July 8, 2025
VH Project No. 32948-23

Chabad of Guelph
81 College Avenue West
Guelph, Ontario, N1G 1S2

Re: Functional Servicing and Stormwater Management Report
Proposed Chabad Development
81 College Avenue West, City of Guelph

1.0 Introduction

Van Harten Surveying Inc. (Van Harten) was retained by Chabad of Guelph to prepare a Functional Servicing and Stormwater Management Report in support of a Zoning By-law Amendment Application for the proposed Chabad development located at 81 College Avenue West in the City of Guelph.

The purpose of this report is to outline the proposed water servicing, sanitary servicing, and stormwater management strategies for the development in accordance with applicable municipal standards. The report and supporting design calculations have been informed by the following background information and reference materials:

- City of Guelph Development Engineering Manual (October 2023)
- City of Guelph As-Constructed Drawings (Received January 2025)
- Geotechnical Investigation and Hydrogeological Assessment prepared by Stonecairn Consulting (July 3, 2025)
- Region of Waterloo and Area Municipalities DGSSMS (January 2025)
- Ministry of the Environment Design Guidelines for Drinking-Water Systems (2008)
- Ministry of the Environment Design Guidelines for Sewage Works (2008)
- 81 College Avenue West Site Plan prepared by a+Link Architecture (Issued June 3, 2025)

Relevant excerpts from the above reports and background information have been provided in Appendix A.

2.0 Existing Site Conditions

The site encompasses an area of approximately 0.33 hectares and is currently occupied by one detached residential dwelling, an associated driveway, and landscaped areas. It is bounded by residential dwellings to the north, east, and west, and by College Avenue West to the south.

A Geotechnical Investigation and Hydrogeological Assessment was completed by Stonecairn Consulting, dated July 3, 2025, to assess subsurface soil and groundwater conditions. Based on the findings of the Geotechnical Investigation, on-site soils consist of sandy silt and sand and gravel, with a factored (design) infiltration rate ranging from 9 to 12 mm/hr.

As outlined in the Geotechnical Investigation and Hydrogeological Assessment, groundwater was encountered at depths ranging from 5.1 to 5.3 metres below ground surface (mbgs) across the site. As a result, low impact development (LID) features are not anticipated to be influenced by groundwater elevations.

3.0 Proposed Development Conditions

According to the Site Plan prepared by a+Link Architecture, the proposed development will consist of the following:

- A 538 m² Chabad facility with an attached 212 m² two-storey residence and a 41 m² garage/nanny suite
- An asphalt/permeable paver parking lot and internal access drive aisle
- Landscaped and amenity areas

Access to the development will be provided via a 7.0 metre-wide driveway from College Avenue West. The existing residential dwelling and driveway on the property will be demolished to accommodate the proposed development.

4.0 Water Servicing

4.1 Existing Water Servicing

The site is located within an urban area and has access to the City of Guelph's municipal water distribution system. As-constructed drawings obtained from the City of Guelph were reviewed to identify the existing municipal water infrastructure in proximity to the site. Based on the available records, the following infrastructure is present:

- A 300 mm diameter polyvinyl chloride (PVC) watermain located on College Avenue West (City of Guelph As-Constructed Drawing NC-05)

- A fire hydrant located on the north side of College Avenue West at municipal address 89 College Avenue West, approximately 24 metres east of the site (City of Guelph As-Constructed Drawing NC-05)
- A fire hydrant located on the south side of College Avenue West at the intersection with McGilvray Street, approximately 31 metres east of the site (City of Guelph As-Constructed Drawing NC-05)
- One existing 25 mm diameter (size assumed) water service lateral connected to 81 College Avenue West, which ties into the 300 mm diameter PVC watermain on College Avenue West (City of Guelph As-Constructed Drawing NC-05)

4.2 Water Demand Calculation

The water demand for the proposed development was calculated with reference to the City of Guelph Development Engineering Manual and the Ministry of the Environment Design Guidelines for Drinking-Water Systems. A summary of the projected water demand is provided in Table 1, with detailed calculations included in Appendix B.

Table 1: Water Demand Calculations – Proposed Development

Design Guidelines	Average Daily Flow (L/s)	Max. Daily Flow (L/s)	Peak Hour Design Flow (L/s)
City of Guelph	0.10	0.36	0.53

Note: Flows include residential and institutional flows inclusive of peaking factors (i.e. total flows from site).

According to the water demand calculation results outlined in Table 1, the maximum daily water demand for the proposed development is 0.36 L/s, and the peak hour water demand is 0.53 L/s.

4.3 Proposed Fire Flow Calculation

The Fire Underwriters Survey – Water Supply for Public Fire Protection (2020) was used to calculate the required fire flow for the proposed development. The specific required fire flow values can be found in Table 2.

Table 2: Required Fire Flows

Fire Flow Criteria	Fire Flow (L/s)	Duration (hours)
FUS 2020	117	2.0

Based on the Fire Underwriters Survey, the required fire flow for the proposed development is 117 L/s for a duration of 2.0 hours. Additional details of the fire flow calculations can be found in

Appendix B. It should be noted that the mechanical engineer and the architect will complete detailed fire flow calculations to ensure all fire suppression requirements are met for the proposed development.

4.4 Proposed Water Servicing

The proposed development will be serviced by a new 100 mm diameter PVC water service connecting to the existing 300 mm diameter PVC watermain on College Avenue West via a tapping sleeve and valve connection. The existing 25 mm water service lateral providing water to 81 College Avenue West will be decommissioned to accommodate the proposed development.

The existing fire hydrant on the north side of College Avenue West, at municipal address 89 College Avenue West, will provide fire coverage for the development. This hydrant is located approximately 24 m east of the site.

Details of the proposed water servicing can be found on the Site Servicing Plan (Drawing C02)

5.0 Sanitary Servicing

5.1 Existing Sanitary Servicing

The site is located in an urban area with access to the City of Guelph's municipal sanitary sewage network. As-constructed drawings obtained from the City of Guelph were reviewed to determine the available sanitary sewer infrastructure near the site. According to these drawings, the following services are present:

- A 250 mm diameter sanitary sewer on College Avenue West, draining east to west at a slope of 1.1% (City of Guelph As-Constructed Drawing NC-05).
- A sanitary sewer within the existing sanitary easement bisecting the property, draining east to west.
- A 100 mm sanitary service connected to 81 College Avenue West. This lateral connects to the existing 250 mm sanitary sewer on College Avenue West and includes a future servicing connection (150 mm diameter 'Y' connection) for 83 College Avenue (City of Guelph As-Constructed Drawing NC-05).

5.2 Sanitary Demand Calculation

The sanitary demand for the proposed development was completed with reference to the City of Guelph Development Engineering Manual and the Region of Waterloo and Area Municipalities

DGSSMS. The sanitary demand for the proposed development is provided in Table 3. Detailed sanitary demand calculations are included in Appendix B.

Table 3: Sanitary Demand Calculations – Proposed Development

Design Guidelines	Peak Flow (L/s)	Peak Infiltration Flow (L/s)	Peak Design Flow (L/s)
City of Guelph	0.37	0.08	0.45

According to the sanitary demand calculations shown in Table 3, the peak sanitary design flow for the proposed development is 0.45 L/s.

5.3 Proposed Sanitary Servicing

The proposed development will be serviced by the existing 100 mm diameter sanitary 'Y' service connecting to the 250 mm diameter PVC sanitary sewer on College Avenue West. The existing 100 mm service, installed at a 2% slope, has a full flow capacity of 7.31 L/s based on Flowmaster calculations. Therefore, the existing service has sufficient capacity to accommodate the proposed development. The existing sanitary lateral servicing 81 College Avenue West will be decommissioned as part of the proposed development.

Details of the sanitary servicing can be found on the Site Servicing Plan (Drawing C02).

6.0 Stormwater Management

6.1 Stormwater Management Criteria

According to the City of Guelph Stormwater Management Master Plan (December 2022), the site is located within Stormwater Management Policy Area 13 (City-Wide). Based on Table 4.2 of the Master Plan, the following stormwater criteria apply to the site:

- Stormwater Quantity Control: Control peak flow to match pre-development levels for all design events (2- to 100-year).
- Stormwater Quality Control: Provide an "enhanced" level of water quality protection, achieving 80% total suspended solids (TSS) removal.
- Infiltration/Water Balance: Maintain pre-development recharge rate, volume, and hydroperiods at post-development conditions. Provide a minimum of 5 mm volume control.

7.0 Existing Storm Servicing

The site is located in an urban area with access to the City of Guelph's storm sewer infrastructure. As-constructed drawings obtained from the City of Guelph were reviewed to determine the available storm sewer infrastructure near the site. According to these drawings, the following infrastructure is present:

- A 900 mm diameter storm sewer on College Avenue West, draining east to west at a slope of 0.4% (City of Guelph As-Constructed Drawing NC-05)

7.1 Existing Drainage Patterns

An Existing Drainage Plan has been prepared (Drawing C03) based on the topographic survey completed by Van Harten in November 2023. According to the survey, there is a high point along the middle of the property that divides the site into two (2) catchments: a northern catchment (Catchment 102) and a southern catchment (Catchment 101). Catchment 101 includes part of the existing dwelling, garage, asphalt driveway, and landscaped areas, and drains overland to the College Avenue West right-of-way. Catchment 102 consists of the remainder of the dwelling, garage, and landscaped area, and drains overland to the rear of the property.

The catchment properties under the existing conditions are summarized in Table 4.

Table 4: Existing Drainage Area Characteristics

Catchment	Use	Area (m^2)	Imp. (%)	Length (m)	Slope (%)	Outlet
101	Res. Dwelling, Driveway and Landscaping	1,837	25.6	42	3.9	College Ave. W ROW
102	Res. Dwelling and Landscaping	1,422	12.4	44	3.6	Rear

Note:
1. Impervious areas based on the topographic survey prepared by Van Harten.

7.2 Proposed Drainage Patterns

A Proposed Drainage Plan has been prepared (Drawing C03) based on the Site Grading Plan (Drawing C01). Consistent with the existing drainage conditions, the grading for the proposed development has been designed to direct runoff toward College Avenue West and the rear of the property. Catchments 201, 202, and UC1, which include the Chabad building, asphalt entrance/lot, and landscaped areas, will outlet to the College Avenue storm sewer network following quantity and quality controls. Catchments 203 and UC2, consisting of the residential building, paver parking lot, and landscaped areas, will outlet to the rear of the property.

The catchment properties under the proposed conditions are summarized in Table 5.

Table 5: Proposed Drainage Area Characteristics

Catchment	Use	Area (m^2)	Imp. (%)	Length (m)	Slope (%)	Outlet
201	Chabad Roof and Landscape	1,183	74.3	40	3.0	Soakaway
202	Asphalt Access and Parking/Res. Building	1,200	83.4	40	2.0	College Ave. W Sewer
203	Permeable Paver Parking Lot	337	100	20	2.5	Pavers/Rear
UC1	Landscape Area	147	0.0	15	4.0	College Ave. W ROW
UC2	Landscaping	392	0.0	40	1.0	Rear

Notes:
1. Impervious areas based on the Grading Plan prepared by Van Harten.

7.3 Stormwater Quantity Controls

The stormwater management criteria for the site are governed by the City of Guelph Stormwater Management Master Plan Policy Area 13. The quantity control criteria require that post-development peak flows be controlled to match pre-development flow rates for storm events ranging from the 2-year to the 100-year return periods. Stormwater hydraulic modeling for the site was completed using a 4-hour Chicago storm simulation for the 2-year through 100-year design storm events. The Intensity-Duration-Frequency (IDF) curves applied were obtained from the City of Guelph Development Engineering Manual (October 2023).

A pre-development and post-development hydrologic analysis for the site was performed using MIDUSS Version 2.25, as detailed in Appendix C. Information on the 2-year through 100-year design storms is provided in Table 6.

Table 6: Guelph DEM IDF Parameters

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
a	475.61	632.75	721.92	822.74	893.80	953.29
b	0.0	0.0	0.0	0.0	0.0	0.0
c	0.738	0.741	0.736	0.725	0.719	0. 711
r	0.40	0.40	0.40	0.40	0.40	0.40
T_d	240	240	240	240	240	240

The hydraulic modelling peak runoff results for the pre-development and post-development-controlled scenarios have been outlined in Table 7 and Table 8 for each respective outlet.

Table 7: Peak Flow and On-Site Storage Summary – Outlet to College Avenue West

Design Storm (year)	Calculated Peak Flow (LPS)		Storage Provided (m^3)
	Existing Uncontrolled	Proposed Controlled[1]	
	101	201 + 202 + UC1	
2	16	12	104
5	26	16	
10	35	18	
25	48	21	
50	64	23	
100	71	25	

Notes:

1. Flows controlled for Catchment 201 and Catchment 202 through the installation of a 100mm dia. orifice pipe.
2. Storage includes the combined storage of the underground storage tank. Catchment 201 is proposed to infiltrate while Catchment 202 will be attenuated and released to the College Avenue Storm sewer.

As shown in Table 7, stormwater quantity controls are required to reduce post-development 100-year flows to match pre-development 100-year flow rates. The proposed stormwater management strategy includes the use of a 100 mm diameter orifice pipe between the proposed underground storage tank and the oil-grit separator to throttle flows from Catchments 201 and 202. An underground storage tank is proposed to provide a total storage volume of 104 m^3 to attenuate the 100-year storm event. The tank will consist of a 69 m^3 permeable linear cell and a 35 m^3 impermeable cell. The permeable cell will capture and infiltrate clean rooftop and landscape runoff from Catchment 201, while the impermeable cell will capture and attenuate parking lot runoff from Catchment 202. Detailed stormwater management calculations are provided in Appendix C. Detailed drawings of the underground tank will be included at the detailed design stage.

Catchment UC1 consists of runoff from the landscaped frontage of the proposed development and will discharge uncontrolled to the College Avenue West storm right-of-way.

Table 8: Peak Flow and On-Site Storage Summary – Outlet to College Avenue West

Design Storm (year)	Calculated Peak Flow (LPS)		Storage Provided (m^3)
	Existing Uncontrolled	Proposed Controlled[1]	
	102	203 + UC2	
2	8	2	54
5	18	4	
10	25	6	
25	35	8	
50	43	9	
100	49	10	

Notes:

1. Storage required to capture and infiltrate the 100-year storm event for Catchment 203. Permeable pavers will provide the storage.

As shown in Table 8, stormwater quantity controls have been implemented to reduce post-development 100-year flows to match pre-development 100-year flows. The proposed stormwater management measures include the use of permeable pavers within the rear parking lot, designed to capture and infiltrate the 100-year storm event from Catchment 203. Catchment UC2 consists of runoff from landscaped areas and will continue to drain uncontrolled to the rear of the property, consistent with existing conditions.

The proposed stormwater design ensures that post-development flows to both College Avenue West and the rear of the property are reduced for all storm events up to and including the 100-year event. Details of the proposed storm servicing are provided on the Site Servicing Plan (Drawing C02).

7.4 Stormwater Quality Controls

As outlined in the City of Guelph Development Engineering Manual, stormwater quality controls must be implemented to achieve an “enhanced” level of water quality protection, defined as 80% total suspended solids (TSS) removal. For the proposed development, this requirement will be met through the installation of an oil-grit separator (Stormceptor EFO4 or equivalent). Details of the proposed oil-grit separator are provided in Appendix C.

7.5 Infiltration/Water Balance

It is our understanding that the water balance criteria for this property require the retention of the first 5 mm of rainfall on-site through infiltration, evapotranspiration, and/or reuse, as well as maintaining pre-development recharge rates, volumes, and hydroperiods under post-development conditions.

To satisfy the 5 mm retention requirement, a total volume of approximately 16.3 m³ must be captured on-site, based on a lot area of 3,259 m². This volume will be retained through the use of permeable pavers and a permeable underground storage tank. Together, these features will provide an estimated combined void volume of 123 m³.

Monthly Water Balance

A monthly water balance assessment was undertaken for the site under existing and proposed conditions. Methodology generally followed that of Thornthwaite and Mather and the MOE Stormwater Management Planning and Design Manual (2003). Local climatic data (precipitation, monthly mean temperature) were taken from the Waterloo Wellington A Climate Station (Climate Station ID 6149387) 1981 to 2010 Climate Normals. Detailed water balance calculations are provided in Appendix D.

Monthly potential evapotranspiration was calculated using the monthly mean temperature and the station latitude. Actual evapotranspiration and water surplus were calculated based on the soil moisture conditions and monthly average precipitation. The water balance calculation methodology assumed that available water would first be used to overcome any soil moisture deficit prior to any excess being available as surplus.

A soil moisture capacity of 125mm was assigned under existing and proposed conditions based on Table 3.1 of the MOE Stormwater Management Planning and Design Manual (silt loam, urban lawn). A weighted infiltration factor was calculated for each condition based on the topography, soils, and cover to distribute the surplus quantity into runoff and infiltration consistent with the MOE Stormwater Management Planning and Design Manual (2003). Under post-development conditions, an annual infiltration deficit of 176.7 m³ was calculated.

The infiltration deficit will be mitigated through the combined use of permeable pavers and a permeable underground storage tank. Based on projected runoff from the property between April and October, the enhanced annual recharge volume is estimated at 607.7 m³. This volume exceeds the calculated infiltration deficit. Therefore, the proposed infiltration features provide sufficient capacity to meet the water balance criteria under post-development conditions.

8.0 Erosion and Sediment Control

Temporary sediment control fence should be installed surrounding the proposed development and siltsacks should be installed in all existing and proposed catchbasins during construction to minimize the potential of sediment accumulating in the surrounding municipal storm sewer system. Temporary erosion and sediment controls may be removed once the construction of the proposed building and landscaping has been completed and once grass growth has been re-established over the disturbed areas.

It is noted that an erosion and sediment control plan is a dynamic plan, and alteration/addition to these measures may be necessary to respond to site conditions during construction. Additional erosion and sediment control measures should be kept on-site at all times and installed as necessary per the direction of the Site Engineer, Contractor, and/or City Staff.

9.0 Closure

The completed Functional Servicing and Stormwater Report is specific to the site based on our knowledge of the proposed development and has been prepared to support the Zoning By-Law Application. Please contact our office if you have any questions or require further consultation.

Van Harten Surveying Inc.

Brett Pond, P. Eng
Project Manager

Encl. Appendix A – Background Information
Encl. Appendix B – Water Supply and Sanitary Demand Calculations
Encl Appendix C – Stormwater Management Calculations
Encl Appendix D – Water Balance

Encl. Drawings
Drawing C01 – Site Grading Plan
Drawing C02 – Site Servicing Plan
Drawing C03 – Drainage Plans

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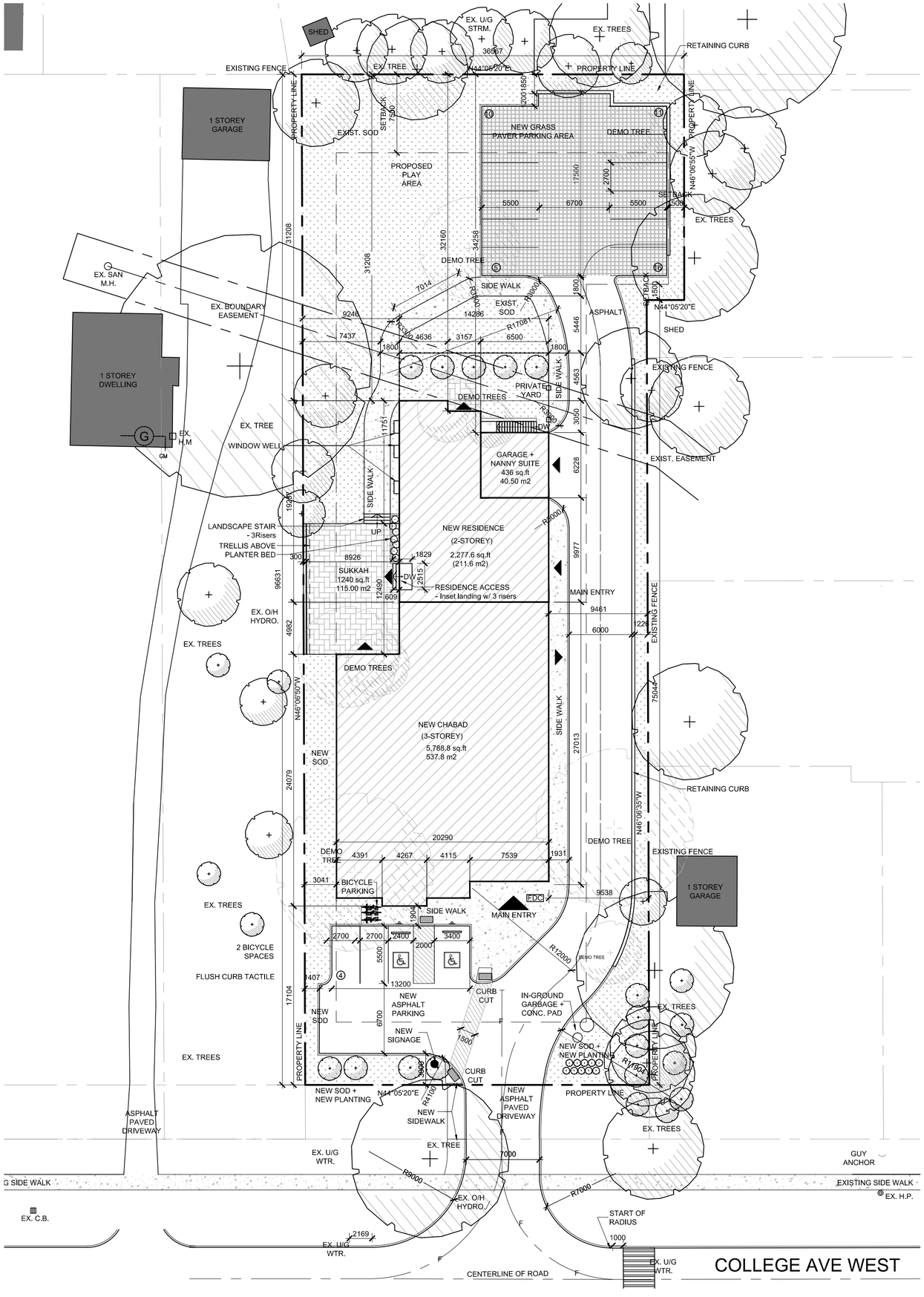
APPENDIX A
BACKGROUND INFORMATION



SITE & ZONING ANALYSIS			
PROJECT:	CHABAD OF GUELPH		
PROJECT ADDRESS - EXISTING:	81 COLLEGE AVE WEST, GUELPH, ON		
EXISTING ZONING:	ZONE R1.B - RESIDENTIAL SINGLE DETACHED		
PROPOSED ZONING:	ZONE NI - NEIGHBOURHOOD INSTITUTIONAL		
PROPOSED USES:	PLACE OF WORSHIP, RESIDENTIAL		
	REQUIRED	EXISTING	PROPOSED
LOT AREA (m²) (min.):	700.00 m²	3,258 m²	No Change
LOT FRONTAGE (m) (min.):	30.0 m MIN.	32.9 m MIN.	No Change
SITE SETBACKS:			
FRONT YARD DEPTH (m) (min.):	6 m MIN.	40.9 m	17.0 m
EXTERIOR SIDE YARD DEPTH (m) (min.):	6 m MIN.	n/a	n/a
INTERIOR SIDE YARD DEPTH (m) (min.):	6.0 m MIN. (or one half building height)	2.2 m (East) 4.5 m (West)	9.6 m (East) 3.0 m (West)
REAR YARD DEPTH (m) (min.):	7.5 m MIN.	37.3 m	31.2 m MIN.
BUFFER STRIP (m) (min.):	3.0 m MIN. ADJACENT TO INTERIOR SIDE YARD AND REAR LOT LINES.	3.0m (Rear Yard) 1.5m (Interior Side Yard - East) 1.5m (Interior Side Yard - West)	0.4 m (Rear Yard) 1.5m (Interior Side Yard - East) 3.0m (Interior Side Yard - West)
LANDSCAPE OPEN SPACE (min.):	15% MIN.	83.8 %	46.2 %
BUILDING HEIGHT (m) (max.):	4 Storey	1 Storey	3 Storeys
LOT COVERAGE (%) (max.):	n/a	9.9 %	25.1 %
LOT DEPTH (m) (min.):	n/a	96.6 m MIN.	No Change
BUILDING AREA (m²):	n/a	322.66 m²	819.11 m²
GROSS FLOOR AREA (m²):	n/a	Ground Floor 845 m² (TBC)	CHABAD Basement 105.4 m² Ground Floor 548.1 m² Second Floor 361.4 m² Third Floor 183.9 m² TOTAL 1,198.8 m² HOUSE Basement 200.0 m² Ground Floor 200.0 m² Second Floor 221.6 m² TOTAL 621.6 m² TOTAL GFA= 1,820.4 m²
PARKING:	PARKING REQUIREMENTS FOR PLACES OF WORSHIP: 5.0 SPACES PER 100 m2 of GFA (MIN) 6.5 SPACES PER 100 m2 OF GFA (MAX) 1,385 m2 / 100 m2 = 14 Spaces required 16 Spaces provided	PARKING FOR RESIDENCE: 1 Space per dwelling unit - required 2 spaces provided in Garage	
STANDARD STALL: 2.7 m x 5.4 m STANDARD TWO WAY DRIVEWAY AISLE WIDTH: 6.0 m			
ACCESSIBLE PARKING: B/F TYPE 'A' STALL SIZE (min.): 3.4 m x 5.5 m B/F TYPE 'B' STALL SIZE (min.): 2.4 m x 5.5 m B/F ACCESS AISLE (min.): 2.0 m x 5.5 m ACCESSIBLE DRIVEWAY: (a) ACCESS AISLE: 1.5 m (b) DRIVEWAY: 3.4 m	DESIGNATED ACCESSIBLE PARKING SPACE REGULATIONS: REFER TO TABLE 5.5 - ACCESSIBLE PARKING RATES 1 Type 'A' and 1 Type 'B' space provided		
BICYCLE PARKING:	DESIGNATED BICYCLE PARKING SPACE REGULATIONS: 4% OF THE REQUIRED PARKING UNDER TABLE 5.3, 2 SPACES MINIMUM - 3 Spaces provided		
YARD PROTECTION AND PATIO COVERAGE:	FRONT/ EXTERIOR SIDE YARD: - 2.4 m (MAX) PROJECTION INTO YARD - 2m (MIN) SETBACK FROM LOT LINE REAR YARD: - 5 m (MAX) PROJECTION INTO YARD - 2 m (MIN) SETBACK FROM LOT LINE INTERIOR SIDE YARD: - 1.2 m (MAX) PROJECTION INTO YARD - CONFORMS - 0.6 m (MIN) SETBACK FROM LOT LINE - CONFORMS NOTE: ROOFED PORCH NOT EXCEEDING 1 STOREY IN HEIGHT		
FENCING:	(a) THE MAXIMUM HEIGHT OF A FENCE LOCATED IN A FRONT YARD, INTERIOR SIDE YARD OR EXTERIOR SIDE YARD IS 0.8 m N HEIGHT (b) THE MAXIMUM HEIGHT OF A FENCE LOCATED IN A FRONT YARD, INTERIOR SIDE YARD OR EXTERIOR SIDE YARD WITH A 4 m SETBACK IS 1.6 m N HEIGHT (c) THE MAXIMUM HEIGHT OF A FENCE LOCATED IN A REAR YARD IS 1.8 m IN HEIGHT		
GARBAGE / REFUSE AND OUTDOOR STORAGE:	EXTERIOR GARBAGE OR REFUSE SHALL BE STORED IN A CONTAINER AT THE INTERIOR SIDE YARD OR REAR YARD OF THE LOT. GARBAGE LOADING AND UNLOADING AREAS VISIBLE FROM AN ADJOINING SITE SHALL HAVE A VISUAL SCREENING CONSISTING OF A SOLID FENCE. AN OUTDOOR STORAGE AREA IS ONLY PERMITTED IN THE REAR YARD OF THE LOT.		

