Legal description and municipal address
6. Development name
7. Drawing title, number, original date and revision dates
8. Owner's name, address and telephone number
9. Engineer's name, address and telephone number
10. Professional engineer's stamp
11. Existing and proposed easements and right of ways
12. Zoning compliance table – required versus proposed
13. Parking space totals – required and proposed
14. All entrances to parking areas marked with directional arrows
15. Loading spaces, facilities and routes (for commercial developments)
16. All dimensions of the subject lands
17. Dimensions and setbacks of all buildings and structures
18. Location and setbacks of septic system and well from all existing and proposed lot lines, and all existing and proposed structures
19. Gross, ground and useable floor area
20. Lot coverage
21. Floor area ratio
22. Building entrances, building type, height, grades and extent of overhangs
23. Names, dimensions and location of adjacent streets including daylighting triangles
24. Driveways, curbs, drop curbs, pavement markings, widths, radii and traffic directional signs
25. All exterior stairways and ramps with dimensions and setbacks
26. Retaining walls including materials proposed
27. Fire access and routes
28. Location, dimensions and number of parking spaces (including visitor and accessible) and drive aisles
29. Location of mechanical room, and other building services (e.g. A/C, HRV)
30. Refuse disposal and storage areas including any related screening (if indoors, need notation on site plan)
31. Winter snow storage location

32. Landscape areas with dimensions
33. Natural features, watercourses and trees
34. Fire hydrants and utilities location
35. Fencing, screening and buffering – size, type and location
36. All hard surface materials
37. Light standards and wall mounted lights (plus a note on the site plan that all outdoor lighting is to be dark sky compliant)
38. Business signs (make sure they are not in sight lines)
39. Sidewalks and walkways with dimensions
40. Pedestrian access routes into site and around site
41. Bicycle parking
42. Architectural elevations of all building sides
43. All other requirements as per the pre-consultation meeting

In addition, the following additional plans, studies and reports, including but not limited to, **may** also be required as part of the complete application submission:

☐ Zoning Deficiency Form

☐ On-Site Sewage Disposal System Evaluation Form (to verify location and condition)

☒ Architectural Plan

☒ Buildings Elevation Plan

☐ Cut and Fill Plan

☒ Erosion and Sediment Control Plan

☒ Grading and Drainage Control Plan (around perimeter and within site) (existing and proposed)

☐ Landscape Plan

☒ Photometric (Lighting) Plan

☐ Plan and Profile Drawings

☒ Site Servicing Plan

☐ Storm water Management Plan

☐ Street Sign and Traffic Plan

☐ Street Tree Planting Plan

☐ Tree Preservation Plan

☐ Archaeological Assessment

☐ Environmental Impact Study

☒ Functional Servicing Report

☒ Geotechnical Study / Hydrogeological Review

☐ Minimum Distance Separation Schedule

☐ Noise or Vibration Study

☐ Record of Site Condition

☒ Storm water Management Report

☐ Traffic Impact Study – please contact the Planner to verify the scope required

Site Plan applications will require the following supporting materials:

1. Two (2) complete sets of the site plan drawings folded to 8½ x 11 and an electronic version in PDF format
2. Letter requesting that the Holding be removed (if applicable)
3. A cost estimate prepared by the applicant's engineer
4. An estimate for Parkland dedication by a certified land appraiser
5. Property Identification Number (PIN) printout

Standard condominium exemptions will require the following supporting materials:

☐ Plan of standard condominium (2 paper copies and 1 electronic copy)

☐ Draft condominium declaration

☐ Property Identification Number (PIN) printout

Your development approval might also be dependent on other relevant federal or provincial legislation, municipal by-laws or other agency approvals.

All final plans must include the owner's signature as well as the engineer's signature and seal.

I. Development Agreements

A development agreement may be required prior to site plan approval, subdivision and condominium applications. Should this be necessary for your development, you will be contacted by the agreement administrator with further details of the requirements including but not limited to insurance coverage, professional liability for your engineer, additional fees and securities.

J. Transfers, Easements and Postponement of Interest

The owner acknowledges and agrees that if required, it is their solicitor's responsibility on behalf of the owner, to disclose the registration of all transfer(s) of land and/or easement in favour of the County and/or utilities. Also, the owner further acknowledges and agrees that it is their solicitor's responsibility on behalf of the owner for the registration of postponements of any charges in favour of the County.

K. Permission to Enter Subject Lands

Permission is hereby granted to Norfolk County officers, employees or agents, to enter the premises subject to this application for the purposes of making inspections associated with this application, during normal and reasonable working hours.

L. Freedom of Information

For the purposes of the *Municipal Freedom of Information and Protection of Privacy Act*, I authorize and consent to the use by or the disclosure to any person or public body any information that is collected under the authority of the *Planning Act, R.S.O. 1990, c. P. 13* for the purposes of processing this application.

Duncan Stewart Digitally signed by Duncan Stewart Date: 2024.08.22 15:09:59 -04'00' — August 22, 2024

Owner/Applicant Signature — Date

M. Owner's Authorization

If the applicant/agent is not the registered owner of the lands that is the subject of this application, the owner(s) must complete the authorization set out below.

I/We VanAmerongen & Son Inc. am/are the registered owner(s) of the lands that is the subject of this application.

I/We authorize Kalos Engineering Inc. to make this application on my/our behalf and to provide any of my/our personal information necessary for the processing of this application. Moreover, this shall be your good and sufficient authorization for so doing.

Duncan Stewart — August 22, 2024

Owner — Date

Owner — Date

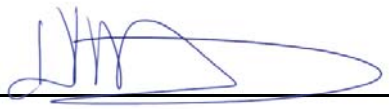
N. Declaration

I, Hank Huitema of Kalos Engineering Inc.

solemnly declare that:

all of the above statements and the statements contained in all of the exhibits transmitted herewith are true and I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of *The Canada Evidence Act*.

Declared before me at:
Hamilton, Ontario



Owner/Applicant Signature

In Hamilton

This 28th day of August

A.D., 2024

A Commissioner, etc.

Pre-Consultation Meeting Notes

Date: April 10, 2024

Description of Proposal: Addition to existing industrial building for warehousing/storage purposes.

Property Location: 14 Boswell Street, Simcoe

Roll Number: 40101540630

Please read all the information in this document on the requirements for future development planning applications. As a result of the information shared at the pre-consultation meeting dated April 10, 2024, the following applications and qualified professional documents/reports are required as part of a complete application. Please include all listed items with the application to ensure a complete application. The County reserves the right to change, reduce or add requirements for a complete application, particularly if the submission does not match the proposal as reviewed during the pre-submission consultation meeting.

Please note that various fees are associated with each application, and there are also costs for qualified professionals retained to complete various documents/reports. All requirements identified are minimum and determined as of the date of the pre-consultation meeting, with the information available at that time. As the proposal proceeds, more information is made public, additional applications, studies, reports, etc., may be required. The information in this document is applicable for a maximum of one (1) year from the meeting date.

Before you submit your application, please contact the assigned Planner to confirm submission requirements and the applicable fee. Fees will not be accepted until the submission has been reviewed and confirmed by the Planning Department.

As part of a complete application, a signed version of these meeting notes is required.

Proponent / Agent Name	Signature	Date
Hank Huitema		
Phil Schilthuis		
Ajay Lad		

Attendance List

Proponent	Hank Huitema Phil Schilthuis Ajay Lad
Community Development – Planning and Agreement	Fabian Serra, Planner Olivia Davies, Planning Coordinator
Building and Zoning	Jonathan Weir, Building Inspector Roxanne Lambrecht, Zoning Administrator Tegan Meulemeester, Building Inspector
Environment & Infrastructure Services – Development Engineering	Stephen Gradish, Development Technologist
Corporate Support Services – Realty Services	Alisha O'Brien, Corporate Services Generalist
Mississaugas of the Credit First Nation	Abby Lee LaForme, Consultation Officer Craig King, Consultation Officer Mark LaForme, Consultation Officer

Table of Contents

Proposal Summary:

Addition to existing industrial building for warehouse/storage purposes.

List of Application Requirements* and General Comments

Planning Department

Planning application(s) required to proceed	Required
Official Plan Amendment Application	
Zoning By-law Amendment Application (May be required)**	X
Site Plan Application	x
Draft Plan of Subdivision Application	
Draft Plan of Condominium Application	
Part Lot Control Application	
Consent / Severance Application	
Minor Variance Application	

Removal of Holding Application		
Temporary Use By-Law Application		
Other - Click here to enter text.		
Planning requirements for a complete application The items below are to be submitted as part of the identified Planning Application(s). ** electronic/PDF copies of all plans, studies and reports are required**	**Required at OPA/ Zoning Stage**	**Required at Site Plan Stage**
Agricultural Impact Assessment		
Air Treatment Control Study		
Archeological Assessment		
Contaminated Site Study		
Dust, Noise and Vibration Study		
Elevation Plan		x
Environmental Impact Study		
Geotechnical Study		
Heritage Impact Assessment		
Hydrogeological Study		
Landscaping Plan		x
Market Impact Analysis		
Minimum Distance Separation Schedule		
MOE D-Series Guidelines Analysis		
Neighbourhood Plan		
Odour Mitigation Plan		
Parking Assessment		
Planning Justification Report/Impact Analysis	X (May be required)	
Photometrics (Lighting) Plan		x
Record of Site Condition		
Restricted Land Use Screening Form		
Site Plan/Drawing		x
Topographical Study		
Other:		
Other:		
Additional Planning Requirements		**Required**
Development Agreement		x
Parkland Dedication/Cash-in-lieu of Parkland		x
Other:		

* Any changes to a proposal may necessitate changes to Planning Department submission

requirements. Reports and studies are subject to peer review.

Summary of Fees, Forms, and other information pertaining to the Planning process can found by visiting https://www.norfolkcounty.ca/government/planning/

See Appendix A for additional information

Planning Comments

The subject lands at 14 Boswell Drive are Designated It is designated Protected Industrial and is Zoned General Industrial (MG).

****** Parking appears to be deficient and would require a zoning by-law amendment to address any parking deficiencies. If the proposed drawings are redesigned to accommodate the required amount of property, than a ZBA will not be required. If the drawings cannot be revised to reflect the required parking provisions than a Zoning By-Law Amendment and a Planning Justification Report will be required. A Zoning table is required on the drawing to show the proposed and the required parking.

Recommended that applicant contact abutting property in regards to the tower. Should have legal review and or insurance in regards to potential future implications of tower (malfunctions/falls).

The applicant will require a Site Plan Application. On the Site Plan, a zoning table is required to show the required setbacks and parking spaces in comparison to the number of proposed. The following is required to be included on the future site plan submission:

- All measurements in metric
- Key map
- Scale, legend and north arrow
- Legal description and municipal address
- Development name
- Drawing title, number, original date and revision dates
- Owner's name, address and telephone number
- Engineer's name, address and telephone number
- Professional engineer's stamp
- Existing and proposed easements and right of ways
- Zoning compliance table – required versus proposed
- Parking space totals – required and proposed
- All entrances to parking areas marked with directional arrows
- All dimensions of the subject lands
- Dimensions and setbacks of all buildings and structures
- Gross, ground and useable floor area
- Lot coverage
- Floor area ratio
- Building entrances, building type, height, grades and extent of overhangs
- Names, dimensions and location of adjacent streets including daylighting triangles
- Driveways, curbs, drop curbs, pavement markings, widths, radii and traffic directional

signs
- All exterior stairways and ramps with dimensions and setbacks
- Retaining walls including materials proposed
- Fire access and routes
- Location, dimensions and number of parking spaces (including visitor and accessible) and drive aisles
- Location of mechanical room, and other building services (e.g. A/C, HRV)
- Refuse disposal and storage areas including any related screening (if indoors, need notation on site plan)
- Winter snow storage location
- Landscape areas with dimensions (a significant amount of landscaping is required)
- Natural features, watercourses and trees
- Fire hydrants and utilities location
- Fencing, screening and buffering – size, type and location
- All hard surface materials
- Light standards and wall mounted lights (plus a note on the site plan that all outdoor lighting is to be dark sky compliant)
- Signs
- Sidewalks and walkways with dimensions
- Pedestrian access routes into site and around site
- Bicycle parking
- Architectural elevations of all building sides

Endangered and threatened species and their habitat are protected under the provinces Endangered Species Act, 2007 (ESA), O. Reg. 242/08 & O. Reg. 830/21. The Act prohibits development or site alteration within areas of significant habitat for endangered or threatened species without demonstrating that no negative impacts will occur. The Ministry of Environment, Conservation and Parks provides the service of responding to species at risk information requests and project screenings. The proponent is responsible for discussing the proposed activity and having their project screened with MECP (Ministry of Environment, Conservation and Parks).

Please be advised that it is the owner's responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws, or other agency approvals.

Assigned Planner:
Fabian Serra,
Planner
Extension: 8046
Fabian.serra@norfolkcounty.ca

Development Engineering

Comments Pending – at such time as they are completed, the Pre-Consultation meeting notes will be updated and circulated immediately.

Stephen Gradish
Development Technologist
Stephen.Gradish@norfolkcounty.ca

Development Agreement

Performance securities will be required by the County to secure any internal and external development works, therefore a recommended condition for your planning application approval will be to enter into a development agreement with the County. The agreement will be registered on title to the subject lands, at the owner's expense. The additional requirements for an agreement could include, but are not limited to the following:

- Engineering drawing review
- Engineer's schedule of costs for the works
- Clearance letter and supporting documentation to support condition clearance
- User fees and performance securities
- Current property identification number (PIN printout)
- Owner's commercial general liability insurance certificate
- Professional liability insurance certificate
- Postponement of interest
- Transfers and / or transfer easements along with registered reference plan

All the best with your development.

Annette Helmig
Agreement and Development Coordinator
Annette.Helmig@norfolkcounty.ca

Building

Zoning Administrator:

14 Boswell St – PRE CON

- Existing food processing is a permitted use of the MG zone (Klassic Coconut)
- Proposing addition to existing facility, no change in use
- The distances to property lines are met but needs to be reflected on a zoning table on the site sketch, max building height does not apply as the property does not abut any residential, commercial or institutional lot lines
- Parking, initial existing parking is deficient, now have to address proper parking at a total area of 55 parking spots (9891sqm / 180sqm) , within these spots there must be 3 accessible spaces. Need isle width of isle entering parking spaces along main entrance

Roxanne Lambrecht
Zoning Administrator

Extension 1839
Roxanne.Lambrecht@norfolkcounty.ca

Building Inspector:

The proposed construction is considered an F2 Industrial type of occupancy as defined by the Ontario Building Code (OBC). You will need to retain the services of a Professional Engineer to complete the General Review documentation for this application.

The Designer will need to provide a Part 3 Building Code matrix. This matrix represents selected elements from your detailed code analysis and presents a quick overview to the municipal building official of the key OBC factors concerning your design. The matrix will identify OBC review items such as occupant loads, fire separations, project description, building size, building classification, fire alarms, type of construction, barrier free requirements, plumbing fixture requirements and spatial separations.

A set of Professional Engineered sealed sprinkler design drawings will be required, documents need to meet the design, installation and testing of NFPA 13.

No Ontario Building Code review has been completed at this time and will be done at permit application stage.

Items for Site Plan

Site plan drawings need to have enough detail, to determine compliance with the code references listed.

1) Indicate location of access route and access route design [OBC 3.2.5.4 to 3.2.5.6]
2) Indicate location of existing and new fire department connections. Dimensions between hydrants and building entrances is required. [OBC 3.2.5.16]
2) Location and specifications of exterior lighting. Lighting to be included in SB-10 report – energy efficiency
3) Indicate barrier free path of travel from parking area to building entrance. Construction of curb cuts and location of tactile attention indicators is required. [OBC 3.8.1.3, & 3.8.3.2]
4) Location of revised septic system (if required)
5) Provide building elevations and cross section, showing building massing, location of proposed entrances and exits, barrier free controls, exterior lighting locations, and exterior signage. [Planning Act 41(4).2]

Items for Building Permit

"-Industrial Commercial Institutional (ICI)" & "Applicable Law Checklist" Step by Step Guide Building Permit Package has been attached to the minutes herein, this contains information

on drawing requirements, designers, forms, contact information for Building Department etc.

If you have any questions on the building permit process or plans required, please contact permits@norfolkcounty.ca or 226-NORFOLK (226-667-3655) ext. 6016

Jonathan Weir
Building Inspector

Extension 1832
jonathan.weir@norfolkcounty.ca

Corporate Support Services – Realty Services

The County will require a postponement of any charges/mortgages (if any) on title to the County's Development Agreement. We recommend that you connect with your Lender(s) (if any) and/or your solicitors as early in the process as possible to avoid any delays.

Alisha O'Brien, Generalist,
Realty Services
realty.services@norfolkcounty.ca

Fire Department

Norfolk County Fire Department has the following comments at this time:

- Ensure fire department access is maintained
- All fire and life safety requirements as a result of the addition shall comply with the Ontario Building Code and not reduce the level of protection

Katie Ballantyne
Community Safety Officer
Katie. Ballantyne@norfolkcounty.ca

Additional Agency Comments & Requirements

Mississaugas of the Credit First Nation

The Mississaugas of the Credit First Nation (MCFN), Department of Consultation and Accommodation (DOCA) would like to submit the following comments:

The Mississaugas of the Credit First Nation would like to notify you that we are the Treaty Holders of the land on which the proposed development of an addition to an existing building for Warehouse/Storage purposes will be taking place. This project is located on the Between the Lakes Treaty No. 3, of 1792.

In light of this, the MCFN Department of Consultation and Accommodation (DOCA) will waive the required Stage 1 Archaeological Assessment at this time. If Archaeological resources are uncovered during any ground disturbance, all groundwork must stop immediately and MCFN DOCA be contacted at your earliest convenience.

Abby Lee LaForme

Consultation Officer

Abby.laforme@mncfn.ca

Appendix A: Planning Reference Materials

Following is a summary of some land use planning reference materials. It is the requirement of the applicant to ensure compliance with applicable legislation, policies and regulations.

Provincial Policy Statement, 2020

https://www.ontario.ca/page/provincial-policy-statement-2020

Norfolk County Official Plan
https://www.norfolkcounty.ca/government/planning/official-plan/

Section 9.6.1 outlines requirements in relation to requests to amend the Official Plan.

Section 9.6.2 outlines requirements in relation to requests to amend the Zoning By-law.

It is the responsibility of the proponent to review and ensure relevant Official Plan policies are addressed in any future development application.

Norfolk County Zoning By-Law 1-Z-2014
https://www.norfolkcounty.ca/government/planning/new-zoning-by-law/

The provisions of the Norfolk County Zoning By-Law shall apply to all lands within the boundaries of Norfolk County. No land, building or structure shall be used, erected, or altered in whole or in part except in conformity with the provisions of this By-Law. No land, building or structure shall be used or occupied except for uses that are specifically identified in the By-Law as permitted uses by the relevant zoning category.

It is the responsibility of the proponent to review and ensure relevant Zoning By-law provisions are addressed in any future development application

REQUIRED INFORMATION

Name of Owner_____

Property Legal Description_____

Roll Number_____

PIN Number_____

Type and Number of Units

Single Detached_____

Semi-Detached_____

Duplex _____

Triplex _____

Four-plex_____

Street Townhouse_____

Stacked Townhouse_____

Apartment_____

Transfer Easements Block Number and Purpose_____

Transfer Block Number and Purpose_____

Geotechnical Report prepared for Lands	◯ YES	◯ NO	◯ UNKNOWN
Lands are Within the Source Water Protection Area	◯ YES	◯ NO	◯ UNKNOWN
Lands Contain any Contaminated or Impacted Soil	◯ YES	◯ NO	◯ UNKNOWN
Lands Contain any Natural Watercourse	◯ YES	◯ NO	◯ UNKNOWN
Lands Contain any Wetlands	◯ YES	◯ NO	◯ UNKNOWN
Lands Contain any Archaeological Sites	◯ YES	◯ NO	◯ UNKNOWN
Lands Contain an Existing Well and or Septic Field	◯ YES	◯ NO	◯ UNKNOWN
Species at Risk Branch MECP Screening	◯ YES	◯ NO	◯ UNKNOWN
Lands Contain any Endangered Species	◯ YES	◯ NO	◯ UNKNOWN

OWNER INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

AGENT INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

ENGINEER INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

LAWYER INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL_____

INSURANCE PROVIDER INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL_____

FINANCIAL INSTITUTION INFORMATION (IF APPLICABLE)

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL_____

MORTGAGEE INFORMATION (IF APPLICABLE)

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

SPECIES AT RISK SCREENING

The Ontario Endangered Species Act inquiries and Species at Risk screening are now handled by the Ministry of the Environment, Conservation and Parks, specifically the "Species at Risk Branch" and the new e-mail address for handling these inquiries is now SAROntario@ontario.ca.

TRANSFERS, EASEMENTS AND POSTPONEMENT OF INTEREST

The owner acknowledges and agrees that, it is their solicitor's responsibility on behalf of the owner for the registration of all transfer(s) of land to the County, free and clear of any charges or encumbrances, and/or transfer(s) of easement in favour of the County and/or utilities at no cost to the County. In addition, the owner further acknowledges and agrees that it is their solicitor's responsibility on behalf of the owner for the registration of postponements of any charges to the County's agreements.

INSURANCE CERTIFICATES

Prior to the execution of the development agreement, the owner shall at their expense obtain and keep in force, during the term of this development agreement, commercial general liability insurance coverage satisfactory to the County. The owner further acknowledges and agrees that he/she has authorized the County to discuss with their insurance provider the specific insurance requirements of the County for agreement purposes. In addition, the County will require any professionals hired to carry professional liability insurance to provide coverage for acts, errors and omissions arising from their professional services performed.

OWNER'S AUTHORIZATION

I/We _____ am/are the registered owner(s) of the lands that is the subject of this site plan agreement.

I/We authorize our Agent _____ to provide information on my/our behalf and to provide any of my/our personal information necessary for the processing of this site plan agreement. Moreover, this shall be your good and sufficient authorization for so doing.

I/We authorize the Agreement Administrator to provide and receive information on my/our behalf in connection to the insurance coverage, letter of credit and agreement registration of my/our development.

I/We acknowledge that if there are any new charges or mortgage holders on the property they will be added to the development agreement and will be required to postpone their interest on the property to the County's development conformity interest.

Owner Signature Date

To start your agreement, please return the required supporting information and fees along with the first three pages of this document completed and signed. Provide your payments by the mail or courier to the address below or drop off at ServiceNorfolk customer service desk on the first floor 185 Robinson Street, Simcoe ON N3Y 5L6 Monday to Friday from 9 am to 4 pm. Please make your cheque payable to the Corporation of Norfolk County. If paying by credit card please contact ServiceNorfolk at 519 426-5870 Ext. 4636.

CONTACT FOR FURTHER INFORMATION AND QUESTIONS

Annette Helmig, Agreement and Development Coordinator
Norfolk County, Community Development Division, Planning Department, Agreement Services
185 Robinson Street Suite 200, Simcoe ON N3Y 5L6
226.777.1445
annette.helmig@norfolkcounty.ca

The information submitted on this form is collected under the authority of the *Freedom of Information and Protection of Privacy Act* (FIPPA) and *Municipal Freedom of Information and Protection of Privacy Act* (MFIPPA) for Norfolk County employees to use for the purpose of preparing and registering a development agreement. Questions about the collection of personal information through this form may be directed to the Agreement and Development Coordinator or Information and Privacy Coordinator, Corporation of Norfolk County, 50 Colborne Street South, Simcoe ON N3Y 4H3.

DOCUMENTATION AND FEES REQUIRED

- ☐ Owner's agreement authorization
- ☐ Postponement of interest from mortgagee / chargee (if applicable)
- ☐ Current parcel register (property identifier or PIN printout)
- ☐ Owner's commercial general liability certificate of insurance
- ☐ Construction estimates (100% for external works and landscaping with 10% of internal works)
- ☐ Professional liability insurance for surveyor and / or engineer
- ☐ Final reference plan for any easements and lands to be conveyed
- ☐ Letter from owner requesting holding (H) symbol be removed from the subject lands
- ☐ Letter of credit or certified cheque for performance securities
- ☐ Current property taxes paid
- ☐ User fees (according to the By-Law in effect at the time that payment is made). If time is of the essence, a certified cheque is requested otherwise it will take three weeks for the cheque to clear our financial institution.

  $2,919 for preparation of the site plan agreement
  $971 to remove the holding from the zoning on the property (if applicable)
  $470 for financial administration of this agreement
  $570 per tree cash-in-lieu of trees (if applicable)
  2% or 5% land appraisal cash-in-lieu of parkland as per consolidated by-law 2016-126 (if applicable)

Planning Department – Agreement Administration
Community Development Division
185 Robinson Street Suite 200, Simcoe Ontario Canada N3Y 5L6
site.plan.agreements@norfolkcounty.ca

INSURANCE REQUIREMENTS

For the Owner Entering Into a Development Agreement

Prior to the execution of the Development Agreement, the Owner shall purchase, at its expense, obtain and keep in force, during the term of the Agreement, until the end of the maintenance / guarantee period and return of all securities, insurance coverage. The insurance policy or policies shall be in the Owner's name as shown on the property identification number.

The issuance of such insurance policy or policies shall not be construed as relieving the Owner from responsibility for any other or larger claims in excess of such policy or policies, if any, for which the Owner may be held responsible. Such insurance policy or policies shall be in a form acceptable to Norfolk County and, without limiting the generality of the foregoing, shall provide:

1. A **Commercial General Liability** insurance policy with and including the following coverages:

    a. a limit of liability of not less than five million dollars ($5,000,000) per occurrence;

    b. The Corporation of Norfolk County 50 Colborne Street South, Simcoe ON N3Y 4H3 named as an additional insured

    c. Non-owned automobile coverage with a limit of at least two million dollars ($2,000,000) per occurrence including contractual non-owned coverage

    d. Cross liability and severability of interest in respect of the named insured

    e. Products and completed operations

    f. Premises and operations liability

    g. Contingent employers liability

    h. Owners and contractors protective

    i. Blanket contractual

    j. Thirty (30) days prior written notice of any alteration, cancellation or change in policy terms, which reduces coverage, and any such notice of cancellation shall be given in writing to Norfolk County

Norfolk County reserves the right to request such higher limits of insurance or other types of policies appropriate to the Agreement as Norfolk County may reasonably require from time to time.

Proof of Insurance

The Owner shall provide the certificate of insurance or certified copies of the above referred to policies, satisfactory to Norfolk County. Provided that if a certificate is provided, all requirements as above set forth must be shown on the said certificate and notwithstanding the provision of any certificate, Norfolk County may require that the Owner provide a certified copy of the policy, if required. Such certificates or policies shall be provided prior to the commencement of any work.

The Owner shall further provide evidence of the continuance of said insurance be filed at each policy renewal date for the duration of the Agreement until the end of maintenance period. In the event any renewal premium is not paid, Norfolk County, in order to prevent the lapse of such policy, may pay the renewal premium or premiums, and the Owner agrees to reimburse Norfolk County for the cost of such renewals within ten (10) days of the account therefore being rendered by Norfolk County. Further, prior to the commencement of the Agreement, the Owner shall cause its insurance broker to confirm in writing that it will accept any request from Norfolk County to renew such insurance and will extend the term of any such insurance policy held by the Owner in accordance with such request upon payment of the renewal premium(s) by Norfolk County.

Notice

Every party to the Agreement agrees to immediately notify all other parties of any occurrence, incident, or event, which may reasonably be expected to expose any of the parties to liability of any kind in relation to the development of the Lands.

APPLICABLE LAW CHECKLIST

The Building Code Act prohibits the issuance of a building permit if the proposed construction or demolition will contravene an applicable law as defined by the Building Code. The questions below will help you to determine if an applicable law applies to your project. No timeframe for building permit review can be established until all required applicable law approvals are completed and the approval documents are submitted to the Building Division.

If the answer is **YES** to any question, the relevant approval documents must be submitted with this permit application. Where any required approval has **NOT** been obtained, the agencies listed on the back of this form must be contacted to obtain approval, and the declaration on the bottom of this form must state accordingly.

Property Address: _____ **Permit Number** (office use)_____

Zoning By-Laws – *Norfolk County Planning Department*	YES	NO
Is/was relief required to permit a minor zoning variance in your proposal?		
Is/was rezoning required to permit the proposed building or land use?		
Is a land division or subdivision required and not yet fully completed?		
Are municipal services required but not yet completed or available?		

Planning Approval - *Norfolk County Planning Department*	YES	NO
Is this property regulated by Site Plan Control under Section 41 of the Planning Act?		

Heritage - N*orfolk County Heritage and Culture Department*	YES	NO
Are you demolishing a building that is listed on the County's heritage inventory?		
Is the building designated or in the process of being designated?		
Is the property located in a heritage district or study area?		

Construction and Fill Permits – *Long Point Regional or Grand River Conservation Authority*	YES	NO
Is the property located within a regulated area (i.e. abutting a ravine, watercourse, wetland, or shoreline)?		

Building and Land Use Permits - *Ontario Ministry of Transportation*	YES	NO
Is the property within 45m of a highway or 180 m from any highway intersection?		
Is the property within 395m of a controlled highway intersection? (applies to Sign Permits)		
Is this a major traffic generating project located within 800m of a highway?		

Clean Water Act – *Public Works*	YES	NO
Is the property located within a Source Water Protection regulated area?		
If yes: does a Water Source Protection Plan restrict the land use you are proposing? (s.59 screening form may be required)		

Community Development Division- Building Department
185 Robinson Street, Suite 200, Simcoe, ON N3Y 5L6 • 519-426-5870 Ext. 6016

Agriculture and Farms - *Ontario Ministry of Agriculture and Food*	YES	NO
Is this a farm building that will house animals or manure?		
Is this a milk processing plant?		

Crown Lands Work Permit – *Ministry of Natural Resources*	YES	NO
Are you proposing to construct or place a structure or combination of structures that are in physical contact with more than 15 square meters of shore lands?		
Are you proposing to build on Crown Land?		

Electrical Conductor Clearances - *Electrical Safety Authority*	YES	NO
Are any overhead power lines located above or within 5.5 metres of the proposed building?		

Environmental Approvals - *Ministry of Environment, Conservation, Parks*	YES	NO
Is a Record of Site Condition required to be filed because of a change to more sensitive land use? Is the property a former waste disposal site?		
Is this project a major industrial, commercial, or government project?		
Is this a renewable energy project?		
Does this property have a Certificate of Property Use under the Environmental Protection Act?		

Child Care Centres - *Ministry of Education*	YES	NO
Is a daycare proposed in any part of the building?		

Seniors Centres - Ministry of Children, Community and Social Services	YES	NO
Is this a seniors project where Ontario Government funding is being sought?		

Long Term Care Centres – *Ministry of Health & Long Term Care*	YES	NO
Construction, alteration or conversion of building used for a nursing home?		

Education Act - *Ministry of Education*	YES	NO
Is the project being carried out on the property of an educational facility?		
If so, is any or all building on the property being fully or partially demolished?		

DELCARATION – I have considered the list of applicable laws in the Ontario Building Code as described above, and do hereby declare that:

	None of these applicable law approvals apply to this project
	Applicable laws check 'yes' apply to this project, and approval documents are submitted with this application.
	Applicable laws checked 'yes' apply to this project; however, all approval documents have not yet been obtained

The information provided on this form is true to the best of my knowledge. I have authority to act on behalf of the owner, corporation, or partnership with respect to this application (if applicable).

Name: _____ Signature: _____ Date: _____

Approvals from other agencies are required in many instances before a building permit can be processed and issued. These approvals are **NOT** administered by the Building Department. The fastest way to obtain a building permit is to ensure that all other required approvals are completed prior to permit application. The Building Department is required by law to prioritize applications that are fully complete in terms of applicable law approvals and document submissions. Building permit documents must be consistent with applicable law approvals. If you answer yes to any of the following question please reach out to these agencies for approvals.

Zoning and Planning – Community Services Division – Norfolk County

Zoning 519-426-5870 ext. 6064 or zoning@norfolkcounty.ca
Planning 519-426-5870 ext. 1842 or planning@norfolkcounty.ca

Planning Act, s.34, 34(5), 45, and Part VI
Zoning By-laws restrict such things as land use, lot size, building size, and setbacks. If your project does not comply with any part of the Zoning By-law, a minor variance or rezoning must be obtained before any building permit can be issued. Zoning By-laws also restrict the issuance of permits until any associated land division, subdivision, or municipal servicing is complete.
Planning Act, s.41
Site Plan Approval applies to commercial, industrial, institutional, multi-residential and intensive livestock site plans. The site plan agreement must be registered before site plans will be approved.

Conservation Authority Permits

Grand River Conservation Authority (GRCA)1-866-900-4722 or grca@grandriver.ca
Long Point Regional Conservation Authority (LPRCA) 1-888-231-5408 or conservation@lprca.on.ca

Conservation Authorities Act s. 28 (1)(c), regulation 166/06
Development within certain conservation regulated areas requires a construction and fill permit from the conservation authority before any building permit can be issued. GRCA or LPRCA will confirm if your property falls within their jurisdiction.

Highway Corridor Building & Land Use Permits

Ministry of Transportation (MTO) 1-800-268-4686 or
www.mto.gov.on.ca/english/highway-bridges/highway-corridor-management/index.shtml

Public Transportation and Highway Improvement Act, s.34, 38
Ministry authorization is required for construction of all buildings within certain distances of a highway or intersection. The requirement for Ministry authorization extents to 800m from a highway where development will generate major traffic, such as a shopping centre.

Environmental Approvals

Ministry of the Environment, Conservation and Parks (MECP)1-800-461-6290 or www.ontario.ca

Environmental Protection Act s. 46, 47.3, 168 and the Environmental Assessment Act s 5.
Ministry of Environment approvals are required where a property of industrial or commercial use is changed to more sensitive residential or parkland use, for major government, industrial and commercial projects where defined by regulation, properties formerly used for landfill or waste disposal, or renewable energy projects.

Electrical Conductor Clearances

Electrical Safety Authority 1-877-372-7233 or www.esasafe.com

Subsection 3.1.19. of the Ontario Building Code prohibits buildings being located beneath or within a certain minimum distances of overhead electrical conductor wires, other than the power feed to the building.

Source Water Protection – Environmental and Infrastructure Services – Norfolk County

Environmental Services – Stephanie Davis- Manager, Water & Wastewater Compliance- 519-426-5870 ext. 8037 or Stephanie.Davis@norfolkcounty.ca
Cambium Inc. Racheal Doyle – sourcewaterprotection@cambium-inc.com

Clean Water Act s. 59
Special land use restrictions may apply if a water source protection plan is in effect in the area where the building is located. Uses affected by these restrictions require the approval of the designated Risk Management Official

Agriculture and Farms

Ministry of Agriculture Food and Rural Affairs 1-877-424-1300 or www.omafra.gov.on.ca

Nutrient Management Act 2002 s.11 reg 267/03, Milk Act s.14
Buildings or structures that house animals or store manure may trigger a requirement for a nutrient management strategy approved by the Ministry. The Ministry must determine that a milk processing plant is necessary and authorize it before a building permit can be issued.

Child Care Centres

Ministry of Education (905) 895-9192 or www.ontario.ca

Child Care and Early Years Act, s. 14 reg 137/15
Ministry plan approval is required if a new building is proposed to be used as a day nursery, an existing building is proposed to be used, altered or renovated for a day nursery, or if an existing day nursery is altered or renovated.

Seniors Centres

Ministry of Children, Community and Social Services 1-888-789-4199 or www.mcss.gov.on.ca

Elderly Persons Centres Act s. 6 of reg 314
Reports must be submitted to the Minister and approval obtained for all seniors centres to which government funding applies.

Long Term Care Homes

Ministry of Health & Long Term Care 1-800-387-5559 or www.health.gov.on.ca

Nursing Home Act s. 4, 5 reg 832
Homes for the Aged & Rest Homes Act s. 14
The Long Term Heath Care Act is designed to help ensure that residents of long-term care homes receive safe, consistent, high-quality, resident-centred care.

Education

Ministry of Education (905) 895-9192 or www.ontario.ca

Education Act s. 194
The board shall obtain approval from the Minister for the demolition of any buildings located on a school site regulated by the Education Act. App

Crown Lands Works Permits

Ministry of Natural Resources www.ontario.ca/page/crown-land-work-permits

Ontario Regulation 239/13 s. 2, s. 5
Ministry approval is required to construct a building on crown lands or to construct or place a structure along shorelines.

INDUSTRIAL
COMMERCIAL
INSTITUTIONAL

Building Permit Package

A step by step guide for making a building permit application

Norfolk County Building Department
Community Development Division
185 Robinson Street, Suite 200 Simcoe, Ontario, N3Y 5L6
norfolkcounty.ca

Industrial, Commercial, Institutional Large Residential Permit Package

Building permits help protect you, your home, and the interests of your community by making sure the project is structurally sound and follows the Ontario Building Code, municipal zoning and other applicable laws.

There are multiple steps to the building permit process. The purpose of this permit package is to highlight these steps and provide guidance to the building permit process.

STEP 1: Applicable Law.

Approvals from other agencies are required in many instances before a building permit can be processed and issued. These approvals are **NOT** administered by the Building Department. The fastest way to obtain a building permit is to ensure that all other required approvals are completed prior to permit application.

An Applicable Law Checklist is required as part of a complete application. Agency contacts are attached with this form. Our community mapping has many of these layers mapped to help you determine if additional approvals are required for your application.

Community Development Division - Building Department
185 Robinson Street, Suite 200, Simcoe, ON N3Y 5L6 • 519-426-5870 Ext. 6016

Pre-consultation meeting – Site plan approval.

Most industrial, commercial and institutional buildings are located on properties where a site plan approval is required through the Planning Act. Before you submit a planning application, please contact our office about the necessity of a pre-consultation meeting.

These confidential meetings are hosted by the Planning Department with staff from various departments (and agencies, as applicable) who will provide valuable feedback on your proposal and outline what will be required as part of a complete planning application. After the meeting, you will receive a detailed summary of the meeting which will summarize the feedback from each department. The document will also include a clear list of what you need to submit as part of a complete planning application form.

To request a pre-consultation meeting, please email the Planning Department at precon@norfolkcounty.ca. You can also call us at (519) 426-5870 ext. 1842.

For more information on the process, please see the Norfolk County Planning Website.

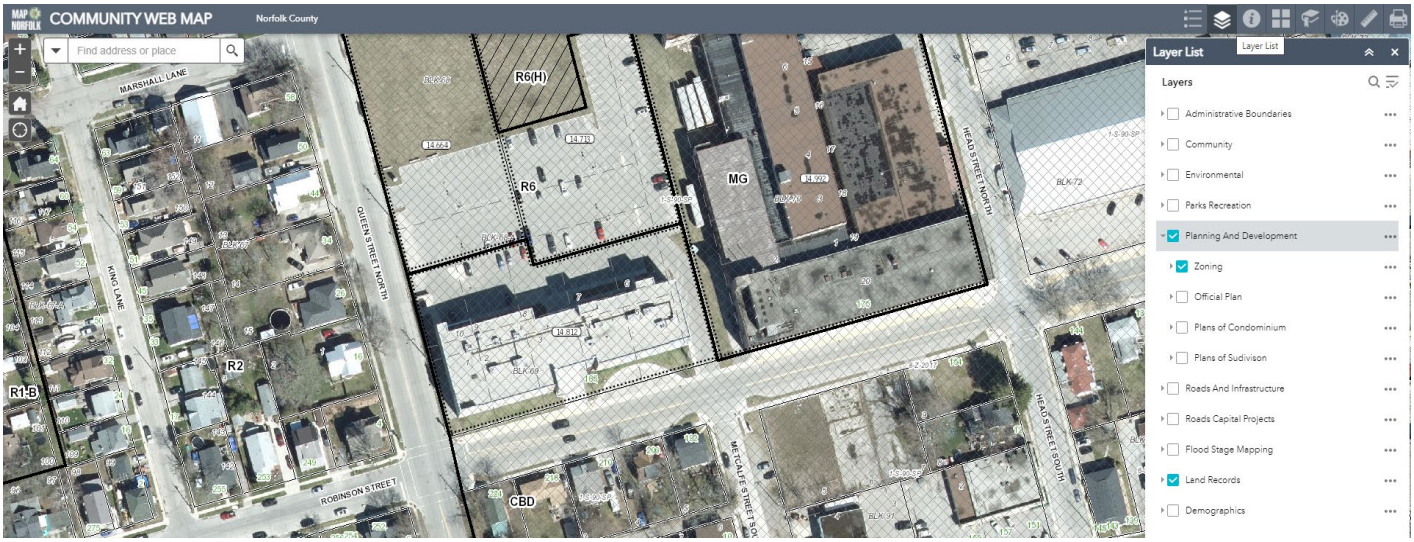
Site Plan Control.

Site Plan Control is a tool utilized by the County to ensure that specific development proposals meet the Official Plan and Zoning By-law objectives. Essentially, site plans approved under this process are very detailed and outline precisely how a particular property will be developed. Site Plan Approval is typically the last planning approval necessary before the Building Permit process.

A Site Plan Agreement is sometimes required for more complicated developments. Where a property has site plan control designation, but the proposed construction is deemed minor in nature, the applicant will need to provided a site plan waiver from the Planning Department as part of an Applicable Law review.

Zoning Requirements.

Finding the zoning associated with your property is easy with our GIS Community Web Map, position over your property and turn on the zoning layer by clicking layer list, planning, zoning. Norfolk County Zoning Bylaw is available online.



To confirm your project conforms to the Zoning By-law you will need to provide a plot plan indicating:

- Property lines and lot dimension,
- Location of building and all other structures on the lot,
- Location of all steps and landings,
- Distance from dwelling to property lines,
- Parking spots with dimensions,
- Location of septic system.

If your proposed building / structure does not comply with the zoning requirements, a planning application will be required. Zoning and Planning approval is required as part of a complete permit application.

Planning Department: planning@norfolkcounty.ca or 519-426-5870 ext. 1842.
Zoning: zoning@norfolkcounty.ca or 519-426-5870 ext. 1000.

Community Development Division - Building Department
185 Robinson Street, Suite 200, Simcoe, ON N3Y 5L6 • 519-426-5870 Ext. 6016

Lot Grading.

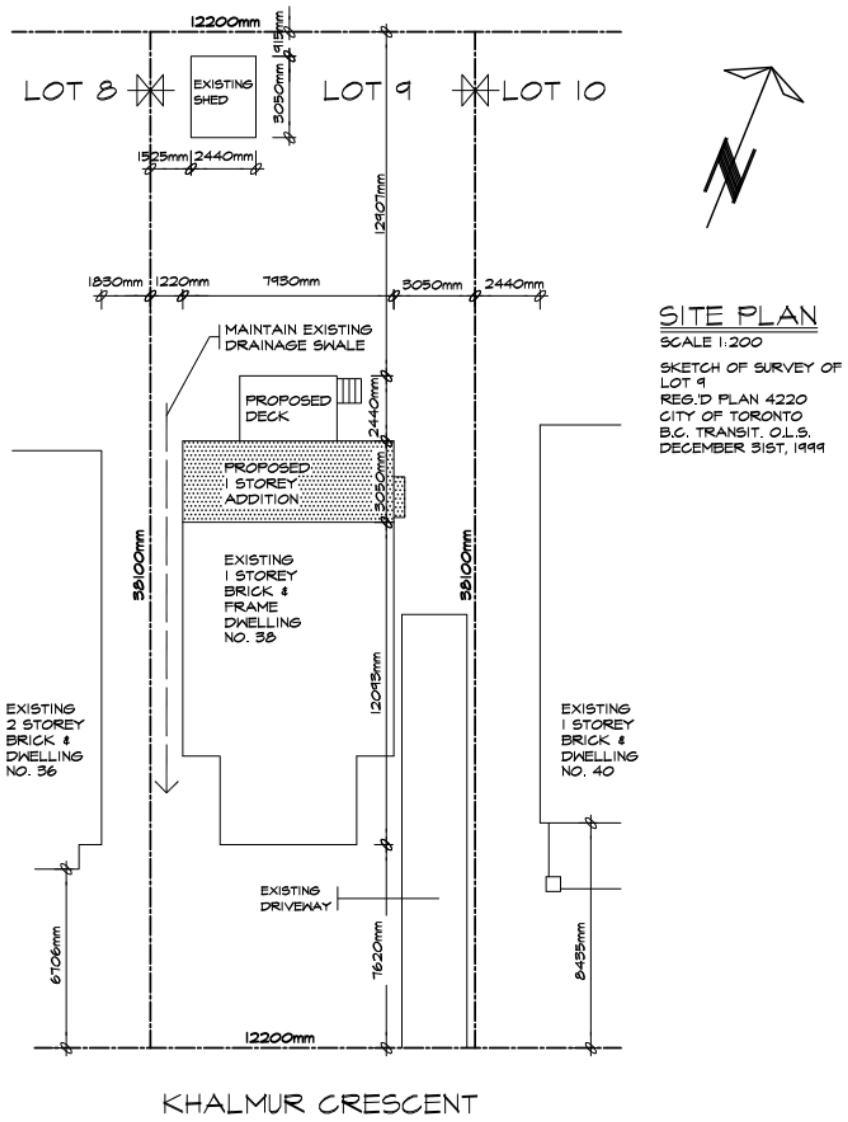
Where a property has been issued a site plan waiver, and the footprint of the building is increasing in size, a lot grading is required.

