



- NOTES:**
1. THE BUILDER IS RESPONSIBLE TO ADJUST THE UNDERSIDE OF FOOTING ELEVATION IN THE FIELD TO ENSURE A FROST COVER OF 1.2m MINIMUM MEASURED DOWN FROM FINISHED GRADE.
 2. ALL DISTURBED AREAS TO RECEIVE MINIMUM 100mm TOPSOIL AND 600.
 3. DRIVEWAYS TO BE LOCATED MINIMUM 1.5m FROM ANY UTILITY STANDARD.
 4. IT IS THE OWNER/DEVELOPERS RESPONSIBILITY TO VERIFY THE SUITABILITY OF THE FOUNDING SOILS.
 5. LOCATION AND ELEVATION OF EXISTING SERVICES ARE APPROXIMATE ONLY. IT IS THE OWNER/DEVELOPERS RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION.
 6. THE BUILDER IS RESPONSIBLE TO VERIFY THE LAYOUTS AND ELEVATIONS AGAINST THE ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION.

OWNER: STEVE MILLER
CONTRACTOR: [Signature] P. ENG.

THE ELEVATION AND LOCATION OF THE BUILDING TO BE ERRECTED ON THE LOT AND THE GRADING OF THE LOT ARE IN GENERAL CONFORMITY WITH THE GRADING AND DRAINAGE PLAN APPROVED BY THE MUNICIPALITY.

GM BLUEPLAN ENGINEERING LIMITED

LEGEND:

EXISTING ELEVATION	× 215.90
AS RECORDED ELEVATION	○ 214.98
PROPOSED ELEVATION	○ 214.98
PROPOSED ELEVATION BENEATH DECK	○ 214.58
PROPOSED SWALE/DITCH	—
DIRECTION OF SURFACE FLOW	→
PROPOSED BUILDING ACCESS	▲
PROPOSED BUILDING ACCESS (ELEVATED)	▲

NOTE: ELEVATION IN METRES.

LOT CALCULATIONS

OVERALL LOT AREA	10,220.76 m ²
AREA OF HOUSE FOOTPRINT	349.59 m ²
AREA OF SHOP FOOTPRINT	294.32 m ²
PORCH/DECK AREA	48.82 m ²
LOT COVERAGE IN PERCENTAGE	6.8 %

#1 BENCHMARK ELEV. - 209.35m
 TOP OF NAIL AND FLAG IN UTILITY POLE ON EAST SIDE OF SOMERS STREET, LOCATED 20m NORTH OF SHORE STREET RIGHT OF WAY.

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND 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 ANY DAMAGE TO THEM.



NO.	DATE	REVISION DESCRIPTION	CHKD
1	AUG 11/20	SURFACE WATER MANAGEMENT PONDS ADDED	I.E.E.

BluePlan ENGINEERING

QUEBEC | OWEN SOUND | LISTOWEL | KITCHENER | LONDON | HAMILTON | GTA
 1260 - 2ND AVENUE EAST, UNIT 1, OWEN SOUND, ON N4K 2J3
 TEL: 519-338-1865 www.gribblueplan.ca

220136
Lot Grading Plan
 Part 1, Plan 16R-6084
 Township of Georgian Bluffs
 (Geographic Township of Sarawak)

DRAWN BY: E.J.T.	APPROVED BY: I.E.E.	PROJECT NO.: 220136	DRAWING NO.: 1
DESIGNED BY: E.J.T.	DATE: JUL 8, 2020	SCALE: 1:400	

FILE: 20200720/16R-6084_Plan1-Part1.dwg
 LAST SAVED BY: Drawing
 20200720 10:38:41 AM PLOTTED BY: E.J.T.



August 11, 2020
Our File: 220136

Via Email: tlewis@georgianbluffs.ca

Township of Georgian Bluffs
177964 Grey Road 18
RR3, Owen Sound, ON N4K 5N5

Attention: Mr. Tim Lewis, CBO

Re: Stormwater Management Design
Proposed Residence
Part 1, Plan 16R-6084, Somers Street
Township of Georgian Bluffs

Dear Tim,

This letter outlines the design of a stormwater management system to address stormwater management requirements in support of the proposed single-family residential development proposed to be constructed along Somers Street in the Brooke area at Part 1, Plan 16R-6084, within the Township of Georgian Bluffs

The subject property is 1.02 ha in size, is located on the west side of Somers Street, between Caughnawaga Street (30th Street West) and Maitland Street (27th Street West). Under existing conditions, runoff from the undeveloped subject property drains overland to a watercourse located along the south side of the property or to a swale along the north side of the property, both outletting to the ditch along Somers Street. The ditch along Somers Street drains to the watercourse and twin 600 mm CSP culverts crossing Somers Street.

Based upon pre-consultation discussions with Township and Grey Sauble Conservation Authority staff, given the level of development on the subject property and downstream concerns in the Brooke Area, the Town has requested attenuation of runoff from the proposed site. Runoff following the proposed construction should be controlled to less than or equal to the runoff under existing conditions.

Following construction of the proposed development, as shown on the attached Lot Grading Plan, prepared by GM BluePlan Engineering, dated August 2020, it is proposed to construct one residential building and one shop building along with associated driveways. Runoff from the proposed development would split with a portion draining to a swale along the north property line and a portion draining southerly to the existing watercourse. A small portion of mostly grassed area will also drain uncontrolled to the watercourse along the south side of the property.

To attenuate the peak flow of runoff from the site, temporary stormwater ponding areas are proposed at the northeast corner and along the southerly portion of the property, as shown on the Lot Grading Plan. Both ponding areas would have a 100 mm PVC storm sewer as the outlet from the site to the downstream drainage system. A stage-storage-discharge table outlining the details of the ponding areas is attached with the letter.

The MIDUSS hydrological software was used to model the allowable release rates and proposed conditions for the property. The subject property has been modelled with the entire site representing one catchment for existing conditions and the property split into three (3) catchments under proposed conditions.

The parameters used in the MIDUSS model are summarized in Table 1 below.

Table 1 – Existing and Post-Development Condition Catchments

Description	Area (ha)	Impervious Level (%)
Existing Conditions - Catchment 10 – Entire Site	1.02	0
Proposed Conditions – Catchment 100 - Grassed Area Draining Uncontrolled to Watercourse along South Side of Property	0.22	0
Proposed Conditions – Catchment 101 – Portion of House and Driveway Draining Southerly to South Temporary Ponding Area	0.40	25
Proposed Conditions – Catchment 101 – Portion of House and Driveway Draining Northerly to North Temporary Ponding Area	0.40	30

Table 2 below provides the breakdown of the expected peak runoff flow rates during the various design storm events. The Chicago Storm parameters for the Owen Sound weather station were used to generate the design storms.

