TRAFALGAR ENGINEERING

FUNCTIONAL SERVICING REPORT

Water, Sanitary, and Stormwater Management

CONDOMINIUM TOWNHOUSE AND COMMERCIAL DEVELOPMENT

16114 AIRPORT ROAD
TOWN OF CALEDON

OUR FILE: 1599

PREPARED FOR SHACCA CALEDON HOLDINGS INC.

OCTOBER 29, 2019

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REVISION HISTORY

DATE	REVISION	SUBMISSION
March 15, 2017		Issued for Rezoning Application
February 6, 2018	2	Revised per TRCA Comments (not submitted)
October 29, 2019	3	Reissued for Rezoning Application

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1.0 INTRODUCTION

1.1 Scope of Functional Servicing Report

This report had been prepared in support of the Rezoning Application made by Shacca Caledon Holdings Inc. (the client) for the site located at 16114 Airport Road (the Subject Lands) in the Town of Caledon. The report examines the availability of municipal services (storm, sanitary and water) to support the proposed development, and provides preliminary servicing details and outlines storm water management requirements. The information provided in this report is preliminary, and detailed engineering designs and drawings will need to be undertaken as part of the site plan design and prior to submission for building permits.

This report has been prepared for the exclusive use of Shacca Caledon Holdings Inc. and cannot be used by other parties without the prior written approval of Trafalgar Engineering Ltd. *Revisions to the body of this report are indicated in italics.*

1.2 Site Location and Description

The site is located on the north-west corner of the intersection of Airport Road and Walker Road in the Town of Caledon. The site is approximately 4.08 ha and currently occupied by a two storey designated heritage home known as Allison's Grove. The site is bounded by Airport Road to the east, a condominium townhouse development to the north, wetland to the west, and Walker Road West to the south. Approximately one third of the southern frontage is interrupted by two residential lots: numbers 5 and 7 Walker Road West.

A copy of the topographic survey has been included in Appendix 'A' for reference.

1.3 Proposed Development

The client proposes to divide the subject lands into two development parcels; a breakdown of the proposal is as follows: a residential condominium of approximately *0.944* ha, a commercial lot of approximately 0.557 ha, an Airport Road widening of approximately 0.067 ha, and the remaining *2.514* ha of wetland, *compensation area, and associated buffer* to remain in its natural condition beyond the limits of the development. The heritage home sits along Airport Road approximately half way along the site frontage and is to remain.

The townhouse condominium consists of *five* blocks of between *six* and *eight* units each for a total of *32* units. Access to the residential condominium is proposed via condominium road from Airport Road, approximately 170 m north of Walker Road. The T-shaped condominium road runs west from Airport Road with a north-south stem dividing the residential and commercial components; on-street parking is proposed along the east side of the stem.

The commercial component of the development consists of the heritage home converted to commercial space, as well as a large commercial building to its south. Two entrances are proposed to the commercial re-development: one from Airport Road approximately 95 m north of Walker Road, and one from Walker Road approximately 55 m west of Airport Road. A copy of the site plan is included in Appendix 'A'.

1.4 Grading Requirements and Restrictions

The grading of the site is widely constricted due to the bounding conditions around the site and the large elevation difference from north to south. Grades along the northerly property line are approximately five metres higher than those along the southerly limit, giving a general down gradient of 2.6% in a north-south direction. The site falls off generally at a gradient of 10% east to west from a central mound at the north end of the site; the grade difference is proposed to be made up by *daylighting through the mount at a mild slope to match the existing grade along* the west limit. *TRCA has reviewed the cross-sections proposed (shown on the Grading Plan, G1) and finds the approach acceptable.* A retaining wall is proposed along the northern limit to allow the townhouse units to sit at a reasonable height relative to the fronting condominium road, *while preserving the existing elevations at the rear lot line*; the wall along the north limit ranges from approximately 1.1 m to 2.4 m high.

The commercial development is graded to be generally compatible with the condominium road grading to the west, the existing heritage house to the north, and with consideration to a 2.0% boulevard along both Walker and Airport Roads; a lane widening and urbanization of Airport Road has been anticipated in the preliminary grading.

The preliminary grading design has attempted to contain drainage from the development, however local portions of the existing heritage frontage will continue to sheet flow to Airport Road. A copy of the preliminary grading plan is included in Appendix 'B' for reference.

2.0 MUNICIPAL WATER AND WASTEWATER

Development of the subject lands will require that municipal services are designed in conformance with the Ontario Building Code, current Region of Peel standards, and current Town of Caledon standards for condominium developments. A servicing plan showing the proposed water, sanitary, and storm servicing is included in Appendix 'B'.

2.1 Water

There are two existing watermains along Airport Road adjacent to the development: an existing 400 mm PVC watermain running along the west side of Airport Road (constructed in 2014), and a

300 mm PVC watermain running along the east side of Airport Road (constructed in 1984). *There is a 300 mm watermain located on the north side of Walker Road West.*

The proposal includes a 150 mm watermain *connected at one end to the 300 mm watermain on Airport Road and the 150 mm watermain on Walker Road West at the other to service* the condominium development. *A* 150 mm fire and 50 mm domestic connection *is proposed to service* the commercial development. Fire and domestic sizing for the commercial development should be confirmed by a mechanical consultant prior to *building permit* approval. The heritage house is currently connected to the 300 mm watermain, and that connection will remain in service.

Water usage for each service has been estimated using the Region's design criteria and is provided below. Refer to supporting calculations provided in Appendix 'C' for further detail.

	Commercial Service	**Residential Service**	
Average Daily Demand	*5*	*20*	(L/min)
Maximum Hourly Demand	*16*	*60*	(L/min)
Maximum Daily Demand	*8*	*40*	(L/min)
Estimated Fire Demand (FUS 1999)	8000	9000	(L/min)
Maximum Daily Plus Fire Demand	8008	*9040*	(L/min)

2.2 Wastewater

There are existing 250 mm PVC sanitary sewers on both Airport Road and Walker Road West. The Airport Road sewer will serve as the connection point for the commercial development, while the condominium townhouse development connects to the Walker Road West sewer.

The 250 mm PVC sanitary on Airport Road drains southerly beginning just north of the subject lands. The sewer was constructed to collect drainage from the adjacent townhouse development to the north; the sewer runs along the east side of Airport Road alongside the 300 mm watermain.

It does not appear as though the existing heritage house has a connection to the sanitary sewer; we therefore recommend that any existing sewage system be located and removed subject to approval, and replaced with a 150 mm sanitary connection to Airport Road complete with property line inspection maintenance hole. It is proposed that the commercial development be provided with a separate 150 mm sanitary connection and inspection maintenance hole south of the new connection to the heritage house.

Due to the site grading constraints, the proposed townhouse development will need to be serviced by a 200 mm connection to Walker Road West via an easement over the proposed commercial development. It is not practical to work against the gradient of the site to connect at a higher point along Airport Road. The existing sanitary sewer on Walker Road West drains in an easterly

direction just south of the centreline of the roadway. The sanitary flows have been estimated using the Region's criteria and are summarized below. Refer to the calculations provided in Appendix 'C' for further detail.

	Commercial Service	**Residential Service**	
Average Daily Dry Weather Flow	13.0	13.0	(L/s)
Peak Daily Flow (Incl. Infiltration)	*13.7*	*15.3*	(L/s)

3.0 STORM DRAINAGE AND STORMWATER MANAGEMENT

3.1 Existing Condition

The pre-development condition of the site is mostly pervious; the impervious areas of the site consist of the existing heritage house and gravel driveway. The stormwater management quantity control requirements for the site are to use unit flow rates for the Humber Watershed (Sub-basin #6, Equation B), refer to the attached email correspondence from TRCA in Appendix 'D'. Because the unit flow rates determine the allowable discharge for the development, pre-development conditions (including pre-development flow) are not examined in-depth.

3.2 Proposed Condition

Due to grading constraints around the existing heritage building, a small portion of the commercial area drains back into the residential area; the drainage areas are adjusted accordingly and illustrated on Figure 1, Drainage Area Plan, in Appendix 'D'. The drainage areas are used to determine the allowable discharge for each component of the development. TRCA requires site discharge for each component (Residential and Commercial) to be limited to a rate determined using Equation B for Humber Watershed sub-basin #6. A table summarizing the allowable discharge rates for the following equation is provided below:

TABLE 1 – ALLOWABLE RELEASE RATES

Return Period	Equation B (Sub-basin 6)	Residential Allowable (Drainage Area=*0.977*)	Commercial Allowable (Drainage Area=*0.523*)
100-year	Q = 15.199–0.751 x ln(A)	Q = *15* L/s	Q = *8* L/s
50-year	Q = 12.692–0.623 x ln(A)	Q = *12* L/s	Q = *7* L/s
25-year	Q = 10.488–0.522 x ln(A)	Q = *10* L/s	Q = *6* L/s
10-year	Q = 7.707–0.382 x ln(A)	Q = *8* L/s	Q = 4 L/s
5-year	Q = 5.755–0.283 x ln(A)	Q = *6* L/s	Q = 3 L/s
2-year	Q = 3.288–0.159 x ln(A)	Q = *3* L/s	Q = 2 L/s

The storage required to attenuate the flow to each allowable discharge rate is determined using HydroCAD and the TRCA 6- and 12-hour AES storm distributions. Due to potential blockage or clogging, an orifice control smaller than 75 mm is not recommended. The model is run with a 75 mm orifice control to determine estimated storage usage and release rates; the maximum quantity determined using the 6- and 12-hour distributions is used. The orifice control is to be located downstream of the storage units. Storage is proposed in the form of underground modular cellular storage (ACO StormBrixx or approved equal) lined with permeable geotextile and set on a granular base to promote infiltration; some surface ponding is anticipated in the lower frequency return storms. *Approximately 375 m^3 of storage is provided for the residential component, and approximately 189 m^3 is provided for the commercial component. Both systems are located within the proposed commercial parking lot; a servicing easement is required for the residential system.*

Tables below summarize the storage and discharge for the residential and commercial components for both the 6- and 12-hour AES distributions. Table *4* below provides a summary of the required storage (maximal usage) *while Table 5 provides a summary of the allowable and calculated overall discharge rates*.

Refer to Tables *2* and *3* for estimated *Residential and Commercial* storage usage and discharge with 75 mm orifice control.

TABLE *2* – RESIDENTIAL COMPONENT
FLOW AND STORAGE SUMMARY
(with 75 mm Orifice)

		6-hr TRCA AES		12-hr TRCA AES	
Return Period	Allowable Flow (L/s)	Calculated Discharge (L/s)	Storage Used (m^3)	Calculated Discharge (L/s)	Storage Used (m^3)
100-yr	*15*	*11.3*	*304.5*	*11.3*	*305.9*
50-yr	*12*	*10.2*	*257.1*	*10.3*	*259.5*
25-yr	*10*	*9.2*	*211.0*	*9.3*	*216.1*
10-yr	*8*	*7.6*	*153.8*	*7.8*	*160.5*
5-yr	*6*	*6.2*	*112.0*	*6.5*	*120.3*
2-yr	*3*	*3.9*	*60.3*	*4.4*	*69.2*

TABLE *3* – COMMERCIAL COMPONENT FLOW AND STORAGE SUMMARY (with 75 mm Orifice)

		6-hr TRCA AES		12-hr TRCA AES	
Return Period	Allowable Flow (L/s)	Calculated Discharge (L/s)	Storage Used (m^3)	Calculated Discharge (L/s)	Storage Used (m^3)
100-yr	*8*	*8.6*	*180.7*	*8.6*	*178.7*
50-yr	*7*	*7.3*	*157.2*	*7.4*	*156.5*
25-yr	*6*	*6.3*	*134.1*	*6.4*	*135.6*
10-yr	4	*4.9*	*105.3*	*5.1*	*108.6*
5-yr	3	*3.6*	*84.5*	*3.9*	*89.3*
2-yr	2	*1.0*	*59.6*	*2.0*	*66.3*

TABLE *4* – OVERALL STORAGE REQUIREMENT (in m^3)

Return Period	Residential	Commercial
100-yr	*305.9*	*180.7*
50-yr	*259.5*	*157.2*
25-yr	*216.1*	*135.6*
10-yr	*160.5*	*108.6*
5-yr	*120.3*	*89.3*
2-yr	*69.2*	*66.3*

TABLE 5 – OVERALL DISCHARGE REQUIREMENT (in L/s)

Return Period	*Allowable*	*6-hr TRCA AES Calculated*	*12-hr TRCA AES Calculated*
100-yr	*23*	*19.5*	*19.4*
50-yr	*19*	*17.6*	*17.6*
25-yr	*16*	*15.5*	*15.7*
10-yr	*12*	*12.5*	*12.9*
5-yr	*9*	*9.9*	*10.5*
2-yr	*5*	*4.9*	*6.4*

3.3 Minor Storm System

Storm drainage is to be collected by a series of inlets and conveyed to the underground storage for both the residential and commercial developments. *Both the residential and commercial storm systems are sized to capture and convey the 100-year Town of Caledon storm.* A Stormceptor oil/grit separator is proposed upstream of the modular storage units to reduce the sediment settling within the storage units. Drainage is controlled by way of control structures complete with 75 mm orifice at the downstream end of the storage units; inspection maintenance holes are provided on each storm service at the property line. The proposed storm outlet for the residential component is a 200 mm connection to a catch basin manhole at the south-east corner of the site. A storm sewer easement over the commercial lands will be required. The commercial component will be serviced by a 200 mm connection to the existing ditch on Airport Road at the south-east corner of the site.

3.4 Major Storm System

In the event of an extreme rainfall event or failure of the storm sewer system, emergency overland flow for the residential development is directed to *Walker Road West by way of a driveway connection through the commercial component*. The condominium road will serve as the primary conduit for overland flow, directing flow south.

The commercial development has been graded to limit ponding *in the parking area to 0.25 m*. The overland flow for the commercial development is north to south via the parking lot to Walker Road West.

3.5 Water Quality

An oil/grit separator is proposed upstream of the underground storage units for both the residential and commercial components. This is to help minimize the settlement of sediment in the modules. Both units are sized to provide MOECC “Enhanced” level of protection (80% long-term removal of suspended solids). A Stormceptor STC *2000* is proposed for the residential development, and a Stormceptor STC 750 is proposed for the commercial development. Sizing calculations are included in Appendix ‘D’. *It should be noted that exaggerated impervious areas were used in the sizing of the units.*

3.6 Erosion and Sediment Control

Typical sediment and erosion control measures will be required during construction. These include silt fencing, mud mat, and check dams with provisions for re-vegetating the site as soon as construction is completed. *Although more detailed information will be provided at the detailed*

design stage, it is recognized that special care must be taken to protect the wetland from sediment laden runoff and erosion potential.

3.7 Feature Based Water Balance

The subject lands are bounded to the west by a small portion of the bottom end of the Provincially Significant Caledon East Wetlands Complex. The wetlands catchment basin is illustrated in Appendix 'E', along with a highlighted portion of the subject lands that is to be redirected to Airport Road as a result of development. The overall catchment area for the wetland complex is approximately 506.7 ha; the area to be redirected away from the wetland as a result of the proposed development is approximately *0.22* ha, representing roughly *0.045*% of the total catchment area for the wetland. Because of the proximity of the proposed development to the adjacent wetland (named Wetland #2, refer to Appendix 'E'), Toronto and Region Conservation Authority requires a Feature Based Water Balance analysis to be undertaken to assess the potential impact as a result of development of the subject lands.

An analysis of the existing and proposed conditions is undertaken using a continuous hydrologic model of both cases, comparing the pre- and post-development evaporation, infiltration, and runoff for the areas that are tributary to the wetland. The same rainfall and temperature data, time steps, analysis duration, and soil parameters are used in both cases. Refer to Figures *3* and *4* in Appendix 'E' for the pre- and post-development drainage area boundary delineation referenced in this text.

3.7.1. Hydrologic Model and Parameters

A continuous hydrologic model using EPA SWMM is setup using estimated parameters. One hour rainfall data for the period 23/05/1986–01/11/2007 measured at Toronto Buttonville Airport was provided by TRCA to be used in the model. Daily temperature data for the same period was also provided by TRCA and is used by the model to estimate evaporation using the Hargreaves method. Further detail on model parameters and subcatchment definition is provided below.

3.7.1.1. Data Limitations

It is noted that the total volume of rainfall provided in the hourly data (9,471 mm) does not equal the total volume of rainfall provided in the daily record (15,283 mm). The hourly rainfall data includes a number of erroneous (flagged as missing) readings; when cross-checked against the daily rainfall records, it is noted that the missing readings correspond to days with higher rainfall totals. Additionally, it should be noted that there are no rainfall events recorded for the months of December–March. Notwithstanding the foregoing, we believe the impact is insignificant.

3.7.1.2. Infiltration

The Green-Ampt infiltration method is selected based on the availability of known soil parameters. The hydraulic conductivity for the soil was calculated by R.J. Burnside based on in-situ testing at two monitoring wells; an average hydraulic conductivity between the two monitoring wells of 4.3×10^{-4} cm/s is converted to 15.5 mm/hr and used for the simulation. Other required parameters for the Green-Ampt method are Suction Head and Initial Deficit, both of which are obtained from published tables and interpolated based on the hydraulic conductivity. The parameters used in the model are discussed in further detail in Appendix 'E'.

It is worthy to note that the prevailing interpreted groundwater flow direction is north to south; most of the infiltration volume estimated for the development area is not tributary to the wetland. Refer to the "Interpreted Groundwater Flow" figure prepared by R.J. Burnside included in Appendix 'E'. Accordingly, there is no discussion of any net change in infiltration volume in the results.

3.7.1.3. Subcatchment Areas

Two subcatchment areas have been delineated and modelled to determine the existing evaporation, infiltration, and runoff that drains to the wetland. The two subcatchment areas are identified as "Buffer" and "Dev-Area", and are illustrated on the attached subcatchment area plans (Figures *3* and *4*, Appendix 'E'). The development area ("Dev-Area") is delineated to the east based on the contours provided on the topographic survey prepared by David B. Searles (Appendix 'A'). It is bounded to the north and south by the property boundaries, and to the west by the development limit. The topography of this area is more steeply sloped than the adjacent Buffer subcatchment area. The Buffer area is bounded to the east by the development limit, to the north and south by the property boundaries, and to the west by the surveyed "drip line". The Buffer area is beyond the limits of the development, and will remain unchanged. The development area subcatchment drains to the Buffer subcatchment in the existing condition, but will drain toward Airport Road upon development. The Buffer subcatchment outlets to the wetland in both cases. A summary of the parameters used to define the subcatchments as well as the model input file is provided in Appendix 'E'.

3.7.2. Results

A simulation is performed with the development area outlet directed to the Buffer in order to evaluate the existing condition, and again with the development area disconnected—representing the post development condition. The results indicate a net reduction in total runoff of approximately 2 mm from the Buffer to the wetland over the entire simulation period (approximately 0.1 mm/year). The net change in runoff is negligible, and it can be concluded that

there is no significant impact to the wetland as a result of redirecting the development area toward Airport Road.

Pre- and post-development weekly hydrographs are not provided; the absence of any meaningful runoff in both conditions makes a graphical representation of these values impractical. In the pre-development condition, there are a total of three runoff events over the entire simulation period from the Buffer area to the wetland ranging between 0.002 and 0.019 m^3/s; there are also three runoff events in the post-development condition ranging between 0.002 and *0.019* m^3/s. Pre- and post-development simulation results over the entire period are tabulated below.

PRE-DEVELOPMENT SIMULATION RESULTS (1986–2007)

Subcatchment Name	Total Precipitation (mm)	Total Evaporation (mm)	Total Infiltration (mm)	Total Runoff (mm)	Peak Runoff (m^3/s)
Dev-Area	9471.10	*0.96*	*9466.88*	*4.36*	0.01
Buffer	9471.10	0.99	*9468.39*	*3.83*	0.02

POST-DEVELOPMENT SIMULATION RESULTS (1986–2007)

Subcatchment Name	Total Precipitation (mm)	Total Evaporation (mm)	Total Infiltration (mm)	Total Runoff (mm)	Peak Runoff (m^3/s)
Buffer	9471.10	0.98	*9467.62*	*3.05*	0.01

NET CHANGE (1986–2007)

Subcatchment Name	Total Precipitation (mm)	Total Evaporation (mm)	Total Infiltration (mm)	Total Runoff (mm)	Peak Runoff (m^3/s)
Buffer	0.00	-0.01	*-0.77*	*-0.78*	-0.01

3.7.3. Summary

The results of continuous hydrologic modelling over the period of 1986–2007 indicate that there is no significant impact to the wetland as a result of redirecting flow from the development area away from the wetland; there is an insignificant net change in total runoff volume to the wetland (in the order of *0.04* mm/year). Rainfall over the simulation period is mostly infiltrated; the prevailing interpreted groundwater flow direction—as determined by R.J. Burnside—is north to south. It is therefore concluded that infiltrated rainfall is not tributary to the wetland.