Proposed grading plans and lot grading form shall be submitted with all building permit applications, under Norfolk County Grading and Drainage By-law.

Proposed grading plans needs to identify:

- all surface features;
- existing and proposed structures;
- changes in grade and slopes in percent between such changes; and
- include sufficient information regarding adjacent properties to confirm conformance with this By-Law with respect to drainage onto those properties.

An exemption may be considered for a lot in a rural area (complete form, fee applies)



STEP 2: Preparing your application.

A building permit application consists of many documents. The forms attached are to be completed, signed, and dated.

Who can design the building?

There are many factors to determine who can complete drawings and design documents for these types of buildings. Your design team can be made up of qualified individuals with a Building Code Identification number (BCIN), an architect, and/or Professional Engineers. If you are unsure what qualifications a designer needs for your specific project, reach out to a building inspector for more information.

Building Department staff cannot make recommendation on a specific designer or design company.

Drawings and Documents.

Drawings are to be legible and to scale. Use a ruler or computer aided drafting (CAD) software to complete your drawings. Provide enough information and detail to ensure compliance with the Ontario Building Code.

The Ontario Building Code is available online under the 'regulations under this act' tab.

Building Department staff are not permitted by law to provide design advice. It is the responsibility of the property owner or authorized agent to complete a design that meets the requirements of the Ontario Building Code (OBC) and the Building Code Act (BCA).

Building Permits – Application Checklist.

Completed Forms.

- ☐ Building Permit Application Form.
- ☐ Signed Commitment to General Review.
- ☐ Property Owner Consent Form, if application is not completed by the property owner,
- ☐ Applicable Law Checklist and supporting documents.
- ☐ Lot grading form (projects with a site plan waiver).

Required Documents.

- ☐ Approved Site Plan approval plot plan.
- ☐ Drawings of the building.
  - Architectural,
  - Structural,
  - Electrical,
  - Mechanical,
  - Plumbing.
- ☐ Building Code Matrix.
- ☐ Completed SB-10 report (energy efficiency).

- ☐ Septic System or Sewage Works.
  - Sewage system is under 10,000 litres/day daily design flow for the whole site. (separate application through Norfolk County)
  - Sewage Works is over 10,000 litres/day daily design flow for the whole site. ECA to be obtained from The Ministry of Environment, Conservation, Parks.
    Contact: *Christopher O'Connor.*
    Phone: 1-800-668-4557, Cell: 905-515-9618
    Email: Chris.O'Connor2@ontario.ca

Fees.

- ☐ Building Permit fee.
- ☐ Plumbing fee.
- ☐ Occupancy fee.
- ☐ Civic address (where applicable).
- ☐ Water / Sanitary / Storm Connection Permit (where applicable).
- ☐ Development charges (if applicable).

Septic Permits - Application Checklist.

Completed Forms.

- ☐ Building Permit Application Form.
- ☐ Schedule 1: Designer Information.
- ☐ Schedule 2: Sewage System Installer Information.

Required Documents.

- ☐ Septic System Permit Application Information Package / Worksheets.
- ☐ Percolation time ('T' time) report from a licensed testing agency.

Fees.

- ☐ Septic Permit fee.

STEP 3: Applying.

Online Portal: Visit Norfolk Permits Portal and make your application online.

Building Department

Apply for a Building Permit
Status and Fees

In Person: Visit our service counter located at 185 Robinson Street, Suite 200 Simcoe Ontario.

Our Permit Coordinators will review your application and provide in writing any item which may be missing from the application and a cost break down for the permit fees and payment options.

Step 4: Plans Review.

A Building Inspector will contact you in writing if there are building code concerns or missing information from your application.

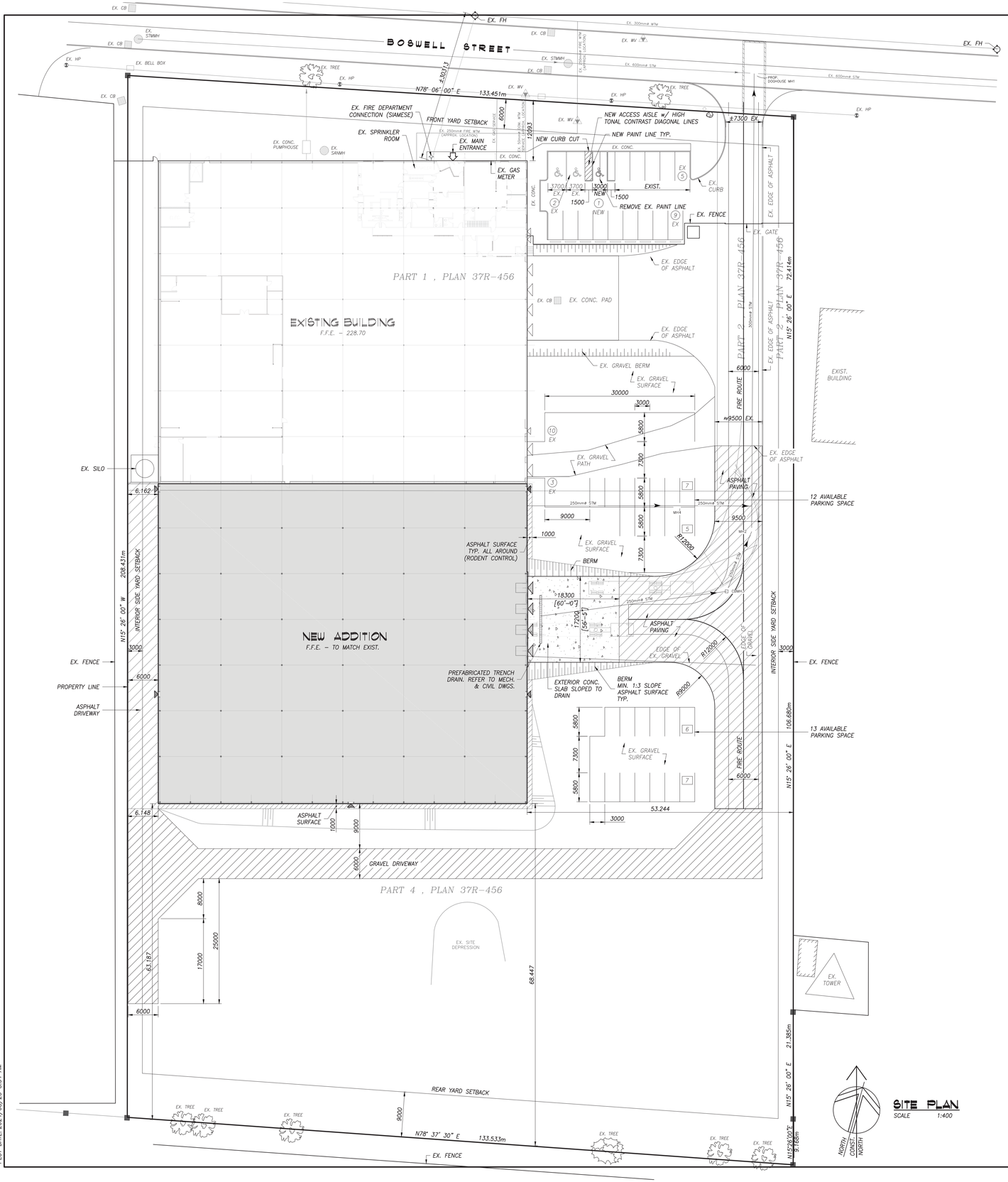
A building permit is issued once all documentation has been received, fees are paid in full, and your plans are check for compliance with zoning by-law and the building code.

Step 5: Inspections

Once you have obtained a building permit, a building inspector needs to attend your site at several milestones in the construction process. For more information, please check the inspection section of Norfolk County's Building Department website. Once all inspections are complete and passed your permit is closed.

Need Help? If you have any question on the building permit process or plans required, please contact permits@norfolkcounty.ca or 519-426-5870 ext. 6016

Updated October 2022



SITE PLAN
SCALE 1:400

PLOT DATE: 2024/08/23 8:34 AM

OWNER:
KLASSIC COCONUT
14 BOSWELL STREET
SIMCOE, ONTARIO
N3Y 4K2
TEL : (905) 768-1152

MUNICIPAL ADDRESS:
14 BOSWELL STREET
SIMCOE, ONTARIO
N3Y 4K2

ZONING DESIGNATION:
MG – GENERAL INDUSTRIAL (BY-LAW 1-Z-2014)

SURVEY REFERENCE:
TOPOGRAPHIC SITE PLAN
OF
LOT 3, CONCESSION 5
IN THE GEOGRAPHIC
TOWNSHIP OF WOODHOUSE
IN
NORFOLK COUNTY

PREPARED BY
JEWITT AND DIXON LTD
ONTARIO LAND SURVEYORS
R.R.1. SIMCOE, ON.
N3Y 4J9
(51 PARK ROAD)

SITE STATISTICS:

SITE AREA	27,844 m²	299,710 ft²	6.88 acre	2.78 ha

BUILDING AREAS		
EXISTING	4,766 m²	51,301 ft²
ADDITION	4,721 m²	50,816 ft²
TOTAL	9,487 m²	102,117 ft²

LOT COVERAGE :

EXISTING	17%
ADDITION	17%
TOTAL	34%

FLOOR AREAS:

EXISTING :		
GROUND LEVEL	±4,766 m²	±51,301 ft²
MEZZANINE	±404 m²	±4,349 ft²
TOTAL EXISTING	±5,170 m²	±55,650 ft²
NEW ADDITION	4,721 m²	50,816 ft²
TOTAL EXIST. & ADDN.	9,891 m²	106,466 ft²

ZONE PROVISIONS 7.1.4

MG ZONE	REQUIRED	PROPOSED
LOT AREA (min.)	1855 m²	27844 m²
LOT FRONTAGE (min.)	30 m	133.451 m
FRONT YARD (min.)	6m	12.093m (EX.)
SIDE YARD (min.) EXTERIOR SIDE YARD INTERIOR SIDE YARD	6m 3m	NOT APPLICABLE 53.244m (EX.) – EAST 6.162m (EX.) – WEST
REAR YARD (min.)	9m	63.187 m
BUILDING HEIGHT (max.)	--	8.435 m

PARKING TABLE 4.1-4.3

	REQUIRED	PROPOSED
EXISTING BUILDING	29	27 STANDARD 2 ACCESSIBLE
PROPSED ADDITION	26	25 STANDARD 1 ACCESSIBLE
TOTAL	55	

LEGEND:
- PROPOSED ACCESS/EXIT DOOR
- PROPOSED OVERHEAD DOOR LOCATION
- EX. ACCESS/EXIT DOOR
- EX. OVERHEAD DOOR
- PROPERTY LINE
- EX. CHAIN LINK FENCE
- EX. OVERHEAD UTILITY WIRES
- B STEEL PIPE BOLLARD
- ENTRANCE

EXISTING REFERENCE INFORMATION

EXISTING REFERENCE INFORMATION ON THIS DRAWING ARE TAKEN FROM

TOPOGRAPHIC SURVEY :
JEWITT AND DIXON LTD
ONTARIO LAND SURVEYORS
R.R.1.SIMCOE, ON.
N3Y 4J9 (51 PARK ROAD)

ARCHITECTURAL :
REINDERS + RIEDER
57 MILL STREET NORTH
BRAMPTON, ON., L6X 1S9

No.	DATE	REVISION
1	24/08/23	ISSUED FOR SITE PLAN APPROVAL

REVISIONS

KALOS ENGINEERING
300 YORK BLVD HAMILTON, ONTARIO L8R 3K6 905-333-9119

KLASSIC COCONUT

PROPOSED ADDITION

14 BOSWELL STREET
SIMCOE ONTARIO

SITE PLAN

LICENCED PROFESSIONAL ENGINEER
H.A.P. HUITEMA
24-08-28
PROVINCE OF ONTARIO

DATE	DRAWN BY	DRAWING No.
NOVEMBER 2023	AL	A1.0
PROJECT No.	CHECKED BY	
23190	HAPH	

REQUIRED INFORMATION

Name of Owner: VanAmerongen & Son Inc. Klassic Coconut

Property Legal Description: Lot 3, Concession 5 in the geographic Township of Woodhouse in Norfolk County

Roll Number: 40101540630

PIN Number:

Type and Number of Units

Single Detached: N/A

Semi-Detached: N/A

Duplex: N/A

Triplex: N/A

Four-plex: N/A

Street Townhouse: N/A

Stacked Townhouse: N/A

Apartment: N/A

Transfer Easements Block Number and Purpose: N/A

Transfer Block Number and Purpose: N/A

Geotechnical Report prepared for Lands	(●) YES	( ) NO	( ) UNKNOWN
Lands are Within the Source Water Protection Area	( ) YES	(●) NO	( ) UNKNOWN
Lands Contain any Contaminated or Impacted Soil	( ) YES	(●) NO	( ) UNKNOWN
Lands Contain any Natural Watercourse	( ) YES	(●) NO	( ) UNKNOWN
Lands Contain any Wetlands	( ) YES	(●) NO	( ) UNKNOWN
Lands Contain any Archaeological Sites	( ) YES	(●) NO	( ) UNKNOWN
Lands Contain an Existing Well and or Septic Field	( ) YES	(●) NO	( ) UNKNOWN
Species at Risk Branch MECP Screening	( ) YES	(●) NO	( ) UNKNOWN
Lands Contain any Endangered Species	( ) YES	(●) NO	( ) UNKNOWN

OWNER INFORMATION

NAME AND CONTACT: Klassic Coconut -

ADDRESS WITH POSTAL CODE: 14 Boswell St. Simcoe, ON N3Y 4KA

PHONE NUMBER: (905) 768-1152

EMAIL:

AGENT INFORMATION

NAME AND CONTACT: Kalos Engineering Inc. - Hank Huitema

ADDRESS WITH POSTAL CODE: 300 York Blvd. Hamilton, ON L8R 3K6

PHONE NUMBER: 905-333-9119

EMAIL: hankh@kaloseng.ca

ENGINEER INFORMATION

NAME AND CONTACT S. LLewellyn & Associates Limited

ADDRESS WITH POSTAL CODE 3228 South Service Road, Suite 105 East Wing, Burlington ON L7N 3H8

PHONE NUMBER (905) 631-6978

EMAIL sfrankovich@sla.on.ca

LAWYER INFORMATION

NAME AND CONTACT MHN Lawyers Peter Karsten

ADDRESS WITH POSTAL CODE 39 Colborne St. N Simcoe,N3Y 3T8

PHONE NUMBER 519-426-6763

EMAIL karsten@mhnlawyers.com

INSURANCE PROVIDER INFORMATION

NAME AND CONTACT Glenda Johnston NFP

ADDRESS WITH POSTAL CODE 35 Stonechurch Rd. Ancaster Ontario

PHONE NUMBER 905 667 4730

EMAIL glenda.johnston@nfp.ca

FINANCIAL INSTITUTION INFORMATION (IF APPLICABLE)

NAME AND CONTACT

ADDRESS WITH POSTAL CODE

PHONE NUMBER

EMAIL

MORTGAGEE INFORMATION (IF APPLICABLE)

NAME AND CONTACT

ADDRESS WITH POSTAL CODE

PHONE NUMBER

EMAIL

SPECIES AT RISK SCREENING

The Ontario Endangered Species Act inquiries and Species at Risk screening are now handled by the Ministry of the Environment, Conservation and Parks, specifically the "Species at Risk Branch" and the new e-mail address for handling these inquiries is now SAROntario@ontario.ca.

TRANSFERS, EASEMENTS AND POSTPONEMENT OF INTEREST

The owner acknowledges and agrees that, it is their solicitor's responsibility on behalf of the owner for the registration of all transfer(s) of land to the County, free and clear of any charges or encumbrances, and/or transfer(s) of easement in favour of the County and/or utilities at no cost to the County. In addition, the owner further acknowledges and agrees that it is their solicitor's responsibility on behalf of the owner for the registration of postponements of any charges to the County's agreements.

INSURANCE CERTIFICATES

Prior to the execution of the development agreement, the owner shall at their expense obtain and keep in force, during the term of this development agreement, commercial general liability insurance coverage satisfactory to the County. The owner further acknowledges and agrees that he/she has authorized the County to discuss with their insurance provider the specific insurance requirements of the County for agreement purposes. In addition, the County will require any professionals hired to carry professional liability insurance to provide coverage for acts, errors and omissions arising from their professional services performed.

OWNER'S AUTHORIZATION

I/We VanAmeongen & Son Inc. am/are the registered owner(s) of the lands that is the subject of this site plan agreement.

I/We authorize our Agent Kalos Engineering Inc. to provide information on my/our behalf and to provide any of my/our personal information necessary for the processing of this site plan agreement. Moreover, this shall be your good and sufficient authorization for so doing.

I/We authorize the Agreement Administrator to provide and receive information on my/our behalf in connection to the insurance coverage, letter of credit and agreement registration of my/our development.

I/We acknowledge that if there are any new charges or mortgage holders on the property they will be added to the development agreement and will be required to postpone their interest on the property to the County's development conformity interest.

Duncan Stewart Digitally signed by Duncan Stewart Date: 2024.08.22 15:06:21 -04'00' August 22, 2024

Owner Signature Date

To start your agreement, please return the required supporting information and fees along with the first three pages of this document completed and signed. Provide your payments by the mail or courier to the address below or drop off at ServiceNorfolk customer service desk on the first floor 185 Robinson Street, Simcoe ON N3Y 5L6 Monday to Friday from 9 am to 4 pm. Please make your cheque payable to the Corporation of Norfolk County. If paying by credit card please contact ServiceNorfolk at 519 426-5870 Ext. 4636.

CONTACT FOR FURTHER INFORMATION AND QUESTIONS

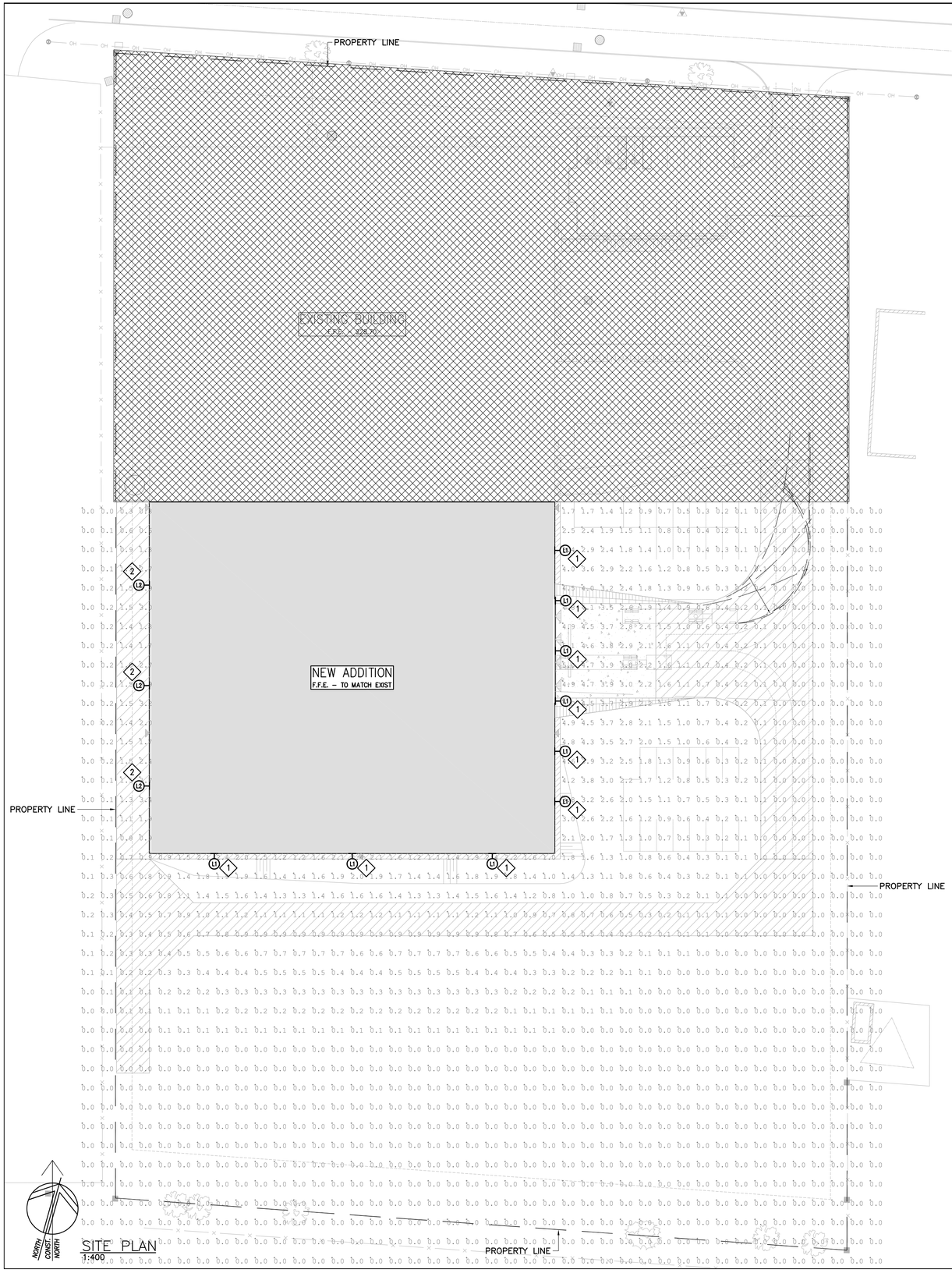
Annette Helmig, Agreement and Development Coordinator
Norfolk County, Community Development Division, Planning Department, Agreement Services
185 Robinson Street Suite 200, Simcoe ON N3Y 5L6
226.777.1445
annette.helmig@norfolkcounty.ca

The information submitted on this form is collected under the authority of the *Freedom of Information and Protection of Privacy Act* (FIPPA) and *Municipal Freedom of Information and Protection of Privacy Act* (MFIPPA) for Norfolk County employees to use for the purpose of preparing and registering a development agreement. Questions about the collection of personal information through this form may be directed to the Agreement and Development Coordinator or Information and Privacy Coordinator, Corporation of Norfolk County, 50 Colborne Street South, Simcoe ON N3Y 4H3.

DOCUMENTATION AND FEES REQUIRED

- ☐ Owner's agreement authorization
- ☐ Postponement of interest from mortgagee / chargee (if applicable)
- ☐ Current parcel register (property identifier or PIN printout)
- ☐ Owner's commercial general liability certificate of insurance
- ☐ Construction estimates (100% for external works and landscaping with 10% of internal works)
- ☐ Professional liability insurance for surveyor and / or engineer
- ☐ Final reference plan for any easements and lands to be conveyed
- ☐ Letter from owner requesting holding (H) symbol be removed from the subject lands
- ☐ Letter of credit or certified cheque for performance securities
- ☐ Current property taxes paid
- ☐ User fees (according to the By-Law in effect at the time that payment is made). If time is of the essence, a certified cheque is requested otherwise it will take three weeks for the cheque to clear our financial institution.

  $2,919 for preparation of the site plan agreement
  $971 to remove the holding from the zoning on the property (if applicable)
  $470 for financial administration of this agreement
  $570 per tree cash-in-lieu of trees (if applicable)
  2% or 5% land appraisal cash-in-lieu of parkland as per consolidated by-law 2016-126 (if applicable)



SITE PLAN
1:400

LUMINAIRE SCHEDULE

SYMBOL	IMAGE	QTY	DESCRIPTION	LUMENS	INPUT WATT	MOUNTING TYPE	MOUNTING HEIGHT	DIST. TYPE	MANUFACTURER	CAT. NO.
L1		9	WALL MOUNT SCONCE	11521	107	WALL	AS NOTED	4	GARDCO	121-32L-1000-NW-G4-4
L2		3	WALL MOUNT SCONCE	4546	38	WALL	AS NOTED	2	GARDCO	121-16L-700-NW-G4-2

GENERAL NOTES:

1. L.L.F. FOR EACH FIXTURE SHOWN IS 0.8 UNLESS OTHERWISE NOTED.
2. ALL CCT FOR NEW FIXTURES TO BE 4000K.
3. LIGHT SOURCE FOR NEW FIXTURES ARE LED TYPE UNLESS OTHERWISE NOTED.
4. FIXTURES ARE CERTIFIED AS DARKSKY APPROVED BY DarkSky.org
5. IMAGE SHOWN IS FOR REFERENCE ONLY. EXACT PHYSICAL APPEARANCE MAY VARY.

CALCULATION SUMMARY

LABEL	CALC TYPE	UNITS	AVG	MAX	MIN	AVG/MIN	MAX/MIN
BUILDING PERIMETER	ILLUMINANCE	Fc	1.70	3.9	0.6	2.83	6.50
FIRE ROUTE	ILLUMINANCE	Fc	0.23	1.60	0.00	N/A	N/A
LOADING DOCK	ILLUMINANCE	Fc	3.64	5.10	1.90	1.92	2.68

DRAWING KEYNOTES:

1. FIXTURE MOUNTING HEIGHT : 8000mm AFF
2. FIXTURE MOUNTING HEIGHT : 5000mm AFF

NOTES:

1. PHOTOMETRIC LIGHTING LEVELS ARE IN Fc.
2. PHOTOMETRIC DATA USED AS INPUT FOR THESE CALCULATIONS IS BASED ON ESTABLISHED IES PROCEDURES AND PUBLISHED LAMP RATINGS. FIELD PERFORMANCE WILL DEPEND ON ACTUAL LAMP, BALLAST, ELECTRICAL AND SITE CHARACTERISTICS.

LICENSED PROFESSIONAL ENGINEER
C. KURUPPU
100053024
24.06.11
PROVINCE OF ONTARIO

No.	DATE	REVISION
01	2024/06/11	ISSUED FOR SPA

REVISIONS

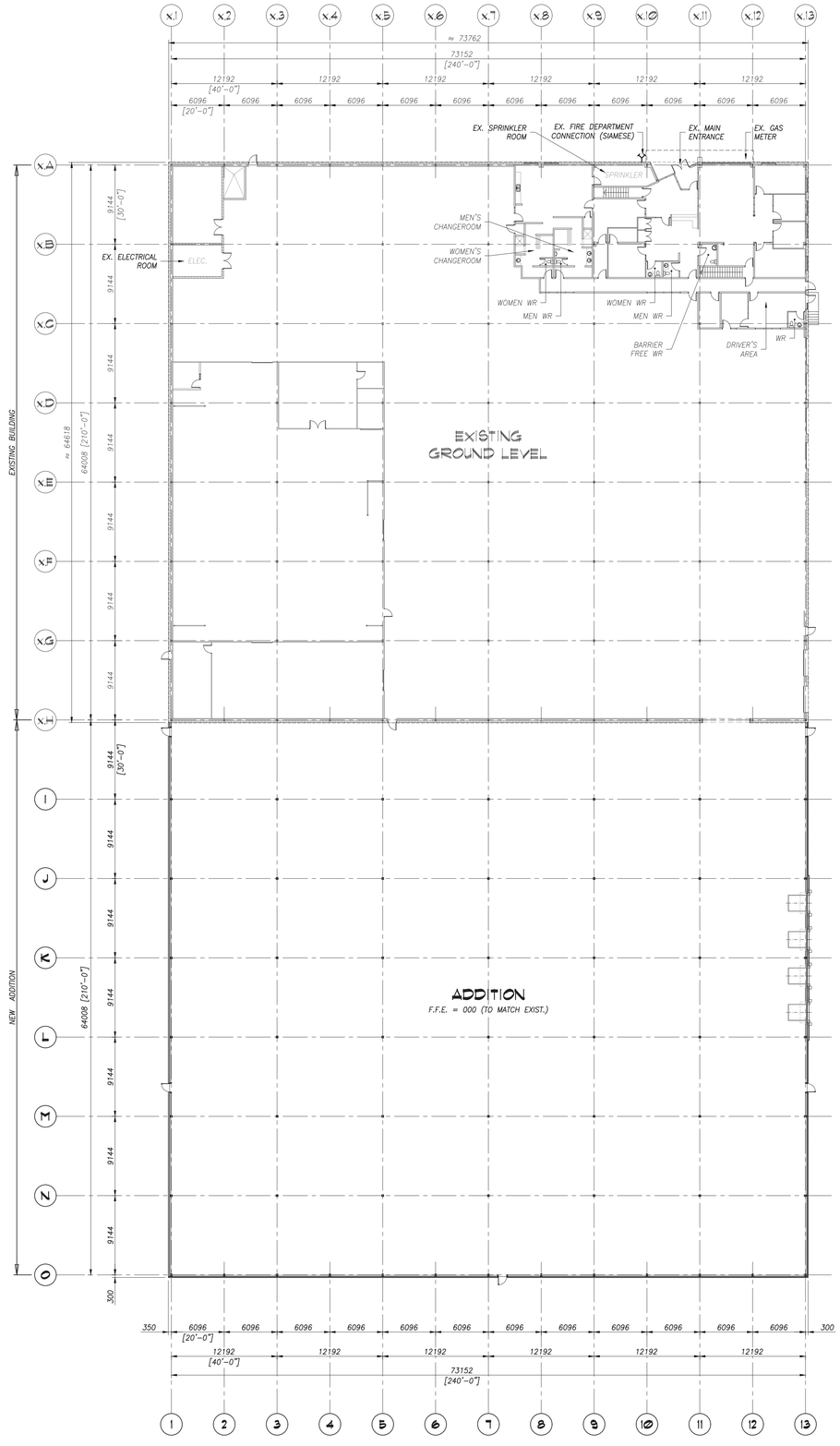
KALOS ENGINEERING
300 YORK BLVD HAMILTON, ONTARIO L8R 3K6 905-333-9119

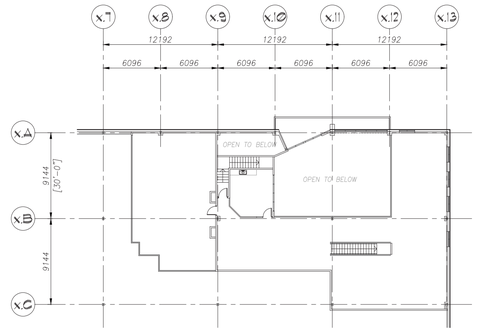
CK ENGINEERING INC
MECHANICAL | ELECTRICAL
2400 INDUSTRIAL STREET
BURLINGTON, ON. L7P 1A5
www.ckengs.com | info@ckengs.net | 905.631.1115

KLASSIC COCONUT
14 BOSWELL STREET
SIMCOE ONTARIO

SITE PLAN
PHOTOMETRIC LIGHTING
CALCULATIONS

DATE	DRAWN BY	DRAWING No.
2024/06/11	N.H.	ESP-1
PROJECT No. 23034	CHECKED BY P.I.	





UPPER FLOOR PLAN - EXISTING

SCALE 1:300

ITEM	ONTARIO BUILDING CODE DATA MATRIX			OBC REFERENCE		
1	Project Description	☐ New ☒ Addition ☐ Alteration	☐ Change of Use	☐ Part 11	☒ Part 3	☐ Part 9
						2.1.1 9.10.1.3
2	Major Occupancy(s)	Medium Hazard Industrial Occupancies			3.1.2.1(1)	9.10.2
3	Building Area (sq.m)	Existing 4766	New 4721	Total 9487	1.1.3.2	1.1.3.2
4	Gross Area (sq.m)	Existing 5170	New 4721	Total 9891	1.1.3.2	1.1.3.2
5	Number of Storeys	Existing Building : Above Grade 1	Below Grade N/A		3.2.1.1 & 1.1.3.2	2.1.1.3
		Proposed Addition : Above Grade 1	Below Grade N/A			
6	Height of Building(m)	Exist. Bldg. - 8435 (27'-8")				2.1.1.3
		Addition - 8435 (27'-8")				
7	Number of Streets/Access Routes	1			3.2.2.10 & 3.2.5.5	
8	Building Classification	3.2.2.69. Group F, Division 2, upto 4 Storeys, Increased Area, Sprinklered Table 3.2.2.69.B.			3.2.2.20-83	9.10.4
9	Sprinkler System Proposed	☒ entire building (Addition) ☐ basement only ☐ in lieu of roof rating ☐ not required			3.2.2.20-.83 3.2.1.5 3.2.2.17	9.10.8
	Note : Existing building is sprinklered					
10	Standpipe required	☐ Yes	☒ No		3.2.9	
11	Fire Alarm required	☐ Yes	☒ No		3.2.4	9.10.7.2
12	Water Services/Supply is Adequate	☒ Yes	☐ No			
13	High Building	☐ Yes	☒ No		3.2.6	
14	Permitted Construction	☐ Combustible	☒ Non-combustible		3.2.2.20-.83	9.10.6
	Actual Construction	☐ Combustible	☒ Non-combustible			
15	Mezzanine(s) Area(sq.m.)	404			3.2.1.1.9)-8	9.10.4.1
16	Occupant load based on	☐ sq.m/person	☐ design of building		3.1.1.6	9.9.1.3
	Basement	Occupancy ____ Load ____ persons				
	1st.Floor	Occupancy ____ Load 40 EX. persons				
	2nd.Floor	Occupancy ____ Load 10 EX. persons				
	3rd.Floor	Occupancy ____ Load ____ persons				
17	Barrier-free Design	☒ Yes	☐ No(Explain)		3.8	9.5.2
18	Hazardous Substances	☐ Yes	☒ No		3.3.1.2.(1) & 3.3.1.19(1)	9.10.1.3
19	Required Fire Resistance Rating (FRR)	Horizontal Assemblies FRR(Hours)	Listed Design No. or Description(SG-2)		3.2.2.20-.83& 3.2.1.4	9.10.8 9.10.9
		Floors N/A Hours				
		Roof N/A (SPRINKLERED) Hours				
		Mezzanine N/A Hours				
		FRR for Supporting Members	Listed Design No. or Description(SG-2)			
		Floors N/A Hours				
		Roof N/A Hours				
		Mezzanine N/A Hours				

20 Spatial Separation-Construction of Exterior Walls

Walls	Area of ESB (sq.m)	L.D. (m)	L/H or H/L	Permitted Max.% of Openings	Proposed % of Openings	FRR (Hours)	Listed Design or Description	Comb Const	Comb.Constr. Nonc. Cladding	Non-Comb. Constr.
North	← N/A →									
South	622	63.18	1:9	100%	0.37%	n/a	n/a	NO	NO	YES
East										
Exist.	545	53.2	1:9	100%	NONE	n/a	n/a	n/a	n/a	n/a
Addition	540	53.24	1:8	100%	5%	n/a	n/a	NO	NO	YES
West										
Exist.	545	6.16	1:9	25%	NONE	n/a	n/a	n/a	n/a	n/a
Addition	540	6.14	1:8	25%	0.85%	2	FIRE RATED INSULATED METAL PANEL	NO	NO	YES

21 Other-Describe

PLUMBING FIXTURES : (EXISTING) — 3.7.4.2-3.7.4.10 TABLE 3.7.4.9 (1) — 9.5.9.1

10	FEMALE OCCUPANTS	40	MALE OCCUPANTS
2	FIXTURES REQUIRED	3	FIXTURES REQUIRED
2	FIXTURES PROVIDED	3	FIXTURES PROVIDED
1	BARRIER FREE		
1	DRIVER'S AREA		

SHOWN
6 WATER CLOSET
1 URINAL
7 LAVATORY

FLOOR AREAS:

EXISTING :		
GROUND LEVEL	±4,766 m²	±51,301 ft²
MEZZANINE	±404 m²	±4,349 ft²
TOTAL EXISTING	±5,170 m²	±55,650 ft²
NEW ADDITION	4,721 m²	50,816 ft²
TOTAL EXIST. & ADDN.	9,891 m²	106,466 ft²

OVERALL GROUND FLOOR PLAN

SCALE 1:300

No.	DATE	REVISION
1	24/08/23	ISSUED FOR SITE PLAN APPROVAL

REVISIONS

KALOS ENGINEERING
300 YORK BLVD HAMILTON, ONTARIO L8R 3K6 905-333-9119

KLASSIC COCONUT

PROPOSED ADDITION

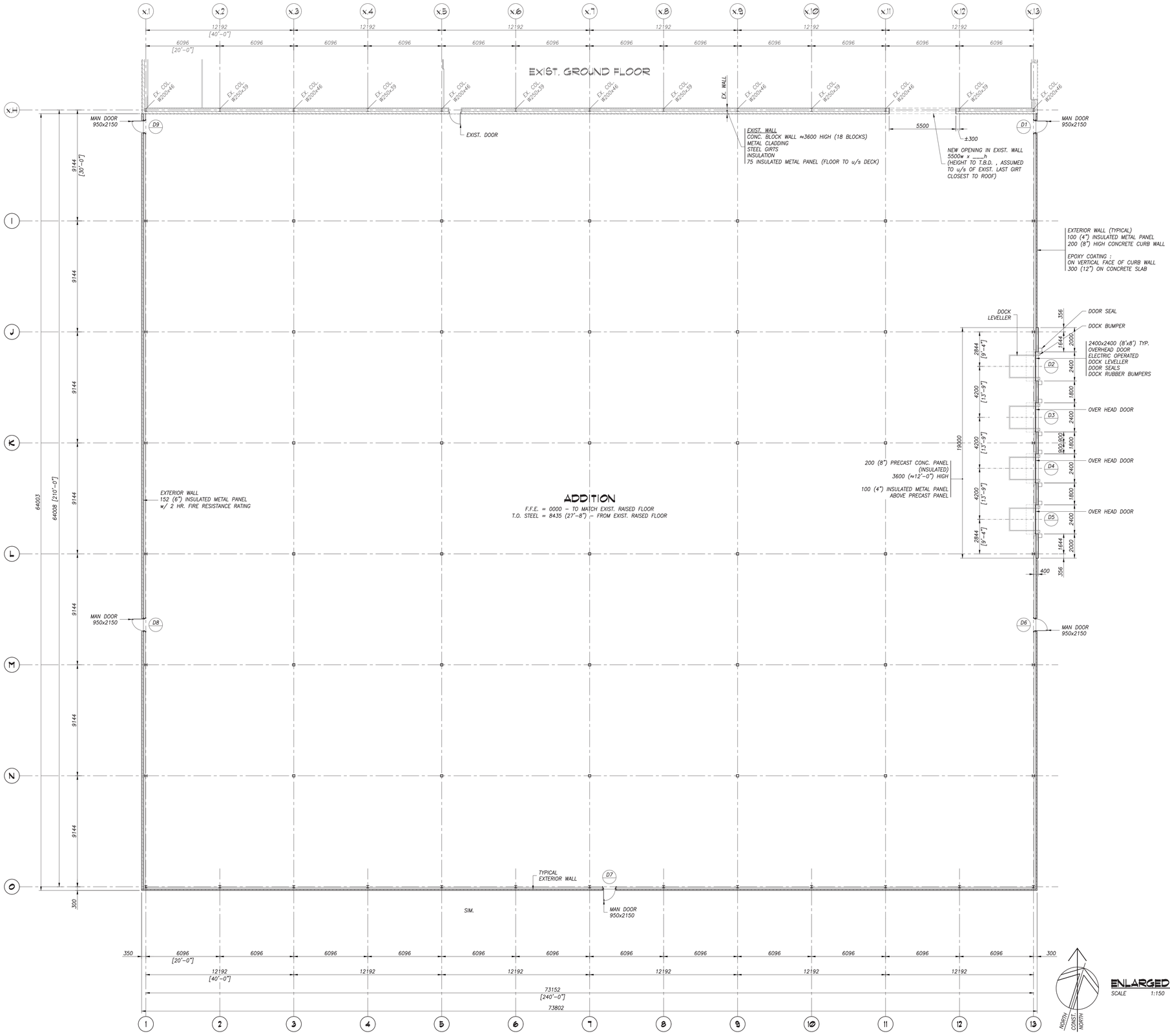
14 BOSWELL STREET
SIMCOE ONTARIO

FLOOR PLAN

DATE	DRAWN BY	DRAWING No.
NOVEMBER 2023	AL	A2.0
PROJECT No. 23190	CHECKED BY HAPH	

LICENSED PROFESSIONAL ENGINEER H.A.P. HUITEMA 24-08-28 PROVINCE OF ONTARIO

PLOT DATE: 2024/08/23 8:40 AM



ENLARGED FLOOR PLAN

SCALE 1:150

No.	DATE	REVISIONS
1	24/08/23	ISSUED FOR SITE PLAN APPROVAL

REVISIONS

KALOS ENGINEERING
300 YORK BLVD HAMILTON, ONTARIO L8R 3K6 905-333-9119

KLASSIC COCONUT

PROPOSED ADDITION

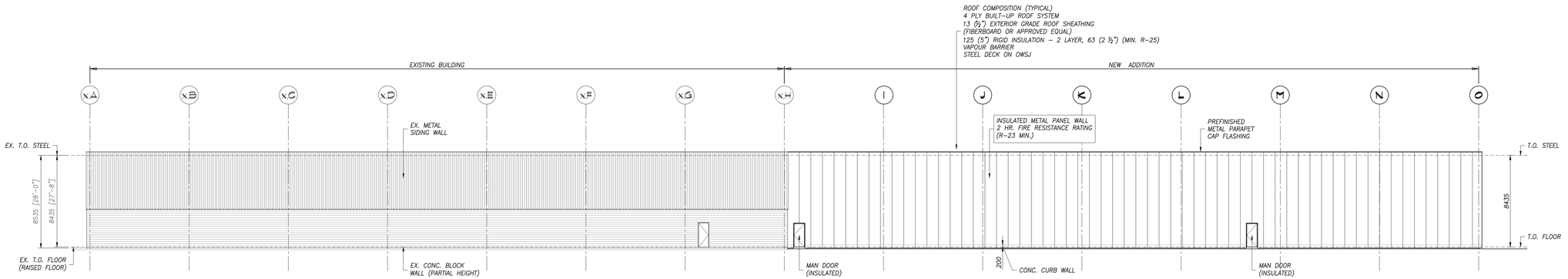
14 BOSWELL STREET
SIMCOE ONTARIO

ENLARGED FLOOR PLAN

LICENSED PROFESSIONAL ENGINEER
H.A.P. HUITEMA
24-08-28
PROVINCE OF ONTARIO

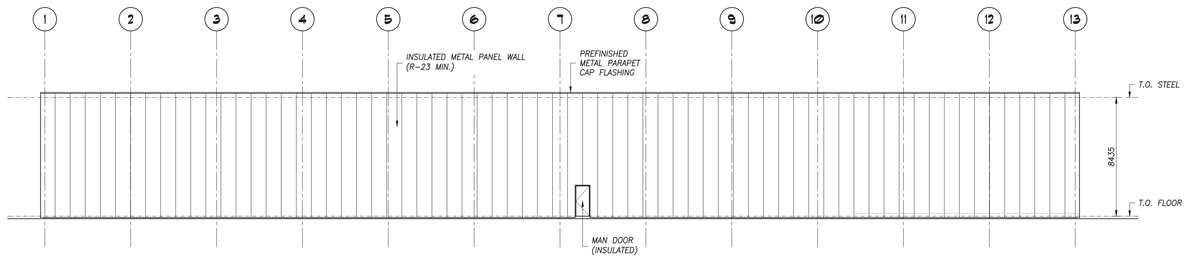
DATE	DRAWN BY	DRAWING No.
NOVEMBER 2023	AL	A2.1
PROJECT No.	CHECKED BY	
23190	HAPH	