Table 2 –Peak Runoff Flow Results

	2 yr	5 yr	25 yr	100 yr
Total Existing Condition Peak Flow Rates (m³/s)	0.011	0.025	0.056	0.090
Total Proposed Conditions Peak Flow Rates – Uncontrolled (m ³ /s)	0.028	0.044	0.080	0.119
Total Proposed Conditions Peak Flow Rates – With Temporary Ponding Areas (m³/s)	0.015	0.024	0.055	0.080

As such, the proposed temporary ponding areas are expected to attenuate peak flows from the site to less than the existing conditions during the 5, 25 and 100 year design storm events. During a 2 year design storm event, proposed peak flow rates would slightly exceed the existing condition peak flow rates (0.004 m³/s) . The exceedance is considered acceptable given the minor storm event and the fact the control outlet pipes are sized as small as possible from each temporary ponding area. MIDUSS modelling is attached for reference.

With regard to stormwater quality treatment, a majority of the imperviousness on the site is from rooftop runoff which is considered clean runoff. Runoff from the driveways is proposed to be directed overland across grassed surfaces and to grass lined temporary ponding areas, where any sediment can settle out.

We trust that the above stormwater management design brief is sufficient at this time to support the proposed development. If there are any questions, feel free to contact the undersigned.

Yours truly,
GM BLUEPLAN ENGINEERING LIMITED

Per:



Ian E. Eriksen, P.Eng.
IEE/kd
Encl.



cc: Owner – Steve Miller (Steven.Miller@homehardware.ca)
Township Planner – Devon Morton (dmorton@georgianbluffs.ca)
File No. 220136

220136 Miller Residence
 Part 1 of Plan 16R-6084
 Township of Georgian Bluffs

Surface Water Detention Area - South Part of Site
 Draining to Somers Street Ditch

Broad Crested Weir

Outlet Orifice

Weir Length:	2.00 m	Orifice Dia.:	100.00 mm
Depth:	0.10 m	Orifice Area:	0.01 m ²
Weir Flow:	0.108 m ³ /s	Coefficient:	0.60
Outlet Vel:	0.54 m/s	Invert Elev:	209.00 m

Stage (m)	Surface Area (m ²)	Incremental Volume (m ³)	Storage Volume (m ³)	Peak Flow (m ³ /s)	
209.00	60.00	0.00	0.00	0.000	Outlet Inv/Pond Bottom
209.15	120.00	13.50	13.50	0.007	
209.30	180.00	22.50	36.00	0.010	
209.45	260.00	33.00	69.00	0.013	Overflow Weir
209.55	300.00	28.00	97.00	0.123	

220136 Miller Residence
 Part 1 of Plan 16R-6084
 Township of Georgian Bluffs

Surface Water Detention Area - Northeast Part of Site
 Draining to Somers Street Ditch

Broad Crested Weir

Outlet Orifice

Weir Length:	2.00 m	Orifice Dia.:	100.00 mm
Depth:	0.10 m	Orifice Area:	0.008 m ²
Weir Flow:	0.108 m ³ /s	Coefficient:	0.60
Outlet Vel:	0.54 m/s	Invert Elev:	208.70 m