DATE 2025-06-03

SCALE 1:300

81 College Ave. Guelph, ON

Chabad of Guelph
Proposed Site Plan

a+LINK architecture inc.
362 DUFFERIN AVENUE, LONDON ON N6B 1Z4 P:519.649.0220 www.aLINKarch.ca

2G-27

UNIVERSITY AVE.
P-69

CALEDONIA ST.
2C-10 STM.
2C-10A SAN.

Reg. Plan Nº 249

Reg. Plan No. 583

R.P. No. 565
21

REG. PLAN No. 283

MATERIAL	SUPPLIER	CHAINAGE
STM. - CEMENT PIPE SAN. - A.C. PIPE	BEST PIPE J.M.	0+280 - 0+620 " "

2G-26

2G-28

"UNIVERSITY OF GUELPH"

SMITH LANE
U. of G.

LEGEND:

ASPHALT SIDEWALK

COLLEGE AVENUE WEST

GENERAL NOTES:
FIELD NOTES: FIELD BOOK 80-10
BENCH MARK: No. ..... ELEVATION: .....
PLAN REFERENCES: 20-98, 20-23, GIR-1921.
YEAR of CONSTR.: 80-10 WAYNCO STM. SAN. & SIDE.

No.	DATE	DESCRIPTION:	BY:	CH'KD.
2	811119	As Builts (Contr # 81-03)	RR	
1	801024	AS CONST'D STM-SAN & SIDE-80-10	JK	

SCHEDULE OF REVISIONS:

CITY OF GUELPH
ENGINEERING DEPARTMENT

COLLEGE AVE. WEST
RODNEY to CALEDONIA
STA. 0+280 to STA. 0+620

DESIGNED BY: A. R. Ferguson
REGISTERED PROFESSIONAL ENGINEER — CIVIL — A. R. FERGUSON — PROVINCE OF ONTARIO

APPROVED BY: R. Poulton, CITY ENGINEER
REGISTERED PROFESSIONAL ENGINEER — B. J. POULTON — PROVINCE OF ONTARIO

SCALES:	H. 1:500 V. 1:50
DATE:	80.02.13
DRAWN:	J.KLIMSTRA
CHECKED:	
CONTRACT No.	
DRAWING No.	2G-27

DRAWING FRAME SIZE: 574 × 821 mm.

CONSUMERS SERVICE RECORD

ADDRESS 81 College Ave. W. LOT NO. PLAN NO. (DATE INSTALLED)

LOCATION OF TAP SIDE OF MAIN FT. OF.

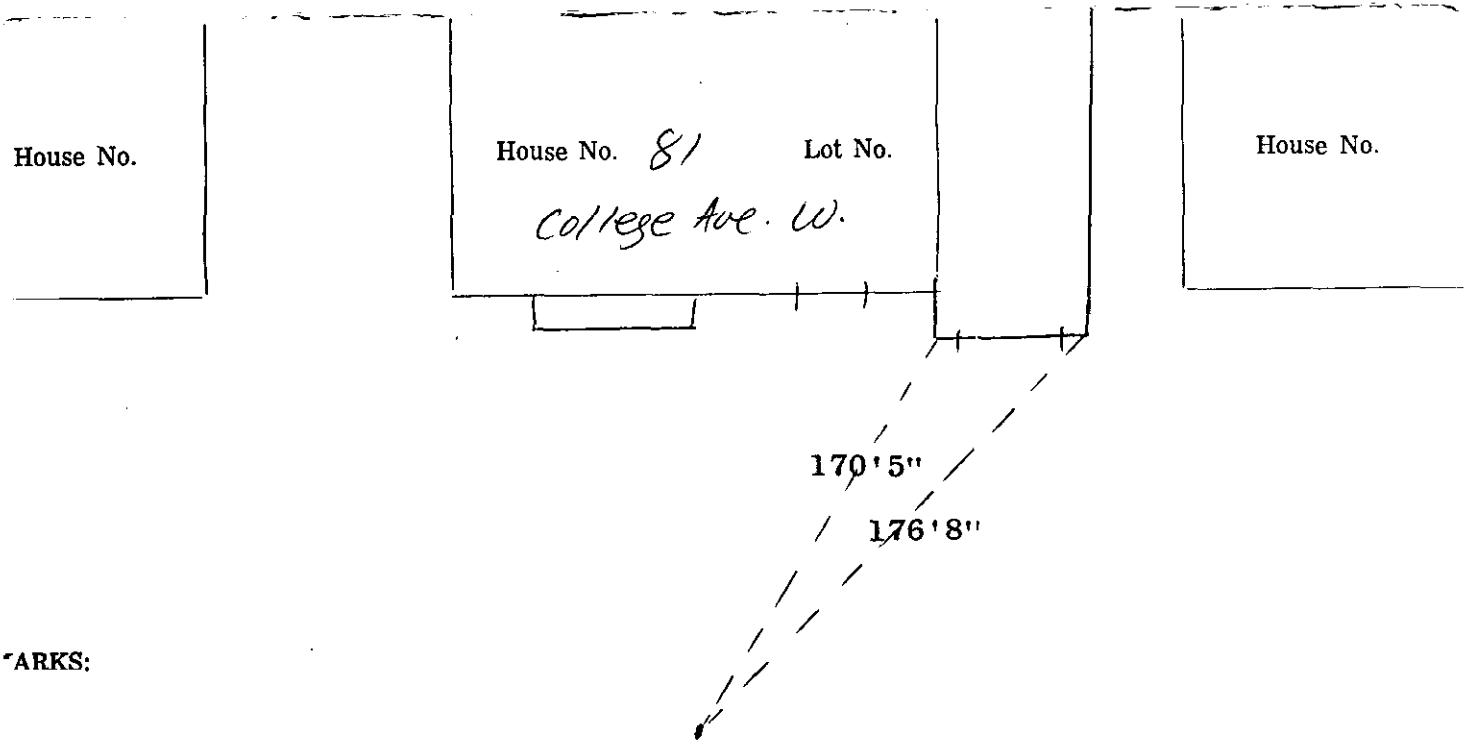
MAIN TO CURB STOP FT. CURB COCK. STYLE

SIZE OF CORP. SIZE OF SERVICE MATERIAL

REMARKS

Maintenance Record

DATE	FOREMAN	WORK PERFORMED
Aug/75		



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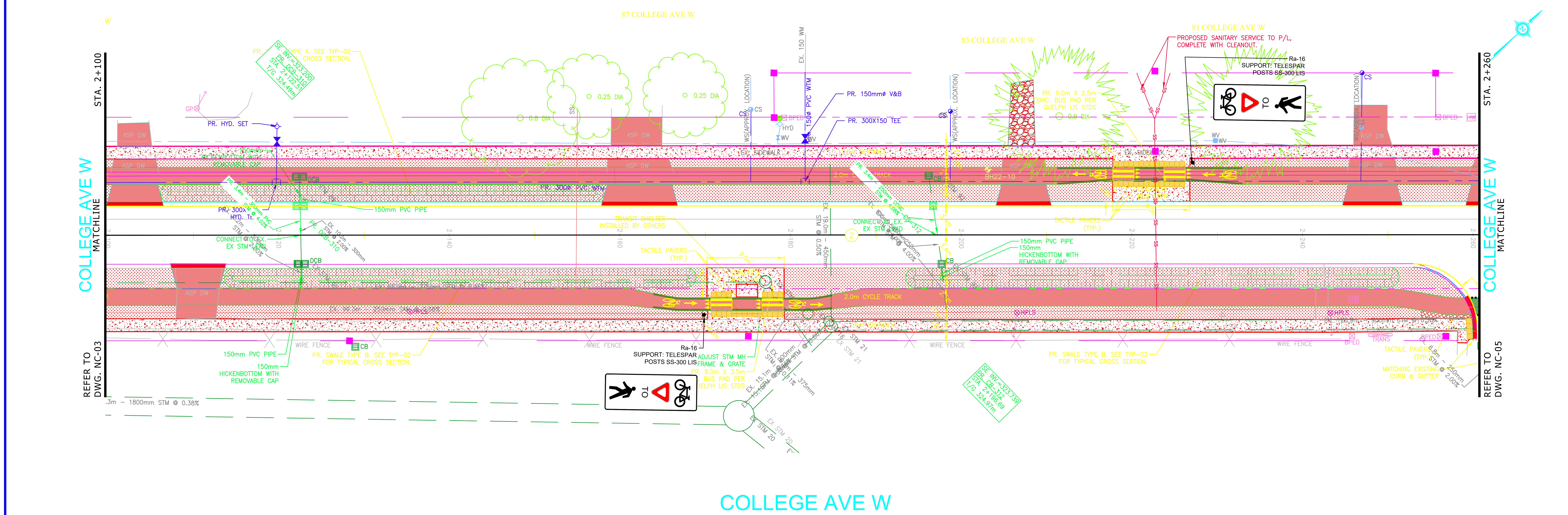
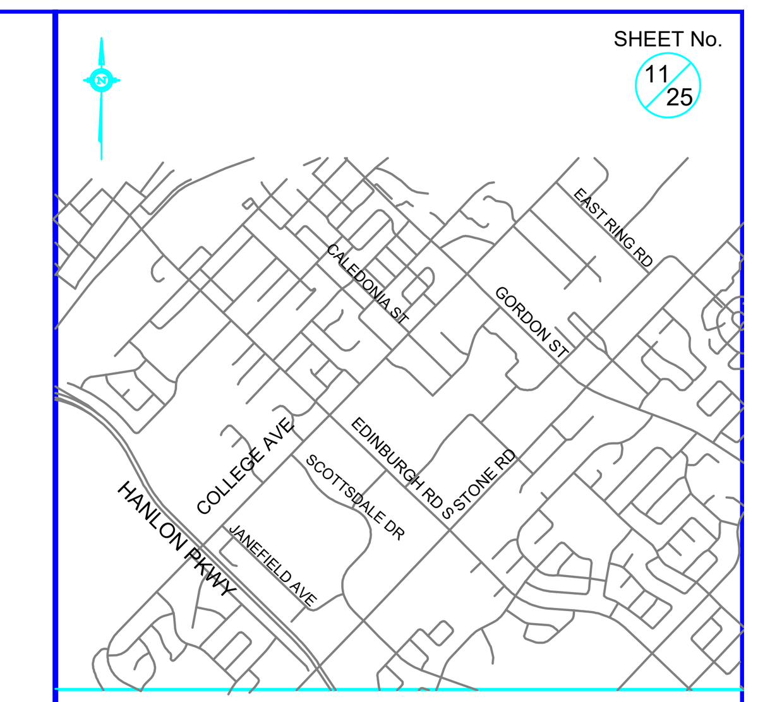


SHEET No. 11/25

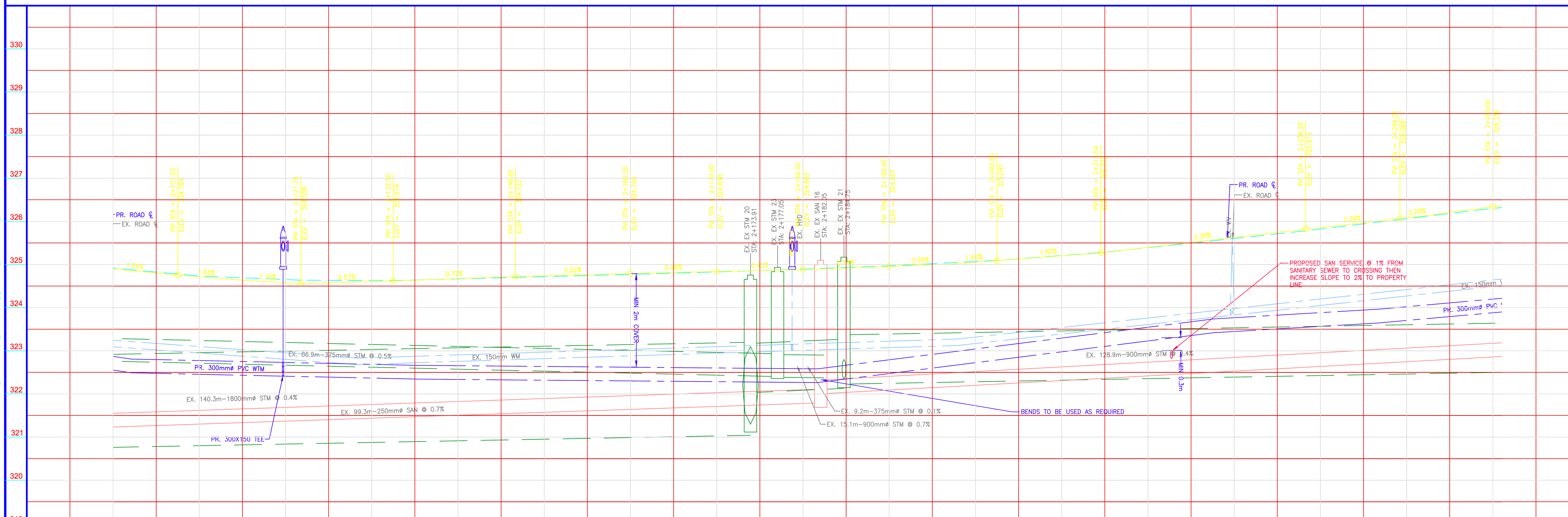


KEY PLAN Scale : NOT TO SCALE

LEGEND

- PROPOSED WATERMAIN
- PR. SAN-D PROPOSED SANITARY
- PR. STM-A PROPOSED STORM
- PROPOSED SIDEWALK
- PROPOSED CYCLE TRACK
- PROPOSED GRASS AREA
- PROPOSED TEXTURED PAVERS
- POTENTIAL CONFLICTS

METRIC 1:250 0 1 2 5 10
METRIC 1:50 0 0.5 1 2



CHAINAGE	2+100	2+110	2+120	2+130	2+140	2+150	2+160	2+170	2+180	2+190	2+200	2+210	2+220	2+230	2+240	2+250	2+260
EX. / PR. CENTRE-LINE GRADE	324.900	324.73 / 324.714	324.65 / 324.579	324.63 / 324.605	324.67 / 324.673	324.72 / 324.739	324.77 / 324.790	324.83 / 324.838	324.89 / 324.883	324.97 / 324.957	325.07 / 325.053	325.21 / 325.204	325.39 / 325.398	325.60 / 325.628	325.82 / 325.858	326.06 / 326.084	326.30 / 326.339
TOP WATER-MAIN	322.87	322.77	322.73	322.69	322.65	322.63	322.61	322.59	322.57	322.78	323.03	323.29	323.54	323.77	323.89	324.02	324.20

STORM SEWER: 140.3m - 1800mm ø STM SEWER -0.4%; 86.9m - 375mm ø STM SEWER -0.5%; SW321.220 N322.150 E321.300; E322.460 SW322.480; 15.1m - 900mm ø STM SEWER -0.7%; S322.250 NW322.350 NE322.350; 9.2m - 375mm ø STM SEWER -0.1%; 128.9m - 900mm ø STM SEWER -0.4%

SANIT. SEWER: 99.26m - 250mm∅ SAN SEWER -0.6%; SW321.828 NE322.038; 84.65m - 250mm∅ SAN SEWER -1.1%

THE POSITION OF POLES, LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	DATE	DESCRIPTION	BY:	CH'KD.
5	9/11/24	REVISED SANITARY & WATERMAIN	DP	AD
4	4/24/24	ISSUED FOR CONSTRUCTION	DP	ABM
3	3/1/24	ISSUED FOR TENDER	DP	ABM
2	1/24/24	ISSUED FOR 90 % DESIGN	DP	ABM
1	7/20/23	ISSUED FOR 60 % DESIGN	BW	ABM

ISSUES/REVISIONS

CITY OF Guelph

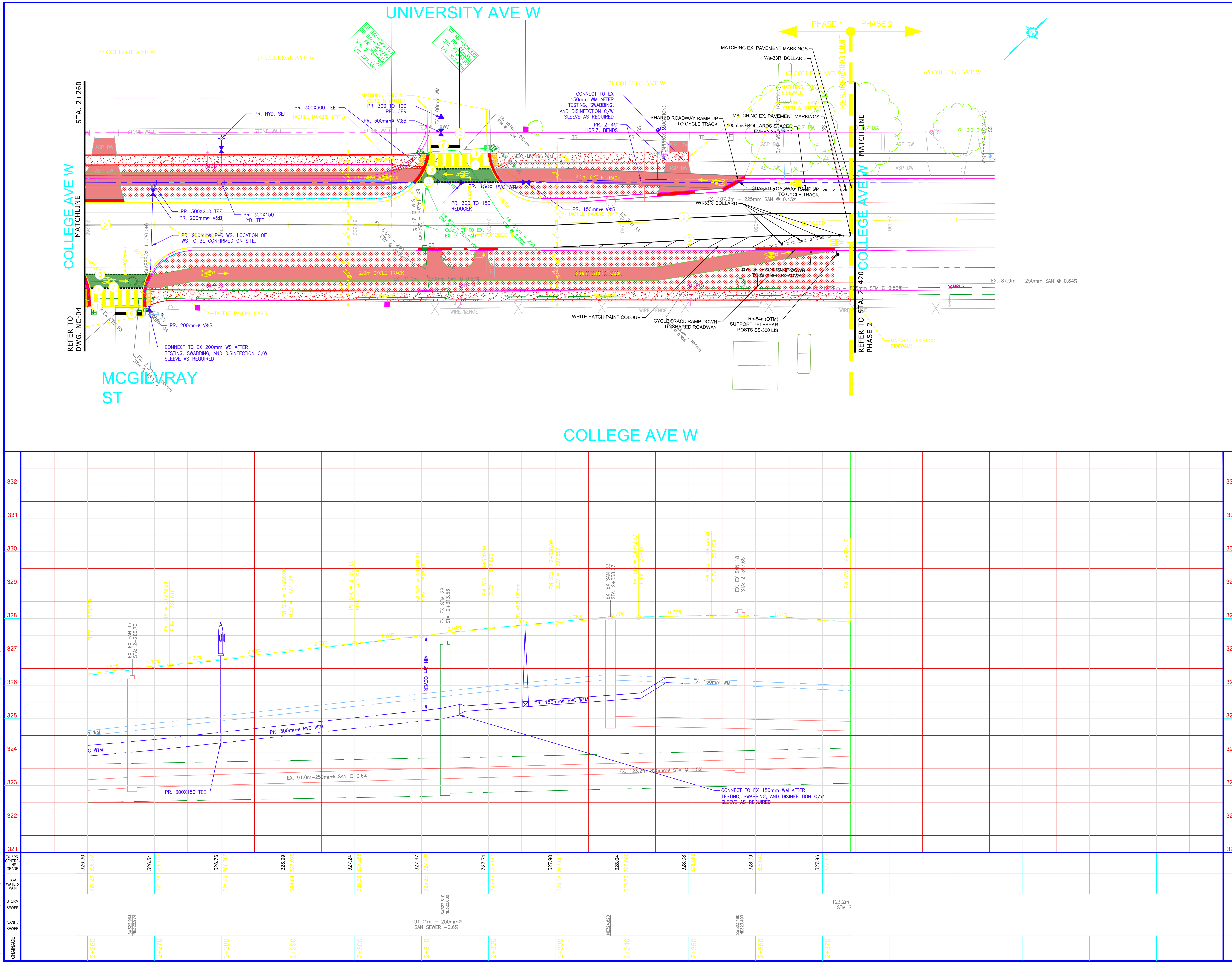
ENGINEERING AND TRANSPORTATION SERVICES

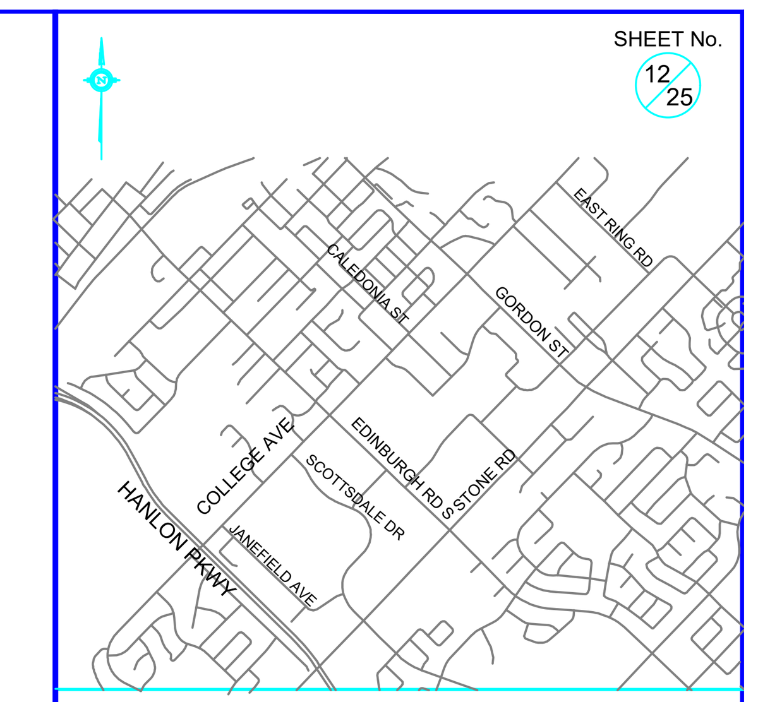
COLLEGE AVE CYCLE TRACKS PHASE 1 JANEFIELD TO UNIVERSITY City of Guelph

################
STA.2+100 TO 2+260

SCALES: HOR: 1:250 VER: 1:50
DATE DRAWN: 9/11/24
DRAWN BY: DP
CHECKED BY: AM
CONSULTANT DRAWING No.
CONTRACT No. 24-015
PROJECT No. RD0379
CITY REFERENCE No. NC-04
REV. 1

C:\USERS\BRETT.POND\APPDATA\LOCAL\TEMP\2905089E-5688-4026-A74E-421517C61332_ACAD-RD0379_NC01 PH1 (1).ZIP.332\ACAD-RD0379_NC01 PH1.DWG





SHEET No. 12/25

KEY PLAN Scale : NOT TO SCALE

LEGEND

- PROPOSED WATERMAIN
- PROPOSED SANITARY
- PROPOSED STORM
- PROPOSED SIDEWALK
- PROPOSED CYCLE TRACK
- PROPOSED GRASS AREA
- PROPOSED TEXTURED PAVERS
- POTENTIAL CONFLICTS

METRIC 1:250
METRIC 1:50

THE POSITION OF POLES, LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	DATE	DESCRIPTION	BY:	CH'KD.
5	9/11/24	REVISED SANITARY & WATERMAIN	DP	AD
4	4/24/24	ISSUED FOR CONSTRUCTION	DP	ABM
3	3/1/24	ISSUED FOR TENDER	DP	ABM
2	1/24/24	ISSUED FOR 90 % DESIGN	DP	ABM
1	7/20/23	ISSUED FOR 60 % DESIGN	BW	ABM

ISSUES/REVISIONS

CITY OF Guelph

ENGINEERING AND TRANSPORTATION SERVICES

COLLEGE AVE CYCLE TRACKS PHASE 1 JANEFIELD TO UNIVERSITY
City of Guelph

################
STA. 2+250 TO 2+375

SCALES: HOR: 1:250 VER: 1:50

DATE DRAWN: 9/11/24

DRAWN BY: DP
CHECKED BY: AM

CONSULTANT DRAWING No.