PLOT DATE: 2024/08/23 8:42 AM



WEST ELEVATION

SCALE 1:200



SOUTH ELEVATION

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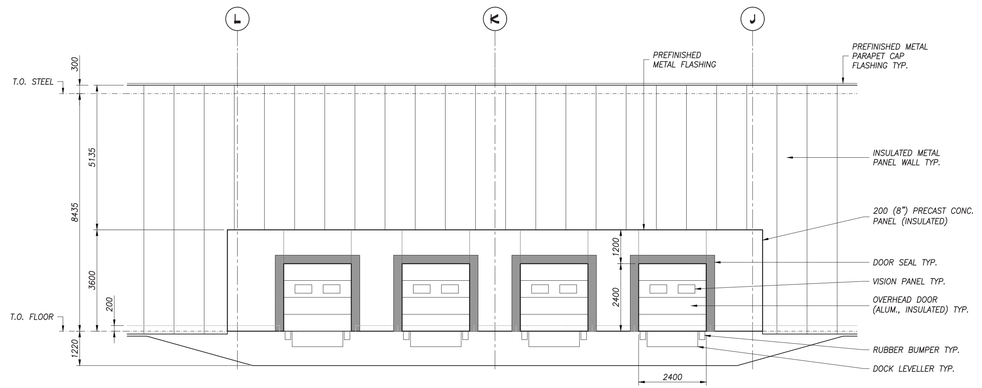
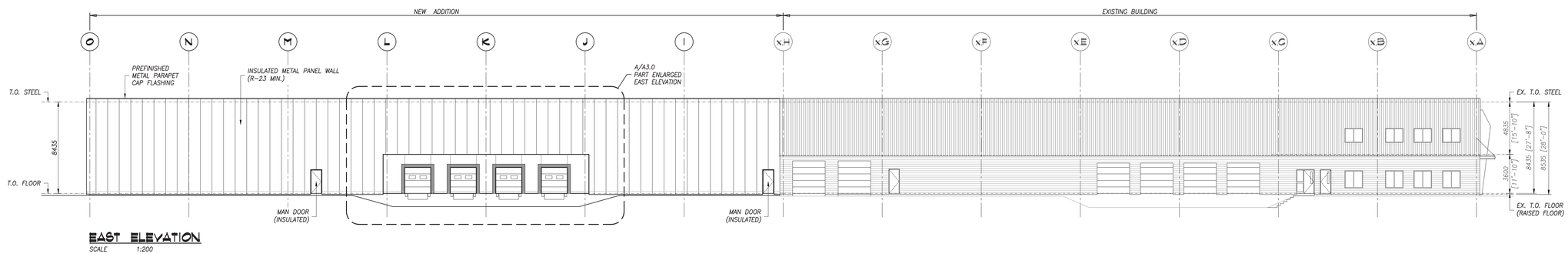


PART ENLARGED EAST ELEVATION @ OVERHEAD DOORS

A / A3.0

SCALE 1:100



EAST ELEVATION

SCALE 1:200

No.	DATE	REVISION
1	24/08/23	ISSUED FOR SITE PLAN APPROVAL

REVISIONS

KALOS ENGINEERING
300 YORK BLVD HAMILTON, ONTARIO L8R 3K6 905-333-9119

KLASSIC COCONUT

PROPOSED ADDITION

14 BOSWELL STREET

SIMCOE ONTARIO

ELEVATIONS

LICENSED PROFESSIONAL ENGINEER
H.A.P. HUITEMA
24-08-28
PROVINCE OF ONTARIO

DATE	DRAWN BY	DRAWING No.
NOVEMBER 2023	AL	A3.0
PROJECT No. 23190	CHECKED BY HAPH	

PLOT DATE: 2024/08/23 8:44 AM

DWG No.: ---- - C101
GRADING AND EROSION CONTROL PLAN
s:\23089\working\current\23089 - grading and servicing plan.dwg

GENERAL NOTES

1. THIS/THESE PLAN(S) IS/ARE NOT TO BE USED FOR CONSTRUCTION UNTIL SEALED BY THE ENGINEER AND INDICATED ISSUED FOR CONSTRUCTION ON THE DRAWING.
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4. EXISTING TOPOGRAPHIC AND LEGAL INFORMATION TAKEN FROM PLANS PREPARED BY JEWITT AND DIXON LTD.
5. SITE PLAN INFORMATION TAKEN FROM PLANS PREPARED BY KALOS ENGINEERING.
6. THIS/THESE PLAN(S) TO BE READ IN CONJUNCTION WITH THE FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT PREPARED BY S. LLEWELLYN AND ASSOCIATES LIMITED.
7. THIS (THESE) PLAN(S) TO BE USED FOR SERVICING AND GRADING ONLY, FOR BUILDING LOCATION REFER TO THE SITE PLAN.
8. MUNICIPAL APPROVAL OF THESE DRAWINGS IS FOR MATERIAL AND COMPLIANCE WITH CITY OF HAMILTON AND PROVINCIAL SPECIFICATIONS AND STANDARDS ONLY. APPROVAL AND INSPECTION OF THE WORKS BY THE CITY OF HAMILTON STAFF DOES NOT CERTIFY THE LINE AND GRADE OF THE WORKS NOR RELIEVE THE CONTRACTOR OF CERTIFICATION OF ALL WORKS BY THE OWNER'S ENGINEER.
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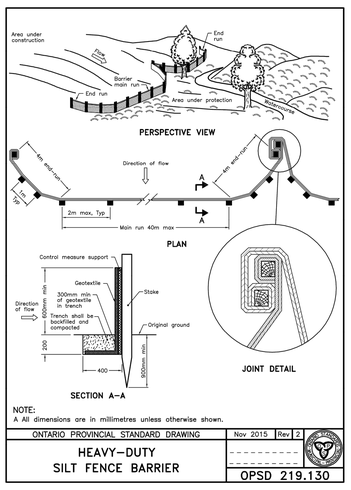
10. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNER'S BONDED CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS NORMALLY REQUIRED TO COMPLETE A CONSTRUCTION PROJECT, SUCH AS, BUT NOT LIMITED TO THE FOLLOWING:
    - ROAD CUT PERMITS
    - SEWER PERMITS
    - APPROACH APPROVAL PERMITS
    - RELOCATION OF SERVICES
    - COMMITTEE OF ADJUSTMENT
    - ENCROACHMENT AGREEMENTS
12. PRIOR TO CONSTRUCTION THE CONTRACTOR MUST:
    i. CHECK AND VERIFY ALL DIMENSIONS AND EXISTING ELEVATIONS WHICH INCLUDE BUT ARE NOT LIMITED TO THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS, EXISTING INVERTS AND REPORT FINDING IN WRITING TO THE ENGINEER.
    ii. OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.
    iii. VERIFY ALL FINISHED FLOOR ELEVATIONS AND BASEMENT FLOOR ELEVATIONS WHICH MAY APPEAR ON THESE PLANS COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.
    iv. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.
    v. NOTIFY THE ENGINEER OF THE PROPOSED CONSTRUCTION SCHEDULE FOR COORDINATION OF NECESSARY INSPECTIONS.
13. **THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE ENGINEER 48 HOURS PRIOR TO THE COMMENCING SITE WORKS TO ARRANGE FOR INSPECTION. THE ENGINEER SHALL DETERMINE THE EXTENT OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF THE UNDERGROUND SERVICE INSTALLATION AS MANDATED BY THE ONTARIO BUILDING CODE DIVISION C, PART 1, SECTION 1.2.2. GENERAL REVIEW. FAILURE TO MAKE SUITABLE ARRANGEMENTS FOR INSPECTION WILL LEAD TO POST CONSTRUCTION TESTING AND INSPECTION AS DETERMINED BY THE ENGINEER, THE COSTS OF WHICH INCLUDING ANY DELAYS IN CONSTRUCTION SHALL BE BORNE BY THE CONTRACTOR. FULL PAYMENT FOR UN-INSPECTED WORKS MAY BE WITHHELD UNTIL THE COMPLETION OF THE POST CONSTRUCTION INSPECTION AND TESTING TO THE SATISFACTION OF THE ENGINEER.**
14. INSPECTION BY THE OWNER'S ENGINEER IS FOR CERTIFICATION AND GENERAL CONFORMANCE PURPOSES AND DOES NOT CERTIFY LINE AND GRADE OR IMPLY AN ASSURANCE OF QUALITY CONTROL. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THE INSTALLATION OF THE WORKS TO PROPER LINE, GRADE AND QUALITY TO CURRENT INDUSTRY STANDARDS.
15. ANY UTILITY RELOCATIONS AND RESTORATIONS DUE TO THE DEVELOPMENT TO BE UNDERTAKEN AT THE EXPENSE OF THE OWNER/DEVELOPER AND SHALL BE COORDINATED BY THE CONTRACTOR.
16. ALL RESTORATIONS AND RECONSTRUCTIONS SHALL BE TO COMPLETED TO MATCH EXISTING CONDITIONS OR BETTER AND ARE TO BE PERFORMED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF HAMILTON.
17. SERVICING CONTRACTOR TO MAINTAIN A "CONFINED TRENCH CONDITION" IN ALL SEWER AND WATERMAIN INSTALLATION TRENCHES.
18. THE SITE SERVICING CONTRACTOR SHALL TERMINATE ALL SERVICES 1.0m FROM THE BUILDING FACE.
19. NO BLASTING WILL BE PERMITTED.

SILTATION AND EROSION CONTROL

A. SILTATION CONTROL BARRIERS SHALL BE PLACED AS DETAILED.
B. ALL SILTATION CONTROL MEASURES SHALL BE CLEANED AND MAINTAINED AFTER EACH RAINFALL AS DIRECTED AND TO THE SATISFACTION OF THE CITY OF HAMILTON AND/OR THE HAMILTON CONSERVATION AUTHORITY.
C. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE ENGINEER, THE CITY OF HAMILTON AND/OR THE HAMILTON CONSERVATION AUTHORITY.
D. ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED PRIOR TO DEVELOPMENT AND MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS, UNTIL ALL DISTURBED AREAS HAVE BEEN RE-ESTABLISHED.
E. ALL EROSION AND SEDIMENT CONTROL DEVICES SHOULD BE INSPECTED MINIMUM WEEKLY, AFTER EVERY RAINFALL AND MAINTAINED AND CLEANED AS REQUIRED.

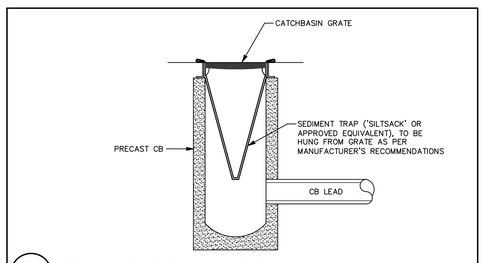
GRADING NOTES

A. ALONG ADJOINING PROPERTIES GRADE TO MEET EXISTING OR PROPOSED ELEVATIONS WITH SODDED SLOPES (MIN. 3H TO 1V) AND/OR RETAINING WALLS AS SPECIFIED.
B. ALL RETAINING WALLS, WALKWAYS, CURBS, ETC., SHALL BE PLACED A MIN. OF 0.45m OFF THE PROPERTY LINE. ALL WALLS 1.0M OR HIGHER SHALL BE DESIGNED BY A P.ENG.
C. SHOULD A RETAINING WALL BE REQUIRED, THE TOP OF WALL ELEVATIONS SHALL BE SET 150mm ABOVE THE PROPOSED SIDE YARD SWALES.
D. RETAINING WALLS 0.6m IN HEIGHT OR GREATER REQUIRE CONSTRUCTION OF A FENCE OR GUARD RAIL AT THE TOP OF THE REAR OF THE WALL. GUARDS FOR RETAINING WALLS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF EXTERIOR GUARDS AS CONTAINED IN THE ONTARIO BUILDING CODE.
E. TOP OF FOUNDATION WALLS FOR BUILDINGS SHALL BE 150mm (MIN) ABOVE FINISHED GRADE.
F. DRIVEWAY SLOPES SHALL NOT BE LESS THAN 2% AND NOT MORE THAN 7.0% REVERSED SLOPED DRIVEWAYS IN NEW DEVELOPMENTS ARE NOT PERMITTED.
G. IF GRADING IS REQUIRED ON LANDS ADJACENT TO THE DEVELOPMENT WHICH ARE NOT OWNED BY THE DEVELOPER, THEN THE DEVELOPER MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNER TO ALLOW THE DEVELOPER TO GRADE ON THE ADJACENT LANDS, OTHERWISE RETAINING WALLS MUST BE USED.
H. THE WRITTEN PERMISSION REQUIRED FROM THE ADJACENT LANDOWNER SHALL BE OBTAINED PRIOR TO ENTERING THE LANDS. SHOULD PERMISSION NOT BE OBTAINED OR IS WITHDRAWN PRIOR TO COMMENCING THE WORK, THEN THE DEVELOPER SHALL LIMIT HIS ACTIVITIES TO THE LIMITS OF THE DEVELOPMENT SITE.
I. DRIVEWAY AND DRIVEWAY APPROACHES SHALL BE LOCATED SUCH THAT HYDRO VAULTS AND OTHER STREET FURNITURE ARE A MIN. OF 1.2m FROM THE PROJECTIONS OF THE OUTSIDE GARAGE WALLS.
J. ANY CHANGES IN GRADES AND CATCH BASINS REQUIRE THE APPROVAL OF THE CITY'S MANAGER OF DEVELOPMENT ENGINEERING.
K. ALL DRIVEWAYS FROM PROPERTY LINES FOR THE FIRST 7.5m SHALL BE WITHIN 5% MAXIMUM GRADE, THEREAFTER, ALL DRIVEWAYS SHALL BE WITHIN 10% MAXIMUM GRADES.

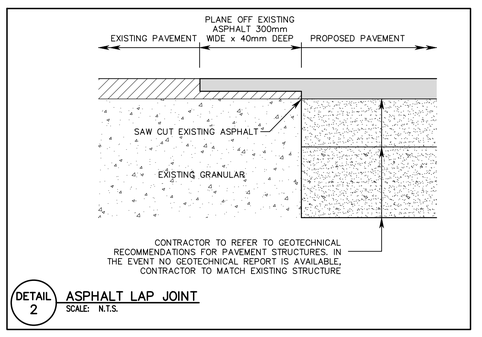


NOTE:
A All dimensions are in millimetres unless otherwise shown.

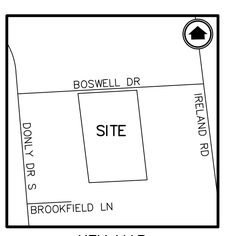
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
HEAVY-DUTY SILT FENCE BARRIER		OPSD 219.130



DETAIL 1 — STREET CATCH BASIN SEDIMENT TRAP
SCALE: N.T.S.



DETAIL 2 — ASPHALT LAP JOINT
SCALE: N.T.S.



KEY MAP
N.T.S.

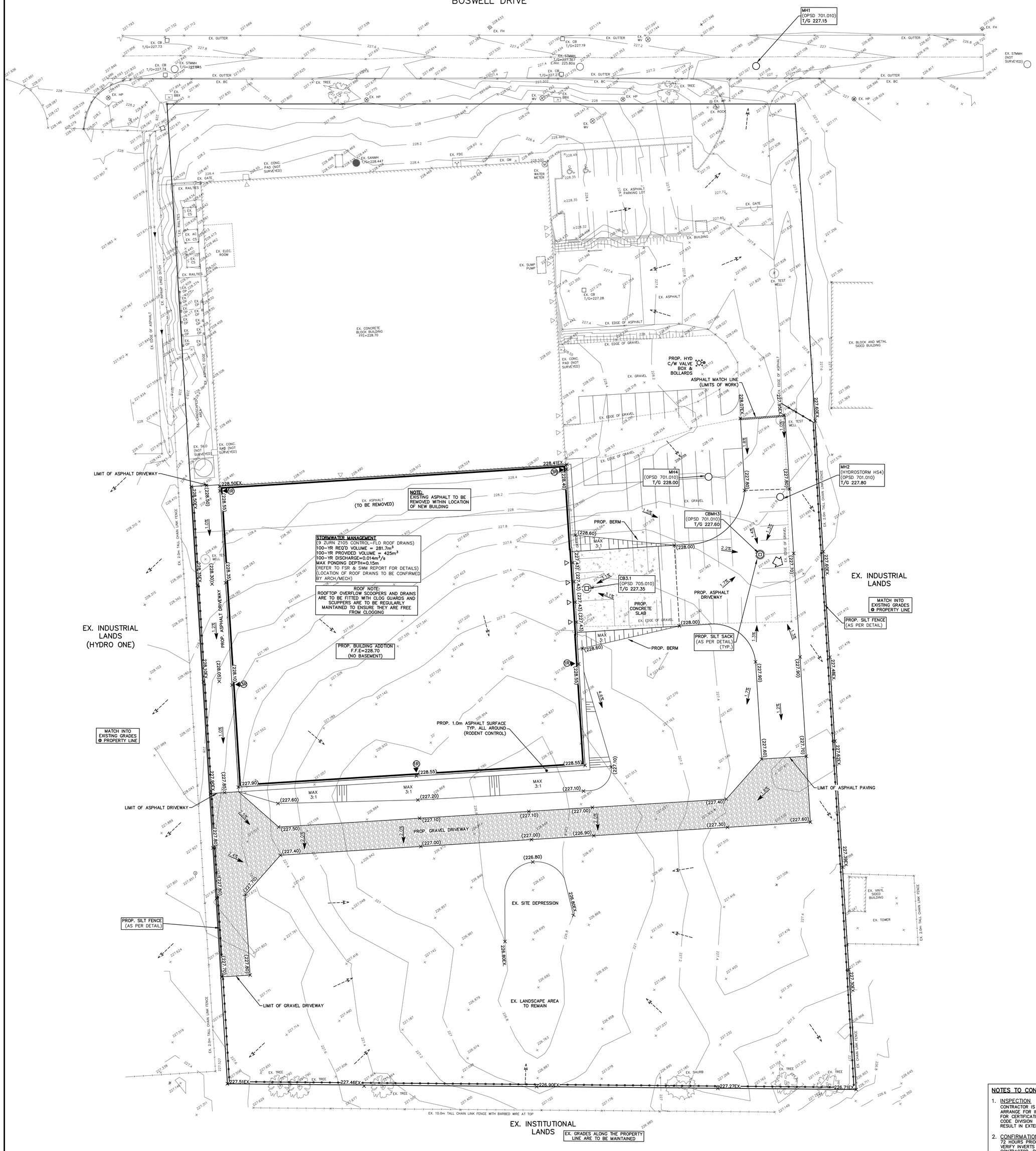
BENCH MARK NOTE:

ELEVATIONS SHOWN ARE GEODETIC.
BM1-TOP OF SOUTH OUTLET OF FIRE HYDRANT NO.263=EL. 228.633
BM2-TOP OF SOUTH OUTLET OF FIRE HYDRANT NO.264=EL. 227.866

LEGEND:

- 209.00 — EXISTING GROUND ELEVATION
- ×(209.00) — PROPOSED GROUND ELEVATION
- ×209.00EX — PROPOSED ELEVATION TO MATCH EXISTING
- 2.0% — PROPOSED DIRECTION OF SHEET FLOW
- EXISTING CATCHBASIN
- EXISTING STORM/SANITARY MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED STORM/SANITARY MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CURB STOP/GATE VALVE
- EXISTING DIRECTION OF DRAINAGE
- PROPOSED EMERGENCY OVERLAND FLOW ROUTE
- (TOP) 3:1 MAX (BOTTOM) — EMBANKMENT (SLOPE AS NOTED)
- PROPOSED BAY DOOR
- PROPOSED MAIN DOOR
- PROPOSED SILTATION CONTROL FENCE
- PROPOSED CATCHBASIN SILT SACK
- PROPOSED DRAINAGE BREAK LINE
- FFE=100.00 — PROPOSED FINISHED FLOOR ELEVATION

BOSWELL DRIVE



NOTES TO CONTRACTOR:

1. **INSPECTION**
   CONTRACTOR IS RESPONSIBLE FOR CONTACTING ENGINEER 48 HRS PRIOR TO COMMENCING WORK TO ARRANGE FOR INSPECTION. ENGINEER TO DETERMINE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION AS MANDATED BY ONTARIO BUILDING CODE DIVISION C, PART 1, SECTION 1.2.2, GENERAL REVIEW. FAILURE TO NOTIFY ENGINEER WILL RESULT IN EXTENSIVE POST CONSTRUCTION INSPECTION AT CONTRACTORS EXPENSE.
2. **CONFIRMATION OF EXISTING INVERTS**
   72 HOURS PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS TO LOCATE, EXPOSE AND VERIFY INVERTS OF EXISTING UTILITIES AND EXISTING SEWERS AT CONNECTION POINTS. SHOULD THE CONTRACTOR PROCEED WITHOUT COMPLETING THESE LOCATES, EXTRA COSTS RESULTING FROM DELAYS AND STANDBY TIME WILL NOT BE CONSIDERED.

NOTES TO CONTRACTOR:

1. CONTRACTORS AND SUBCONTRACTORS SHALL NOT SCALE FROM THIS DRAWING.
2. ANY INCONSISTENCIES AND OMISSIONS FOUND ON THE DRAWINGS MUST BE REPORTED TO THE ENGINEER FOR CLARIFICATION BEFORE COMMENCING THE WORK.
3. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND ELEVATIONS AND REPORT ALL FINDINGS TO THE ENGINEER. ONCE CONSTRUCTION HAS COMMENCED, THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL DIMENSIONS, ELEVATIONS, AND SITE CONDITIONS.
4. THE POSITIONS OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVER-GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS. WHERE SHOWN ON THE DRAWING, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
5. ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED, REUSED, OR REVISED WITHOUT THE WRITTEN CONSENT OF S. LLEWELLYN AND ASSOCIATES LIMITED.

NO.	DATE	BY	REVISIONS

DESIGN	YM	CHK'D	SF	DATE
DRAWN	YM	CHK'D	SF	May 14, 2024

APPROVALS

STAMP: LICENSED PROFESSIONAL ENGINEER — S.V. FRANKOWICH — 14/05/2024 — PROVINCE OF ONTARIO

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS
Tel. (905) 631-6978
Website: www.sla.on.ca
email: info@sla.on.ca
3228 South Service Road, Suite #105 East Wing, Burlington, Ont., L7N 3H8

CLIENT: KALOS ENGINEERING INC.

PROJECT NAME: 14 BOSWELL DRIVE
SIMCOE, ON

TITLE: GRADING & EROSION CONTROL PLAN

PROJECT No. 23089 | DRAWING No. C101

SCALE 1:300 (0, 5, 10, 20, 30)

s:\23089\working\current\23089 - grading and servicing plan.dwg
Plotted: May 14, 2024 1:21:53 PM, By: Yognik Moradiya

DWG No.: ---- - C102

SITE SERVICING PLAN

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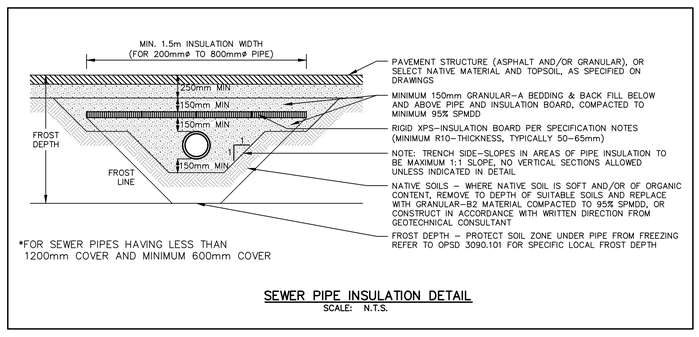
18. THE SITE SERVICING CONTRACTOR SHALL TERMINATE ALL SERVICES 1.0m FROM THE BUILDING FACE.
19. NO BLASTING WILL BE PERMITTED.

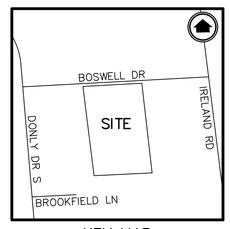
SEWERS

1. SANITARY AND STORM SEWERS
    A. CONSTRUCTION OF SANITARY & STORM SEWERS & PRIVATE DRAINS SHALL BE IN ACCORDANCE WITH CITY STANDARDS & SPECIFICATIONS (LATEST EDITION) AND MINISTRY OF ENVIRONMENT (MOE) GUIDELINES (LATEST EDITION).
    B. COVER AND BEDDING MATERIAL FOR CONCRETE PIPE SHALL BE GRANULAR 'A' MATERIAL AS PER OPSD 802.030 OR 802.033, CLASS 'B' BEDDING.
    C. COVER AND BEDDING MATERIAL FOR PVC PIPE SHALL BE GRANULAR 'A' MATERIAL AS PER OPSD 802.010 OR 802.013.
    D. PVC PIPE WILL REQUIRE SPECIAL CONSTRUCTION PROCEDURES AS PER CITY SPECIFICATIONS.
    E. ALL SEWERS TO BE VIDEO INSPECTED AS PER OPSS 409.
    F. ALL SEWERS TO BE FLUSHED PRIOR TO VIDEO INSPECTION.
    G. MANHOLE FRAMES AND COVERS SHALL BE AS PER OPSD 401.010 (STORM-OPEN, SANITARY-CLOSED).
    H. CATCHBASIN FRAMES AND GRATES SHALL BE AS PER OPSD 400.100 IN PAVED AREA AND 400.120 IN LANDSCAPED AREAS.
    I. ALL REAR LOT CATCHBASINS SHALL BE SUMPLESS AND HAVE NO GOSS TRAPS.
    J. SANITARY SEWERS 200mm TO 375mm IN DIAMETER SHALL BE PVC PIPE, CSA B182.2. SDR-35.
    K. STORM SEWERS 250mm TO 600mm IN DIAMETER SHALL BE PVC PIPE, CSA B182.2, SDR-35.
    L. STORM SEWERS GREATER THAN 600mm IN DIAMETER SHALL BE CONCRETE PIPE, CSA A257.2 (AS SPECIFIED).
    M. ALL PVC STORM SEWERS ARE TO BE TESTED FOR DEFLECTION (MANDREL PASSAGE) AFTER INSTALLATION AS PER OPSS 410. SANITARY SEWERS SHALL BE TESTED FOR DEFLECTION (MANDREL PASSAGE) AND LEAKAGE (LOW AIR PRESSURE METHOD) AS PER OPSS 410. PRIOR TO ASSUMPTION BY THE CITY, PIPE DEFLECTION TESTING SHALL BE REPEATED.
    N. N. CLEANOUTS CAN ONLY BE PROVIDED FOR SEWERS CONTAINING A SIZE OF 150mm IN DIAMETER OR SMALLER. CLEANOUTS SHALL BE PROVIDED AT EACH CHANGE IN PIPE ALIGNMENT (VERTICAL AND HORIZONTAL), AND AT ANY CHANGE IN PIPE SIZE OR MATERIAL.
2. PRIVATE DRAINS
    A. PRIVATE DRAINS TO BE 150mmø PVC PIPE, CSA B182.1 M-1983, SDR 28 AS PER FORM 500. STORM PIPE SHALL BE WHITE AND SANITARY SHALL BE ANY COLOUR OTHER THAN WHITE. WOOD MARKING AT END OF SANITARY PRIVATE DRAIN SHALL BE PAINTED RED.
    B. COVER AND BEDDING MATERIAL FOR PRIVATE DRAINS SHALL BE GRANULAR 'A' INSTALLED AS PER OPSD 802.010 OR 802.013.
    C. MINIMUM FALL FOR PRIVATE DRAINS TO BE 2.0%.
    D. TOP OF SANITARY PRIVATE DRAINS AT STREET LINE TO BE 2.2M (MIN.) BELOW CENTERLINE ROAD ELEVATION AT THAT POINT OR AS DETAILED.
    E. TOP OF STORM PRIVATE DRAINS AT STREET LINE TO BE 1.2M (MIN.) BELOW CENTERLINE ROAD ELEVATION AT THAT POINT OR AS DETAILED.
    F. BUILDING RAINWATER LEADERS SHALL NOT BE CONNECTED TO THE STORM PRIVATE DRAIN BUT SHALL DISCHARGE ONTO THE GROUND SURFACE VIA SPLASH PADS.



*FOR SEWER PIPES HAVING LESS THAN 1200mm COVER AND MINIMUM 600mm COVER

SEWER PIPE INSULATION DETAIL
SCALE: N.T.S.



KEY MAP
N.T.S.

BENCH MARK NOTE:

ELEVATIONS SHOWN ARE GEODETIC.
BM1-TOP OF SOUTH OUTLET OF FIRE HYDRANT NO.263=EL. 228.633
BM2-TOP OF SOUTH OUTLET OF FIRE HYDRANT NO.264=EL. 227.866

LEGEND:

- EXISTING CATCHBASIN
- EXISTING STORM/SANITARY MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED STORM/SANITARY MANHOLE
- PROPOSED ROAD RESTORATION
- FFE=100.00 PROPOSED FINISHED FLOOR ELEVATION
- PROPOSED CURB STOP/GATE VALVE
- PROPOSED BAY DOOR
- PROPOSED MAIN DOOR
- PROPOSED SEWER INSULATION

BOSWELL DRIVE

PROP. DOGHOUSE MH1 TO BE PLACED OVER EX. 600mmø STM SEWER. (OPSD 701.010) T/G 227.15 EX. E.INV. 225.61 EX. W.INV. 225.61 PROP. S.INV. 225.71

SAWCUT, REMOVE & RESTORE EX. ASPHALT & CONCRETE TO EXISTING CONDITION OR BETTER (AS PER NORFOLK COUNTY STANDARD)

EX. 300mmø WTM
EX. FH
EX. GUTTER
EX. CB T/G=227.73
EX. CB T/G=227.19
EX. WV
EX. CENTRELINE OF ROAD
EX. STMMH T/G=227.845
EX. STMMH T/G=227.367 E.INV. 225.80±
EX. 250mmø FIRE WTM (APPROX. LOCATION)
EX. 85.0m-600mmø STM @ 0.5%±
EX. 95.0m-600mmø STM @ 0.5%±
EX. STMMH (NOT SURVEYED)
EX. CB T/G=227.74
EX. CB T/G=227.27
EX. BC
EX. TREE
EX. HP
EX. BBX
EX. OVERHEAD HYDRO
EX. WP
EX. ROCK
EX. 50mmø DOM. WTM SERVICE (APPROX. LOCATION)
PROP. 150mmø WATERMAIN
45° BEND
250 TO 150mm REDUCER
EX. FORCEMAIN (NOT SURVEYED)
EX. GAS SERVICE
EX. CONCRETE PUMPHOUSE
EX. SANMH T/G=228.447
EX. FDC
EX. GM
EX. CONC. PAD (NOT SURVEYED)
EX. GATE
EX. WATER METER
EX. 150mmø SAN. SERVICE
EX. RAILTIES
EX. ASPHALT PARKING LOT
EX. 200mmø STM (APPROX. LOCATION)
EX. BUILDING
EX. CS
EX. AC
EX. ELEC. ROOM
EX. 75mmø STM
EX. SUMP PUMP
EX. 150mmø STM (APPROX. LOCATION)
EX. CB T/G=227.28
EX. ASPHALT
EX. TEST WELL
EX. EDGE OF ASPHALT
EX. RIPRAP LINED DITCH
EX. EDGE OF GRAVEL
EX. CONCRETE BLOCK BUILDING FFE=228.70
EX. CONC. PAD (NOT SURVEYED)
PROP. HYD C/W VALVE BOX & BOLLARDS
EX. GRAVEL
ASPHALT MATCH LINE (LIMITS OF WORK)
92.0m-300mmø STM @ 0.4%
EX. BLOCK AND METAL SIDED BUILDING
EX. ASPHALT EDGE
EX. LANDSCAPED AREA
EX. SILO (NOT SURVEYED)
EX. CONC. PAD (NOT SURVEYED)
MH4 (OPSD 701.010) T/G 228.00 W.INV. 226.52 E.INV. 226.49
MH2 (HYDROSTORM HS4) (OPSD 701.010) T/G 227.80 N.INV. 226.08 S.INV. 226.11
30.0m-250mmø STM @ 0.6%
15.0m-250mmø STM @ 0.6%
INV. 226.40
EX. 2.0m TALL CHAIN LINK FENCE
LIMIT OF ASPHALT DRIVEWAY
INV. 226.70
NOTE: EXISTING ASPHALT TO BE REMOVED WITHIN LOCATION OF NEW BUILDING
EX. ASPHALT (TO BE REMOVED)
PROP. SEWER INSULATION (WHERE SEWER HAS LESS THAN 1.2m COVER) (AS PER DETAIL)
CB3.1 (OPSD 705.010) T/G 227.35 INV. 226.41
13.0m-300mmø STM @ 0.4%
CBMH3 (OPSD 701.010) T/G 227.60 N.INV. 226.16 W.INV. 226.22
37.5m-250mmø STM @ 0.5%
PROP. ASPHALT DRIVEWAY
PROP. CONCRETE SLAB
EX. INDUSTRIAL LANDS
EX. INDUSTRIAL LANDS (HYDRO ONE)
STORMWATER MANAGEMENT
(9 ZURN Z105 CONTROL-FLO ROOF DRAINS)
100-YR REQ'D VOLUME = 281.7m³
100-YR PROVIDED VOLUME = 425m³
100-YR DISCHARGE=0.014m³/s
MAX PONDING DEPTH=0.15m
(REFER TO FSR & SWM REPORT FOR DETAILS)
(LOCATION OF ROOF DRAINS TO BE CONFIRMED BY ARCH/MECH)
ROOF NOTE:
ROOFTOP OVERFLOW SCOOPERS AND DRAINS ARE TO BE FITTED WITH CLOG GUARDS AND SCUPPERS ARE TO BE REGULARLY MAINTAINED TO ENSURE THEY ARE FREE FROM CLOGGING
PROP. BUILDING ADDITION F.F.E=228.70 (NO BASEMENT)
NOTE: SANITARY & WATER SERVICES FOR THE PROPOSED BUILDING ARE TO CONNECT TO EX. MECHANICAL SYSTEM. (REFER TO MECHANICAL DRAWINGS)
PROP. 1.0m ASPHALT SURFACE TYP. ALL AROUND (RODENT CONTROL)
LIMIT OF ASPHALT PAVING
LIMIT OF ASPHALT DRIVEWAY
PROP. GRAVEL DRIVEWAY
EX. LP
EX. VINYL SIDED BUILDING
EX. TOWER
LIMIT OF GRAVEL DRIVEWAY
EX. TREE
EX. SHURB
EX. 10.0m TALL CHAIN LINK FENCE WITH BARBED WIRE AT TOP
EX. INSTITUTIONAL LANDS

NOTES TO CONTRACTOR:

1. INSPECTION
   CONTRACTOR IS RESPONSIBLE FOR CONTACTING ENGINEER 48 HRS PRIOR TO COMMENCING WORK TO ARRANGE FOR INSPECTION. ENGINEER TO DETERMINE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION AS MANDATED BY ONTARIO BUILDING CODE DIVISION C, PART 1, SECTION 1.2.2, GENERAL REVIEW. FAILURE TO NOTIFY ENGINEER WILL RESULT IN EXTENSIVE POST CONSTRUCTION INSPECTION AT CONTRACTORS EXPENSE.
2. CONFIRMATION OF EXISTING INVERTS
   72 HOURS PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS TO LOCATE, EXPOSE AND VERIFY INVERTS OF EXISTING UTILITIES AND EXISTING SEWERS AT CONNECTION POINTS. SHOULD THE CONTRACTOR PROCEED WITHOUT COMPLETING THESE LOCATES, EXTRA COSTS RESULTING FROM DELAYS AND STANDBY TIME WILL NOT BE CONSIDERED.

NOTES TO CONTRACTOR:

1. CONTRACTORS AND SUBCONTRACTORS SHALL NOT SCALE FROM THIS DRAWING.
2. ANY INCONSISTENCIES AND OMISSIONS FOUND ON THE DRAWINGS MUST BE REPORTED TO THE ENGINEER FOR CLARIFICATION BEFORE COMMENCING THE WORK.
3. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND ELEVATIONS AND REPORT ALL FINDINGS TO THE ENGINEER. ONCE CONSTRUCTION HAS COMMENCED, THE CONTRACTOR ACCEPTS RESPONSIBILITY FOR ALL DIMENSIONS, ELEVATIONS, AND SITE CONDITIONS.
4. THE POSITIONS OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVER-GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS. WHERE SHOWN ON THE DRAWING, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
5. ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED, REUSED, OR REVISED WITHOUT THE WRITTEN CONSENT OF S. LLEWELLYN AND ASSOCIATES LIMITED.

NO.	DATE	BY	REVISIONS
.	.	.	.

DESIGN	YM	CHK'D	SF	DATE: May 14, 2024
DRAWN	YM	CHK'D	SF	

APPROVALS

STAMP: LICENSED PROFESSIONAL ENGINEER, S.V. FRANKOVICH, 14/05/2024, PROVINCE OF ONTARIO

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS
Tel. (905) 631-6978
Website: www.sla.on.ca
email: info@sla.on.ca
3228 South Service Road, Suite #105 East Wing, Burlington, Ont., L7N 3H8

CLIENT: KALOS ENGINEERING INC.

PROJECT NAME: 14 BOSWELL DRIVE, SIMCOE, ON

TITLE: SITE SERVICING PLAN

PROJECT No.: 23089

DRAWING No.: C102

SCALE: 1:300 (0 5 10 20 30)

s:\23089\working\current\23089 - grading and servicing plan.dwg
Plotted: May 14, 2024 1:17:02 PM, By: Yagnik Moradiya

TOPOGRAPHIC SITE PLAN

OF

LOT 3
CONCESSION 5

IN THE GEOGRAPHIC

TOWNSHIP OF WOODHOUSE

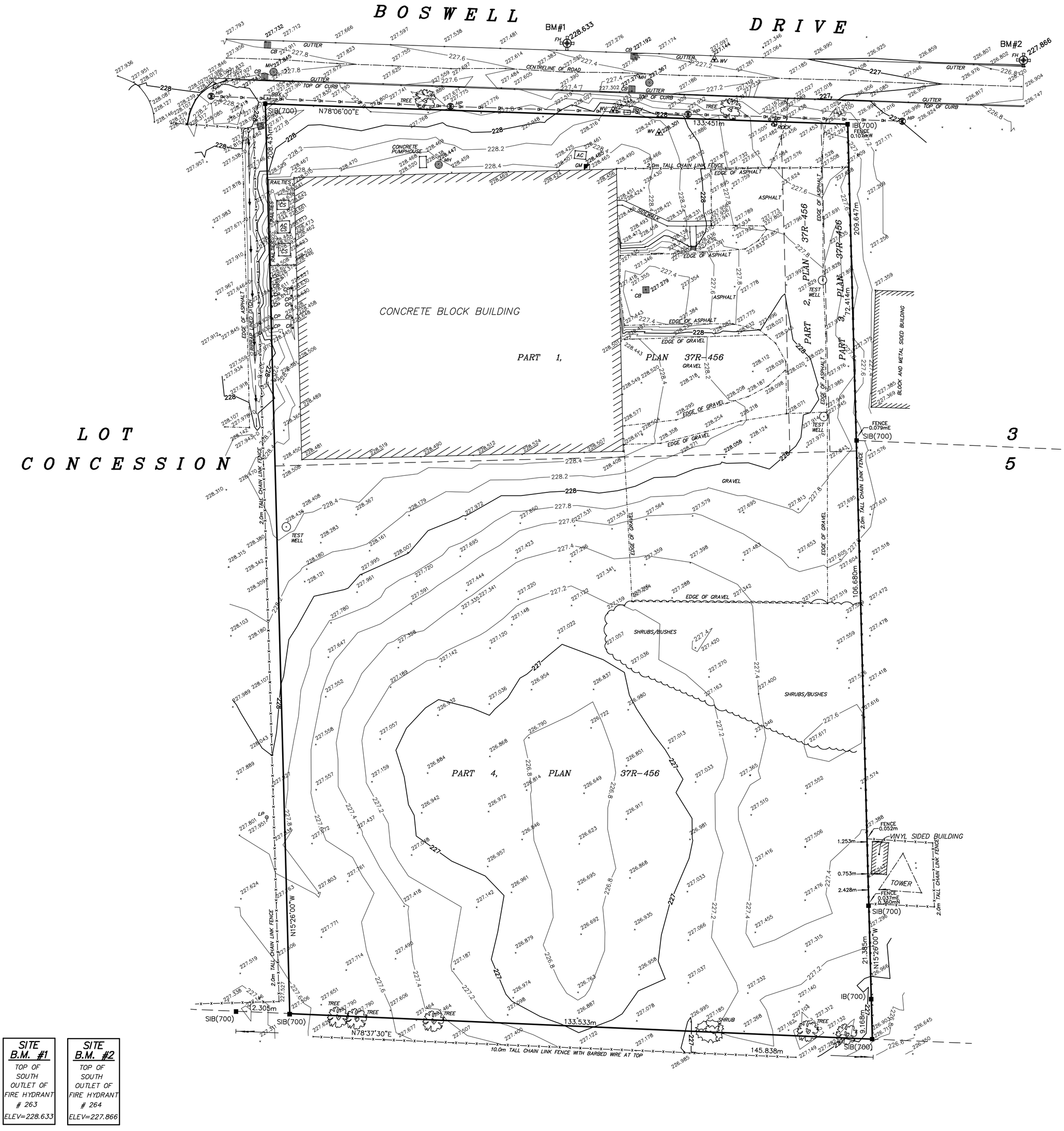
IN

NORFOLK COUNTY

SCALE: 1 : 500

5 0 20 METRES

JEWITT AND DIXON LTD.



SITE B.M. #1	SITE B.M. #2
TOP OF SOUTH OUTLET OF FIRE HYDRANT # 263	TOP OF SOUTH OUTLET OF FIRE HYDRANT # 264
ELEV=228.633	ELEV=227.866

LEGEND

STANDARD IRON BAR	SHOWN	SIB ■
IRON BAR	SHOWN	IB ■
ROUND IRON BAR	SHOWN	IB ⌀ ■
4' HIGH CHAINLINK FENCE	SHOWN	-X-X-X-
EDGE OF ASPHALT/GRAVEL	SHOWN	— · — · — · —
CENTRE LINE	SHOWN	——— – ———
GUY WIRE	SHOWN	⟶
AIR CONDITIONER UNIT	SHOWN	A/C
BELL BOX	SHOWN	BBX □
BENCH MARK	SHOWN	BM ⦿
BORE HOLE	SHOWN	BH ⊗
BUILDING CORNER	SHOWN	BDG
CONCRETE SLAB	SHOWN	CS
CATCH BASIN	SHOWN	CB ▥
CONCRETE PIERS	SHOWN	CP ∘
DOOR	SHOWN	D
ROOF DRAIN PIPE	SHOWN	DS ○
DRYER VENT	SHOWN	DV ▭
ELECTRICAL OUTLET	SHOWN	E/O ⌽
FOUNDATION ELEVATION	SHOWN	FND
FIRE HYDRANT	SHOWN	FH ✣
GAS SERVICE	SHOWN	G
GAS METER	SHOWN	GM ◩
OVERHEAD HYDRO LINE	SHOWN	HL
HYDRO METER	SHOWN	HM ◩
HYDRO POLE	SHOWN	HP ⊗
HOSE BIB	SHOWN	HB
HYDRO POLE WITH LIGHT	SHOWN	HPLS ○
LIGHT POST	SHOWN	LP ⚲
WATER METER	SHOWN	M
MANHOLE	SHOWN	MH ▨
DOOR SILL ELEVATION	SHOWN	SILL
SHRUBS	SHOWN	SHB
TREE (CONIFEROUS)	SHOWN	TRC (dia.)
TREE (DECIDUOUS)	SHOWN	TRD (dia.)
UNDERGROUND HYDRO SERVICE	SHOWN	UHS
WATER VALVE	SHOWN	WV ⧊
WOOD POST	SHOWN	WP

CONTOUR INTERVAL IS 0.200m

ELEVATIONS SHOWN HEREON ARE IN METRES AND ARE BASED ON A GEODETIC DATUM.

NOTE:

THE VARIOUS UTILITY LOCATIONS SHOWN ON THIS PLAN ARE BASED ON PHYSICAL LOCATES PROVIDED BY THE RESPECTIVE UTILITY COMPANIES.

CABLE T.V. LOCATE INFORMATION IS BASED ON DOCUMENTARY DATA SUPPLIED BY AMTELECOM COMMUNICATIONS AND NOT BY FIELD LOCATES.

PRIOR TO ANY ON SITE CONSTRUCTION ACTIVITY A VERIFICATION LOCATE IS BOTH RECOMMENDED AND ADVISED.

METRIC NOTE:

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

DATED: AUGUST 29, 2013

KIM HUSTED
ONTARIO LAND SURVEYOR

JEWITT AND DIXON LTD.
ONTARIO LAND SURVEYORS
R.R.1, SIMCOE, ONTARIO, N3Y 4J9
(51 PARK ROAD)
PHONE: (519) 426-0842 FAX: (519) 426-1034
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F.W.	J.P.H.
BOOK	LL-FILE
CALC.	J.L.M.
PLAN	J.L.M.
CHECK	R.C.D.
CLIENT	SCHILTHUIS
JOB No.	13-390

P13 06 A9788

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

Functional Servicing and Stormwater Management Report

14 BOSWELL DRIVE

KLASSIC COCONUT
INDUSTRIAL BUILDING ADDITION

NORFOLK COUNTY
TOWN OF SIMCOE

KALOS ENGINEERING INC.