Stage (m)	Surface Area (m ²)	Incremental Volume (m ³)	Storage Volume (m ³)	Peak Flow (m ³ /s)	
208.70	60.00	0.00	0.00	0.000	Outlet Inv/Pond Bottom
208.80	80.00	7.00	7.00	0.005	
208.90	100.00	9.00	16.00	0.008	
209.00	120.00	11.00	27.00	0.010	Overflow Weir
209.10	140.00	13.00	40.00	0.120	

```

220136 Pre and Post Dev 2yr Aug 2020
MIDUSS Output ----->"
MIDUSS version          Version 2.25 rev. 473"
MIDUSS created          Sunday, February 07, 2010"
10 Units used:          ie METRIC"
Job folder:             C:\Users\ieriksen\Documents\MIDUSS\
                        220136"
Output filename:       220136 Pre and Post Dev 2yr Aug 2020.out"
Licensee name:         gmbp"
Company                "
Date & Time last used: 8/5/2020 at 8:43:26 AM"
31 TIME PARAMETERS"
10.000 Time Step"
360.000 Max. Storm length"
2400.000 Max. Hydrograph"
32 STORM Chicago storm"
1 Chicago storm"
763.660 Coefficient A"
7.416 Constant B"
0.813 Exponent C"
0.375 Fraction R"
360.000 Duration"
1.000 Time step multiplier"
Maximum intensity      73.754 mm/hr"
Total depth            37.634 mm"
6 002hyd Hydrograph extension used in this file"
33 CATCHMENT 10"
1 Triangular SCS"
1 Equal length"
1 SCS method"
10 Existing Conditions"
0.000 % Impervious"
1.020 Total Area"
50.000 Flow length"
1.000 Overland Slope"
1.020 Pervious Area"
50.000 Pervious length"
1.000 Pervious slope"
0.000 Impervious Area"
50.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.212 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
95.000 Impervious SCS Curve No."
0.000 Impervious Runoff coefficient"

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220136 Pre and Post Dev 2yr Aug 2020
0.100 Impervious Ia/S coefficient"
1.337 Impervious Initial abstraction"
0.011 0.000 0.000 0.000 c.m/sec"
CATCHMENT 10 Pervious Impervious Total Area "
Surface Area 1.020 0.000 1.020 hectare"
Time of concentration 54.523 4.730 54.523 minutes"
Time to Centroid 263.027 180.399 263.027 minutes"
Rainfall depth 37.634 37.634 37.634 mm"
Rainfall volume 383.86 0.00 383.86 c.m"
Rainfall losses 29.652 11.422 29.652 mm"
Runoff depth 7.982 26.212 7.982 mm"
Runoff volume 81.42 0.00 81.42 c.m"
Runoff coefficient 0.212 0.000 0.212 "
Maximum flow 0.011 0.000 0.011 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
0.011 0.011 0.000 0.000"
40 HYDROGRAPH Copy to Outflow"
8 Copy to Outflow"
0.011 0.011 0.011 0.000"
40 HYDROGRAPH Combine 1000"
6 Combine "
1000 Node #"
Existing Conditions"
Maximum flow 0.011 c.m/sec"
Hydrograph volume 81.416 c.m"
0.011 0.011 0.011 0.011"
40 HYDROGRAPH Start - New Tributary"
2 Start - New Tributary"
0.011 0.000 0.011 0.011"
33 CATCHMENT 100"
1 Triangular SCS"
1 Equal length"
1 SCS method"
100 Proposed Conditions - Uncontrolled Area to South"
0.000 % Impervious"
0.220 Total Area"
30.000 Flow length"
1.000 Overland Slope"
0.220 Pervious Area"
30.000 Pervious length"
1.000 Pervious slope"
0.000 Impervious Area"
30.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.212 Pervious Runoff coefficient"

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220136 Pre and Post Dev 2yr Aug 2020

0.100 Pervious Ia/S coefficient"
 8.021 Pervious Initial abstraction"
 0.015 Impervious Manning 'n'"
 98.000 Impervious SCS Curve No."
 0.000 Impervious Runoff coefficient"
 0.100 Impervious Ia/S coefficient"
 0.518 Impervious Initial abstraction"
 0.003 0.000 0.011 0.011 c.m/sec"
 Catchment 100 Pervious Impervious Total Area "
 Surface Area 0.220 0.000 0.220 hectare"
 Time of concentration 40.130 3.187 40.130 minutes"
 Time to Centroid 244.740 171.931 244.740 minutes"
 Rainfall depth 37.634 37.634 37.634 mm"
 Rainfall volume 82.79 0.00 82.79 c.m"
 Rainfall losses 29.662 5.556 29.662 mm"
 Runoff depth 7.972 32.077 7.972 mm"
 Runoff volume 17.54 0.00 17.54 c.m"
 Runoff coefficient 0.212 0.000 0.212 "
 Maximum flow 0.003 0.000 0.003 c.m/sec"
 40 HYDROGRAPH Add Runoff "
 4 Add Runoff "
 0.003 0.003 0.011 0.011"
 40 HYDROGRAPH Copy to Outflow"
 8 Copy to Outflow"
 0.003 0.003 0.003 0.011"
 40 HYDROGRAPH Combine 2000"
 6 Combine "
 2000 Node #"
 Proposed Conditions"
 Maximum flow 0.003 c.m/sec"
 Hydrograph volume 17.538 c.m"
 0.003 0.003 0.003 0.003"
 40 HYDROGRAPH Start - New Tributary"
 2 Start - New Tributary"
 0.003 0.000 0.003 0.003"
 33 CATCHMENT 101"
 1 Triangular SCS"
 1 Equal length"
 1 SCS method"
 101 Proposed Conditions - House, shed and driveway draining south"
 25.000 % Impervious"
 0.400 Total Area"
 40.000 Flow length"
 1.000 Overland Slope"
 0.300 Pervious Area"
 40.000 Pervious length"
 1.000 Pervious slope"
 0.100 Impervious Area"

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40.000 Impervious length"
 1.000 Impervious slope"
 0.300 Pervious Manning 'n'"
 76.000 Pervious SCS Curve No."
 0.212 Pervious Runoff coefficient"
 0.100 Pervious Ia/S coefficient"
 8.021 Pervious Initial abstraction"
 0.015 Impervious Manning 'n'"
 95.000 Impervious SCS Curve No."
 0.697 Impervious Runoff coefficient"
 0.100 Impervious Ia/S coefficient"
 1.337 Impervious Initial abstraction"
 0.011 0.000 0.003 0.003 c.m/sec"
 Catchment 101 Pervious Impervious Total Area "
 Surface Area 0.300 0.100 0.400 hectare"
 Time of concentration 47.691 4.137 24.924 minutes"
 Time to Centroid 254.359 179.516 215.235 minutes"
 Rainfall depth 37.634 37.634 37.634 mm"
 Rainfall volume 112.90 37.63 150.54 c.m"
 Rainfall losses 29.651 11.403 25.089 mm"
 Runoff depth 7.983 26.231 12.545 mm"
 Runoff volume 23.95 26.23 50.18 c.m"
 Runoff coefficient 0.212 0.697 0.333 "
 Maximum flow 0.003 0.011 0.011 c.m/sec"
 40 HYDROGRAPH Add Runoff "
 4 Add Runoff "
 0.011 0.011 0.003 0.003"
 54 POND DESIGN"
 0.011 Current peak flow c.m/sec"
 0.026 Target outflow c.m/sec"
 50.2 Hydrograph volume c.m"
 5. Number of stages"
 208.700 Minimum water level metre"
 209.100 Maximum water level metre"
 208.700 Starting water level metre"
 0 Keep Design Data: 1 = True; 0 = False"
 Level Discharge Volume"
 209.000 0.000 0.000"
 209.150 0.00700 13.500"
 209.300 0.01000 36.000"
 209.450 0.01300 69.000"
 209.550 0.1230 97.000"
 Peak outflow 0.006 c.m/sec"
 Maximum level 209.064 metre"
 Maximum storage 10.918 c.m"
 Centroidal lag 4.123 hours"
 0.011 0.011 0.006 0.003 c.m/sec"
 40 HYDROGRAPH Combine 2000"

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6 Combine "
2000 Node #
Proposed Conditions"
Maximum flow 0.008 c.m/sec"
Hydrograph volume 67.717 c.m"
0.011 0.011 0.006 0.008"
40 HYDROGRAPH Start - New Tributary"
2 Start - New Tributary"
0.011 0.000 0.006 0.008"
33 CATCHMENT 102"
1 Triangular SCS"
1 Equal length"
1 SCS method"
102 Building and Driveway Area Draining to North Swale"
30.000 % Impervious"
0.400 Total Area"
25.000 Flow length"
1.000 Overland Slope"
0.280 Pervious Area"
25.000 Pervious length"
1.000 Pervious slope"
0.120 Impervious Area"
25.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.212 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
95.000 Impervious SCS Curve No."
0.694 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
1.337 Impervious Initial abstraction"
0.014 0.000 0.006 0.008 c.m/sec"
Catchment 102 Pervious Impervious Total Area "
Surface Area 0.280 0.120 0.400 hectare"
Time of concentration 35.972 3.121 16.792 minutes"
Time to Centroid 239.405 177.837 203.460 minutes"
Rainfall depth 37.634 37.634 37.634 mm"
Rainfall volume 105.37 45.16 150.54 c.m"
Rainfall losses 29.658 11.527 24.219 mm"
Runoff depth 7.976 26.107 13.415 mm"
Runoff volume 22.33 31.33 53.66 c.m"
Runoff coefficient 0.212 0.694 0.356 "
Maximum flow 0.004 0.014 0.014 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "

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0.014 0.014 0.006 0.008"
54 POND DESIGN"
0.014 Current peak flow c.m/sec"
0.026 Target outflow c.m/sec"
53.7 Hydrograph volume c.m"
5. Number of stages"
208.700 Minimum water level metre"
209.100 Maximum water level metre"
208.700 Starting water level metre"
0 Keep Design Data: 1 = True; 0 = False"
Level Discharge Volume"
208.700 0.000 0.000"
208.800 0.00500 7.000"
208.900 0.00800 16.000"
209.000 0.01000 27.000"
209.100 0.1200 40.000"
Peak outflow 0.007 c.m/sec"
Maximum level 208.862 metre"
Maximum storage 12.545 c.m"
Centroidal lag 3.827 hours"
0.014 0.014 0.007 0.008 c.m/sec"
40 HYDROGRAPH Combine 2000"
6 Combine "
2000 Node #
Proposed Conditions"
Maximum flow 0.015 c.m/sec"
Hydrograph volume 121.352 c.m"
0.014 0.014 0.007 0.015"
38 START/RE-START TOTALS 102"
3 Runoff Totals on EXIT"
Total Catchment area 2.040 hectare"
Total Impervious area 0.220 hectare"
Total % impervious 10.784"
19 EXIT"