3.8 LOW IMPACT DEVELOPMENT

Underground stormwater detention is proposed as part of the stormwater quantity control for the development. The detention system is designed to permit infiltration of stormwater in an effort to offset the increase in imperviousness over the site.

4.0 CONCLUSION

The servicing requirements as discussed in this report are summarized below in support of the proposed rezoning application.

1. Water servicing for both domestic and fire purposes will be from the existing 300 mm watermain on Airport Road *and the 300 mm watermain on Walker Road West* for *the* residential *component. The* commercial component *is to be serviced from the 300 mm watermain on Airport Road*. A 150 mm diameter main will be per Region standards to provide service to the proposed townhouse units. A 150 mm fire and 50 mm domestic service is proposed for the commercial component.

2. The commercial sanitary drainage will be directed to the existing 250 mm sanitary sewer along Airport Road by way of 150 mm service laterals.

3. The residential sanitary drainage will be directed to the existing 250 mm sanitary sewer on Walker Road West by way of 200 mm sanitary sewer via an easement over the proposed commercial development.

4. Storm drainage is to be controlled as closely as possible to the 2-100 year unit flow rates for sub-basin #6 determined using equation B provided by TRCA for the Humber River watershed; a 75 mm minimum diameter orifice control is *proposed*. A total of *305.9* m^3 of storage is required for the residential development, and *180.7* m^3 of storage is required for the commercial development; storage is underground in modular cellular storage. *Approximately 375 m^3 is provided for the residential component and 189 m^3 for the commercial component.*

5. There is no significant impact to the adjacent wetland as a result of redirecting flow from a small portion of the wetland catchment area toward Airport Road.

PREPARED BY TRAFALGAR ENGINEERING LTD.

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29 Oct 2019
PROVINCE OF ONTARIO

Appendix ‘A’

Topographic Survey

Site Plan

SURVEYOR'S REAL PROPERTY REPORT
PART 1, PLAN OF
PART OF LOT 4, CONCESSION 6
EAST OF HURONTARIO STREET
(GEOGRAPHIC TOWNSHIP OF CALEDON, COUNTY OF PEEL)

TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL

SCALE 1: 500

10 5 0 5 10 15 20 30 40 50 metres

David B. Searles Surveying Ltd.
ONTARIO LAND SURVEYORS

METRIC

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

LEGEND

■	DENOTES	MONUMENT FOUND
□	DENOTES	MONUMENT SET
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
WIT	DENOTES	WITNESS
769	DENOTES	I.L. THOMPSON O.L.S.
1184	DENOTES	E. BIASON O.L.S.
1514	DENOTES	M.J. TERRY, O.L.S.
1606	DENOTES	L. BIASON, O.L.S.
M&P	DENOTES	MACKAY & PETERS, O.L.S.
M	DENOTES	MEASURED
P1	DENOTES	PLAN 43R-20293
P2	DENOTES	PLAN 43R-21686
P3	DENOTES	REGISTERED PLAN 43M-1481
P4	DENOTES	PLAN 43R-28552
ANC	DENOTES	ANCHOR
BB	DENOTES	BELL BOX
BC	DENOTES	BACK OF CURB
BF	DENOTES	BOARD FENCE
CB	DENOTES	CATCH BASIN
CCUT	DENOTES	CURB CUT
CLF	DENOTES	CHAIN LINK FENCE
CPAD	DENOTES	CONCRETE PAD
CSP	DENOTES	CULVERT (STEEL PIPE)
CSW	DENOTES	CONCRETE SIDE WALK
CUL	DENOTES	CULVERT
EG	DENOTES	EDGE OF GRAVEL
EP	DENOTES	EDGE OF PAVEMENT
FF	DENOTES	FINISHED FLOOR
FH	DENOTES	FIRE HYDRANT
GD	DENOTES	GRAVEL DRIVEWAY
GM	DENOTES	GAS METER
GLM	DENOTES	GAS LINE MARKER
HM	DENOTES	HYDRO METER
HLINE	DENOTES	HEDGE LINE
LS	DENOTES	LIGHT STANDARD
MW	DENOTES	MONITORING WELL
MHC(SAN)	DENOTES	MAINTENANCE HOLE COVER (SANITARY)
MHC(STM)	DENOTES	MAINTENANCE HOLE COVER (STORM)
MHC(W)	DENOTES	MAINTENANCE HOLE COVER (WATER)
PWF	DENOTES	PCOT AND WIRE FENCE
SP	DENOTES	SIGN POST
WP(B)	DENOTES	WOODEN POLE (BELL)
WP(H)	DENOTES	WOODEN POLE (HYDRO)
WV	DENOTES	WATER VALVE
ø	DENOTES	DIAMETER
TOS	DENOTES	TOP OF SLOPE
BOS	DENOTES	BOTTOM OF SLOPE
DL	DENOTES	DITCH LINE
OHW	DENOTES	OVERHEAD WIRES
	DENOTES	CONIFEROUS TREE
	DENOTES	DECIDUOUS TREE
	DENOTES	TREE LINE
TC	DENOTES	TOP CASING
TP	DENOTES	TOP PIPE
TW	DENOTES	TEST WELL

BEARING NOTE

BEARINGS SHOWN HEREON ARE GRID AND ARE REFERRED TO THE NORTHEAST LIMIT OF PART 1 AS SHOWN ON PLAN 43R-20293, HAVING A BEARING OF N45°06'55"W.

BEARINGS ON PLAN 43R-20293 (P1), 43R-21686 (P2), 43M-1481 (P3), 43R-28552 (P4), HAVE BEEN ROTATED 0°43'45" COUNTERCLOCKWISE TO MAKE COMPARISONS.

DISTANCE NOTE

DISTANCES SHOWN HEREON ARE GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.99966073.

BENCH MARK NOTE

ELEVATIONS ARE REFERRED TO THE TOWN OF CALEDON BENCHMARK No. 25, BEING ON THE NORTH FACE AT THE WEST CORNER OF A TWO STOREY BLOCK BUILDING #16301 LOCATED ON THE EAST SIDE OF AIRPORT ROAD, APPROXIMATELY 0.32km NORTH OF NORTHERLY LIMIT OF CALEDON EAST, HAVING AN ELEVATION OF 310.640 METRES

NOTE

PROPERTY LIMITS ARE NOT FENCED UNLESS OTHERWISE NOTED ON THE FACE OF THE PLAN.

CAUTION

LOCATIONS OF ALL UTILITIES ARE APPROXIMATE. ALL UTILITIES SHOULD BE CONTACTED PRIOR TO ANY DIGGING OR CONSTRUCTION.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE *SURVEYS ACT*, THE *SURVEYORS ACT*, AND THE REGULATIONS MADE UNDER THEM.

2. THE SURVEY WAS COMPLETED ON THE 22nd DAY OF SEPTEMBER, 2016.

PRELIMINARY

DATE

ALISTER SANKEY
ONTARIO LAND SURVEYOR

THIS PLAN WAS PREPARED FOR
SHACCA CALEDON HOLDINGS INC.
c/o GLEN SCHNARR & ASSOCIATES INC.

DAVID B. SEARLES SURVEYING LTD. IS NOT RESPONSIBLE FOR USE BY OTHER PARTIES

PART 2

THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED JULY 21st, 2016

David B. Searles Surveying Ltd.
ONTARIO LAND SURVEYORS
4255 Sherwoodtowne Blvd, Suite 206, Mississauga, Ont. L4Z 1Y5
Tel: (905) 273-6840 Fax: (905) 896-4410
Email: info@dbsearles.ca

Calculator	Draftsperson
KR	PG
Editor	Plan Index No.
ADS	E-17

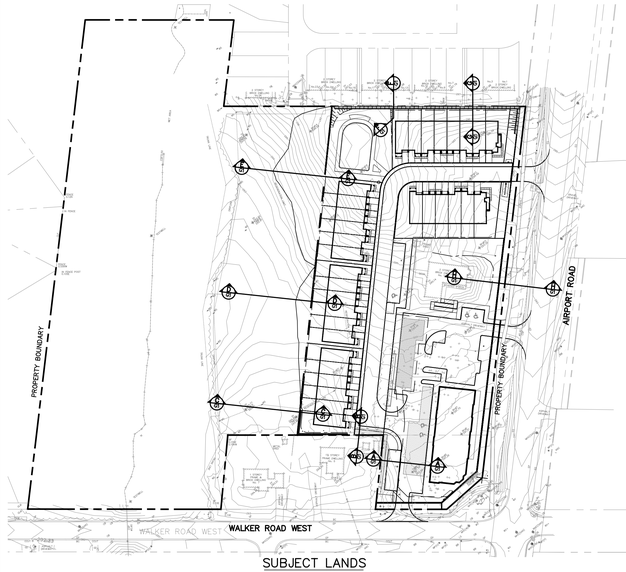
Calculation File	Drawing File	File No.
104-16CALC.DWG	104-0-16.DWG	104-0-16

Appendix ‘B’

Grading Plan (G1)

Servicing Plan (S1)

Erosion and Sediment Control Plan (E1)



SUBJECT LANDS

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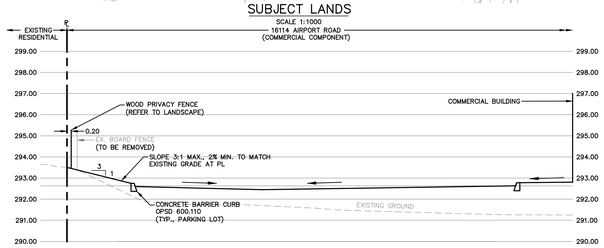

SECTION A–A

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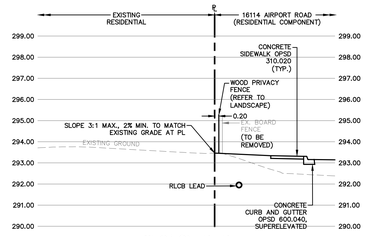

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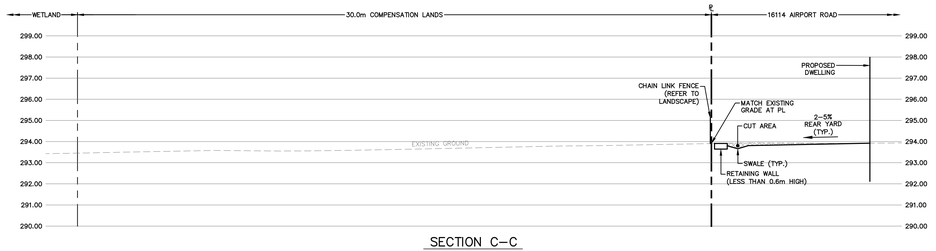

SECTION C–C

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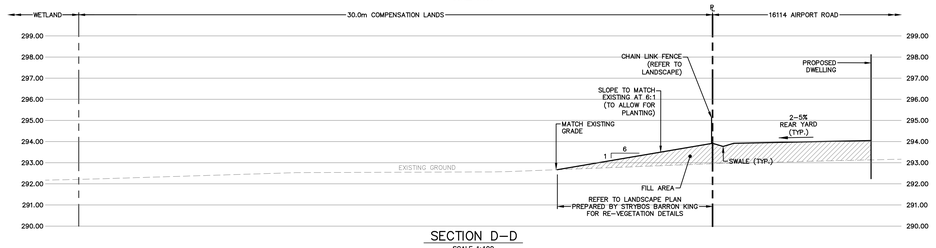

SECTION D–D

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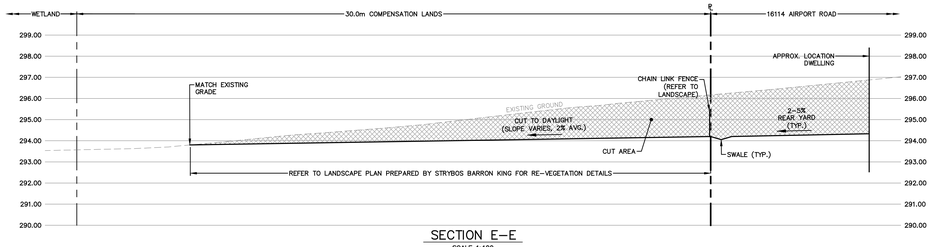


SECTION E–E

SCALE 1:100

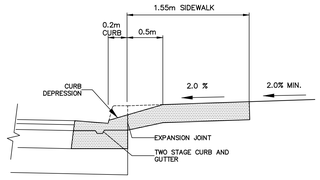
CATCH BASIN TABLE					
CB	INV	TOP	OPSD	COVER	COMMENTS
RESIDENTIAL DEVELOPMENT					
1	292.10	293.47	705.010	STD.503	BEEHIVE STYLE TOP
2	291.80	293.25	705.010	STD.503	BEEHIVE STYLE TOP
3	292.20	293.65	705.010	STD.503	BEEHIVE STYLE TOP
4	292.60	294.05	705.010	STD.503	BEEHIVE STYLE TOP
5	292.65	294.10	705.010	STD.503	BEEHIVE STYLE TOP
6	292.99	294.44	705.010	STD.503	BEEHIVE STYLE TOP
7	292.93	293.98	705.010	STD.503	BEEHIVE STYLE TOP
8	292.87	294.32	705.010	400.010	
9	292.90	294.35	705.010	400.010	
10	292.60	294.05	705.010	400.010	
11	292.60	294.05	705.010	400.010	
12	292.20	293.65	705.010	400.010	
13	292.16	293.61	705.010	400.010	
14	291.84	293.29	705.010	400.010	
15	291.81	293.26	705.010	400.010	
16	291.55	293.00	705.010	400.010	
17	291.58	293.03	705.010	400.010	
COMMERCIAL DEVELOPMENT					
18	291.34	292.36	705.010	400.010	
19	291.66	292.56	705.010	400.010	
20	291.67	292.57	705.010	400.010	
21	291.55	292.85	705.010	STD.503	BEEHIVE STYLE TOP

GENERAL GRADING NOTES

1. ALL DOWNSPOUTS TO SPLASH AT GRADE c/w CONCRETE SPLASH PAD
2. ALL LOTS TO HAVE MIN 200mm TOPSOIL
3. ALL YARDS SHALL HAVE A MIN. SLOPE OF 2.0%
4. ALL REAR YARDS SHALL HAVE A SLOPE BETWEEN 2.0% AND 5.0% WITHIN 5.0m OF THE REAR FACE OF DWELLING.
5. MAX. SLOPE IS 3 HORIZONTAL TO 1 VERTICAL (3:1).
6. MIN. DRIVEWAY SLOPE IS 2.0%, MAX. SLOPE IS 7.0%
7. DECKS AND LANDINGS LESS THAN 1.0M HIGH SHALL HAVE 100MM LAYER OF 19MM CLEAR STONE DIRECTLY UNDER DECK.
8. WHEN THE SEPARATION BETWEEN ADJACENT DWELLINGS IS 1.2m OR LESS THE AREA SHALL BE COVERED WITH 100mm DEEP 19mm CLEAR STONE.
9. ALL SWALES SHALL BE 150mm DEEP MIN. WITH A GRADE OF 2.0% MIN. UNLESS OTHERWISE NOTED.
10. RETAINING WALL EXCEEDING 1.0m IN HEIGHT SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.
11. SEE GEOTECHNICAL REPORT PREPARED BY TERRAPROBE DATED JANUARY 30, 2017 FOR SOIL INFORMATION AND FOUNDATION REQUIREMENTS.

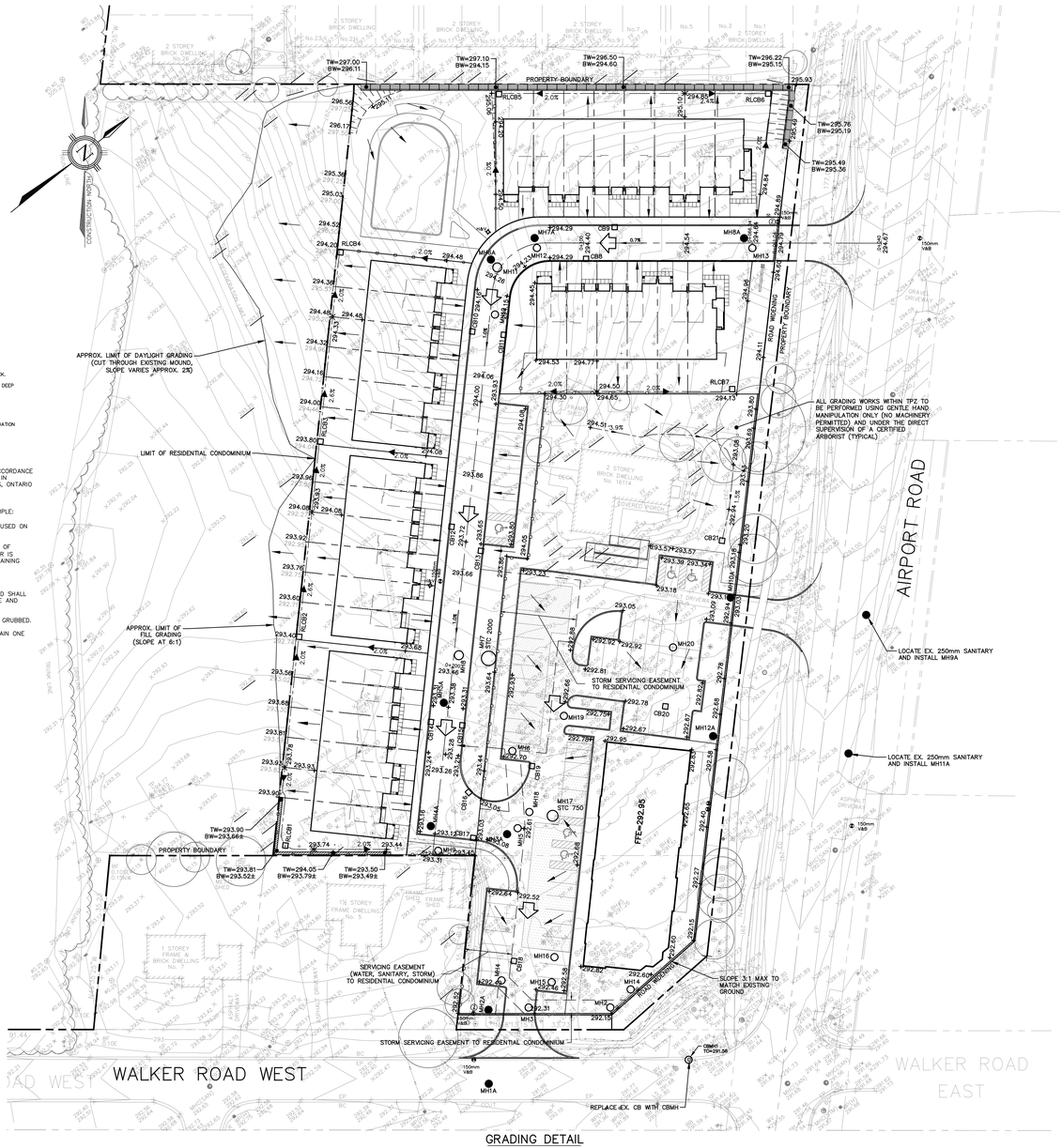
GENERAL NOTES

1. ALL ROADS, STORM SEWERS AND OTHER MISCELLANEOUS ITEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TOWN OF OAKVILLE REQUIREMENTS. SANITARY SEWERS AND WATERMAINS SHALL BE IN ACCORDANCE WITH THE REGION OF HALTON REQUIREMENTS. IN ABSENCE OF LOCAL STANDARDS, ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS SHALL BE USED, AS MODIFIED BY THE LOCAL MUNICIPALITY.
2. ONTARIO PROVINCIAL STANDARD DRAWINGS (O.P.S.D.) ARE TO BE USED WHEN INDICATED (EXAMPLE: O.P.S.D. 600.04) TOWN OF OAKVILLE STANDARDS ARE USED FOR ROADS, STORM SEWERS AND MISCELLANEOUS WHEN INDICATED (EXAMPLE: 6-1). THE REGION OF HALTON STANDARDS ARE USED ON WATERMAINS AND SANITARY SEWERS AS INDICATED (EXAMPLE: S1).
3. ALL INFORMATION SHOWN ON THE ENGINEERING DRAWINGS REGARDING THE SIZE AND LOCATION OF EXISTING UTILITIES AND/OR SERVICES HAS NOT BEEN VERIFIED IN THE FIELD. THE CONTRACTOR IS RESPONSIBLE FOR THE VERIFICATION AND LOCATION OF SAID UTILITIES AND PROTECTING AND MAINTAINING UTILITIES DURING CONSTRUCTION.
4. THE CONTRACTOR SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER.
5. HOARDING OR SNOW FENCE SHALL BE ERECTED PRIOR TO ANY GRADING OR CONSTRUCTION AND SHALL REMAIN IN PLACE AND IN GOOD REPAIR THROUGHOUT THE CONSTRUCTION AND GRADING PHASE AND REMOVED ONLY AS DIRECTED BY THE ENGINEER.
6. THE CONTRACTOR SHALL NOT DAMAGE TREES OUTSIDE AREAS INDICATED TO BE CLEARED AND GRUBBED.
7. TRAFFIC DETOURS AND SIGNAGE TO BE APPROVED BY OAKVILLE TRAFFIC DEPARTMENT. MAINTAIN ONE LANE OPEN TO TRAFFIC AT ALL TIMES.