May 2024
SLA File: 23089

3228 South Service Road, Suite 105, East Wing Burlington, Ontario L7N 3H8
Tel. (905) 631-6978 www.sla.on.ca

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APPENDICES

1.0 INTRODUCTION AND BACKGROUND

1.1 OVERVIEW

S. Llewellyn & Associates Limited has been retained by Kalos Engineering Incorporated to provide consulting engineering services for the proposed industrial development at 14 Boswell Drive in the Town of Simcoe (see Figure 1.0 for location plan). This report will outline the servicing and stormwater management strategy for the proposed development.

The proposed development consists of constructing an addition to the existing industrial building. This site will also include associated asphalt/gravel driveways and landscaped areas.

This Function Servicing and Stormwater Management Report will provide detailed information of the proposed servicing and stormwater management scheme for this development. Please refer to the Site Engineering plans prepared by S. Llewellyn & Associates Limited and the Site Plan provided by Kalos Engineering Incorporated for additional information.

1.2 BACKGROUND INFORMATION

The following documents were referenced in the preparation of this report:

Ref. 1: MOE Stormwater Management Practices Planning and Design Manual (Ministry of Environment, March 2003)

Ref. 2: The Corporation of Norfolk County Design Criteria (February 2019)

Figure 1.0 – Location Plan

2.0 STORMWATER MANAGEMENT

The following stormwater management (SWM) criteria will be applied to the site, in accordance with the Norfolk County Pre-consultation notes.

Quantity Control

The stormwater discharge rate from the proposed site shall be controlled to the existing conditions discharge rates for all storm events up to and including the 100-year event.

Quality Control

The stormwater runoff from the proposed condition site must meet Level 1 (Enhanced) stormwater quality control (80% TSS removal, 95% average annual runoff treatment).

Erosion Control

Erosion and sediment control measures will be implemented in accordance with the standards of the Norfolk County.

2.1 EXISTING CONDITIONS

Under existing condition, 2.79ha site is occupied by a coconut products manufacturing facility, with associated asphalt/gravel driveways and parking lots, concrete curbing/sidewalks, and landscaped areas. The site is bound by Boswell Drive to the north, existing industrial lands to the east and to the west and existing institutional lands to the south.

The existing topography of the site is split with the majority of the property generally sloping in the south direction where the stormwater runoff sheet drains to the existing site depression and ultimately infiltrating into the ground. The remainder of the site's stormwater runoff is captured by the existing catchbasin located in the loading area of the existing building and is conveyed to the existing 600mmø storm sewer on Boswell Drive.

Five (5) catchment areas have been identified in the existing conditions. See Table 2.1 below and the Pre-Development Storm Drainage Area Plan in Appendix A for details.

Catchment 101 represents the drainage area from existing asphalt /gravel parking lot and building roof which is captured by the existing catchbasin located in the loading area of the existing building and ultimately discharges to the existing 600mmø storm sewer along Boswell Drive.

Catchment 102 and Catchment 103 represent the existing conditions drainage area for the existing gravel parking lot and landscaped area which sheet drains uncontrolled in the south direction to the existing site depression which ultimately infiltrates into the ground.

Catchment 104 represents existing conditions drainage area for the landscaped area which sheet drains west towards neighbouring industrial lands.

Catchment 105 represents existing condition drainage area for the landscaped area which sheet drains east towards neighbouring industrial lands.

Table 2.1 – Existing Condition Catchment Areas

Catchment ID	Description	Area (ha)	Percent Impervious	Run-off Coefficient
101	To Boswell Drive	0.98	79%	0.79
102	To Ex. Site Depression	0.68	30%	0.45
103	To Ex. Site Depression	0.84	0%	0.25
104	To West	0.04	0%	0.25
105	To East	0.25	8%	0.30

An analysis was performed on Catchment 101 and Catchment 102 using the SWMHYMO hydrologic modeling program developed by J.F. Sabourin & Associates for the 2-year to 100-year Town of Simcoe design storms. A summary of the results can be found in the Table 2.2 and detailed SWMHYMO input/output information can be found in Appendix A.

Table 2.2 – Existing Condition Site Discharge					
Storm Event	Catchment 101 Discharge (m^3/s)	Catchment 102 Discharge (m^3/s)	Catchment 103 Discharge (m^3/s)	Catchment 104 Discharge (m^3/s)	Catchment 105 Discharge (m^3/s)
2-Yr Event	0.159	0.042	0.031	0.002	0.012
5-Yr Event	0.218	0.060	0.061	0.004	0.023
10-Yr Event	0.257	0.074	0.084	0.005	0.031
25-Yr Event	0.309	0.094	0.115	0.007	0.042
50-Yr Event	0.348	0.111	0.140	0.009	0.051
100-Yr Event	0.388	0.130	0.165	0.010	0.061

2.2 PROPOSED CONDITIONS

Under proposed condition, it is proposed to construct an addition to the existing industrial building as well as asphalt/gravel driveways including associated landscaping and walkways. The proposed site will be serviced by a private storm sewer system designed and constructed in accordance with the standards and specification of Norfolk County.

Six (6) catchment areas have been identified in the proposed condition. See Table 2.3 below and the Post-Development Storm Drainage Area Plan in Appendix A for details.

Catchment 201 represents the drainage area, which has will remain unchanged from the existing condition, for existing asphalt /gravel parking lot and building roof which is captured by the existing catchbasin located in the loading area of the existing building and ultimately discharges to the existing 600mmø storm sewer along Boswell Drive.

Catchment 202A represents the drainage area for the roof of the proposed addition, which is captured and controlled before ultimately discharging to the existing 600mmø storm sewer along Boswell Drive.

Catchment 202B represents the drainage area for the proposed asphalt/gravel driveways which will drain uncontrolled to the proposed catchbasins before ultimately discharges to the existing 600mmø storm sewer along Boswell Drive.

Catchment 203 represents the drainage area for the proposed gravel/asphalt driveways and landscaped areas which will sheet drain uncontrolled to the existing site depression where the stormwater runoff will infiltrates into the ground.

Catchment 204 represents the drainage area from the proposed gravel driveway and landscaped area which will sheet drain uncontrolled west towards the neighbouring industrial lands.

Catchment 205 represents the drainage area from the existing landscaped areas which will sheet drain uncontrolled east towards the neighbouring industrial lands.

Table 2.3 – Proposed Condition Catchment Areas				
Catchment ID	Description	Area (ha)	Percent Impervious	Run-off Coefficient
201	To Boswell Drive	0.98	79%	0.79
202A	Controlled Rooftop Drainage to Boswell Drive	0.47	100%	0.95
202B	Uncontrolled to Boswell Drive	0.20	93%	0.86
203	Uncontrolled towards Ex. Site Depression	0.87	17%	0.37
204	Uncontrolled towards West	0.03	6%	0.29
205	Uncontrolled towards East	0.18	0%	0.25

Water Quantity Control

It is proposed to apply quantity control measures to the runoff from Catchment 202A via a total of 9-Zurn105 Control-Flo Roof Drains to restrict the stormwater runoff from the site to the pre-development levels for all storm events up to and including the 100-year storm event.

Will the installation of on-site quantity control measures, it will be required to provide stormwater storage during storm events up to and including the 100-year event. To provide this storage, the proposed building addition will be designed to allow a maximum depth of 0.15m of roof ponding. The stage-storage-discharge characteristics can be seen in Table 2.4 below and in Appendix A for details.

The stormwater runoff generated from Catchment 203 is conveyed toward the existing site depression located south of the proposed gravel driveway, where the stormwater runoff will infiltrate into the ground. Based on the Geotechnical Report dated January 18, 2023, sandy sit/silty sand is found beneath the topsoil across the site to depths ranging from 2.5 to 4.1 metres below the existing ground surface. The upper levels of the sandy silt/silty sand encountered were generally loose to very loose. Therefore, it can be concluded that the soil across the site can provide infiltration.

Table 2.4 – Proposed Condition Stage-Storage-Discharge (Catchment 202A Rooftop storage)		
Head Above Drain	Storage (m^3)	Discharge (m^3/s)
0.00m	0	0.0000
0.05m	142	0.0068
0.075m	213	0.0103
0.10m	283	0.0137
0.15m	425	0.0205

An analysis was performed on the proposed condition site using the SWMHYMO hydrologic modelling program to determine the discharge rate and volume of stormwater storage that is required during the 2-year to 100-year Town of Simcoe design storms. Catchment 201 has been excluded from the proposed analysis as it will remain

unchanged from the existing condition. A summary of the results can be found in Table 2.5 and 2.6 below and the detailed SWMHYMO input/output information in Appendix A.

Table 2.5 – Proposed Condition Controlled Discharge and Required Storage

Storm Event	Catchment 202A Controlled Discharge (m^3/s)	Catchment 202B Uncontrolled Discharge (m^3/s)	Total Discharge[1] (m^3/s)	Allowable Discharge[2] (m^3/s)	Required Storage (m^3)
2-Yr	0.006	0.038	0.042	0.043	115.4
5-Yr	0.008	0.051	0.056	0.061	159.5
10-Yr	0.009	0.059	0.066	0.075	188.6
25-Yr	0.011	0.070	0.078	0.096	225.1
50-Yr	0.012	0.079	0.087	0.114	253.7
100-Yr	0.014	0.087	0.096	0.133	281.7

[1] Total discharge is derived from ADD HYD command in SWMHYMO output file.
[2] Derived from Catchment 102 in Table 2.2.

Table 2.6 – Site Discharge Rates Comparison

	To Site Depression		To Lands to The West		To Lands to The East	
Storm Event	Catchment 103[1] (m^3/s)	Catchment 203 (m^3/s)	Catchment 104[1] (m^3/s)	Catchment 204 (m^3/s)	Catchment 105[1] (m^3/s)	Catchment 205 (m^3/s)
2-Yr	0.030	0.037	0.002	0.002	0.012	0.008
5-Yr	0.059	0.071	0.004	0.003	0.023	0.016
10-Yr	0.081	0.097	0.005	0.004	0.031	0.021
25-Yr	0.111	0.133	0.007	0.005	0.042	0.029
50-Yr	0.135	0.162	0.009	0.007	0.051	0.035
100-Yr	0.159	0.191	0.010	0.008	0.061	0.042

[1] Derived from Table 2.2.

This analysis determined the following:

- The proposed discharge rates for Catchment 202A and Catchment 202B will not exceed the existing condition discharge rates during the 2-year to 100-year design storms, with the installation of 9 Zurn105 Control-Flo Roof Drains.

- Catchment 202A will require a total of 281.7m^3 of roof top storage during the 100-year event, which can be accommodated by the total roof top storage on site which is 425m^3.

- Stormwater runoff from Catchment 203 will infiltrate in the sites depressed area.

- Stormwater runoff from Catchment 204 and Catchment 205 will not exceed the existing conditions discharge rate during the 2-year to 100-year storm events.

Water Quality Control
The proposed development is required to achieve an “Enhanced” (80% TSS removal) level of water quality protection. To achieve this criteria, discharge from Catchment 202B will be subject to treatment from a HydroStorm oil/grit separator before ultimately discharging to the existing storm sewer along Boswell Drive. The Hydrostorm sizing software was used to determine the required size of oil/grit separator unit for the site. It was determined that a Hydrostrorm HS4 will provide 86% TSS removal and 97% average annual runoff treatment. As such, the HydroStorm units have been designed to achieve an ‘Enhanced’ (80% TSS Removal) level of stormwater quality control. See HydroStorm unit sizing procedures in Appendix B for details.

HydroStorm units require regular inspection and maintenance as per the manufacture’s specifications to ensure the units operate properly. See HydroStorm maintenance manuals in Appendix B for details.

2.3 SEDIMENT AND EROSION CONTROL

In order to minimize erosion during the grading and site servicing period of construction, the following measures will be implemented:

- Install silt fencing along the outer boundary of the site to ensure that sediment does not migrate to the adjacent properties;

- Install sediment control (silt sacks) in the proposed catchbasins as well as the nearby existing catchbasins to ensure that no untreated runoff enters the existing conveyance system

- Stabilize all disturbed or landscaped areas with hydro seeding/sodding to minimize the opportunity for erosion.

To ensure and document the effectiveness of the erosion and sediment control structures, an appropriate inspection and maintenance program is necessary. The program will include the following activities:

- Inspection of the erosion and sediment controls (e.g. silt fences, sediment traps, outlets, vegetation, etc.) with follow up reports to the governing municipality; and

- The developer and/or his contractor shall be responsible for any costs incurred during the remediation of problem areas.

For details on the proposed erosion and sediment control for the proposed site, see the Grading & Erosion Control Plan included in the engineering drawings.

3.0 SANITARY SEWER SERVICING

3.1 EXISTING CONDITIONS

There is an existing 75mmø sanitary forcemain on Boswell Drive, which is serviced from an existing sanitary lift station located within the subject site near the north property line in the landscaped area which flows west along Boswell Drive.

3.2 SANITARY DEMAND

Sanitary discharge from the proposed industrial building addition was estimated in accordance with the Norfolk County Design Criteria (Ref. 2).

Table 3.1 summarizes the sanitary sewer discharge rates for industrial development in accordance with Norfolk Country Sanitary Sewage Flow criteria.

Table 3.1 – Proposed Sanitary Sewer Discharge

Population [A]	Average Sewage flows [B] (l/s)	Peaking Factor [C]	Infiltration [D] (l/s)	**Peak Flow [E] (l/s)**
335 persons	1.78	3.2	0.78	**6.48**

[A] Population = 120 persons/hectare = (120 persons/ha x 2.79 ha) = 335 persons

[B] Average per capita Sewage Flows = (55 m^3/ha/day x 2.79 ha) = 153.45 m^3/day

[C] Peak Factor (2<Peak Factor<5) = (0.80 * (1 + (14/4+(population in thousands)$^{0.5}$))) = (14.86/4.58) = 3.2

[D] Infiltration flow based on Norfolk County standards 0.28 l/sec/ha = 0.28 l/sec x 2.79 ha=0.78

[E] Peak/Design Flow = (Average Sewage Flow x Peaking Factor) + Infiltration

Based on the above, the estimate of sanitary demand for the Industrial addition is:

6.5 L/s

3.3 PROPOSED SANITARY SERVICING

The existing internal sanitary services of the existing industrial building are to be routed internally to service the proposed addition. The sanitary discharge from the proposed addition and existing industrial building will be conveyed to Boswell Drive via a 75mmø sanitary forcemain.

4.0 DOMESTIC AND FIRE WATER SUPPLY SERVICING

4.1 EXISTING CONDITIONS

The existing municipal water distribution system consists of a 300mmø watermain located along Boswell Drive. There is an existing 50mmø domestic water service and 250mmø fire water service within the existing industrial building which connects to the existing 300mmø watermain along Boswell Drive. Existing fire hydrants are located fronting the subject site on Boswell Drive.

4.2 DOMESTIC WATER DEMAND

The water usage has been estimated based on Norfolk County Design Water Demand Criteria. The design water demand is calculated as a greater of the maximum daily demand plus fire flow or maximum hourly demand of the proposed development. See Table 4.1 for the water demand of the proposed development.

Table 4.1 – Proposed Water Demand						
Population [A]	Average Daily Demand [B] (l/s)	Maximum Daily Peaking Factor [C]	Maximum Daily Demand [D] (l/s)	Maximum Hourly Peaking Factor [E]	Maximum Hourly Demand [F] (l/s)	**Max. Daily Demand plus Fire Flow [G] (l/s)**
335 persons	1.74	2.25	3.92	2.00	3.48	**171**

[A] Population = 120 persons/hectare = (120 persons/ha x 2.79 ha) = 335 persons
[B] Average daily demand = (0.45 m^3/cap/day x 335 persons) = 150.75 m^3/day
[C] Maximum daily demand Peak Factor as per Norfolk Country Design Criteria = 2.25
[D] Maximum Daily demand = Average Daily Demand x Maximum DailyPeaking Factor
[E] Maximum Hourly Peak Factor as per Norfolk Country Design Criteria = 2.00
[F] Maximum Hourly Demand = Average Daily Demand x Maximum Hourly Peaking Factor
[G] Total Maximum Daily Demand as per Norfolk County Design Criteria = Maximum Daily Demand + Fire Flow Demand

It can be seen from the above table that the total maximum daily demand plus fire flow is 171 l/s.

4.3 FIRE FLOW DEMAND

Fire flow demands for development are governed by a number of guidelines and criteria, such as the Water Supply for Public Fire Protection (Fire Underwriters Survey, 2020), Ontario Building Code (OBC), and various codes and standards published by the National Fire Protection Association (NFPA). The Fire Underwriters Survey - 2020 was used to determine the required flow rate for the proposed development.

In addition to the existing municipal hydrants located along Boswell Drive, an additional hydrant has been proposed within the subject site to meet the required 90m separation from the proposed additional building face adjacent to a street (as per Sentence 3.2.5.7 of the 2020 Ontario Building Code). Please refer to the Site Servicing Plan for the hydrant location.

The proposed addition is a ordinary construction type (C=1.0), with limited combustible occupancy (15% correction) and sprinkler system (50% correction). Exposure corrections are based on the following:

North Face: 0% correction (45m+)
South Face: 0% correction (45m+)
East Face: 0% correction (45m+)
West Face: 5% correction (30.1 to 45m)
Total: 5%

An estimate of the required flow rate for the proposed addition can be found in Appendix C. The flow rate was determined in accordance with the Fire Underwriters Survey – 2020 Water Supply for Public Fire Protection. It has been determined that the required fire flow for the site is 10000 l/min (167 l/s).

4.4 PROPOSED WATER SERVICING AND ANALYSIS

The existing internal water services of the existing industrial building are to be routed internally to service the proposed addition. Existing water service from the existing industrial building is connected to the existing 300mmø watermain along Boswell Drive.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information provided herein, it is concluded that the proposed development of 14 Boswell Drive can be constructed to meet the requirements of the Norfolk County. Therefore, it is recommended that:

- The development be graded and serviced in accordance with the Grading & Erosion Control Plan and the Site Servicing Plan prepared by S. Llewellyn & Associates Limited;
- 9-Zurn105 Control-Flo Roof Drains be installed as per Site Servicing Plan and this report to provide adequate quantity control for Catchment 202A;
- All roof drains and scuppers are to be fitted with clog guards and inspected regularly to ensure they are free from clogging;
- Rooftop Storage be implemented as per the Site Servicing Plan to provide stormwater storage;
- HydroStorm HS4 oil/grit separator be installed as per the Site Servicing Plan and this report to provide efficient stormwater quality control;
- Erosion and sediment controls be installed as described in this report to meet Norfolk County requirements;
- The proposed sanitary and water servicing system be routed internally to connect with the existing sanitary and water services of the existing building as per the Mechanical Plan and this report to adequately service the proposed development;

We trust the information enclosed herein is satisfactory. Should you have any questions please do not hesitate to contact our office.

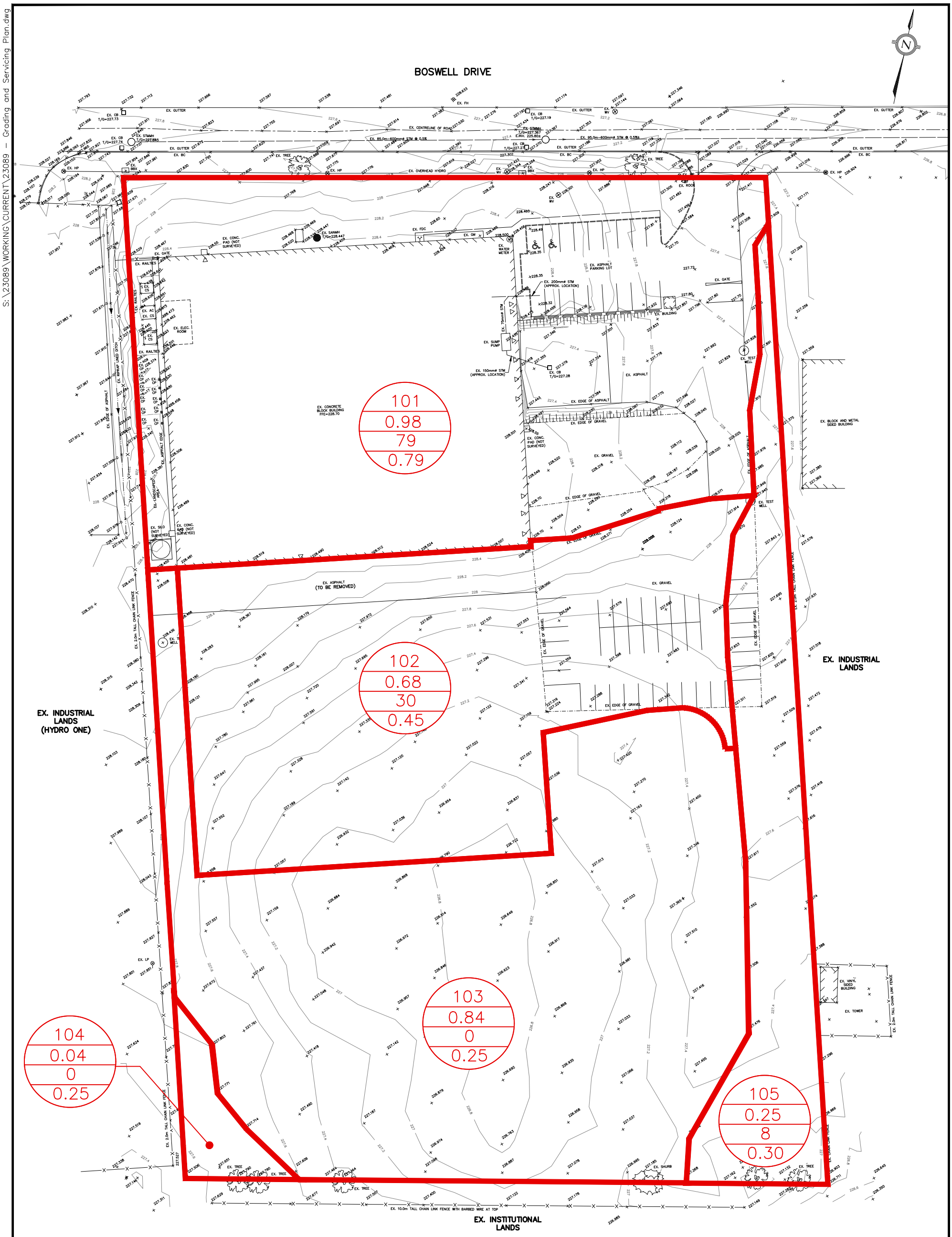
Prepared by:
S. LLEWELLYN & ASSOCIATES LIMITED

Y. Moradiya, B.Eng.

S. Frankovich, P.Eng.

APPENDIX A

STORMWATER MANAGEMENT INFORMATION



LEGEND

DRAINAGE BOUNDARY

101
0.39
11
0.32

DRAINAGE AREA I.D.
DRAINAGE AREA (ha)
PERCENT IMPERVIOUS
RUNOFF COEFFICENT

FIGURE 1.0
PRE DEVELOPMENT CONDITIONS STORM DRAINAGE PLAN

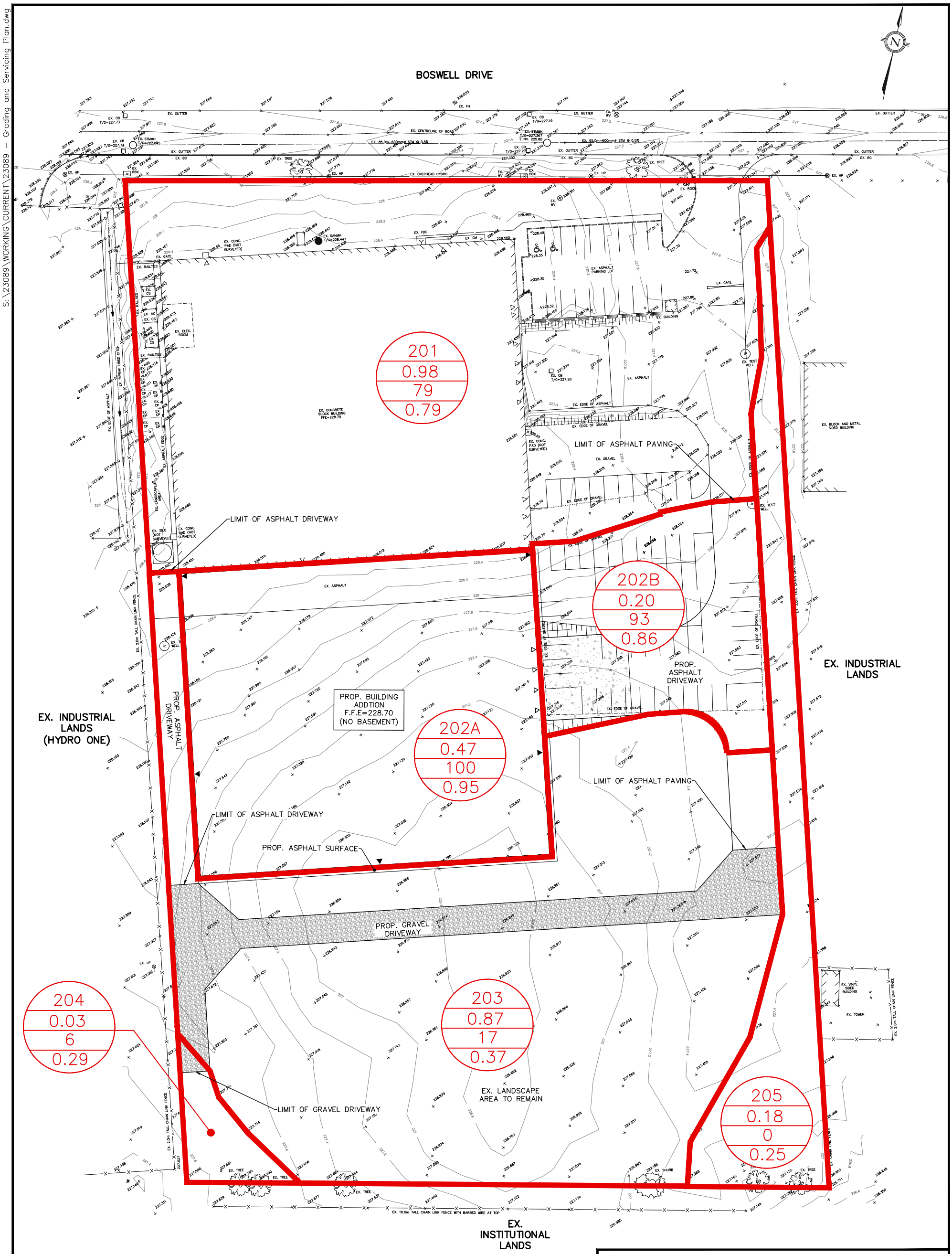
SCALE: 1:750

PROJECT: 14 BOSWELL DRIVE, SIMCOE, ON
PROJECT No.: 23089

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

Tel. (905) 631-6978
Website: www.sla.on.ca
email: info@sla.on.ca

3228 South Service Road, Suite #105 East Wing, Burlington, Ont., L7N 3H8



LEGEND

- DRAINAGE BOUNDARY
- 201 / 0.39 / 11 / 0.32 — DRAINAGE AREA I.D. / DRAINAGE AREA (ha) / PERCENT IMPERVIOUS / RUNOFF COEFFICENT

FIGURE 2.0
POST DEVELOPMENT CONDITIONS STORM DRAINAGE PLAN

SCALE: 1:750

PROJECT: 14 BOSWELL DRIVE, SIMCOE, ON
PROJECT No.: 23089

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

Tel. (905) 631-6978
Website: www.sla.on.ca
email: info@sla.on.ca

3228 South Service Road, Suite #105 East Wing, Burlington, Ont., L7N 3H8

14 Boswell Drive
Simcoe, ON

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

RUNOFF COEFFICIENT CALCULATIONS

Pre

		C-Value
Drainage Area #:	101	
Roof/Building Area (m²):	4776	0.95
Asphalt/Conc. Area (m²):	2244	0.90
Gravel Area (m²):	966	0.80
Grass Area - Pervious (m²):	1836	0.25
Total Area (m²):	9822	0.79
Impervious	7793	**0.79**
Pervious	2029	**0.21**
Site	9822	

		C-Value
Drainage Area #:	102	
Roof/Building Area (m²):	0	0.95
Asphalt/Conc. Area (m²):	760	0.90
Gravel Area (m²):	1580	0.80
Grass Area - Pervious (m²):	4731	0.25
Total Area (m²):	7070	0.44
Impervious	2023	**0.29**
Pervious	5047	**0.71**
Site	7070	

		C-Value
Drainage Area #:	103	
Roof/Building Area (m²):	0	0.95
Asphalt/Conc. Area (m²):	0	0.90
Gravel Area (m²):	0	0.80
Grass Area - Pervious (m²):	8108	0.25
Total Area (m²):	8108	0.25
Impervious	0	**0.00**
Pervious	8108	**1.00**
Site	8108	

		C-Value
Drainage Area #:	104	
Roof/Building Area (m²):	0	0.95
Asphalt/Conc. Area (m²):	0	0.90
Gravel Area (m²):	0	0.80
Grass Area - Pervious (m²):	381	0.25
Total Area (m²):	381	0.25
Impervious	0	**0.00**
Pervious	381	**1.00**
Site	381	

		C-Value
Drainage Area #:	105	
Roof/Building Area (m²):	0	0.95
Asphalt/Conc. Area (m²):	0	0.90
Gravel Area (m²):	241	0.80
Grass Area - Pervious (m²):	2218	0.25
Total Area (m²):	2459	0.30
Impervious	193	**0.08**
Pervious	2266	**0.92**
Site	2459	

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

Post

		C-Value
Drainage Area #:	201	
Roof/Building Area (m²):	4776	0.95
Asphalt/Conc. Area (m²):	2244	0.90
Gravel Area (m²):	966	0.80
Grass Area - Pervious (m²):	1836	0.25
Total Area (m²):	9822	0.79
Impervious	7793	**0.79**
Pervious	2029	**0.21**
Site	9822	

		C-Value
Drainage Area #:	202A	
Roof/Building Area (m²):	4720	0.95
Asphalt/Conc. Area (m²):	0	0.90
Gravel Area (m²):	0	0.80
Grass Area - Pervious (m²):	0	0.25
Total Area (m²):	4720	0.95
Impervious	4720	**1.00**
Pervious	0	**0.00**
Site	4720	

		C-Value
Drainage Area #:	202B	
Roof/Building Area (m²):	0	0.95
Asphalt/Conc. Area (m²):	1277	0.90
Gravel Area (m²):	755	0.80
Grass Area - Pervious (m²):	0	0.25
Total Area (m²):	2032	0.86
Impervious	1881	**0.93**
Pervious	151	**0.07**
Site	2032	

		C-Value
Drainage Area #:	203	
Roof/Building Area (m²):	0	0.95
Asphalt/Conc. Area (m²):	697	0.90
Gravel Area (m²):	1106	0.80
Grass Area - Pervious (m²):	7344	0.25
Total Area (m²):	9147	0.37
Impervious	1581	**0.17**
Pervious	7566	**0.83**
Site	9147	

		C-Value
Drainage Area #:	204	
Roof/Building Area (m²):	0	0.95
Asphalt/Conc. Area (m²):	0	0.90
Gravel Area (m²):	24	0.80
Grass Area - Pervious (m²):	307	0.25
Total Area (m²):	331	0.29
Impervious	19	**0.06**
Pervious	312	**0.94**
Site	331	

		C-Value
Drainage Area #:	205	
Roof/Building Area (m²):	0	0.95
Asphalt/Conc. Area (m²):	0	0.90
Gravel Area (m²):	0	0.80
Grass Area - Pervious (m²):	1787	0.25
Total Area (m²):	1787	0.25
Impervious	0	**0.00**
Pervious	1787	**1.00**
Site	1787	

S. LLEWELLYN & ASSOCIATES LIMITED
CONSULTING ENGINEERS

STAGE-STORAGE-DISCHARGE CALCULATIONS - ROOFTOP STORAGE

Proposed Building (Catchment 201)

Type of Drain = Z-105 (Canadian Market Zurn Contol-Flo Roof Drain)
Total Roof Area = 4723 m^2
Area Available for Ponding = 2833.8 m^2 (60% of Roof Area)
Number of Roof Drains = 9 (min. # drains = 1 per 900 m^2)
Drain Discharge = 0.380 l/s per 0.25m head (5 IGPM per inch head)

Head (m)	Available Storage (m^3)	Total Discharge (m^3/s)
0.00	0	0.0000
0.05	141.69	0.0068
0.075	212.5	0.0103
0.10	283.38	0.0137
0.15	425.07	0.0205

Time to Peak Calculations - Phase 1 Conditions

Time to peak (Tp) values derived from time of concentration (Tc) calculations based on the Airport Method Equation:

$$T_c = \frac{3.26(1.1-C)L^{0.5}}{S_w^{0.33}}$$ *(MTO Drainage Manual Design Chart 1.12)*

T_c = Overland flow time of concentration (min)
L = Flow travel length (m)
S = Basin slope (%)
C = Runoff coefficient

From this, **Time-to-peak (Tp) = 0.67 Tc**

The time to peak values used in the NASHYD command for the existing conditions hydrologic modeling are shown below.

Catchment ID	Area (ha)	Length (m)	"C"	Slope (m/m)	Tc (min)	**Tp**	
						(min)	**(hrs)**
103	0.81	55	0.25	0.2	7.65	5.12	**0.09**
104	0.04	15	0.25	0.35	3.32	2.22	**0.04**
105	0.25	25	0.30	0.2	4.85	3.25	**0.05**
203	0.87	55	0.37	0.2	6.57	4.40	**0.07**
204	0.03	15	0.29	0.2	3.81	2.55	**0.04**
205	0.18	25	0.25	0.2	5.16	3.45	**0.06**

```
2     Metric units
*#*************************************************************************|
*#  Project Name: 14 Bosewell Drive
*#                Simcoe, Ontario
*#  JOB NUMBER  : 23089
*#       Date   : JANUARY 2024
*#    Company   : S. LLEWELLYN AND ASSOCIATES LTD.
*#       File   : 23089.DAT
*#*************************************************************************|
*
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[002]
                    SIMC002.STM
*
READ STORM          STORM_FILENAME "STORM.001"
*
*#*************************************************************************|
*#
*#        PRE-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#*************************************************************************|
*# CATCHMENT 101 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
CALIB STANDHYD      ID=[1], NHYD=["101"], DT=[1](min), AREA=[0.98](ha),
                    XIMP=[0.79], TIMP=[0.79], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80],
                    Pervious   surfaces: IAper=[6.35](mm), SLPP=[2.5](%),
                                         LGP=[15](m), MNP=[0.250], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.0](mm), SLPI=[2.0](%),
                                         LGI=[25](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
*%-----------------|-------------------------------------------------------|
*# CATCHMENT 102 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
CALIB STANDHYD      ID=[2], NHYD=["102"], DT=[1](min), AREA=[0.68](ha),
                    XIMP=[0.30], TIMP=[0.30], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80],
                    Pervious   surfaces: IAper=[6.35](mm), SLPP=[2.5](%),
                                         LGP=[65](m), MNP=[0.250], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.0](mm), SLPI=[2.0](%),
                                         LGI=[50](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
*%-----------------|-------------------------------------------------------|
*# CATCHMENT 103 - EXISTING CONDITION (PONDING ON SITE)
*
CALIB NASHYD        ID=[3], NHYD=["103"], DT=[1]min, AREA=[0.84](ha),
                    DWF=[0](cms), CN/C=[80], IA=[6.35](mm),
                    N=[3], TP=[0.09]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------|
*# CATCHMENT 104 - EXISTING CONDITION (TO EX. LANDS TO WEST)
*
CALIB NASHYD        ID=[4], NHYD=["104"], DT=[1]min, AREA=[0.04](ha),
                    DWF=[0](cms), CN/C=[80], IA=[6.35](mm),
                    N=[3], TP=[0.04]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------|
*# CATCHMENT 105 - EXISTING CONDITION (TO EX. LANDS TO EAST)
*
CALIB NASHYD        ID=[5], NHYD=["105"], DT=[1]min, AREA=[0.25](ha),
                    DWF=[0](cms), CN/C=[80], IA=[6.35](mm),
                    N=[3], TP=[0.05]hrs,
```

```
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*#*************************************************************************|
*#
*#        POST-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#************************************************************************|
*# CATCHMENT 201 - PROPOSED CONDITION (TO BOSEWELL DRIVE)
*
CALIB STANDHYD      ID=[1], NHYD=["201"], DT=[1](min), AREA=[0.98](ha),
                    XIMP=[0.79], TIMP=[0.79], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80],
                    Pervious   surfaces: IAper=[6.35](mm), SLPP=[2.5](%),
                                         LGP=[15](m), MNP=[0.250], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.0](mm), SLPI=[2.0](%),
                                         LGI=[25](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
*%-----------------|-------------------------------------------------------|
*# CATCHMENT 202A - PROPOSED CONDITION (PROPOSED ROOF TO BOSEWELL DR.)
*
CALIB STANDHYD      ID=[2], NHYD=["202A"], DT=[1](min), AREA=[0.47](ha),
                    XIMP=[0.99], TIMP=[0.99], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80],
                    Pervious   surfaces: IAper=[6.35](mm), SLPP=[2.0](%),
                                         LGP=[5.0](m), MNP=[0.250], SCP=[0](min)
                    Impervious surfaces: IAimp=[1.0](mm), SLPI=[1.0](%),
                                         LGI=[25](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[3],   NHYD=["ROOF"],  IDin=[2],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                   (cms) -  (ha-m)
                                      0.0       0.0
                                   0.0068   0.01417
                                   0.0103   0.02125
                                   0.0137   0.02834
                                   0.0205   0.04251
                                   -1        -1   (max twenty pts)
                    IDovf=[4], NHYDovf=["ROOF OFL"]
*%-----------------|-------------------------------------------------------|
*# CATCHMENT 202B - PROPOSED CONDITION (UNCONTROLLED TO BOSEWELL DR.)
*
CALIB STANDHYD      ID=[5], NHYD=["202B"], DT=[1](min), AREA=[0.20](ha),
                    XIMP=[0.93], TIMP=[0.93], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[80],
                    Pervious   surfaces: IAper=[6.35](mm), SLPP=[2.0](%),
                                         LGP=[5.0](m), MNP=[0.250], SCP=[0](min)
                    Impervious surfaces: IAimp=[1.0](mm), SLPI=[3.0](%),
                                         LGI=[25](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
*%-----------------|-------------------------------------------------------|
ADD HYD             IDsum=[6], NHYD=["TOTAL CONTROLLED"], IDs to add=[3, 5]
*%-----------------|-------------------------------------------------------|
*# CATCHMENT 203 - PROPOSED CONDITION (INFILTRATING ON SITE)
*
CALIB NASHYD        ID=[7], NHYD=["203"], DT=[1]min, AREA=[0.87](ha),
                    DWF=[0](cms), CN/C=[80], IA=[6.35](mm),
                    N=[3], TP=[0.07]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------|
*# CATCHMENT 204 - PROPOSED CONDITION (UNCONTROLLED TO WEST)
```

```
*
CALIB NASHYD        ID=[8], NHYD=["204"], DT=[1]min, AREA=[0.03](ha),
                    DWF=[0](cms), CN/C=[80], IA=[6.35](mm),
                    N=[3], TP=[0.04]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
*%-----------------|-------------------------------------------------------------|
*# CATCHMENT 205 - PROPOSED CONDITION (UNCONTROLLED TO EAST)
*
CALIB NASHYD        ID=[9], NHYD=["205"], DT=[1]min, AREA=[0.18](ha),
                    DWF=[0](cms), CN/C=[80], IA=[6.35](mm),
                    N=[3], TP=[0.06]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr),  END=-1
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* RUN REMAINING DESIGN STORMS (SIMCOE 2 TO 100-YR)

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                    SIMC005.STM
*
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[010]
                    SIMC010.STM
*
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[025]
                    SIMC025.STM
*
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[050]
                    SIMC050.STM
*
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[100]
                    SIMC100.STM
*
*%-----------------|-------------------------------------------------------------|
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 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   # 3902680
        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: S. Llewellyn & Associates Ltd                +++++++++
 +++++++++                in any City           SERIAL#:3902680       +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

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



 **********************   D E T A I L E D   O U T P U T   **********************
 ********************************************************************************
 *         DATE: 2024-02-06     TIME: 14:57:40     RUN COUNTER: 000931         *
 ********************************************************************************
 * Input   filename: T:\PROJECTS\23089\SWMHYMO\23089.dat                        *
 * Output  filename: T:\PROJECTS\23089\SWMHYMO\23089.out                        *
 * Summary filename: T:\PROJECTS\23089\SWMHYMO\23089.sum                        *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************


--------------------------------------------------------------------------------
001:0001--------------------------------------------------------------------------
*#*****************************************************************************|
*#  Project Name: 14 Bosewell Drive
*#               Simcoe, Ontario
*#  JOB NUMBER  : 23089
*#       Date   : JANUARY 2024
*#    Company   : S. LLEWELLYN AND ASSOCIATES LTD.
*#       File   : 23089.DAT
*#*****************************************************************************|
*
  ** END OF RUN :   1

********************************************************************************




--------------------
| START            |  Project  dir.: T:\PROJECTS\23089\SWMHYMO\
--------------------  Rainfall dir.: T:\PROJECTS\23089\SWMHYMO\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
    NSTORM=   1
           #  1=SIMC002.STM
--------------------------------------------------------------------------------
002:0002--------------------------------------------------------------------------
*#*****************************************************************************|
*#  Project Name: 14 Bosewell Drive
*#               Simcoe, Ontario
*#  JOB NUMBER  : 23089
*#       Date   : JANUARY 2024
*#    Company   : S. LLEWELLYN AND ASSOCIATES LTD.
*#       File   : 23089.DAT
*#*****************************************************************************|
*
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002:0002--------------------------------------------------------------------------
*
--------------------
| READ STORM       |    Filename: 2-year Simcoe a=529.711 b=4.501 c=0.745
| Ptotal=  35.21 mm|    Comments: 2-year Simcoe a=529.711 b=4.501 c=0.745
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
             .17   2.656 |   1.17   8.782 |   2.17   6.717 |   3.17   3.208
             .33   2.957 |   1.33  18.663 |   2.33   5.591 |   3.33   2.977
             .50   3.352 |   1.50  72.243 |   2.50   4.822 |   3.50   2.781
             .67   3.896 |   1.67  22.255 |   2.67   4.259 |   3.67   2.612
             .83   4.702 |   1.83  12.075 |   2.83   3.828 |   3.83   2.466
            1.00   6.040 |   2.00   8.542 |   3.00   3.487 |   4.00   2.337


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002:0003--------------------------------------------------------------------------
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*#*****************************************************************************|
*#
*#        PRE-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#*****************************************************************************|
*# CATCHMENT 101 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:101    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
---------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77         .21
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope    (%)=      2.00        2.50
     Length           (m)=     25.00       15.00
     Mannings n          =      .013        .250

     Max.eff.Inten.(mm/hr)=     72.24       16.17
               over (min)       1.00        9.00
     Storage Coeff.  (min)=     1.03 (ii)   8.62 (ii)
     Unit Hyd. Tpeak (min)=     1.00        9.00
     Unit Hyd. peak  (cms)=     1.06         .13
                                                      *TOTALS*
     PEAK FLOW       (cms)=      .16         .01          .159 (iii)
     TIME TO PEAK    (hrs)=     1.50        1.62         1.500
     RUNOFF VOLUME    (mm)=    34.21        9.02        28.918
     TOTAL RAINFALL   (mm)=    35.21       35.21        35.208
     RUNOFF COEFFICIENT   =     .97         .26          .821

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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002:0004--------------------------------------------------------------------------
*# CATCHMENT 102 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .68
| 02:102    DT= 1.00 |   Total Imp(%)=   30.00   Dir. Conn.(%)=   30.00
---------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .20         .48
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope    (%)=      2.00        2.50
     Length           (m)=     50.00       65.00
     Mannings n          =      .013        .250

     Max.eff.Inten.(mm/hr)=     72.24       10.71
               over (min)       2.00       23.00
     Storage Coeff.  (min)=     1.56 (ii)  23.14 (ii)
     Unit Hyd. Tpeak (min)=     2.00       23.00
     Unit Hyd. peak  (cms)=      .65         .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=      .04         .01          .042 (iii)
     TIME TO PEAK    (hrs)=     1.50        1.90         1.500
     RUNOFF VOLUME    (mm)=    34.21        9.02        16.574
     TOTAL RAINFALL   (mm)=    35.21       35.21        35.208
     RUNOFF COEFFICIENT   =     .97         .26          .471

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
002:0005--------------------------------------------------------------------------
*# CATCHMENT 103 - EXISTING CONDITION (PONDING ON SITE)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .84   Curve Number   (CN)=80.00
| 03:103    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .090

     Unit Hyd Qpeak  (cms)=     .356

     PEAK FLOW       (cms)=     .031 (i)
     TIME TO PEAK    (hrs)=    1.550
     RUNOFF VOLUME    (mm)=    9.017
     TOTAL RAINFALL   (mm)=   35.208
     RUNOFF COEFFICIENT   =     .256

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
002:0006--------------------------------------------------------------------------
*# CATCHMENT 104 - EXISTING CONDITION (TO EX. LANDS TO WEST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .04   Curve Number   (CN)=80.00
| 04:104    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .038

     PEAK FLOW       (cms)=     .002 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=    9.015
     TOTAL RAINFALL   (mm)=   35.208
     RUNOFF COEFFICIENT   =     .256

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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002:0007--------------------------------------------------------------------------
*# CATCHMENT 105 - EXISTING CONDITION (TO EX. LANDS TO EAST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .25   Curve Number   (CN)=80.00
| 05:105    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .191

     PEAK FLOW       (cms)=     .012 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=    9.016
     TOTAL RAINFALL   (mm)=   35.208
     RUNOFF COEFFICIENT   =     .256

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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002:0008--------------------------------------------------------------------------
*#*****************************************************************************|
*#
*#        POST-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ===============================================
*#
**#*****************************************************************************|
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*# CATCHMENT 201 - PROPOSED CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:201    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77         .21
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      2.00        2.50
     Length            (m)=     25.00       15.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=     72.24       16.17
               over (min)        1.00        9.00
     Storage Coeff.  (min)=     1.03 (ii)   8.62 (ii)
     Unit Hyd. Tpeak (min)=     1.00        9.00
     Unit Hyd. peak  (cms)=     1.06         .13
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .16         .01         .159 (iii)
     TIME TO PEAK    (hrs)=     1.50        1.62        1.500
     RUNOFF VOLUME    (mm)=    34.21        9.02       28.918
     TOTAL RAINFALL   (mm)=    35.21       35.21       35.208
     RUNOFF COEFFICIENT   =      .97         .26         .821

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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002:0009----------------------------------------------------------------------
*# CATCHMENT 202A - PROPOSED CONDITION (PROPOSED ROOF TO BOSEWELL DR.)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .47
| 02:202A   DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .47         .00
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      1.00        2.00
     Length            (m)=     25.00        5.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=     72.24       19.94
               over (min)        1.00        5.00
     Storage Coeff.  (min)=     1.27 (ii)   5.13 (ii)
     Unit Hyd. Tpeak (min)=     1.00        5.00
     Unit Hyd. peak  (cms)=      .93         .22
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .09         .00         .094 (iii)
     TIME TO PEAK    (hrs)=     1.50        1.55        1.500
     RUNOFF VOLUME    (mm)=    34.21        9.02       33.956
     TOTAL RAINFALL   (mm)=    35.21       35.21       35.208
     RUNOFF COEFFICIENT   =      .97         .26         .964

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
002:0010----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>02:(202A  )   |
| OUT<03:(ROOF  )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |     .014  .2834E-01
                           .007  .1417E-01   |     .021  .4251E-01
                           .010  .2125E-01   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (202A  )        .47      .094     1.500     33.956
     OUTFLOW<03: (ROOF  )        .47      .006     2.617     33.956
    OVERFLOW<04: (ROOF O)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=    5.922
                  TIME SHIFT OF PEAK FLOW         (min)=    67.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1154E-01

--------------------------------------------------------------------------------
002:0011----------------------------------------------------------------------
*# CATCHMENT 202B - PROPOSED CONDITION (UNCONTROLLED TO BOSEWELL DR.)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .20
| 05:202B   DT= 1.00 |   Total Imp(%)=   93.00   Dir. Conn.(%)=   93.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .19         .01
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      3.00        2.00
     Length            (m)=     25.00        5.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=     72.24       19.94
               over (min)        1.00        5.00
     Storage Coeff.  (min)=      .91 (ii)   4.77 (ii)
     Unit Hyd. Tpeak (min)=     1.00        5.00
     Unit Hyd. peak  (cms)=     1.13         .23
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .04         .00         .038 (iii)
     TIME TO PEAK    (hrs)=     1.50        1.55        1.500
     RUNOFF VOLUME    (mm)=    34.21        9.02       32.445
     TOTAL RAINFALL   (mm)=    35.21       35.21       35.208
     RUNOFF COEFFICIENT   =      .97         .26         .922

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
002:0012----------------------------------------------------------------------
----------------------
| ADD HYD (TOTAL CONT) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                       ID1 03:ROOF         .47     .006    2.62  33.96    .000
                      +ID2 05:202B         .20     .038    1.50  32.44    .000
                       ============================================================
                       SUM 06:TOTAL CONT    .67     .042    1.50  33.50    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
002:0013----------------------------------------------------------------------
*# CATCHMENT 203 - PROPOSED CONDITION (INFILTRATING ON SITE)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .87   Curve Number   (CN)=80.00
| 07:203    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .475

     PEAK FLOW       (cms)=     .037 (i)
     TIME TO PEAK    (hrs)=    1.533
     RUNOFF VOLUME    (mm)=    9.017
     TOTAL RAINFALL   (mm)=   35.208
     RUNOFF COEFFICIENT   =     .256

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
002:0014----------------------------------------------------------------------
*# CATCHMENT 204 - PROPOSED CONDITION (UNCONTROLLED TO WEST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .03   Curve Number   (CN)=80.00
| 08:204    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .029

     PEAK FLOW       (cms)=     .002 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=    9.013
     TOTAL RAINFALL   (mm)=   35.208
     RUNOFF COEFFICIENT   =     .256

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
002:0015----------------------------------------------------------------------
*# CATCHMENT 205 - PROPOSED CONDITION (UNCONTROLLED TO EAST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .18   Curve Number   (CN)=80.00
| 09:205    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .060

     Unit Hyd Qpeak  (cms)=     .115

     PEAK FLOW       (cms)=     .008 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=    9.016
     TOTAL RAINFALL   (mm)=   35.208
     RUNOFF COEFFICIENT   =     .256

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
002:0016----------------------------------------------------------------------
**#*************************************************************************|
* RUN REMAINING DESIGN STORMS (SIMCOE 2 TO 100-YR)
*
  ** END OF RUN :   4

********************************************************************************




--------------------
| START            |  Project  dir.: T:\PROJECTS\23089\SWMHYMO\
--------------------  Rainfall dir.: T:\PROJECTS\23089\SWMHYMO\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
           #  1=SIMC005.STM
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*#*************************************************************************|
*#  Project Name: 14 Bosewell Drive
*#               Simcoe, Ontario
*#  JOB NUMBER  : 23089
*#       Date   : JANUARY 2024
*#    Company   : S. LLEWELLYN AND ASSOCIATES LTD.
*#       File   : 23089.DAT
*#*************************************************************************|
*
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*
--------------------
| READ STORM       |    Filename: 5-year Simcoe a=583.017 b=3.007 c=0.703
| Ptotal=  49.03 mm|    Comments: 5-year Simcoe a=583.017 b=3.007 c=0.703
--------------------
             TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
              hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
              .17   4.171 |   1.17  12.361 |   2.17   9.718 |   3.17   4.963
              .33   4.604 |   1.33  24.395 |   2.33   8.234 |   3.33   4.633
              .50   5.166 |   1.50  96.032 |   2.50   7.199 |   3.50   4.351
              .67   5.928 |   1.67  28.708 |   2.67   6.431 |   3.67   4.107
              .83   7.035 |   1.83  16.461 |   2.83   5.834 |   3.83   3.895
             1.00   8.826 |   2.00  12.063 |   3.00   5.356 |   4.00   3.707
```