```


220136 Pre and Post Dev 5yr Aug 2020

MIDUSS Output ----->
 MIDUSS version Version 2.25 rev. 473"
 MIDUSS created Sunday, February 07, 2010"
 10 Units used: ie METRIC"
 Job folder: C:\Users\ieriksen\Documents\MIDUSS\
 220136"
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 Licensee name: gmbp"
 Company "
 Date & Time last used: 8/5/2020 at 8:47:51 AM"

31 TIME PARAMETERS"

10.000 Time Step"
 360.000 Max. Storm length"
 2400.000 Max. Hydrograph"

32 STORM Chicago storm"

1 Chicago storm"
 1235.530 Coefficient A"
 9.942 Constant B"
 0.845 Exponent C"
 0.375 Fraction R"
 360.000 Duration"
 1.000 Time step multiplier"

Maximum intensity 97.037 mm/hr"
 Total depth 50.052 mm"

6 005hyd Hydrograph extension used in this file"

33 CATCHMENT 10"

1 Triangular SCS"
 1 Equal length"
 1 SCS method"
 10 Existing Conditions"
 0.000 % Impervious"
 1.020 Total Area"
 50.000 Flow length"
 1.000 Overland Slope"
 1.020 Pervious Area"
 50.000 Pervious length"
 1.000 Pervious slope"
 0.000 Impervious Area"
 50.000 Impervious length"
 1.000 Impervious slope"
 0.300 Pervious Manning 'n'"
 76.000 Pervious SCS Curve No."
 0.289 Pervious Runoff coefficient"
 0.100 Pervious Ia/S coefficient"
 8.021 Pervious Initial abstraction"
 0.015 Impervious Manning 'n'"
 95.000 Impervious SCS Curve No."
 0.000 Impervious Runoff coefficient"

220136 Pre and Post Dev 5yr Aug 2020

0.100 Impervious Ia/S coefficient"
 1.337 Impervious Initial abstraction"
 0.025 0.000 0.000 0.000 c.m/sec"
 Catchment 10 Pervious Impervious Total Area "
 Surface Area 1.020 0.000 1.020 hectare"
 Time of concentration 40.700 4.087 40.700 minutes"
 Time to Centroid 239.892 175.486 239.892 minutes"
 Rainfall depth 50.052 50.052 50.052 mm"
 Rainfall volume 510.53 0.00 510.53 c.m"
 Rainfall losses 35.608 12.318 35.608 mm"
 Runoff depth 14.443 37.734 14.443 mm"
 Runoff volume 147.32 0.00 147.32 c.m"
 Runoff coefficient 0.289 0.000 0.289 "
 Maximum flow 0.025 0.000 0.025 c.m/sec"

40 HYDROGRAPH Add Runoff "

4 Add Runoff "
 0.025 0.025 0.000 0.000"

40 HYDROGRAPH Copy to Outflow"

8 Copy to Outflow"
 0.025 0.025 0.025 0.000"

40 HYDROGRAPH Combine 1000"

6 Combine "
 1000 Node #"

Existing Conditions"

Maximum flow 0.025 c.m/sec"
 Hydrograph volume 147.323 c.m"
 0.025 0.025 0.025 0.025"

40 HYDROGRAPH Start - New Tributary"

2 Start - New Tributary"
 0.025 0.000 0.025 0.025"

33 CATCHMENT 100"

1 Triangular SCS"
 1 Equal length"
 1 SCS method"
 100 Proposed Conditions - Uncontrolled Area to South"
 0.000 % Impervious"
 0.220 Total Area"
 30.000 Flow length"
 1.000 Overland Slope"
 0.220 Pervious Area"
 30.000 Pervious length"
 1.000 Pervious slope"
 0.000 Impervious Area"
 30.000 Impervious length"
 1.000 Impervious slope"
 0.300 Pervious Manning 'n'"
 76.000 Pervious SCS Curve No."
 0.288 Pervious Runoff coefficient"

220136 Pre and Post Dev 5yr Aug 2020

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0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
98.000 Impervious SCS Curve No."
0.000 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
      0.006      0.000      0.025      0.025 c.m/sec"
Catchment 100      Pervious      Impervious      Total Area "
Surface Area      0.220      0.000      0.220      hectare"
Time of concentration 29.956      2.823      29.956      minutes"
Time to Centroid 225.730      168.485      225.730      minutes"
Rainfall depth 50.052      50.052      50.052      mm"
Rainfall volume 110.11      0.00      110.11      c.m"
Rainfall losses 35.619      6.035      35.619      mm"
Runoff depth 14.433      44.016      14.433      mm"
Runoff volume 31.75      0.00      31.75      c.m"
Runoff coefficient 0.288      0.000      0.288      ""
Maximum flow 0.006      0.000      0.006      c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
      0.006      0.006      0.025      0.025"
40 HYDROGRAPH Copy to Outflow"
8 Copy to Outflow"
      0.006      0.005      0.006      0.025"
40 HYDROGRAPH Combine 2000"
6 Combine "
2000 Node #"
Proposed Conditions"
Maximum flow 0.006      c.m/sec"
Hydrograph volume 31.752      c.m"
      0.006      0.005      0.006      0.006"
40 HYDROGRAPH Start - New Tributary"
2 Start - New Tributary"
      0.006      0.000      0.006      0.006"
33 CATCHMENT 101"
1 Triangular SCS"
1 Equal length"
1 SCS method"
101 Proposed Conditions - House, shed and driveway draining north"
25.000 % Impervious"
0.400 Total Area"
40.000 Flow length"
1.000 Overland Slope"
0.300 Pervious Area"
40.000 Pervious length"
1.000 Pervious slope"
0.100 Impervious Area"