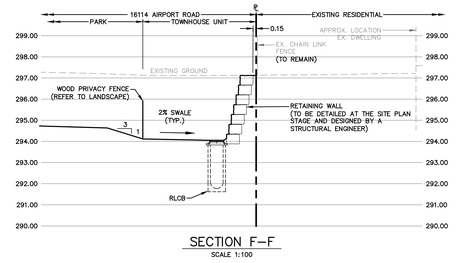
CURB AND SIDEWALK AT HOUSE DRIVEWAY

TO BE READ IN CONJUNCTION WITH OPSD 310.020 AND OPSD 600.070



GRADING DETAIL

SCALE 1:400



SECTION F–F

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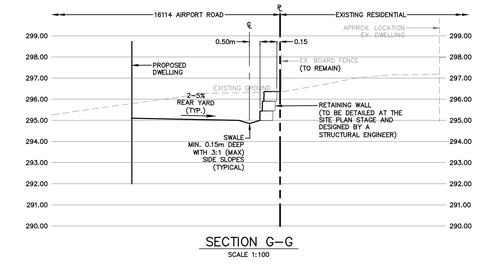

SECTION G–G

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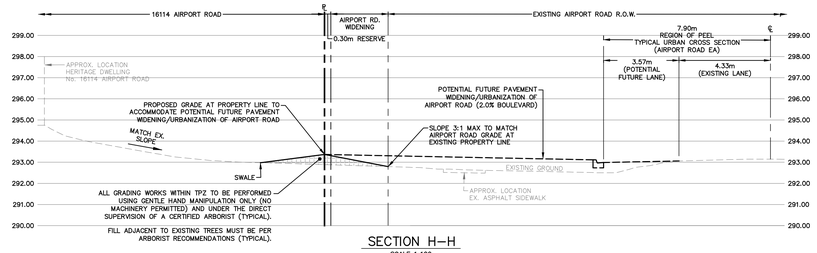
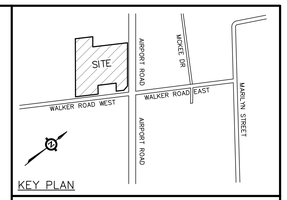


SECTION H–H

SCALE 1:100



KEY PLAN

LEGEND

- EXISTING ELEVATION
- PROPOSED ELEVATION
- PROPOSED SWALE DIRECTION
- PROPOSED DRAINAGE DIRECTION
- PROPERTY LINE
- PROPOSED SLOPE
- PROPOSED SWALE HIGH POINT
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- EXISTING CATCHBASIN
- EXISTING DOUBLE CATCHBASIN
- EISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- PROPOSED OVERLAND FLOW DIRECTION
- PROPOSED CHAIN LINK FENCE
- PROPOSED WOOD PRIVACY FENCE
- PROPOSED WOOD ACOUSTIC FENCE
- PROPOSED DECORATIVE METAL FENCE

NO.	DATE	BY/DRAWN	REVISIONS
2	29/10/2019	JN	RE-ISSUED FOR REZONING APPLICATION
1	15/03/2017	JN/ZG	ISSUED FOR REZONING APPLICATION

CAD FILE: 1599S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Oct 30, 2019

BENCHMARK

ELEVATIONS ARE REFERRED TO THE TOWN OF CALEDON BENCHMARK No. 25 HAVING AN ELEVATION OF 310.64 METRES

SURVEY CREDIT

TOPOGRAPHIC INFORMATION SHOWN HEREON IS OBTAINED FROM THE TOPOGRAPHIC SURVEY (104-0-16.DWG) PREPARED BY DAVID B. SEARLES SURVEYING LTD. DATED 22 SEPTEMBER 2016.

LICENSED PROFESSIONAL ENGINEER
J. T. NELSON
100193929
30 Oct 2019
PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-681 MORDEN ROAD, OAKVILLE, ON, L6K 3W8
www.trafalgareng.com

PROJECT TITLE
RESIDENTIAL CONDOMINIUM AND RETAIL DEVELPOMENT
SHACCA CALEDON HOLDINGS

LOCATION
16114 AIRPORT ROAD
TOWN OF CALEDON

DRAWING TITLE
PRELIMINARY GRADING PLAN

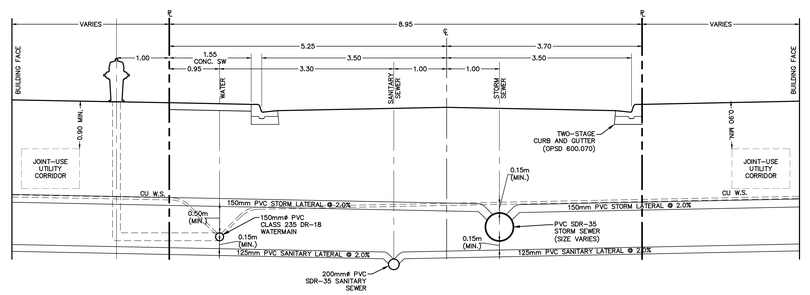
SCALE	AS NOTED	DESIGN BY	JN
DRAWN BY	JN	CHECKED BY	JN
DATE	2019/09/04	SHEET	1 OF 1
PROJECT No.	1599		
PLAN No.	G1		

FILENAME: P:\1599 Shacca\Drawings\DWG\1599S.dwg
PLOTDATE: Oct 30, 2019 - 10:47am

SANITARY SEWER DESIGN TABLE												
MH	N	NE	E	SE	S	SW	W	NW	TOP	DIA	OPSD	COVER	COMMENTS
RESIDENTIAL DEVELOPMENT													
1A	288.49		288.23				288.25			1200	701.010	401.010	
2A	288.69				288.66					1200	701.010	401.010	
3A					289.05		289.15		292.82	1200	701.010	401.010	
4A	289.41		289.31						293.14	1200	701.010	401.010	
5A	289.69				289.66				294.37	1200	701.010	401.010	
6A		290.69			290.59				294.22	1200	701.010	401.010	
7A			290.89			290.79			294.31	1200	701.010	401.010	
8A							291.31		294.61	1200	701.010	401.010	
COMMERCIAL DEVELOPMENT													
9A	290.33				290.31		290.43		292.66	1200	701.010	401.010	
10A			290.71					290.81	293.06	1200	701.010	401.010	
11A	290.15				290.13		290.52		292.25	1200	701.010	401.010	
12A			290.80			290.90			292.69	1200	701.010	401.010	

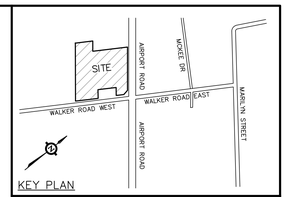
CATCH BASIN TABLE					
CB	INV	TOP	OPSD	COVER	COMMENTS
RESIDENTIAL DEVELOPMENT					
1	292.10	293.47	705.010	STD.503	BEEHIVE STYLE TOP
2	291.80	293.25	705.010	STD.503	BEEHIVE STYLE TOP
3	292.20	293.65	705.010	STD.503	BEEHIVE STYLE TOP
4	292.60	294.05	705.010	STD.503	BEEHIVE STYLE TOP
5	292.65	294.10	705.010	STD.503	BEEHIVE STYLE TOP
6	292.99	294.44	705.010	STD.503	BEEHIVE STYLE TOP
7	292.93	293.98	705.010	STD.503	BEEHIVE STYLE TOP
8	292.87	294.32	705.010	400.010	
9	292.90	294.35	705.010	400.010	
10	292.60	294.05	705.010	400.010	
11	292.60	294.05	705.010	400.010	
12	292.20	293.65	705.010	400.010	
13	292.16	293.61	705.010	400.010	
14	291.84	293.29	705.010	400.010	
15	291.81	293.26	705.010	400.010	
16	291.55	293.00	705.010	400.010	
17	291.58	293.03	705.010	400.010	
COMMERCIAL DEVELOPMENT					
18	291.34	292.36	705.010	400.010	
19	291.66	292.56	705.010	400.010	
20	291.67	292.57	705.010	400.010	
21	291.55	292.85	705.010	STD.503	BEEHIVE STYLE TOP

STORM SEWER DESIGN TABLE												
MH	N	NE	E	SE	S	SW	W	NW	TOP	DIA	OPSD	COVER	COMMENTS
RESIDENTIAL DEVELOPMENT													
1					290.44			290.46	291.64	1200	701.010	400.010	REPLACE EX. CB
2					290.56		290.66		292.22	1200	701.010	401.010	
3				290.74				290.79	292.34	1200	701.010	401.010	
4	290.88		290.83						292.45	1200	701.010	401.010	
5	291.08			291.03					292.67	1200	701.010	401.010	
6	290.86				291.16				292.66	1200	701.010	401.010	
7			291.25				291.27		293.61			401.010	STC 2000
8	291.41		291.31						293.47	1500	701.011	401.010	
9			291.79		291.74				293.29	1200	701.010	401.010	
10		291.95	291.83						294.16	1200	701.010	401.010	
11	292.30		292.17		292.00		292.30		294.25	1500	701.011	401.010	
12			292.27			292.22			294.31	1200	701.010	401.010	
13	292.62						292.49		294.63	1200	701.010	401.010	
COMMERCIAL DEVELOPMENT													
14					290.56		290.61		292.24	1200	701.010	401.010	
15	290.74				290.69				292.52	1200	701.010	400.020	
16	290.78		290.76						292.54	1200	701.010	401.010	
17	290.91				290.83		290.91		292.65	1200	701.010	401.010	
18	291.04		290.94		291.04				292.59	1200	701.010	401.010	
19		291.04			291.01				292.63	1200	701.010	401.010	
20	291.30				291.17				292.87	1200	701.010	401.010	



PRIVATE ROAD TYPICAL SECTION

1:40



KEY PLAN

LEGEND

- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPERTY LINE
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED FIRE HYDRANT
- PROPOSED VALVE & BOX
- PROPOSED CHECK VALVE IN CHAMBER
- PROPOSED WATERMAIN
- PROPOSED PLUG
- EXISTING CATCHBASIN
- EXISTING DOUBLE CATCHBASIN
- EISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE

GENERAL NOTES

1. CONSTRUCTION FOR THIS PROJECT TO COMPLY WITH THE MOST CURRENT VERSION OF THE DEVELOPMENT STANDARDS, POLICIES AND GUIDELINES, PREPARED BY THE TOWN OF CALEDON INFRASTRUCTURE DEPARTMENT AND THE ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
2. ALL PROPOSED CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
3. A MINIMUM OF FORTY-EIGHT (48) HOURS PRIOR TO COMMENCING CONSTRUCTION WITHIN THE MUNICIPAL RIGHT OF WAY THE CONTRACTOR MUST CONTACT THE FOLLOWING: THE TOWN OF CALEDON PUBLIC WORKS AND ENGINEERING DEPARTMENT 905-584-2272, THE REGION OF PEEL, ENBRIDGE CONSUMERS GAS, HYDRO ONE, BELL CANADA, ROGERS CABLE, FIRE AND EMERGENCY SERVICES
4. ALL DRAINAGE TO BE SELF-CONTAINED AND DISCHARGED TO A LOCATION APPROVED BY THE PUBLIC WORKS AND ENGINEERING DEPARTMENT AND CONSERVATION AUTHORITY PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
5. SEDIMENT CONTROL DEVICES ARE TO BE INSTALLED PRIOR TO ANY CONSTRUCTION ON THE SITE AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD TO THE SATISFACTION OF THE TOWN AND THE APPLICABLE CONSERVATION AUTHORITY.
6. A MINIMUM OF 1.2M CLEARANCE IS TO BE PROVIDED FROM THE LIMITS OF ALL SIDEWALKS AND DRIVEWAYS TO EXISTING UTILITY STRUCTURES WITHIN THE MUNICIPAL RIGHT OF WAY. IF THIS CLEARANCE IS NOT MAINTAINED THEY SHALL BE RELOCATED AT THE APPLICANT'S EXPENSE.
7. STREET CURBS ARE TO BE CONTINUOUS THROUGH THE PROPOSED ENTRANCE.
8. MUNICIPAL SIDEWALKS SHALL BE CONTINUOUS THROUGH ALL ENTRANCES TO THE SITE AND THE CURB SHALL BE TAPERED BACK 600MM. SIDEWALKS SHALL BE COMPLETELY REMOVED AND REPLACED WITH A 180MM MINIMUM CONCRETE THICKNESS, 30MPA AND 5 TO 7% AIR ENTRAINMENT AT ALL PROPOSED INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL ENTRANCES.
9. ANY CHANGES TO GRADES OR SERVICING FROM THE ORIGINAL APPROVED SITE PLAN MUST BE SUBMITTED BY THE ENGINEER TO THE TOWN FOR APPROVAL PRIOR TO CONSTRUCTION.
10. ALL BOULEVARDS TO BE RESTORED WITH 150MM MINIMUM OF TOPSOIL AND SOD TO THE SATISFACTION OF THE TOWN OF CALEDON PUBLIC WORKS AND ENGINEERING DEPARTMENT.
11. THE MINIMUM PAVEMENT DESIGN FOR THE ASPHALT DRIVEWAY APRON WITHIN THE MUNICIPAL ROAD ALLOWANCE SHALL BE AS FOLLOWS: 40MM HL3 ASPHALT 50MM HL8 ASPHALT 150MM GRANULAR 'A' 300MM GRANULAR 'B' THE CONSULTANT SHOULD REVIEW THE ABOVE WITH RESPECT TO THE EXPECTED USAGE.
12. ALL DIMENSIONS AND ELEVATIONS TO BE VERIFIED PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES FOUND PRIOR TO OR DURING CONSTRUCTION SHALL BE CLARIFIED WITH THE ENGINEER.
13. THE LOCATION OF ALL EXISTING UTILITIES AND SERVICES TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
14. THIS PLAN SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANT'S PLANS. ANY DISCREPANCIES SHALL BE CLARIFIED PRIOR TO CONSTRUCTION. INFORMATION RELATED TO DIMENSIONS FOR PRIVATE ROAD, PARKING AND SETBACKS SHALL BE TAKEN FROM THE SITE PLAN PREPARED BY the ARCHITECT.
15. ALL SERVICES AND APPURTENANCE MATERIAL AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH THE LATEST TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL, ONTARIO PLUMBING CODE AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
16. O.P.S.D. REFERS TO ONTARIO PROVINCIAL STANDARD DRAWING.
17. ALL REMOVED OR DAMAGED CURBS, SIDEWALK AND SOD RESULTING FROM SERVICE INSTALLATION SHALL BE REINSTATED BY SERVICING CONTRACTOR TO THE TOWN OF CALEDON STANDARDS.
18. ALL SEWER TRENCH BACKFILL WITHIN SITE SHALL BE NATIVE MATERIAL FREE OF ORGANIC MATERIAL AND COMPACTED TO 95% SPMDD OR AS OTHERWISE DIRECTED BY THE GEOTECHNICAL ENGINEER.

WATERMAINS

1. ALL MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT PEEL PUBLIC WORKS STANDARDS AND SPECIFICATIONS.
2. WATERMAIN AND / OR WATER SERVICE MATERIALS 100mm (4") AND LARGER MUST BE AWWA C-900-16 POLYVINYL CHLORIDE (PVC) DR18 INSTALLED WITH A 12 GAUGE THH SOLID COPPER LIGHT COLOURED PLASTIC COATED TRACER WIRE BROUGHT TO THE SURFACE AT EACH VALVE BOX. SIZE 50mm (2") AND SMALLER MUST BE COPPER TYPE "K" SOFT COPPER TUBING.
3. WATERMAINS AND / OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7m (5'6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2m (4") FROM THEMSELVES AND ALL OTHER UTILITIES.
4. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC, MUST BE PROVIDED WITH AT LEAST A 50mm (2") OUTLET ON 100mm (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100mm (4") DIAMETER MINIMUM ON A HYDRANT.
5. ALL CURB STOPS TO BE 3.0m (10') OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
6. HYDRANT AND VALVE SET TO REGION STANDARD 1-6-1. DIMENSION A AND B, 0.7m (2") AND 0.9m (3") AND TO HAVE PUMPER NOZZLE.
7. WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON THE APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
8. WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 0.30m (12") OVER / 0.50m (20") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
9. ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
10. ALL LIVE TAPPING AND OPERATION OF REGION OF WATER VALVES SHALL BE ARRANGED THROUGH THE REGIONAL INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENCE DIVISION.
11. ALL PROPOSED WATER PIPING MUST BE ISOLATED THROUGH A TEMPORARY CONNECTION THAT SHALL INCLUDE AN APPROPRIATE CROSS-CONNECTION CONTROL DEVICE, CONSISTANT WITH THE DEGREE OF HAZARD, FOR BACKFLOW PREVENTION OF THE ACTIVE DISTRIBUTION SYSTEM, CONFORMING TO REGION OF PEEL STANDARDS 1-7-7 OR 1-7-8.

SANITARY SEWERS

1. ALL SANITARY SEWER BEDDING AS PER STD. 2-3-1.
2. MAINLINE SANITARY SEWER PIPE SIZE SHALL BE MINIMUM 250mm IN DIAMETER INSTALLED AT THE APPROVED DESIGN GRADE. PIPE CLASS AND APPURTENANCES AS PER REGION'S SPECIFICATIONS.
3. ALL SEWERS CONSTRUCTED WITH GRADES 0.5% OR LESS SHALL BE APPROVED BY THE ENGINEER AND THE AGENCY PROJECT MANAGER OR DESIGNATE AND BE INSTALLED WITH LASER AND CHECKED PRIOR TO BACKFILL.
4. MINIMUM SANITARY SEWER PIPE SLOPE FOR LAST LEG SHALL BE 1% AND DESIRABLE SLOPE 2%.
5. ALL MANHOLES SHALL BE AS PER REGION STD. DWG. 2-5-1, 2-5-2, AND 2-5-3, WITH BENCHING AS PER STD 2-5-20. SEE NOTE 9.c. FOR IN-FLOW AND INFILTRATION.
6. FRAME AND COVERS SHALL BE AS PER REGION STD. DWG. 2-6-1.
7. MANHOLE STEPS SHALL BE AS PER REGION STD. DWG. 2-6-11.
8. MANHOLES DEEPER THAN 5.0m MUST BE EQUIPPED WITH SAFETY PLATFORMS, AS PER STD 2-6-13, 2-6-14, AND 2-6-15
9. SANITARY SERVICE LATERALS SHALL BE MINIMUM 150mm DIAMETER.
   a. SANITARY SERVICE SHALL BE LOWER THAN AND TO THE RIGHT OF THE STORM SERVICE AT THE PROPERTY LINE WHEN FACING THE LOT FROM THE STREET.
   b. CONNECTIONS TO SEWERS SHALL BE MADE WITH MANUFACTURED TEES OR WYES WHERE APPLICABLE AND SHALL BE COLOUR CODED AS NON-WHITE, AS PER STD. DWG. 2-4-1, 2-4-2, AND 2-4-3.
   c. ANY SANITARY CONNECTION OR STRUCTURE LEADING TO IN-FLOW AND INFILTRATION WILL HAVE TO BE ADDRESSED AND WILL BE ENFORCED IN THE FIELD BY A REGION OF PEEL INSPECTOR.

STORM SEWERS

1. ALL STORM SEWERS 450mm DIAMETER AND LESS SHALL BE PVC DR-35 SEWER PIPE & FITTINGS IN ACCORDANCE WITH CSA B 182.2 WITH BEDDING PER O.P.S.D. 802.010. STORM SEWER 525mm DIA. AND LARGER SHALL BE REINFORCED CONCRETE PIPE 65-D, CSA A257.2 COMPLETE WITH BEDDING PER OPSD 802.030 (UNLESS OTHERWISE NOTED).
2. SINGLE CATCHBASINS SHALL BE IN ACCORDANCE WITH O.P.S.D. 705.01 WITH 250mm DIAMETER (UNLESS OTHERWISE SHOWN) PVC LEAD AT 1.0% MIN. DOUBLE CATCHBASIN SHALL BE IN ACCORDANCE WITH O.P.S.D. 705.02 WITH 300mm DIAMETER (UNLESS OTHERWISE SHOWN) PVC LEAD AT 1.0% MIN. FRAME AND COVER PER O.P.S.D. 400.02 (UNLESS OTHERWISE SHOWN). ALL CB LEADS TO HAVE A MINIMUM COVER OF 1.2m AND A MAXIMUM COVER OF 1.8m BELOW TOP OF COVER (UNLESS OTHERWISE SHOWN) SINGLE CATCHBASINS SPECIFIED TO HAVE 'NO SUMP' SHALL BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STD 2114.01.
3. STORM CONNECTIONS SHALL BE 150mm DIAMETER, WHITE COLOUR ONLY PVC PIPE SDR-28 AT A MIN. GRADE OF 2.0% PER CITY STD. 2115.05.
4. MINIMUM CLEARANCE SHALL BE 150mm OR AS REQUIRED FOR BEDDING WHICHEVER IS GREATER.
5. CATCHBASINS AT ROAD SIDES SHALL HAVE 270 R GEOTEXTILE MATERIAL PLACED BETWEEN FRAME AND COVER TO CONTROL SEDIMENT. MAINTENANCE OF THE GEOTEXTILE SHALL BE ROUTINELY DONE TO ENSURE ADEQUATE DRAINAGE.
6. STORM PIPE WITH LESS THAN 1.2m COVER TO BE PROVIDED WITH INSULATION IN ACCORDANCE WITH OBC SECTION 7.3.5.4. APPENDIX A.