CONTRACT No. 24-015
PROJECT No. RD0379

CITY REFERENCE No. NC-05
REV. 1

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APPENDIX B
WATER SUPPLY AND SANITARY DEMAND CALCULATIONS

Project No:	32948-23
Project Name:	81 College Avenue West
Project Location:	City of Guelph
Date:	2025-02-03
Update:	2025-07-08

Sanitary Design Flow Calculation

Site Characteristics

Site Area =	0.326	ha	*Per Site Plan

Residential

Number of Units =	1	units	
Population per Unit =	3.4	ppu	*Per Guelph DEM Single Detached
Site Population =	4	people	

Chabad (Institutional)

Floor area =	548	m2	*GFA Per Site Plan
Population per m2 =	0.7	ppsqm	
Population =	783	people	*Per OBC Table 3.1.17.1 for Group A-2 - Assembly Occupancy, Religious Facility

Residential Design Flow

Average Daily Sanitary Flow =	300	L/cap/day	
Site Population =	4	people	
Site Average Daily Flow =	0.01	L/s	
Harmon Peaking Factor =	4.00		*Min PF = 2 , Max PF = 4
Peak Residential Design Flow =	**0.06**	**L/s**	=Average Daily Flow * Peaking Factor

Institutional Design Flow

Average Daily Sanitary Flow =	0.25	L/s/ha	*Per Region of Waterloo DGSSMS
Site Average Daily Flow =	0.08	L/s	
Harmon Peaking Factor =	3.87		*Min PF = 2 , Max PF = 4
Peak Institutional Design Flow =	**0.31**	**L/s**	=Average Daily Flow * Peaking Factor

Inflow and Infiltration

Average Inflow per Hectare =	0.25	L/s/ha
Site Area =	0.326	ha
Total Infiltration Flow =	**0.08**	**L/s**

	Design Guideline*	Peak Residential Flow (L/s)	Peak Infiltration Flow (L/s)	Peak Design Flow (L/s)
Residential	City of Guelph	0.06	0.00	0.06
Institutional		0.31	0.08	0.40
			Total	**0.45**

*Sanitary design flow calculations complete with reference to the City of Guelph Development Engineering Manual (October 2023), Region of Waterloo Design Guidelines and Supplemental Specifications for Municipal Services (January 2025) and the Ontario Building Code (2024)

Project No:	32948-23
Project Name:	81 College Avenue West
Project Location:	City of Guelph
Date:	2025-02-03
Update:	2025-07-08

Water Design Flow Calculation

Site Characteristics			**Notes:**
Site Area =	0.326	ha	*Per Site Plan
Residential			
Number of Units =	1	units	
Population per Unit =	3.4	ppu	*Per Guelph DEM Single Detached
Site Population =	4	people	
Chabad (Institutional)			
Floor area =	548	m2	*GFA Per Site Plan
Population per m2 =	0.7	ppsqm	
Population =	783	people	*Per OBC Table 3.1.17.1 for Group A-2 - Assembly Occupancy, Religious Facility
Residential Design Flow			
Average Daily Water Flow =	300	L/cap/day	=sanitary demand design flow
Site Population =	4	people	
Site Average Daily Flow =	**0.01**	**L/s**	
MOE Max. Day Peak Factor =	9.50		*Per MOE Design Guidelines (2008)
MOE Peak Hour Factor =	14.30		
Peak Max. Day Design Flow =	**0.13**	**L/s**	=Average Daily Flow * Max Day PF
Peak Hour Design Flow =	**0.20**	**L/s**	=Average Daily Flow * Max Hour PF
Institutional Design Flow			
Average Daily Water Flow =	0.25	L/s/ha	*Per Region of Waterloo DGSSMS
Site Average Daily Flow =	**0.08**	**L/s**	
MOE Max. Day Peak Factor =	2.75		*Per MOE Design Guidelines (2008)
MOE Peak Hour Factor =	4.13		
Peak Max. Day Design Flow =	**0.22**	**L/s**	=Average Daily Flow * Max Day PF
Peak Hour Design Flow =	**0.34**	**L/s**	=Average Daily Flow * Max Hour PF

Design Guideline	Design Guideline*	Average Daily Flow (L/s)	Max. Day Flow (L/s)	Peak Hour Design Flow (L/s)
Residential	City of Guelph	0.01	0.13	0.20
Institutional		0.08	0.22	0.34
	Total	**0.10**	**0.36**	**0.53**

*Sanitary design flow calculations complete with reference to the City of Guelph Development Engineering Manual (October 2023), Region of Waterloo Design Guidelines and Supplemental Specifications for Municipal Services (January 2025), MOE Drinking Water Systems 2008, and the Ontario Building Code (2024)

100mm dia. Service

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data		
Roughness Coefficient	0.013	
Channel Slope	2.000	%
Normal Depth	100.0	mm
Diameter	100.0	mm
Discharge	7.31	L/s

Results		
Discharge	7.31	L/s
Normal Depth	100.0	mm
Flow Area	0.0	m²
Wetted Perimeter	0.3	m
Hydraulic Radius	25.0	mm
Top Width	0.00	m
Critical Depth	86.4	mm
Percent Full	100.0	%
Critical Slope	1.842	%
Velocity	0.93	m/s
Velocity Head	0.04	m
Specific Energy	0.14	m
Froude Number	(N/A)	
Maximum Discharge	7.86	L/s
Discharge Full	7.31	L/s
Slope Full	2.000	%
Flow Type	Undefined	

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

GVF Output Data		
Upstream Depth	0.0	mm
Profile Description	N/A	
Profile Headloss	0.00	m
Average End Depth Over Rise	0.0	%
Normal Depth Over Rise	100.0	%
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	100.0	mm
Critical Depth	86.4	mm
Channel Slope	2.000	%
Critical Slope	1.842	%

Project No:	32948-23
Project Name:	81 College Avenue West
Project Location:	City of Guelph
Date:	2025-02-03
Update:	2025-07-08

Water Supply for Fire Protection - Fire Underwriters Survey 2020

Required Fire Flow (RFF)

Equation: RFF = 220*C*sqrt(A)

RFF = Required Fire Flow (LPM)
C = Construction Coefficient
A = Effective Floor Area (m^2)

Construction Coefficient =	1.0		*Construction Type III - Ordinary Construction
Total Effective Floor Area =	1,523	m^2	*Per Site Plan
Required Fire Flow =	9,000	LPM	

Occupancy and Contents Adjustment Factor

Description of Major Occupancy =	Assembly (A2)	
Occupancy and Contents Adjustment Factor =	0%	
Occupancy Reduction/Increase =	0	LPM
Occupancy Adjusted Required Fire Flow =	9,000	LPM

Automatic Sprinkler Protection

Automatic Sprinkler System Design	With Complete Building Coverage	With Partial Building Coverage
Automatic sprinkler protection (NFPA 13)	30%	30% * Percent of Floor Area Sprinklered
Water Supply is Standard	10%	10% * Percent of Floor Area Sprinklered
Fully Supervised	10%	10% * Percent of Floor Area Sprinklered

Sprinkler Adjustment Factor =	50%	
Automatic Sprinkler Reduction =	4,500	LPM

Project No: 32948-23
Project Name: 81 College Avenue West
Project Location: City of Guelph
Date: 2025-02-03
Update: 2025-07-08

Water Supply for Fire Protection - Fire Underwriters Survey 2020

Exposure Adjustment Charge

Separation Distance (m)	Maximum Exposure Adjustment Charge
0 m to 3 m	25%
3.1 m to 10 m	20%
10.1 m to 20 m	15%
20.1 m to 30 m	10%
> 30 m	0%

Exposure Direction	Structure	Exposure Distance (m)	Exposure Adjustment Charge
North	-	>30	0%
East	Residential	12	15%
South	-	>30	0%
West	Residential	21	10%

Exposure Adjustment Charge =	25%	
Exposure Adjustment Charge =	2,250	LPM

Fire Flow Summary

Required Fire Flow =	9,000	LPM		
Occupancy Adjusted Fire Flow =	9,000	LPM		
Automatic Sprinkler Reduction =	4,500	LPM		
Exposure Adjustment Charge =	2,250	LPM		
Calculated Fire Flow =	**7,000**	**LPM**	**117**	**LPS**
Required Duration =	**2.0**	**hr**		

APPENDIX C
STORMWATER MANAGEMENT CALCULATIONS

Project No: 32948-23
Project Name: Proposed Chabad
Project Location: 81 College Street West, Guelph
Date: 2025-02-05
Update: 2025-07-08

MIDUSS PARAMETERS

Horton Parameters

	Impervious Areas	Pervious Areas
Maximum Infiltration (mm/hr)*	0.0	34.0
Minimum Infiltration (mm/hr)*	0.0	9.0
Lag Constant (hr)	0.00	0.50
Depression Storage (mm)	1.5	5.0

*Infiltration Rates (safety factor inclusive) per Geotechnical Investigation and Hydrogeological Assessment prepared by Stoncairn Consulting (January 2025).

IDF Parameters

Parameter	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A	475.61	632.75	721.92	822.74	893.80	953.29
B	0	0	0	0	0	0
C	0.738	0.741	0.736	0.725	0.719	0.711
R	0.4	0.4	0.4	0.4	0.4	0.4
Duration (min)	240	240	240	240	240	240
Total Depth (mm)	33.321	43.607	51.134	61.897	69.491	77.438

*IDF Parameters per Table 5-2 of the City of Guelph Development Engineering Manual (October 2023)

Catchment Parameters - Pre-Development

Catchment ID	Outlet	Catchment Area *sq.m.*	Catchment Length *m*	Slope *%*	Impervious Area *sq.m.*	% Impervious
101	College Ave. ROW	1,837	42	3.9%	470	25.6%
102	Rear	1,422	44	3.6%	177	12.4%
TOTAL		3,259			647	19.9%

*Pre-Development Catchment Parameters per Topographic Survey complete by Van Harten.

Catchment Parameters - Post-Development

Catchment ID	Outlet	Catchment Area *sq.m.*	Catchment Length *m*	Slope *%*	Impervious Area *sq.m.*	% Impervious *%*
201	Soakaway	1,183	40	3.0%	879	74.3%
202	College Ave. Sewer	1,200	40	2.0%	1,001	83.4%
203	Pavers/Rear	337	20	2.5%	337	100.0%
UC1	College Ave. ROW	147	15	4.0%	0	0.0%
UC2	Rear	392	40	1.0%	0	0.0%
TOTAL		3,259			2,217	68.0%

*Post-Development Catchment Parameters per Grading Plan complete by Van Harten.

Project No:	32948-23
Project Name:	Proposed Chabad
Project Location:	81 College Street West, Guelph
Date:	2025-02-05
Update:	2025-02-06

Underground Storage Stage-Storage - Open Bottom Chamber

Tank Invert =	324.00	m
Tank Obvert =	324.65	m
Porosity =	0.89	
Surface Area =	120	m^2

Elevation (m)	Depth (m)	Volume (m^3)	Cumulative Volume (m^3)
324.00	0.00	0.00	0.00
324.10	0.10	10.68	10.68
324.20	0.20	10.68	21.36
324.30	0.30	10.68	32.04
324.40	0.40	10.68	42.72
324.50	0.50	10.68	53.40
324.65	0.65	16.02	69.42

Underground Storage Drawdown Calculation

$$A = \frac{1{,}000\,V}{P n \Delta t}$$

Bottom area of trench (m^2)	120
Reservoir Depth (m)	0.65
Volume to be Infiltrated (m^3)	69.42
Infiltration Rate (mm/hr)	12
Porosity of storage media	0.89
Retention time (hours)	**54.2**

Project No:	32948-23
Project Name:	Proposed Chabad
Project Location:	81 College Street West, Guelph
Date:	2025-02-05
Update:	2025-02-06

Underground Storage Stage-Storage - Impervious Chamber

Tank Invert =	324.00	m
Tank Obvert =	324.65	m
Porosity =	0.89	
Surface Area =	60	m^2

Elevation (m)	Depth (m)	Volume (m^3)	Cumulative Volume (m^3)
324.00	0.00	0.00	0.00
324.10	0.10	5.34	5.34
324.20	0.20	5.34	10.68
324.30	0.30	5.34	16.02
324.40	0.40	5.34	21.36
324.50	0.50	5.34	26.70
324.65	0.65	8.01	34.71

Project No:	32948-23
Project Name:	Proposed Chabad
Project Location:	81 College Street West, Guelph
Date:	2025-02-05
Update:	2025-02-06

Pavers Subgrade Stage-Storage

Surface Elevation =	327.04	m
Porosity =	0.4	m
Surface Area =	337	m^2

Elevation (m)	Depth (m)	Volume (m^3)	Cumulative Volume (m^3)
326.53	0.00	0.00	0.00
326.58	0.05	6.74	6.74
326.63	0.10	6.74	13.48
326.68	0.15	6.74	20.22
326.73	0.20	6.74	26.96
326.78	0.25	6.74	33.70
326.83	0.30	6.74	40.44
326.88	0.35	6.74	47.18
326.93	0.40	6.74	53.92
326.94	0.41	0.00	53.92
326.99	0.46	0.00	53.92
327.04	0.51	0.00	53.92

*Only stone reservoir and granular basecourse volume utilized for storage purposes in MIDUSS modelling. Elevation 327.04 to 326.93 is comprised of pavers and bedding course.

Pavers Drawdown Calculation

$$A = \frac{1{,}000\,V}{P\,n\,\Delta t}$$

Bottom area of trench (m^2)	337
Reservoir Depth (m)	0.40
Volume to be Infiltrated (m^3)	53.92
Infiltration Rate (mm/hr)	12
Porosity of storage media	0.4
Retention time (hours)	**33.3**

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"        3.900   Pervious slope"
"        0.047   Impervious Area"
"       42.000   Impervious length"
"        3.900   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
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"        1.500   Impervious Depression storage"
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"             Surface Area           0.137      0.047      0.184      hectare"
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"             Time to Centroid       112.240    116.948    115.304    minutes"
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"             Rainfall volume        45.61      15.70      61.31      c.m"
"             Rainfall losses        27.515     1.863      20.948     mm"
"             Runoff depth           5.805      31.458     12.372     mm"
"             Runoff volume          7.95       14.82      22.77      c.m"
"             Runoff coefficient     0.174      0.944      0.371      "
"             Maximum flow           0.008      0.014      0.016      c.m/sec"
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"            2   Start - New Tributary"
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"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.008     0.000     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.124      0.018      0.142      hectare"
"             Time of concentration  14.878     2.033      9.296      minutes"
"             Time to Centroid       112.870    117.120    114.717    minutes"
"             Rainfall depth         33.321     33.321     33.321     mm"
```

```
"             Rainfall volume        41.45      5.87       47.32      c.m"
"             Rainfall losses        27.512     1.787      24.322     mm"
"             Runoff depth           5.809      31.534     8.999      mm"
"             Runoff volume          7.23       5.55       12.78      c.m"
"             Runoff coefficient     0.174      0.946      0.270      "
"             Maximum flow           0.007      0.005      0.008      c.m/sec"
" 38          START/RE-START TOTALS "
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"             Total % impervious                          0.000"
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"                MIDUSS created                          Sunday, February 7, 2010"
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"                Job folder:                        C:\Users\brett.pond\Desktop\"
"                                                       81 College Street MIDUSS"
"                Output filename:                                    Pre-5yr.out"
"                Licensee name:                                       Brett Pond"
"                Company                                  Hewlett-Packard Company"
"                Date & Time last used:                    2/5/2025 at 9:47:15 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      632.750   Coefficient A"
"        0.000   Constant B"
"        0.741   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          188.288    mm/hr"
"             Total depth                 43.607    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          101   No description"
"       25.600   % Impervious"
"        0.184   Total Area"
"       42.000   Flow length"
"        3.900   Overland Slope"
"        0.137   Pervious Area"
"       42.000   Pervious length"
"        3.900   Pervious slope"
"        0.047   Impervious Area"
"       42.000   Impervious length"
"        3.900   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
```

```
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.026     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.137      0.047      0.184      hectare"
"             Time of concentration  10.954     1.725      5.865      minutes"
"             Time to Centroid       110.707    115.724    113.473    minutes"
"             Rainfall depth         43.607     43.607     43.607     mm"
"             Rainfall volume        59.70      20.54      80.24      c.m"
"             Rainfall losses        31.981     2.075      24.325     mm"
"             Runoff depth           11.626     41.532     19.282     mm"
"             Runoff volume          15.92      19.56      35.48      c.m"
"             Runoff coefficient     0.267      0.952      0.442      "
"             Maximum flow           0.016      0.019      0.026      c.m/sec"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.026     0.000     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          102   No description"
"       12.400   % Impervious"
"        0.142   Total Area"
"       44.000   Flow length"
"        3.600   Overland Slope"
"        0.124   Pervious Area"
"       44.000   Pervious length"
"        3.600   Pervious slope"
"        0.018   Impervious Area"
"       44.000   Impervious length"
"        3.600   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.018     0.000     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.124      0.018      0.142      hectare"
"             Time of concentration  11.538     1.817      8.274      minutes"
"             Time to Centroid       111.244    115.858    112.793    minutes"
"             Rainfall depth         43.607     43.607     43.607     mm"
```

```
"             Rainfall volume        54.24      7.68       61.92      c.m"
"             Rainfall losses        31.959     2.007      28.245     mm"
"             Runoff depth           11.648     41.600     15.362     mm"
"             Runoff volume          14.49      7.32       21.81      c.m"
"             Runoff coefficient     0.267      0.954      0.352      "
"             Maximum flow           0.014      0.007      0.018      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.000    hectare"
"             Total Impervious area                     0.000    hectare"
"             Total % impervious                        0.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
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"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                         C:\Users\brett.pond\Desktop\"
"                                                        81 College Street MIDUSS"
"                Output filename:                                    Pre-10yr.out"
"                Licensee name:                                        Brett Pond"
"                Company                                  Hewlett-Packard Company"
"                Date & Time last used:                    2/5/2025 at 9:51:49 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      721.920   Coefficient A"
"        0.000   Constant B"
"        0.736   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           216.508    mm/hr"
"             Total depth                  51.134    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          101   No description"
"       25.600   % Impervious"
"        0.184   Total Area"
"       42.000   Flow length"
"        3.900   Overland Slope"
"        0.137   Pervious Area"
"       42.000   Pervious length"
"        3.900   Pervious slope"
"        0.047   Impervious Area"
"       42.000   Impervious length"
"        3.900   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
```

```
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.035     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.137      0.047      0.184      hectare"
"             Time of concentration  9.856      1.631      5.600      minutes"
"             Time to Centroid       110.813    115.278    113.124    minutes"
"             Rainfall depth         51.134     51.134     51.134     mm"
"             Rainfall volume        70.00      24.09      94.09      c.m"
"             Rainfall losses        35.443     2.227      26.939     mm"
"             Runoff depth           15.692     48.908     24.195     mm"
"             Runoff volume          21.48      23.04      44.52      c.m"
"             Runoff coefficient     0.307      0.956      0.473      "
"             Maximum flow           0.024      0.022      0.035      c.m/sec"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.035     0.000     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          102   No description"
"       12.400   % Impervious"
"        0.142   Total Area"
"       44.000   Flow length"
"        3.600   Overland Slope"
"        0.124   Pervious Area"
"       44.000   Pervious length"
"        3.600   Pervious slope"
"        0.018   Impervious Area"
"       44.000   Impervious length"
"        3.600   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.025     0.000     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.124      0.018      0.142      hectare"
"             Time of concentration  10.382     1.718      7.743      minutes"
"             Time to Centroid       111.386    115.441    112.621    minutes"
"             Rainfall depth         51.134     51.134     51.134     mm"
```

```
"             Rainfall volume        63.61      9.00       72.61      c.m"
"             Rainfall losses        35.308     2.173      31.200     mm"
"             Runoff depth           15.826     48.962     19.935     mm"
"             Runoff volume          19.69      8.62       28.31      c.m"
"             Runoff coefficient     0.309      0.958      0.390      "
"             Maximum flow           0.020      0.008      0.025      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.000    hectare"
"             Total Impervious area                       0.000    hectare"
"             Total % impervious                          0.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                         C:\Users\brett.pond\Desktop\"
"                                                        81 College Street MIDUSS"
"                Output filename:                                    Pre-25yr.out"
"                Licensee name:                                        Brett Pond"
"                Company                                  Hewlett-Packard Company"
"                Date & Time last used:                    2/5/2025 at 9:53:02 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      822.740   Coefficient A"
"        0.000   Constant B"
"        0.725   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           251.029    mm/hr"
"             Total depth                  61.897    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          101   No description"
"       25.600   % Impervious"
"        0.184   Total Area"
"       42.000   Flow length"
"        3.900   Overland Slope"
"        0.137   Pervious Area"
"       42.000   Pervious length"
"        3.900   Pervious slope"
"        0.047   Impervious Area"
"       42.000   Impervious length"
"        3.900   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
```

```
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.048     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.137      0.047      0.184      hectare"
"             Time of concentration  8.796      1.537      5.363      minutes"
"             Time to Centroid       112.028    114.914    113.393    minutes"
"             Rainfall depth         61.897     61.897     61.897     mm"
"             Rainfall volume        84.73      29.16      113.89     c.m"
"             Rainfall losses        39.136     2.552      29.771     mm"
"             Runoff depth           22.761     59.345     32.126     mm"
"             Runoff volume          31.16      27.95      59.11      c.m"
"             Runoff coefficient     0.368      0.959      0.519      "
"             Maximum flow           0.035      0.026      0.048      c.m/sec"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.048     0.000     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          102   No description"
"       12.400   % Impervious"
"        0.142   Total Area"
"       44.000   Flow length"
"        3.600   Overland Slope"
"        0.124   Pervious Area"
"       44.000   Pervious length"
"        3.600   Pervious slope"
"        0.018   Impervious Area"
"       44.000   Impervious length"
"        3.600   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.035     0.000     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.124      0.018      0.142      hectare"
"             Time of concentration  9.264      1.619      7.193      minutes"
"             Time to Centroid       112.484    115.101    113.193    minutes"
"             Rainfall depth         61.897     61.897     61.897     mm"
```

```
"             Rainfall volume        76.99      10.90      87.89      c.m"
"             Rainfall losses        39.244     2.416      34.677     mm"
"             Runoff depth           22.653     59.481     27.220     mm"
"             Runoff volume          28.18      10.47      38.65      c.m"
"             Runoff coefficient     0.366      0.961      0.440      "
"             Maximum flow           0.030      0.009      0.035      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.000    hectare"
"             Total Impervious area                       0.000    hectare"
"             Total % impervious                          0.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                            ie METRIC"
"                Job folder:                        C:\Users\brett.pond\Desktop\"
"                                                       81 College Street MIDUSS"
"                Output filename:                                    Pre-50yr.out"
"                Licensee name:                                        Brett Pond"
"                Company                                  Hewlett-Packard Company"
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" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      893.800   Coefficient A"
"        0.000   Constant B"
"        0.719   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          275.287    mm/hr"
"             Total depth                 69.491    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          101   No description"
"       25.600   % Impervious"
"        0.184   Total Area"
"       42.000   Flow length"
"        3.900   Overland Slope"
"        0.137   Pervious Area"
"       42.000   Pervious length"
"        3.900   Pervious slope"
"        0.047   Impervious Area"
"       42.000   Impervious length"
"        3.900   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
```

```
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.064     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.137      0.047      0.184      hectare"
"             Time of concentration  8.235      1.482      5.201      minutes"
"             Time to Centroid       113.320    114.689    113.935    minutes"
"             Rainfall depth         69.491     69.491     69.491     mm"
"             Rainfall volume        95.13      32.73      127.86     c.m"
"             Rainfall losses        41.372     2.809      31.500     mm"
"             Runoff depth           28.118     66.682     37.991     mm"
"             Runoff volume          38.49      31.41      69.90      c.m"
"             Runoff coefficient     0.405      0.960      0.547      "
"             Maximum flow           0.050      0.028      0.064      c.m/sec"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.064     0.000     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          102   No description"
"       12.400   % Impervious"
"        0.142   Total Area"
"       44.000   Flow length"
"        3.600   Overland Slope"
"        0.124   Pervious Area"
"       44.000   Pervious length"
"        3.600   Pervious slope"
"        0.018   Impervious Area"
"       44.000   Impervious length"
"        3.600   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.043     0.000     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.124      0.018      0.142      hectare"
"             Time of concentration  8.674      1.561      6.882      minutes"
"             Time to Centroid       113.558    114.872    113.889    minutes"
"             Rainfall depth         69.491     69.491     69.491     mm"
```

```
"             Rainfall volume        86.44      12.24      98.68      c.m"
"             Rainfall losses        41.397     2.654      36.593     mm"
"             Runoff depth           28.094     66.837     32.898     mm"
"             Runoff volume          34.95      11.77      46.72      c.m"
"             Runoff coefficient     0.404      0.962      0.473      "
"             Maximum flow           0.038      0.010      0.043      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.000    hectare"
"             Total Impervious area                     0.000    hectare"
"             Total % impervious                        0.000"
" 19          EXIT"
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"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                         C:\Users\brett.pond\Desktop\"
"                                                        81 College Street MIDUSS"
"                Output filename:                                    Pre-100yr.out"
"                Licensee name:                                         Brett Pond"
"                Company                                  Hewlett-Packard Company"
"                Date & Time last used:                    2/5/2025 at 9:56:05 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      953.290   Coefficient A"
"        0.000   Constant B"
"        0.711   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          297.317    mm/hr"
"             Total depth                 77.438    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          101   No description"
"       25.600   % Impervious"
"        0.184   Total Area"
"       42.000   Flow length"
"        3.900   Overland Slope"
"        0.137   Pervious Area"
"       42.000   Pervious length"
"        3.900   Pervious slope"
"        0.047   Impervious Area"
"       42.000   Impervious length"
"        3.900   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
```