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220136 Pre and Post Dev 5yr Aug 2020

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40.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.289 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
95.000 Impervious SCS Curve No."
0.754 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
1.337 Impervious Initial abstraction"
      0.017      0.000      0.006      0.006 c.m/sec"
Catchment 101      Pervious      Impervious      Total Area "
Surface Area      0.300      0.100      0.400      hectare"
Time of concentration 35.600      3.575      20.697      minutes"
Time to Centroid 233.146      174.778      205.985      minutes"
Rainfall depth 50.052      50.052      50.052      mm"
Rainfall volume 150.15      50.05      200.21      c.m"
Rainfall losses 35.607      12.337      29.790      mm"
Runoff depth 14.444      37.715      20.262      mm"
Runoff volume 43.33      37.71      81.05      c.m"
Runoff coefficient 0.289      0.754      0.405      ""
Maximum flow 0.008      0.016      0.017      c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
      0.017      0.017      0.006      0.006"
54 POND DESIGN"
0.017 Current peak flow      c.m/sec"
0.026 Target outflow      c.m/sec"
81.0 Hydrograph volume      c.m"
5. Number of stages"
208.700 Minimum water level      metre"
209.100 Maximum water level      metre"
208.700 Starting water level      metre"
0 Keep Design Data: 1 = True; 0 = False"
Level Discharge      Volume"
209.000      0.000      0.000"
209.150      0.00700      13.500"
209.300      0.01000      36.000"
209.450      0.01300      69.000"
209.550      0.1230      97.000"
Peak outflow 0.008      c.m/sec"
Maximum level 209.215      metre"
Maximum storage 23.264      c.m"
Centroidal lag 4.058      hours"
      0.017      0.017      0.008      0.006 c.m/sec"
40 HYDROGRAPH Combine 2000"

```

```

6 Combine "
2000 Node #
    Proposed Conditions"
Maximum flow          0.014 c.m/sec"
Hydrograph volume    112.853 c.m"
    0.017 0.017 0.008 0.014"
40 HYDROGRAPH Start - New Tributary"
2 Start - New Tributary"
    0.017 0.000 0.008 0.014"
33 CATCHMENT 102"
1 Triangular SCS"
1 Equal length"
1 SCS method"
102 Building and Driveway Area Draining to North Swale"
30.000 % Impervious"
0.400 Total Area"
25.000 Flow length"
1.000 Overland Slope"
0.280 Pervious Area"
25.000 Pervious length"
1.000 Pervious slope"
0.120 Impervious Area"
25.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.288 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
95.000 Impervious SCS Curve No."
0.749 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
1.337 Impervious Initial abstraction"
    0.022 0.000 0.008 0.014 c.m/sec"
Catchment 102 Pervious Impervious Total Area "
Surface Area 0.280 0.120 0.400 hectare"
Time of concentration 26.852 2.696 14.116 minutes"
Time to Centroid 221.713 173.427 196.254 minutes"
Rainfall depth 50.052 50.052 50.052 mm"
Rainfall volume 140.14 60.06 200.21 c.m"
Rainfall losses 35.645 12.562 28.720 mm"
Runoff depth 14.407 37.490 21.331 mm"
Runoff volume 40.34 44.99 85.33 c.m"
Runoff coefficient 0.288 0.749 0.426 "
Maximum flow 0.009 0.021 0.022 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
    
```

```

    0.022 0.022 0.008 0.014"
54 POND DESIGN"
0.022 Current peak flow c.m/sec"
0.026 Target outflow c.m/sec"
85.3 Hydrograph volume c.m"
5. Number of stages"
208.700 Minimum water level metre"
209.100 Maximum water level metre"
208.700 Starting water level metre"
0 Keep Design Data: 1 = True; 0 = False"
    Level Discharge Volume"
208.700 0.000 0.000"
208.800 0.00500 7.000"
208.900 0.00800 16.000"
209.000 0.01000 27.000"
209.100 0.1200 40.000"
Peak outflow 0.010 c.m/sec"
Maximum level 208.993 metre"
Maximum storage 26.225 c.m"
Centroidal lag 3.827 hours"
    0.022 0.022 0.010 0.014 c.m/sec"
40 HYDROGRAPH Combine 2000"
6 Combine "
2000 Node #
    Proposed Conditions"
Maximum flow 0.024 c.m/sec"
Hydrograph volume 198.347 c.m"
    0.022 0.022 0.010 0.024"
38 START/RE-START TOTALS 102"
3 Runoff Totals on EXIT"
Total Catchment area 2.040 hectare"
Total Impervious area 0.220 hectare"
Total % impervious 10.784"
19 EXIT"
    