ADDITIONAL NOTES

1. LOCATION OF ALL EXISTING UTILITIES IN THE FIELD TO BE ESTABLISHED BY THE CONTRACTOR.
2. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF 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 RESULTING FROM DAMAGE TO SAME.
3. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.

NO.	DATE	BY/DRAWN	REVISIONS
2	29/10/2019	JN	RE-ISSUED FOR REZONING APPLICATION
1	15/03/2017	JN/ZG	ISSUED FOR REZONING APPLICATION

CAD FILE: 1599S.dwg | PLOT SCALE: 1:1 | PLOT DATE: Oct 30, 2019

BENCHMARK

ELEVATIONS ARE REFERRED TO THE TOWN OF CALEDON BENCHMARK No. 25 HAVING AN ELEVATION OF 310.64 METRES

SURVEY CREDIT

TOPOGRAPHIC INFORMATION SHOWN HEREON IS OBTAINED FROM THE TOPOGRAPHIC SURVEY (104-0-16.DWG) PREPARED BY DAVID B. SEARLES SURVEYING LTD. DATED 22 SEPTEMBER 2016.

LICENSED PROFESSIONAL ENGINEER J.T. NELSON 100193989 PROVINCE OF ONTARIO
30 OCT 2019

DESIGNED BY | APPROVED BY

CONSULTANT
TRAFALGAR ENGINEERING
#1-481 MORDEN ROAD, OAKVILLE, ON, L6K 3W6
www.trafalgareng.com

PROJECT TITLE
RESIDENTIAL CONDOMINIUM AND RETAIL DEVELPOMENT
SHACCA CALEDON HOLDINGS

LOCATION
16114 AIRPORT ROAD
TOWN OF CALEDON

DRAWING TITLE
PRELIMINARY SERVICING PLAN

SCALE	1:400	DESIGN BY	JN	PROJECT No.	1599
DRAWN BY	JN	CHECKED BY	JN	PLAN No.	S1
DATE	2019/09/04	SHEET	1 OF 1		

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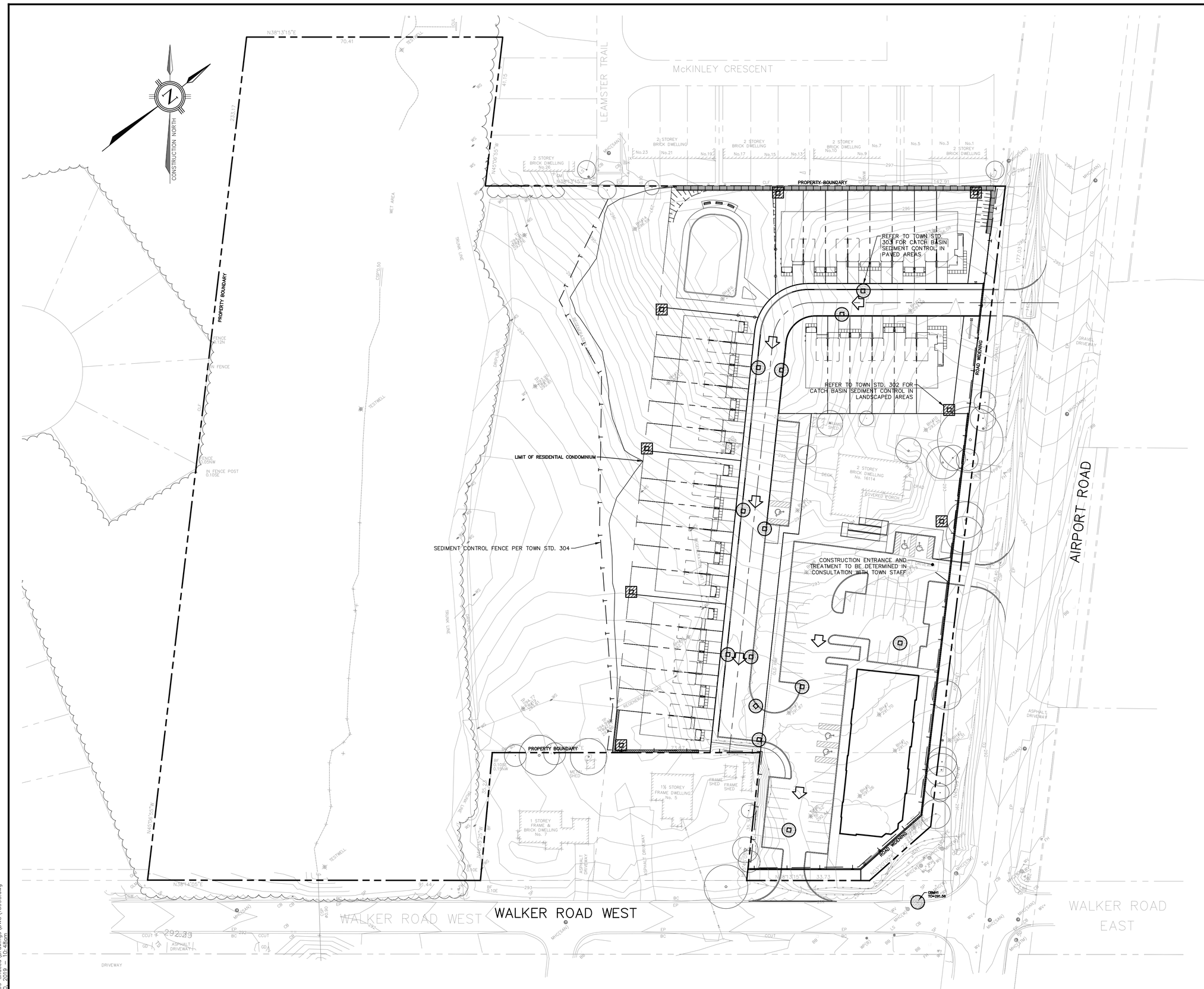
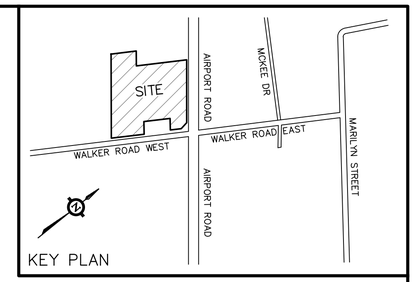
PLOTDATE: Oct 30, 2019 @ 10:46am





LEGEND

- SEDIMENT CONTROL CB IN PAVED AREAS
- SEDIMENT CONTROL CB IN LANDSCAPED AREA
- PROPERTY LINE
- PROPOSED SLOPE
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- EXISTING CATCHBASIN
- EXISTING DOUBLE CATCHBASIN
- PROPOSED OVERLAND FLOW DIRECTION
- — T — SEDIMENT CONTROL FENCE

NO.	DATE	BY/DRAWN	REVISIONS
2	29/10/2019	JN	RE-ISSUED FOR REZONING APPLICATION
1	15/03/2017	JN/ZG	ISSUED FOR REZONING APPLICATION

CAD FILE: 1599S.dwg | PLOT SCALE: 1:1 | PLOT DATE: 30/10/19

BENCHMARK

ELEVATIONS ARE REFERRED TO THE TOWN OF CALEDON BENCHMARK No. 25 HAVING AN ELEVATION OF 310.64 METRES

SURVEY CREDIT

TOPOGRAPHIC INFORMATION SHOWN HEREON IS OBTAINED FROM THE TOPOGRAPHIC SURVEY (104-0-16.DWG) PREPARED BY DAVID B. SEARLES SURVEYING LTD. DATED 22 SEPTEMBER 2016.

LICENSED PROFESSIONAL ENGINEER
J. T. NELSON
100199369
29 Oct 2019
PROVINCE OF ONTARIO

DESIGNED BY | APPROVED BY

TRAFALGAR ENGINEERING LTD.
481 MORDEN ROAD OAKVILLE, ONTARIO L6K 3W6
TEL: (905) 338-3366 FAX: (905) 338-7734
tel@trafalgareng.com

PROJECT TITLE
RESIDENTIAL CONDOMINIUM AND RETAIL DEVELOPMENT
SHACCA CALEDON HOLDINGS

LOCATION
16114 AIRPORT ROAD
TOWN OF CALEDON

DRAWING TITLE
EROSION AND SEDIMENTATION CONTROL PLAN

SCALE 1:500	DESIGN BY JN/SP	PROJECT No. 1599
DRAWN BY JN/ZG	CHECKED BY SP	PLAN No. E1
DATE 15/11/2016	SHEET 1 OF 1	

FILENAME: P:\1599 Shacca\Drawings\DWG\1599S.dwg
PLOTDATE: Oct 30, 2019 - 10:48am

Appendix ‘C’

Estimated Domestic Water Demand

Estimated Sanitary Flow

TRAFALGAR ENGINEERING LTD.

ESTIMATED SANITARY FLOW

Project: Shacca Caledon
Desc: Second submission Rezoning

Project No.: 1599
Prepared By: JN
Checked By: SP

Residential

Land Use / Occupancy Type	Site Area (ha)	Population Density (pers/unit)	Eq. Population (cap.)	Per Cap. Demand (L/cap. Day)	Average Daily Dry Weather Flow (L/s)
Proposed Townhouse Condominium	32	3.2	102	302.8	13.0
*SEE PEEL STD. 2-5-2					
TOTAL			**102**		**13.0**

Industrial / Commercial / Institutional

Land Use / Occupancy Type	GFA	Population Density (pers/ha)	Eq. Population (cap.)	Per Cap. Demand (L/Ha. Day)	Average Daily Dry Weather Flow (L/s)
					0.0
					0.0
TOTAL			**0**		**0.0**

Residential Peaking Factor:	1.00	*PEAKING IS INCLUDED IN REGION FLOW (STD 2-5-2)
ICI Peaking Factor:	4.50	
Include ICI Peaking?	No	
Site Area:	0.94	(ha)
Infiltration Allowance:	0.20	(L/s ha)
Manhole Allowance	2.24	(L/s)
Residential Average Flow:	15.3	(L/s)
ICI Average Flow:	0.0	(L/s)
Groundwater Discharge:	0.0	(L/s)
Total Average Flow:	**15.3**	**(L/s)**
Residential Peak Flow:	15.3	(L/s)
ICI Peak Flow:	0.0	(L/s)
Groundwater Discharge:	0.0	(L/s)
Total Peak Flow:	**15.3**	**(L/s)**

TRAFALGAR ENGINEERING LTD.

ESTIMATED SANITARY FLOW

Project: Shacca Caledon
Desc: Second submission Rezoning

Project No.: 1599
Prepared By: JN
Checked By: SP

Residential

Land Use / Occupancy Type	Site Area (ha)	Population Density (pers/ha)	Eq. Population (cap.)	Per Cap. Demand (L/cap. Day)	Average Daily Dry Weather Flow (L/s)
Proposed Commercial Development	0.557	50	28	*	13.0
*SEE PEEL STD. 2-5-2					
TOTAL			**28**		**13.0**

Industrial / Commercial / Institutional

Land Use / Occupancy Type	GFA	Population Density (pers/ha)	Eq. Population (cap.)	Per Cap. Demand (L/Ha. Day)	Average Daily Dry Weather Flow (L/s)
					0.0
					0.0
TOTAL			**0**		**0.0**

Residential Peaking Factor:	1.00	*PEAKING IS INCLUDED IN REGION FLOW (STD 2-5-2)
ICI Peaking Factor:	4.50	
Include ICI Peaking?	No	
Site Area:	0.56	(ha)
Infiltration Allowance:	0.20	(L/s ha)
Manhole Allowance	1.12	(L/s)
Residential Average Flow:	13.7	(L/s)
ICI Average Flow:	0.0	(L/s)
Groundwater Discharge:	0.0	(L/s)
Total Average Flow:	**13.7**	**(L/s)**
Residential Peak Flow:	13.7	(L/s)
ICI Peak Flow:	0.0	(L/s)
Groundwater Discharge:	0.0	(L/s)
Total Peak Flow:	**13.7**	**(L/s)**

TRAFALGAR ENGINEERING LTD.

ESTIMATED DOMESTIC WATER DEMAND

Project: Shacca Caledon
Desc: Second submission Rezoning

Project No.: 1599
Prepared By: JN
Checked By: SP

	Occupancy Data					Peaking Factors			Demand Flow		
Land Use / Occupancy Type	Units	Population Density (pers/unit)	Eq. Population (cap.)	Per Cap. Demand (L/cap. Day)	Average Daily Demand (L/min)	Min. Hour	Peak Hour	Max. Daily	Min. Hour Demand (L/min)	Max. Hour Demand (L/min)	Max. Daily Demand (L/min)
Proposed Townhouse Condominium	32	3.2	102	280	20	1.00	3.00	2.00	20	60	40
									0	0	0
									0	0	0
									0	0	0
TOTAL			**102**		**20**				**20**	**60**	**40**

Average Daily Demand: **20 (L/min)**
Minimum Hourly Demand: **20 (L/min)**
Maximum Hourly Demand: **60 (L/min)**
Maximum Daily Demand: **40 (L/min)**
Max. Daily Plus Fire: **9040 (L/min)**

Fire Flow
Using Fire Underwriters Survery Methodology:

1. **An estimate of the fire flow is given by the formula** $F = 220C\sqrt{A}$

Where:
F = The required fire flow in litres per minute
C = Coefficient related to the type of construction
A = The total floor area in square metres (including all storeys but excluding basements at least 50% below grade)

Type of Construction: Ordinary Coefficient: 1.00 Total Floor Area: 1200 (m^2)

F = 8000 (L/min)

Adequately Protected Vertical Openings: No

Area Note: For fire resistive buildings, consider the two largest adjoining floors plus 50% of the remaining floors up to eight, when openings are inadequately protected. For adequately protected vertical openings consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors

2. **Adjust the value in No. 1 for occupancy surcharge/reduction**

Occupancy Contents: Limited Combustible Factor: -15%

F = 6800 (L/min)

3. **Adjust the value in No. 2 for sprinkler**

NFPA 13 Sprinkler:	No	Reduction:	0%
Standard Water Supply:	Yes	Reduction:	0%
Fully Supervised:	No	Reduction:	0%
		Total Reduction:	**0%**
		Sprinkler Reduction:	**0 (L/min)**

4. Adjust the value in No. 2 for exposure

	Separation (m)	Charge
North	45	0%
East	3	20%
South	18	15%
West	N/A	
Total Charge:		**35%**
Exposure Charge:		**2380 (L/min)**

5. **Estimated Fire Flow is value in No. 2 less *Sprinkler Reduction* plus *Exposure Charge*, rounded to the nearest 1000**

F = 9000 (L/min)

TRAFALGAR ENGINEERING LTD.

ESTIMATED DOMESTIC WATER DEMAND

Project: Shacca Caledon
Desc: Second submission Rezoning

Project No.: 1599
Prepared By: JN
Checked By: SP

	Occupancy Data					Peaking Factors			Demand Flow		
Land Use / Occupancy Type	Site Area (ha)	Population Density (pers/ha)	Eq. Population (cap.)	Per Cap. Demand (L/cap. Day)	Average Daily Demand (L/min)	Min. Hour	Peak Hour	Max. Daily	Min. Hour Demand (L/min)	Max. Hour Demand (L/min)	Max. Daily Demand (L/min)
Proposed Commercial Development	0.557	50	28	280	5	1.00	3.00	1.40	5	16	8
									0	0	0
									0	0	0
									0	0	0
TOTAL			**28**		**5**				**5**	**16**	**8**

Average Daily Demand: **5 (L/min)**
Minimum Hourly Demand: **5 (L/min)**
Maximum Hourly Demand: **16 (L/min)**
Maximum Daily Demand: **8 (L/min)**
Max. Daily Plus Fire: **8008 (L/min)**

Fire Flow
Using Fire Underwriters Survery Methodology:

1. **An estimate of the fire flow is given by the formula** $F = 220C\sqrt{A}$

Where:
F = The required fire flow in litres per minute
C = Coefficient related to the type of construction
A = The total floor area in square metres (including all storeys but excluding basements at least 50% below grade)

Type of Construction: Ordinary Coefficient: 1.00 Total Floor Area: 905 (m^2)

F = 7000 (L/min)

Adequately Protected Vertical Openings: No

Area Note: For fire resistive buildings, consider the two largest adjoining floors plus 50% of the remaining floors up to eight, when openings are inadequately protected. For adequately protected vertical openings consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors

2. **Adjust the value in No. 1 for occupancy surcharge/reduction**

Occupancy Contents: Combustible Factor: 0%

F = 7000 (L/min)

3. **Adjust the value in No. 2 for sprinkler**

NFPA 13 Sprinkler:	No	Reduction:	0%
Standard Water Supply:	Yes	Reduction:	0%
Fully Supervised:	No	Reduction:	0%
		Total Reduction:	**0%**
		Sprinkler Reduction:	**0 (L/min)**

4. Adjust the value in No. 2 for exposure

	Separation (m)	Charge
North	35	5%
East	N/A	
South	N/A	
West	35	5%
	Total Charge:	**10%**
	Exposure Charge:	**700 (L/min)**

5. **Estimated Fire Flow is value in No. 2 less *Sprinkler Reduction* plus *Exposure Charge*, rounded to the nearest 1000**

F = 8000 (L/min)

Appendix ‘D’

TRCA SWM Requirements (Email)

Pre-Development Drainage Area Plan (Figure 1)

Post-Development Drainage Area Plan (Figure 2)

Storm Sewer Design Sheet

HydroCAD Output

Oil/Grit Separator Sizing

James Nelson

From: Anant Patel <APatel@trca.on.ca>
Sent: June-22-16 10:16 AM
To: Stephen Potter
Subject: 16114 Airport Road, Caledon

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Steve,

As discussed this morning, please see below TRCA's Stormwater Management requirements.

The stormwater management requirements for the proposed development at 16114 Airport Road, Caledon is:

- **Quantity Control:** TRCA's quantity control criteria for the site is that post development peak flows to be controlled to pre-development peak flows for 2 - 100 year storms. The pre-development peak flows for 2 - 100 year storms should be established based on the unit flow rates for Sub-basin # 6 (Equation B) and typically with drainage areas under existing conditions. The unit flow relationships for the Humber River Watershed are provided in the TRCA Stormwater Management Criteria document which can be found in the following link: http://www.trca.on.ca/dotAsset/26183.pdf. Please use 6 hr AES and 12 hr AES to estimate storage requirements for the post-development flows to achieve the targets and then select the option that require greater storage requirements.

- **Quality Control:** Level 1/Enhanced protection such that 80% TSS removal is achieved.

- **Erosion Control:** due to the size of the site, an erosion assessment is required to identify the necessary controls required to mitigate any potential downstream erosion issues. However, the minimum control required is to detain runoff from a 25 mm storm for at least 48 hours.

- **Water Balance:** As the site is located on the Oak Ridges Moraine, post-development infiltration should be maintained to pre-development infiltration by implementing mitigation measures to aid in the infiltration.

- **Feature Based Water Balance Analysis:** Given that the Ministry of Natural Resources and Forestry (MNRF) has identified the wetland to the rear of the property as a Provincially Significant Wetland (PSW, a feature based water balance will be required in support of the application. Scoping of the FBWB will depend on the conceptual alterations to the wetland catchment area as well as the sensitivity of the wetland complex. Please refer the applicant to Appendix: D of he SWM Criteria Document for further guidance.

TRCA staff recommend that you also refer to TRCA Low Impact Development Stormwater Management Planning & Design Guide, which can be found in the following link: https://trca.ca/wp-content/uploads/2016/04/LID-SWM-Guide-v1.0_2010_1_no-appendices.pdf.

Should you have any further questions, please do not hesitate to contact me.