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--------------------------------------------------------------------------------
005:0003----------------------------------------------------------------------
*
*#*************************************************************************|
*#
*#        PRE-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#************************************************************************|
*# CATCHMENT 101 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:101    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77          .21
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      2.00         2.50
     Length            (m)=     25.00        15.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=     96.03        35.97
               over (min)       1.00         6.00
     Storage Coeff.  (min)=      .92 (ii)    6.43 (ii)
     Unit Hyd. Tpeak (min)=      1.00         6.00
     Unit Hyd. peak  (cms)=      1.13          .18
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .21          .01          .218 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.57         1.500
     RUNOFF VOLUME    (mm)=     48.03        17.15        41.546
     TOTAL RAINFALL   (mm)=     49.03        49.03        49.029
     RUNOFF COEFFICIENT   =       .98          .35          .847

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0004----------------------------------------------------------------------
*# CATCHMENT 102 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .68
| 02:102    DT= 1.00 |   Total Imp(%)=   30.00   Dir. Conn.(%)=   30.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .20          .48
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      2.00         2.50
     Length            (m)=     50.00        65.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=     96.03        23.40
               over (min)       1.00        17.00
     Storage Coeff.  (min)=      1.39 (ii)   17.18 (ii)
     Unit Hyd. Tpeak (min)=      1.00        17.00
     Unit Hyd. peak  (cms)=       .87          .07
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .05          .02          .060 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.77         1.500
     RUNOFF VOLUME    (mm)=     48.03        17.15        26.417
     TOTAL RAINFALL   (mm)=     49.03        49.03        49.029
     RUNOFF COEFFICIENT   =       .98          .35          .539

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0005----------------------------------------------------------------------
*# CATCHMENT 103 - EXISTING CONDITION (PONDING ON SITE)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .84   Curve Number   (CN)=80.00
| 03:103    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .090

     Unit Hyd Qpeak  (cms)=     .356

     PEAK FLOW       (cms)=     .061 (i)
     TIME TO PEAK    (hrs)=    1.550
     RUNOFF VOLUME    (mm)=   17.155
     TOTAL RAINFALL   (mm)=   49.029
     RUNOFF COEFFICIENT   =     .350

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0006----------------------------------------------------------------------
*# CATCHMENT 104 - EXISTING CONDITION (TO EX. LANDS TO WEST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .04   Curve Number   (CN)=80.00
| 04:104    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .038

     PEAK FLOW       (cms)=     .004 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   17.153
     TOTAL RAINFALL   (mm)=   49.029
     RUNOFF COEFFICIENT   =     .350

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0007----------------------------------------------------------------------
*# CATCHMENT 105 - EXISTING CONDITION (TO EX. LANDS TO EAST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .25   Curve Number   (CN)=80.00
| 05:105    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .191

     PEAK FLOW       (cms)=     .023 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=   17.154
     TOTAL RAINFALL   (mm)=   49.029
     RUNOFF COEFFICIENT   =     .350

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0008----------------------------------------------------------------------
*#*************************************************************************|
*#
*#        POST-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ===============================================
*#
**#************************************************************************|
*# CATCHMENT 201 - PROPOSED CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:201    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77          .21
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      2.00         2.50
     Length            (m)=     25.00        15.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=     96.03        35.97
               over (min)       1.00         6.00
     Storage Coeff.  (min)=      .92 (ii)    6.43 (ii)
     Unit Hyd. Tpeak (min)=      1.00         6.00
     Unit Hyd. peak  (cms)=      1.13          .18
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .21          .01          .218 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.57         1.500
     RUNOFF VOLUME    (mm)=     48.03        17.15        41.546
     TOTAL RAINFALL   (mm)=     49.03        49.03        49.029
     RUNOFF COEFFICIENT   =       .98          .35          .847

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0009----------------------------------------------------------------------
*# CATCHMENT 202A - PROPOSED CONDITION (PROPOSED ROOF TO BOSEWELL DR.)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .47
| 02:202A   DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .47          .00
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      1.00         2.00
     Length            (m)=     25.00         5.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=     96.03        38.41
               over (min)       1.00         4.00
     Storage Coeff.  (min)=      1.13 (ii)    4.10 (ii)
     Unit Hyd. Tpeak (min)=      1.00         4.00
     Unit Hyd. peak  (cms)=      1.00          .28
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .12          .00          .124 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.52         1.500
     RUNOFF VOLUME    (mm)=     48.03        17.16        47.720
     TOTAL RAINFALL   (mm)=     49.03        49.03        49.029
     RUNOFF COEFFICIENT   =       .98          .35          .973

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0010----------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(202A  )    |
| OUT<03:(ROOF  )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |     .014  .2834E-01
                            .007  .1417E-01   |     .021  .4251E-01
                            .010  .2125E-01   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (202A  )        .47      .124     1.500     47.720
     OUTFLOW<03: (ROOF  )        .47      .008     2.717     47.720
    OVERFLOW<04: (ROOF O)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=    6.170
                  TIME SHIFT OF PEAK FLOW         (min)=    73.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1595E-01

--------------------------------------------------------------------------------
005:0011----------------------------------------------------------------------
*# CATCHMENT 202B - PROPOSED CONDITION (UNCONTROLLED TO BOSEWELL DR.)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .20
| 05:202B   DT= 1.00 |   Total Imp(%)=   93.00   Dir. Conn.(%)=   93.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .19          .01
```

```
     Dep. Storage     (mm)=       1.00         6.35
     Average Slope     (%)=       3.00         2.00
     Length            (m)=      25.00         5.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=      96.03        38.41
               over (min)         1.00         4.00
     Storage Coeff.  (min)=        .81 (ii)    3.78 (ii)
     Unit Hyd. Tpeak (min)=       1.00         4.00
     Unit Hyd. peak  (cms)=       1.20          .29
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .05          .00          .051 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.52         1.500
     RUNOFF VOLUME    (mm)=      48.03        17.16        45.868
     TOTAL RAINFALL   (mm)=      49.03        49.03        49.029
     RUNOFF COEFFICIENT   =        .98          .35          .936

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0012----------------------------------------------------------------------
----------------------
| ADD HYD (TOTAL CONT) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 03:ROOF           .47      .008    2.72  47.72    .000
                     +ID2 05:202B           .20      .051    1.50  45.87    .000
                      ==========================================================
                      SUM 06:TOTAL CONT      .67     .056    1.50  47.17    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0013----------------------------------------------------------------------
*# CATCHMENT 203 - PROPOSED CONDITION (INFILTRATING ON SITE)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .87   Curve Number   (CN)=80.00
| 07:203    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .475

     PEAK FLOW       (cms)=     .071 (i)
     TIME TO PEAK    (hrs)=    1.533
     RUNOFF VOLUME    (mm)=   17.155
     TOTAL RAINFALL   (mm)=   49.029
     RUNOFF COEFFICIENT   =     .350

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0014----------------------------------------------------------------------
*# CATCHMENT 204 - PROPOSED CONDITION (UNCONTROLLED TO WEST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .03   Curve Number   (CN)=80.00
| 08:204    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .029

     PEAK FLOW       (cms)=     .003 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   17.153
     TOTAL RAINFALL   (mm)=   49.029
     RUNOFF COEFFICIENT   =     .350

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0015----------------------------------------------------------------------
*# CATCHMENT 205 - PROPOSED CONDITION (UNCONTROLLED TO EAST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .18   Curve Number   (CN)=80.00
| 09:205    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .060

     Unit Hyd Qpeak  (cms)=     .115

     PEAK FLOW       (cms)=     .016 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=   17.154
     TOTAL RAINFALL   (mm)=   49.029
     RUNOFF COEFFICIENT   =     .350

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
005:0016----------------------------------------------------------------------
**#*****************************************************************************|
* RUN REMAINING DESIGN STORMS (SIMCOE 2 TO 100-YR)
*
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*
  ** END OF RUN :   9

*******************************************************************************




---------------------
| START            |  Project  dir.: T:\PROJECTS\23089\SWMHYMO\
---------------------  Rainfall dir.: T:\PROJECTS\23089\SWMHYMO\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 010
    NSTORM=   1
          #  1=SIMC010.STM
--------------------------------------------------------------------------------
010:0002----------------------------------------------------------------------
*#*****************************************************************************|
*#  Project Name: 14 Bosewell Drive
*#               Simcoe, Ontario
*#  JOB NUMBER  : 23089
*#       Date   : JANUARY 2024
*#    Company   : S. LLEWELLYN AND ASSOCIATES LTD.
*#       File   : 23089.DAT
*#*****************************************************************************|
*
--------------------------------------------------------------------------------
010:0002----------------------------------------------------------------------
*
--------------------
| READ STORM       |    Filename: 10-year Simcoe a=670.324 b=3.007 c=0.698
| Ptotal=  57.94 mm|    Comments: 10-year Simcoe a=670.324 b=3.007 c=0.698
--------------------
             TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
              hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
              .17   5.004 |   1.17  14.695 |   2.17  11.578 |   3.17   5.946
              .33   5.520 |   1.33  28.804 |   2.33   9.824 |   3.33   5.554
              .50   6.188 |   1.50 111.838 |   2.50   8.600 |   3.50   5.219
              .67   7.093 |   1.67  33.848 |   2.67   7.689 |   3.67   4.929
              .83   8.406 |   1.83  19.518 |   2.83   6.982 |   3.83   4.675
             1.00  10.525 |   2.00  14.345 |   3.00   6.414 |   4.00   4.451

--------------------------------------------------------------------------------
010:0003----------------------------------------------------------------------
*
*#*****************************************************************************|
*#
*#        PRE-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#*****************************************************************************|
*# CATCHMENT 101 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:101    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
----------------------                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .77          .21
     Dep. Storage     (mm)=       1.00         6.35
     Average Slope     (%)=       2.00         2.50
     Length            (m)=      25.00        15.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     111.84        48.51
               over (min)         1.00         6.00
     Storage Coeff.  (min)=        .86 (ii)    5.76 (ii)
     Unit Hyd. Tpeak (min)=       1.00         6.00
     Unit Hyd. peak  (cms)=       1.17          .19
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .24          .02          .257 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.55         1.500
     RUNOFF VOLUME    (mm)=      56.94        23.13        49.840
     TOTAL RAINFALL   (mm)=      57.94        57.94        57.941
     RUNOFF COEFFICIENT   =        .98          .40          .860

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0004----------------------------------------------------------------------
*# CATCHMENT 102 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .68
| 02:102    DT= 1.00 |   Total Imp(%)=   30.00   Dir. Conn.(%)=   30.00
----------------------                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .20          .48
     Dep. Storage     (mm)=       1.00         6.35
     Average Slope     (%)=       2.00         2.50
     Length            (m)=      50.00        65.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     111.84        33.79
               over (min)         1.00        15.00
     Storage Coeff.  (min)=       1.31 (ii)   14.94 (ii)
     Unit Hyd. Tpeak (min)=       1.00        15.00
     Unit Hyd. peak  (cms)=        .91          .08
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .06          .03          .074 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.72         1.500
     RUNOFF VOLUME    (mm)=      56.94        23.13        33.270
     TOTAL RAINFALL   (mm)=      57.94        57.94        57.941
     RUNOFF COEFFICIENT   =        .98          .40          .574

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0005----------------------------------------------------------------------
*# CATCHMENT 103 - EXISTING CONDITION (PONDING ON SITE)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .84   Curve Number   (CN)=80.00
| 03:103    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .090

     Unit Hyd Qpeak  (cms)=     .356

     PEAK FLOW       (cms)=     .084 (i)
     TIME TO PEAK    (hrs)=    1.550
     RUNOFF VOLUME    (mm)=   23.126
     TOTAL RAINFALL   (mm)=   57.941
     RUNOFF COEFFICIENT   =     .399

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0006----------------------------------------------------------------------
*# CATCHMENT 104 - EXISTING CONDITION (TO EX. LANDS TO WEST)
*
----------------------
```

```
| CALIB NASHYD       |   Area    (ha)=     .04   Curve Number   (CN)=80.00
| 04:104    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .038

     PEAK FLOW       (cms)=     .005 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   23.123
     TOTAL RAINFALL   (mm)=   57.941
     RUNOFF COEFFICIENT   =     .399

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0007----------------------------------------------------------------------
*# CATCHMENT 105 - EXISTING CONDITION (TO EX. LANDS TO EAST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .25   Curve Number   (CN)=80.00
| 05:105    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .191

     PEAK FLOW       (cms)=     .031 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   23.126
     TOTAL RAINFALL   (mm)=   57.941
     RUNOFF COEFFICIENT   =     .399

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0008----------------------------------------------------------------------
*#*************************************************************************|
*#
*#        POST-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ===============================================
*#
**#*************************************************************************|
*# CATCHMENT 201 - PROPOSED CONDITION (TO BOSEWELL DRIVE)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:201    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
----------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77         .21
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      2.00        2.50
     Length            (m)=     25.00       15.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=    111.84       48.51
               over (min)        1.00        6.00
     Storage Coeff.  (min)=      .86 (ii)    5.76 (ii)
     Unit Hyd. Tpeak (min)=      1.00        6.00
     Unit Hyd. peak  (cms)=      1.17         .19
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .24          .02          .257 (iii)
     TIME TO PEAK    (hrs)=      1.50        1.55          1.500
     RUNOFF VOLUME    (mm)=     56.94       23.13        49.840
     TOTAL RAINFALL   (mm)=     57.94       57.94        57.941
     RUNOFF COEFFICIENT   =      .98         .40          .860

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0009----------------------------------------------------------------------
*# CATCHMENT 202A - PROPOSED CONDITION (PROPOSED ROOF TO BOSEWELL DR.)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .47
| 02:202A   DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
----------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .47         .00
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      1.00        2.00
     Length            (m)=     25.00        5.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=    111.84       51.36
               over (min)        1.00        4.00
     Storage Coeff.  (min)=      1.06 (ii)   3.71 (ii)
     Unit Hyd. Tpeak (min)=      1.00        4.00
     Unit Hyd. peak  (cms)=      1.04         .30
                                                    *TOTALS*
     PEAK FLOW       (cms)=      .14          .00          .145 (iii)
     TIME TO PEAK    (hrs)=      1.50        1.52          1.500
     RUNOFF VOLUME    (mm)=     56.94       23.13        56.603
     TOTAL RAINFALL   (mm)=     57.94       57.94        57.941
     RUNOFF COEFFICIENT   =      .98         .40          .977

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0010----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>02:(202A  )   |
| OUT<03:(ROOF  )   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                          .000  .0000E+00    |     .014  .2834E-01
                          .007  .1417E-01    |     .021  .4251E-01
                          .010  .2125E-01    |     .000  .0000E+00

     ROUTING RESULTS           AREA     QPEAK     TPEAK       R.V.
     -------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (202A  )        .47      .145     1.500     56.603
     OUTFLOW<03: (ROOF  )        .47      .009     2.733     56.602
    OVERFLOW<04: (ROOF O)        .00      .000      .000      .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=    6.286
                    TIME SHIFT OF PEAK FLOW         (min)=    74.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1886E-01

--------------------------------------------------------------------------------
010:0011----------------------------------------------------------------------
*# CATCHMENT 202B - PROPOSED CONDITION (UNCONTROLLED TO BOSEWELL DR.)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .20
| 05:202B   DT= 1.00 |   Total Imp(%)=   93.00   Dir. Conn.(%)=   93.00
----------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .19         .01
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      3.00        2.00
     Length            (m)=     25.00        5.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=    111.84       52.70
               over (min)        1.00        3.00
     Storage Coeff.  (min)=       .76 (ii)   3.38 (ii)
     Unit Hyd. Tpeak (min)=      1.00        3.00
     Unit Hyd. peak  (cms)=      1.24         .35
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .06         .00          .059 (iii)
     TIME TO PEAK    (hrs)=      1.50        1.52          1.500
     RUNOFF VOLUME    (mm)=     56.94       23.13        54.574
     TOTAL RAINFALL   (mm)=     57.94       57.94        57.941
     RUNOFF COEFFICIENT   =      .98         .40          .942

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0012----------------------------------------------------------------------
-----------------------
| ADD HYD (TOTAL CONT) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                        ID1 03:ROOF         .47     .009    2.73  56.60    .000
                       +ID2 05:202B         .20     .059    1.50  54.57    .000
                        ==========================================================
                        SUM 06:TOTAL CONT    .67     .066    1.50  56.00    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
010:0013----------------------------------------------------------------------
*# CATCHMENT 203 - PROPOSED CONDITION (INFILTRATING ON SITE)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .87   Curve Number   (CN)=80.00
| 07:203    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .475

     PEAK FLOW       (cms)=     .097 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=   23.126
     TOTAL RAINFALL   (mm)=   57.941
     RUNOFF COEFFICIENT   =     .399

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0014----------------------------------------------------------------------
*# CATCHMENT 204 - PROPOSED CONDITION (UNCONTROLLED TO WEST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .03   Curve Number   (CN)=80.00
| 08:204    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .029

     PEAK FLOW       (cms)=     .004 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   23.123
     TOTAL RAINFALL   (mm)=   57.941
     RUNOFF COEFFICIENT   =     .399

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0015----------------------------------------------------------------------
*# CATCHMENT 205 - PROPOSED CONDITION (UNCONTROLLED TO EAST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .18   Curve Number   (CN)=80.00
| 09:205    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .060

     Unit Hyd Qpeak  (cms)=     .115

     PEAK FLOW       (cms)=     .021 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=   23.126
     TOTAL RAINFALL   (mm)=   57.941
     RUNOFF COEFFICIENT   =     .399

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
010:0016----------------------------------------------------------------------
**#*************************************************************************|
* RUN REMAINING DESIGN STORMS (SIMCOE 2 TO 100-YR)
*
--------------------------------------------------------------------------------
```

```
010:0002----------------------------------------------------------------------
*
----------------------------------------------------------------------------
010:0002----------------------------------------------------------------------
*
  ** END OF RUN :  24

*******************************************************************************




--------------------
| START            |  Project  dir.: T:\PROJECTS\23089\SWMHYMO\
--------------------  Rainfall dir.: T:\PROJECTS\23089\SWMHYMO\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 025
    NSTORM=   1
          #  1=SIMC025.STM
----------------------------------------------------------------------------
025:0002----------------------------------------------------------------------
*#*****************************************************************************|
*#  Project Name: 14 Bosewell Drive
*#               Simcoe, Ontario
*#  JOB NUMBER  : 23089
*#       Date   : JANUARY 2024
*#    Company   : S. LLEWELLYN AND ASSOCIATES LTD.
*#       File   : 23089.DAT
*#*****************************************************************************|
*
----------------------------------------------------------------------------
025:0002----------------------------------------------------------------------
*
--------------------
| READ STORM       |    Filename: 25-year Simcoe a=721.533 b=2.253 c=0.679
| Ptotal=  69.37 mm|    Comments: 25-year Simcoe a=721.533 b=2.253 c=0.679
--------------------
               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   6.290 |   1.17  17.632 |   2.17  14.058 |   3.17   7.426
               .33   6.913 |   1.33  33.366 |   2.33  12.019 |   3.33   6.954
               .50   7.716 |   1.50 131.625 |   2.50  10.582 |   3.50   6.549
               .67   8.797 |   1.67  38.939 |   2.67   9.506 |   3.67   6.199
               .83  10.353 |   1.83  23.084 |   2.83   8.665 |   3.83   5.891
              1.00  12.835 |   2.00  17.238 |   3.00   7.987 |   4.00   5.618

----------------------------------------------------------------------------
025:0003----------------------------------------------------------------------
*
*#*****************************************************************************|
*#
*#        PRE-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#*****************************************************************************|
*# CATCHMENT 101 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:101    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .77          .21
     Dep. Storage     (mm)=       1.00         6.35
     Average Slope     (%)=       2.00         2.50
     Length            (m)=      25.00        15.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=     131.63        67.19
               over (min)        1.00         5.00
     Storage Coeff.  (min)=        .81 (ii)    5.11 (ii)
     Unit Hyd. Tpeak (min)=       1.00         5.00
     Unit Hyd. peak  (cms)=       1.21          .22
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .28          .03          .309 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.53         1.500
     RUNOFF VOLUME    (mm)=      68.37        31.39        60.608
     TOTAL RAINFALL   (mm)=      69.37        69.37        69.374
     RUNOFF COEFFICIENT   =        .99          .45          .874

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
025:0004----------------------------------------------------------------------
*# CATCHMENT 102 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .68
| 02:102    DT= 1.00 |   Total Imp(%)=   30.00   Dir. Conn.(%)=   30.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .20          .48
     Dep. Storage     (mm)=       1.00         6.35
     Average Slope     (%)=       2.00         2.50
     Length            (m)=      50.00        65.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=     131.63        49.54
               over (min)        1.00        13.00
     Storage Coeff.  (min)=       1.23 (ii)   12.92 (ii)
     Unit Hyd. Tpeak (min)=       1.00        13.00
     Unit Hyd. peak  (cms)=        .95          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .07          .04          .094 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.68         1.500
     RUNOFF VOLUME    (mm)=      68.37        31.39        42.487
     TOTAL RAINFALL   (mm)=      69.37        69.37        69.374
     RUNOFF COEFFICIENT   =        .99          .45          .612

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
025:0005----------------------------------------------------------------------
*# CATCHMENT 103 - EXISTING CONDITION (PONDING ON SITE)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .84   Curve Number   (CN)=80.00
| 03:103    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .090

     Unit Hyd Qpeak  (cms)=     .356

     PEAK FLOW       (cms)=     .115 (i)
     TIME TO PEAK    (hrs)=    1.533
     RUNOFF VOLUME    (mm)=   31.393
     TOTAL RAINFALL   (mm)=   69.374
     RUNOFF COEFFICIENT   =     .453

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
025:0006----------------------------------------------------------------------
*# CATCHMENT 104 - EXISTING CONDITION (TO EX. LANDS TO WEST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .04   Curve Number   (CN)=80.00
| 04:104    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .038

     PEAK FLOW       (cms)=     .007 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   31.391
     TOTAL RAINFALL   (mm)=   69.374
     RUNOFF COEFFICIENT   =     .452

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
025:0007----------------------------------------------------------------------
*# CATCHMENT 105 - EXISTING CONDITION (TO EX. LANDS TO EAST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .25   Curve Number   (CN)=80.00
| 05:105    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .191

     PEAK FLOW       (cms)=     .042 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   31.393
     TOTAL RAINFALL   (mm)=   69.374
     RUNOFF COEFFICIENT   =     .453

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
025:0008----------------------------------------------------------------------
*#*****************************************************************************|
*#
*#        POST-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ===============================================
*#
**#*****************************************************************************|
*# CATCHMENT 201 - PROPOSED CONDITION (TO BOSEWELL DRIVE)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:201    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .77          .21
     Dep. Storage     (mm)=       1.00         6.35
     Average Slope     (%)=       2.00         2.50
     Length            (m)=      25.00        15.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=     131.63        67.19
               over (min)        1.00         5.00
     Storage Coeff.  (min)=        .81 (ii)    5.11 (ii)
     Unit Hyd. Tpeak (min)=       1.00         5.00
     Unit Hyd. peak  (cms)=       1.21          .22
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .28          .03          .309 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.53         1.500
     RUNOFF VOLUME    (mm)=      68.37        31.39        60.608
     TOTAL RAINFALL   (mm)=      69.37        69.37        69.374
     RUNOFF COEFFICIENT   =        .99          .45          .874

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
025:0009----------------------------------------------------------------------
*# CATCHMENT 202A - PROPOSED CONDITION (PROPOSED ROOF TO BOSEWELL DR.)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .47
| 02:202A   DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .47          .00
     Dep. Storage     (mm)=       1.00         6.35
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      25.00         5.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=     131.63        70.33
               over (min)        1.00         3.00
     Storage Coeff.  (min)=       1.00 (ii)    3.33 (ii)
     Unit Hyd. Tpeak (min)=       1.00         3.00
     Unit Hyd. peak  (cms)=       1.08          .35
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .17          .00          .171 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.52         1.500
```

```
     RUNOFF VOLUME    (mm)=      68.37        31.39         68.004
     TOTAL RAINFALL   (mm)=      69.37        69.37         69.374
     RUNOFF COEFFICIENT   =        .99          .45           .980

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
025:0010--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>02:(202A  )   |
| OUT<03:(ROOF  )   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |     .014  .2834E-01
                           .007  .1417E-01    |     .021  .4251E-01
                           .010  .2125E-01    |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (202A  )        .47      .171     1.500     68.004
     OUTFLOW<03: (ROOF  )        .47      .011     2.850     68.003
    OVERFLOW<04: (ROOF O)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=    6.381
                  TIME SHIFT OF PEAK FLOW       (min)=    81.00
                  MAXIMUM  STORAGE   USED      (ha.m.)=.2251E-01

--------------------------------------------------------------------------------
025:0011--------------------------------------------------------------------------
*# CATCHMENT 202B - PROPOSED CONDITION (UNCONTROLLED TO BOSEWELL DR.)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .20
| 05:202B   DT= 1.00 |   Total Imp(%)=   93.00   Dir. Conn.(%)=   93.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .19          .01
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      3.00         2.00
     Length            (m)=     25.00         5.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    131.63        70.33
               over (min)        1.00         3.00
     Storage Coeff.  (min)=       .72 (ii)    3.05 (ii)
     Unit Hyd. Tpeak (min)=      1.00         3.00
     Unit Hyd. peak  (cms)=      1.28          .37
                                                      *TOTALS*
     PEAK FLOW       (cms)=       .07          .00          .070 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.50         1.500
     RUNOFF VOLUME    (mm)=     68.37        31.39        65.785
     TOTAL RAINFALL   (mm)=     69.37        69.37        69.374
     RUNOFF COEFFICIENT   =       .99          .45          .948

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
025:0012--------------------------------------------------------------------------
-----------------------
| ADD HYD (TOTAL CONT) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-----------------------                   (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 03:ROOF          .47      .011    2.85  68.00    .000
                     +ID2 05:202B          .20      .070    1.50  65.78    .000
                      ==========================================================
                      SUM 06:TOTAL CONT     .67      .078    1.50  67.34    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
025:0013--------------------------------------------------------------------------
*# CATCHMENT 203 - PROPOSED CONDITION (INFILTRATING ON SITE)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .87   Curve Number   (CN)=80.00
| 07:203    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .475

     PEAK FLOW       (cms)=     .133 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=   31.393
     TOTAL RAINFALL   (mm)=   69.374
     RUNOFF COEFFICIENT   =     .453

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
025:0014--------------------------------------------------------------------------
*# CATCHMENT 204 - PROPOSED CONDITION (UNCONTROLLED TO WEST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .03   Curve Number   (CN)=80.00
| 08:204    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .029

     PEAK FLOW       (cms)=     .005 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   31.389
     TOTAL RAINFALL   (mm)=   69.374
     RUNOFF COEFFICIENT   =     .452

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
025:0015--------------------------------------------------------------------------
*# CATCHMENT 205 - PROPOSED CONDITION (UNCONTROLLED TO EAST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .18   Curve Number   (CN)=80.00
| 09:205    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .060

     Unit Hyd Qpeak  (cms)=     .115

     PEAK FLOW       (cms)=     .029 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=   31.393
     TOTAL RAINFALL   (mm)=   69.374
     RUNOFF COEFFICIENT   =     .453

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
025:0016--------------------------------------------------------------------------
**#*************************************************************************|
* RUN REMAINING DESIGN STORMS (SIMCOE 2 TO 100-YR)
*
--------------------------------------------------------------------------------
025:0002--------------------------------------------------------------------------
*
--------------------------------------------------------------------------------
025:0002--------------------------------------------------------------------------
*
--------------------------------------------------------------------------------
025:0002--------------------------------------------------------------------------
*
  ** END OF RUN :  49

********************************************************************************




--------------------
| START            |  Project  dir.: T:\PROJECTS\23089\SWMHYMO\
--------------------  Rainfall dir.: T:\PROJECTS\23089\SWMHYMO\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 050
    NSTORM=   1
           #  1=SIMC050.STM
--------------------------------------------------------------------------------
050:0002--------------------------------------------------------------------------
*#*************************************************************************|
*#  Project Name: 14 Bosewell Drive
*#               Simcoe, Ontario
*#  JOB NUMBER  : 23089
*#       Date   : JANUARY 2024
*#    Company   : S. LLEWELLYN AND ASSOCIATES LTD.
*#       File   : 23089.DAT
*#*************************************************************************|
*
--------------------------------------------------------------------------------
050:0002--------------------------------------------------------------------------
*
--------------------
| READ STORM       |    Filename: 50-year Simcoe a=766.038 b=1.898 c=0.668
| Ptotal=  78.31 mm|    Comments: 50-year Simcoe a=766.038 b=1.898 c=0.668
--------------------
             TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
              hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
              .17   7.300 |   1.17  19.969 |   2.17  16.022 |   3.17   8.591
              .33   8.009 |   1.33  37.058 |   2.33  13.752 |   3.33   8.055
              .50   8.918 |   1.50 146.499 |   2.50  12.145 |   3.50   7.596
              .67  10.139 |   1.67  43.072 |   2.67  10.937 |   3.67   7.197
              .83  11.888 |   1.83  25.944 |   2.83   9.990 |   3.83   6.847
             1.00  14.660 |   2.00  19.537 |   3.00   9.225 |   4.00   6.536

--------------------------------------------------------------------------------
050:0003--------------------------------------------------------------------------
*
*#*************************************************************************|
*#
*#        PRE-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#*************************************************************************|
*# CATCHMENT 101 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:101    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77          .21
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      2.00         2.50
     Length            (m)=     25.00        15.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    146.50        80.94
               over (min)        1.00         5.00
     Storage Coeff.  (min)=       .78 (ii)    4.76 (ii)
     Unit Hyd. Tpeak (min)=      1.00         5.00
     Unit Hyd. peak  (cms)=      1.23          .23
                                                      *TOTALS*
     PEAK FLOW       (cms)=       .32          .04          .348 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.53         1.500
     RUNOFF VOLUME    (mm)=     77.31        38.23        69.106
     TOTAL RAINFALL   (mm)=     78.31        78.31        78.314
     RUNOFF COEFFICIENT   =       .99          .49          .882

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
050:0004--------------------------------------------------------------------------
*# CATCHMENT 102 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
```

```
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .68
| 02:102    DT= 1.00 |   Total Imp(%)=   30.00   Dir. Conn.(%)=   30.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .20         .48
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      2.00        2.50
     Length            (m)=     50.00       65.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=    146.50       63.16
               over (min)       1.00       12.00
     Storage Coeff.  (min)=      1.18 (ii)  11.79 (ii)
     Unit Hyd. Tpeak (min)=      1.00       12.00
     Unit Hyd. peak  (cms)=       .97         .10
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .08         .05          .111 (iii)
     TIME TO PEAK    (hrs)=      1.50        1.65         1.500
     RUNOFF VOLUME    (mm)=     77.31       38.23        49.955
     TOTAL RAINFALL   (mm)=     78.31       78.31        78.314
     RUNOFF COEFFICIENT   =       .99         .49          .638

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
050:0005---------------------------------------------------------------------
*# CATCHMENT 103 - EXISTING CONDITION (PONDING ON SITE)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .84   Curve Number   (CN)=80.00
| 03:103    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .090

     Unit Hyd Qpeak  (cms)=     .356

     PEAK FLOW       (cms)=     .140 (i)
     TIME TO PEAK    (hrs)=    1.533
     RUNOFF VOLUME    (mm)=   38.230
     TOTAL RAINFALL   (mm)=   78.314
     RUNOFF COEFFICIENT   =     .488

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
050:0006---------------------------------------------------------------------
*# CATCHMENT 104 - EXISTING CONDITION (TO EX. LANDS TO WEST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .04   Curve Number   (CN)=80.00
| 04:104    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .038

     PEAK FLOW       (cms)=     .009 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   38.228
     TOTAL RAINFALL   (mm)=   78.314
     RUNOFF COEFFICIENT   =     .488

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
050:0007---------------------------------------------------------------------
*# CATCHMENT 105 - EXISTING CONDITION (TO EX. LANDS TO EAST)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .25   Curve Number   (CN)=80.00
| 05:105    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .191

     PEAK FLOW       (cms)=     .051 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   38.230
     TOTAL RAINFALL   (mm)=   78.314
     RUNOFF COEFFICIENT   =     .488

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
050:0008---------------------------------------------------------------------
*#*****************************************************************************|
*#
*#        POST-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#*****************************************************************************|
*# CATCHMENT 201 - PROPOSED CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:201    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77         .21
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      2.00        2.50
     Length            (m)=     25.00       15.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=    146.50       80.94
               over (min)       1.00        5.00
     Storage Coeff.  (min)=       .78 (ii)   4.76 (ii)
     Unit Hyd. Tpeak (min)=      1.00        5.00
     Unit Hyd. peak  (cms)=      1.23         .23
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .32         .04          .348 (iii)
     TIME TO PEAK    (hrs)=      1.50        1.53         1.500
     RUNOFF VOLUME    (mm)=     77.31       38.23        69.106
     TOTAL RAINFALL   (mm)=     78.31       78.31        78.314
     RUNOFF COEFFICIENT   =       .99         .49          .882

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
050:0009---------------------------------------------------------------------
*# CATCHMENT 202A - PROPOSED CONDITION (PROPOSED ROOF TO BOSEWELL DR.)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .47
| 02:202A   DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .47         .00
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      1.00        2.00
     Length            (m)=     25.00        5.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=    146.50       84.35
               over (min)       1.00        3.00
     Storage Coeff.  (min)=       .95 (ii)   3.12 (ii)
     Unit Hyd. Tpeak (min)=      1.00        3.00
     Unit Hyd. peak  (cms)=      1.10         .37
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .19         .00          .190 (iii)
     TIME TO PEAK    (hrs)=      1.50        1.50         1.500
     RUNOFF VOLUME    (mm)=     77.31       38.23        76.923
     TOTAL RAINFALL   (mm)=     78.31       78.31        78.314
     RUNOFF COEFFICIENT   =       .99         .49          .982

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
050:0010---------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(202A  )    |
| OUT<03:(ROOF  )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00    |     .014  .2834E-01
                           .007  .1417E-01    |     .021  .4251E-01
                           .010  .2125E-01    |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     ---------------            (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (202A  )        .47      .190     1.500     76.923
     OUTFLOW<03: (ROOF  )        .47      .012     2.850     76.922
    OVERFLOW<04: (ROOF O)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=    6.452
                  TIME SHIFT OF PEAK FLOW         (min)=    81.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.2537E-01

-------------------------------------------------------------------------------
050:0011---------------------------------------------------------------------
*# CATCHMENT 202B - PROPOSED CONDITION (UNCONTROLLED TO BOSEWELL DR.)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .20
| 05:202B   DT= 1.00 |   Total Imp(%)=   93.00   Dir. Conn.(%)=   93.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .19         .01
     Dep. Storage     (mm)=      1.00        6.35
     Average Slope     (%)=      3.00        2.00
     Length            (m)=     25.00        5.00
     Mannings n           =      .013        .250

     Max.eff.Inten.(mm/hr)=    146.50       84.35
               over (min)       1.00        3.00
     Storage Coeff.  (min)=       .69 (ii)   2.86 (ii)
     Unit Hyd. Tpeak (min)=      1.00        3.00
     Unit Hyd. peak  (cms)=      1.30         .39
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .08         .00          .079 (iii)
     TIME TO PEAK    (hrs)=      1.50        1.50         1.500
     RUNOFF VOLUME    (mm)=     77.31       38.23        74.578
     TOTAL RAINFALL   (mm)=     78.31       78.31        78.314
     RUNOFF COEFFICIENT   =       .99         .49          .952

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
050:0012---------------------------------------------------------------------
------------------------
| ADD HYD (TOTAL CONT) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 03:ROOF          .47      .012    2.85  76.92    .000
                     +ID2 05:202B          .20      .079    1.50  74.58    .000
                      ========================================================
                      SUM 06:TOTAL CONT    .67      .087    1.50  76.22    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
050:0013---------------------------------------------------------------------
*# CATCHMENT 203 - PROPOSED CONDITION (INFILTRATING ON SITE)
*
---------------------
| CALIB NASHYD       |   Area    (ha)=     .87   Curve Number   (CN)=80.00
| 07:203    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .475
```

```
     PEAK FLOW      (cms)=     .162 (i)
     TIME TO PEAK   (hrs)=    1.517
     RUNOFF VOLUME   (mm)=   38.230
     TOTAL RAINFALL  (mm)=   78.314
     RUNOFF COEFFICIENT  =     .488

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
050:0014--------------------------------------------------------------------------
*# CATCHMENT 204 - PROPOSED CONDITION (UNCONTROLLED TO WEST)
*
---------------------
| CALIB NASHYD      |   Area    (ha)=     .03   Curve Number   (CN)=80.00
| 08:204    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .029

     PEAK FLOW      (cms)=     .007 (i)
     TIME TO PEAK   (hrs)=    1.500
     RUNOFF VOLUME   (mm)=   38.228
     TOTAL RAINFALL  (mm)=   78.314
     RUNOFF COEFFICIENT  =     .488

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
050:0015--------------------------------------------------------------------------
*# CATCHMENT 205 - PROPOSED CONDITION (UNCONTROLLED TO EAST)
*
---------------------
| CALIB NASHYD      |   Area    (ha)=     .18   Curve Number   (CN)=80.00
| 09:205    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .060

     Unit Hyd Qpeak  (cms)=     .115

     PEAK FLOW      (cms)=     .035 (i)
     TIME TO PEAK   (hrs)=    1.517
     RUNOFF VOLUME   (mm)=   38.230
     TOTAL RAINFALL  (mm)=   78.314
     RUNOFF COEFFICIENT  =     .488