```

220136 Pre and Post Dev 25yr Aug 2020

MIDUSS Output
 MIDUSS version Version 2.25 rev. 473"
 MIDUSS created Sunday, February 07, 2010"
 10 Units used: ie METRIC"
 Job folder: C:\Users\ieriksen\Documents\MIDUSS\
 220136"
 Output filename: 220136 Pre and Post Dev 25yr Aug 2020.out"
 Licensee name: gmbp"
 Company "
 Date & Time last used: 8/5/2020 at 8:48:51 AM"

31 TIME PARAMETERS"

10.000 Time Step"
 360.000 Max. Storm length"
 2400.000 Max. Hydrograph"
 32 STORM Chicago storm"
 1 Chicago storm"
 2011.900 Coefficient A"
 12.344 Constant B"
 0.874 Exponent C"
 0.375 Fraction R"
 360.000 Duration"
 1.000 Time step multiplier"
 Maximum intensity 131.370 mm/hr"
 Total depth 68.474 mm"
 6 025hyd Hydrograph extension used in this file"

33 CATCHMENT 10"

1 Triangular SCS"
 1 Equal length"
 1 SCS method"
 10 Existing Conditions"
 0.000 % Impervious"
 1.020 Total Area"
 50.000 Flow length"
 1.000 Overland Slope"
 1.020 Pervious Area"
 50.000 Pervious length"
 1.000 Pervious slope"
 0.000 Impervious Area"
 50.000 Impervious length"
 1.000 Impervious slope"
 0.300 Pervious Manning 'n'"
 76.000 Pervious SCS Curve No."
 0.379 Pervious Runoff coefficient"
 0.100 Pervious Ia/S coefficient"
 8.021 Pervious Initial abstraction"
 0.015 Impervious Manning 'n'"
 95.000 Impervious SCS Curve No."
 0.000 Impervious Runoff coefficient"

220136 Pre and Post Dev 25yr Aug 2020

0.100 Impervious Ia/S coefficient"
 1.337 Impervious Initial abstraction"
 0.056 0.000 0.000 0.000 c.m/sec"
 Catchment 10 Pervious Impervious Total Area "
 Surface Area 1.020 0.000 1.020 hectare"
 Time of concentration 31.088 3.516 31.088 minutes"
 Time to Centroid 221.961 171.299 221.961 minutes"
 Rainfall depth 68.474 68.474 68.474 mm"
 Rainfall volume 698.43 0.00 698.43 c.m"
 Rainfall losses 42.537 13.192 42.537 mm"
 Runoff depth 25.937 55.282 25.937 mm"
 Runoff volume 264.55 0.00 264.56 c.m"
 Runoff coefficient 0.379 0.000 0.379 "
 Maximum flow 0.056 0.000 0.056 c.m/sec"
 40 HYDROGRAPH Add Runoff "
 4 Add Runoff "
 0.056 0.056 0.000 0.000"
 40 HYDROGRAPH Copy to Outflow"
 8 Copy to Outflow"
 0.056 0.056 0.056 0.000"
 40 HYDROGRAPH Combine 1000"
 6 Combine "
 1000 Node #"
 Existing Conditions"
 Maximum flow 0.056 c.m/sec"
 Hydrograph volume 264.555 c.m"
 0.056 0.056 0.056 0.056"
 40 HYDROGRAPH Start - New Tributary"
 2 Start - New Tributary"
 0.056 0.000 0.056 0.056"
 33 CATCHMENT 100"
 1 Triangular SCS"
 1 Equal length"
 1 SCS method"
 100 Proposed Conditions - Uncontrolled Area to South"
 0.000 % Impervious"
 0.220 Total Area"
 30.000 Flow length"
 1.000 Overland Slope"
 0.220 Pervious Area"
 30.000 Pervious length"
 1.000 Pervious slope"
 0.000 Impervious Area"
 30.000 Impervious length"
 1.000 Impervious slope"
 0.300 Pervious Manning 'n'"
 76.000 Pervious SCS Curve No."
 0.379 Pervious Runoff coefficient"

220136 Pre and Post Dev 25yr Aug 2020

```

0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
98.000 Impervious SCS Curve No."
0.000 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
0.014 0.000 0.056 0.056 c.m/sec"
Catchment 100 Pervious Impervious Total Area
Surface Area 0.220 0.000 0.220 hectare"
Time of concentration 22.881 2.480 22.881 minutes"
Time to Centroid 210.896 165.577 210.895 minutes"
Rainfall depth 68.474 68.474 68.474 mm"
Rainfall volume 150.64 0.00 150.64 c.m"
Rainfall losses 42.543 6.742 42.543 mm"
Runoff depth 25.930 61.732 25.930 mm"
Runoff volume 57.05 0.00 57.05 c.m"
Runoff coefficient 0.379 0.000 0.379 "
Maximum flow 0.014 0.000 0.014 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
0.014 0.014 0.056 0.056"
40 HYDROGRAPH Copy to Outflow"
8 Copy to Outflow"
0.014 0.014 0.014 0.056"
40 HYDROGRAPH Combine 2000"
6 Combine "
2000 Node #"
Proposed Conditions"
Maximum flow 0.014 c.m/sec"
Hydrograph volume 57.047 c.m"
0.014 0.014 0.014 0.014"
40 HYDROGRAPH Start - New Tributary"
2 Start - New Tributary"
0.014 0.000 0.014 0.014"
33 CATCHMENT 101"
1 Triangular SCS"
1 Equal length"
1 SCS method"
101 Proposed Conditions - House, shed and driveway draining south"
25.000 % Impervious"
0.400 Total Area"
40.000 Flow length"
1.000 Overland Slope"
0.300 Pervious Area"
40.000 Pervious length"
1.000 Pervious slope"
0.100 Impervious Area"

```

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```

40.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.378 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
95.000 Impervious SCS Curve No."
0.806 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
1.337 Impervious Initial abstraction"
0.030 0.000 0.014 0.014 c.m/sec"
Catchment 101 Pervious Impervious Total Area "
Surface Area 0.300 0.100 0.400 hectare"
Time of concentration 27.192 3.075 17.178 minutes"
Time to Centroid 216.778 170.610 197.607 minutes"
Rainfall depth 68.474 68.474 68.474 mm"
Rainfall volume 205.42 68.47 273.89 c.m"
Rainfall losses 42.569 13.291 35.250 mm"
Runoff depth 25.905 55.182 33.224 mm"
Runoff volume 77.71 55.18 132.90 c.m"
Runoff coefficient 0.378 0.806 0.485 "
Maximum flow 0.018 0.025 0.030 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
0.030 0.030 0.014 0.014"
54 POND DESIGN"
0.030 Current peak flow c.m/sec"
0.026 Target outflow c.m/sec"
132.9 Hydrograph volume c.m"
5. Number of stages"
208.700 Minimum water level metre"
209.100 Maximum water level metre"
208.700 Starting water level metre"
0 Keep Design Data: 1 = True; 0 = False"
Level Discharge Volume"
209.000 0.000 0.000"
209.150 0.00700 13.500"
209.300 0.01000 36.000"
209.450 0.01300 69.000"
209.550 0.1230 97.000"
Peak outflow 0.011 c.m/sec"
Maximum level 209.374 metre"
Maximum storage 52.225 c.m"
Centroidal lag 4.211 hours"
0.030 0.030 0.011 0.014 c.m/sec"
40 HYDROGRAPH Combine 2000"