```
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.071     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.137      0.047      0.184      hectare"
"             Time of concentration  7.924      1.437      5.134      minutes"
"             Time to Centroid       114.988    114.594    114.818    minutes"
"             Rainfall depth         77.438     77.438     77.438     mm"
"             Rainfall volume        106.01     36.48      142.49     c.m"
"             Rainfall losses        43.497     3.001      33.130     mm"
"             Runoff depth           33.941     74.437     44.308     mm"
"             Runoff volume          46.46      35.06      81.53      c.m"
"             Runoff coefficient     0.438      0.961      0.572      "
"             Maximum flow           0.056      0.031      0.071      c.m/sec"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.071     0.000     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          102   No description"
"       12.400   % Impervious"
"        0.142   Total Area"
"       44.000   Flow length"
"        3.600   Overland Slope"
"        0.124   Pervious Area"
"       44.000   Pervious length"
"        3.600   Pervious slope"
"        0.018   Impervious Area"
"       44.000   Impervious length"
"        3.600   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.049     0.000     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           0.124      0.018      0.142      hectare"
"             Time of concentration  8.346      1.513      6.728      minutes"
"             Time to Centroid       115.318    114.754    115.185    minutes"
"             Rainfall depth         77.438     77.438     77.438     mm"
```

```
"             Rainfall volume        96.33      13.64      109.96     c.m"
"             Rainfall losses        43.454     2.920      38.428     mm"
"             Runoff depth           33.984     74.519     39.010     mm"
"             Runoff volume          42.27      13.12      55.39      c.m"
"             Runoff coefficient     0.439      0.962      0.504      "
"             Maximum flow           0.044      0.011      0.049      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.000    hectare"
"             Total Impervious area                       0.000    hectare"
"             Total % impervious                          0.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                            Sunday, February 7, 2010"
"           10   Units used:                                                ie METRIC"
"                Job folder:                          C:\Users\brett.pond\Desktop\"
"                                                  81 College Street MIDUSS\Post\Good"
"                Output filename:                                        Post-2yr.out"
"                Licensee name:                                            Brett Pond"
"                Company                                    Hewlett-Packard Company"
"                Date & Time last used:                    3/14/2025 at 12:09:27 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      475.610   Coefficient A"
"        0.000   Constant B"
"        0.738   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           142.193    mm/hr"
"             Total depth                  33.321    mm"
"            4   2hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          203   Catchment 203 - Outlet to Rear"
"      100.000   % Impervious"
"        0.034   Total Area"
"       20.000   Flow length"
"        2.500   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        2.500   Pervious slope"
"        0.034   Impervious Area"
"       20.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.011     0.000     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.034      0.034      hectare"
"             Time of concentration  10.342     1.413      1.413      minutes"
"             Time to Centroid       109.039    115.993    115.993    minutes"
"             Rainfall depth         33.321     33.321     33.321     mm"
"             Rainfall volume        0.00       11.33      11.33      c.m"
"             Rainfall losses        27.563     2.165      2.165      mm"
"             Runoff depth           5.758      31.156     31.156     mm"
"             Runoff volume          0.00       10.59      10.59      c.m"
"             Runoff coefficient     0.000      0.935      0.935      "
"             Maximum flow           0.000      0.011      0.011      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.011     0.011     0.000     0.000"
" 54          POND DESIGN"
"        0.011   Current peak flow    c.m/sec"
"        0.001   Target outflow    c.m/sec"
"         10.6   Hydrograph volume    c.m"
"          11.   Number of stages"
"      326.530   Minimum water level    metre"
"      327.290   Maximum water level    metre"
"      326.530   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                326.530     0.000     0.000"
"                326.580  1.01E-05     6.740"
"                326.630  1.01E-05    13.480"
"                326.680  1.01E-05    20.220"
"                326.730  1.01E-05    26.960"
"                326.780  1.01E-05    33.700"
"                326.830  1.01E-05    40.440"
"                326.880  1.01E-05    47.180"
"                326.930  1.01E-05    53.920"
"                327.140  1.01E-05    54.000"
"                327.290   0.04458    54.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                327.140     0.900     0.500     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level              326.582    metre"
"             Maximum storage              7.079    c.m"
"             Centroidal lag              13.305   hours"
"                  0.011     0.011     0.000     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.011     0.000     0.000     0.000"
" 33          CATCHMENT 2"
"            1   Triangular SCS"
```

```
"            1   Equal length"
"            2   Horton equation"
"            2   Catchment UC2"
"        0.010   % Impervious"
"        0.039   Total Area"
"       40.000   Flow length"
"        1.000   Overland Slope"
"        0.039   Pervious Area"
"       40.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       40.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.002     0.000     0.000     0.000 c.m/sec"
"             Catchment 2            Pervious   Impervious Total Area "
"             Surface Area           0.039      0.000      0.039      hectare"
"             Time of concentration  20.634     2.819      20.625     minutes"
"             Time to Centroid       117.489    118.597    117.490    minutes"
"             Rainfall depth         33.321     33.321     33.321     mm"
"             Rainfall volume        12.99      0.00       13.00      c.m"
"             Rainfall losses        27.510     1.834      27.508     mm"
"             Runoff depth           5.810      31.487     5.813      mm"
"             Runoff volume          2.27       0.00       2.27       c.m"
"             Runoff coefficient     0.174      0.945      0.174      "
"             Maximum flow           0.002      0.000      0.002      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.002     0.002     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.002     0.002     0.002     0.000"
" 40          HYDROGRAPH   Combine    99"
"            6   Combine "
"           99   Node #"
"                Rear Flows"
"             Maximum flow                 0.002    c.m/sec"
"             Hydrograph volume            3.120    c.m"
"                     0.002     0.002     0.002     0.002"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
```

```
"                    0.002     0.000     0.002     0.002"
" 33          CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             2   Horton equation"
"           201   Catchment 201"
"        74.300   % Impervious"
"         0.118   Total Area"
"        40.000   Flow length"
"         3.000   Overland Slope"
"         0.030   Pervious Area"
"        40.000   Pervious length"
"         3.000   Pervious slope"
"         0.088   Impervious Area"
"        40.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        34.000   Pervious Max.infiltration"
"         9.000   Pervious Min.infiltration"
"         0.500   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                    0.026     0.000     0.002     0.002 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.030      0.088      0.118      hectare"
"             Time of concentration  14.841     2.028      2.795      minutes"
"             Time to Centroid       112.841    117.110    116.854    minutes"
"             Rainfall depth         33.321     33.321     33.321     mm"
"             Rainfall volume        10.10      29.21      39.32      c.m"
"             Rainfall losses        27.512     1.789      8.400      mm"
"             Runoff depth           5.809      31.531     24.921     mm"
"             Runoff volume          1.76       27.64      29.41      c.m"
"             Runoff coefficient     0.174      0.946      0.748      "
"             Maximum flow           0.002      0.025      0.026      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.026     0.026     0.002     0.002"
" 54          POND DESIGN"
"         0.026   Current peak flow    c.m/sec"
"         0.004   Target outflow    c.m/sec"
"          29.4   Hydrograph volume    c.m"
"             8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
```

```
"                  Level Discharge    Volume"
"                324.000     0.000     0.000"
"                324.100  1.01E-05    10.680"
"                324.200  1.01E-05    21.360"
"                324.300  1.01E-05    32.040"
"                324.400  1.01E-05    42.720"
"                324.500  1.01E-05    53.400"
"                324.650  1.01E-05    69.420"
"                324.660   0.00308    69.430"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                324.650     0.900     2.000     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level               324.119    metre"
"             Maximum storage              12.731    c.m"
"             Centroidal lag               13.264   hours"
"                  0.026     0.026     0.000     0.002 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.026     0.000     0.000     0.002"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          202   Catchment 202"
"       83.400   % Impervious"
"        0.120   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        0.020   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.028     0.000     0.000     0.002 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.020      0.100      0.120      hectare"
"             Time of concentration  16.760     2.290      2.799      minutes"
```

```
"             Time to Centroid       114.305    117.616    117.499    minutes"
"             Rainfall depth         33.321     33.321     33.321     mm"
"             Rainfall volume        6.64       33.35      39.98      c.m"
"             Rainfall losses        27.528     1.709      5.995      mm"
"             Runoff depth           5.793      31.612     27.326     mm"
"             Runoff volume          1.15       31.64      32.79      c.m"
"             Runoff coefficient     0.174      0.949      0.820      "
"             Maximum flow           0.001      0.028      0.028      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.028     0.028     0.000     0.002"
" 54          POND DESIGN"
"         0.028   Current peak flow    c.m/sec"
"         0.020   Target outflow    c.m/sec"
"          33.6   Hydrograph volume    c.m"
"            8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 324.000     0.000     0.000"
"                 324.100   0.00508     5.340"
"                 324.200   0.01016    10.680"
"                 324.300   0.01344    16.020"
"                 324.400   0.01607    21.360"
"                 324.500   0.01832    26.700"
"                 324.650   0.02126    34.710"
"                 324.660   0.02144    34.720"
"            1.   ORIFICES"
"                 Orifice   Orifice   Orifice Number of"
"                  invert coefficie  diameter  orifices"
"                 324.000     0.800    0.1000     1.000"
"            1.   SUPERPIPES_1"
"            1.   Type 1 is Pipe"
"              Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                  Invert    Length     Width    Height   Grade %     Pipes"
"                 324.390    39.900     1.500     1.500     0.300     1.000"
"              Peak outflow                  0.011    c.m/sec"
"              Maximum level                324.223    metre"
"              Maximum storage               11.903    c.m"
"              Centroidal lag                 2.532   hours"
"                   0.028     0.028     0.011     0.002 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.028     0.011     0.011     0.002"
" 33          CATCHMENT 1"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"            1   Catchment UC1"
"        0.010   % Impervious"
"        0.015   Total Area"
"       15.000   Flow length"
"        4.000   Overland Slope"
"        0.015   Pervious Area"
"       15.000   Pervious length"
"        4.000   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.001     0.011     0.011     0.002 c.m/sec"
"             Catchment 1            Pervious   Impervious Total Area "
"             Surface Area           0.015      0.000      0.015      hectare"
"             Time of concentration  7.558      1.033      7.554      minutes"
"             Time to Centroid       107.098    115.520    107.103    minutes"
"             Rainfall depth         33.321     33.321     33.321     mm"
"             Rainfall volume        5.00       0.00       5.00       c.m"
"             Rainfall losses        27.549     2.656      27.547     mm"
"             Runoff depth           5.772      30.665     5.774      mm"
"             Runoff volume          0.87       0.00       0.87       c.m"
"             Runoff coefficient     0.173      0.920      0.173      "
"             Maximum flow           0.001      0.000      0.001      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.001     0.012     0.011     0.002"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.326    hectare"
"             Total Impervious area                     0.222    hectare"
"             Total % impervious                       68.024"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                        C:\Users\brett.pond\Desktop\"
"                                                81 College Street MIDUSS\Post\Good"
"                Output filename:                                     Post-5yr.out"
"                Licensee name:                                         Brett Pond"
"                Company                                  Hewlett-Packard Company"
"                Date & Time last used:                  3/14/2025 at 12:12:32 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      632.750   Coefficient A"
"        0.000   Constant B"
"        0.741   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           188.288    mm/hr"
"             Total depth                  43.607    mm"
"            4   5hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          203   Catchment 203 - Outlet to Rear"
"      100.000   % Impervious"
"        0.034   Total Area"
"       20.000   Flow length"
"        2.500   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        2.500   Pervious slope"
"        0.034   Impervious Area"
"       20.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.014     0.000     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.034      0.034      hectare"
"             Time of concentration  8.020      1.263      1.263      minutes"
"             Time to Centroid       108.442    114.811    114.811    minutes"
"             Rainfall depth         43.607     43.607     43.607     mm"
"             Rainfall volume        0.00       14.83      14.83      c.m"
"             Rainfall losses        31.970     2.546      2.546      mm"
"             Runoff depth           11.637     41.061     41.061     mm"
"             Runoff volume          0.00       13.96      13.96      c.m"
"             Runoff coefficient     0.000      0.942      0.942      "
"             Maximum flow           0.000      0.014      0.014      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.014     0.014     0.000     0.000"
" 54          POND DESIGN"
"        0.014   Current peak flow    c.m/sec"
"        0.001   Target outflow    c.m/sec"
"         14.0   Hydrograph volume    c.m"
"          11.   Number of stages"
"      326.530   Minimum water level    metre"
"      327.290   Maximum water level    metre"
"      326.530   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                326.530     0.000     0.000"
"                326.580  1.01E-05     6.740"
"                326.630  1.01E-05    13.480"
"                326.680  1.01E-05    20.220"
"                326.730  1.01E-05    26.960"
"                326.780  1.01E-05    33.700"
"                326.830  1.01E-05    40.440"
"                326.880  1.01E-05    47.180"
"                326.930  1.01E-05    53.920"
"                327.140  1.01E-05    54.000"
"                327.290   0.04458    54.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                327.140     0.900     0.500     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level               326.582    metre"
"             Maximum storage               7.025    c.m"
"             Centroidal lag               13.266   hours"
"                  0.014     0.014     0.000     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.014     0.000     0.000     0.000"
" 33          CATCHMENT 2"
"            1   Triangular SCS"
```

```
"            1   Equal length"
"            2   Horton equation"
"            2   Catchment UC2"
"        0.010   % Impervious"
"        0.039   Total Area"
"       40.000   Flow length"
"        1.000   Overland Slope"
"        0.039   Pervious Area"
"       40.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       40.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.004     0.000     0.000     0.000 c.m/sec"
"             Catchment 2            Pervious   Impervious Total Area "
"             Surface Area           0.039      0.000      0.039      hectare"
"             Time of concentration  16.002     2.520      15.997     minutes"
"             Time to Centroid       115.149    117.093    115.150    minutes"
"             Rainfall depth         43.607     43.607     43.607     mm"
"             Rainfall volume        17.01      0.00       17.01      c.m"
"             Rainfall losses        32.043     1.802      32.040     mm"
"             Runoff depth           11.564     41.805     11.567     mm"
"             Runoff volume          4.51       0.00       4.51       c.m"
"             Runoff coefficient     0.265      0.959      0.265      "
"             Maximum flow           0.004      0.000      0.004      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.004     0.004     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.004     0.004     0.004     0.000"
" 40          HYDROGRAPH   Combine    99"
"            6   Combine "
"           99   Node #"
"                Rear Flows"
"             Maximum flow                 0.004    c.m/sec"
"             Hydrograph volume            5.367    c.m"
"                     0.004     0.004     0.004     0.004"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
```

```
"                    0.004     0.000     0.004     0.004"
" 33          CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             2   Horton equation"
"           201   Catchment 201"
"        74.300   % Impervious"
"         0.118   Total Area"
"        40.000   Flow length"
"         3.000   Overland Slope"
"         0.030   Pervious Area"
"        40.000   Pervious length"
"         3.000   Pervious slope"
"         0.088   Impervious Area"
"        40.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        34.000   Pervious Max.infiltration"
"         9.000   Pervious Min.infiltration"
"         0.500   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                    0.035     0.000     0.004     0.004 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.030      0.088      0.118      hectare"
"             Time of concentration  11.509     1.812      2.669      minutes"
"             Time to Centroid       111.219    115.852    115.443    minutes"
"             Rainfall depth         43.607     43.607     43.607     mm"
"             Rainfall volume        13.22      38.23      51.46      c.m"
"             Rainfall losses        31.959     2.010      9.707      mm"
"             Runoff depth           11.648     41.597     33.900     mm"
"             Runoff volume          3.53       36.47      40.00      c.m"
"             Runoff coefficient     0.267      0.954      0.777      "
"             Maximum flow           0.003      0.034      0.035      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.035     0.035     0.004     0.004"
" 54          POND DESIGN"
"         0.035   Current peak flow    c.m/sec"
"         0.004   Target outflow    c.m/sec"
"          40.0   Hydrograph volume    c.m"
"             8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
```

```
"                  Level Discharge    Volume"
"                324.000     0.000     0.000"
"                324.100  1.01E-05    10.680"
"                324.200  1.01E-05    21.360"
"                324.300  1.01E-05    32.040"
"                324.400  1.01E-05    42.720"
"                324.500  1.01E-05    53.400"
"                324.650  1.01E-05    69.420"
"                324.660   0.00308    69.430"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                324.650     0.900     2.000     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level               324.120    metre"
"             Maximum storage              12.835    c.m"
"             Centroidal lag               13.217   hours"
"                  0.035     0.035     0.000     0.004 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.035     0.000     0.000     0.004"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          202   Catchment 202"
"       83.400   % Impervious"
"        0.120   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        0.020   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.039     0.000     0.000     0.004 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.020      0.100      0.120      hectare"
"             Time of concentration  12.998     2.047      2.617      minutes"
```

```
"             Time to Centroid       112.396    116.237    116.037    minutes"
"             Rainfall depth         43.607     43.607     43.607     mm"
"             Rainfall volume        8.69       43.64      52.33      c.m"
"             Rainfall losses        32.094     1.862      6.881      mm"
"             Runoff depth           11.513     41.745     36.726     mm"
"             Runoff volume          2.29       41.78      44.07      c.m"
"             Runoff coefficient     0.264      0.957      0.842      "
"             Maximum flow           0.002      0.038      0.039      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.039     0.039     0.000     0.004"
" 54          POND DESIGN"
"         0.039   Current peak flow    c.m/sec"
"         0.020   Target outflow    c.m/sec"
"          44.9   Hydrograph volume    c.m"
"             8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 324.000     0.000     0.000"
"                 324.100   0.00508     5.340"
"                 324.200   0.01016    10.680"
"                 324.300   0.01344    16.020"
"                 324.400   0.01607    21.360"
"                 324.500   0.01832    26.700"
"                 324.650   0.02126    34.710"
"                 324.660   0.02144    34.720"
"            1.   ORIFICES"
"                 Orifice   Orifice   Orifice Number of"
"                  invert coefficie  diameter  orifices"
"                 324.000     0.800    0.1000     1.000"
"            1.   SUPERPIPES_1"
"            1.   Type 1 is Pipe"
"              Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                  Invert    Length     Width    Height   Grade %     Pipes"
"                 324.390    39.900     1.500     1.500     0.300     1.000"
"              Peak outflow                  0.013    c.m/sec"
"              Maximum level                324.305    metre"
"              Maximum storage               16.278    c.m"
"              Centroidal lag                 2.446   hours"
"                   0.039     0.039     0.013     0.004 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.039     0.013     0.013     0.004"
" 33          CATCHMENT 1"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"            1   Catchment UC1"
"        0.010   % Impervious"
"        0.015   Total Area"
"       15.000   Flow length"
"        4.000   Overland Slope"
"        0.015   Pervious Area"
"       15.000   Pervious length"
"        4.000   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.003     0.013     0.013     0.004 c.m/sec"
"             Catchment 1            Pervious   Impervious Total Area "
"             Surface Area           0.015      0.000      0.015      hectare"
"             Time of concentration  5.861      0.923      5.859      minutes"
"             Time to Centroid       106.314    114.316    106.317    minutes"
"             Rainfall depth         43.607     43.607     43.607     mm"
"             Rainfall volume        6.54       0.00       6.54       c.m"
"             Rainfall losses        32.032     3.357      32.030     mm"
"             Runoff depth           11.574     40.250     11.577     mm"
"             Runoff volume          1.74       0.00       1.74       c.m"
"             Runoff coefficient     0.265      0.923      0.265      "
"             Maximum flow           0.003      0.000      0.003      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.003     0.016     0.013     0.004"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.326    hectare"
"             Total Impervious area                     0.222    hectare"
"             Total % impervious                       68.024"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                          Version 2.25  rev. 473"
"                MIDUSS created                       Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                    C:\Users\brett.pond\Desktop\"
"                                            81 College Street MIDUSS\Post\Good"
"                Output filename:                                  Post-10yr.out"
"                Licensee name:                                       Brett Pond"
"                Company                                Hewlett-Packard Company"
"                Date & Time last used:              3/14/2025 at 12:16:01 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      721.920   Coefficient A"
"        0.000   Constant B"
"        0.736   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          216.508    mm/hr"
"             Total depth                 51.134    mm"
"            5   10hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          203   Catchment 203 - Outlet to Rear"
"      100.000   % Impervious"
"        0.034   Total Area"
"       20.000   Flow length"
"        2.500   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        2.500   Pervious slope"
"        0.034   Impervious Area"
"       20.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.017     0.000     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.034      0.034      hectare"
"             Time of concentration  7.217      1.194      1.194      minutes"
"             Time to Centroid       108.576    114.492    114.492    minutes"
"             Rainfall depth         51.134     51.134     51.134     mm"
"             Rainfall volume        0.00       17.39      17.39      c.m"
"             Rainfall losses        35.396     2.839      2.839      mm"
"             Runoff depth           15.738     48.296     48.296     mm"
"             Runoff volume          0.00       16.42      16.42      c.m"
"             Runoff coefficient     0.000      0.944      0.944      "
"             Maximum flow           0.000      0.017      0.017      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.017     0.017     0.000     0.000"
" 54          POND DESIGN"
"        0.017   Current peak flow    c.m/sec"
"        0.001   Target outflow    c.m/sec"
"         16.4   Hydrograph volume    c.m"
"          11.   Number of stages"
"      326.530   Minimum water level    metre"
"      327.290   Maximum water level    metre"
"      326.530   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                326.530     0.000     0.000"
"                326.580  1.01E-05     6.740"
"                326.630  1.01E-05    13.480"
"                326.680  1.01E-05    20.220"
"                326.730  1.01E-05    26.960"
"                326.780  1.01E-05    33.700"
"                326.830  1.01E-05    40.440"
"                326.880  1.01E-05    47.180"
"                326.930  1.01E-05    53.920"
"                327.140  1.01E-05    54.000"
"                327.290   0.04458    54.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                327.140     0.900     0.500     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level               326.592    metre"
"             Maximum storage               8.335    c.m"
"             Centroidal lag               13.236   hours"
"                  0.017     0.017     0.000     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.017     0.000     0.000     0.000"
" 33          CATCHMENT 2"
"            1   Triangular SCS"
```

```
"            1   Equal length"
"            2   Horton equation"
"            2   Catchment UC2"
"        0.010   % Impervious"
"        0.039   Total Area"
"       40.000   Flow length"
"        1.000   Overland Slope"
"        0.039   Pervious Area"
"       40.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       40.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.006     0.000     0.000     0.000 c.m/sec"
"             Catchment 2            Pervious   Impervious Total Area "
"             Surface Area           0.039      0.000      0.039      hectare"
"             Time of concentration  14.399     2.383      14.395     minutes"
"             Time to Centroid       115.320    116.598    115.321    minutes"
"             Rainfall depth         51.134     51.134     51.134     mm"
"             Rainfall volume        19.94      0.00       19.94      c.m"
"             Rainfall losses        35.189     1.818      35.186     mm"
"             Runoff depth           15.945     49.316     15.949     mm"
"             Runoff volume          6.22       0.00       6.22       c.m"
"             Runoff coefficient     0.312      0.964      0.312      "
"             Maximum flow           0.006      0.000      0.006      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.006     0.006     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.006     0.006     0.006     0.000"
" 40          HYDROGRAPH   Combine    99"
"            6   Combine "
"           99   Node #"
"                Rear Flows"
"             Maximum flow                  0.006    c.m/sec"
"             Hydrograph volume             7.078    c.m"
"                     0.006     0.006     0.006     0.006"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
```

```
"                    0.006     0.000     0.006     0.006"
" 33          CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             2   Horton equation"
"           201   Catchment 201"
"        74.300   % Impervious"
"         0.118   Total Area"
"        40.000   Flow length"
"         3.000   Overland Slope"
"         0.030   Pervious Area"
"        40.000   Pervious length"
"         3.000   Pervious slope"
"         0.088   Impervious Area"
"        40.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        34.000   Pervious Max.infiltration"
"         9.000   Pervious Min.infiltration"
"         0.500   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                    0.042     0.000     0.006     0.006 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.030      0.088      0.118      hectare"
"             Time of concentration  10.356     1.714      2.583      minutes"
"             Time to Centroid       111.359    115.433    115.023    minutes"
"             Rainfall depth         51.134     51.134     51.134     mm"
"             Rainfall volume        15.51      44.83      60.34      c.m"
"             Rainfall losses        35.314     2.174      10.691     mm"
"             Runoff depth           15.820     48.960     40.443     mm"
"             Runoff volume          4.80       42.93      47.72      c.m"
"             Runoff coefficient     0.309      0.957      0.791      "
"             Maximum flow           0.005      0.040      0.042      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.042     0.042     0.006     0.006"
" 54          POND DESIGN"
"         0.042   Current peak flow    c.m/sec"
"         0.004   Target outflow    c.m/sec"
"          47.7   Hydrograph volume    c.m"
"             8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
```