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
050:0016--------------------------------------------------------------------------
**#*************************************************************************|
* RUN REMAINING DESIGN STORMS (SIMCOE 2 TO 100-YR)
*
--------------------------------------------------------------------------------
050:0002--------------------------------------------------------------------------
*
--------------------------------------------------------------------------------
050:0002--------------------------------------------------------------------------
*
--------------------------------------------------------------------------------
050:0002--------------------------------------------------------------------------
*
--------------------------------------------------------------------------------
050:0002--------------------------------------------------------------------------
*
  ** END OF RUN :  99

********************************************************************************




--------------------
| START            |  Project  dir.: T:\PROJECTS\23089\SWMHYMO\
-------------------  Rainfall dir.: T:\PROJECTS\23089\SWMHYMO\
    TZERO =   .00 hrs on      0
    METOUT=   2 (output = METRIC)
    NRUN  = 100
    NSTORM=   1
            #  1=SIMC100.STM
--------------------------------------------------------------------------------
100:0002--------------------------------------------------------------------------
*#*************************************************************************|
*#  Project Name: 14 Bosewell Drive
*#               Simcoe, Ontario
*#  JOB NUMBER  : 23089
*#       Date   : JANUARY 2024
*#    Company   : S. LLEWELLYN AND ASSOCIATES LTD.
*#       File   : 23089.DAT
*#*************************************************************************|
*
--------------------------------------------------------------------------------
100:0002--------------------------------------------------------------------------
*
--------------------
| READ STORM       |    Filename: 100-year Simcoe a=801.041 b=1.501 c=0.65
| Ptotal=  87.08 mm|    Comments: 100-year Simcoe a=801.041 b=1.501 c=0.65
--------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   8.338 |   1.17  22.251 |   2.17  17.966 |   3.17   9.778
               .33   9.129 |   1.33  40.454 |   2.33  15.482 |   3.33   9.181
               .50  10.142 |   1.50 160.972 |   2.50  13.715 |   3.50   8.668
               .67  11.498 |   1.67  46.813 |   2.67  12.382 |   3.67   8.222
               .83  13.431 |   1.83  28.681 |   2.83  11.333 |   3.83   7.830
              1.00  16.477 |   2.00  21.787 |   3.00  10.483 |   4.00   7.481

--------------------------------------------------------------------------------
100:0003--------------------------------------------------------------------------
*
*#*************************************************************************|
*#
*#        PRE-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ==============================================
*#
**#*************************************************************************|
*# CATCHMENT 101 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:101    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77          .21
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      2.00         2.50
     Length            (m)=     25.00        15.00
     Mannings n             =    .013         .250

     Max.eff.Inten.(mm/hr)=    160.97        96.61
               over (min)        1.00         4.00
     Storage Coeff.  (min)=       .75 (ii)    4.46 (ii)
     Unit Hyd. Tpeak (min)=      1.00         4.00
     Unit Hyd. peak  (cms)=      1.25          .26
                                                      *TOTALS*
     PEAK FLOW      (cms)=       .35          .04          .388 (iii)
     TIME TO PEAK   (hrs)=      1.50         1.52         1.500
     RUNOFF VOLUME   (mm)=     86.08        45.19        77.495
     TOTAL RAINFALL  (mm)=     87.08        87.08        87.083
     RUNOFF COEFFICIENT  =       .99          .52          .890

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
100:0004--------------------------------------------------------------------------
*# CATCHMENT 102 - EXISTING CONDITION (TO BOSEWELL DRIVE)
*
---------------------
| CALIB STANDHYD     |   Area    (ha)=     .68
| 02:102    DT= 1.00 |   Total Imp(%)=   30.00   Dir. Conn.(%)=   30.00
---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .20          .48
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      2.00         2.50
     Length            (m)=     50.00        65.00
     Mannings n             =    .013         .250

     Max.eff.Inten.(mm/hr)=    160.97        78.66
               over (min)        1.00        11.00
     Storage Coeff.  (min)=      1.13 (ii)   10.85 (ii)
     Unit Hyd. Tpeak (min)=      1.00        11.00
     Unit Hyd. peak  (cms)=      1.00          .10
                                                      *TOTALS*
     PEAK FLOW      (cms)=       .09          .06          .130 (iii)
     TIME TO PEAK   (hrs)=      1.50         1.63         1.500
     RUNOFF VOLUME   (mm)=     86.08        45.19        57.457
     TOTAL RAINFALL  (mm)=     87.08        87.08        87.083
     RUNOFF COEFFICIENT  =       .99          .52          .660

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
100:0005--------------------------------------------------------------------------
*# CATCHMENT 103 - EXISTING CONDITION (PONDING ON SITE)
*
---------------------
| CALIB NASHYD      |   Area    (ha)=     .84   Curve Number   (CN)=80.00
| 03:103    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .090

     Unit Hyd Qpeak  (cms)=     .356

     PEAK FLOW      (cms)=     .165 (i)
     TIME TO PEAK   (hrs)=    1.533
     RUNOFF VOLUME   (mm)=   45.189
     TOTAL RAINFALL  (mm)=   87.083
     RUNOFF COEFFICIENT  =     .519

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
100:0006--------------------------------------------------------------------------
*# CATCHMENT 104 - EXISTING CONDITION (TO EX. LANDS TO WEST)
*
---------------------
| CALIB NASHYD      |   Area    (ha)=     .04   Curve Number   (CN)=80.00
| 04:104    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .038

     PEAK FLOW      (cms)=     .010 (i)
     TIME TO PEAK   (hrs)=    1.500
     RUNOFF VOLUME   (mm)=   45.186
     TOTAL RAINFALL  (mm)=   87.083
     RUNOFF COEFFICIENT  =     .519

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
100:0007--------------------------------------------------------------------------
*# CATCHMENT 105 - EXISTING CONDITION (TO EX. LANDS TO EAST)
*
---------------------
| CALIB NASHYD      |   Area    (ha)=     .25   Curve Number   (CN)=80.00
| 05:105    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .050

     Unit Hyd Qpeak  (cms)=     .191

     PEAK FLOW      (cms)=     .061 (i)
     TIME TO PEAK   (hrs)=    1.500
     RUNOFF VOLUME   (mm)=   45.189
     TOTAL RAINFALL  (mm)=   87.083
     RUNOFF COEFFICIENT  =     .519

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
100:0008--------------------------------------------------------------------------
*#*************************************************************************|
```

```
*#
*#        POST-DEVELOPMENT CONDITIONS HYDROLOGIC MODELING
*#        ===============================================
*#
**#*************************************************************************|
*# CATCHMENT 201 - PROPOSED CONDITION (TO BOSEWELL DRIVE)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .98
| 01:201    DT= 1.00 |   Total Imp(%)=   79.00   Dir. Conn.(%)=   79.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .77          .21
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      2.00         2.50
     Length            (m)=     25.00        15.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    160.97        96.61
               over (min)       1.00         4.00
     Storage Coeff.  (min)=      .75 (ii)    4.46 (ii)
     Unit Hyd. Tpeak (min)=      1.00         4.00
     Unit Hyd. peak  (cms)=      1.25          .26
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .35          .04          .388 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.52         1.500
     RUNOFF VOLUME    (mm)=     86.08        45.19        77.495
     TOTAL RAINFALL   (mm)=     87.08        87.08        87.083
     RUNOFF COEFFICIENT   =       .99          .52          .890

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
100:0009---------------------------------------------------------------------
*# CATCHMENT 202A - PROPOSED CONDITION (PROPOSED ROOF TO BOSEWELL DR.)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .47
| 02:202A   DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .47          .00
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      1.00         2.00
     Length            (m)=     25.00         5.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    160.97        98.37
               over (min)       1.00         3.00
     Storage Coeff.  (min)=      .92 (ii)    2.96 (ii)
     Unit Hyd. Tpeak (min)=      1.00         3.00
     Unit Hyd. peak  (cms)=      1.13          .38
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .21          .00          .209 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.50         1.500
     RUNOFF VOLUME    (mm)=     86.08        45.19        85.674
     TOTAL RAINFALL   (mm)=     87.08        87.08        87.083
     RUNOFF COEFFICIENT   =       .99          .52          .984

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
100:0010---------------------------------------------------------------------
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>02:(202A  )    |
| OUT<03:(ROOF  )    |    =========  OUTLFOW STORAGE TABLE  =========
---------------------     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |     .014  .2834E-01
                            .007  .1417E-01    |     .021  .4251E-01
                            .010  .2125E-01    |     .000  .0000E+00

     ROUTING RESULTS           AREA     QPEAK     TPEAK       R.V.
     --------------------      (ha)     (cms)     (hrs)       (mm)
     INFLOW >02: (202A  )       .47      .209     1.500     85.674
     OUTFLOW<03: (ROOF  )       .47      .014     3.000     85.673
    OVERFLOW<04: (ROOF O)       .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=    6.510
                    TIME SHIFT OF PEAK FLOW         (min)=    90.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2817E-01

-------------------------------------------------------------------------------
100:0011---------------------------------------------------------------------
*# CATCHMENT 202B - PROPOSED CONDITION (UNCONTROLLED TO BOSEWELL DR.)
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .20
| 05:202B   DT= 1.00 |   Total Imp(%)=   93.00   Dir. Conn.(%)=   93.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .19          .01
     Dep. Storage     (mm)=      1.00         6.35
     Average Slope     (%)=      3.00         2.00
     Length            (m)=     25.00         5.00
     Mannings n           =      .013         .250

     Max.eff.Inten.(mm/hr)=    160.97        98.37
               over (min)       1.00         3.00
     Storage Coeff.  (min)=      .66 (ii)    2.70 (ii)
     Unit Hyd. Tpeak (min)=      1.00         3.00
     Unit Hyd. peak  (cms)=      1.32          .40
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .08          .00          .087 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.50         1.500
     RUNOFF VOLUME    (mm)=     86.08        45.19        83.220
     TOTAL RAINFALL   (mm)=     87.08        87.08        87.083
     RUNOFF COEFFICIENT   =       .99          .52          .956

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
100:0012---------------------------------------------------------------------
----------------------
| ADD HYD (TOTAL CONT) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
----------------------                    (ha)     (cms)   (hrs)   (mm)   (cms)
                      ID1 03:ROOF           .47      .014    3.00  85.67    .000
                     +ID2 05:202B           .20      .087    1.50  83.22    .000
                      ============================================================
                      SUM 06:TOTAL CONT     .67      .096    1.50  84.94    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
100:0013---------------------------------------------------------------------
*# CATCHMENT 203 - PROPOSED CONDITION (INFILTRATING ON SITE)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .87   Curve Number   (CN)=80.00
| 07:203    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .070

     Unit Hyd Qpeak  (cms)=     .475

     PEAK FLOW       (cms)=     .191 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=   45.189
     TOTAL RAINFALL   (mm)=   87.083
     RUNOFF COEFFICIENT   =     .519

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
100:0014---------------------------------------------------------------------
*# CATCHMENT 204 - PROPOSED CONDITION (UNCONTROLLED TO WEST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .03   Curve Number   (CN)=80.00
| 08:204    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .040

     Unit Hyd Qpeak  (cms)=     .029

     PEAK FLOW       (cms)=     .008 (i)
     TIME TO PEAK    (hrs)=    1.500
     RUNOFF VOLUME    (mm)=   45.186
     TOTAL RAINFALL   (mm)=   87.083
     RUNOFF COEFFICIENT   =     .519

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
100:0015---------------------------------------------------------------------
*# CATCHMENT 205 - PROPOSED CONDITION (UNCONTROLLED TO EAST)
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .18   Curve Number   (CN)=80.00
| 09:205    DT= 1.00 |   Ia      (mm)=   6.350   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .060

     Unit Hyd Qpeak  (cms)=     .115

     PEAK FLOW       (cms)=     .042 (i)
     TIME TO PEAK    (hrs)=    1.517
     RUNOFF VOLUME    (mm)=   45.189
     TOTAL RAINFALL   (mm)=   87.083
     RUNOFF COEFFICIENT   =     .519