Thank you,
Anant

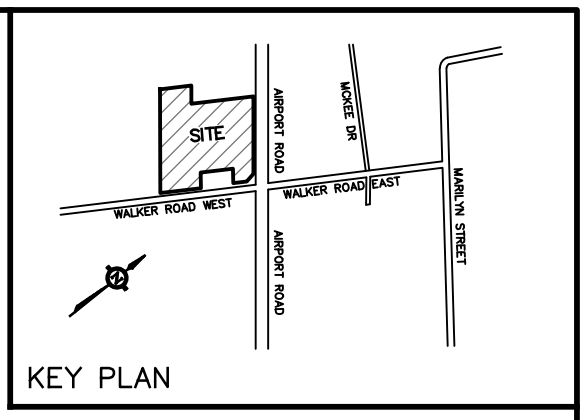
Anant Patel, Acting Planner II | Planning and Development |
Toronto and Region Conservation Authority|
P: 416.661.6600 x5618 | F: 416.661.6898 | apatel@trca.on.ca | www.trca.on.ca |
Head Office location & courier address: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 |

LEGEND

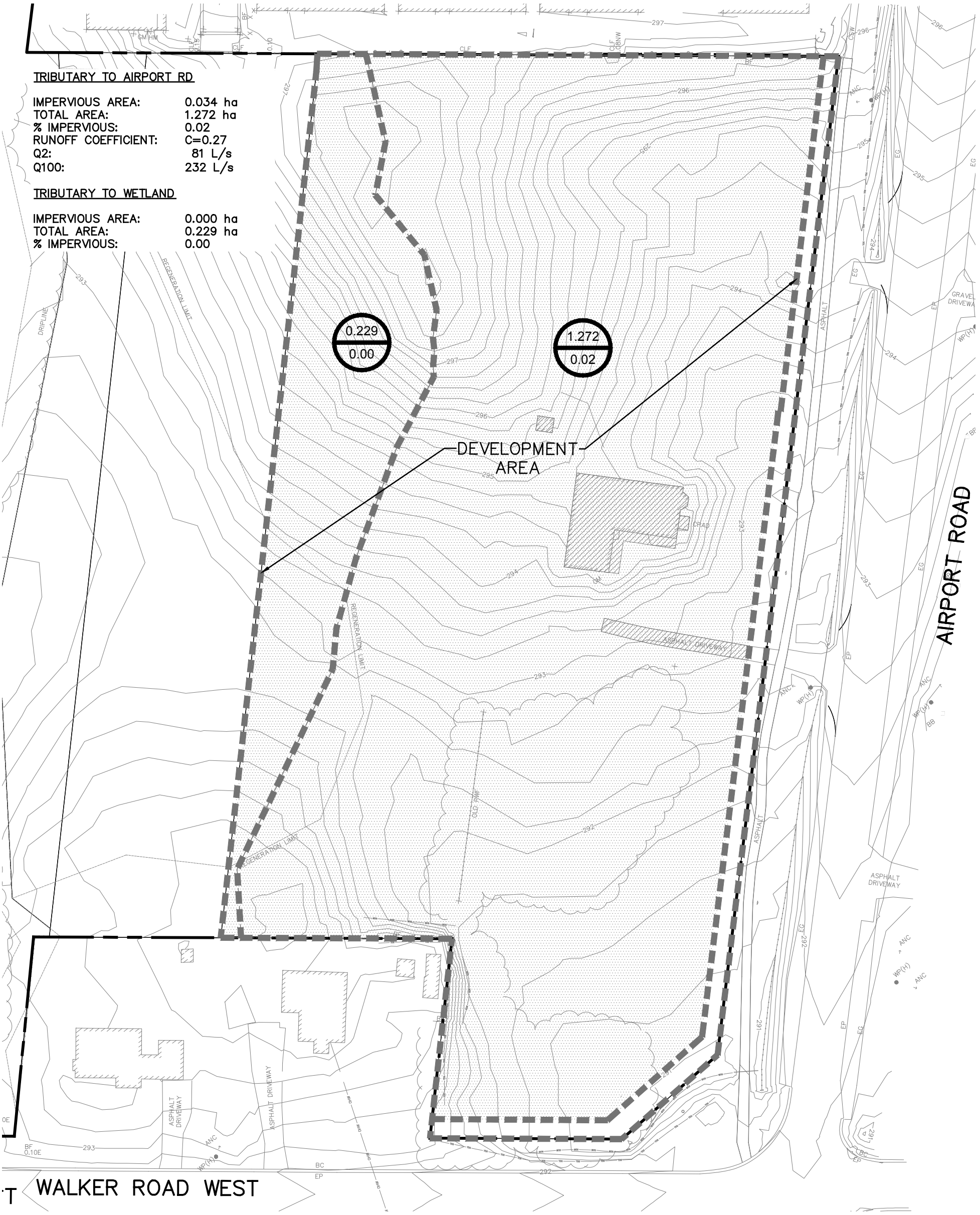
PROPOSED OVERLAND FLOW DIRECTION

PROPOSED DRAINAGE AREA

0.195 / 0.25 — DRAINAGE AREA (ha) / IMPERVIOUSNESS



KEY PLAN



PROJECT TITLE	16114 AIRPORT ROAD TOWN OF CALEDON
DRAWING TITLE	PRE-DEVELOPMENT DRAINAGE AREA PLAN

TRAFALGAR ENGINEERING LTD.
TEL: (905) 338-3366 FAX: (905) 338-7734
tel@trafalgareng.com

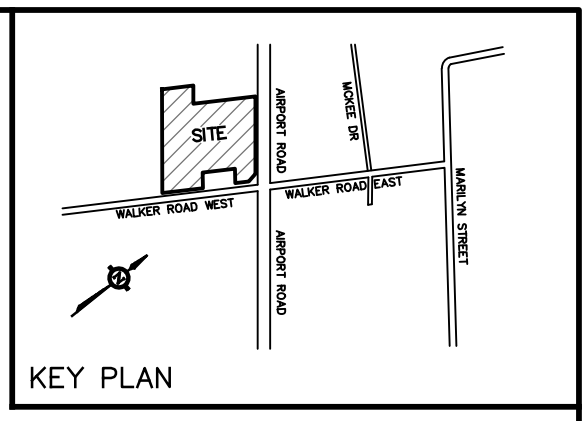
DESIGN BY	JN/SP	SCALE	1:1	DRAWING No. FIGURE 1
DRAWN BY	JN	DATE	06/03/2017	
CAD FILE:	1599S.DWG	PLOT SCALE:	1:1	PLOT DATE: 06/02/2018

LEGEND

PROPOSED OVERLAND FLOW DIRECTION

PROPOSED DRAINAGE AREA

0.195 / 0.25 — DRAINAGE AREA (ha) / IMPERVIOUSNESS



KEY PLAN

IMPERVIOUSNESS:

RESIDENTIAL COMPONENT

IMPERVIOUS AREA:	0.591 ha
TOTAL AREA:	0.966 ha
% IMPERVIOUS:	61%

RESIDENTIAL COMPONENT (UNCONTROLLED)

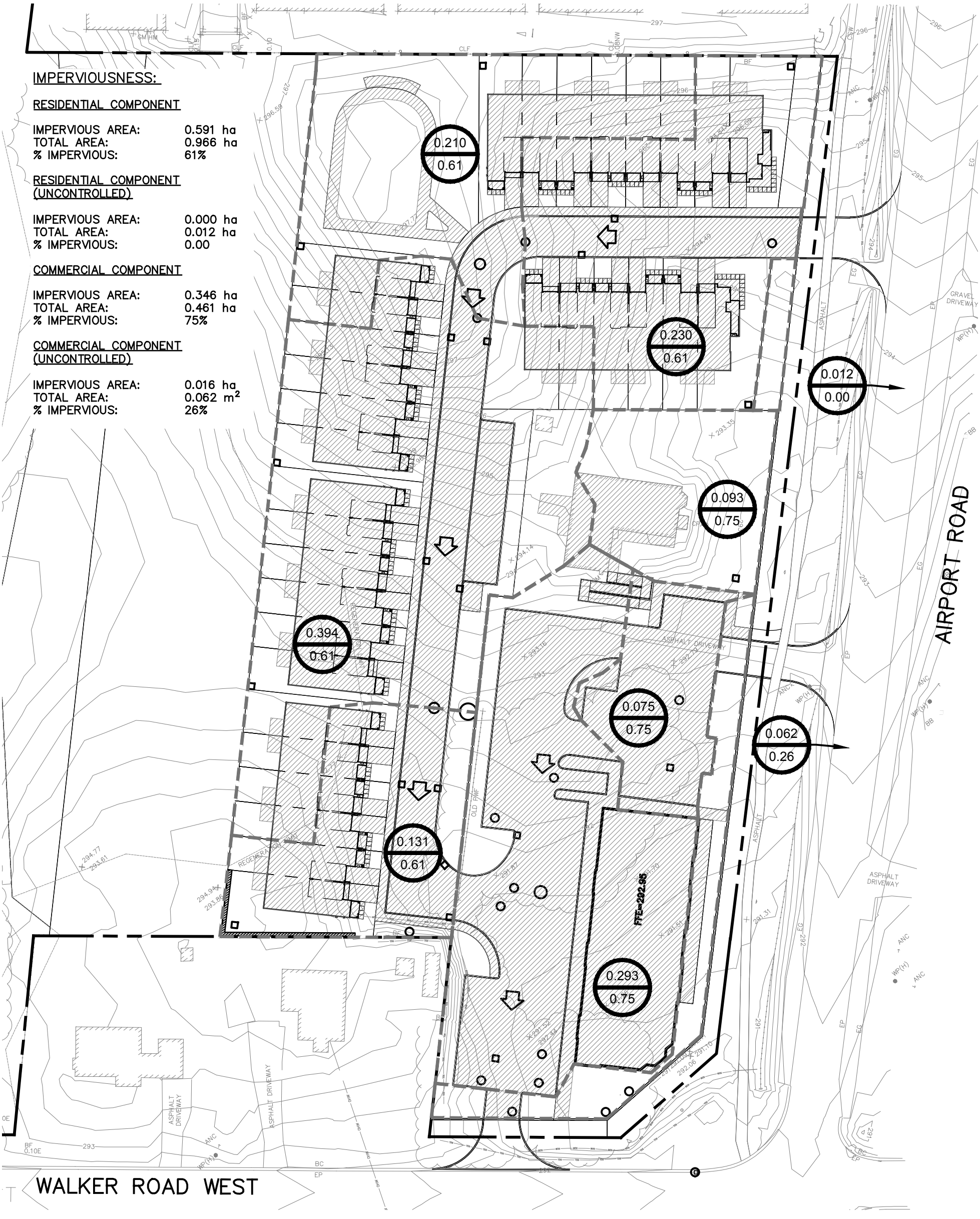
IMPERVIOUS AREA:	0.000 ha
TOTAL AREA:	0.012 ha
% IMPERVIOUS:	0.00

COMMERCIAL COMPONENT

IMPERVIOUS AREA:	0.346 ha
TOTAL AREA:	0.461 ha
% IMPERVIOUS:	75%

COMMERCIAL COMPONENT (UNCONTROLLED)

IMPERVIOUS AREA:	0.016 ha
TOTAL AREA:	0.062 m^2
% IMPERVIOUS:	26%



PROJECT TITLE: 16114 AIRPORT ROAD, TOWN OF CALEDON	TRAFALGAR ENGINEERING LTD. TEL: (905) 338-3366 FAX: (905) 338-7734 tel@trafalgareng.com		
DRAWING TITLE: POST-DEVELOPMENT DRAINAGE AREA PLAN	DESIGN BY: JN/SP	SCALE: 1:1	DRAWING No.: FIGURE 2
	DRAWN BY: JN	DATE: 06/03/2017	
	CAD FILE: 1599S.DWG	PLOT SCALE: 1:1	PLOT DATE: 06/02/2018

TRAFALGAR ENGINEERING LTD.
Consulting Engineers

Project Name : 16114 Airport Road
Project No. : 1599
Date : 06-Sep-19

STORM SEWER DESIGN SHEET

100-year Storm

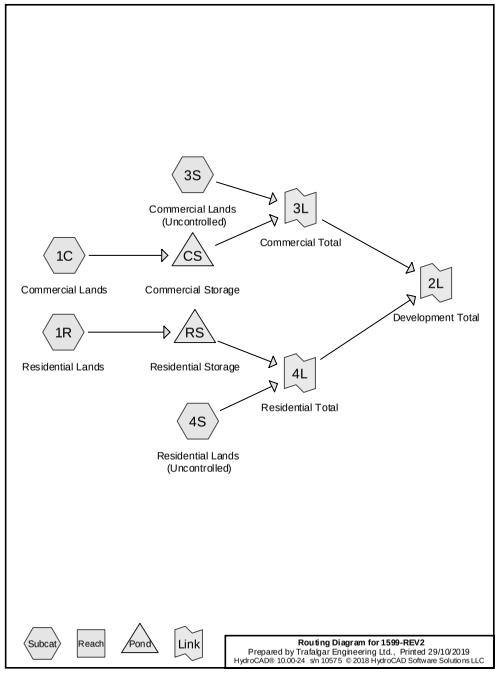
Town of Caledon

Intensity = $A / (T_d + B)^C$

A= 4688
B= 17
C= 0.96

Area No.	LOCATION	FROM MH	TO MH	DRAINAGE AREA Area (ha)	Runoff Coeff. ('c')	A x R (ha x 'c')	Accum. A x R (ha x 'c')	RUNOFF T of C (min)	Intensity (mm/hr)	Expected Flow (m^3/s)	PROPOSED SEWER Length (m)	Gradient (%)	Pipe Size (mm)	Manning's Coeff. (n)	Capacity (m^3/s)	Velocity (m/s)	Time of Flow (min)	Fraction Full (%)
	Residential Development																	
1		13	12	0.230	0.76	0.176	0.176	10.00	198.10	0.097	43.50	0.50	375	0.013	0.130	1.14	0.64	75
		12	11				0.176	10.64	193.71	0.095	9.00	0.50	375	0.013	0.130	1.14	0.13	73
2		11	10	0.210	0.76	0.160	0.336	10.77	192.83	0.180	9.50	0.50	450	0.013	0.211	1.28	0.12	85
3		10	8	0.394	0.76	0.301	0.637	10.89	192.01	0.340	69.00	0.60	525	0.013	0.348	1.56	0.74	97
4		9	8	0.131	0.76	0.100	0.100	10.00	198.10	0.055	39.50	0.50	300	0.013	0.072	0.98	0.67	77
		8	7				0.736	11.63	187.26	0.383	4.50	1.00	525	0.013	0.450	2.01	0.04	85
		7	STOR				0.736	11.67	187.02	0.383	3.00	1.00	525	0.013	0.450	2.01	0.02	85
		STOR	6				0.736	11.69	186.87	0.382	1.50	2.00	525	0.013	0.636	2.85	0.01	60
		6	5							0.011	15.50	0.50	200	0.013	0.024	0.75	0.35	45
		5	4							0.011	31.00	0.50	200	0.013	0.024	0.75	0.69	45
		4	3							0.011	7.50	0.50	200	0.013	0.024	0.75	0.17	45
		3	2							0.011	16.50	0.50	200	0.013	0.024	0.75	0.37	45
		2	1							0.019	19.00	0.50	250	0.013	0.044	0.87	0.36	43
		1											250					
	Commercial Development																	
5		CB8	20	0.093	0.94	0.087	0.087	10.00	198.10	0.048	43.00	1.00	250	0.013	0.062	1.23	0.58	77
6		20	19	0.075	0.94	0.070	0.158	10.58	194.07	0.085	26.00	0.50	375	0.013	0.130	1.14	0.38	66
		19	17				0.158	10.96	191.53	0.084	20.50	0.50	375	0.013	0.130	1.14	0.30	65
7		18	17	0.293	0.94	0.274	0.274	10.00	198.10	0.151	5.00	0.50	450	0.013	0.211	1.28	0.06	72
		17	STORC				0.432	11.27	189.58	0.227	1.00	2.00	450	0.013	0.422	2.57	0.01	54
		STORC	16				0.432	11.27	189.54	0.227	1.50	2.00	450	0.013	0.422	2.57	0.01	54
		16	15							0.007	5.00	0.50	200	0.013	0.024	0.75	0.11	29
		15	14							0.007	16.00	0.50	200	0.013	0.024	0.75	0.36	29
		14	1							0.007	7.50	0.50	250	0.013	0.044	0.87	0.14	16

Note: Composite runoff coefficient is based on impervious area using C=0.25 for pervious and C=0.9 for impervious areas. The resultant composite runoff coefficient has a 1.25 factor applied for the 100-year storm.



Summary for Subcatchment 1C: Commercial Lands

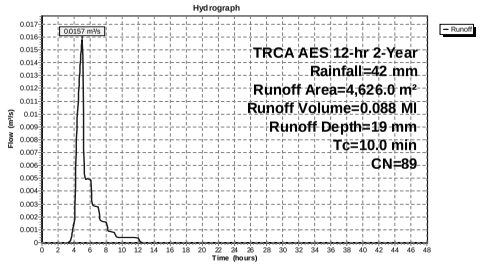
Runoff = 0.0157 m³/s @ 5.02 hrs, Volume= 0.088 Ml, Depth= 19 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 2-Year Rainfall=42 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

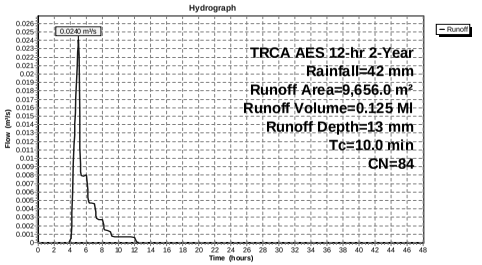
Runoff = 0.0240 m³/s @ 5.03 hrs, Volume= 0.125 Ml, Depth= 13 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 2-Year Rainfall=42 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

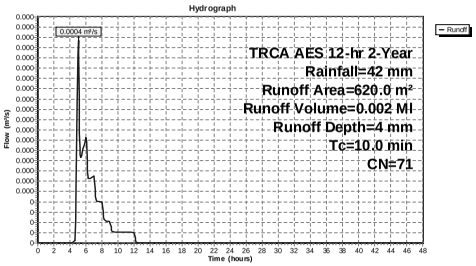
Runoff = 0.0004 m³/s @ 5.05 hrs, Volume= 0.002 Ml, Depth= 4 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 2-Year Rainfall=42 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

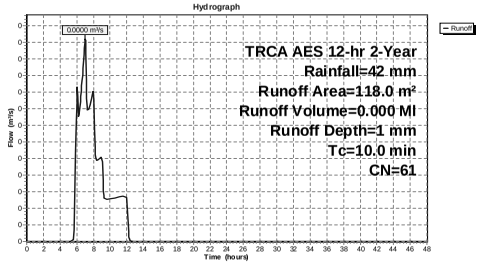
Runoff = 0.0000 m³/s @ 7.03 hrs, Volume= 0.000 Ml, Depth= 1 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 2-Year Rainfall=42 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 19 mm for 2-Year event
Inflow = 0.0157 m³/s @ 5.02 hrs, Volume= 0.088 Ml
Outflow = 0.0019 m³/s @ 7.20 hrs, Volume= 0.040 Ml, Atten= 88%, Lag= 130.9 min
Primary = 0.0019 m³/s @ 7.20 hrs, Volume= 0.040 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 290.865 m @ 7.20 hrs Surf.Area= 325.3 m² Storage= 66.3 m³

Plug-Flow detention time= 369.5 min calculated for 0.040 Ml (46% of inflow)
Center-of-Mass det. time= 304.6 min (649.3 - 344.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx** 1 x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx** 1 x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0019 m³/s @ 7.20 hrs HW=290.865 m (Free Discharge)
↳**1=Orifice/Grate** (Orifice Controls 0.0019 m³/s @ 0.48 m/s)

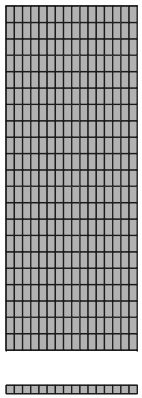
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



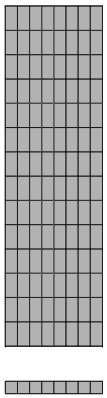
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

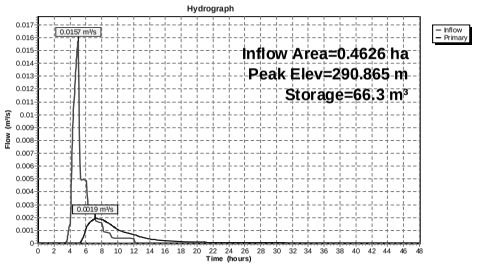
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 13 mm for 2-Year event
Inflow = 0.0240 m³/s @ 5.03 hrs, Volume= 0.125 Ml
Outflow = 0.0044 m³/s @ 7.09 hrs, Volume= 0.109 Ml, Atten= 82%, Lag= 123.6 min
Primary = 0.0044 m³/s @ 7.09 hrs, Volume= 0.109 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.226 m @ 7.09 hrs Surf.Area= 323.3 m² Storage= 69.2 m³