```
"                  Level Discharge    Volume"
"                324.000     0.000     0.000"
"                324.100  1.01E-05    10.680"
"                324.200  1.01E-05    21.360"
"                324.300  1.01E-05    32.040"
"                324.400  1.01E-05    42.720"
"                324.500  1.01E-05    53.400"
"                324.650  1.01E-05    69.420"
"                324.660   0.00308    69.430"
"            1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"               elevation coefficie   breadth sideslope sideslope"
"                  324.650     0.900     2.000     0.000     0.000"
"              Peak outflow                 0.000    c.m/sec"
"              Maximum level               324.145    metre"
"              Maximum storage              15.527    c.m"
"              Centroidal lag               13.181   hours"
"                   0.042     0.042     0.000     0.006 c.m/sec"
" 40           HYDROGRAPH Next link "
"             5   Next link "
"                       0.042     0.000     0.000     0.006"
" 33           CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             2   Horton equation"
"           202   Catchment 202"
"        83.400   % Impervious"
"         0.120   Total Area"
"        40.000   Flow length"
"         2.000   Overland Slope"
"         0.020   Pervious Area"
"        40.000   Pervious length"
"         2.000   Pervious slope"
"         0.100   Impervious Area"
"        40.000   Impervious length"
"         2.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        34.000   Pervious Max.infiltration"
"         9.000   Pervious Min.infiltration"
"         0.500   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                       0.045     0.000     0.000     0.006 c.m/sec"
"              Catchment 202          Pervious   Impervious Total Area "
"              Surface Area           0.020      0.100      0.120      hectare"
"              Time of concentration  11.695     1.936      2.528      minutes"
```

```
"             Time to Centroid       112.696    115.765    115.579    minutes"
"             Rainfall depth         51.134     51.134     51.134     mm"
"             Rainfall volume        10.19      51.18      61.36      c.m"
"             Rainfall losses        35.193     2.062      7.562      mm"
"             Runoff depth           15.941     49.073     43.573     mm"
"             Runoff volume          3.18       49.11      52.29      c.m"
"             Runoff coefficient     0.312      0.960      0.852      "
"             Maximum flow           0.003      0.045      0.045      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.045     0.045     0.000     0.006"
" 54          POND DESIGN"
"         0.045   Current peak flow    c.m/sec"
"         0.020   Target outflow    c.m/sec"
"          53.2   Hydrograph volume    c.m"
"            8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 324.000     0.000     0.000"
"                 324.100   0.00508     5.340"
"                 324.200   0.01016    10.680"
"                 324.300   0.01344    16.020"
"                 324.400   0.01607    21.360"
"                 324.500   0.01832    26.700"
"                 324.650   0.02126    34.710"
"                 324.660   0.02144    34.720"
"            1.   ORIFICES"
"                 Orifice   Orifice   Orifice Number of"
"                  invert coefficie  diameter  orifices"
"                 324.000     0.800    0.1000     1.000"
"            1.   SUPERPIPES_1"
"            1.   Type 1 is Pipe"
"              Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                  Invert    Length     Width    Height   Grade %     Pipes"
"                 324.390    39.900     1.500     1.500     0.300     1.000"
"              Peak outflow                  0.015    c.m/sec"
"              Maximum level                324.360    metre"
"              Maximum storage               19.243    c.m"
"              Centroidal lag                 2.413   hours"
"                   0.045     0.045     0.015     0.006 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.045     0.015     0.015     0.006"
" 33          CATCHMENT 1"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"            1   Catchment UC1"
"        0.010   % Impervious"
"        0.015   Total Area"
"       15.000   Flow length"
"        4.000   Overland Slope"
"        0.015   Pervious Area"
"       15.000   Pervious length"
"        4.000   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.004     0.015     0.015     0.006 c.m/sec"
"             Catchment 1            Pervious   Impervious Total Area "
"             Surface Area           0.015      0.000      0.015      hectare"
"             Time of concentration  5.274      0.873      5.273      minutes"
"             Time to Centroid       106.643    113.862    106.645    minutes"
"             Rainfall depth         51.134     51.134     51.134     mm"
"             Rainfall volume        7.67       0.00       7.67       c.m"
"             Rainfall losses        35.203     3.861      35.200     mm"
"             Runoff depth           15.931     47.274     15.935     mm"
"             Runoff volume          2.39       0.00       2.39       c.m"
"             Runoff coefficient     0.312      0.924      0.312      "
"             Maximum flow           0.004      0.000      0.004      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.004     0.018     0.015     0.006"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.326    hectare"
"             Total Impervious area                     0.222    hectare"
"             Total % impervious                       68.024"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                            ie METRIC"
"                Job folder:                       C:\Users\brett.pond\Desktop\"
"                                                81 College Street MIDUSS\Post\Good"
"                Output filename:                                  Post-25yr.out"
"                Licensee name:                                       Brett Pond"
"                Company                                  Hewlett-Packard Company"
"                Date & Time last used:                  3/14/2025 at 12:18:53 PM"
" 32          STORM Chicago storm"
"             1   Chicago storm"
"      822.740   Coefficient A"
"        0.000   Constant B"
"        0.725   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           251.029    mm/hr"
"             Total depth                  61.897    mm"
"            5   25hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          203   Catchment 203 - Outlet to Rear"
"      100.000   % Impervious"
"        0.034   Total Area"
"       20.000   Flow length"
"        2.500   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        2.500   Pervious slope"
"        0.034   Impervious Area"
"       20.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.019     0.000     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.034      0.034      hectare"
"             Time of concentration  6.440      1.126      1.126      minutes"
```

```
"             Time to Centroid       109.565    114.266    114.266    minutes"
"             Rainfall depth         61.897     61.897     61.897     mm"
"             Rainfall volume        0.00       21.04      21.04      c.m"
"             Rainfall losses        39.495     3.299      3.299      mm"
"             Runoff depth           22.402     58.598     58.598     mm"
"             Runoff volume          0.00       19.92      19.92      c.m"
"             Runoff coefficient     0.000      0.947      0.947      "
"             Maximum flow           0.000      0.019      0.019      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.019     0.019     0.000     0.000"
" 54          POND DESIGN"
"         0.019   Current peak flow    c.m/sec"
"         0.001   Target outflow    c.m/sec"
"          19.9   Hydrograph volume    c.m"
"           11.   Number of stages"
"       326.530   Minimum water level    metre"
"       327.290   Maximum water level    metre"
"       326.530   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 326.530     0.000     0.000"
"                 326.580  1.01E-05     6.740"
"                 326.630  1.01E-05    13.480"
"                 326.680  1.01E-05    20.220"
"                 326.730  1.01E-05    26.960"
"                 326.780  1.01E-05    33.700"
"                 326.830  1.01E-05    40.440"
"                 326.880  1.01E-05    47.180"
"                 326.930  1.01E-05    53.920"
"                 327.140  1.01E-05    54.000"
"                 327.290   0.04458    54.000"
"            1.   WEIRS"
"                   Crest      Weir     Crest      Left     Right"
"               elevation coefficie   breadth sideslope sideslope"
"                 327.140     0.900     0.500     0.000     0.000"
"             Peak outflow                  0.000    c.m/sec"
"             Maximum level                326.587    metre"
"             Maximum storage                7.700    c.m"
"             Centroidal lag                13.196   hours"
"                  0.019     0.019     0.000     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.019     0.000     0.000     0.000"
" 33          CATCHMENT 2"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"            2   Catchment UC2"
"         0.010   % Impervious"
```

```
"        0.039   Total Area"
"       40.000   Flow length"
"        1.000   Overland Slope"
"        0.039   Pervious Area"
"       40.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       40.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.008     0.000     0.000     0.000 c.m/sec"
"             Catchment 2            Pervious   Impervious Total Area "
"             Surface Area           0.039      0.000      0.039      hectare"
"             Time of concentration  12.849     2.246      12.846     minutes"
"             Time to Centroid       116.317    116.214    116.317    minutes"
"             Rainfall depth         61.897     61.897     61.897     mm"
"             Rainfall volume        24.14      0.00       24.14      c.m"
"             Rainfall losses        39.293     1.942      39.289     mm"
"             Runoff depth           22.604     59.955     22.608     mm"
"             Runoff volume          8.81       0.00       8.82       c.m"
"             Runoff coefficient     0.365      0.969      0.365      "
"             Maximum flow           0.008      0.000      0.008      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.008     0.008     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.008     0.008     0.008     0.000"
" 40          HYDROGRAPH   Combine    99"
"            6   Combine "
"           99   Node #"
"                Rear Flows"
"             Maximum flow                 0.008    c.m/sec"
"             Hydrograph volume            9.678    c.m"
"                    0.008     0.008     0.008     0.008"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.008     0.000     0.008     0.008"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
```

```
"            2   Horton equation"
"          201   Catchment 201"
"       74.300   % Impervious"
"        0.118   Total Area"
"       40.000   Flow length"
"        3.000   Overland Slope"
"        0.030   Pervious Area"
"       40.000   Pervious length"
"        3.000   Pervious slope"
"        0.088   Impervious Area"
"       40.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.050     0.000     0.008     0.008 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.030      0.088      0.118      hectare"
"             Time of concentration  9.241      1.615      2.503      minutes"
"             Time to Centroid       112.461    115.093    114.787    minutes"
"             Rainfall depth         61.897     61.897     61.897     mm"
"             Rainfall volume        18.77      54.27      73.04      c.m"
"             Rainfall losses        39.237     2.422      11.884     mm"
"             Runoff depth           22.660     59.475     50.013     mm"
"             Runoff volume          6.87       52.14      59.02      c.m"
"             Runoff coefficient     0.366      0.961      0.808      "
"             Maximum flow           0.007      0.047      0.050      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.050     0.050     0.008     0.008"
" 54          POND DESIGN"
"        0.050   Current peak flow    c.m/sec"
"        0.004   Target outflow    c.m/sec"
"         59.0   Hydrograph volume    c.m"
"           8.   Number of stages"
"      324.000   Minimum water level    metre"
"      324.650   Maximum water level    metre"
"      324.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                324.000     0.000     0.000"
"                324.100  1.01E-05    10.680"
"                324.200  1.01E-05    21.360"
```

```
"               324.300  1.01E-05    32.040"
"               324.400  1.01E-05    42.720"
"               324.500  1.01E-05    53.400"
"               324.650  1.01E-05    69.420"
"               324.660   0.00308    69.430"
"           1.   WEIRS"
"                 Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                324.650     0.900     2.000     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level               324.126    metre"
"             Maximum storage              13.413    c.m"
"             Centroidal lag               13.124   hours"
"                  0.050     0.050     0.000     0.008 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.050     0.000     0.000     0.008"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          202   Catchment 202"
"       83.400   % Impervious"
"        0.120   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        0.020   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.054     0.000     0.000     0.008 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.020      0.100      0.120      hectare"
"             Time of concentration  10.437     1.824      2.430      minutes"
"             Time to Centroid       113.762    115.488    115.366    minutes"
"             Rainfall depth         61.897     61.897     61.897     mm"
"             Rainfall volume        12.33      61.95      74.28      c.m"
"             Rainfall losses        39.242     2.239      8.381      mm"
```

```
"             Runoff depth           22.655     59.658     53.516     mm"
"             Runoff volume          4.51       59.71      64.22      c.m"
"             Runoff coefficient     0.366      0.964      0.865      "
"             Maximum flow           0.004      0.053      0.054      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.054     0.054     0.000     0.008"
" 54          POND DESIGN"
"         0.054   Current peak flow    c.m/sec"
"         0.020   Target outflow    c.m/sec"
"          65.1   Hydrograph volume    c.m"
"            8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 324.000     0.000     0.000"
"                 324.100   0.00508     5.340"
"                 324.200   0.01016    10.680"
"                 324.300   0.01344    16.020"
"                 324.400   0.01607    21.360"
"                 324.500   0.01832    26.700"
"                 324.650   0.02126    34.710"
"                 324.660   0.02144    34.720"
"            1.   ORIFICES"
"                 Orifice   Orifice   Orifice Number of"
"                  invert coefficie  diameter  orifices"
"                 324.000     0.800    0.1000     1.000"
"            1.   SUPERPIPES_1"
"            1.   Type 1 is Pipe"
"              Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                  Invert    Length     Width    Height   Grade %     Pipes"
"                 324.390    39.900     1.500     1.500     0.300     1.000"
"              Peak outflow                  0.017    c.m/sec"
"              Maximum level              324.442    metre"
"              Maximum storage             23.589    c.m"
"              Centroidal lag               2.389   hours"
"                   0.054     0.054     0.017     0.008 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.054     0.017     0.017     0.008"
" 33          CATCHMENT 1"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"            1   Catchment UC1"
"         0.010   % Impervious"
"         0.015   Total Area"
"        15.000   Flow length"
```

```
"        4.000   Overland Slope"
"        0.015   Pervious Area"
"       15.000   Pervious length"
"        4.000   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.005     0.017     0.017     0.008 c.m/sec"
"             Catchment 1            Pervious   Impervious Total Area "
"             Surface Area           0.015      0.000      0.015      hectare"
"             Time of concentration  4.706      0.823      4.705      minutes"
"             Time to Centroid       107.704    113.525    107.705    minutes"
"             Rainfall depth         61.897     61.897     61.897     mm"
"             Rainfall volume        9.28       0.00       9.28       c.m"
"             Rainfall losses        39.198     4.534      39.195     mm"
"             Runoff depth           22.699     57.363     22.702     mm"
"             Runoff volume          3.40       0.00       3.41       c.m"
"             Runoff coefficient     0.367      0.927      0.367      "
"             Maximum flow           0.005      0.000      0.005      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.005     0.021     0.017     0.008"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.326    hectare"
"             Total Impervious area                     0.222    hectare"
"             Total % impervious                       68.024"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                            Version 2.25  rev. 473"
"                MIDUSS created                          Sunday, February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                        C:\Users\brett.pond\Desktop\"
"                                                81 College Street MIDUSS\Post\Good"
"                Output filename:                                    Post-50yr.out"
"                Licensee name:                                         Brett Pond"
"                Company                                  Hewlett-Packard Company"
"                Date & Time last used:                  3/14/2025 at 12:23:04 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      893.800   Coefficient A"
"        0.000   Constant B"
"        0.719   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           275.287    mm/hr"
"             Total depth                  69.491    mm"
"            5   50hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          203   Catchment 203 - Outlet to Rear"
"      100.000   % Impervious"
"        0.034   Total Area"
"       20.000   Flow length"
"        2.500   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        2.500   Pervious slope"
"        0.034   Impervious Area"
"       20.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.021     0.000     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.034      0.034      hectare"
"             Time of concentration  6.030      1.085      1.085      minutes"
"             Time to Centroid       110.593    114.107    114.107    minutes"
"             Rainfall depth         69.491     69.491     69.491     mm"
"             Rainfall volume        0.00       23.63      23.63      c.m"
"             Rainfall losses        41.594     3.682      3.683      mm"
"             Runoff depth           27.897     65.809     65.808     mm"
"             Runoff volume          0.00       22.37      22.37      c.m"
"             Runoff coefficient     0.000      0.947      0.947      "
"             Maximum flow           0.000      0.021      0.021      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.021     0.021     0.000     0.000"
" 54          POND DESIGN"
"        0.021   Current peak flow    c.m/sec"
"        0.001   Target outflow    c.m/sec"
"         22.4   Hydrograph volume    c.m"
"          11.   Number of stages"
"      326.530   Minimum water level    metre"
"      327.290   Maximum water level    metre"
"      326.530   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                326.530     0.000     0.000"
"                326.580  1.01E-05     6.740"
"                326.630  1.01E-05    13.480"
"                326.680  1.01E-05    20.220"
"                326.730  1.01E-05    26.960"
"                326.780  1.01E-05    33.700"
"                326.830  1.01E-05    40.440"
"                326.880  1.01E-05    47.180"
"                326.930  1.01E-05    53.920"
"                327.140  1.01E-05    54.000"
"                327.290   0.04458    54.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                327.140     0.900     0.500     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level               326.595    metre"
"             Maximum storage               8.733    c.m"
"             Centroidal lag               13.170   hours"
"                  0.021     0.021     0.000     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.021     0.000     0.000     0.000"
" 33          CATCHMENT 2"
"            1   Triangular SCS"
```

```
"            1   Equal length"
"            2   Horton equation"
"            2   Catchment UC2"
"        0.010   % Impervious"
"        0.039   Total Area"
"       40.000   Flow length"
"        1.000   Overland Slope"
"        0.039   Pervious Area"
"       40.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       40.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.009     0.000     0.000     0.000 c.m/sec"
"             Catchment 2            Pervious   Impervious Total Area "
"             Surface Area           0.039      0.000      0.039      hectare"
"             Time of concentration  12.030     2.165      12.028     minutes"
"             Time to Centroid       117.423    115.971    117.422    minutes"
"             Rainfall depth         69.491     69.491     69.491     mm"
"             Rainfall volume        27.10      0.00       27.10      c.m"
"             Rainfall losses        41.404     2.084      41.400     mm"
"             Runoff depth           28.087     67.407     28.091     mm"
"             Runoff volume          10.95      0.00       10.96      c.m"
"             Runoff coefficient     0.404      0.970      0.404      "
"             Maximum flow           0.009      0.000      0.009      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.009     0.009     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.009     0.009     0.009     0.000"
" 40          HYDROGRAPH   Combine    99"
"            6   Combine "
"           99   Node #"
"                Rear Flows"
"             Maximum flow                  0.009    c.m/sec"
"             Hydrograph volume            11.819    c.m"
"                     0.009     0.009     0.009     0.009"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
```

```
"                    0.009     0.000     0.009     0.009"
" 33          CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             2   Horton equation"
"           201   Catchment 201"
"        74.300   % Impervious"
"         0.118   Total Area"
"        40.000   Flow length"
"         3.000   Overland Slope"
"         0.030   Pervious Area"
"        40.000   Pervious length"
"         3.000   Pervious slope"
"         0.088   Impervious Area"
"        40.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        34.000   Pervious Max.infiltration"
"         9.000   Pervious Min.infiltration"
"         0.500   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                    0.056     0.000     0.009     0.009 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.030      0.088      0.118      hectare"
"             Time of concentration  8.653      1.557      2.458      minutes"
"             Time to Centroid       113.533    114.863    114.694    minutes"
"             Rainfall depth         69.491     69.491     69.491     mm"
"             Rainfall volume        21.07      60.93      82.00      c.m"
"             Rainfall losses        41.395     2.662      12.616     mm"
"             Runoff depth           28.096     66.829     56.875     mm"
"             Runoff volume          8.52       58.59      67.11      c.m"
"             Runoff coefficient     0.404      0.962      0.818      "
"             Maximum flow           0.009      0.052      0.056      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.056     0.056     0.009     0.009"
" 54          POND DESIGN"
"         0.056   Current peak flow    c.m/sec"
"         0.004   Target outflow    c.m/sec"
"          67.1   Hydrograph volume    c.m"
"            8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
```

```
"                  Level Discharge    Volume"
"                324.000     0.000     0.000"
"                324.100  1.01E-05    10.680"
"                324.200  1.01E-05    21.360"
"                324.300  1.01E-05    32.040"
"                324.400  1.01E-05    42.720"
"                324.500  1.01E-05    53.400"
"                324.650  1.01E-05    69.420"
"                324.660   0.00308    69.430"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                324.650     0.900     2.000     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level               324.113    metre"
"             Maximum storage              12.084    c.m"
"             Centroidal lag               13.087   hours"
"                  0.056     0.056     0.000     0.009 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.056     0.000     0.000     0.009"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          202   Catchment 202"
"       83.400   % Impervious"
"        0.120   Total Area"
"       40.000   Flow length"
"        2.000   Overland Slope"
"        0.020   Pervious Area"
"       40.000   Pervious length"
"        2.000   Pervious slope"
"        0.100   Impervious Area"
"       40.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.060     0.000     0.000     0.009 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.020      0.100      0.120      hectare"
"             Time of concentration  9.772      1.758      2.368      minutes"
```

```
"             Time to Centroid       114.744    115.298    115.256    minutes"
"             Rainfall depth         69.491     69.491     69.491     mm"
"             Rainfall volume        13.84      69.55      83.39      c.m"
"             Rainfall losses        41.744     2.404      8.935      mm"
"             Runoff depth           27.747     67.087     60.556     mm"
"             Runoff volume          5.53       67.14      72.67      c.m"
"             Runoff coefficient     0.399      0.965      0.871      "
"             Maximum flow           0.005      0.058      0.060      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.060     0.060     0.000     0.009"
" 54          POND DESIGN"
"         0.060   Current peak flow    c.m/sec"
"         0.020   Target outflow    c.m/sec"
"          73.5   Hydrograph volume    c.m"
"            8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 324.000     0.000     0.000"
"                 324.100   0.00508     5.340"
"                 324.200   0.01016    10.680"
"                 324.300   0.01344    16.020"
"                 324.400   0.01607    21.360"
"                 324.500   0.01832    26.700"
"                 324.650   0.02126    34.710"
"                 324.660   0.02144    34.720"
"            1.   ORIFICES"
"                 Orifice   Orifice   Orifice Number of"
"                  invert coefficie  diameter  orifices"
"                 324.000     0.800    0.1000     1.000"
"            1.   SUPERPIPES_1"
"            1.   Type 1 is Pipe"
"              Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                  Invert    Length     Width    Height   Grade %     Pipes"
"                 324.390    39.900     1.500     1.500     0.300     1.000"
"              Peak outflow                  0.018    c.m/sec"
"              Maximum level                324.501    metre"
"              Maximum storage               26.753    c.m"
"              Centroidal lag                 2.379   hours"
"                   0.060     0.060     0.018     0.009 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.060     0.018     0.018     0.009"
" 33          CATCHMENT 1"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"            1   Catchment UC1"
"        0.010   % Impervious"
"        0.015   Total Area"
"       15.000   Flow length"
"        4.000   Overland Slope"
"        0.015   Pervious Area"
"       15.000   Pervious length"
"        4.000   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.006     0.018     0.018     0.009 c.m/sec"
"             Catchment 1            Pervious   Impervious Total Area "
"             Surface Area           0.015      0.000      0.015      hectare"
"             Time of concentration  4.406      0.793      4.406      minutes"
"             Time to Centroid       108.639    113.333    108.640    minutes"
"             Rainfall depth         69.491     69.491     69.491     mm"
"             Rainfall volume        10.42      0.00       10.42      c.m"
"             Rainfall losses        41.727     4.969      41.723     mm"
"             Runoff depth           27.764     64.522     27.768     mm"
"             Runoff volume          4.16       0.00       4.17       c.m"
"             Runoff coefficient     0.400      0.928      0.400      "
"             Maximum flow           0.006      0.000      0.006      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.006     0.023     0.018     0.009"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.326    hectare"
"             Total Impervious area                     0.222    hectare"
"             Total % impervious                       68.024"
" 19          EXIT"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                          Version 2.25  rev. 473"
"                MIDUSS created                       Sunday, February 7, 2010"
"           10   Units used:                                          ie METRIC"
"                Job folder:                    C:\Users\brett.pond\Desktop\"
"                                            81 College Street MIDUSS\Post\Good"
"                Output filename:                                 Post-100yr.out"
"                Licensee name:                                       Brett Pond"
"                Company                                 Hewlett-Packard Company"
"                Date & Time last used:               3/14/2025 at 11:55:03 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      240.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      953.290   Coefficient A"
"        0.000   Constant B"
"        0.711   Exponent C"
"        0.400   Fraction R"
"      240.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          297.317    mm/hr"
"             Total depth                 77.438    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
"          203   Catchment 203 - Outlet to Rear"
"      100.000   % Impervious"
"        0.034   Total Area"
"       20.000   Flow length"
"        2.500   Overland Slope"
"        0.000   Pervious Area"
"       20.000   Pervious length"
"        2.500   Pervious slope"
"        0.034   Impervious Area"
"       20.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
```

```
"                    0.023     0.000     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.034      0.034      hectare"
"             Time of concentration  5.802      1.052      1.052      minutes"
"             Time to Centroid       112.099    114.015    114.015    minutes"
"             Rainfall depth         77.438     77.438     77.438     mm"
"             Rainfall volume        0.00       26.33      26.33      c.m"
"             Rainfall losses        43.642     4.078      4.078      mm"
"             Runoff depth           33.797     73.360     73.360     mm"
"             Runoff volume          0.00       24.94      24.94      c.m"
"             Runoff coefficient     0.000      0.947      0.947      "
"             Maximum flow           0.000      0.023      0.023      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.023     0.023     0.000     0.000"
" 54          POND DESIGN"
"        0.023   Current peak flow    c.m/sec"
"        0.001   Target outflow    c.m/sec"
"         24.9   Hydrograph volume    c.m"
"          11.   Number of stages"
"      326.530   Minimum water level    metre"
"      327.290   Maximum water level    metre"
"      326.530   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                326.530     0.000     0.000"
"                326.580  1.01E-05     6.740"
"                326.630  1.01E-05    13.480"
"                326.680  1.01E-05    20.220"
"                326.730  1.01E-05    26.960"
"                326.780  1.01E-05    33.700"
"                326.830  1.01E-05    40.440"
"                326.880  1.01E-05    47.180"
"                326.930  1.01E-05    53.920"
"                327.140  1.01E-05    54.000"
"                327.290   0.04458    54.000"
"           1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"                327.140     0.900     0.500     0.000     0.000"
"             Peak outflow                 0.000    c.m/sec"
"             Maximum level               326.582    metre"
"             Maximum storage               7.004    c.m"
"             Centroidal lag               13.141   hours"
"                  0.023     0.023     0.000     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.023     0.000     0.000     0.000"
" 33          CATCHMENT 2"
"            1   Triangular SCS"
```