```

```

6 Combine "
2000 Node #
    Proposed Conditions"
Maximum flow          0.024 c.m/sec"
Hydrograph volume    190.009 c.m"
    0.030 0.030 0.011 0.024"
40 HYDROGRAPH Start - New Tributary"
2 Start - New Tributary"
    0.030 0.000 0.011 0.024"
33 CATCHMENT 102"
1 Triangular SCS"
1 Equal length"
1 SCS method"
102 Building and Driveway Area Draining to North Swale"
30.000 % Impervious"
0.400 Total Area"
25.000 Flow length"
1.000 Overland Slope"
0.200 Pervious Area"
25.000 Pervious length"
1.000 Pervious slope"
0.120 Impervious Area"
25.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.378 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
95.000 Impervious SCS Curve No."
0.797 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
1.337 Impervious Initial abstraction"
    0.036 0.000 0.011 0.024 c.m/sec"
Catchment 102 Pervious Impervious Total Area "
Surface Area 0.280 0.120 0.400 hectare"
Time of concentration 20.510 2.320 11.875 minutes"
Time to Centroid 207.792 169.676 189.698 minutes"
Rainfall depth 68.474 68.474 68.474 mm"
Rainfall volume 191.73 82.17 273.89 c.m"
Rainfall losses 42.603 13.925 33.999 mm"
Runoff depth 25.871 54.549 34.474 mm"
Runoff volume 72.44 65.46 137.90 c.m"
Runoff coefficient 0.378 0.797 0.503 "
Maximum flow 0.019 0.031 0.036 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
    
```

```

    0.036 0.036 0.011 0.024"
54 POND DESIGN"
0.036 Current peak flow c.m/sec"
0.026 Target outflow c.m/sec"
137.9 Hydrograph volume c.m"
5. Number of stages"
208.700 Minimum water level metre"
209.100 Maximum water level metre"
208.700 Starting water level metre"
0 Keep Design Data: 1 = True; 0 = False"
    Level Discharge Volume"
208.700 0.000 0.000"
208.800 0.00500 7.000"
208.900 0.00800 16.000"
209.000 0.01000 27.000"
209.100 0.1200 40.000"
Peak outflow 0.031 c.m/sec"
Maximum level 209.022 metre"
Maximum storage 29.814 c.m"
Centroidal lag 3.624 hours"
    0.036 0.036 0.031 0.024 c.m/sec"
40 HYDROGRAPH Combine 2000"
6 Combine "
2000 Node #
    Proposed Conditions"
Maximum flow 0.055 c.m/sec"
Hydrograph volume 327.390 c.m"
    0.036 0.036 0.031 0.055"
38 START/RE-START TOTALS 102"
3 Runoff Totals on EXIT"
Total Catchment area 2.040 hectare"
Total Impervious area 0.220 hectare"
Total % impervious 10.784"
19 EXIT"
    
```

```

220136 Pre and Post Dev 100yr Aug 2020
MIDUSS Output ----->
MIDUSS version          Version 2.25 rev. 473"
MIDUSS created          Sunday, February 07, 2010"
10  Units used:          ie METRIC"
Job folder:             C:\Users\ieriksen\Documents\MIDUSS\
                        220136"
Output filename:       220136 Pre and Post Dev 100yr Aug 2020.out"
Licensee name:         gmbp"
Company                "
Date & Time last used: 8/5/2020 at 8:50:43 AM"
31  TIME PARAMETERS"
10.000 Time Step"
360.000 Max. Storm length"
2400.000 Max. Hydrograph"
32  STORM Chicago storm"
1 Chicago storm"
2721.060 Coefficient A"
13.798 Constant B"
0.890 Exponent C"
0.375 Fraction R"
350.000 Duration"
1.000 Time step multiplier"
Maximum intensity      159.700 mm/hr"
Total depth            83.800 mm"
6  100hyd Hydrograph extension used in this file"
33  CATCHMENT 10"
1 Triangular SCS"
1 Equal length"
1 SCS method"
10 Existing Conditions"
0.000 % Impervious"
1.020 Total Area"
50.000 Flow length"
1.000 Overland Slope"
1.020 Pervious Area"
50.000 Pervious length"
1.000 Pervious slope"
0.000 Impervious Area"
50.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.438 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
95.000 Impervious SCS Curve No."
0.000 Impervious Runoff coefficient"

```

```

220136 Pre and Post Dev 100yr Aug 2020
0.100 Impervious Ia/S coefficient"
1.337 Impervious Initial abstraction"
0.090 0.000 0.000 0.000 c.m/sec"
Catchment 10 Pervious Impervious Total Area "
Surface Area 1.020 0.000 1.020 hectare"
Time of concentration 26.632 3.206 26.632 minutes"
Time to Centroid 213.073 169.017 213.074 minutes"
Rainfall depth 83.800 83.800 83.800 mm"
Rainfall volume 854.76 0.00 854.76 c.m"
Rainfall losses 47.127 13.776 47.127 mm"
Runoff depth 36.673 70.024 36.673 mm"
Runoff volume 374.06 0.00 374.07 c.m"
Runoff coefficient 0.438 0.000 0.438 "
Maximum flow 0.090 0.000 0.090 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "
0.090 0.090 0.000 0.000"
40 HYDROGRAPH Copy to Outflow"
8 Copy to Outflow"
0.090 0.090 0.090 0.000"
40 HYDROGRAPH Combine 1000"
6 Combine "
1000 Node #"
Existing Conditions"
Maximum flow 0.090 c.m/sec"
Hydrograph volume 374.066 c.m"
0.090 0.090 0.090 0.090"
40 HYDROGRAPH Start - New Tributary"
2 Start - New Tributary"
0.090 0.000 0.090 0.090"
33 CATCHMENT 100"
1 Triangular SCS"
1 Equal length"
1 SCS method"
100 Proposed Conditions - Uncontrolled Area to South"
0.000 % Impervious"
0.220 Total Area"
30.000 Flow length"
1.000 Overland Slope"
0.220 Pervious Area"
30.000 Pervious length"
1.000 Pervious slope"
0.000 Impervious Area"
30.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.437 Pervious Runoff coefficient"