Plug-Flow detention time= 250.4 min calculated for 0.109 Ml (87% of inflow)
Center-of-Mass det. time= 222.4 min (580.6 - 358.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0044 m³/s @ 7.09 hrs HW=291.226 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0044 m³/s @ 0.99 m/s)

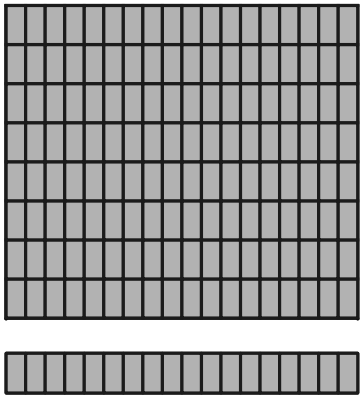
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



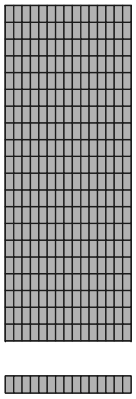
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

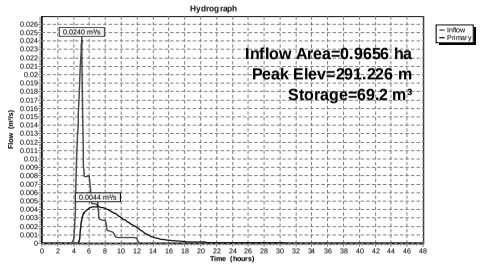
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

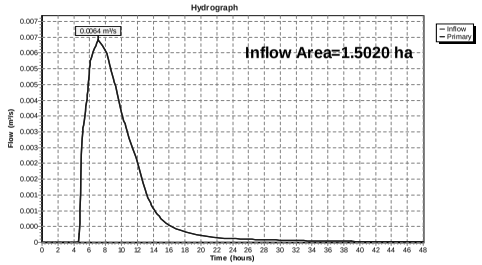


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 10 mm for 2-Year event
Inflow = 0.0064 m³/s @ 7.10 hrs, Volume= 0.152 Ml
Primary = 0.0064 m³/s @ 7.10 hrs, Volume= 0.152 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

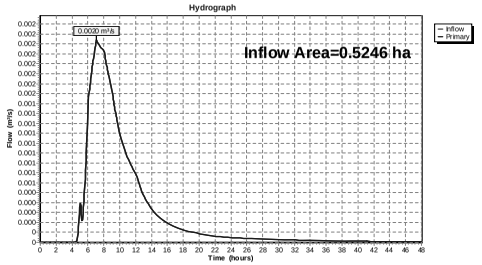


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 8 mm for 2-Year event
Inflow = 0.0020 m³/s @ 7.10 hrs, Volume= 0.043 Ml
Primary = 0.0020 m³/s @ 7.10 hrs, Volume= 0.043 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

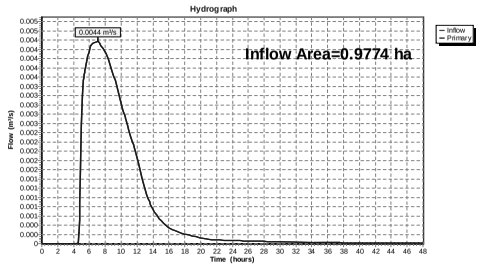


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 11 mm for 2-Year event
Inflow = 0.0044 m³/s @ 7.08 hrs, Volume= 0.109 Ml
Primary = 0.0044 m³/s @ 7.08 hrs, Volume= 0.109 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

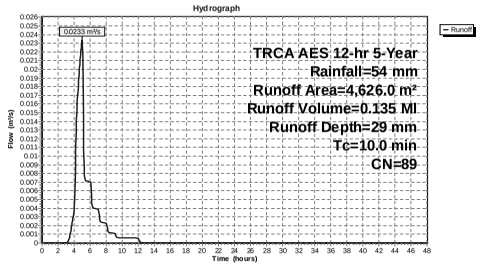
Runoff = 0.0233 m³/s @ 5.01 hrs, Volume= 0.135 Ml, Depth= 29 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 5-Year Rainfall=54 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

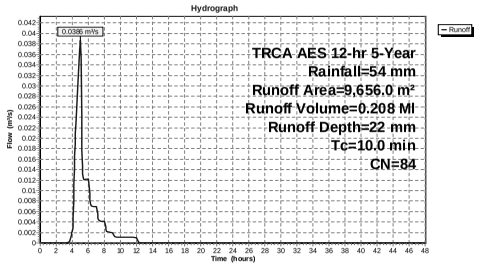
Runoff = 0.0386 m³/s @ 5.03 hrs, Volume= 0.208 Ml, Depth= 22 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 5-Year Rainfall=54 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

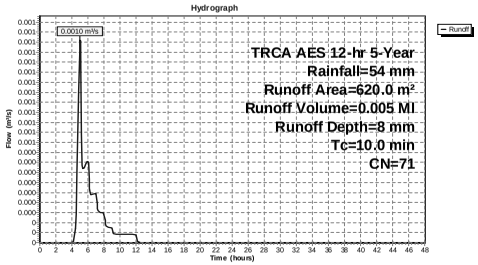
Runoff = 0.0010 m³/s @ 5.04 hrs, Volume= 0.005 Ml, Depth= 8 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 5-Year Rainfall=54 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

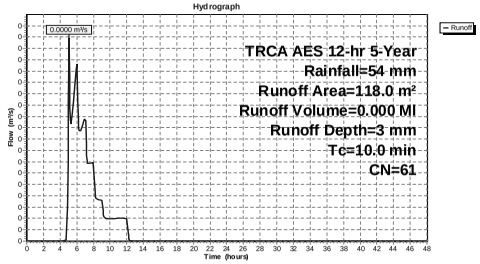
Runoff = 0.0000 m³/s @ 5.08 hrs, Volume= 0.000 Ml, Depth= 3 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 5-Year Rainfall=54 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 29 mm for 5-Year event
Inflow = 0.0233 m³/s @ 5.01 hrs, Volume= 0.135 Ml
Outflow = 0.0037 m³/s @ 7.08 hrs, Volume= 0.088 Ml, Atten= 84%, Lag= 124.3 min
Primary = 0.0037 m³/s @ 7.08 hrs, Volume= 0.088 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 290.939 m @ 7.08 hrs Surf.Area= 325.3 m² Storage= 89.3 m³

Plug-Flow detention time= 292.0 min calculated for 0.088 Ml (65% of inflow)
Center-of-Mass det. time= 239.6 min (578.6 - 339.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx** 1 x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0037 m³/s @ 7.08 hrs HW=290.939 m (Free Discharge)
↳ **1=Orifice/Grate** (Orifice Controls 0.0037 m³/s @ 0.85 m/s)

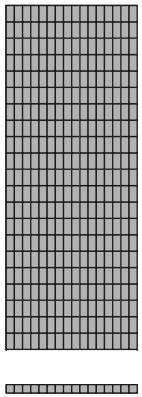
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



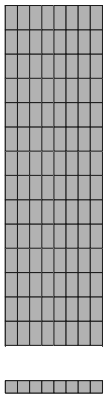
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

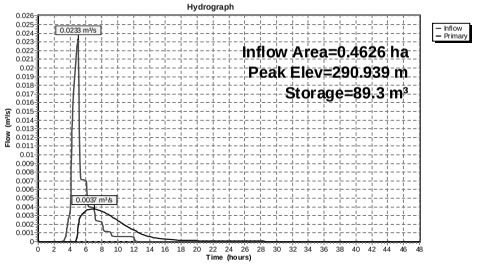
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 22 mm for 5-Year event
Inflow = 0.0386 m³/s @ 5.03 hrs, Volume= 0.208 Ml
Outflow = 0.0065 m³/s @ 7.09 hrs, Volume= 0.192 Ml, Atten= 83%, Lag= 123.8 min
Primary = 0.0065 m³/s @ 7.09 hrs, Volume= 0.192 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.393 m @ 7.09 hrs Surf.Area= 322.3 m² Storage= 120.3 m³

Plug-Flow detention time= 265.8 min calculated for 0.192 Ml (92% of inflow)
Center-of-Mass det. time= 246.4 min (597.0 - 350.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0065 m³/s @ 7.09 hrs HW=291.393 m (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.0065 m³/s @ 1.47 m/s)

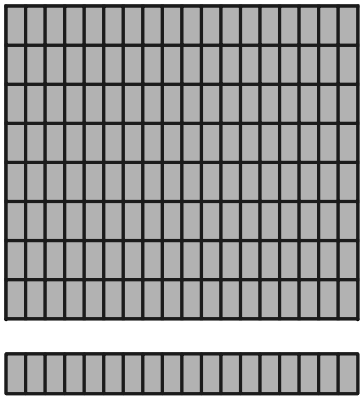
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



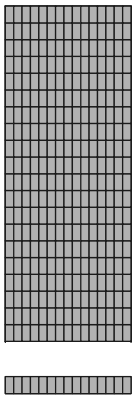
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

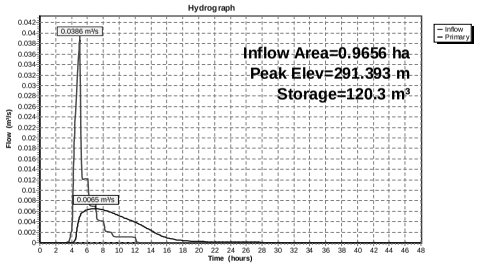
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

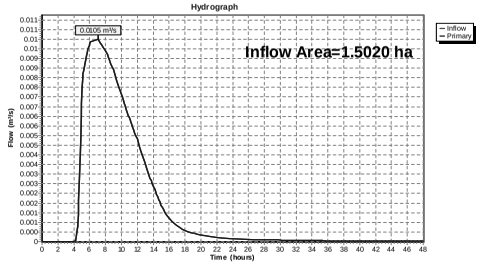


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 19 mm for 5-Year event
Inflow = 0.0105 m³/s @ 7.03 hrs, Volume= 0.285 Ml
Primary = 0.0105 m³/s @ 7.03 hrs, Volume= 0.285 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

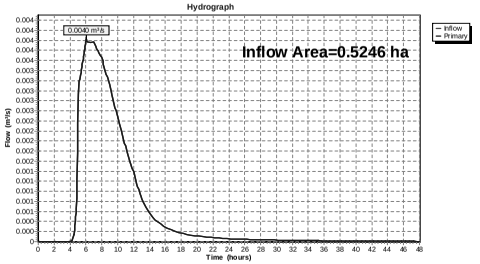


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 18 mm for 5-Year event
Inflow = 0.0040 m³/s @ 6.07 hrs, Volume= 0.093 Ml
Primary = 0.0040 m³/s @ 6.07 hrs, Volume= 0.093 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

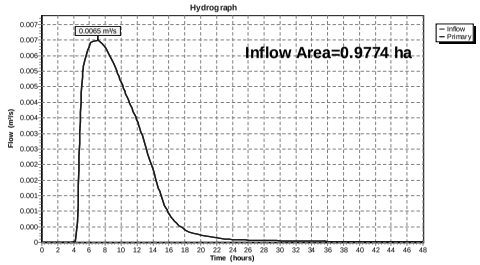


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 20 mm for 5-Year event
Inflow = 0.0065 m³/s @ 7.07 hrs, Volume= 0.193 Ml
Primary = 0.0065 m³/s @ 7.07 hrs, Volume= 0.193 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

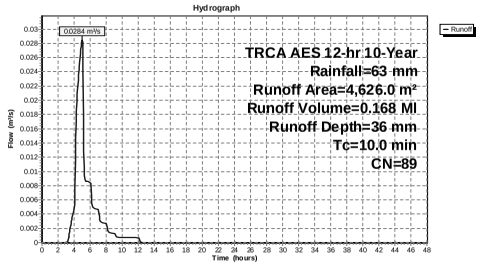
Runoff = 0.0284 m³/s @ 5.00 hrs, Volume= 0.168 Ml, Depth= 36 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 10-Year Rainfall=63 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

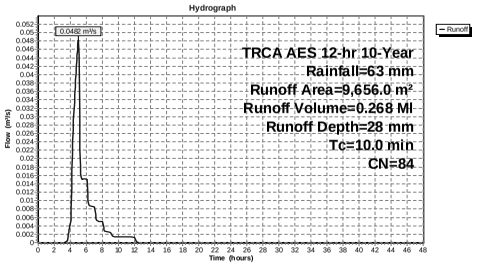
Runoff = 0.0482 m³/s @ 5.02 hrs, Volume= 0.268 Ml, Depth= 28 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 10-Year Rainfall=63 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

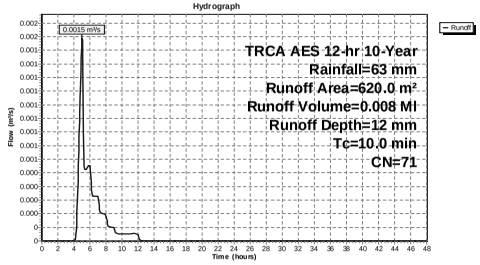
Runoff = 0.0015 m³/s @ 5.04 hrs, Volume= 0.008 Ml, Depth= 12 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 10-Year Rainfall=63 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

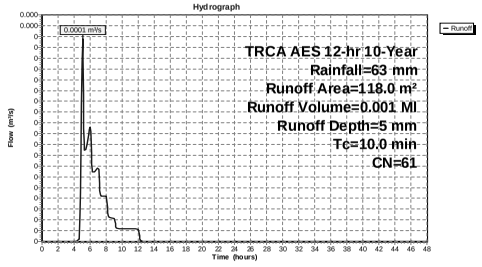
Runoff = 0.0001 m³/s @ 5.06 hrs, Volume= 0.001 Ml, Depth= 5 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 10-Year Rainfall=63 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 36 mm for 10-Year event
Inflow = 0.0284 m³/s @ 5.00 hrs, Volume= 0.168 Ml
Outflow = 0.0048 m³/s @ 7.03 hrs, Volume= 0.121 Ml, Atten= 83%, Lag= 121.7 min
Primary = 0.0048 m³/s @ 7.03 hrs, Volume= 0.121 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 291.001 m @ 7.03 hrs Surf.Area= 325.3 m² Storage= 108.6 m³

Plug-Flow detention time= 287.0 min calculated for 0.121 Ml (72% of inflow)
Center-of-Mass det. time= 239.0 min (574.6 - 335.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx** 1 x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx** 1 x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0048 m³/s @ 7.03 hrs HW=291.001 m (Free Discharge)
↳**1=Orifice/Grate** (Orifice Controls 0.0048 m³/s @ 1.08 m/s)

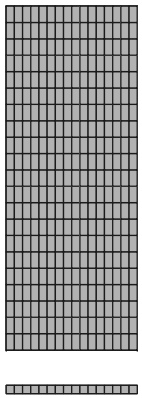
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



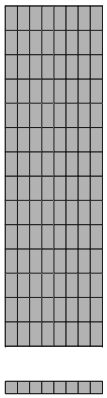
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

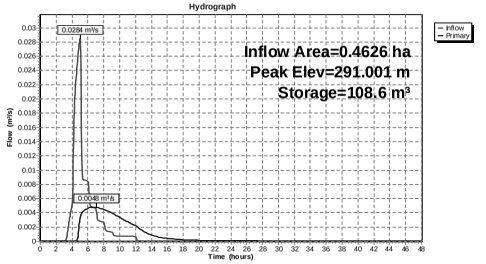
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 28 mm for 10-Year event
Inflow = 0.0482 m³/s @ 5.02 hrs, Volume= 0.268 Ml
Outflow = 0.0078 m³/s @ 7.10 hrs, Volume= 0.252 Ml, Atten= 84%, Lag= 124.9 min
Primary = 0.0078 m³/s @ 7.10 hrs, Volume= 0.252 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.524 m @ 7.10 hrs Surf.Area= 323.3 m² Storage= 160.5 m³

Plug-Flow detention time= 285.2 min calculated for 0.252 Ml (94% of inflow)
Center-of-Mass det. time= 269.4 min (615.8 - 346.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0078 m³/s @ 7.10 hrs HW=291.524 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0078 m³/s @ 1.76 m/s)

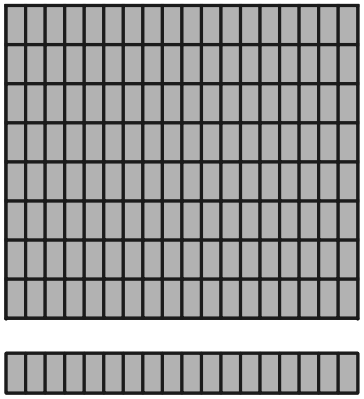
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



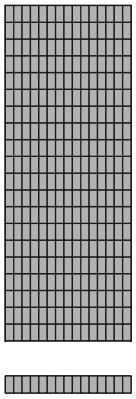
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

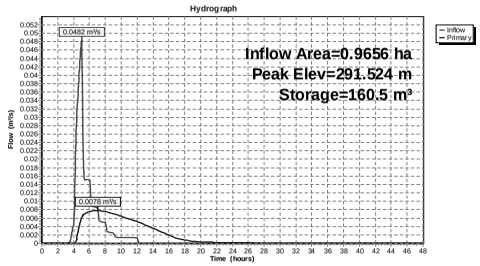
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

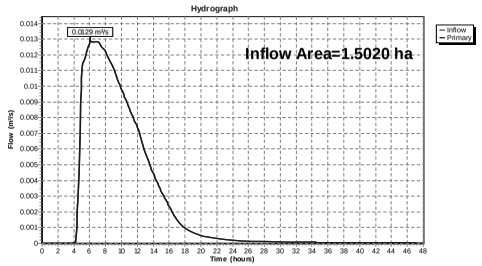


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 25 mm for 10-Year event
Inflow = 0.0129 m³/s @ 6.09 hrs, Volume= 0.381 Ml
Primary = 0.0129 m³/s @ 6.09 hrs, Volume= 0.381 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

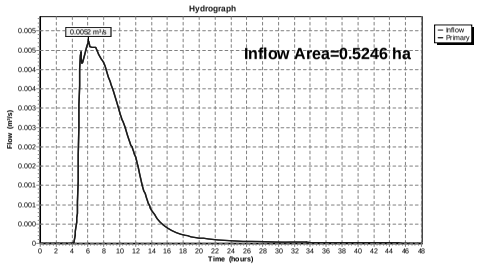


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 24 mm for 10-Year event
Inflow = 0.0052 m³/s @ 6.06 hrs, Volume= 0.128 Ml
Primary = 0.0052 m³/s @ 6.06 hrs, Volume= 0.128 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

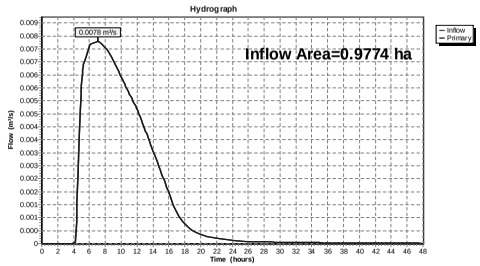


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 26 mm for 10-Year event
Inflow = 0.0078 m³/s @ 7.07 hrs, Volume= 0.253 Ml
Primary = 0.0078 m³/s @ 7.07 hrs, Volume= 0.253 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

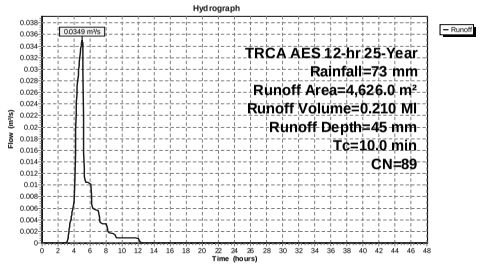
Runoff = 0.0349 m³/s @ 5.00 hrs, Volume= 0.210 Ml, Depth= 45 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 25-Year Rainfall=73 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

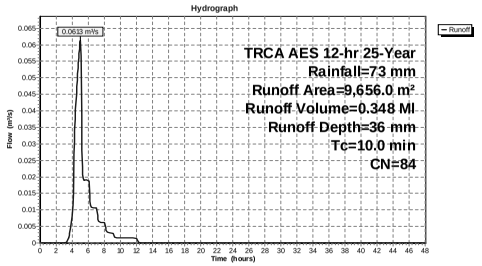
Runoff = 0.0613 m³/s @ 5.01 hrs, Volume= 0.348 Ml, Depth= 36 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 25-Year Rainfall=73 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

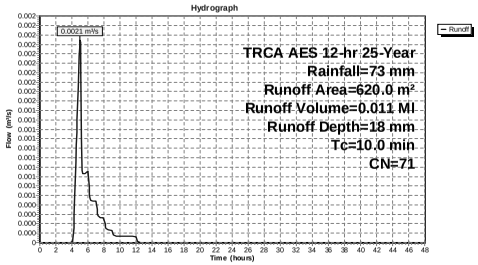
Runoff = 0.0021 m³/s @ 5.03 hrs, Volume= 0.011 Ml, Depth= 18 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 25-Year Rainfall=73 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