```
"            1   Equal length"
"            2   Horton equation"
"            2   Catchment UC2"
"        0.010   % Impervious"
"        0.039   Total Area"
"       40.000   Flow length"
"        1.000   Overland Slope"
"        0.039   Pervious Area"
"       40.000   Pervious length"
"        1.000   Pervious slope"
"        0.000   Impervious Area"
"       40.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                     0.010     0.000     0.000     0.000 c.m/sec"
"             Catchment 2            Pervious   Impervious Total Area "
"             Surface Area           0.039      0.000      0.039      hectare"
"             Time of concentration  11.576     2.099      11.574     minutes"
"             Time to Centroid       119.428    115.846    119.427    minutes"
"             Rainfall depth         77.438     77.438     77.438     mm"
"             Rainfall volume        30.20      0.00       30.20      c.m"
"             Rainfall losses        43.462     2.247      43.457     mm"
"             Runoff depth           33.977     75.191     33.981     mm"
"             Runoff volume          13.25      0.00       13.25      c.m"
"             Runoff coefficient     0.439      0.971      0.439      "
"             Maximum flow           0.010      0.000      0.010      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.010     0.010     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.010     0.010     0.010     0.000"
" 40          HYDROGRAPH   Combine    99"
"            6   Combine "
"           99   Node #"
"                Rear Flows"
"             Maximum flow                  0.010    c.m/sec"
"             Hydrograph volume            14.118    c.m"
"                     0.010     0.010     0.010     0.010"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
```

```
"                    0.010     0.000     0.010     0.010"
" 33          CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             2   Horton equation"
"           201   Catchment 201"
"        74.300   % Impervious"
"         0.118   Total Area"
"        40.000   Flow length"
"         3.000   Overland Slope"
"         0.030   Pervious Area"
"        40.000   Pervious length"
"         3.000   Pervious slope"
"         0.088   Impervious Area"
"        40.000   Impervious length"
"         3.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        34.000   Pervious Max.infiltration"
"         9.000   Pervious Min.infiltration"
"         0.500   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                    0.059     0.000     0.010     0.010 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.030      0.088      0.118      hectare"
"             Time of concentration  8.326      1.510      2.438      minutes"
"             Time to Centroid       115.524    114.746    114.852    minutes"
"             Rainfall depth         77.438     77.438     77.438     mm"
"             Rainfall volume        23.48      67.89      91.38      c.m"
"             Rainfall losses        43.453     2.926      13.341     mm"
"             Runoff depth           33.985     74.512     64.097     mm"
"             Runoff volume          10.31      65.33      75.63      c.m"
"             Runoff coefficient     0.439      0.962      0.828      "
"             Maximum flow           0.012      0.057      0.059      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    0.059     0.059     0.010     0.010"
" 54          POND DESIGN"
"         0.059   Current peak flow    c.m/sec"
"         0.004   Target outflow    c.m/sec"
"          75.6   Hydrograph volume    c.m"
"            8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
```

```
"                  Level Discharge    Volume"
"                324.000     0.000     0.000"
"                324.100  1.01E-05    10.680"
"                324.200  1.01E-05    21.360"
"                324.300  1.01E-05    32.040"
"                324.400  1.01E-05    42.720"
"                324.500  1.01E-05    53.400"
"                324.650  1.01E-05    69.420"
"                324.660   0.00308    69.430"
"            1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"               elevation coefficie   breadth sideslope sideslope"
"                 324.650     0.900     2.000     0.000     0.000"
"              Peak outflow                 0.001    c.m/sec"
"              Maximum level               324.660    metre"
"              Maximum storage              69.430    c.m"
"              Centroidal lag                5.171   hours"
"                   0.059     0.059     0.001     0.010 c.m/sec"
" 40           HYDROGRAPH Next link "
"             5   Next link "
"                     0.059     0.001     0.001     0.010"
" 33           CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             2   Horton equation"
"           202   Catchment 202"
"        83.400   % Impervious"
"         0.120   Total Area"
"        40.000   Flow length"
"         2.000   Overland Slope"
"         0.020   Pervious Area"
"        40.000   Pervious length"
"         2.000   Pervious slope"
"         0.100   Impervious Area"
"        40.000   Impervious length"
"         2.000   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        34.000   Pervious Max.infiltration"
"         9.000   Pervious Min.infiltration"
"         0.500   Pervious Lag constant (hours)"
"         5.000   Pervious Depression storage"
"         0.015   Impervious Manning 'n'"
"         0.000   Impervious Max.infiltration"
"         0.000   Impervious Min.infiltration"
"         0.001   Impervious Lag constant (hours)"
"         1.500   Impervious Depression storage"
"                     0.066     0.001     0.001     0.010 c.m/sec"
"              Catchment 202          Pervious   Impervious Total Area "
"              Surface Area           0.020      0.100      0.120      hectare"
"              Time of concentration  9.402      1.705      2.339      minutes"
```

```
"             Time to Centroid       116.636    115.187    115.307    minutes"
"             Rainfall depth         77.438     77.438     77.438     mm"
"             Rainfall volume        15.43      77.50      92.93      c.m"
"             Rainfall losses        43.683     2.563      9.389      mm"
"             Runoff depth           33.755     74.875     68.049     mm"
"             Runoff volume          6.72       74.94      81.66      c.m"
"             Runoff coefficient     0.436      0.967      0.879      "
"             Maximum flow           0.006      0.064      0.066      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.066     0.066     0.001     0.010"
" 54          POND DESIGN"
"         0.066   Current peak flow    c.m/sec"
"         0.020   Target outflow    c.m/sec"
"          87.0   Hydrograph volume    c.m"
"             8.   Number of stages"
"       324.000   Minimum water level    metre"
"       324.650   Maximum water level    metre"
"       324.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                  324.000     0.000     0.000"
"                  324.100   0.00508     5.340"
"                  324.200   0.01016    10.680"
"                  324.300   0.01344    16.020"
"                  324.400   0.01607    21.360"
"                  324.500   0.01832    26.700"
"                  324.650   0.02126    34.710"
"                  324.660   0.02144    34.720"
"            1.   ORIFICES"
"                 Orifice   Orifice   Orifice Number of"
"                  invert coefficie  diameter  orifices"
"                  324.000     0.800    0.1000     1.000"
"            1.   SUPERPIPES_1"
"            1.   Type 1 is Pipe"
"              Downstream      Pipe      Pipe      Pipe      Pipe Number of"
"                  Invert    Length     Width    Height   Grade %     Pipes"
"                  324.390    39.900     1.500     1.500     0.300     1.000"
"              Peak outflow                  0.019    c.m/sec"
"              Maximum level                324.557    metre"
"              Maximum storage               29.764    c.m"
"              Centroidal lag                 2.454   hours"
"                   0.066     0.066     0.019     0.010 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                     0.066     0.019     0.019     0.010"
" 33          CATCHMENT 1"
"            1   Triangular SCS"
"            1   Equal length"
"            2   Horton equation"
```