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
100:0016---------------------------------------------------------------------
**#*************************************************************************|
* RUN REMAINING DESIGN STORMS (SIMCOE 2 TO 100-YR)
*
-------------------------------------------------------------------------------
100:0002---------------------------------------------------------------------
*
-------------------------------------------------------------------------------
100:0002---------------------------------------------------------------------
*
-------------------------------------------------------------------------------
100:0002---------------------------------------------------------------------
*
-------------------------------------------------------------------------------
100:0002---------------------------------------------------------------------
*
-------------------------------------------------------------------------------
100:0002---------------------------------------------------------------------
*
-------------------------------------------------------------------------------
100:0002---------------------------------------------------------------------
*
      FINISH
-------------------------------------------------------------------------------
*************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2024-02-06     at 14:57:42
=========================================================================
```

APPENDIX B

QUALITY CONTROL INFORMATION

Hydroworks Sizing Summary

14 Boswell Drive
Simcoe, Ontario

01-25-2024

Recommended Size: HS 4

A HydroStorm HS 4 is recommended to provide 80 % annual TSS removal based on a drainage area of 0.20 (ha) with an imperviousness of 93 % and Hamilton Airport, Ontario rainfall for the 20 um to 2000 um particle size distribution.

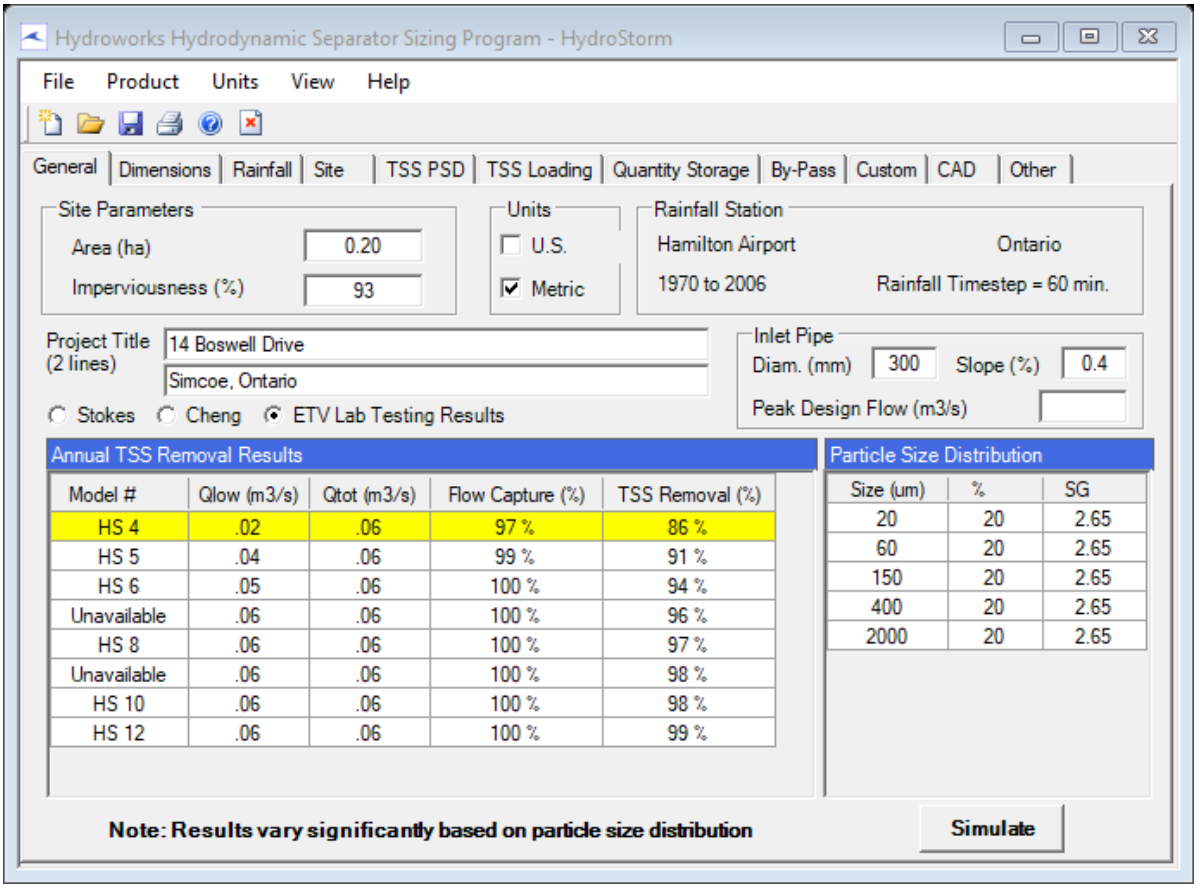
The recommended HydroStorm HS 4 treats 97 % of the annual runoff and provides 86 % annual TSS removal for the Hamilton Airport rainfall records and 20 um to 2000 um particle size distribution.

The HydroStorm has a headloss coefficient (K) of 1.04. Since a peak flow was not specified, headloss was calculated using the full pipe flow of .06 (m3/s) for the given 300 (mm) pipe diameter at .4% slope. The headloss was calculated to be 40 (mm) based on a flow depth of 300 (mm) (full pipe flow).

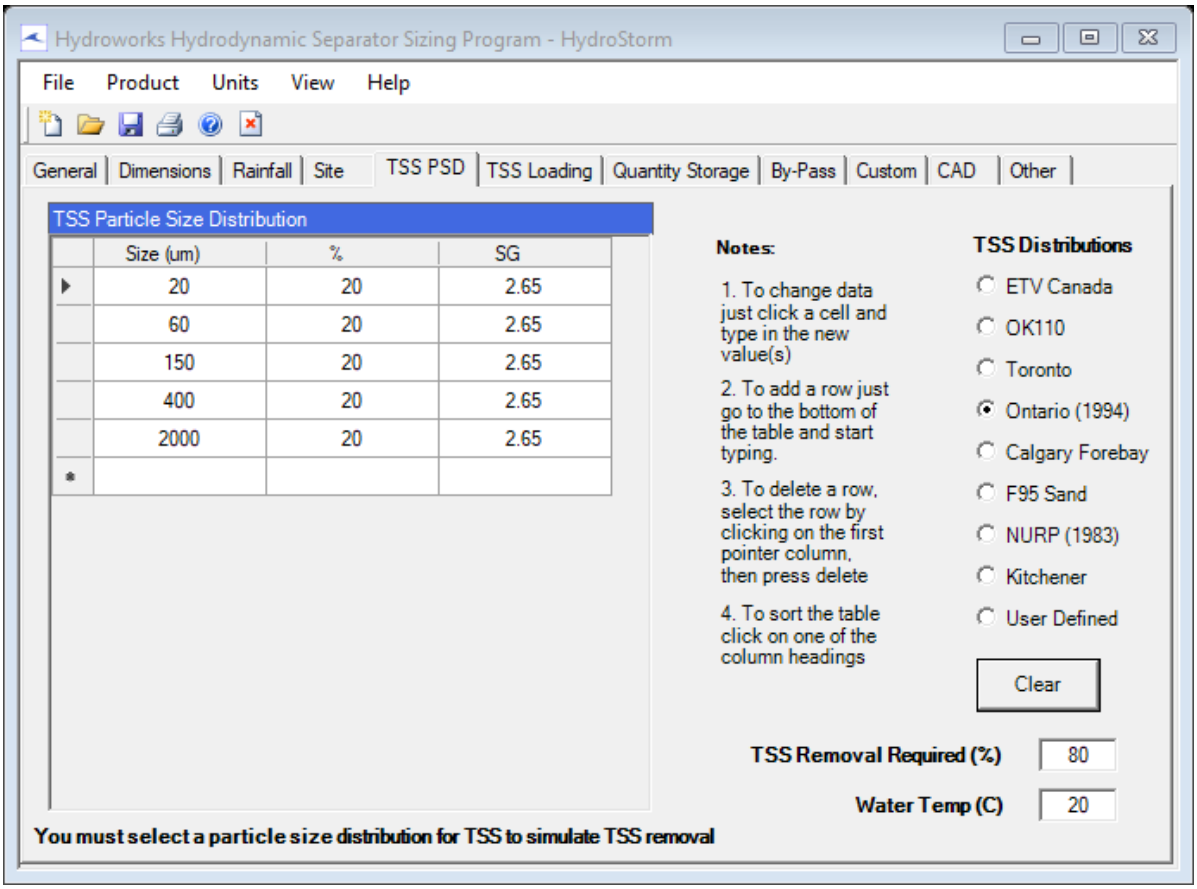
This summary report provides the main parameters that were used for sizing. These parameters are shown on the summary tables and graphs provided in this report.

If you have any questions regarding this sizing summary please do not hesitate to contact Hydroworks at 888-290-7900 or email us at support@hydroworks.com.

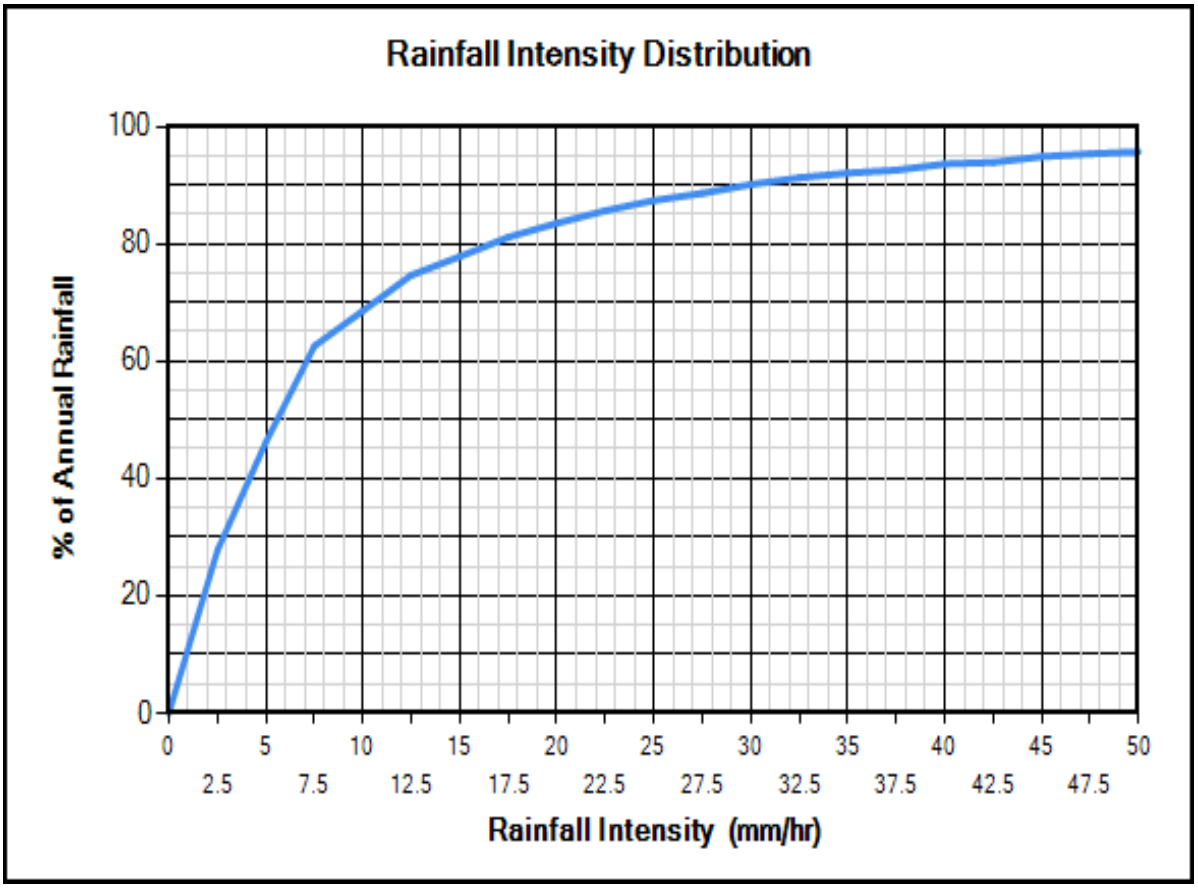
TSS Removal Sizing Summary



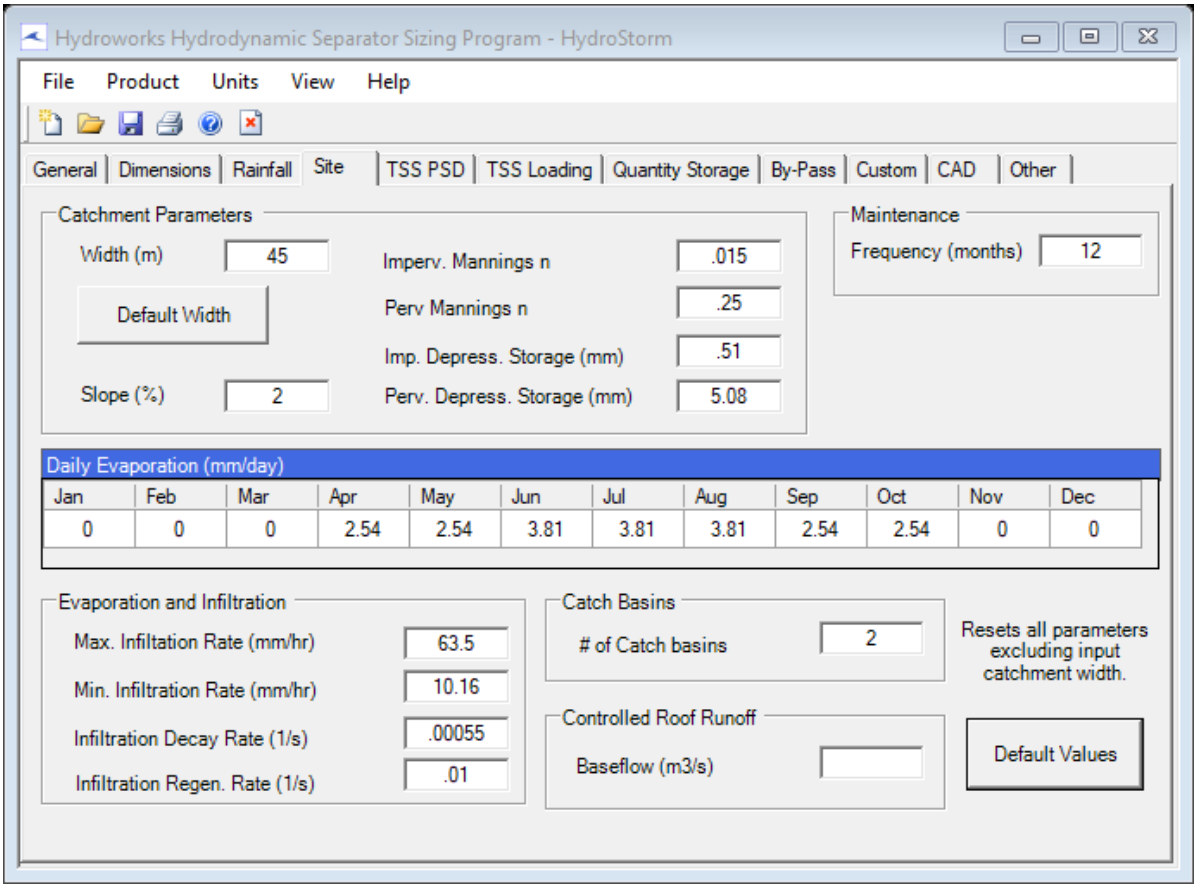
TSS Particle Size Distribution



Rainfall Station - Hamilton Airport, Ontario(1970 to 2006)



Site Physical Characteristics



Dimensions And Capacities

Hydroworks Hydrodynamic Separator Sizing Program - HydroStorm

File Product Units View Help

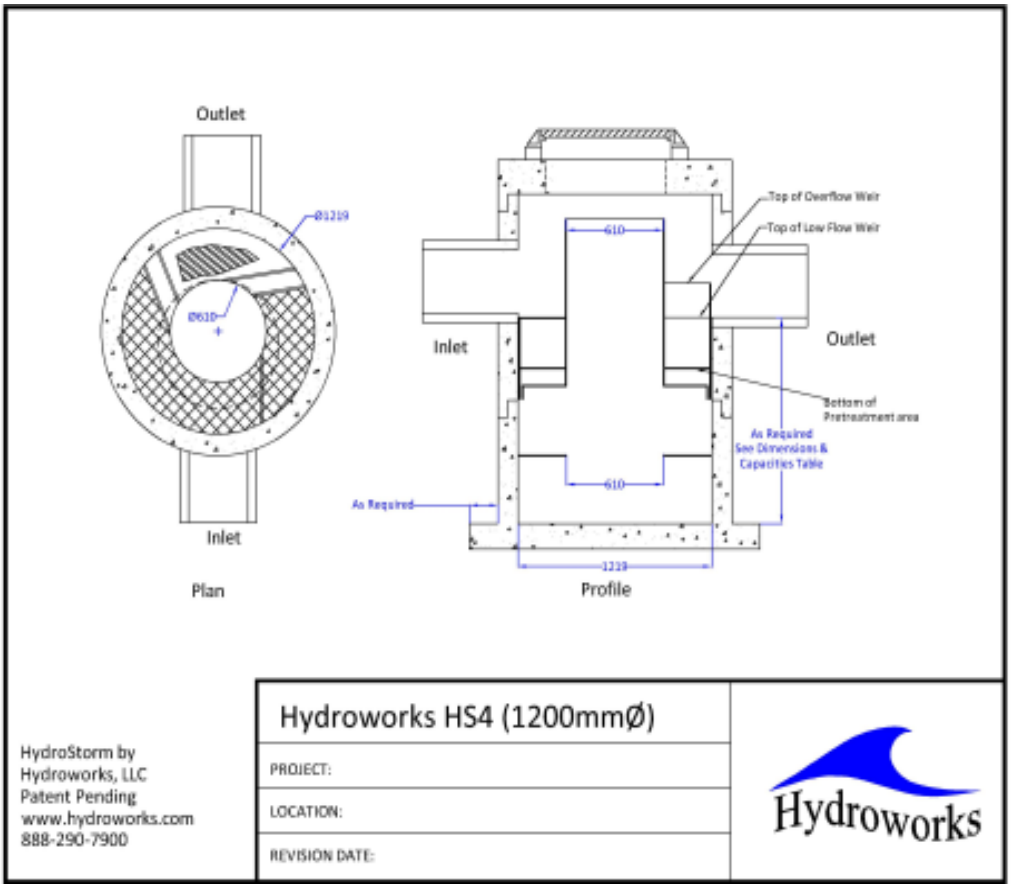
General | Dimensions | Rainfall | Site | TSS PSD | TSS Loading | Quantity Storage | By-Pass | Custom | CAD | Other

Dimensions and Capacities

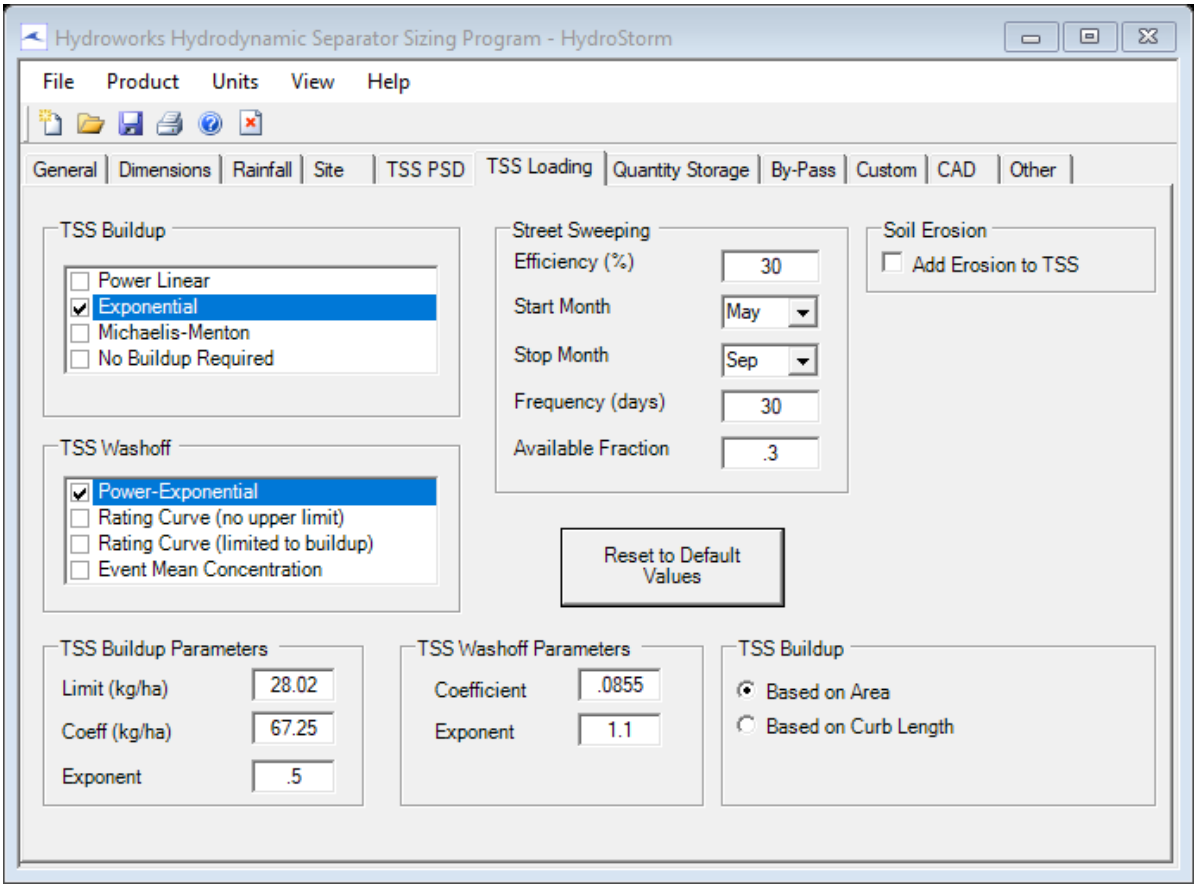
Model	Diam. (m)	Depth (m)	Float. Vol. (L)	Sediment Vol. (m3)	Total Vol. (m3)
HS 4	1.22	1.22	381	0.9	1.4
HS 5	1.52	1.52	642	1.8	2.8
HS 6	1.83	1.83	1041	3.2	4.8
HS 7	2.13	1.98	1575	4.6	7.1
HS 8	2.44	2.13	2354	6.3	10
HS 9	2.74	2.44	3242	9.3	14.4
HS 10	3.05	2.74	4327	13.2	20
HS 12	3.66	3.35	7164	23.8	35.2

Depth = Depth from outlet invert to inside bottom of tank

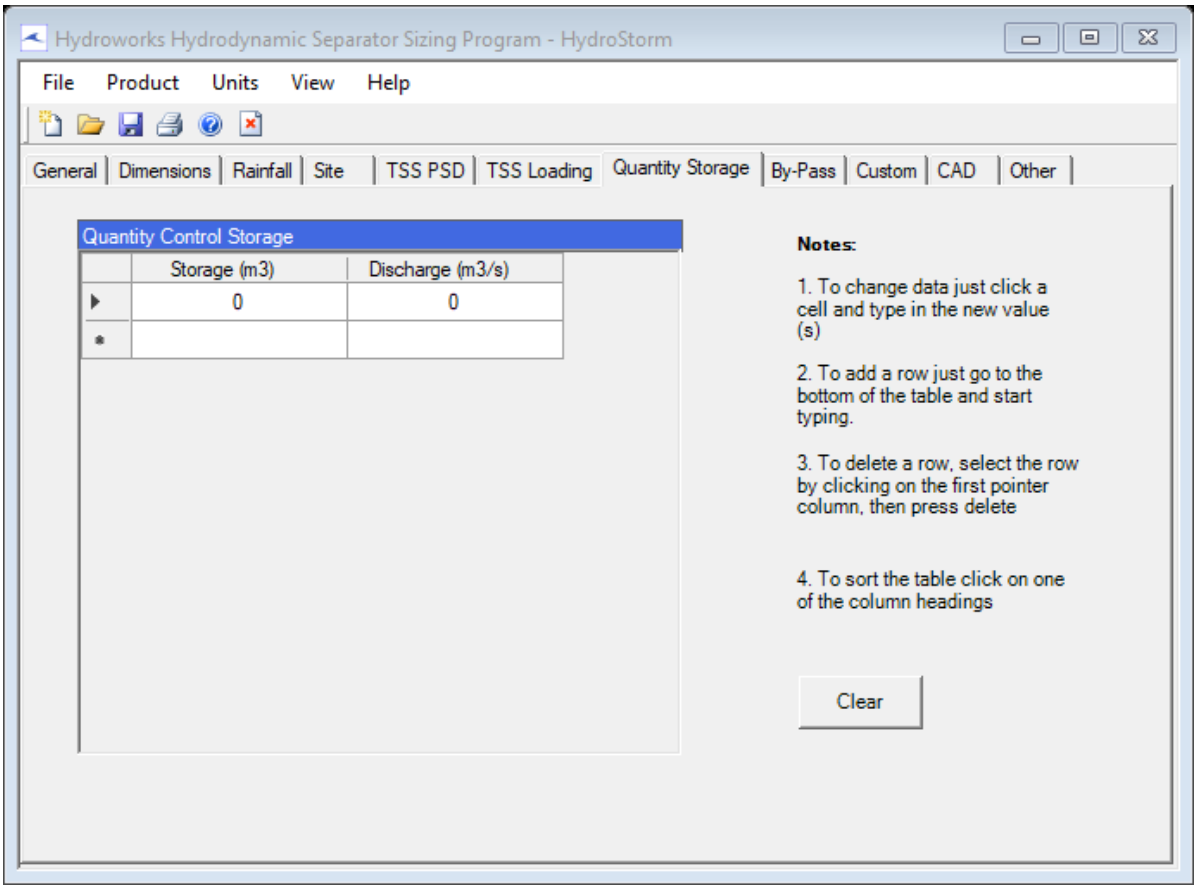
Generic HS 4 CAD Drawing



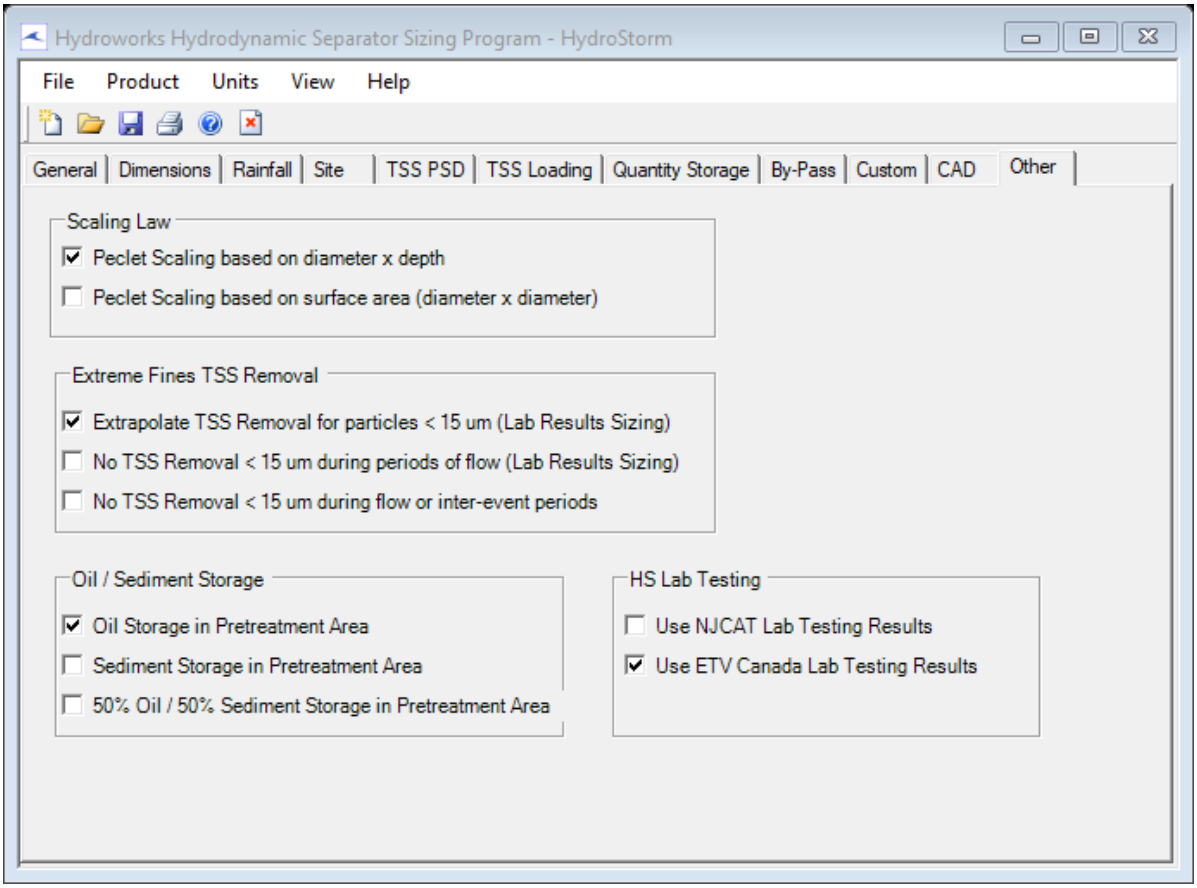
TSS Buildup And Washoff



Upstream Quantity Storage



Other Parameters



Hydroworks® HydroStorm

Operations & Maintenance Manual

Version 1.0

Please call Hydroworks at 888-290-7900 or email us at support@hydroworks.com if you have any questions regarding the Inspection Checklist. Please fax a copy of the completed checklist to Hydroworks at 888-783-7271 for our records.

Introduction

The HydroStorm is a state of the art hydrodynamic separator. Hydrodynamic separators remove solids, debris and lighter than water (oil, trash, floating debris) pollutants from stormwater. Hydrodynamic separators and other water quality measures are mandated by regulatory agencies (Town/City, State, Federal Government) to protect storm water quality from pollution generated by urban development (traffic, people) as part of new development permitting requirements.

As storm water treatment structures fill up with pollutants they become less and less effective in removing new pollution. Therefore, it is important that storm water treatment structures be maintained on a regular basis to ensure that they are operating at optimum performance. The HydroStorm is no different in this regard and this manual has been assembled to provide the owner/operator with the necessary information to inspect and coordinate maintenance of their HydroStorm.

Hydroworks® HydroStorm Operation

The Hydroworks HydroStorm (HS) separator is a unique hydrodynamic by-pass separator. It incorporates a protected submerged pretreatment zone to collect larger solids, a treatment tank to remove finer solids, and a dual set of weirs to create a high flow bypass. High flows are conveyed directly to the outlet and do not enter the treatment area, however, the submerged pretreatment area still allows removal of coarse solids during high flows.

Under normal or low flows, water enters an inlet area with a horizontal grate. The area underneath the grate is submerged with openings to the main treatment area of the separator. Coarse solids fall through the grate and are either trapped in the pretreatment area or conveyed into the main treatment area depending on the flow rate. Fines are transported into the main treatment area. Openings and weirs in the pretreatment area allow entry of water and solids into the main treatment area and cause water to rotate in the main treatment area creating a vortex motion. Water in the main treatment area is forced to rise along the walls of the separator to discharge from the treatment area to the downstream pipe.

The vortex motion forces solids and floatables to the middle of the inner chamber. Floatables are trapped since the inlet to the treatment area is submerged. The design maximizes the retention of settled solids since solids are forced to the center of the inner chamber by the vortex motion of water while water must flow up the walls of the separator to discharge into the downstream pipe.

A set of high flow weirs near the outlet pipe create a high flow bypass over both the pretreatment area and main treatment chamber. The rate of flow into the treatment area is regulated by the number and size of openings into the treatment chamber and the height of by-pass weirs. High flows flow over the weirs directly to the outlet pipe preventing the scour and resuspension of any fines collected in the treatment chamber.

A central access tube is located in the structure to provide access for cleaning. The arrangement of the inlet area and bypass weirs near the outlet pipe facilitate the use of multiple inlet pipes.

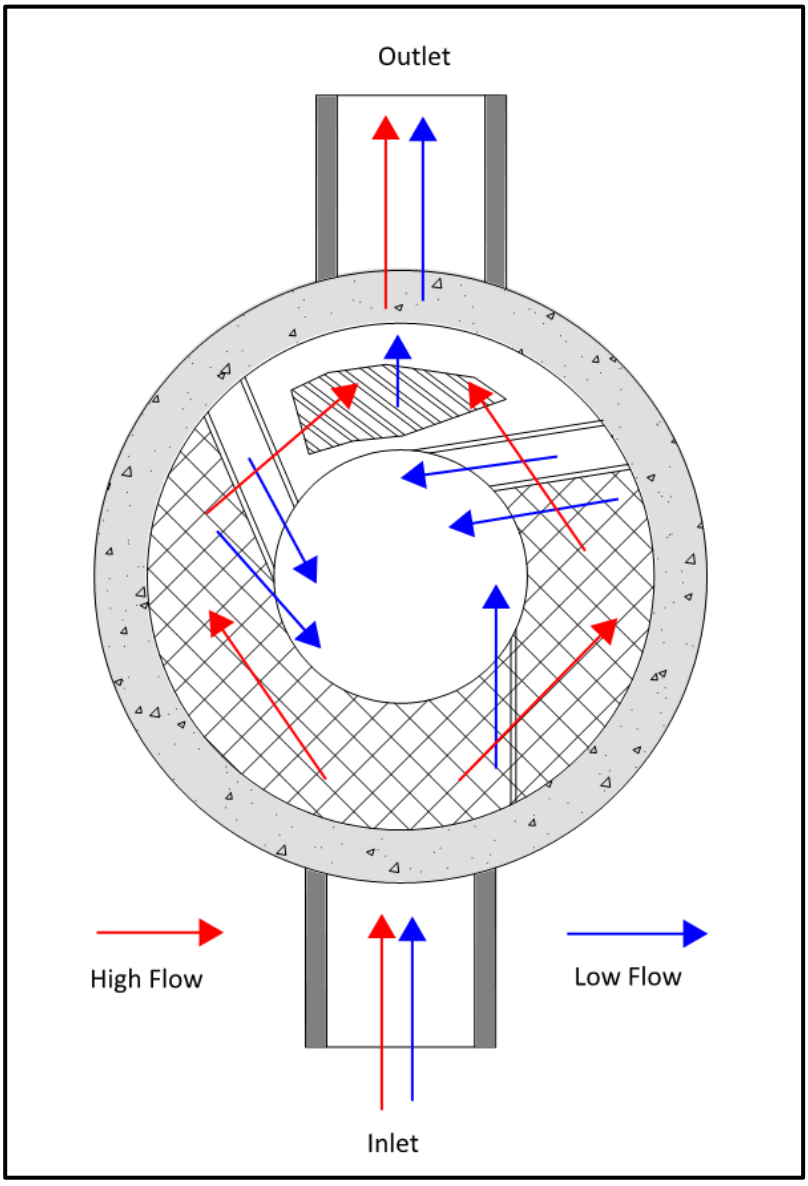


Figure 1. Hydroworks HydroStorm Operation – Plan View

Figure 2 is a profile view of the HydroStorm separator showing the flow patterns for low and high flows.

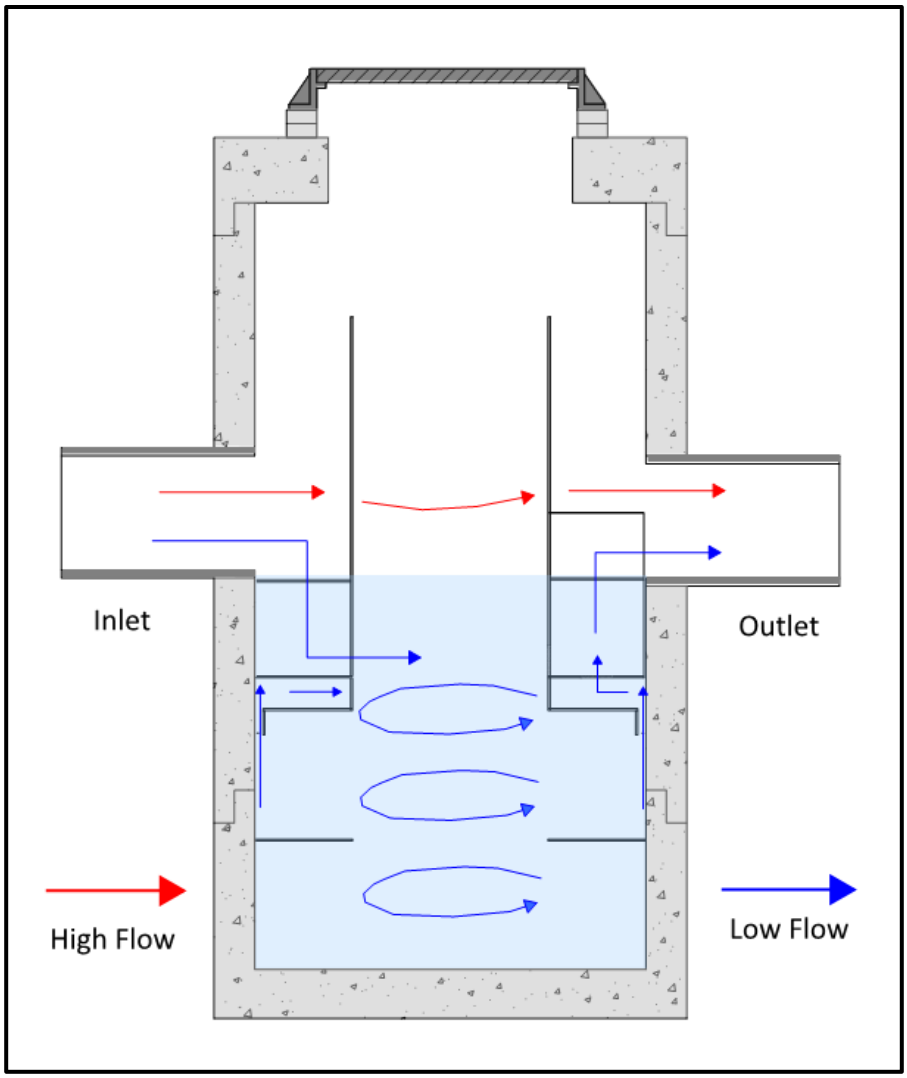


Figure 2. Hydroworks HydroStorm Operation – Profile View

The HS 4i is an inlet version of the HS 4 separator. There is a catch-basin grate on top of the HS 4i. A funnel sits sits underneath the grate on the frame and directs the water to the inlet side of the separator to ensure all lows flows are properly treated. The whole funnel is removed for inspection and cleaning.

Hydroworks

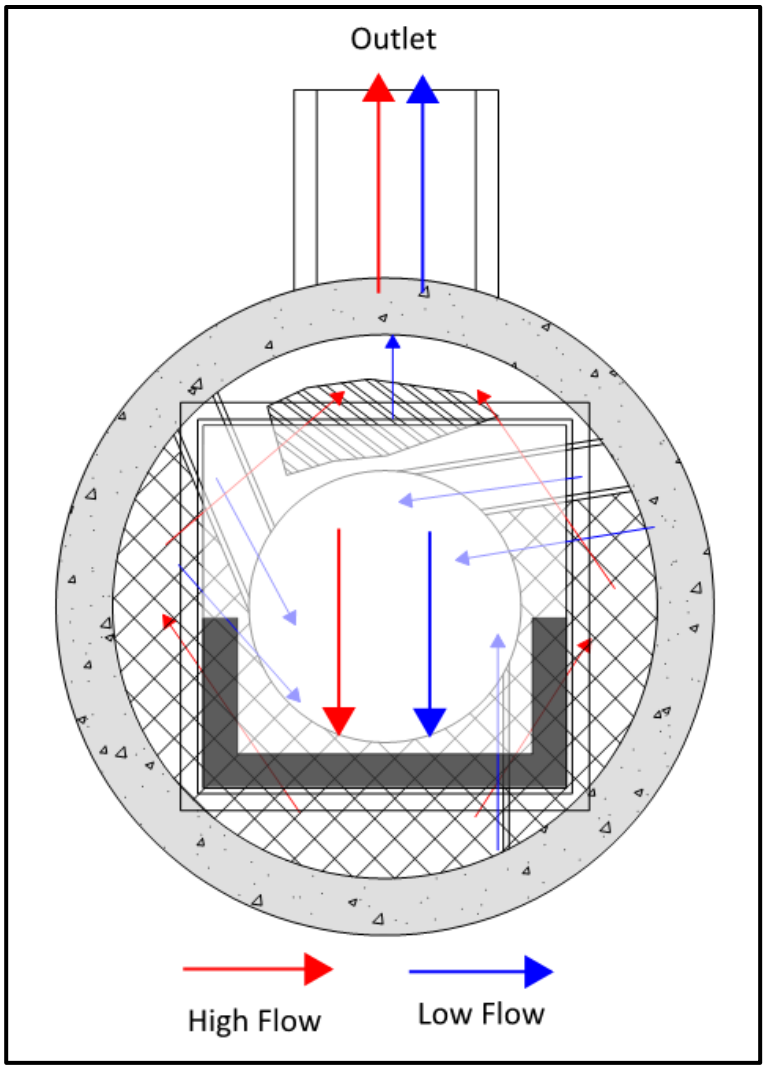


Figure 3. Hydroworks HS 4i Funnel

Inspection

Procedure

Floatables

A visual inspection can be conducted for floatables by removing the covers and looking down into the center access tube of the separator. Separators with an inlet grate (HS 4i or custom separator) will have a plastic funnel located under the grate that must be removed from the frame prior to inspection or maintenance. If you are missing a funnel please contact Hydroworks at the numbers provided at the end of this document.

Hydroworks

TSS/Sediment

Inspection for TSS build-up can be conducted using a Sludge Judge®, Core Pro®, AccuSludge® or equivalent sampling device that allows the measurement of the depth of TSS/sediment in the unit. These devices typically have a ball valve at the bottom of the tube that allows water and TSS to flow into the tube when lowering the tube into the unit. Once the unit touches the bottom of the device, it is quickly pulled upward such that the water and TSS in the tube forces the ball valve closed allowing the user to see a full core of water/TSS in the unit. The unit should be inspected for TSS through each of the access covers. Several readings (2 or 3) should be made at each access cover to ensure that an accurate TSS depth measurement is recorded.

Frequency

Construction Period

The HydroStorm separator should be inspected every four weeks and after every large storm (over 0.5" (12.5 mm) of rain) during the construction period.

Post-Construction Period

The Hydroworks HydroStorm separator should be inspected during the first year of operation for normal stabilized sites (grassed or paved areas). If the unit is subject to oil spills or runoff from unstabilized (storage piles, exposed soils) areas the HydroStorm separator should be inspected more frequently (4 times per year). The initial annual inspection will indicate the required future frequency of inspection and maintenance if the unit was maintained after the construction period.

Reporting

Reports should be prepared as part of each inspection and include the following information:

1. Date of inspection
2. GPS coordinates of Hydroworks unit
3. Time since last rainfall
4. Date of last inspection
5. Installation deficiencies (missing parts, incorrect installation of parts)
6. Structural deficiencies (concrete cracks, broken parts)
7. Operational deficiencies (leaks, blockages)
8. Presence of oil sheen or depth of oil layer
9. Estimate of depth/volume of floatables (trash, leaves) captured
10. Sediment depth measured
11. Recommendations for any repairs and/or maintenance for the unit
12. Estimation of time before maintenance is required if not required at time of inspection

A sample inspection checklist is provided at the end of this manual.

Maintenance

Procedure

The Hydroworks HydroStorm unit is typically maintained using a vacuum truck. There are numerous companies that can maintain the HydroStorm separator. Maintenance with a vacuum truck involves removing all of the water and sediment together. The water is then separated from the sediment on the truck or at the disposal facility.

A central access opening (24” or greater) is provided to the gain access to the lower treatment tank of the unit. This is the primary location to maintain by vacuum truck. The pretreatment area can also be vacuumed and/or flushed into the lower treatment tank of the separator for cleaning via the central access once the water level is lowered below the pretreatment floor.

In instances where a vacuum truck is not available other maintenance methods (i.e. clamshell bucket) can be used, but they will be less effective. If a clamshell bucket is used the water must be decanted prior to cleaning since the sediment is under water and typically fine in nature. Disposal of the water will depend on local requirements. Disposal options for the decanted water may include:

1. Discharge into a nearby sanitary sewer manhole
2. Discharge into a nearby LID practice (grassed swale, bioretention)
3. Discharge through a filter bag into a downstream storm drain connection

The local municipality should be consulted for the allowable disposal options for both water and sediments prior to any maintenance operation. Once the water is decanted the sediment can be removed with the clamshell bucket.

Disposal of the contents of the separator depend on local requirements. Maintenance of a Hydroworks HydroStorm unit will typically take 1 to 2 hours based on a vacuum truck and longer for other cleaning methods (i.e. clamshell bucket).

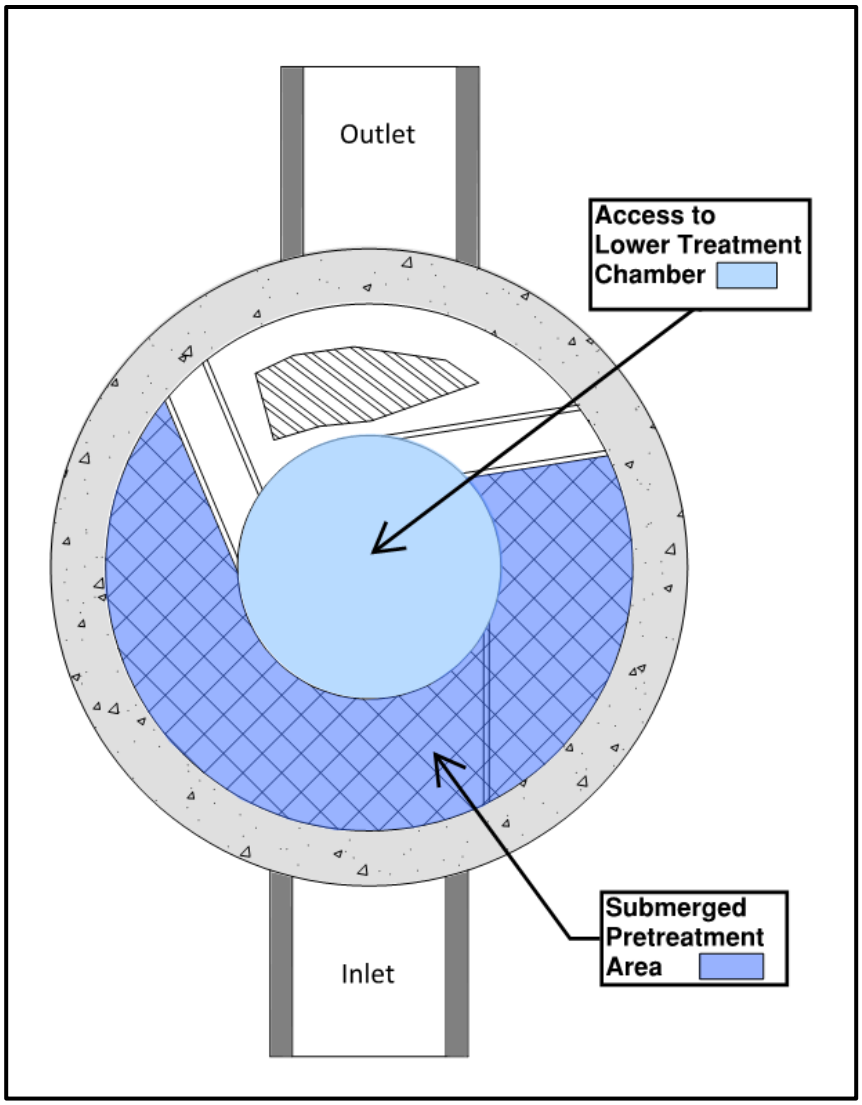


Figure 3. Maintenance Access

Frequency

Construction Period

A HydroStorm separator can fill with construction sediment quickly during the construction period. The HydroStorm must be maintained during the construction period when the depth of TSS/sediment reaches 24" (600 mm). It must also be maintained during the construction period if there is an appreciable depth of oil in the unit (more than a sheen) or if floatables other than oil cover over 50% of the area of the separator

The HydroStorm separator should be maintained at the end of the construction period, prior to operation for the post-construction period.

Post-Construction Period

The HydroStorm was independently tested by Alden Research Laboratory in 2017. A HydroStorm HS 4 was tested for scour with a 50% sediment depth of 0.5 ft. Therefore, maintenance for sediment accumulation is required if the depth of sediment is 1 ft or greater in separators with standard water (sump) depths (Table 1).

There will be designs with increased sediment storage based on specifications or site-specific criteria. A measurement of the total water depth in the separator through the central access tube should be taken and compared to water depth given in Table 1. The standard water depth from Table 1 should be subtracted from the measured water depth and the resulting extra depth should be added to the 1 ft to determine the site-specific sediment maintenance depth for that separator.

For example, if the measured water depth in the HS-7 is 7 feet, then the sediment maintenance depth for that HS-7 is 2 ft (= 1 + 7 – 6) and the separator does not need to be cleaned for sediment accumulation until the measure sediment depth is 2 ft.

The HydroStorm separator must also be maintained if there is an appreciable depth of oil in the unit (more than a sheen) or if floatables other than oil cover over 50% of the water surface of the separator.

Table 1 Standard Dimensions for Hydroworks HydroStorm Models

Model	Diameter (ft)	Total Water Depth (ft)	Sediment Maintenance Depth for Table 1 Total Water Depth(ft)
HS-3	3	3	1
HS-4	4	4	1
HS-5	5	4	1
HS-6	6	4	1
HS-7	7	6	1
HS-8	8	7	1
HS-9	9	7.5	1
HS-10	10	8	1
HS-11	11	9	1
HS-12	12	9.5	1

HYDROSTORM INSPECTION SHEET

Date _____
Date of Last Inspection _____

Site _____
City _____
State _____
Owner _____

GPS Coordinates _____

Date of last rainfall _____

Site Characteristics	**Yes**	**No**
Soil erosion evident	☐	☐
Exposed material storage on site	☐	☐
Large exposure to leaf litter (lots of trees)	☐	☐
High traffic (vehicle) area	☐	☐

HydroStorm	**Yes**	**No**
Obstructions in the inlet or outlet	☐ *	☐
Missing internal components	☐ **	☐
Improperly installed inlet or outlet pipes	☐ ***	☐
Internal component damage (cracked, broken, loose pieces)	☐ **	☐
Floating debris in the separator (oil, leaves, trash)	☐	☐
Large debris visible in the separator	☐ *	☐
Concrete cracks/deficiencies	☐ ***	☐
Exposed rebar	☐ **	☐
Water seepage (water level not at outlet pipe invert)	☐ ***	☐

Water level depth below outlet pipe invert _____“

Routine Measurements

Floating debris depth	**< 0.5” (13mm)**	☐	**>0.5” 13mm)**	☐ *
Floating debris coverage	**< 50% of surface area**	☐	**> 50% surface area**	☐ *
Sludge depth	**< 12” (300mm)**	☐	**> 12” (300mm)**	☐ *

* Maintenance required
** Repairs required
*** Further investigation is required

Hydroworks

Other Comments:

Hydroworks

Hydroworks® HydroStorm

One Year Limited Warranty

Hydroworks, LLC warrants, to the purchaser and subsequent owner(s) during the warranty period subject to the terms and conditions hereof, the Hydroworks HydroStorm to be free from defects in material and workmanship under normal use and service, when properly installed, used, inspected and maintained in accordance with Hydroworks written instructions, for the period of the warranty. The standard warranty period is 1 year.

The warranty period begins once the separator has been manufactured and is available for delivery. Any components determined to be defective, either by failure or by inspection, in material and workmanship will be repaired, replaced or remanufactured at Hydroworks' option provided, however, that by doing so Hydroworks, LLC will not be obligated to replace an entire insert or concrete section, or the complete unit. This warranty does not cover shipping charges, damages, labor, any costs incurred to obtain access to the unit, any costs to repair/replace any surface treatment/cover after repair/replacement, or other charges that may occur due to product failure, repair or replacement.

This warranty does not apply to any material that has been disassembled or modified without prior approval of Hydroworks, LLC, that has been subjected to misuse, misapplication, neglect, alteration, accident or act of God, or that has not been installed, inspected, operated or maintained in accordance with Hydroworks, LLC instructions and is in lieu of all other warranties expressed or implied. Hydroworks, LLC does not authorize any representative or other person to expand or otherwise modify this limited warranty.

The owner shall provide Hydroworks, LLC with written notice of any alleged defect in material or workmanship including a detailed description of the alleged defect upon discovery of the defect. Hydroworks, LLC should be contacted at 136 Central Ave., Clark, NJ 07066 or any other address as supplied by Hydroworks, LLC. (888-290-7900).

This limited warranty is exclusive. There are no other warranties, express or implied, or merchantability or fitness for a particular purpose and none shall be created whether under the uniform commercial code, custom or usage in the industry or the course of dealings between the parties. Hydroworks, LLC will replace any goods that are defective under this warranty as the sole and exclusive remedy for breach of this warranty.

Subject to the foregoing, all conditions, warranties, terms, undertakings or liabilities (including liability as to negligence), expressed or implied, and howsoever arising, as to the condition, suitability, fitness, safety, or title to the Hydroworks HydroStorm are hereby negated and excluded and Hydroworks, LLC gives and makes no such representation, warranty or undertaking except as expressly set forth herein. Under no circumstances shall Hydroworks, LLC be liable to the Purchaser or to any third party for product liability claims; claims arising from the design, shipment, or installation of the HydroStorm, or the cost of other goods or services related to the purchase and installation of the HydroStorm. For this Limited Warranty to apply, the HydroStorm must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Hydroworks' written installation instructions.

Hydroworks, LLC expressly disclaims liability for special, consequential or incidental damages (even if it has been advised of the possibility of the same) or breach of expressed or implied warranty. Hydroworks, LLC shall not be liable for penalties or liquidated damages, including loss of production and profits; labor and materials; overhead costs; or other loss or expense incurred by the purchaser or any third party. Specifically excluded from limited warranty coverage are damages to the HydroStorm arising from ordinary wear and tear; alteration, accident, misuse, abuse or neglect; improper maintenance, failure of the product due to improper installation of the concrete sections or improper sizing; or any other event not caused by Hydroworks, LLC. This limited warranty represents Hydroworks' sole liability to the purchaser for claims related to the HydroStorm, whether the claim is based upon contract, tort, or other legal basis.

APPENDIX C

WATER ANALYSIS INFORMATION

FIRE FLOW DEMAND REQUIREMENTS - FIRE UNDERWRITERS SURVEY (FUS GUIDELINES)

Project Number: 23089
Project Name: 14 Boswell Drive
Date: 07-Feb-24

Fire flow demands for the FUS method is based on information and guidance provided in "Water Supply for Public Protection" (Fire Underwriters Survey, 2020).

An estimate of the fire flow required is given by the following formula:

$$F = 220\,C\sqrt{A} \qquad (1)$$

where:

F = the required fire flow in litres per minute
C = coefficient related to the type of construction
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls)
= 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = Total floor area in square metres

	Building Area				(1)		(2)			(3)		(4)		Final Adjusted Fire Flow	
Building / Location	Footprint Area (m^2)	# of Storeys	**Total GFA (m^2)**	Type of Construction	***Fire Flow "F"*** (l/min)	(l/s)	***Occupancy*** %	Adjustment (l/min)	**Adjusted Fire Flow (l/min)**	***Sprinkler*** %	Adjustment (l/min)	***Exposure*** %	Adjustment (l/min)	**(l/min)**	**(l/s)**
Proposed Industrial Addition	**9489.0**	**1**	**9489**	**1.0**	21000	350.0	**-15**	-3150.0	**17850.0**	**-50**	-8925.0	5	892.5	**10000**	**167**

(2) Occupancy

Non-Combustible	-25%
Limited Combustible	-15%
Combustible	No charge
Free Burning	15%
Rapid Burning	25%

(3) Sprinkler

Minimum credit for systems designed to NFPA 13 is 30%.

If the domestic and fire services are supplied by the same municipal water system, then take an additional 10%.

If the sprinkler system is fully supervised (ie. annunciator panel that alerts the Fire Dept., such as a school), then an additional 10% can be taken. Maximum credit = 50%.

(4) Exposure

0 to 3m	25%	
3.1 to 10m	20%	Calculate for all
10.1 to 20m	15%	sides. Maximum
20.1 to 30m	10%	charge shall not
30.1 to 45m	5%	exceed 75%

Side	Exposure (m)	Charge (%)
North =	**45m+**	**0**
South =	**45m+**	**0**
East =	**45m+**	**0**
West =	**30.1 to 45m**	**5**
Total Expoure =		***5***

APPENDIX D

GEO-TECHNICAL INFORMATION

SOIL-MAT ENGINEERS & CONSULTANTS LTD.
401 Grays Road · Hamilton, ON · L8E 2Z3
www.soil-mat.ca info@soil-mat.ca 905.318.7440 / 800.243.1922 (*toll free*) 905.318.7455

PROJECT NO.: SM 230662-G January 18, 2023

KALOS ENGINEERING INC.
300 York Boulevard
Hamilton, Ontario
L8R 3K6

Attention: Hank Huitema

GEOTECHNICAL INVESTIGATION
PROPOSED WAREHOUSE ADDITION
14 BOSWELL DRIVE
SIMCOE, ONTARIO

Dear Mr. Huitema

Further to your authorisation, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has completed the fieldwork, laboratory testing, and report preparation in connection with the above noted project. The investigation and reporting were undertaken in general accordance with our proposal P230662, dated August 1, 2023. Our comments and recommendations, based on our findings at the six [6] borehole locations, are presented in the following paragraphs.

1. INTRODUCTION

We understand that the project will involve the construction of a new warehouse building addition of approximately 50,000 square feet to the south side of the existing Klassic Coconut building at 14 Boswell Drive in Simcoe, Ontario. The purpose of this geotechnical investigation work is to assess the subsurface soil conditions, and to provide our comments as recommendations with respect to the design and construction of the proposed development, from a geotechnical point of view.

This report is based on the above summarised project description, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, this office must be consulted to review the new design with respect to the results of this investigation.

2. PROCEDURE

A total of six [6] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment to termination at depths of between approximately 3.7 to 6.7 metres below the existing grade on December 13, 2023, under the direction of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD. Upon completion of drilling, all of the boreholes were backfilled in general accordance with Ontario Regulation 903, and the grade reinstated even with the existing surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of the ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings, with hand penetrometer testing conducted on cohesive samples.

The boreholes were located in the field by a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., based on accessibility over the site and underground utilities. The ground surface elevation at the borehole locations was referenced to a geodetic benchmark referenced from the topographic site plan provided to this office [Topographic Site Plan, Jewitt and Dixon Ltd, job NO 13-390, Dated August 29,2013]. The borehole elevation have been interpolated to the nearest tenth of a meter.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Boreholes Nos 1 to 6, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed as the exact planes of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject property is located at 14 Boswell Drive in Simcoe, Ontario. The site is bordered by Boswell Drive to the north, existing commercial properties to the east and west, and the Sprucedale Youth Center facility to the south. The area of the proposed addition is an asphalt paved surface, and is relatively flat as measured at the borehole locations.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 450 millimetres in thickness was encountered at all borehole locations with the exception of Borehole No. 6. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations, and a conservative approach should be taken in estimated topsoil quantities. It is also noted that the term 'topsoil' has been used from a geotechnical perspective and does not necessarily reflect its ability to support plant life.

Sand and Gravel

A deposit of sand and gravel fill was encountered at the surface and beneath the topsoil layer at borehole Nos. 1 and 6. The granular fill material was brown in colour and generally in a compact state. The fill soils were proven to depths of approximately 0.45 to 1.6 metres below the existing ground surface. The sand and gravel fill encountered at Borehole No. 1 appeared to be backfill material associated with an abandoned underground concrete structure detailed below, while the granular material encountered in Borehole No. 6 was associated with the granular surfaced parking/staging area of the existing facility.

Concrete Structure

A concrete structure approximately 300 millimetres in thickness was encountered beneath the sand and gravel and topsoil layers at Borehole No. 1. While no details are available regarding this concrete structure, it is assumed to be abandoned infrastructure or remnants of an unknown former structure.

Sandy silt/silty sandy

Native sandy silt/silty sand/sandy silt/silty sandy sand was encountered beneath the topsoil, and fill deposits all of the borehole locations. The native fine-grained soil is brown in colour, contains trace to some amounts gravel with increasing sand content with depth, and was generally in a loose to very dense in state. The native sandy silt/silty sand was proven to depths of approximately 2.5 to 4.1 metres below the existing ground surface. The upper levels of the sandy silt/silty sand encountered were generally loose to very loose, weathered, and may be fill or disturbed material associated with former agricultural activities. Some depth of disturbed/organic material due to former agricultural activities should be expected.

It is noted that some depths of fill associated with the existing structure, underground servicing, etc., should be expected across the site. Additionally, as the area of the proposed addition was formerly utilised as an agricultural field, some depth of unsuitable disturbed and/or organic material should be expected, as noted above.

A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface to consist of coarse-textured glaciolacustrine deposits consisting of sand, gravel, minor silt and clay. This is consistent with our experience in the area and the conditions encountered on site.

Groundwater Observations

All boreholes were noted to be dry upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes. Based on the conditions encountered in the boreholes and our experience in the area, the static groundwater level is estimated to be below the anticipated depths of construction. Regardless, some minor perched deposits of water may be encountered across the site, especially during the 'wet' times of the year

4. FOUNDATION CONSIDERATIONS

The soil conditions encountered at the borehole locations are considered suitable to support the proposed new building on conventional spread footings founded in the undisturbed native sandy silt/silty sand, below any fill or otherwise unsuitable material. Spread footings may be designed considering a bearing capacity of 150 kPa [~ 3,000 psf] SLS and 225 kPa [~4,500 psf] ULS, based on the total and differential settlements not exceeding 25 and 20 millimetres respectively. Depending on the condition of the founding soils encountered, some depth of sub-excavation may be required to remove unsuitable fill, organics, etc. Where sub-excavation below the design founding elevation is required, the founding level may be raised via the placement of lean-mix [~5 MPa] concrete from the competent native soils up to the design founding elevation.

It is noted that the SLS value represents the Serviceability Limit State, which is governed by the tolerable deflection [settlement] based on the proposed building type, using unfactored load combination. The ULS value represents the Ultimate Limit State and is intended to reflect the upper limit of the available bearing capacity of the founding soils in terms of geotechnical design, using factored load combinations. There is no direct relationship between ULS and SLS; rather they are a function of the soil type and the tolerable deflections for serviceability, respectively. The above dissertation assumes a typical building. Evidently, the bearing capacity values would be lower for very settlement sensitive structures and larger more flexible buildings.

In areas where it will be necessary to provide adjacent footings at different founding elevations, the lower footing should be constructed before the higher footing is constructed, if possible, and the higher footing should be set below an imaginary line drawn up from the edge of the lower footing at 10 horizontal to 7 vertical. This practice will limit stress transfer from the higher footings to the lower footings. The new foundations should be designed to match the founding level of the existing structure, stepping up or down as necessary.

All footings exposed to the environment must be provided with a minimum of 1.2 metres of earth cover or equivalent insulation to protect against frost damage. This frost protection would also be required if construction were undertaken during the winter months. All footings and foundations should be designed and constructed in accordance with the current Ontario Building Code.

It is noted, that the stress-strain properties of the supporting soils are never uniform across the site, nor are the loads on the various foundation elements. Some settlements must be expected in response to the applied load until equilibrium is achieved. Therefore, as is typical in most new construction, 'cosmetic' cracking of plasterboard, foundation walls, slabs, etc. may occur within the first year of construction as a result of shrinkage, minor settlement, etc. Subsequent to repair, additional cracking should be minimal. As some differential movement is expected between the addition and the existing building, expansion/movement joints should be provided where connections are made to the existing structure to allow for differential movements to occur, both vertically due to the compression of the soil under the weight of the addition, and horizontally as the walls expand and contract with fluctuations in humidity and temperature. It is recommended that the foundations be structurally reinforced to account for such movements, as well as variable loading and support conditions.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations of this report and to allow changes to be made in the event that subsurface conditions differ from the conditions identified at the borehole locations.

5. SEISMIC DESIGN CONSIDERATIONS

The structure shall be designed according to Section 4.1.8 of the Ontario Building Code, Ontario Regulation 332/12. Based on the subsurface soil conditions encountered in this investigation, the applicable Site Classification for the seismic design is Site Class D – Stiff Soil, based on the average soil characteristics for the site, it is noted that Site Class C may be available, however, site specific seismic shear wave velocity testing would be required.

The seismic data from Supplementary Standard SB-1 of the Ontario Building Code for Simcoe are as follows:

$S_a(0.2)$	$S_a(0.5)$	$S_a(1.0)$	$S_a(2.0)$	$S_a(5.0)$	$S_a(10.0)$	PGA	PGV
0.141	0.0.084	0.047	0.0230	0.0058	0.0024	0.087	0.064

6. EXCAVATIONS

It is anticipated that excavations for the proposed addition will extend to depth of up to approximately 1 to 2 metres beneath the existing ground surface. Excavations through the native sandy silt/silty sand would be expected to remain stable for the short construction period at inclinations of up to 45 to 60 degrees to the horizontal. Where wet seams are encountered, or during periods of extended precipitation, excavation faces may 'slough' in as flat as 3 horizontal to 1 vertical, or flatter. Notwithstanding the forgoing, all excavations must comply with the current Occupational Health and Safety Act and Regulations for Construction Projects. In regards to the act the native sandy silt/silty sand soils would be considered "Type 3".

As noted above the depth of the static groundwater level is anticipated to be below the depths of construction. Nevertheless, some infiltration of perched water through permeable seams, as well as from surface run off into open excavations should be anticipated, especially during the 'wet' times of the year. The rate of infiltration is expected to be relatively low, such that it is possible to control such infiltration that may seep into the excavations using conventional construction 'dewatering' techniques, such as pumping from sumps and ditches. More groundwater control should be anticipated when connections are made to existing services and foundations. Surface water should be directed away from the excavations.

7. FLOOR SLAB AND PERMANENT DRAINAGE

The building floor slab may be constructed using conventional slab-on-grade techniques on a prepared subgrade. The exposed subgrade surface should be well compacted in the presence of a representative of SOIL-MAT ENGINEERS. Any soft 'spots' delineated during this work must be sub-excavated and replaced with quality backfill material compacted to a minimum of98 percent of its standard Proctor maximum dry density [SPMDD]. Granular fill, such as an imported Ontario Provincial Standard Specification [OPSS] Granular 'B' or approved alternative, is preferred within the building footprint due to its relative insensitivity to weather conditions, ease in achieving the required degree of compaction, its quick response to applied stresses.

As with all concrete floor slabs, there is a tendency for the floor slabs to crack. The slab thickness, concrete mix design, the amount of steel and/or fiber reinforcement and/or wire mesh placed into the concrete slab, if any, will therefore be a function of the owner's tolerance for cracks in, movements of, the slabs-on-grade, etc. The 'saw-cuts' in the concrete floor, for crack control, should extend to a minimum depth of 1/3 of the thickness of the slab.

A moisture barrier will be required under the floor slabs such as the placement of at least 200-milimetres of well compacted 20-millimetre clear crushed stone. At a minimum the moisture barrier material should contain no more then 10 percent passing the No. 4 sieve. Where 'non-damp' floor slabs are required, as for instance under sheet vinyl floor coverings, etc., extra efforts will be required to damp proof the floor slab, as with the additional provisions of a heavy 'poly' sheet, damp proofing sprays/membranes, drainage board products, etc. Where 'poly' sheets are used care should be taken to prevent puncturing and tearing, and a sufficiently heavy gauge material be provided. The floor finish product supplier should be consulted regarding the requirement for such a non-damp condition.

Curing of the slab-on-grade must be carefully specified to ensure that slab curl is minimised. This is especially critical during the hot summer month of the year when the surface of the slab tends to dry out quickly while high moisture conditions in the moisture barrier or water trapped on top of any 'poly' sheet at the sawcut joints and cracks, and at the edges of the slabs, maintains the underside of the slab in a moist condition. It is important that the concrete mix design provide a limiting water/cement ratio and total cement content, which will mitigate moisture related problems with low permeance floor coverings, such as debonding of vinyl and ceramic tile. It is equally important that excess free water not be added to the concrete during its placement as this could increase the potential for shrinkage cracking and curling of the slab.

Where the finished floor is less than 300 millimetres above the finished exterior grade consideration should be given to the provision of a perimeter weeping tile system to prevent the build up of water against the foundations. Where provided, the perimeter drainage system should consist of 100-millimetre diameter perforated pipe, encased in a geofabric sock and covered with a minimum of 200 millimetres of a 20-millimetre clear crushed stone product in turn encased in a heavy filter geotextile product. The suppliers of the filter geotextile should be consulted as to the best type suited to this project. Great care should be taken during the installation of the drains, as even a small break in the filtering materials could result in loss of fines into the drains with attendant performance difficulties, including settlements of the ground surface. The perimeter

drains should outlet to a gravity sewer connection, a nearby catch basin, or a sump pit a minimum of 150 millimetres below the underside of the finished floor. In the event that a perimeter weeping tile is not provided, a barrier or 'slip plane' should be provided against the exterior foundation walls to prevent freezing of the backfill soils to the foundation walls. The exterior grade around the structure should be sloped away from the structure, and provided with a low permeability surface to prevent the ponding of water against the foundation walls.

8. BACKFILL CONSIDERATIONS

The majority of the excavated materials will primarily consist of the native sandy silt/silty sand and sand encountered in the boreholes, as described above. These soils are generally considered suitable for use as engineered fill, trench backfill, etc., provided they are free of organics, large construction debris, or otherwise deleterious materials, and that their moisture contents can be controlled to within 3 percent of their standard proctor optimum moisture content.

It is noted that the fine grained soils encountered on site are not considered to be free draining and should not be used where this characteristic is necessary. These soils will also present difficulties in achieving effective compaction where access with compaction equipment is restricted, such as within the building footprint or against foundations. The use of a free draining granular material, such as an OPSS Granular 'B', or approved alternative, in areas of restricted access areas such as within the building footprints or against the building foundations. These materials are more efficiently compacted in such areas, and generally provide a more uniform support condition for the exterior concrete and pavements.

The on-site soils encountered are generally considered to be near to slightly 'dry' of their standard Proctor optimum moisture content. Some moisture conditioning may be required depending upon the weather conditions at the time of construction. These soils are also noted to be sensitive to high moisture conditions and will be almost impossible to effectively compact when they become well 'wet' of their optimum. After a period of heavy precipitation, and near-surface wet, saturated or softened material should be allowed to air dry or be removed and discarded.

We note that where backfill material is placed near or slightly above its optimum moisture content, the potential for long term settlements due to the ingress of groundwater and collapse of the fill structure is reduced. Correspondingly the shear strength of the 'wet' backfill material is also lowered, therefor reducing its ability to

support construction traffic and therefore impacting pavement structure construction. If the soil is compacted well dry of its optimum value, it will appear to be very strong when compacted, but will tend to settle with time as the moisture content in the fill increases to equilibrium condition. The on-site soils will require high compaction energy to achieve acceptable densities if the moisture content is not close to its standard Proctor optimum value. It is therefore very important that the placement moisture content of the backfill soils be within 3 percent of its standard Proctor optimum moisture content during placement and compaction to minimise long term subsidence [settlement] of the fill mass. Any imported fill required should have its moisture content within 3 percent of its optimum moisture content and meet the necessary environmental guidelines.

A representative of SOIL-MAT should be present on-site during the backfilling and compaction operations to confirm the uniform compaction of the backfill material to project specification requirements. Close supervision is prudent in areas that are not readily accessible to compaction equipment, for instance near the end of compaction 'runs'. All structural fill, backfill within service trenches, areas to be paved, etc., should be compacted to a minimum of 98 percent of its SPMDD. The appropriate compaction equipment should be employed based on soil type, i.e. pad-toe for cohesive soils and smooth drum/vibratory plate for granular soils. A method should be developed to assess compaction efficiency employing the on-site compaction equipment and backfill materials used during construction.

9. PAVEMENT CONSIDERATIONS

In the event new paved areas are to be constructed, all areas to be paved should be stripped of all topsoil, along with any otherwise unsuitable materials. The exposed subgrade should be proof rolled with 3 to 4 passes of a loaded tandem truck in the presence of a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., immediately prior to the placement of the sub-base material. Any areas of distress revealed by this or other means must be sub-excavated and replaced with suitable backfill material. Alternatively, the soft areas may be stabilised by placing coarse crushed stone and 'punching' it into the soft areas. It is noted that the predominately sandy silt/silty sand soils are highly susceptible to disturbance from moisture conditions and construction traffic. The need for the treatment of softened subgrade will be reduced if construction is undertaken during the dry summer months and careful attention is paid to the compaction operations. The fill over shallow utilities cut into or across paved areas must also be compacted to a minimum of 98 per cent of its SPMDD.

Good drainage provisions will optimise the long-term performance of the pavement structure. The subgrade must be properly crowned and shaped to promote drainage to the subdrain system. Subdrains should be installed to intercept excess subsurface water and mitigate softening of the subgrade material. Surface water should not be allowed to pond adjacent to the outer limits of the paved areas.

The most severe loading conditions on the subgrade typically occur during the course of construction. Therefore, precautionary measures should be taken to ensure that the subgrade is not unduly disturbed by construction traffic. These measures would include minimising the amount of heavy traffic travelling over the subgrade, such as during the placement of granular base layers.

If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. During wet weather conditions, such as during the Fall and Spring months, or during colder winter weather, it should be anticipated that additional subgrade preparation will be required, such as additional depth of Ontario Provincial Standard Specification [OPSS] Granular 'B', and/or the use of a Type II (crushed limestone bedrock) sub-base material. It is also important that the sub-base and base granular layers of the pavement structure be placed as soon as possible after exposure, preparation, and approval of the exposed subgrade.

The suggested pavement structures outlined in Table A below are based on subgrade parameters estimated on the basis of visual and tactile examinations of the on-site soils and past experience. The outlined pavement structure may be expected to have an approximate ten-to-fifteen-year lifespan, assuming that regular maintenance is performed. Should a more detailed pavement structure design be required, site specific traffic information would be needed, together with detailed laboratory testing of the subgrade soils.

TABLE A – TYPICAL SUGGESTED PAVEMENT STRUCTURES

LAYER DESCRIPTION	COMPACTION REQUIREMENTS	LIGHT DUTY SECTIONS	HEAVY DUTY [TRUCK ROUTE]
Asphaltic Concrete Wearing course OPSS HL 3 or HL 3A	92 per cent Marshall	40 millimetres	40 millimetres
Binder Course OPSS HL 8	92 per cent Marshall	50 millimetres	80 millimetres