```

220136 Pre and Post Dev 100yr Aug 2020

0.100 Pervious Ia/S coefficient"
 8.021 Pervious Initial abstraction"
 0.015 Impervious Manning 'n'"
 98.000 Impervious SCS Curve No."
 0.000 Impervious Runoff coefficient"
 0.100 Impervious Ia/S coefficient"
 0.518 Impervious Initial abstraction"
 0.023 0.000 0.090 0.090 c.m/sec"
 Catchment 100 Pervious Impervious Total Area "
 Surface Area 0.220 0.000 0.220 hectare"
 Time of concentration 19.602 2.285 19.602 minutes"
 Time to Centroid 203.576 164.054 203.576 minutes"
 Rainfall depth 83.800 83.800 83.800 mm"
 Rainfall volume 184.36 0.00 184.36 c.m"
 Rainfall losses 47.195 7.456 47.195 mm"
 Runoff depth 36.604 76.343 36.604 mm"
 Runoff volume 80.53 0.00 80.53 c.m"
 Runoff coefficient 0.437 0.000 0.437 "
 Maximum flow 0.023 0.000 0.023 c.m/sec"
 40 HYDROGRAPH Add Runoff "
 4 Add Runoff "
 0.023 0.023 0.090 0.090"
 40 HYDROGRAPH Copy to Outflow"
 8 Copy to Outflow"
 0.023 0.023 0.023 0.090"
 40 HYDROGRAPH Combine 2000"
 6 Combine "
 2000 Node #"
 Proposed Conditions"
 Maximum flow 0.023 c.m/sec"
 Hydrograph volume 80.530 c.m"
 0.023 0.023 0.023 0.023"
 40 HYDROGRAPH Start - New Tributary"
 2 Start - New Tributary"
 0.023 0.000 0.023 0.023"
 33 CATCHMENT 101"
 1 Triangular SCS"
 1 Equal length"
 1 SCS method"
 101 Proposed Conditions - House, shed and driveway draining south"
 25.000 % Impervious"
 0.400 Total Area"
 40.000 Flow length"
 1.000 Overland Slope"
 0.300 Pervious Area"
 40.000 Pervious length"
 1.000 Pervious slope"
 0.100 Impervious Area"

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40.000 Impervious length"
 1.000 Impervious slope"
 0.300 Pervious Manning 'n'"
 76.000 Pervious SCS Curve No."
 0.439 Pervious Runoff coefficient"
 0.100 Pervious Ia/S coefficient"
 8.021 Pervious Initial abstraction"
 0.015 Impervious Manning 'n'"
 95.000 Impervious SCS Curve No."
 0.832 Impervious Runoff coefficient"
 0.100 Impervious Ia/S coefficient"
 1.337 Impervious Initial abstraction"
 0.044 0.000 0.023 0.023 c.m/sec"
 Catchment 101 Pervious Impervious Total Area "
 Surface Area 0.300 0.100 0.400 hectare"
 Time of concentration 23.295 2.805 15.360 minutes"
 Time to Centroid 208.468 168.408 192.955 minutes"
 Rainfall depth 83.800 83.800 83.800 mm"
 Rainfall volume 251.40 83.80 335.20 c.m"
 Rainfall losses 47.023 14.074 38.786 mm"
 Runoff depth 36.777 69.725 45.014 mm"
 Runoff volume 110.33 69.73 180.06 c.m"
 Runoff coefficient 0.439 0.832 0.537 "
 Maximum flow 0.028 0.032 0.044 c.m/sec"
 40 HYDROGRAPH Add Runoff "
 4 Add Runoff "
 0.044 0.044 0.023 0.023"
 54 POND DESIGN"
 0.044 Current peak flow c.m/sec"
 0.026 Target outflow c.m/sec"
 180.1 Hydrograph volume c.m"
 5. Number of stages"
 208.700 Minimum water level metre"
 209.100 Maximum water level metre"
 208.700 Starting water level metre"
 0 Keep Design Data: 1 = True; 0 = False"
 Level Discharge Volume"
 209.000 0.000 0.000"
 209.150 0.00700 13.500"
 209.300 0.01000 36.000"
 209.450 0.01300 69.000"
 209.550 0.1230 97.000"
 Peak outflow 0.026 c.m/sec"
 Maximum level 209.462 metre"
 Maximum storage 72.234 c.m"
 Centroidal lag 4.245 hours"
 0.044 0.044 0.026 0.023 c.m/sec"
 40 HYDROGRAPH Combine 2000"


```

6 Combine "
2000 Node #
Proposed Conditions"
Maximum flow 0.037 c.m/sec"
Hydrograph volume 259.384 c.m"
0.044 0.044 0.026 0.037"
40 HYDROGRAPH Start - New Tributary"
2 Start - New Tributary"
0.044 0.000 0.026 0.037"
33 CATCHMENT 102"
1 Triangular SCS"
1 Equal length"
1 SCS method"
102 Building and Driveway Area Draining to North Swale"
30.000 % Impervious"
0.400 Total Area"
25.000 Flow length"
1.000 Overland Slope"
0.280 Pervious Area"
25.000 Pervious length"
1.000 Pervious slope"
0.120 Impervious Area"
25.000 Impervious length"
1.000 Impervious slope"
0.300 Pervious Manning 'n'"
76.000 Pervious SCS Curve No."
0.438 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
8.021 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
95.000 Impervious SCS Curve No."
0.820 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
1.337 Impervious Initial abstraction"
0.052 0.000 0.026 0.037 c.m/sec"
Catchment 102 Pervious Impervious Total Area "
Surface Area 0.280 0.120 0.400 hectare"
Time of concentration 17.571 2.115 10.687 minutes"
Time to Centroid 200.714 167.634 185.980 minutes"
Rainfall depth 83.800 83.800 83.800 mm"
Rainfall volume 234.64 100.56 335.20 c.m"
Rainfall losses 47.131 15.081 37.516 mm"
Runoff depth 36.669 68.719 46.284 mm"
Runoff volume 102.67 82.46 185.13 c.m"
Runoff coefficient 0.438 0.820 0.552 "
Maximum flow 0.030 0.040 0.052 c.m/sec"
40 HYDROGRAPH Add Runoff "
4 Add Runoff "

```

```

0.052 0.052 0.026 0.037"
54 POND DESIGN"
0.052 Current peak flow c.m/sec"
0.026 Target outflow c.m/sec"
185.1 Hydrograph volume c.m"
5. Number of stages"
208.700 Minimum water level metre"
209.100 Maximum water level metre"
208.700 Starting water level metre"
0 Keep Design Data: 1 = True; 0 = False"
Level Discharge Volume"
208.700 0.000 0.000"
208.800 0.00500 7.000"
208.900 0.00800 16.000"
209.000 0.01000 27.000"
209.100 0.1200 40.000"
Peak outflow 0.051 c.m/sec"
Maximum level 209.037 metre"
Maximum storage 31.820 c.m"
Centroidal lag 3.486 hours"
0.052 0.052 0.051 0.037 c.m/sec"
40 HYDROGRAPH Combine 2000"
6 Combine "
2000 Node #
Proposed Conditions"
Maximum flow 0.080 c.m/sec"
Hydrograph volume 445.557 c.m"
0.052 0.052 0.051 0.080"
38 START/RE-START TOTALS 102"
3 Runoff Totals on EXIT"
Total Catchment area 2.040 hectare"
Total Impervious area 0.220 hectare"
Total % impervious 10.784"
19 EXIT"

```