```
"            1   Catchment UC1"
"        0.010   % Impervious"
"        0.015   Total Area"
"       15.000   Flow length"
"        4.000   Overland Slope"
"        0.015   Pervious Area"
"       15.000   Pervious length"
"        4.000   Pervious slope"
"        0.000   Impervious Area"
"       15.000   Impervious length"
"        4.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       34.000   Pervious Max.infiltration"
"        9.000   Pervious Min.infiltration"
"        0.500   Pervious Lag constant (hours)"
"        5.000   Pervious Depression storage"
"        0.015   Impervious Manning 'n'"
"        0.000   Impervious Max.infiltration"
"        0.000   Impervious Min.infiltration"
"        0.001   Impervious Lag constant (hours)"
"        1.500   Impervious Depression storage"
"                    0.007     0.019     0.019     0.010 c.m/sec"
"             Catchment 1            Pervious   Impervious Total Area "
"             Surface Area           0.015      0.000      0.015      hectare"
"             Time of concentration  4.240      0.769      4.239      minutes"
"             Time to Centroid       110.073    113.313    110.073    minutes"
"             Rainfall depth         77.438     77.438     77.438     mm"
"             Rainfall volume        11.61      0.00       11.62      c.m"
"             Rainfall losses        43.989     5.360      43.985     mm"
"             Runoff depth           33.449     72.078     33.453     mm"
"             Runoff volume          5.02       0.00       5.02       c.m"
"             Runoff coefficient     0.432      0.931      0.432      "
"             Maximum flow           0.007      0.000      0.007      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.007     0.025     0.019     0.010"
" 38          START/RE-START TOTALS 1"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.326    hectare"
"             Total Impervious area                     0.222    hectare"
"             Total % impervious                       68.024"
" 19          EXIT"
```

Stormceptor®

Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

07/08/2025

Province:	Ontario
City:	Guelph
Nearest Rainfall Station:	WATERLOO WELLINGTON AP
Climate Station Id:	6149387
Years of Rainfall Data:	34

Site Name:	81 College Avenue West

Drainage Area (ha):	0.24
% Imperviousness:	78.90

Runoff Coefficient 'c': 0.77

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	7.03
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	25.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	244
Estimated Average Annual Sediment Volume (L/yr):	198

Project Name:	81 College Avenue West
Project Number:	32948-23
Designer Name:	Brett Pond
Designer Company:	Van Harten
Designer Email:	brett.pond@vanharten.com
Designer Phone:	519-994-0425
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	92
EFO5	95
EFO6	97
EFO8	99
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 92

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

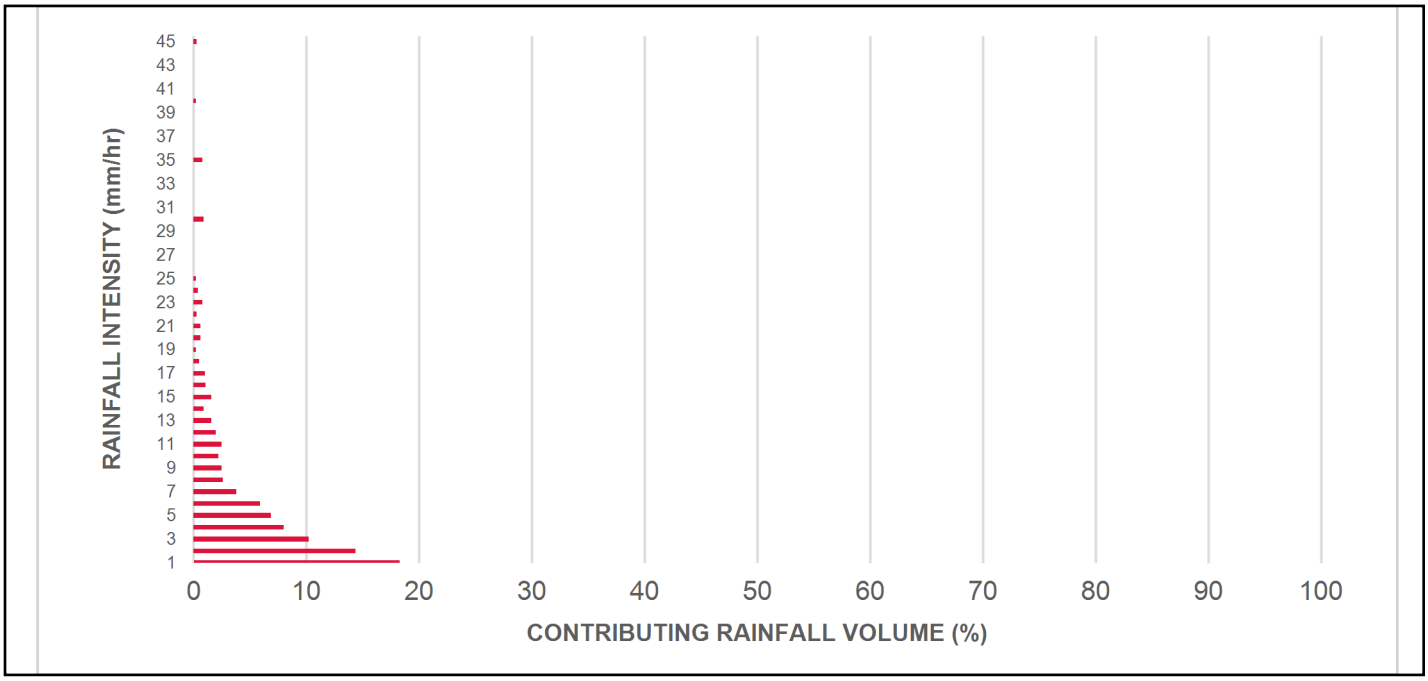
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

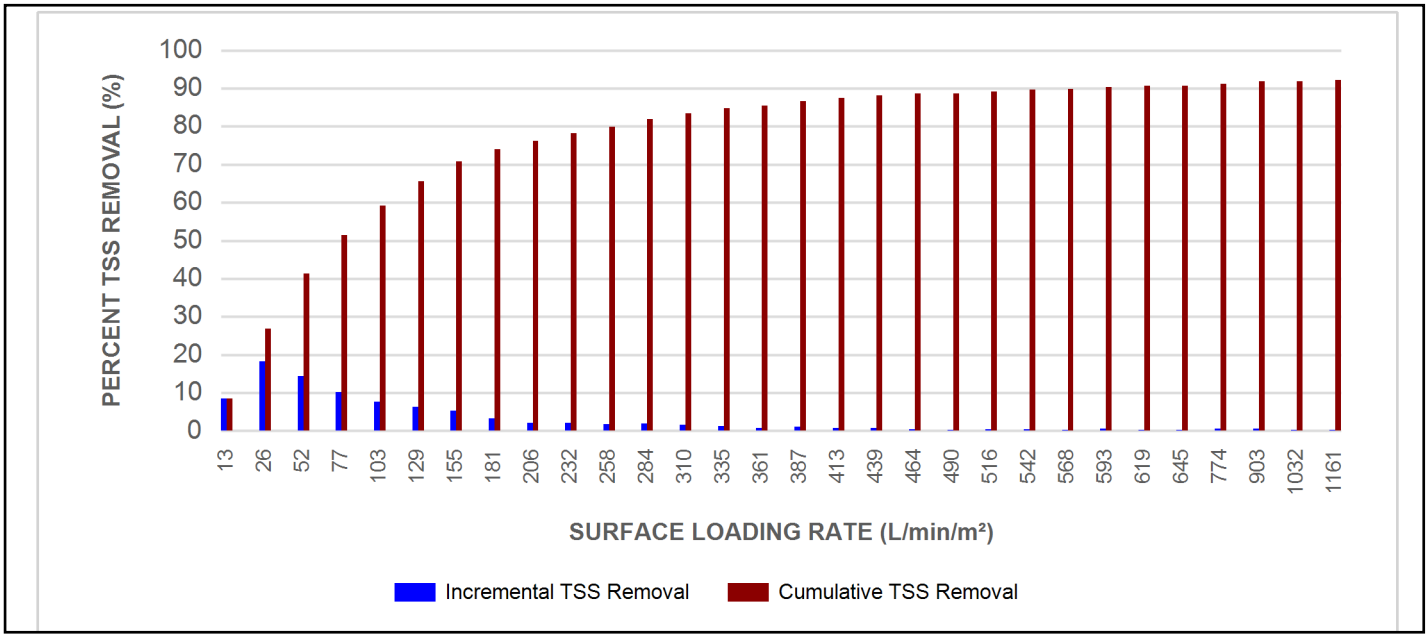
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	0.26	15.0	13.0	100	8.5	8.5
1.00	18.3	26.8	0.52	31.0	26.0	100	18.3	26.8
2.00	14.4	41.3	1.03	62.0	52.0	100	14.4	41.3
3.00	10.2	51.5	1.55	93.0	77.0	100	10.2	51.5
4.00	8.0	59.5	2.06	124.0	103.0	96	7.7	59.1
5.00	6.9	66.4	2.58	155.0	129.0	92	6.4	65.5
6.00	5.9	72.3	3.10	186.0	155.0	89	5.3	70.8
7.00	3.8	76.1	3.61	217.0	181.0	86	3.2	74.0
8.00	2.6	78.7	4.13	248.0	206.0	83	2.2	76.2
9.00	2.5	81.1	4.64	279.0	232.0	82	2.0	78.2
10.00	2.2	83.3	5.16	310.0	258.0	81	1.8	79.9
11.00	2.5	85.8	5.68	341.0	284.0	79	2.0	81.9
12.00	2.0	87.8	6.19	372.0	310.0	78	1.6	83.5
13.00	1.6	89.4	6.71	402.0	335.0	77	1.2	84.7
14.00	0.9	90.4	7.22	433.0	361.0	76	0.7	85.4
15.00	1.6	91.9	7.74	464.0	387.0	75	1.2	86.6
16.00	1.1	93.0	8.26	495.0	413.0	73	0.8	87.4
17.00	1.0	94.0	8.77	526.0	439.0	72	0.8	88.2
18.00	0.5	94.6	9.29	557.0	464.0	71	0.4	88.6
19.00	0.2	94.8	9.80	588.0	490.0	70	0.2	88.7
20.00	0.6	95.4	10.32	619.0	516.0	69	0.4	89.1
21.00	0.6	96.1	10.84	650.0	542.0	67	0.4	89.6
22.00	0.3	96.4	11.35	681.0	568.0	66	0.2	89.8
23.00	0.8	97.2	11.87	712.0	593.0	65	0.6	90.3
24.00	0.4	97.6	12.38	743.0	619.0	64	0.3	90.6
25.00	0.2	97.8	12.90	774.0	645.0	64	0.1	90.7
30.00	0.9	98.7	15.48	929.0	774.0	63	0.5	91.2
35.00	0.8	99.5	18.06	1084.0	903.0	62	0.5	91.8
40.00	0.2	99.7	20.64	1238.0	1032.0	61	0.1	91.9
45.00	0.3	100.0	23.22	1393.0	1161.0	58	0.2	92.1
Estimated Net Annual Sediment (TSS) Load Reduction =								**92 %**

Climate Station ID: 6149387 *Years of Rainfall Data*: 34

RAINFALL DATA FROM WATERLOO WELLINGTON AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

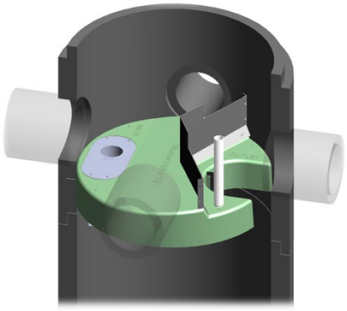
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

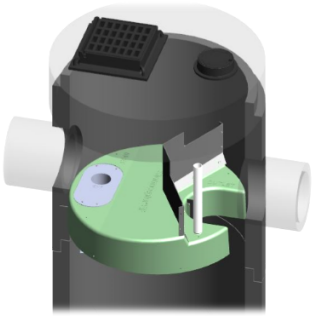
DESIGN FLEXIBILITY

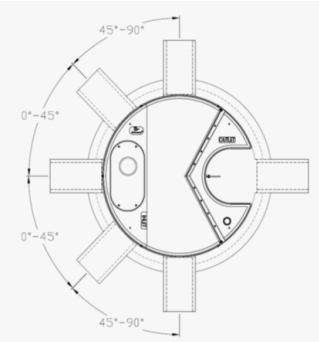
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

APPENDIX D
WATER BALANCE

Project No:	32948-23
Project Name:	Proposed Chabad
Project Location:	81 College Street West, Guelph
Date:	2025-02-20
Update:	2025-07-08

Water Balance Summary Page

	Annual Volumes (cu.m.)			
	Infiltration	Evaporation + Evapotranspiration	Runoff	Total
Existing Condition	341.4	1599.1	1045.7	2986.2
Proposed Condition	164.7	925.9	1895.6	2986.2

Infiltration Deficit (annual) **176.7 cu.m.**

Project No:	32948-23
Project Name:	Proposed Chabad
Project Location:	81 College Street West, Guelph
Date:	2025-02-20
Update:	2025-07-08

Van Harten
LAND SURVEYORS — ENGINEERS

Climate Data

Climate Station	WATERLOO WELLINGTON A
Climate Station ID	6149387
Data Period	1981 to 2010 Canadian Climate Normals station data
Latitude	43°27'00.000" N

Month	Mean Temp T deg C	Heat Index I	"α" α	Potential Evapotranspiration mm	Daily Correction Factor	Total Precipitation P mm	Adjusted Potential Evapotranspiration PET mm	P-PET mm
Jan	-6.5	0.00	0.49	0.0	0.81	65.2	0.0	65.2
Feb	-5.5	0.00	0.49	0.0	0.81	54.9	0.0	54.9
Mar	-1.0	0.00	0.49	0.0	1.03	61.0	0.0	61.0
Apr	6.2	1.38	0.52	29.1	1.12	74.5	32.7	41.8
May	12.5	4.00	0.56	61.1	1.27	82.3	77.6	4.7
Jun	17.6	6.72	0.61	87.7	1.29	82.4	112.9	-30.5
Jul	20.0	8.16	0.63	100.4	1.30	98.6	130.9	-32.3
Aug	18.9	7.49	0.62	94.5	1.20	83.9	113.8	-29.9
Sep	14.5	5.01	0.58	71.4	1.06	87.8	75.5	12.3
Oct	8.2	2.11	0.53	39.1	0.95	67.4	37.0	30.4
Nov	2.5	0.35	0.50	11.1	0.81	87.1	9.0	78.1
Dec	-3.3	0.00	0.49	0.0	0.77	71.2	0.0	71.2
Annual	7.0	**35.23**	**1.06**	**494.4**	-	**916.3**	**589.5**	**326.8**

Project No: 32948-23
Project Name: Proposed Chabad
Project Location: 81 College Street West, Guelph
Date: 2025-02-20
Update: 2025-07-08

EXISTING CONDITION WATER BALANCE

Catchment Data

Catchment Area	0.3259	ha
Impervious Area	0.0647	ha
Pervious Area *(remainder)*	0.2612	ha
Infiltration Factor[1]	0.4	
Topography	0.1	
Soils	0.2	
Cover	0.1	
Soil Moisture Capacity[2]	125	mm
Impervious evaporation assumption	10%	
% imperviousness	19.9%	

Silty Sand per Stonecairn Consulting - Geotechnical Investigation and Hydrogeological Assessment"

of rainfall evaporates from impervious surfaces; no evapotranspiration from impervious areas

Catchment Summary

Infiltration	341.4	cu.m.
Evapotranspiration + Evaporation	1599.1	cu.m.
Runoff	1045.7	cu.m.
Total	2986.2	cu.m.

		Pervious Area									Impervious Areas		Pervious[3]			Impervious Areas	
Month	Precipitation	Adjusted Potential Evapo-transpiration	P-PET	Change in Soil Moisture Storage	Soil Moisture Storage[5]	Actual Evapo-transpiration	Soil Moisture Deficit	Water Surplus[4]	Potential Pervious Infiltration	Potential Pervious Runoff	Potential Impervious Evaporation	Potential Impervious Runoff	Evapo-transpiration	Runoff	Infiltration	Evaporation	Runoff
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	cu.m.	cu.m.	cu.m.	cu.m.	cu.m.
Jan	65.2	0.0	65.2	0.0	125.0	0.0	0.0	65.2	26.1	39.1	6.5	58.7	0.0	0.0	0.0	4.2	38.0
Feb	54.9	0.0	54.9	0.0	125.0	0.0	0.0	54.9	22.0	32.9	5.5	49.4	0.0	0.0	0.0	3.6	32.0
Mar	61.0	0.0	61.0	0.0	125.0	0.0	0.0	61.0	24.4	36.6	6.1	54.9	0.0	0.0	0.0	3.9	35.5
Apr	74.5	32.7	41.8	0.0	125.0	32.7	0.0	41.8	16.7	25.1	7.5	67.1	85.4	460.9	307.3	4.8	43.4
May	82.3	77.6	4.7	0.0	125.0	77.6	0.0	4.7	1.9	2.8	8.2	74.1	202.7	7.4	4.9	5.3	47.9
Jun	82.4	112.9	-30.5	-30.5	94.5	112.9	30.5	0.0	0.0	0.0	8.2	74.2	295.0	0.0	0.0	5.3	48.0
Jul	98.6	130.9	-32.3	-32.3	62.1	130.9	62.9	0.0	0.0	0.0	9.9	88.7	342.0	0.0	0.0	6.4	57.4
Aug	83.9	113.8	-29.9	-29.9	32.2	113.8	92.8	0.0	0.0	0.0	8.4	75.5	297.4	0.0	0.0	5.4	48.9
Sep	87.8	75.5	12.3	12.3	44.5	75.5	80.5	0.0	0.0	0.0	8.8	79.0	197.3	0.0	0.0	5.7	51.1
Oct	67.4	37.0	30.4	30.4	74.9	37.0	50.1	0.0	0.0	0.0	6.7	60.7	96.6	0.0	0.0	4.4	39.2
Nov	87.1	9.0	78.1	50.1	125.0	9.0	0.0	28.0	11.2	16.8	8.7	78.4	23.4	43.9	29.3	5.6	50.7
Dec	71.2	0.0	71.2	0.0	125.0	0.0	0.0	71.2	28.5	42.7	7.1	64.1	0.0	0.0	0.0	4.6	41.5
Annual	**916.3**	**589.5**				**589.5**		**326.8**	**130.7**	**196.1**	**91.6**	**824.7**	**1539.8**	**512.2**	**341.4**	**59.3**	**533.6**

Notes:

1. Infiltration factors based on Ontario Ministry of Environment, 2003 Stormwater Management Planning and Design Manual
2. Soil Moisture Capacity is assumed based on Water Holding Capacity per Table 3.1 of the Ontario Ministry of Environment, 2003 Stormwater Management Planning and Design Manual.
3. For pervious areas: runoff, infiltration and evapotranspiration do not occur in months where the average temperature is less than 0 deg C. Precipitation is assumed to accumulate as snowfall during these months months and is applied in April for this data set, which is the first month where the average temperature exceeds 0 deg C.
4. Surplus water is not available for runoff or infiltration during months where the evapotranspiration exceeds the precipitation
5. Soil moisture storage is assumed to be at a maximum in the month of March

Project No: 32948-23
Project Name: Proposed Chabad
Project Location: 81 College Street West, Guelph
Date: 2025-02-20
Update: 2025-07-08

PROPOSED CONDITION WATER BALANCE

Catchment Data

Catchment Area	0.3259	ha
Impervious Area	0.1999	ha
Pervious Area *(remainder)*	0.1260	ha
Infiltration Factor[1]	0.4	
Topography	0.1	
Soils	0.2	
Cover	0.1	
Soil Moisture Capacity[2]	125	mm
Impervious evaporation assumption	10.0%	
% imperviousness	61.3%	

Silty Sand per Stonecairn Consulting - Geotechnical Investigation and Hydrogeological Assessment"

of rainfall evaporates from impervious surfaces; no evapotranspiration from impervious areas

Catchment Summary

Infiltration	164.7	cu.m.
Evapotranspiration + Evaporation	925.9	cu.m.
Runoff	1895.6	cu.m.
Total	2986.2	cu.m.

		Pervious Area									Impervious Areas		Pervious[3]			Impervious Areas	
Month	Precipitation	Adjusted Potential Evapo-transpiration	P-PET	Change in Soil Moisture Storage	Soil Moisture Storage[5]	Actual Evapo-transpiration	Soil Moisture Deficit	Water Surplus[4]	Potential Pervious Infiltration	Potential Pervious Runoff	Potential Impervious Evaporation	Potential Impervious Runoff	Evapo-transpiration	Runoff	Infiltration	Evaporation	Runoff
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	cu.m.	cu.m.	cu.m.	cu.m.	cu.m.
Jan	65.2	0.0	65.2	0.0	125.0	0.0	0.0	65.2	26.1	39.1	6.5	58.7	0.0	0.0	0.0	13.0	117.3
Feb	54.9	0.0	54.9	0.0	125.0	0.0	0.0	54.9	22.0	32.9	5.5	49.4	0.0	0.0	0.0	11.0	98.8
Mar	61.0	0.0	61.0	0.0	125.0	0.0	0.0	61.0	24.4	36.6	6.1	54.9	0.0	0.0	0.0	12.2	109.7
Apr	74.5	32.7	41.8	0.0	125.0	32.7	0.0	41.8	16.7	25.1	7.5	67.1	41.2	222.3	148.2	14.9	134.0
May	82.3	77.6	4.7	0.0	125.0	77.6	0.0	4.7	1.9	2.8	8.2	74.1	97.8	3.5	2.4	16.5	148.1
Jun	82.4	112.9	-30.5	-30.5	94.5	112.9	30.5	0.0	0.0	0.0	8.2	74.2	142.3	0.0	0.0	16.5	148.2
Jul	98.6	130.9	-32.3	-32.3	62.1	130.9	62.9	0.0	0.0	0.0	9.9	88.7	165.0	0.0	0.0	19.7	177.4
Aug	83.9	113.8	-29.9	-29.9	32.2	113.8	92.8	0.0	0.0	0.0	8.4	75.5	143.4	0.0	0.0	16.8	150.9
Sep	87.8	75.5	12.3	12.3	44.5	75.5	80.5	0.0	0.0	0.0	8.8	79.0	95.2	0.0	0.0	17.6	158.0
Oct	67.4	37.0	30.4	30.4	74.9	37.0	50.1	0.0	0.0	0.0	6.7	60.7	46.6	0.0	0.0	13.5	121.3
Nov	87.1	9.0	78.1	50.1	125.0	9.0	0.0	28.0	11.2	16.8	8.7	78.4	11.3	21.2	14.1	17.4	156.7
Dec	71.2	0.0	71.2	0.0	125.0	0.0	0.0	71.2	28.5	42.7	7.1	64.1	0.0	0.0	0.0	14.2	128.1
Annual	**916.3**	**589.5**				**589.5**		**326.8**	**130.7**	**196.1**	**91.6**	**824.7**	**742.8**	**247.1**	**164.7**	**183.2**	**1648.5**

Notes:

1. Infiltration factors based on Ontario Ministry of Environment, 2003 Stormwater Management Planning and Design Manual
2. Soil Moisture Capacity is assumed based on Water Holding Capacity per Table 3.1 of the Ontario Ministry of Environment, 2003 Stormwater Management Planning and Design Manual.
3. For pervious areas: runoff, infiltration and evapotranspiration do not occur in months where the average temperature is less than 0 deg C. Precipitation is assumed to accumulate as snowfall during these months months and is applied in April for this data set, which is the first month where the average temperature exceeds 0 deg C.
4. Surplus water is not available for runoff or infiltration during months where the evapotranspiration exceeds the precipitation
5. Soil moisture storage is assumed to be at a maximum in the month of March

Project No: 32948-23
Project Name: Proposed Chabad
Project Location: 81 College Street West, Guelph
Date: 2025-02-20
Update: 2025-07-08

WATER BALANCE MITIGATION - CATCHMENT 201 AND 203

Soakaway Feature Details

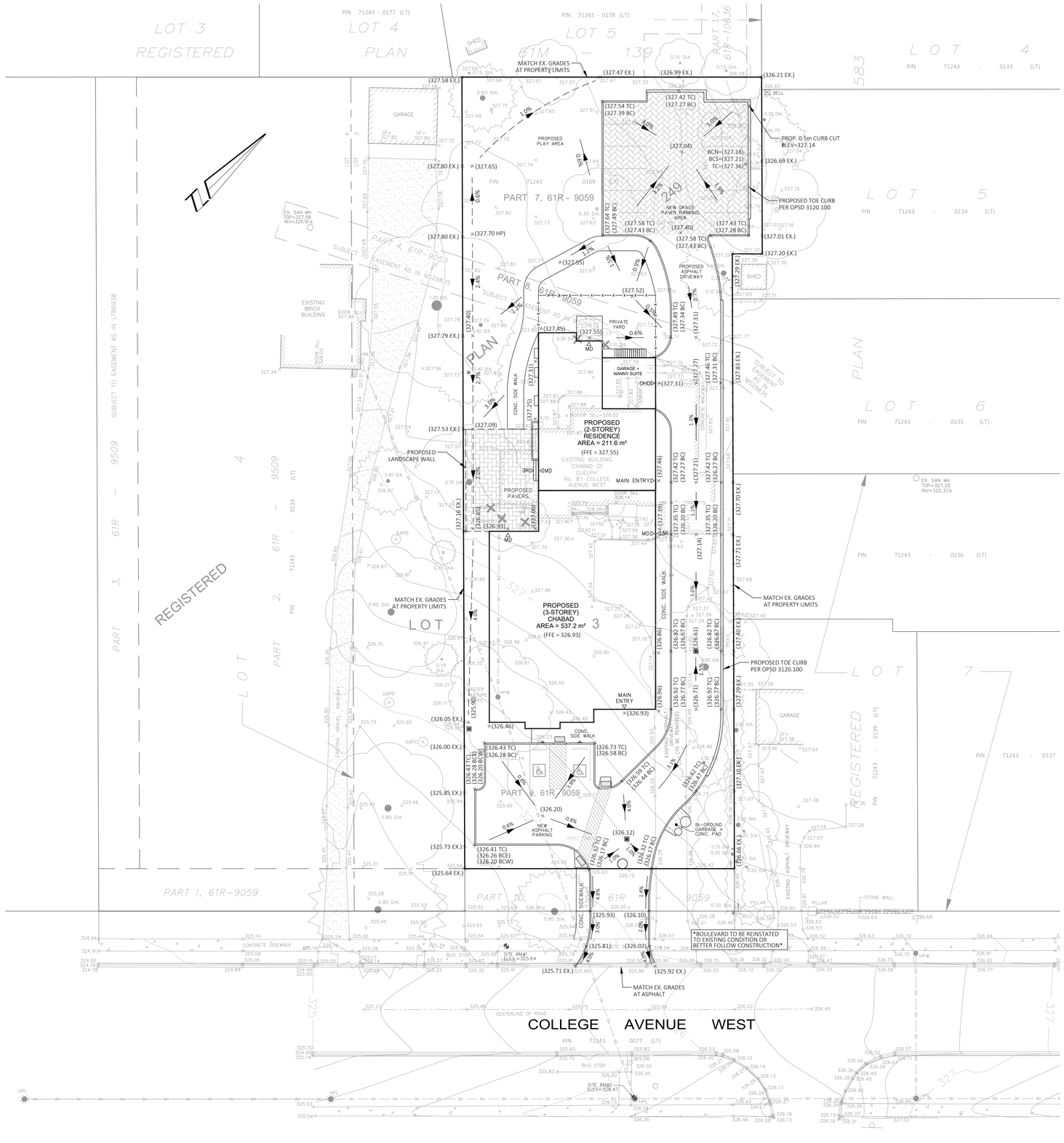
Contributing Drainage Area	1,520	sq.m.
Contributing Drainage Area RC	0.77	
Feature Available Storage Volume	123	cu.m.
Drawdown time	2.26	day (with design infiltration rate)

Month	Impervious Area Runoff Depth[2] mm	Days in Month	Potential Recharge[3] cu.m.	Available Recharge Volume[4] cu.m.	Recharge (soakaway)[5] cu.m.
January	58.7	31	1688.4	68.7	0.0
February	49.4	28	1525.0	57.8	0.0
March	54.9	31	1688.4	64.3	0.0
April	67.1	30	1633.9	78.5	78.5
May	74.1	31	1688.4	86.7	86.7
June	74.2	30	1633.9	86.8	86.8
July	88.7	31	1688.4	103.9	103.9
August	75.5	31	1688.4	88.4	88.4
September	79.0	30	1633.9	92.5	92.5
October	60.7	31	1688.4	71.0	71.0
November	78.4	30	1633.9	91.7	0.0
December	64.1	31	1688.4	75.0	0.0
				TOTAL	607.7 cu.m.

Notes:

1 Contributing drainage area is the clean roof area and landscaped area connected to the infiltration features.
2 Impervious potential runoff depth from previous table (includes a 10% reduction in available depth for depression storage and evaporation)
3 Potential recharge is calculated based on the drawdown period and days per month and assumes that the feature fully drawdown between rainfall events.
4 Available recharge volume is the volume available from the contributing drainage area (e.g. runoff depth x contributing drainage area).
5 Additional recharge soakaway is the lesser of the potential recharge volume and the available recharge volume
We have assumed that the connected roofs will not contribute to the soakaway during the winter months (e.g. November through March)

DRAWINGS



SCALE 1 : 250

0 2.5 5 10 15 meters

VAN HARTEN SURVEYING INC.

NOT FOR CONSTRUCTION

GENERAL NOTES:

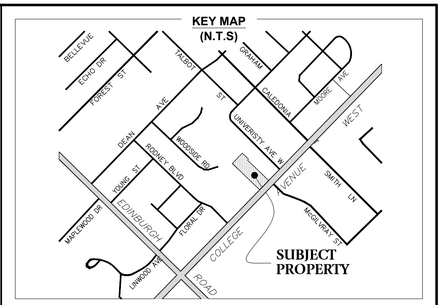
1. CONSTRUCTION FOR THIS PROJECT TO COMPLY WITH MOST RECENT VERSION OF CITY OF GUELPH MUNICIPAL SERVICING STANDARDS, THE ONTARIO BUILDING CODE, AND OPSS AND OPSD. ALL UNDERGROUND SERVICE MATERIALS AND METHODS TO BE IN ACCORDANCE WITH THE LATEST APPLICABLE CODES AND STANDARDS.
2. LIST OF MATERIAL, SEE THE CITY OF GUELPH DEM FOR MATERIAL SPECS, TO BE SUBMITTED TO THE CITY A MINIMUM OF 2 WEEKS PRIOR TO START OF CONSTRUCTION.
3. ALL CONSTRUCTION TO BE CARRIED OUT IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
4. A PRE–CONSTRUCTION MEETING IS REQUIRED BETWEEN THE DEVELOPER, DEVELOPER ENGINEER AND CONTRACTOR, AND CITY STAFF PRIOR TO THE START OF ANY CONSTRUCTION.
5. CONTRACTOR TO SUBMIT PROOF OF INSURANCE AND WSIB CLEARANCE CERTIFICATE TO THE CITY PRIOR TO THE START OF CONSTRUCTION.
6. THE OWNER IS RESPONSIBLE FOR THE COORDINATION OF ALL REQUIRED UTILITIES.
7. THE OWNER IS RESPONSIBLE FOR SATISFYING HIMSELF THAT THERE IS ADEQUATE FIRE PROTECTION AVAILABLE FOR HIS PURPOSES.
8. TEMPORARY SEDIMENT CONTROLS TO BE INSTALLED PRIOR TO ANY CONSTRUCTION ON SITE AND MAINTAINED FOR THE DURATION OF THE CONSTRUCTION PERIOD TO THE SATISFACTION OF THE CITY.
9. DISTURBED AREAS TO BE MINIMIZED TO THE EXTENT POSSIBLE, AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS THE WORK PROGRESSES.
10. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RELATING TO DAMAGE OF SAME.
11. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES, FOR THE PURPOSES OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.
12. A GEOTECHNICAL CONSULTANT IS TO BE RETAINED TO CARRY OUT NECESSARY INSPECTIONS AND TESTING DURING CONSTRUCTION OF THE WORKS TO ENSURE PLACEMENT OF PROPER MATERIALS AND ADEQUATE COMPACTION.
13. UNLESS OTHERWISE SPECIFIED BY THE GEOTECHNICAL CONSULTANT, THE PAVEMENT STRUCTURE FOR PARKING AREAS SHALL COMPRISE OF A MIN. 40mm HL3, 60mm HL4 OR HL8, 150mm GRANULAR 'A' AND 450mm GRANULAR 'B'.
14. IT IS RECOMMENDED THAT A TACKCOAT IN CONFORMANCE WITH OPSS 308 BE APPLIED TO THE EDGE AND SURFACE OF ALL MILLED ASPHALT PRIOR TO PLACEMENT OF NEW ASPHALT.
15. ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY AN OLS AT THE CONTRACTOR'S EXPENSE IF REMOVED DURING CONSTRUCTION.
16. ANY ERRORS, OMISSIONS AND/OR CHANGE OF CONDITIONS ON SITE TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PERFORMING THE RELATED WORK.
17. THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES.
18. DEMOLITION OF EXISTING BUILDING AND CONSTRUCTION OF NEW BUILDING TO FOLLOW RECOMMENDATIONS OUTLINED BY THE GEOTECHNICAL ENGINEER.

WORKS WITHIN THE MUNICIPAL RIGHT OF WAY

1. AN ENTRANCE PERMIT IS REQUIRED PRIOR TO CONSTRUCTION OF THE PROPOSED SITE ENTRANCE.
2. A ROAD OCCUPANCY PERMIT IS REQUIRED PRIOR TO ANY CONSTRUCTION WITHIN THE MUNICIPAL RIGHT–OF–WAY.
3. CONTRACTOR TO CONFORM TO REQUIREMENTS OF ENTRANCE PERMIT AND ROAD OCCUPANCY PERMIT. WHERE THE PERMITS DIFFER FROM THESE NOTES, THE PERMIT CONDITIONS SHALL TAKE PRECEDENCE.
4. ALL WORKS WITHIN THE MUNICIPAL RIGHT–OF–WAY ARE AT THE DEVELOPER'S COST AND ARE TO BE COMPLETED BY A CITY APPROVED CONTRACTOR.
5. NO WORK SHALL PROCEED WITHIN CITY ROAD ALLOWANCES OR ON OTHER CITY PROPERTY WITHOUT PRIOR (MINIMUM 96 HOURS) WRITTEN NOTIFICATION TO THE CITY AND NOT UNTIL RECEIPT OF CITY APPROVAL. CONTRACTOR TO PROVIDE THE CITY WITH PROOF OF INSURANCE AND WSIB CLEARANCE CERTIFICATE PRIOR TO CONSTRUCTION.
6. CONTRACTOR TO BE RESPONSIBLE FOR PROPERLY COMPACTING BACKFILL MATERIAL AND RESTORING SURFACES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY.
7. ALL MATERIAL TO BE PLACED IN LAYERS NOT EXCEEDING 300mm LIFTS. GEOTECHNICAL TESTING TO BE COMPLETED BY THE GEOTECHNICAL CONSULTANT WITH RESULTS PROVIDED TO THE CITY.
8. ALL GRANULAR AND ASPHALT MATERIALS AND PLACEMENT TO BE IN ACCORDANCE WITH OPSS 310, 314, AND 1010 UNLESS OTHERWISE SPECIFIED.
9. BOULEVARDS THAT ARE NOT HARD–SURFACED AREA TO BE RESTORED WITH MINIMUM 200mm TOPSOIL AND No. 1 NURSERY SOD TO THE SATISFACTION OF THE CITY.
10. REPLACEMENT CONCRETE CURB AND GUTTER TO BE PER OPSD 600.040.
11. SIDEWALK PANELS TO BE REPLACED IN FULL. CONCRETE SIDEWALK TO BE PLACED AT A MINIMUM OF 2% GRADE SLOPE TOWARDS THE ROAD UNLESS OTHERWISE STATED ON THE GRADING PLAN WITH A MINIMUM THICKNESS OF 125mm WITH THE THICKNESS INCREASING TO 200mm AT BUILDING ENTRANCES AND AT PEDESTRIAN RAMPS. A GRANULAR 'A' BASE SHALL BE A MINIMUM OF 125mm THICKNESS AND INCREASED TO MATCH THICKNESS OF CONCRETE AT VARIOUS LOCATIONS. ALL CONTRACTION JOINTS TO BE SAW CUT IN HARDENED CONCRETE WITHIN A SUFFICIENT TIME OF PLACING SIDEWALK.
12. WHERE NEW ASPHALT MATCHES EXISTING ASPHALT, A MINIMUM 0.5m LAP JOINT SHALL BE INSTALLED.
13. STREET CURBS ARE TO BE CONTINUOUS THROUGH THE PROPOSED ENTRANCE.
14. SUBDRAINS TO REMAIN INTACT AND AT GRADE DURING CONSTRUCTION AND ROAD RESTORATION.
15. ROAD MUST BE MAINTAINED TO A MINIMUM OF ONE LANE AT ALL TIMES FOR EMERGENCY ACCESS PER OTM GUIDELINES.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL, BOOK 7 – TEMPORARY CONDITIONS. THE CONTRACTOR IS TO SUBMIT A TRAFFIC CONTROL PLAN TO THE CITY PRIOR TO CONSTRUCTION.

GRADING NOTES:

1. UNDERSIDE OF FOOTING TO BE MINIMUM 1.22m BELOW EXTERIOR GRADES AROUND BUILDING. TOP OF FOUNDATION WALL TO BE MINIMUM 0.15m ABOVE EXTERIOR GRADES AROUND BUILDING. LOT TO BE GRADED SO THAT WATER DOES NOT POND AT/NEAR BUILDINGS.
2. DRIVEWAY AND PARKING AREAS TO BE BETWEEN 0.8% AND 5% UNLESS OTHERWISE NOTED.
3. TACTILE WARNING PLATES ARE TO BE PROVIDED AT ALL DROP CURB LOCATIONS PER OPSD 310.039.
4. ACCESSIBLE PATH TO BE GRADED AT MAXIMUM 5%.
5. ALL LANDSCAPE AREAS ON SITE TO BE RESTORED WITH MINIMUM OF 150mm TOPSOIL AND EITHER SEED OR SOD UNLESS OTHERWISE SPECIFIED BY LANDSCAPE PLANS.
6. MATCH EXISTING GRADES AT ALL PROPERTY LIMITS. GRADING NOT TO EXTEND ONTO ADJACENT PROPERTIES WITHOUT PRIOR WRITTEN CONSENT OF ADJACENT PROPERTY OWNER.
7. SLOPES TO BE MAXIMUM 4H:1V UNLESS OTHERWISE NOTED.
8. RETAINING WALLS TO BE DESIGNED BY OTHERS AND IN CONFORMANCE WITH THE ONTARIO BUILDING CODE.
9. UNLESS OTHERWISE RECOMMENDED BY A GEOTECHNICAL CONSULTANT, ALL PARKING GRANULAR MATERIAL TO BE COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY.
10. UNLESS OTHERWISE RECOMMENDED BY A GEOTECHNICAL CONSULTANT, ALL GENERAL BACKFILL TO BE APPROVED MATERIAL AND COMPACTED TO MINIMUM 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
11. FILL MATERIALS TO BE FREE OF ANY DELETERIOUS MATERIAL INCLUDING DEBRIS, LARGE ROCKS, ORGANICS, ETC. FILL MATERIAL TO BE FREE FROM LENSES, POCKETS OR LAYERS OF MATERIAL WHICH ARE SIGNIFICANTLY DIFFERENT IN GRADATION FROM SURROUNDING MATERIAL IN THE SAME ZONING. CARE SHOULD BE TAKEN TO ENSURE THAT FILL MATERIAL DOES NOT SEGREGATE DURING TRANSPORTATION OR STORAGE. IF SEGREGATION OCCURS, MATERIAL SHOULD BE MIXED PRIOR TO PLACEMENT.
12. ALL EARTHWORKS ACTIVITIES TO BE UNDERTAKEN IN COMPLIANCE WITH O.Reg 406/19 REGARDING ON–SITE AND EXCESS SOIL MANAGEMENT.



LEGEND:

EXISTING SPOT ELEVATION	+ 327.71
EXISTING CONTOUR (0.25m INTERVAL)	327
PROPOSED SWALE	
PROPOSED GRADE	+ (326.93)
PROPOSED DRAINAGE DIRECTION	1.4%
PROPOSED CATCHBASIN	CB
PROPOSED MANHOLE	MH
PROPOSED 3:1 MAXIMUM SLOPE	
DECIDUOUS TREE	
CONIFEROUS TREE	
TREE TO BE REMOVED	

CALL BEFORE YOU DIG

THE LOCATION OF SERVICES ON THIS DRAWING ARE ONLY APPROXIMATE AND BASED ON SURFACE FEATURES LOCATED AT THE TIME OF THE TOPOGRAPHIC SURVEY. PRIOR TO ANY CONSTRUCTION IT IS THE RESPONSIBILITY OF THE CONTRACTOR/BUILDER TO ENSURE THE EXACT LOCATION OF ALL UTILITIES.

BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS TO PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM AND HAVE BEEN CORRECTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTv2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

SITE BENCH MARK 1:
CUT CROSS ON SIDEWALK, 325.64m.

SITE BENCH MARK 2:
NAIL IN HYDRO POLE, 328.47m.

BOUNDARY NOTE:

BOUNDARY SHOWN IN HEAVY OUTLINE ARE IN ACCORDANCE WITH PRIOR PLANS AND DEEDS. (INDIVIDUAL BEARINGS ROTATED TO A COMMON BASE AS REQUIRED)

METRIC:

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

NO.	REVISION	BY	DATE
0	ISSUED FOR 1st SUBMISSION (ZBA)	BP	JULY 8, 2025

DRAWING REVISION SCHEDULE

CAUTION:
- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES
- SOIL BEARING CAPACITY SHOULD BE VERIFIED AT THE TIME OF CONSTRUCTION.
- THE BUILDER MUST ENSURE A MINIMUM OF 1.22m OF EARTH COVER OVER THE FOOTINGS FOR FROST PROTECTION.
- THIS SKETCH IS PROTECTED BY COPYRIGHT

LICENSED PROFESSIONAL ENGINEER
B.P.D. POND
100583029
JULY 8, 2025
PROVINCE OF ONTARIO

Van Harten
LAND SURVEYORS - ENGINEERS

Kitchener/Waterloo	Guelph	Orangeville
Ph: 519-742-8371	Ph: 519-821-2763	Ph: 519-940-4110

www.vanharten.com info@vanharten.com

DRAWN BY: CE | DESIGN BY: BP | CHECKED BY: BP

G:\GUELPH\249\ACAD\LDP-PTLOT 3 (32948-23 CHABAD OF GUELPH) UTM 2010.dwg

LEGAL DESCRIPTION:
PART OF LOT 3, REGISTERED PLAN 249
BEING PARTS 7, 8 AND 9
DEPOSITED PLAN 61R-9059
CITY OF GUELPH
COUNTY OF WELLINGTON

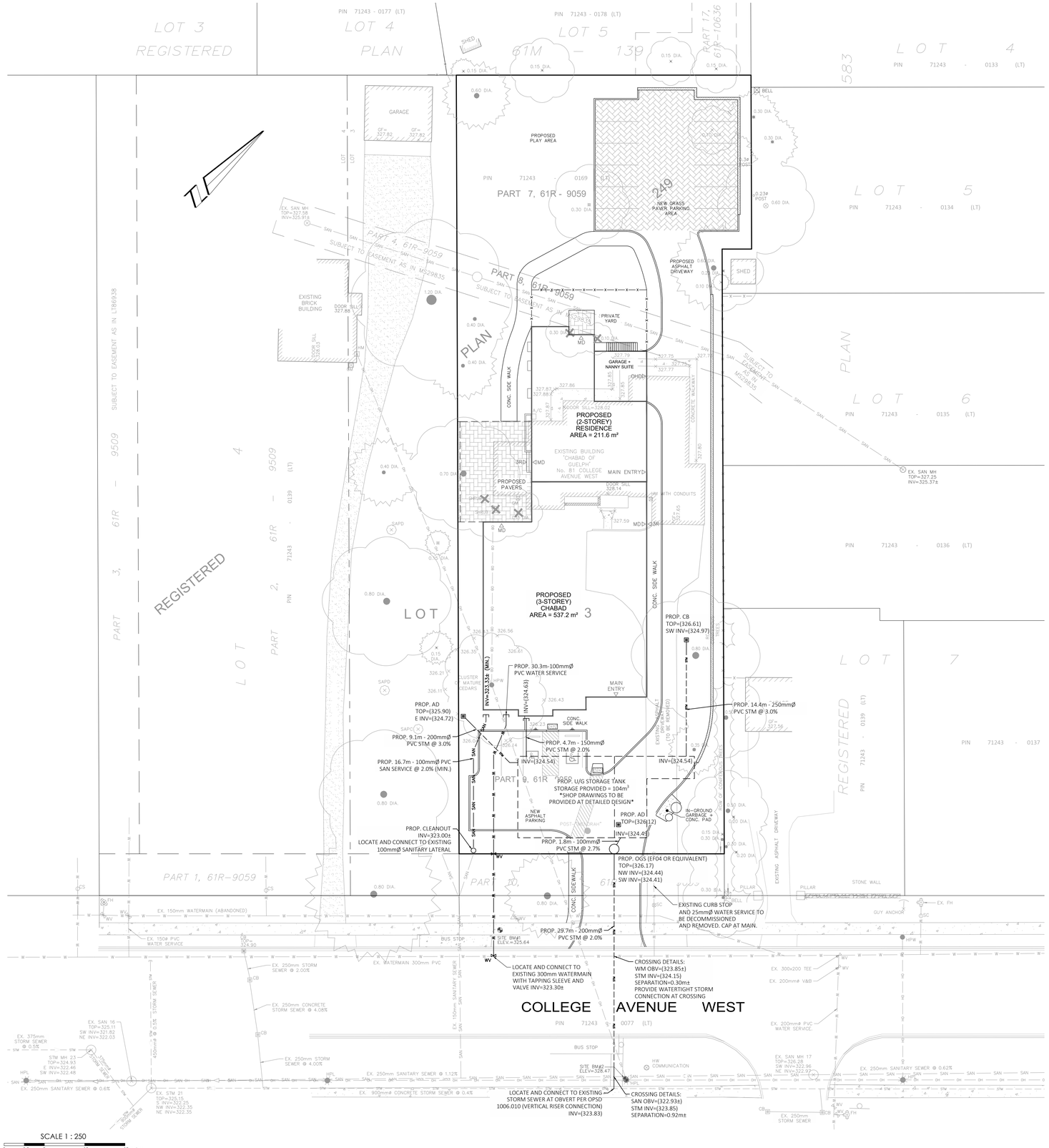
CLIENT: CHABAD OF GUELPH

PROJECT No: 32948-23

PROJECT: PROPOSED CHABAD BUILDING
81 COLLEGE AVENUE WEST

DRAWING TITLE: SITE GRADING PLAN

SHEET No:	DRAWING No:	REVISION:
1 OF 3	C01	0
DRAWING SCALE: 1:250		



SCALE 1 : 250

0 2.5 5 10 15 meters

VAN HARTEN SURVEYING INC.

SERVICING NOTES

1. ALL MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT CITY SERVICING STANDARDS AND APPLICABLE OPSS / OPSD.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RELATING TO DAMAGE OF SAME.
3. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES, FOR THE PURPOSES OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.
4. PRIOR TO CONSTRUCTION, THE STRUCTURAL FOUNDATION DRAWINGS ARE TO BE CROSS-REFERENCED WITH SERVICING DRAWING BY THE CONTRACTOR TO ENSURE PIPES DO NOT CONFLICT WITH BUILDING FOUNDATIONS AND THE DESIGNER NOTIFIED OF ANY CONFLICTS.

SANITARY AND STORM SEWERS

1. ALL EXISITNG SANITARY AND STORM LATERALS ON-SITE ARE TO BE REMOVED AND CAPPED AT THE MAIN.
2. SANITARY SERVICE TO BE 150mm PVC SDR28 AND GREEN IN COLOUR INSTALLED AT MINIMUM SLOPE OF 2.0% UNLESS OTHERWISE NOTED. GRANULAR 'A' BEDDING AND COVER IN ACCORDANCE WITH OPSD 802.010.
3. STORM SEWERS TO BE PVC SDR28 AND WHITE IN COLOUR. GRANULAR A BEDDING AND COVER IN ACCORDANCE WITH OPSD 802.010.
4. ALL SEWERS ARE TO BE INSTALLED WITH GASKETED BELL AND SPIGOT PIPE AND TO THE APPROPRIATE OPSS, OPSD AND THE CURRENT CITY SERVICING STANDARDS.
5. PIPE SUPPORT AT MANHOLES, CATCHBASINS AND CATCHBASIN MANHOLES PER OPSD 708.020.
6. MANHOLES TO BE INSTALLED WITH CRETEX RUBBER SEALS BETWEEN MANHOLE SECTIONS. KOR-N-SEAL RUBBER BOOTS TO BE USED FOR ALL SANITARY PIPE CONNECTIONS AND STORM CONNECTIONS WITH SDR35 PIPE. ALL SANITARY MANHOLE EXTERNAL JOINTS TO BE WRAPPED IN 300mm DENSO TAPE OR APPROVED EQUIVALENT. FROST STRAPPING SHALL BE INSTALLED PER OPSD 701.100. ALL SANITARY MAINTENANCE HOLES REQUIRE BENCHING PER OPSD 701.021.

WATER

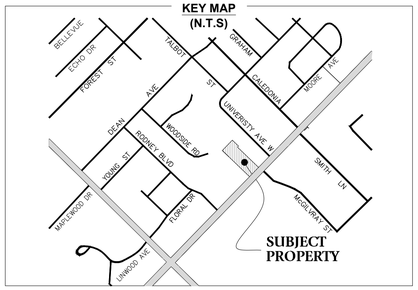
1. ALL WATERMAINS TO BE CONSTRUCTED IN ACCORDANCE WITH OPSS 441.
2. WRITTEN AUTHORIZATION IS REQUIRED FROM THE CITY PRIOR TO INSTALLATION / DECOMMISSIONING OF THE WATER SERVICE. A MINIMUM OF 96 HOURS NOTICE IS TO BE PROVIDED TO THE CITY PRIOR TO THE INSTALLATION / DISCONNECTION OF THE WATER SERVICE. CITY'S LICENSED OPERATOR TO BE PRESENT FOR CONNECTIONS TO EXISTING WATERMAIN.
3. NOTIFICATIONS TO BE PROVIDED TO THE LOCAL OPERATING AUTHORITY AND AFFECTED RESIDENTS AT LEAST 96 HOURS IN ADVANCE OF ANY INTERRUPTION TO WATER SERVICE.
4. EXISTING WATER SERVICES TO BE REMOVED AND CAPPED AT THE MAIN. A SEALED PLUG IS TO BE INSTALLED ON THE MAIN STOP COMPLETE WITH A DZP-12, 5.4KG ANODE PLACED ON THE EXISTING MAIN STOP FOR PROTECTION. NEW SERVICE TO BE INSTALLED BY WAY OF LIVE TAPPING SLEEVE AND VALVE INSTALLED A MINIMUM 1.2M FROM ANY EXISTING SERVICING CONNECTIONS.
5. ALL TESTING SHALL FOLLOW THE MOST CURRENT VERSIONS OF AWWA C651 DISINFECTING WATERMAINS, WATERMAIN DISINFECTION PROCEDURE AUGUST 1, 2020, ONTARIO REGULATION 170/03 AND CITY SERVICING STANDARDS. WATERMAIN COMMISSIONING PLAN THAT INCLUDES THE SWABBING, PRESSURE TESTING, DISINFECTION, SAMPLING AND TESTING, AND FINAL CONNECTION (LESS THAN 6 METRES IN LENGTH) PROCEDURE DETAILS ARE TO BE PROVIDED TO THE CITY FOR APPROVAL A MINIMUM OF 2 WEEKS IN ADVANCE OF ANY WATERMAIN CONSTRUCTION. ONLY CITY LICENSED OPERATORS SHALL OPERATE VALVES AND HYDRANTS LOCATED ON THE MUNICIPAL WATER SYSTEM.
6. WATERMAIN TESTING SHALL NOT COMMENCE UNTIL PLACEMENT OF GRANULAR 'B' HAS BEEN COMPLETED.
7. ALL NEW WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH CITY'S SPECIFICATIONS AND PROVINCIAL GUIDELINES. THE SYSTEM SHALL BE CONSTRUCTED AND TESTED PER OPSS 701.
8. ALL WATERMAINS AND WATER SERVICES TO HAVE A MINIMUM COVER OF 2.0m.
9. THE CONTRACTOR SHALL FURNISH ALL FITTINGS, SPECIALS, BRANCH OUTLETS, CLOSURE PIECES, ETC. REQUIRED FOR THE COMPLETE INSTALLATION OF THE WATERMAIN.
10. ALL FITTINGS, VALVES, AND HYDRANT LEADS SHALL BE FULLY RESTRAINED AND AT A MINIMUM MEET THE CITY'S REQUIREMENTS AND MANUFACTURER'S RECOMMENDATIONS.
11. WATERMAIN TO BE PVC DR18 CLASS 235 AND CONFORMING TO ASTM D1784, AWWA C900 OF C905 AND CAN/CSA B137.3 WITH GASKETED BELL END.
12. A 12 GAUGE, 7 STRAND COPPER TRACER WIRE, WITH AN OUTER PLASTIC COATING, SHALL BE ATTACHED TO EVERY NON-METALLIC WATERMAIN AND SERVICE CONNECTION.
13. SEPARATION DISTANCES BETWEEN SEWER AND WATERMAINS, INCLUDING SERVICES AND LATERALS, SHALL BE PER MECP PROCEDURE F-6-1; IN GENERAL, 2.5m HORIZONTAL SEPARATION BETWEEN PARALLEL INSTALLATIONS AND 0.5m VERTICAL SEPARATIONS WHERE THE WATERMAIN OR WATER SERVICE CROSSES UNDER THE SEWER OR LATERAL. WHERE THIS SPATIAL SEPARATION CANNOT BE ACHIEVED, OTHER MEASURES ARE TO BE IMPLEMENTED, SUCH AS USE OF PRESSURE PIPE (350 kPA) FOR SEWERS, AS TO BE APPROVED BY THE CITY. CITY AND ENGINEER TO BE IMMEDIATELY NOTIFIED IF THE SPATIAL SEPARATIONS DESCRIBED ABOVE CANNOT BE ACHIEVED.
14. WATER SERVICES TO BE BEDDED AND COVER IN APPROVED SAND CONFORMING TO OPSS 1001 AND TO BE PLACED TO 300mm ABOVE THE TOP OF PIPE.
15. CURB STOPS LOCATED IN DRIVEWAYS OR HARD SURFACE AREAS TO HAVE A 100mm PVC FROST COLLAR INSTALLED. CATHODIC PROTECTION SHALL BE INSTALLED.
16. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TEMPORARY WATER SUPPLY TO BUILDINGS AT ALL TIMES. THE CONTRACTOR WILL BE RESPONSIBLE FOR QUALITY TESTING OF THE TEMPORARY SUPPLY IN ACCORDANCE WITH TESTING PROCEDURES TO THE SATISFACTION OF THE CITY.
17. NON-METALLIC WATERMAIN WITH METALLIC VALVES AND FITTINGS AND NON-METALLIC SERVICE LATERALS TO HAVE ONE ZINC Z-24-48 (24 lb) ANODE ATTACHED TO EACH METALLIC FITTING WITH A BRASS GROUNDING CLAMP. PETROLATUM TAPE TO BE USED ON ALL METALLIC FITTINGS.
18. ALL PROPOSED WATER PIPING TO BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
19. WHERE EXISTING WATERMAINS ARE TAPPED, THE PIPE SURFACE AT THE LOCATION OF THE TAP SHALL BE CLEANED AND DISINFECTED USING A MINIMUM 1% SODIUM HYPOCHLORITE SOLUTION. WHERE APPLICABLE, THE DRILL/CUTTING/TAPPING BITS AND ALL SURFACES OF MAINSTOPS, SERVICE SADDLES, TAPPING SLEEVES AND VALVES WHICH WILL COME INTO CONTACT WITH DRINKING WATER SHALL LIKEWISE BE CLEANED AND DISINFECTED USING A MINIMUM 1% SODIUM HYPOCHLORITE SOLUTION IMMEDIATELY PRIOR TO INSTALLATION. IF ANY OF THE DISINFECTED SURFACES COME INTO CONTACT WITH THE SOIL AND/OR WATER IN THE EXCAVATION PRIOR TO USE, THE CLEANING AND DISINFECTION PROCEDURE SHALL BE REPEATED

CALL BEFORE YOU DIG

THE LOCATION OF SERVICES ON THIS DRAWING ARE ONLY APPROXIMATE AND BASED ON SURFACE FEATURES LOCATED AT THE TIME OF THE TOPOGRAPHIC SURVEY. PRIOR TO ANY CONSTRUCTION IT IS THE RESPONSIBILITY OF THE CONTRACTOR/BUILDER TO ENSURE THE EXACT LOCATION OF ALL UTILITIES AND ADVISE THE CIVIL ENGINEER OF ANY DISCREPANCIES. DAYLIGHTING THE EXISTING UTILITIES PRIOR TO CONSTRUCTION IS RECOMMENDED.

NOT FOR CONSTRUCTION

KEY MAP (N.T.S)



LEGEND:

EX. GAS METER	GM	EXISTING STORM SEWER	STM
EX. AIR CONDITIONER	A/C	EXISTING SANITARY SEWER	SAN
EX. SIGN		EXISTING WATER SERVICE	W
EX. HYDRO METER	HM	EXISTING STORM MANHOLE	EX. STM
EX. BELL PEDESTAL	BELL	EXISTING SANITARY MANHOLE	EX. SAN
EX. GUY WIRE	GUY ANCHOR	CLEAN OUT	
EX. HYDRO POLE	HPW	PROPOSED WATER VALVE	WV
EX. FIRE HYDRANT	FH	PROPOSED CATCHBASIN	CB
EXISTING WATER VALVE	WV	PROPOSED MANHOLE	MH
EXISTING CATCHBASIN	CB	PROPOSED STORM SEWER	STM
DECIDUOUS TREE		PROPOSED SANITARY SEWER	SAN
CONIFEROUS TREE		PROPOSED WATER SERVICE	W
TREE TO BE REMOVED			

BENCHMARK

ELEVATIONS ARE BASED ON GPS OBSERVATIONS TO PERMANENT REFERENCE STATIONS IN THE NAD83 (CSRS-2010) COORDINATE SYSTEM AND HAVE BEEN CORRECTED TO ORTHOMETRIC ELEVATIONS ON THE CGVD28 DATUM (1978 ADJUSTMENT) WITH GEOID MODEL HTv2.0, AS SUPPLIED BY NATURAL RESOURCES CANADA.

SITE BENCH MARK 1:
CUT CROSS ON SIDEWALK, 325.64m.

SITE BENCH MARK 2:
NAIL IN HYDRO POLE, 328.47m.

BOUNDARY NOTE:

BOUNDARY SHOWN IN HEAVY OUTLINE ARE IN ACCORDANCE WITH PRIOR PLANS AND DEEDS. (INDIVIDUAL BEARINGS ROTATED TO A COMMON BASE AS REQUIRED)

METRIC:

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

NO.	REVISION	BY	DATE
0	ISSUED FOR 1st SUBMISSION (ZBA)	BP	JULY 8, 2025

DRAWING REVISION SCHEDULE

LICENSED PROFESSIONAL ENGINEER
B.P.D. POND
100583029
JULY 8, 2025
PROVINCE OF ONTARIO

Van Harten
LAND SURVEYORS - ENGINEERS

Kitchener/Waterloo Ph: 519-742-8371
Guelph Ph: 519-821-2763
Orangeville Ph: 519-940-4110
www.vanharten.com info@vanharten.com

DRAWN BY: CE | DESIGN BY: BP | CHECKED BY: BP

G:\GUELPH\249\ACAD\LDP-PTLOT 3 (32948-23 CHABAD OF GUELPH) UTM 2010.dwg

LEGAL DESCRIPTION:
PART OF LOT 3, REGISTERED PLAN 249
BEING PARTS 7, 8 AND 9
DEPOSITED PLAN 61R-9059
CITY OF GUELPH
COUNTY OF WELLINGTON

CLIENT:
CHABAD OF GUELPH

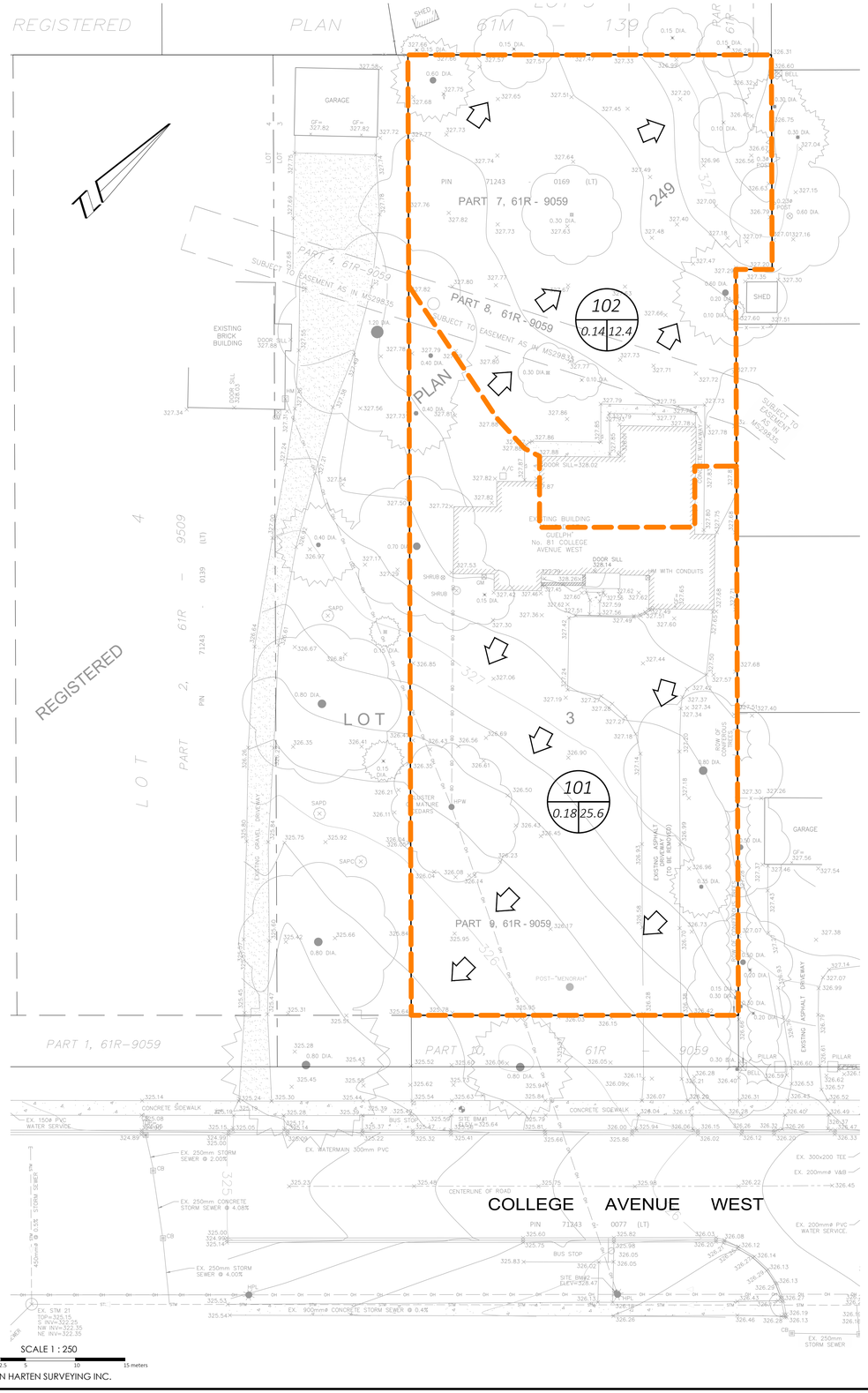
PROJECT No:
32948-23

PROJECT:
PROPOSED CHABAD BUILDING
81 COLLEGE AVENUE WEST

DRAWING TITLE:
SITE SERVICING PLAN

SHEET No:	2 OF 3	DRAWING No:	REVISION:
DRAWING SCALE:	1:250	C02	0

PRE-DEVELOPMENT DRAINAGE PLAN

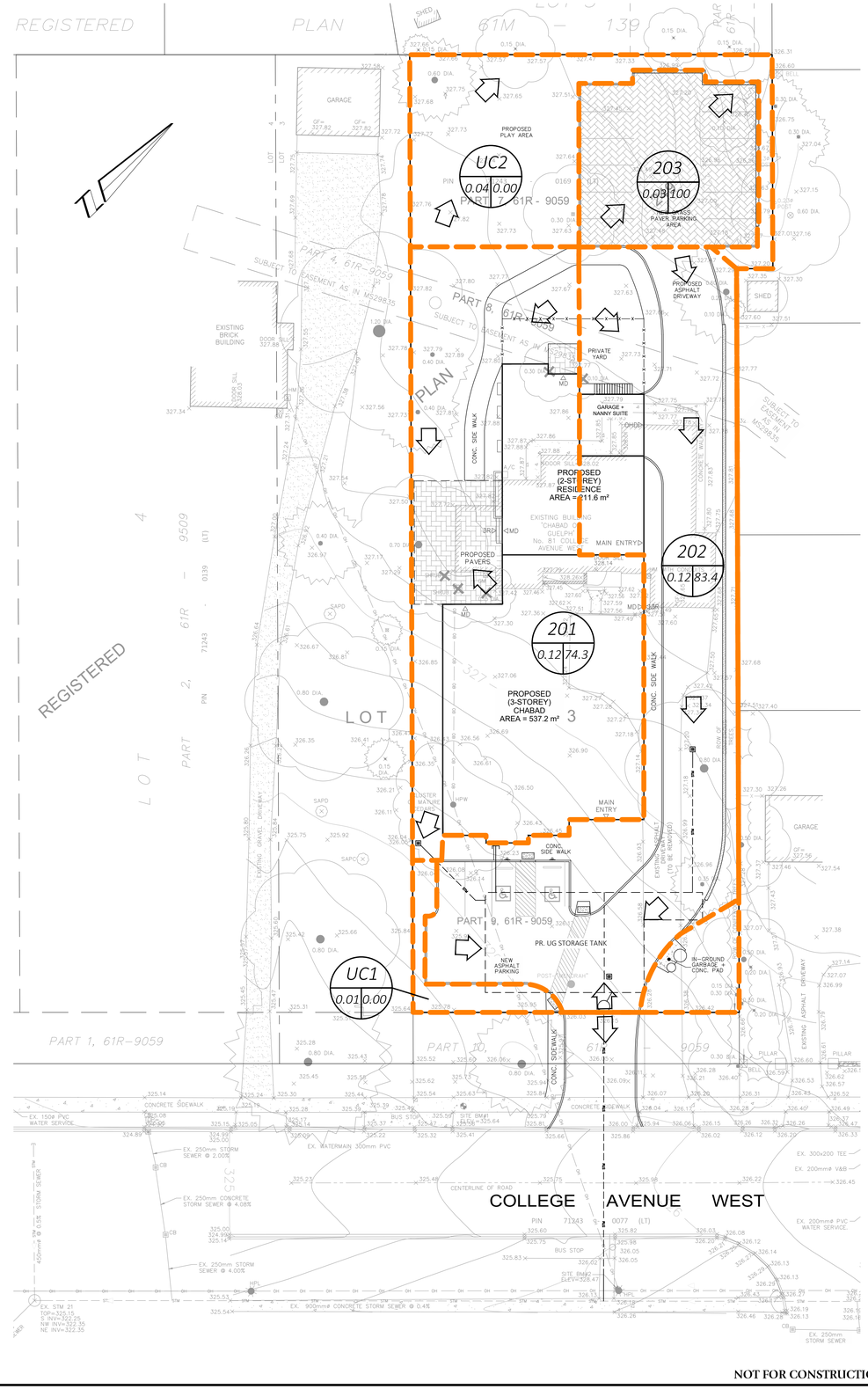


SCALE 1 : 250

0 2.5 5 10 15 meters

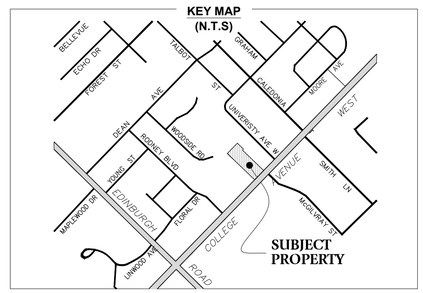
VAN HARTEN SURVEYING INC.

POST-DEVELOPMENT DRAINAGE PLAN



NOT FOR CONSTRUCTION

KEY MAP (N.T.S)



LEGEND:

- PR. STORM SEWER
- PR. RETAINING WALL
- PR. CATCHBASIN MANHOLE
- PR. MANHOLE
- PR. CATCHBASIN
- OVERLAND FLOW DIRECTION
- CATCHMENT BOUNDARY
- PR. SLOPE

101 – CATCHMENT I.D.
0.07 29.9 – AREA (ha) | PERCENT IMP. (%)

BENCHMARK

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NO.	REVISION	BY	DATE
0	ISSUED FOR 1st SUBMISSION (ZBA)	BP	JULY 8, 2025

DRAWING REVISION SCHEDULE

CAUTION:
- THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES
- SOIL BEARING CAPACITY SHOULD BE VERIFIED AT THE TIME OF CONSTRUCTION.
- THE BUILDER MUST ENSURE A MINIMUM OF 1.22m OF EARTH COVER OVER THE FOOTINGS FOR FROST PROTECTION.
- THIS SKETCH IS PROTECTED BY COPYRIGHT

LICENSED PROFESSIONAL ENGINEER — B.D. POND — 100583029 — JULY 8, 2025 — PROVINCE OF ONTARIO

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PROJECT: PROPOSED CHABAD BUILDING
81 COLLEGE AVENUE WEST

DRAWING TITLE: DRAINAGE PLANS

SHEET No:	3 OF 3	DRAWING No:	REVISION:
DRAWING SCALE:	1:250	C03	0