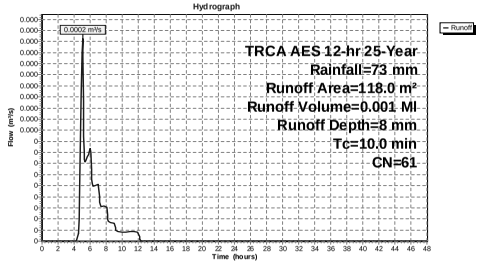
Runoff = 0.0002 m³/s @ 5.05 hrs, Volume= 0.001 Ml, Depth= 8 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 25-Year Rainfall=73 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 45 mm for 25-Year event
Inflow = 0.0349 m³/s @ 5.00 hrs, Volume= 0.210 Ml
Outflow = 0.0059 m³/s @ 6.34 hrs, Volume= 0.163 Ml, Atten= 83%, Lag= 80.3 min
Primary = 0.0059 m³/s @ 6.34 hrs, Volume= 0.163 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 291.089 m @ 6.34 hrs Surf.Area= 325.3 m² Storage= 135.6 m³

Plug-Flow detention time= 289.1 min calculated for 0.163 Ml (77% of inflow)
Center-of-Mass det. time= 249.5 min (581.4 - 331.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx** 1 x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0059 m³/s @ 6.34 hrs HW=291.089 m (Free Discharge)
↳ **1=Orifice/Grate** (Orifice Controls 0.0059 m³/s @ 1.33 m/s)

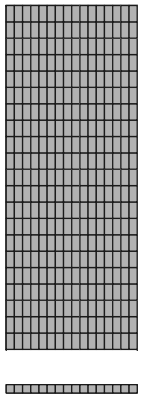
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



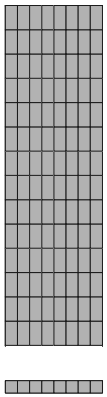
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

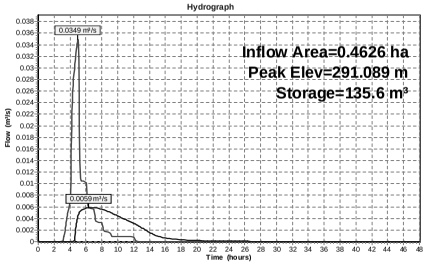
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 36 mm for 25-Year event
Inflow = 0.0613 m³/s @ 5.01 hrs, Volume= 0.348 Ml
Outflow = 0.0092 m³/s @ 7.12 hrs, Volume= 0.332 Ml, Atten= 85%, Lag= 126.1 min
Primary = 0.0092 m³/s @ 7.12 hrs, Volume= 0.332 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.706 m @ 7.12 hrs Surf.Area= 323.3 m² Storage= 216.1 m³

Plug-Flow detention time= 314.4 min calculated for 0.332 Ml (95% of inflow)
Center-of-Mass det. time= 299.9 min (641.6 - 341.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0092 m³/s @ 7.12 hrs HW=291.706 m (Free Discharge)
←1=Orifice/Grate (Orifice Controls 0.0092 m³/s @ 2.09 m/s)

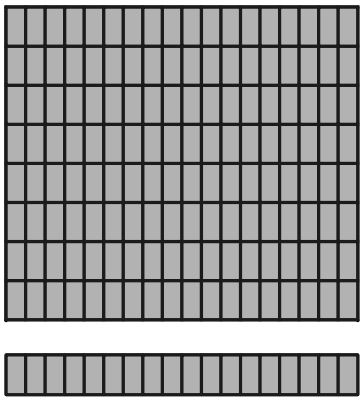
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



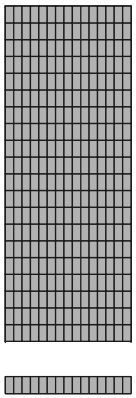
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

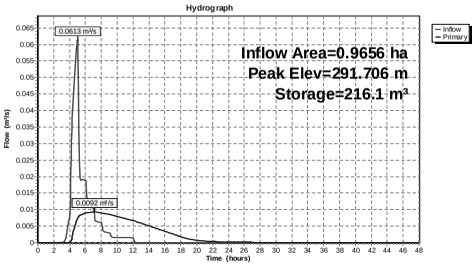
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

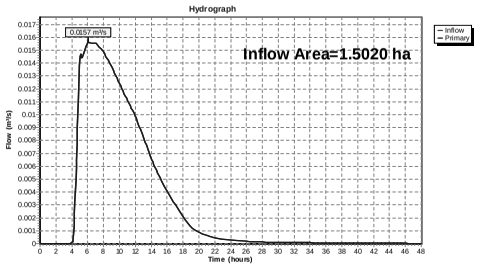


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 34 mm for 25-Year event
Inflow = 0.0157 m³/s @ 6.07 hrs, Volume= 0.507 Ml
Primary = 0.0157 m³/s @ 6.07 hrs, Volume= 0.507 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

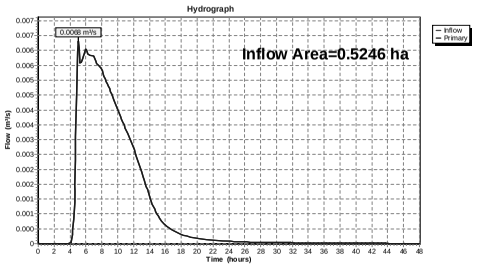


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 33 mm for 25-Year event
Inflow = 0.0068 m³/s @ 5.07 hrs, Volume= 0.174 Ml
Primary = 0.0068 m³/s @ 5.07 hrs, Volume= 0.174 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

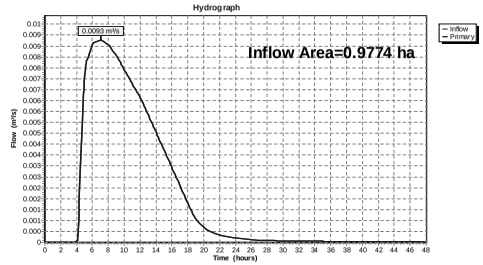


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 34 mm for 25-Year event
Inflow = 0.0093 m³/s @ 7.07 hrs, Volume= 0.333 Ml
Primary = 0.0093 m³/s @ 7.07 hrs, Volume= 0.333 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

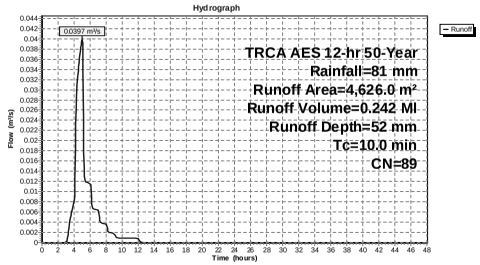
Runoff = 0.0397 m³/s @ 5.00 hrs, Volume= 0.242 Ml, Depth= 52 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 50-Year Rainfall=81 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

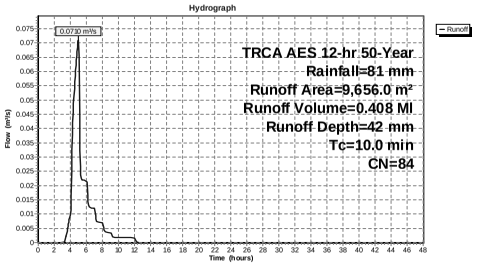
Runoff = 0.0710 m³/s @ 5.01 hrs, Volume= 0.408 Ml, Depth= 42 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 50-Year Rainfall=81 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

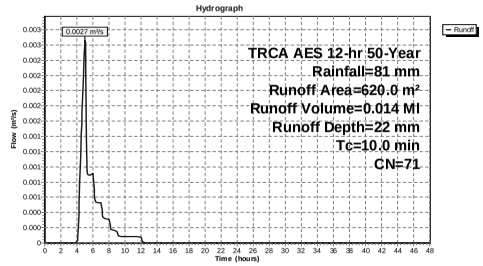
Runoff = 0.0027 m³/s @ 5.03 hrs, Volume= 0.014 Ml, Depth= 22 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 50-Year Rainfall=81 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

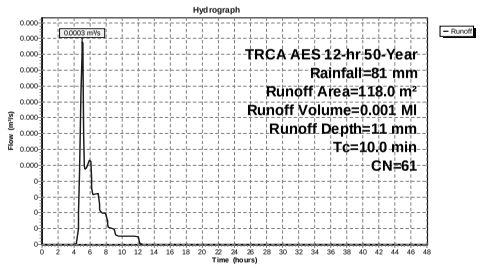
Runoff = 0.0003 m³/s @ 5.04 hrs, Volume= 0.001 Ml, Depth= 11 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 50-Year Rainfall=81 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 52 mm for 50-Year event
Inflow = 0.0397 m³/s @ 5.00 hrs, Volume= 0.242 Ml
Outflow = 0.0066 m³/s @ 6.33 hrs, Volume= 0.195 Ml, Atten= 83%, Lag= 79.8 min
Primary = 0.0066 m³/s @ 6.33 hrs, Volume= 0.195 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 291.157 m @ 6.33 hrs Surf.Area= 325.3 m² Storage= 156.5 m³

Plug-Flow detention time= 298.5 min calculated for 0.195 Ml (80% of inflow)
Center-of-Mass det. time= 260.1 min (590.2 - 330.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx** 1 x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx** 1 x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0066 m³/s @ 6.33 hrs HW=291.157 m (Free Discharge)
↳**1=Orifice/Grate** (Orifice Controls 0.0066 m³/s @ 1.50 m/s)

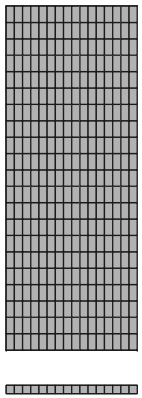
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



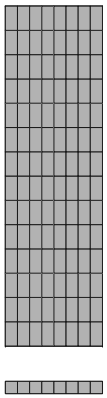
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

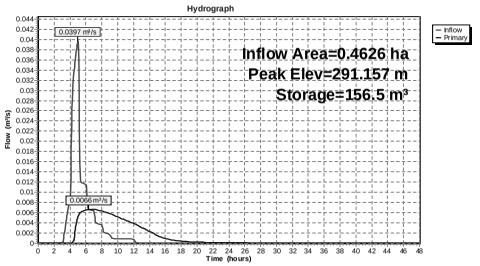
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 42 mm for 50-Year event
Inflow = 0.0710 m³/s @ 5.01 hrs, Volume= 0.408 Ml
Outflow = 0.0102 m³/s @ 7.13 hrs, Volume= 0.392 Ml, Atten= 86%, Lag= 126.9 min
Primary = 0.0102 m³/s @ 7.13 hrs, Volume= 0.392 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.847 m @ 7.13 hrs Surf.Area= 323.3 m² Storage= 259.5 m³

Plug-Flow detention time= 334.9 min calculated for 0.392 Ml (96% of inflow)
Center-of-Mass det. time= 322.1 min (661.6 - 339.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0102 m³/s @ 7.13 hrs HW=291.847 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0102 m³/s @ 2.32 m/s)

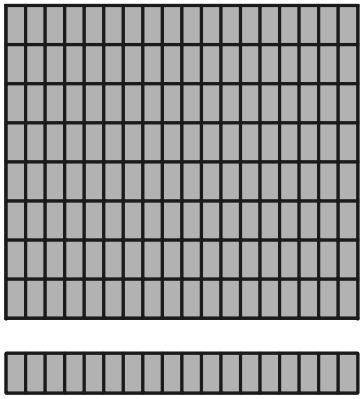
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



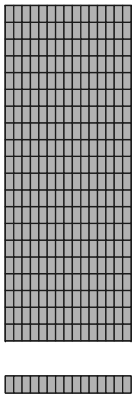
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

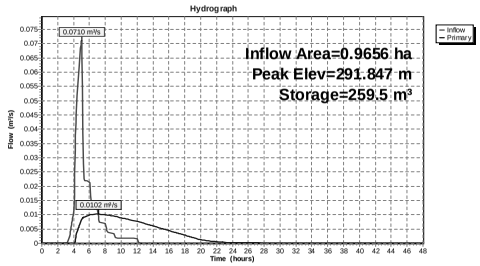
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

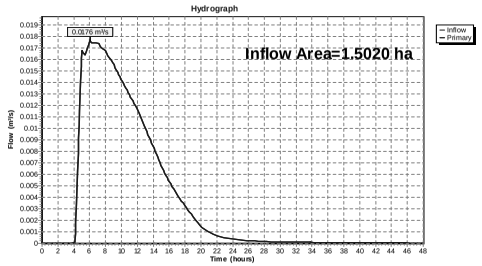


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 40 mm for 50-Year event
Inflow = 0.0176 m³/s @ 6.06 hrs, Volume= 0.602 Ml
Primary = 0.0176 m³/s @ 6.06 hrs, Volume= 0.602 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

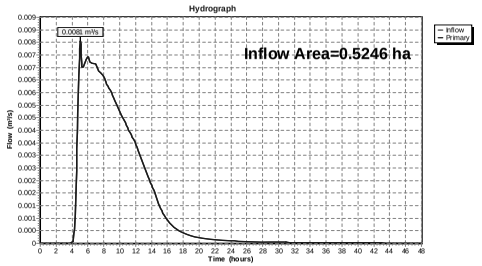


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 40 mm for 50-Year event
Inflow = 0.0081 m³/s @ 5.06 hrs, Volume= 0.209 Ml
Primary = 0.0081 m³/s @ 5.06 hrs, Volume= 0.209 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

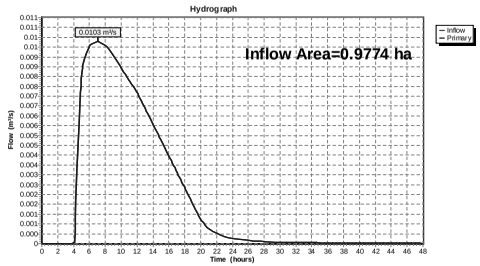


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 40 mm for 50-Year event
Inflow = 0.0103 m³/s @ 7.07 hrs, Volume= 0.394 Ml
Primary = 0.0103 m³/s @ 7.07 hrs, Volume= 0.394 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

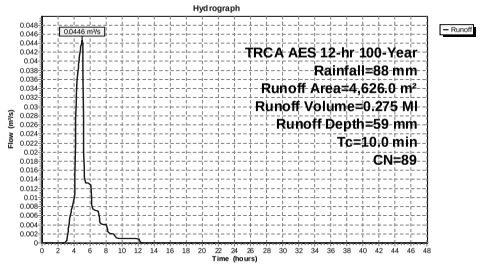
Runoff = 0.0446 m³/s @ 4.99 hrs, Volume= 0.275 Ml, Depth= 59 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 100-Year Rainfall=88 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

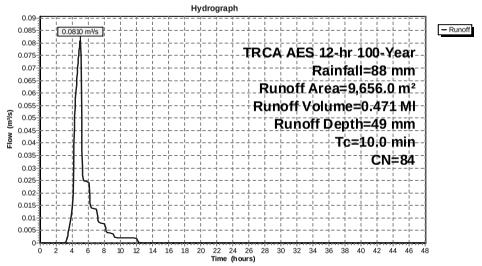
Runoff = 0.0810 m³/s @ 5.01 hrs, Volume= 0.471 Ml, Depth= 49 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 100-Year Rainfall=88 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

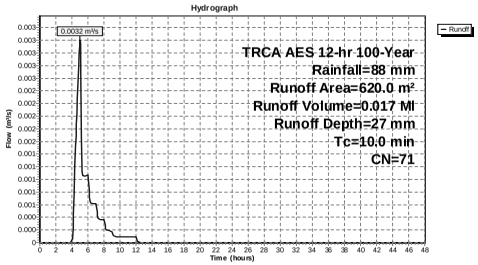
Runoff = 0.0032 m³/s @ 5.03 hrs, Volume= 0.017 Ml, Depth= 27 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 100-Year Rainfall=88 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

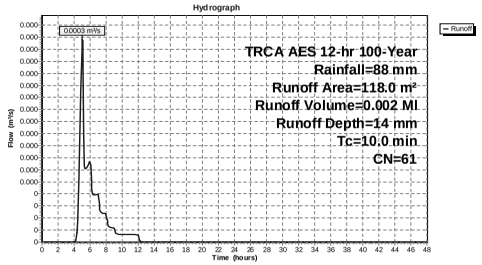
Runoff = 0.0003 m³/s @ 5.04 hrs, Volume= 0.002 Ml, Depth= 14 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 12-hr 100-Year Rainfall=88 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 59 mm for 100-Year event
Inflow = 0.0446 m³/s @ 4.99 hrs, Volume= 0.275 Ml
Outflow = 0.0073 m³/s @ 6.36 hrs, Volume= 0.228 Ml, Atten= 84%, Lag= 81.7 min
Primary = 0.0073 m³/s @ 6.36 hrs, Volume= 0.228 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 291.228 m @ 6.36 hrs Surf.Area= 325.3 m² Storage= 178.7 m³

Plug-Flow detention time= 305.3 min calculated for 0.228 Ml (83% of inflow)
Center-of-Mass det. time= 272.0 min (600.2 - 328.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx** 1 x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0073 m³/s @ 6.36 hrs HW=291.228 m (Free Discharge)
↳ **1=Orifice/Grate** (Orifice Controls 0.0073 m³/s @ 1.66 m/s)

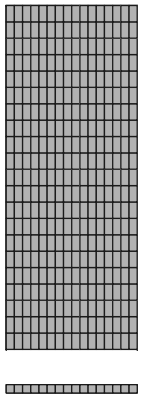
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



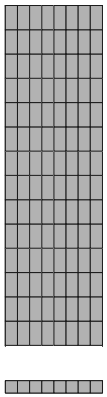
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

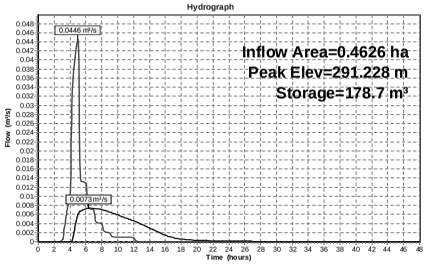
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 49 mm for 100-Year event
Inflow = 0.0810 m³/s @ 5.01 hrs, Volume= 0.471 Ml
Outflow = 0.0112 m³/s @ 7.13 hrs, Volume= 0.455 Ml, Atten= 86%, Lag= 127.7 min
Primary = 0.0112 m³/s @ 7.13 hrs, Volume= 0.455 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.999 m @ 7.13 hrs Surf.Area= 322.3 m² Storage= 305.9 m³

Plug-Flow detention time= 353.8 min calculated for 0.455 Ml (96% of inflow)
Center-of-Mass det. time= 344.2 min (681.3 - 337.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0112 m³/s @ 7.13 hrs HW=291.999 m (Free Discharge)
←1=Orifice/Grate (Orifice Controls 0.0112 m³/s @ 2.54 m/s)

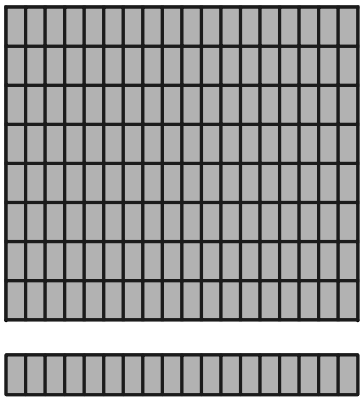
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



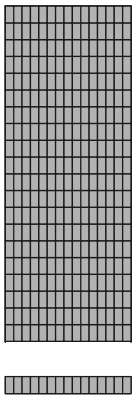
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

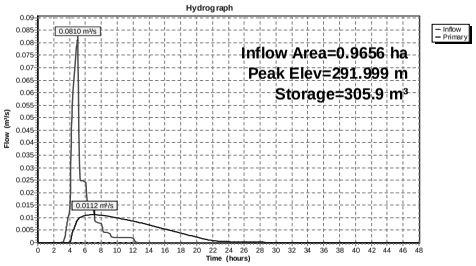
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

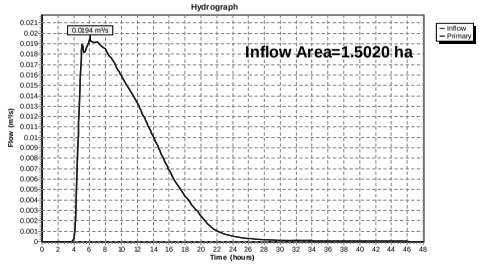


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 47 mm for 100-Year event
Inflow = 0.0194 m³/s @ 6.06 hrs, Volume= 0.702 Ml
Primary = 0.0194 m³/s @ 6.06 hrs, Volume= 0.702 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