Base Course OPSS Granular A	100% SPMDD	150 millimetres	150 millimetres
Sub-base Course OPSS Granular B Type II	100% SPMDD	300 millimetres	450 millimetres

* SPMDD denotes Standard Proctor Maximum Dry Density, ASTM-D698.

In the event that a pit run sand and gravel aggregate (Type I) is to be utilised for the granular sub-base materials, it is recommended that the sub-base depth be increased by 100 millimetres. It should also be feasible to reuse the existing granular materials present on site, however this should be confirmed at the time of construction and via additional laboratory sieve analyses of the granular material.

Depending on the anticipated traffic, a reduced light duty asphalt structure consisting of 65 millimetres of HL3 surface course may also perform sufficiently. This would be reasonable in areas subjected only to light vehicles such as cars for parking. Such a structure may have a reduced lifespan if subjected to heavier vehicles, and would also not allow for 'mill and pave' type operations for future rehabilitation.

Asphaltic concrete pavement surfaces at industrial facilities may be exposed to significant surficial distress due to static loading and frequent turning heavy multi-axle trucks. It would be prudent to consider a concrete pavement structure in areas of such high-volume traffic areas. A recommended heavy concrete pavement structure may consist of 300 millimetres of OPSS Granular 'B' Type II (crushed bedrock), overlain by 150 millimetres of OPSS Granular 'A', with 200 millimetres of surficial concrete. As noted above, depending on the condition of the subgrade at the time of construction, sub-excavation of unsuitable materials may be required. Alternatively, the use of a reinforced asphalt product such as Aramid Fibre reinforced asphalt of similar product may be considered. As these products are proprietary in nature, a specialty contractor should be consulted regarding the use of such a product.

A heavy-duty granular pavement structure may also be considered, which would consist of a minimum of 450 millimetres of OPSS Granular 'B' Type II (crushed bedrock), surfaced with 150 millimetres of OPSS Granular 'A' material. It may also be feasible to make use of alternative granular materials, such as recycled concrete aggregate, or existing granular materials on site. However, such materials should be reviewed and approved by our office prior to use.

To minimise segregation of the finished asphalt mat, the asphalt temperature must be maintained uniform throughout the mat during placement and compaction. All too often, significant temperature gradients exist in the delivered and placed asphalt with the cooler portions of the mat resisting compaction and presenting a honeycomb surface. As the spreader moves forward, a responsible member of the paving crew should monitor the pavement surface, to ensure a smooth uniform surface. The contractor can mitigate the surface segregation by 'back-casting' or scattering shovels of the full mix material over the segregated areas and raking out the course particles during compaction operations. Of course, the above assumes that the asphalt mix is sufficiently hot to allow the 'back-casting' to be performed.

10. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available to it at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.

Kevin Reid, B. Eng.
Junior Engineer

Kyle Richardson, P.Eng.
Project Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
Log of Borehole Nos. 1 to 6 inclusive

Distribution: Kalos Engineering Inc. [1, pdf]

LEGEND

BH# Borehole Location

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 230662-G.

2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Warehouse Addition
14 Boswell Drive
Simcoe, Ontario

Borehole Location Plan

Project No. SM 230662-G

Date: December, 2023

Drawn: KJR

Checked: KR

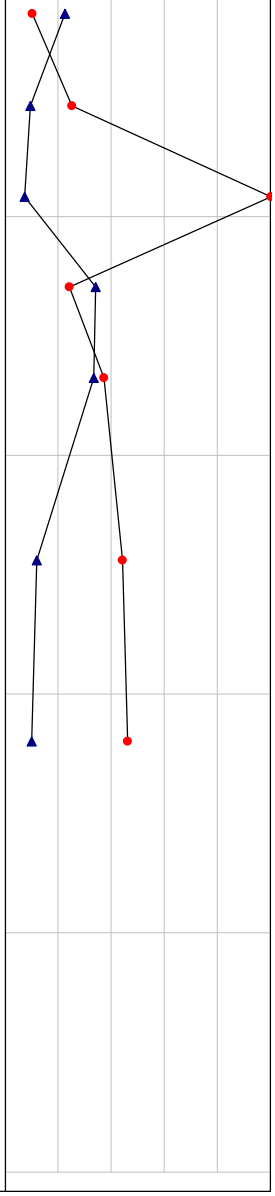
Drawing No. 1

Log of Borehole No. 1

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742381
E: 558627

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		228.20	Ground Surface							
0	0	227.75	**Topsoil** Approximately 450 millimetres of topsoil.	SS	1	3,4,6,4	10			
1			**Sand and Gravel Fill** Brown, compact.							
2				SS	2	5,10,15,33	25			
3	1	226.60								
4		226.30	**Concrete Structure** Aproximately 300 millimetres of concrete.	SS	3	26,60,50	100			
5			**Sandy Silt/Silty Sand** Brown, trace gravel, increasing sand with depth, compact to dense.							
6	2			SS	4	5,8,16,20	24			
7										
8				SS	5	10,19,28,43	37			
9	3									
10										
11										
12										
13	4									
14										
15										
16				SS	6	12,21,23,24	44			
17	5									
18										
19										
20	6									
21				SS	7	11,22,24,27	46			
22		221.50								
23	7		End of Borehole							
24			NOTES:							
25			1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 6.7 metres.							
26	8									
27										
28			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.							
29										
30	9									
31			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.							
32										
33										



Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

Soil-Mat Engineers & Consultants Ltd.
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Datum: Temporary Benchmark
Field Logged by: MG
Checked by: KJR
Sheet: 1 of 1

Log of Borehole No. 2

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742402
E: 558679

Depth (ft)	Depth (m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		228.00	Ground Surface								
		227.55	**Topsoil** Approximately 450 millimetres of topsoil, trace to some gravel.								
			Sandy Silt/Silty Sand Brown, trace clay and gravel, increasing sand with depth, compact to dense.		SS	1	1,2,1,1	3			
					SS	2	7,9,12,13	21			
					SS	3	9,7,5,7	12			
					SS	4	7,13,19,23	32			
					SS	5	9,13,17,22	30			
					SS	6	13,28,22,24	40			
					SS	7	12,21,28,34	49			
		221.30	End of Borehole								

NOTES:

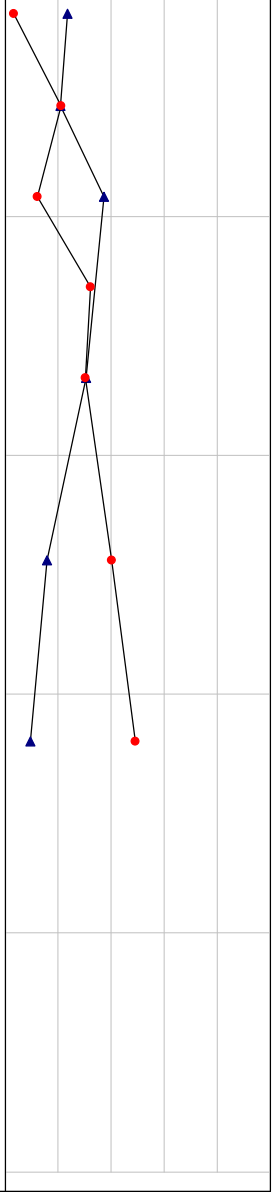
1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 6.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Moisture Content w% 10 20 30 40

Standard Penetration Test blows/300mm 20 40 60 80



Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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Datum: Temporary Benchmark
Field Logged by: MG
Checked by: KJR
Sheet: 1 of 1

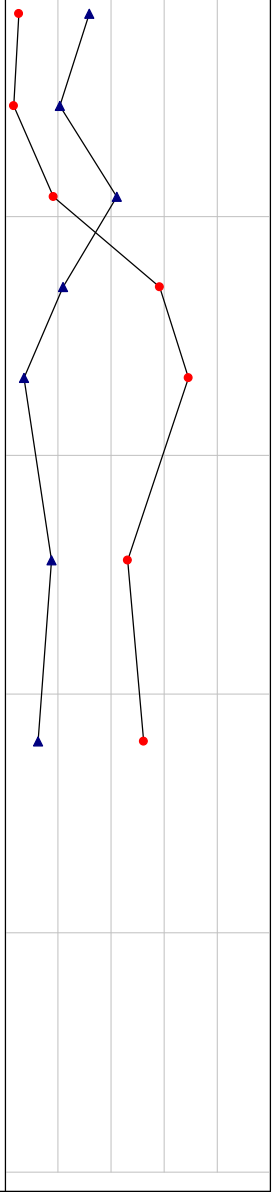
Log of Borehole No. 3

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742343
E: 558640

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
	227.20	Ground Surface								
0 / 0	226.75	**Topsoil** Approximately 450 millimetres of topsoil.								
1 /		**Sandy Silt/Silty Sand** Brown, increasing sand with depth, very loose to very dense.		SS	1	1,2,3,2	5			
2 /										
3 / 1				SS	2	3,2,1,2	3			
4 /										
5 /				SS	3	4,6,12,22	18			
6 / 2										
7 /				SS	4	20,29,29,28	58			
8 /										
9 / 3				SS	5	13,30,39,34	69			
10 /										
11 /										
12 / 4										
13 /										
14 /										
15 / 5				SS	6	15,22,24,21	46			
16 /										
17 /										
18 / 6										
19 /										
20 /				SS	7	9,21,31,32	52			
21 /	220.50									
22 / 7		End of Borehole								
23 /		NOTES:								
24 /		1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 6.7 metres.								
25 /										
26 / 8		2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.								
27 /										
28 /		3. Soil samples will be discarded after 3 months unless otherwise directed by our client.								
29 /										
30 / 9										
31 /										
32 /										
33 /										

Moisture Content w%: 10 20 30 40
Standard Penetration Test blows/300mm: 20 40 60 80



Drill Method: Solid Stem Auger
Drill Date: Decemeber 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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Datum: Temporary Benchmark
Field Logged by: MG
Checked by: KJR
Sheet: 1 of 1

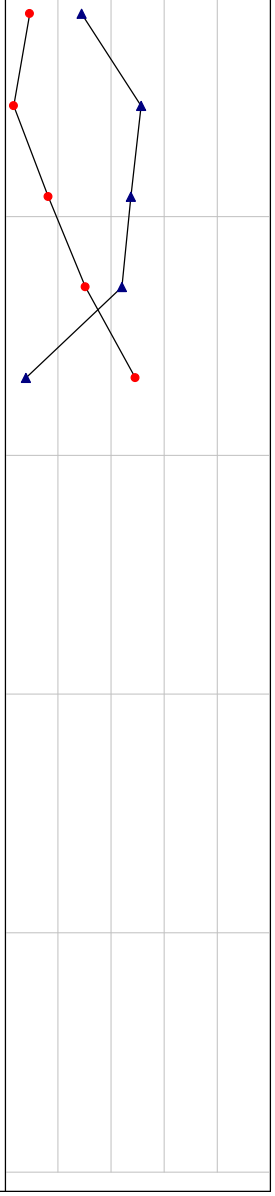
Log of Borehole No. 4

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742365
E: 558661

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	227.40	Ground Surface								
0–3 / 0–1	226.95	**Topsoil** Approximately 450 millimetres of topsoil.								
3–12 / 1–3		**Sandy Silt/Silty Sand** Brown, trace clay, increasing sand with depth, very loose to dense.		SS	1	3,5,4,3	9			
				SS	2	1,2,1,1	3			
				SS	3	4,6,10,12	16			
				SS	4	7,10,20,55	30			
				SS	5	23,26,23,21	49			
12 / 3.7	223.70	End of Borehole								

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 3.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

Soil-Mat Engineers & Consultants Ltd.
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Datum: Temporary Benchmark
Field Logged by: MG
Checked by: KJR
Sheet: 1 of 1

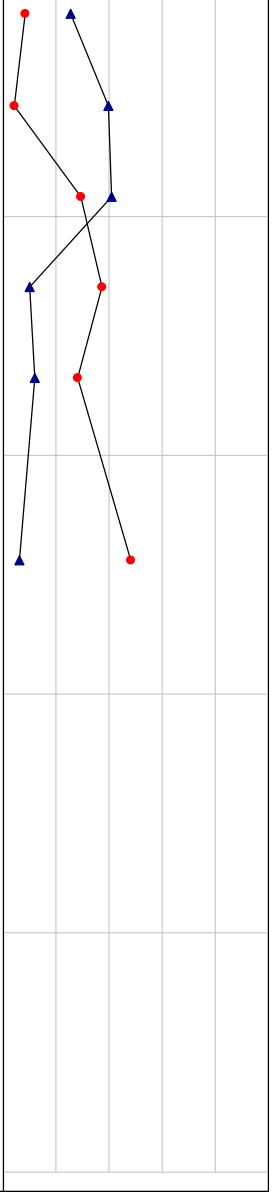
Log of Borehole No. 5

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Rd. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742352
E: 558684

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		226.90	Ground Surface							
0	0	226.45	**Topsoil** Approximately 450 millimetres of topsoil.							
1			**Sandy Silt/Silty Sand** Brown, trace gravel, trace to some sand, loose to compact.	SS	1	2,4,4,4	8			
2										
3	1			SS	2	2,2,2,2	4			
4										
5				SS	3	6,11,18,21	29			
6	2									
7				SS	4	15,18,19,18	37			
8										
9	3			SS	5	11,14,14,13	28			
10										
11										
12										
13	4									
14										
15										
16				SS	6	13,23,25,33	48			
17	5	221.70	End of Borehole							
18			NOTES:							
19										
20	6		1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 5.2 metres.							
21										
22										
23	7		2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.							
24										
25										
26	8		3. Soil samples will be discarded after 3 months unless otherwise directed by our client.							
27										
28										
29										
30	9									
31										
32										
33										

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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Datum: Temporary Benchmark
Field Logged by: MG
Checked by: KJR
Sheet: 1 of 1

Log of Borehole No. 6

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742386
E: 558714

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		227.40	Ground Surface							
0	0	226.95	**Sand and Gravel Fill** Approximately 450 millimetres of sand and gravel parking lot base.	SS	1	8,7,12,11	19			
3	1		**Sandy Silt/Silty Sand** Brown, trace clay and gravel, increasing sand with depth, loose to dense.	SS	2	2,4,4,2	8			
6	2			SS	3	3,3,6,9	9			
9	3			SS	4	9,17,17,22	34			
11		223.70		SS	5	3,12,17,21	29			
12	4		End of Borehole							

NOTES:

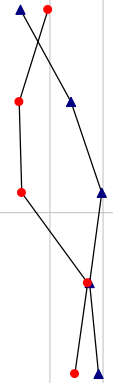
1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 3.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Moisture Content w% 10 20 30 40

Standard Penetration Test blows/300mm 20 40 60 80



Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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SOIL-MAT ENGINEERS & CONSULTANTS LTD.
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PROJECT NO.: SM 230662-G January 18, 2023

KALOS ENGINEERING INC.
300 York Boulevard
Hamilton, Ontario
L8R 3K6

Attention: Hank Huitema

GEOTECHNICAL INVESTIGATION
PROPOSED WAREHOUSE ADDITION
14 BOSWELL DRIVE
SIMCOE, ONTARIO

Dear Mr. Huitema

Further to your authorisation, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has completed the fieldwork, laboratory testing, and report preparation in connection with the above noted project. The investigation and reporting were undertaken in general accordance with our proposal P230662, dated August 1, 2023. Our comments and recommendations, based on our findings at the six [6] borehole locations, are presented in the following paragraphs.

1. INTRODUCTION

We understand that the project will involve the construction of a new warehouse building addition of approximately 50,000 square feet to the south side of the existing Klassic Coconut building at 14 Boswell Drive in Simcoe, Ontario. The purpose of this geotechnical investigation work is to assess the subsurface soil conditions, and to provide our comments as recommendations with respect to the design and construction of the proposed development, from a geotechnical point of view.

This report is based on the above summarised project description, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, this office must be consulted to review the new design with respect to the results of this investigation.

2. PROCEDURE

A total of six [6] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment to termination at depths of between approximately 3.7 to 6.7 metres below the existing grade on December 13, 2023, under the direction of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD. Upon completion of drilling, all of the boreholes were backfilled in general accordance with Ontario Regulation 903, and the grade reinstated even with the existing surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of the ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings, with hand penetrometer testing conducted on cohesive samples.

The boreholes were located in the field by a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., based on accessibility over the site and underground utilities. The ground surface elevation at the borehole locations was referenced to a geodetic benchmark referenced from the topographic site plan provided to this office [Topographic Site Plan, Jewitt and Dixon Ltd, job NO 13-390, Dated August 29,2013]. The borehole elevation have been interpolated to the nearest tenth of a meter.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Boreholes Nos 1 to 6, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed as the exact planes of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject property is located at 14 Boswell Drive in Simcoe, Ontario. The site is bordered by Boswell Drive to the north, existing commercial properties to the east and west, and the Sprucedale Youth Center facility to the south. The area of the proposed addition is an asphalt paved surface, and is relatively flat as measured at the borehole locations.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 450 millimetres in thickness was encountered at all borehole locations with the exception of Borehole No. 6. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations, and a conservative approach should be taken in estimated topsoil quantities. It is also noted that the term 'topsoil' has been used from a geotechnical perspective and does not necessarily reflect its ability to support plant life.

Sand and Gravel

A deposit of sand and gravel fill was encountered at the surface and beneath the topsoil layer at borehole Nos. 1 and 6. The granular fill material was brown in colour and generally in a compact state. The fill soils were proven to depths of approximately 0.45 to 1.6 metres below the existing ground surface. The sand and gravel fill encountered at Borehole No. 1 appeared to be backfill material associated with an abandoned underground concrete structure detailed below, while the granular material encountered in Borehole No. 6 was associated with the granular surfaced parking/staging area of the existing facility.

Concrete Structure

A concrete structure approximately 300 millimetres in thickness was encountered beneath the sand and gravel and topsoil layers at Borehole No. 1. While no details are available regarding this concrete structure, it is assumed to be abandoned infrastructure or remnants of an unknown former structure.

Sandy silt/silty sandy

Native sandy silt/silty sand/sandy silt/silty sandy sand was encountered beneath the topsoil, and fill deposits all of the borehole locations. The native fine-grained soil is brown in colour, contains trace to some amounts gravel with increasing sand content with depth, and was generally in a loose to very dense in state. The native sandy silt/silty sand was proven to depths of approximately 2.5 to 4.1 metres below the existing ground surface. The upper levels of the sandy silt/silty sand encountered were generally loose to very loose, weathered, and may be fill or disturbed material associated with former agricultural activities. Some depth of disturbed/organic material due to former agricultural activities should be expected.

It is noted that some depths of fill associated with the existing structure, underground servicing, etc., should be expected across the site. Additionally, as the area of the proposed addition was formerly utilised as an agricultural field, some depth of unsuitable disturbed and/or organic material should be expected, as noted above.

A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface to consist of coarse-textured glaciolacustrine deposits consisting of sand, gravel, minor silt and clay. This is consistent with our experience in the area and the conditions encountered on site.

Groundwater Observations

All boreholes were noted to be dry upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes. Based on the conditions encountered in the boreholes and our experience in the area, the static groundwater level is estimated to be below the anticipated depths of construction. Regardless, some minor perched deposits of water may be encountered across the site, especially during the 'wet' times of the year

4. FOUNDATION CONSIDERATIONS

The soil conditions encountered at the borehole locations are considered suitable to support the proposed new building on conventional spread footings founded in the undisturbed native sandy silt/silty sand, below any fill or otherwise unsuitable material. Spread footings may be designed considering a bearing capacity of 150 kPa [~ 3,000 psf] SLS and 225 kPa [~4,500 psf] ULS, based on the total and differential settlements not exceeding 25 and 20 millimetres respectively. Depending on the condition of the founding soils encountered, some depth of sub-excavation may be required to remove unsuitable fill, organics, etc. Where sub-excavation below the design founding elevation is required, the founding level may be raised via the placement of lean-mix [~5 MPa] concrete from the competent native soils up to the design founding elevation.

It is noted that the SLS value represents the Serviceability Limit State, which is governed by the tolerable deflection [settlement] based on the proposed building type, using unfactored load combination. The ULS value represents the Ultimate Limit State and is intended to reflect the upper limit of the available bearing capacity of the founding soils in terms of geotechnical design, using factored load combinations. There is no direct relationship between ULS and SLS; rather they are a function of the soil type and the tolerable deflections for serviceability, respectively. The above dissertation assumes a typical building. Evidently, the bearing capacity values would be lower for very settlement sensitive structures and larger more flexible buildings.

In areas where it will be necessary to provide adjacent footings at different founding elevations, the lower footing should be constructed before the higher footing is constructed, if possible, and the higher footing should be set below an imaginary line drawn up from the edge of the lower footing at 10 horizontal to 7 vertical. This practice will limit stress transfer from the higher footings to the lower footings. The new foundations should be designed to match the founding level of the existing structure, stepping up or down as necessary.

All footings exposed to the environment must be provided with a minimum of 1.2 metres of earth cover or equivalent insulation to protect against frost damage. This frost protection would also be required if construction were undertaken during the winter months. All footings and foundations should be designed and constructed in accordance with the current Ontario Building Code.

It is noted, that the stress-strain properties of the supporting soils are never uniform across the site, nor are the loads on the various foundation elements. Some settlements must be expected in response to the applied load until equilibrium is achieved. Therefore, as is typical in most new construction, 'cosmetic' cracking of plasterboard, foundation walls, slabs, etc. may occur within the first year of construction as a result of shrinkage, minor settlement, etc. Subsequent to repair, additional cracking should be minimal. As some differential movement is expected between the addition and the existing building, expansion/movement joints should be provided where connections are made to the existing structure to allow for differential movements to occur, both vertically due to the compression of the soil under the weight of the addition, and horizontally as the walls expand and contract with fluctuations in humidity and temperature. It is recommended that the foundations be structurally reinforced to account for such movements, as well as variable loading and support conditions.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations of this report and to allow changes to be made in the event that subsurface conditions differ from the conditions identified at the borehole locations.

5. SEISMIC DESIGN CONSIDERATIONS

The structure shall be designed according to Section 4.1.8 of the Ontario Building Code, Ontario Regulation 332/12. Based on the subsurface soil conditions encountered in this investigation, the applicable Site Classification for the seismic design is Site Class D – Stiff Soil, based on the average soil characteristics for the site, it is noted that Site Class C may be available, however, site specific seismic shear wave velocity testing would be required.

The seismic data from Supplementary Standard SB-1 of the Ontario Building Code for Simcoe are as follows:

$S_a(0.2)$	$S_a(0.5)$	$S_a(1.0)$	$S_a(2.0)$	$S_a(5.0)$	$S_a(10.0)$	PGA	PGV
0.141	0.0.084	0.047	0.0230	0.0058	0.0024	0.087	0.064

6. EXCAVATIONS

It is anticipated that excavations for the proposed addition will extend to depth of up to approximately 1 to 2 metres beneath the existing ground surface. Excavations through the native sandy silt/silty sand would be expected to remain stable for the short construction period at inclinations of up to 45 to 60 degrees to the horizontal. Where wet seams are encountered, or during periods of extended precipitation, excavation faces may 'slough' in as flat as 3 horizontal to 1 vertical, or flatter. Notwithstanding the forgoing, all excavations must comply with the current Occupational Health and Safety Act and Regulations for Construction Projects. In regards to the act the native sandy silt/silty sand soils would be considered "Type 3".

As noted above the depth of the static groundwater level is anticipated to be below the depths of construction. Nevertheless, some infiltration of perched water through permeable seams, as well as from surface run off into open excavations should be anticipated, especially during the 'wet' times of the year. The rate of infiltration is expected to be relatively low, such that it is possible to control such infiltration that may seep into the excavations using conventional construction 'dewatering' techniques, such as pumping from sumps and ditches. More groundwater control should be anticipated when connections are made to existing services and foundations. Surface water should be directed away from the excavations.

7. FLOOR SLAB AND PERMANENT DRAINAGE

The building floor slab may be constructed using conventional slab-on-grade techniques on a prepared subgrade. The exposed subgrade surface should be well compacted in the presence of a representative of SOIL-MAT ENGINEERS. Any soft 'spots' delineated during this work must be sub-excavated and replaced with quality backfill material compacted to a minimum of98 percent of its standard Proctor maximum dry density [SPMDD]. Granular fill, such as an imported Ontario Provincial Standard Specification [OPSS] Granular 'B' or approved alternative, is preferred within the building footprint due to its relative insensitivity to weather conditions, ease in achieving the required degree of compaction, its quick response to applied stresses.

As with all concrete floor slabs, there is a tendency for the floor slabs to crack. The slab thickness, concrete mix design, the amount of steel and/or fiber reinforcement and/or wire mesh placed into the concrete slab, if any, will therefore be a function of the owner's tolerance for cracks in, movements of, the slabs-on-grade, etc. The 'saw-cuts' in the concrete floor, for crack control, should extend to a minimum depth of 1/3 of the thickness of the slab.

A moisture barrier will be required under the floor slabs such as the placement of at least 200-milimetres of well compacted 20-millimetre clear crushed stone. At a minimum the moisture barrier material should contain no more then 10 percent passing the No. 4 sieve. Where 'non-damp' floor slabs are required, as for instance under sheet vinyl floor coverings, etc., extra efforts will be required to damp proof the floor slab, as with the additional provisions of a heavy 'poly' sheet, damp proofing sprays/membranes, drainage board products, etc. Where 'poly' sheets are used care should be taken to prevent puncturing and tearing, and a sufficiently heavy gauge material be provided. The floor finish product supplier should be consulted regarding the requirement for such a non-damp condition.

Curing of the slab-on-grade must be carefully specified to ensure that slab curl is minimised. This is especially critical during the hot summer month of the year when the surface of the slab tends to dry out quickly while high moisture conditions in the moisture barrier or water trapped on top of any 'poly' sheet at the sawcut joints and cracks, and at the edges of the slabs, maintains the underside of the slab in a moist condition. It is important that the concrete mix design provide a limiting water/cement ratio and total cement content, which will mitigate moisture related problems with low permeance floor coverings, such as debonding of vinyl and ceramic tile. It is equally important that excess free water not be added to the concrete during its placement as this could increase the potential for shrinkage cracking and curling of the slab.

Where the finished floor is less than 300 millimetres above the finished exterior grade consideration should be given to the provision of a perimeter weeping tile system to prevent the build up of water against the foundations. Where provided, the perimeter drainage system should consist of 100-millimetre diameter perforated pipe, encased in a geofabric sock and covered with a minimum of 200 millimetres of a 20-millimetre clear crushed stone product in turn encased in a heavy filter geotextile product. The suppliers of the filter geotextile should be consulted as to the best type suited to this project. Great care should be taken during the installation of the drains, as even a small break in the filtering materials could result in loss of fines into the drains with attendant performance difficulties, including settlements of the ground surface. The perimeter

drains should outlet to a gravity sewer connection, a nearby catch basin, or a sump pit a minimum of 150 millimetres below the underside of the finished floor. In the event that a perimeter weeping tile is not provided, a barrier or 'slip plane' should be provided against the exterior foundation walls to prevent freezing of the backfill soils to the foundation walls. The exterior grade around the structure should be sloped away from the structure, and provided with a low permeability surface to prevent the ponding of water against the foundation walls.

8. BACKFILL CONSIDERATIONS

The majority of the excavated materials will primarily consist of the native sandy silt/silty sand and sand encountered in the boreholes, as described above. These soils are generally considered suitable for use as engineered fill, trench backfill, etc., provided they are free of organics, large construction debris, or otherwise deleterious materials, and that their moisture contents can be controlled to within 3 percent of their standard proctor optimum moisture content.

It is noted that the fine grained soils encountered on site are not considered to be free draining and should not be used where this characteristic is necessary. These soils will also present difficulties in achieving effective compaction where access with compaction equipment is restricted, such as within the building footprint or against foundations. The use of a free draining granular material, such as an OPSS Granular 'B', or approved alternative, in areas of restricted access areas such as within the building footprints or against the building foundations. These materials are more efficiently compacted in such areas, and generally provide a more uniform support condition for the exterior concrete and pavements.

The on-site soils encountered are generally considered to be near to slightly 'dry' of their standard Proctor optimum moisture content. Some moisture conditioning may be required depending upon the weather conditions at the time of construction. These soils are also noted to be sensitive to high moisture conditions and will be almost impossible to effectively compact when they become well 'wet' of their optimum. After a period of heavy precipitation, and near-surface wet, saturated or softened material should be allowed to air dry or be removed and discarded.

We note that where backfill material is placed near or slightly above its optimum moisture content, the potential for long term settlements due to the ingress of groundwater and collapse of the fill structure is reduced. Correspondingly the shear strength of the 'wet' backfill material is also lowered, therefor reducing its ability to

support construction traffic and therefore impacting pavement structure construction. If the soil is compacted well dry of its optimum value, it will appear to be very strong when compacted, but will tend to settle with time as the moisture content in the fill increases to equilibrium condition. The on-site soils will require high compaction energy to achieve acceptable densities if the moisture content is not close to its standard Proctor optimum value. It is therefore very important that the placement moisture content of the backfill soils be within 3 percent of its standard Proctor optimum moisture content during placement and compaction to minimise long term subsidence [settlement] of the fill mass. Any imported fill required should have its moisture content within 3 percent of its optimum moisture content and meet the necessary environmental guidelines.

A representative of SOIL-MAT should be present on-site during the backfilling and compaction operations to confirm the uniform compaction of the backfill material to project specification requirements. Close supervision is prudent in areas that are not readily accessible to compaction equipment, for instance near the end of compaction 'runs'. All structural fill, backfill within service trenches, areas to be paved, etc., should be compacted to a minimum of 98 percent of its SPMDD. The appropriate compaction equipment should be employed based on soil type, i.e. pad-toe for cohesive soils and smooth drum/vibratory plate for granular soils. A method should be developed to assess compaction efficiency employing the on-site compaction equipment and backfill materials used during construction.

9. PAVEMENT CONSIDERATIONS

In the event new paved areas are to be constructed, all areas to be paved should be stripped of all topsoil, along with any otherwise unsuitable materials. The exposed subgrade should be proof rolled with 3 to 4 passes of a loaded tandem truck in the presence of a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., immediately prior to the placement of the sub-base material. Any areas of distress revealed by this or other means must be sub-excavated and replaced with suitable backfill material. Alternatively, the soft areas may be stabilised by placing coarse crushed stone and 'punching' it into the soft areas. It is noted that the predominately sandy silt/silty sand soils are highly susceptible to disturbance from moisture conditions and construction traffic. The need for the treatment of softened subgrade will be reduced if construction is undertaken during the dry summer months and careful attention is paid to the compaction operations. The fill over shallow utilities cut into or across paved areas must also be compacted to a minimum of 98 per cent of its SPMDD.

Good drainage provisions will optimise the long-term performance of the pavement structure. The subgrade must be properly crowned and shaped to promote drainage to the subdrain system. Subdrains should be installed to intercept excess subsurface water and mitigate softening of the subgrade material. Surface water should not be allowed to pond adjacent to the outer limits of the paved areas.

The most severe loading conditions on the subgrade typically occur during the course of construction. Therefore, precautionary measures should be taken to ensure that the subgrade is not unduly disturbed by construction traffic. These measures would include minimising the amount of heavy traffic travelling over the subgrade, such as during the placement of granular base layers.

If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. During wet weather conditions, such as during the Fall and Spring months, or during colder winter weather, it should be anticipated that additional subgrade preparation will be required, such as additional depth of Ontario Provincial Standard Specification [OPSS] Granular 'B', and/or the use of a Type II (crushed limestone bedrock) sub-base material. It is also important that the sub-base and base granular layers of the pavement structure be placed as soon as possible after exposure, preparation, and approval of the exposed subgrade.

The suggested pavement structures outlined in Table A below are based on subgrade parameters estimated on the basis of visual and tactile examinations of the on-site soils and past experience. The outlined pavement structure may be expected to have an approximate ten-to-fifteen-year lifespan, assuming that regular maintenance is performed. Should a more detailed pavement structure design be required, site specific traffic information would be needed, together with detailed laboratory testing of the subgrade soils.

TABLE A – TYPICAL SUGGESTED PAVEMENT STRUCTURES

LAYER DESCRIPTION	COMPACTION REQUIREMENTS	LIGHT DUTY SECTIONS	HEAVY DUTY [TRUCK ROUTE]
Asphaltic Concrete Wearing course OPSS HL 3 or HL 3A	92 per cent Marshall	40 millimetres	40 millimetres
Binder Course OPSS HL 8	92 per cent Marshall	50 millimetres	80 millimetres
Base Course OPSS Granular A	100% SPMDD	150 millimetres	150 millimetres
Sub-base Course OPSS Granular B Type II	100% SPMDD	300 millimetres	450 millimetres

* SPMDD denotes Standard Proctor Maximum Dry Density, ASTM-D698.

In the event that a pit run sand and gravel aggregate (Type I) is to be utilised for the granular sub-base materials, it is recommended that the sub-base depth be increased by 100 millimetres. It should also be feasible to reuse the existing granular materials present on site, however this should be confirmed at the time of construction and via additional laboratory sieve analyses of the granular material.

Depending on the anticipated traffic, a reduced light duty asphalt structure consisting of 65 millimetres of HL3 surface course may also perform sufficiently. This would be reasonable in areas subjected only to light vehicles such as cars for parking. Such a structure may have a reduced lifespan if subjected to heavier vehicles, and would also not allow for 'mill and pave' type operations for future rehabilitation.

Asphaltic concrete pavement surfaces at industrial facilities may be exposed to significant surficial distress due to static loading and frequent turning heavy multi-axle trucks. It would be prudent to consider a concrete pavement structure in areas of such high-volume traffic areas. A recommended heavy concrete pavement structure may consist of 300 millimetres of OPSS Granular 'B' Type II (crushed bedrock), overlain by 150 millimetres of OPSS Granular 'A', with 200 millimetres of surficial concrete. As noted above, depending on the condition of the subgrade at the time of construction, sub-excavation of unsuitable materials may be required. Alternatively, the use of a reinforced asphalt product such as Aramid Fibre reinforced asphalt of similar product may be considered. As these products are proprietary in nature, a specialty contractor should be consulted regarding the use of such a product.

A heavy-duty granular pavement structure may also be considered, which would consist of a minimum of 450 millimetres of OPSS Granular 'B' Type II (crushed bedrock), surfaced with 150 millimetres of OPSS Granular 'A' material. It may also be feasible to make use of alternative granular materials, such as recycled concrete aggregate, or existing granular materials on site. However, such materials should be reviewed and approved by our office prior to use.

To minimise segregation of the finished asphalt mat, the asphalt temperature must be maintained uniform throughout the mat during placement and compaction. All too often, significant temperature gradients exist in the delivered and placed asphalt with the cooler portions of the mat resisting compaction and presenting a honeycomb surface. As the spreader moves forward, a responsible member of the paving crew should monitor the pavement surface, to ensure a smooth uniform surface. The contractor can mitigate the surface segregation by 'back-casting' or scattering shovels of the full mix material over the segregated areas and raking out the course particles during compaction operations. Of course, the above assumes that the asphalt mix is sufficiently hot to allow the 'back-casting' to be performed.

10. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available to it at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.

Kevin Reid, B. Eng.
Junior Engineer

Kyle Richardson, P.Eng.
Project Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
Log of Borehole Nos. 1 to 6 inclusive

Distribution: Kalos Engineering Inc. [1, pdf]

LEGEND

BH# Borehole Location

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 230662-G.

2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Warehouse Addition
14 Boswell Drive
Simcoe, Ontario

Borehole Location Plan

Project No. SM 230662-G

Date: December, 2023

Drawn: KJR

Checked: KR

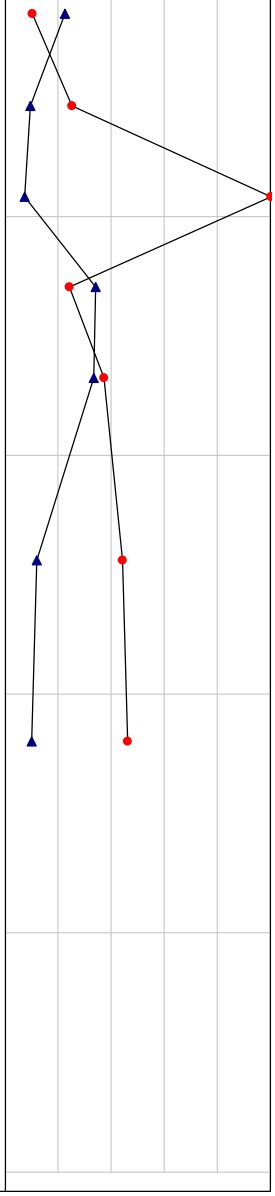
Drawing No. 1

Log of Borehole No. 1

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742381
E: 558627

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		228.20	Ground Surface							
0	0	227.75	**Topsoil** Approximately 450 millimetres of topsoil.	SS	1	3,4,6,4	10			
1			**Sand and Gravel Fill** Brown, compact.							
2				SS	2	5,10,15,33	25			
3	1	226.60								
4		226.30	**Concrete Structure** Aproximately 300 millimetres of concrete.	SS	3	26,60,50	100			
5			**Sandy Silt/Silty Sand** Brown, trace gravel, increasing sand with depth, compact to dense.							
6	2			SS	4	5,8,16,20	24			
7										
8				SS	5	10,19,28,43	37			
9	3									
10										
11										
12										
13	4									
14										
15										
16				SS	6	12,21,23,24	44			
17	5									
18										
19										
20	6									
21				SS	7	11,22,24,27	46			
22		221.50								
23	7		End of Borehole							
24			NOTES:							
25			1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 6.7 metres.							
26	8									
27										
28			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.							
29										
30	9									
31			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.							
32										
33										



Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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Datum: Temporary Benchmark
Field Logged by: MG
Checked by: KJR
Sheet: 1 of 1

Log of Borehole No. 2

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742402
E: 558679

Depth (ft)	Depth (m)	Elevation (m)	Description	Well Data	SAMPLE Type	SAMPLE Number	SAMPLE Blow Counts	SAMPLE Blows/300mm	SAMPLE Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		228.00	Ground Surface								
		227.55	**Topsoil** Approximately 450 millimetres of topsoil, trace to some gravel.								
			Sandy Silt/Silty Sand Brown, trace clay and gravel, increasing sand with depth, compact to dense.		SS	1	1,2,1,1	3			
					SS	2	7,9,12,13	21			
					SS	3	9,7,5,7	12			
					SS	4	7,13,19,23	32			
					SS	5	9,13,17,22	30			
					SS	6	13,28,22,24	40			
					SS	7	12,21,28,34	49			
		221.30	End of Borehole								

NOTES:

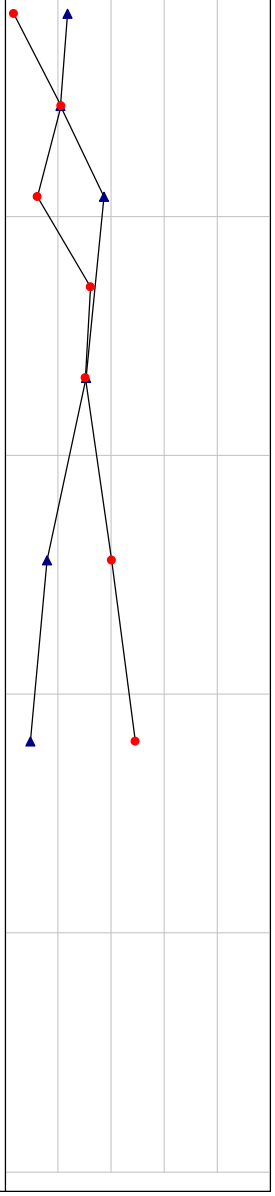
1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 6.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Moisture Content w% 10 20 30 40

Standard Penetration Test blows/300mm 20 40 60 80



Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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Field Logged by: MG
Checked by: KJR
Sheet: 1 of 1

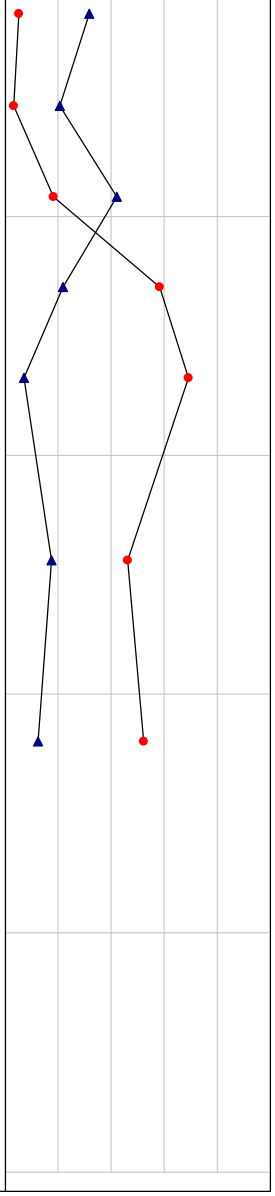
Log of Borehole No. 3

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742343
E: 558640

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
	227.20	Ground Surface								
0 / 0	226.75	**Topsoil** Approximately 450 millimetres of topsoil.								
1 /		**Sandy Silt/Silty Sand** Brown, increasing sand with depth, very loose to very dense.		SS	1	1,2,3,2	5			
2 /										
3 / 1				SS	2	3,2,1,2	3			
4 /										
5 /				SS	3	4,6,12,22	18			
6 / 2										
7 /				SS	4	20,29,29,28	58			
8 /										
9 / 3				SS	5	13,30,39,34	69			
10 /										
11 /										
12 / 4										
13 /										
14 /										
15 / 5				SS	6	15,22,24,21	46			
16 /										
17 /										
18 / 6										
19 /										
20 /				SS	7	9,21,31,32	52			
21 /	220.50									
22 / 7		End of Borehole								
23 /		NOTES:								
24 /		1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 6.7 metres.								
25 /										
26 / 8		2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.								
27 /										
28 /		3. Soil samples will be discarded after 3 months unless otherwise directed by our client.								
29 /										
30 / 9										
31 /										
32 /										
33 /										

Moisture Content w%: 10 20 30 40
Standard Penetration Test blows/300mm: 20 40 60 80



Drill Method: Solid Stem Auger
Drill Date: Decemeber 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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Sheet: 1 of 1

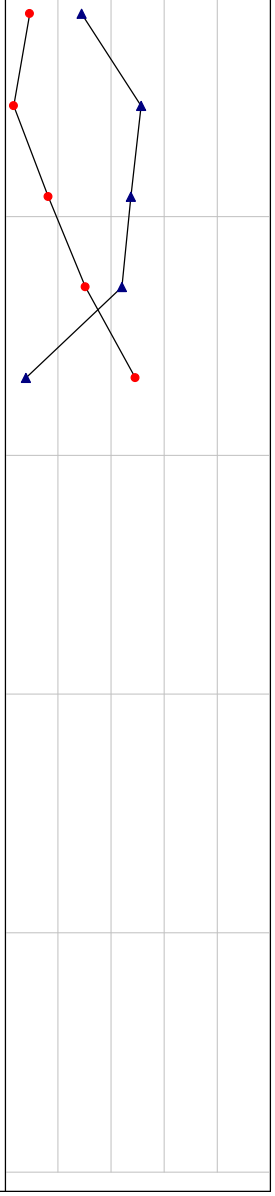
Log of Borehole No. 4

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742365
E: 558661

Depth (ft / m)	Elevation (m)	Description	Well Data	SAMPLE Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
0 / 0	227.40	Ground Surface								
0–3 / 0–1	226.95	**Topsoil** Approximately 450 millimetres of topsoil.								
3–12 / 1–3		**Sandy Silt/Silty Sand** Brown, trace clay, increasing sand with depth, very loose to dense.		SS	1	3,5,4,3	9			
				SS	2	1,2,1,1	3			
				SS	3	4,6,10,12	16			
				SS	4	7,10,20,55	30			
				SS	5	23,26,23,21	49			
12 / 3.7	223.70	End of Borehole								

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



NOTES:

1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 3.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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Sheet: 1 of 1

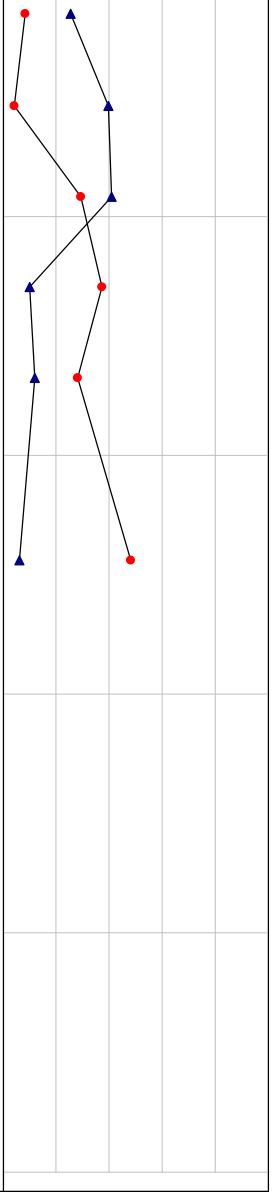
Log of Borehole No. 5

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Rd. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742352
E: 558684

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		226.90	Ground Surface							
0	0	226.45	**Topsoil** Approximately 450 millimetres of topsoil.							
1			**Sandy Silt/Silty Sand** Brown, trace gravel, trace to some sand, loose to compact.	SS	1	2,4,4,4	8			
2										
3	1			SS	2	2,2,2,2	4			
4										
5				SS	3	6,11,18,21	29			
6	2									
7				SS	4	15,18,19,18	37			
8										
9	3			SS	5	11,14,14,13	28			
10										
11										
12										
13	4									
14										
15										
16				SS	6	13,23,25,33	48			
17	5	221.70	End of Borehole							
18			NOTES:							
19										
20	6		1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 5.2 metres.							
21										
22										
23	7		2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.							
24										
25										
26	8		3. Soil samples will be discarded after 3 months unless otherwise directed by our client.							
27										
28										
29										
30	9									
31										
32										
33										

Moisture Content w% (10 20 30 40)
Standard Penetration Test blows/300mm (20 40 60 80)



Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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Sheet: 1 of 1

Log of Borehole No. 6

Project No: SM 230662-G
Project: Proposed Warehouse Addition
Location: 14 Boswell Dr. Simcoe, On
Client: KALOS ENGINEERING INC.

Project Manager: Kyle Richardson, P.Eng.
Borehole Location: See Drawing No. 1
UTM Coordinates - N: 4742386
E: 558714

Depth (ft)	Depth (m)	Elevation (m)	Description	Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)
		227.40	Ground Surface							
0	0	226.95	**Sand and Gravel Fill** Approximately 450 millimetres of sand and gravel parking lot base.	SS	1	8,7,12,11	19			
3	1		**Sandy Silt/Silty Sand** Brown, trace clay and gravel, increasing sand with depth, loose to dense.	SS	2	2,4,4,2	8			
6	2			SS	3	3,3,6,9	9			
9	3			SS	4	9,17,17,22	34			
11		223.70		SS	5	3,12,17,21	29			
12	4		End of Borehole							

NOTES:

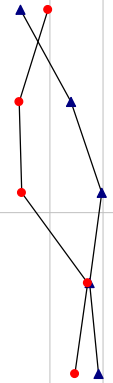
1. Borehole was advanced using solid stem auger equipment on December 13, 2023 to termination at a depth of 3.7 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Moisture Content w% 10 20 30 40

Standard Penetration Test blows/300mm 20 40 60 80



Drill Method: Solid Stem Auger
Drill Date: December 13, 2023
Hole Size: 150 millimetres
Drilling Contractor: Elements GEO

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