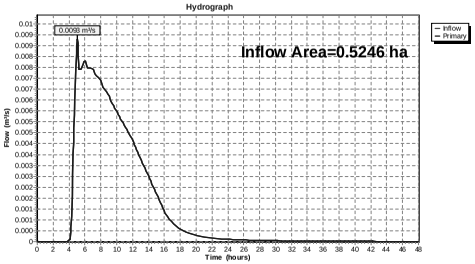


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 47 mm for 100-Year event
Inflow = 0.0093 m³/s @ 5.06 hrs, Volume= 0.244 Ml
Primary = 0.0093 m³/s @ 5.06 hrs, Volume= 0.244 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

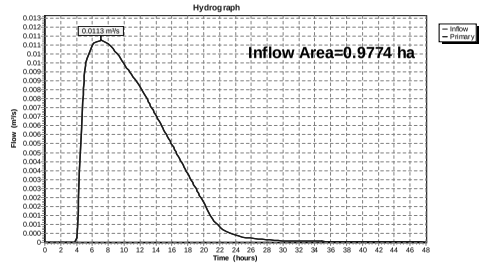


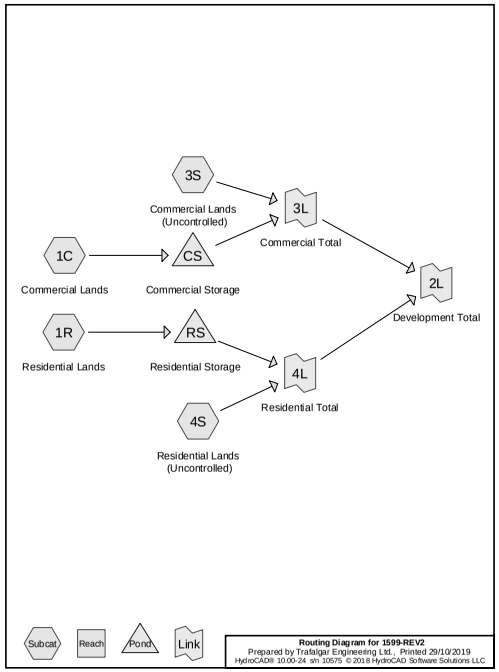
Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 47 mm for 100-Year event
Inflow = 0.0113 m³/s @ 7.07 hrs, Volume= 0.457 Ml
Primary = 0.0113 m³/s @ 7.07 hrs, Volume= 0.457 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total





Summary for Subcatchment 1C: Commercial Lands

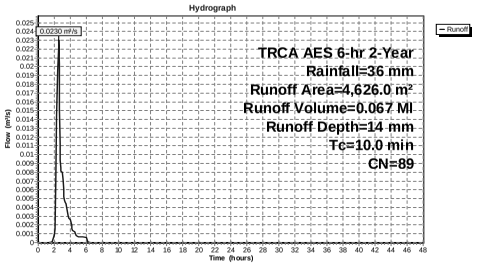
Runoff = 0.0230 m³/s @ 2.54 hrs, Volume= 0.067 Ml, Depth= 14 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 2-Year Rainfall=36 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

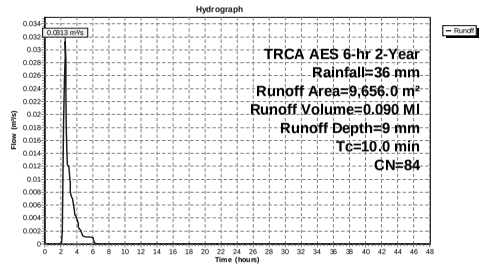
Runoff = 0.0313 m³/s @ 2.55 hrs, Volume= 0.090 Ml, Depth= 9 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 2-Year Rainfall=36 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

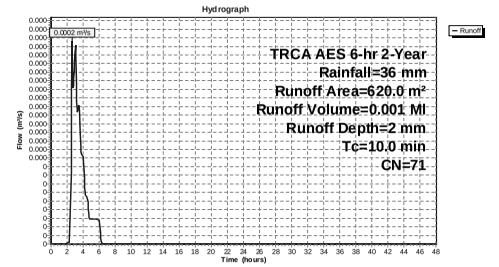
Runoff = 0.0002 m³/s @ 2.61 hrs, Volume= 0.001 Ml, Depth= 2 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 2-Year Rainfall=36 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

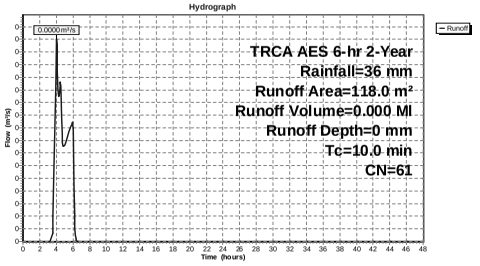
Runoff = 0.0000 m³/s @ 4.06 hrs, Volume= 0.000 Ml, Depth= 0 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 2-Year Rainfall=36 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 14 mm for 2-Year event
Inflow = 0.0230 m³/s @ 2.54 hrs, Volume= 0.067 Ml
Outflow = 0.0010 m³/s @ 4.64 hrs, Volume= 0.020 Ml, Atten= 96%, Lag= 126.3 min
Primary = 0.0010 m³/s @ 4.64 hrs, Volume= 0.020 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 290.843 m @ 4.64 hrs Surf.Area= 325.3 m² Storage= 59.6 m³

Plug-Flow detention time= 407.4 min calculated for 0.020 Ml (29% of inflow)
Center-of-Mass det. time= 370.0 min (549.4 - 179.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx 1** x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0010 m³/s @ 4.64 hrs HW=290.843 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0010 m³/s @ 0.39 m/s)

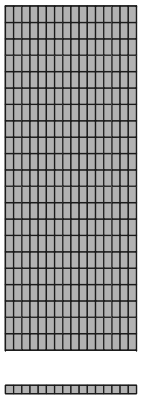
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



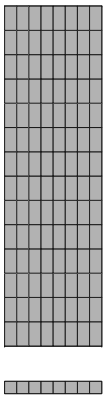
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

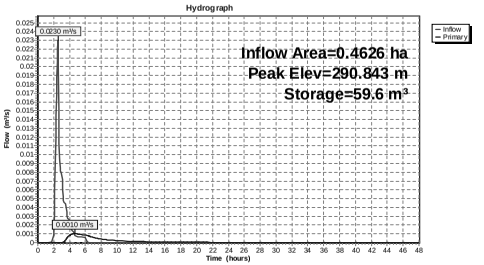
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 9 mm for 2-Year event
Inflow = 0.0313 m³/s @ 2.55 hrs, Volume= 0.090 Ml
Outflow = 0.0039 m³/s @ 4.09 hrs, Volume= 0.074 Ml, Atten= 88%, Lag= 92.4 min
Primary = 0.0039 m³/s @ 4.09 hrs, Volume= 0.074 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.197 m @ 4.09 hrs Surf.Area= 322.3 m² Storage= 60.3 m³

Plug-Flow detention time= 245.1 min calculated for 0.074 Ml (83% of inflow)
Center-of-Mass det. time= 226.0 min (413.1 - 187.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0039 m³/s @ 4.09 hrs HW=291.197 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0039 m³/s @ 0.88 m/s)

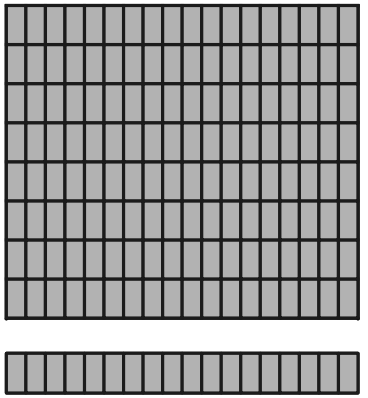
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



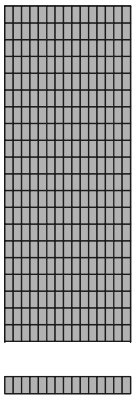
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

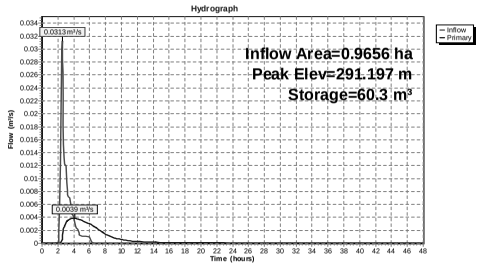
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

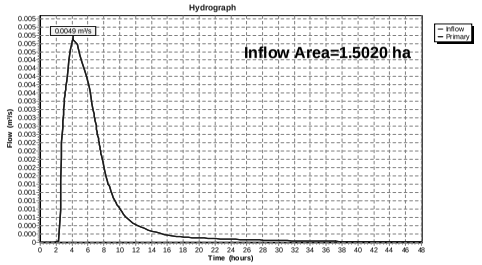


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 6 mm for 2-Year event
Inflow = 0.0049 m³/s @ 4.16 hrs, Volume= 0.095 Ml
Primary = 0.0049 m³/s @ 4.16 hrs, Volume= 0.095 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

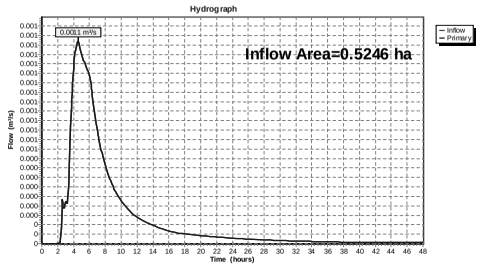


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 4 mm for 2-Year event
Inflow = 0.0011 m³/s @ 4.58 hrs, Volume= 0.021 Ml
Primary = 0.0011 m³/s @ 4.58 hrs, Volume= 0.021 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

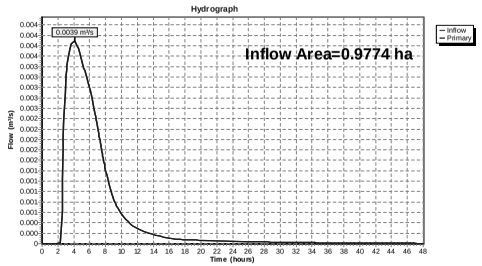


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 8 mm for 2-Year event
Inflow = 0.0039 m³/s @ 4.09 hrs, Volume= 0.074 Ml
Primary = 0.0039 m³/s @ 4.09 hrs, Volume= 0.074 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

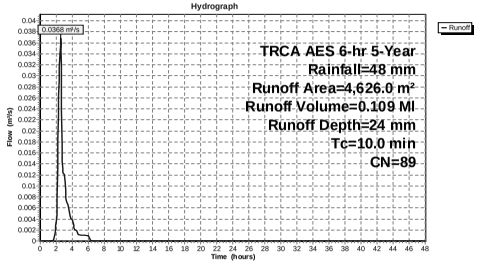
Runoff = 0.0368 m³/s @ 2.53 hrs, Volume= 0.109 Ml, Depth= 24 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 5-Year Rainfall=48 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

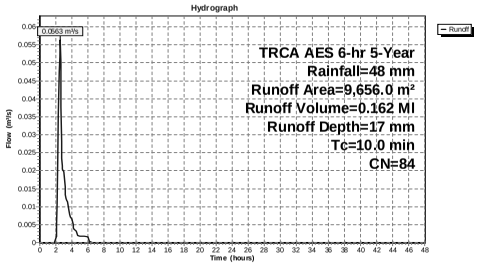
Runoff = 0.0563 m³/s @ 2.54 hrs, Volume= 0.162 Ml, Depth= 17 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 5-Year Rainfall=48 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

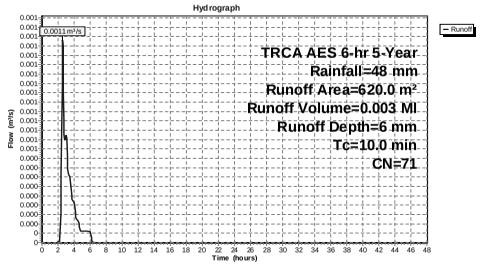
Runoff = 0.0011 m³/s @ 2.57 hrs, Volume= 0.003 Ml, Depth= 6 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 5-Year Rainfall=48 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

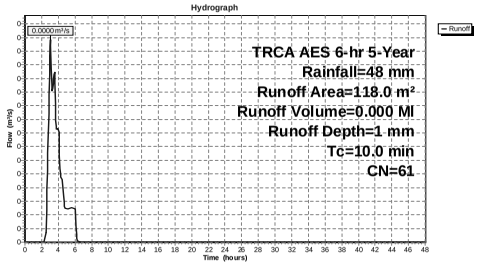
Runoff = 0.0000 m³/s @ 3.06 hrs, Volume= 0.000 Ml, Depth= 1 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 5-Year Rainfall=48 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 24 mm for 5-Year event
Inflow = 0.0368 m³/s @ 2.53 hrs, Volume= 0.109 Ml
Outflow = 0.0034 m³/s @ 4.10 hrs, Volume= 0.062 Ml, Atten= 91%, Lag= 93.9 min
Primary = 0.0034 m³/s @ 4.10 hrs, Volume= 0.062 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 290.923 m @ 4.10 hrs Surf.Area= 325.3 m² Storage= 84.5 m³

Plug-Flow detention time= 264.2 min calculated for 0.062 Ml (57% of inflow)
Center-of-Mass det. time= 236.1 min (411.6 - 175.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx 1** x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0034 m³/s @ 4.10 hrs HW=290.923 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0034 m³/s @ 0.78 m/s)

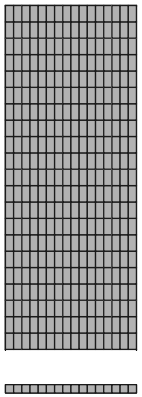
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



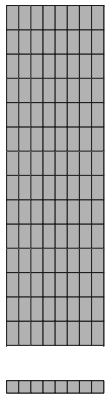
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

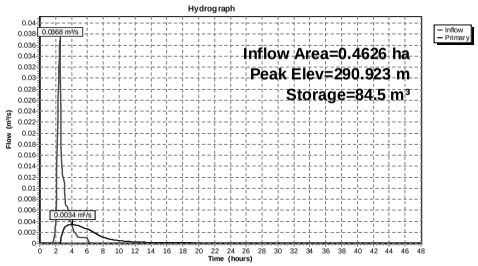
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 17 mm for 5-Year event
Inflow = 0.0563 m³/s @ 2.54 hrs, Volume= 0.162 Ml
Outflow = 0.0062 m³/s @ 4.08 hrs, Volume= 0.146 Ml, Atten= 89%, Lag= 92.7 min
Primary = 0.0062 m³/s @ 4.08 hrs, Volume= 0.146 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.366 m @ 4.08 hrs Surf.Area= 322.3 m² Storage= 112.0 m³

Plug-Flow detention time= 252.7 min calculated for 0.146 Ml (90% of inflow)
Center-of-Mass det. time= 240.0 min (421.8 - 181.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0062 m³/s @ 4.08 hrs HW=291.366 m (Free Discharge)
↳1=Orifice/Grate (Orifice Controls 0.0062 m³/s @ 1.40 m/s)

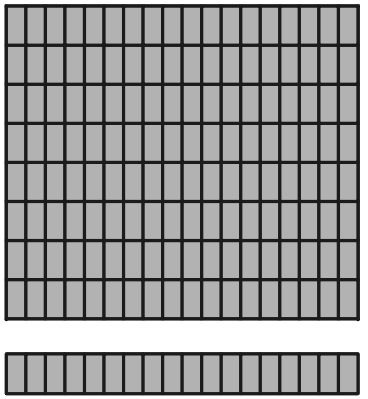
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



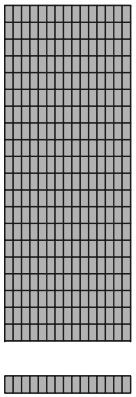
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

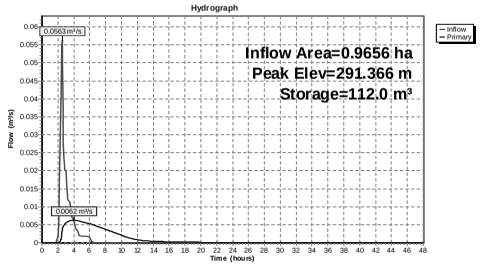
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

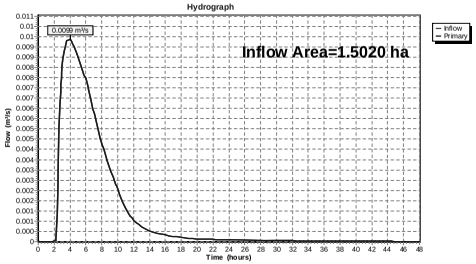


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 14 mm for 5-Year event
Inflow = 0.0099 m³/s @ 4.04 hrs, Volume= 0.212 Ml
Primary = 0.0099 m³/s @ 4.04 hrs, Volume= 0.212 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

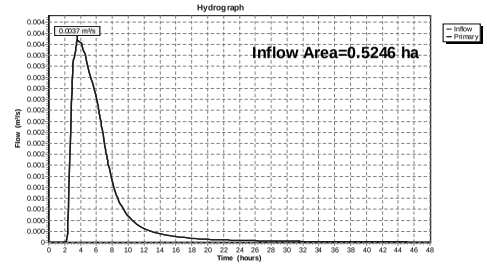


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 13 mm for 5-Year event
Inflow = 0.0037 m³/s @ 3.59 hrs, Volume= 0.066 Ml
Primary = 0.0037 m³/s @ 3.59 hrs, Volume= 0.066 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

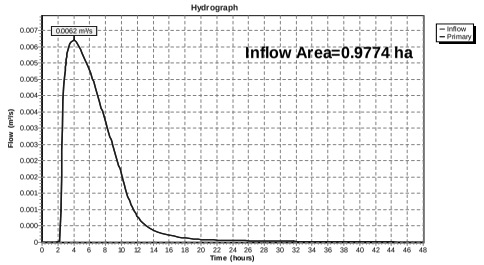


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 15 mm for 5-Year event
Inflow = 0.0062 m³/s @ 4.07 hrs, Volume= 0.147 Ml
Primary = 0.0062 m³/s @ 4.07 hrs, Volume= 0.147 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

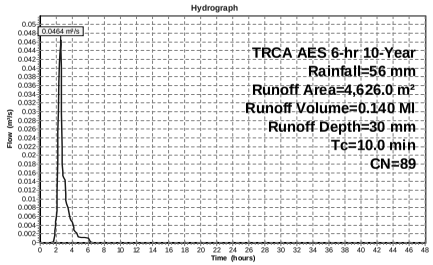
Runoff = 0.0464 m³/s @ 2.53 hrs, Volume= 0.140 Ml, Depth= 30 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 10-Year Rainfall=56 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

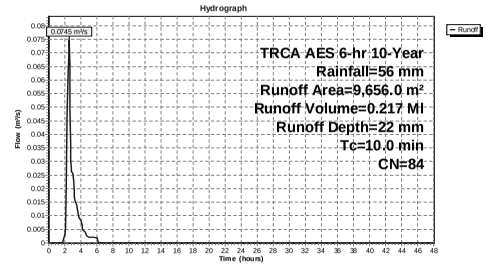
Runoff = 0.0745 m³/s @ 2.54 hrs, Volume= 0.217 Ml, Depth= 22 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 10-Year Rainfall=56 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

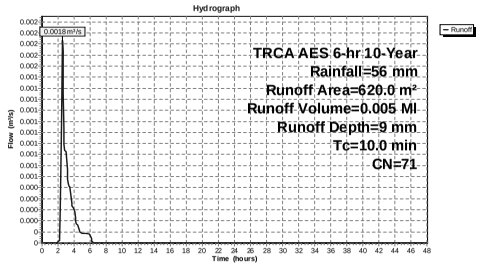
Runoff = 0.0018 m³/s @ 2.56 hrs, Volume= 0.005 Ml, Depth= 9 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 10-Year Rainfall=56 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

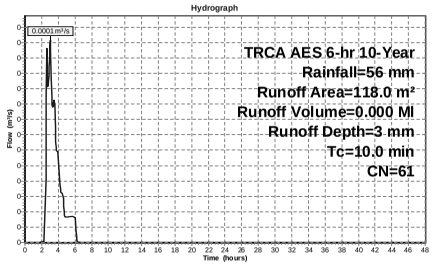
Runoff = 0.0001 m³/s @ 3.04 hrs, Volume= 0.000 Ml, Depth= 3 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 10-Year Rainfall=56 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 30 mm for 10-Year event
Inflow = 0.0464 m³/s @ 2.53 hrs, Volume= 0.140 Ml
Outflow = 0.0046 m³/s @ 4.06 hrs, Volume= 0.093 Ml, Atten= 90%, Lag= 91.7 min
Primary = 0.0046 m³/s @ 4.06 hrs, Volume= 0.093 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 290.991 m @ 4.06 hrs Surf.Area= 325.3 m² Storage= 105.3 m³

Plug-Flow detention time= 257.3 min calculated for 0.093 Ml (66% of inflow)
Center-of-Mass det. time= 230.6 min (404.3 - 173.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx 1** x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0046 m³/s @ 4.06 hrs HW=290.991 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0046 m³/s @ 1.04 m/s)

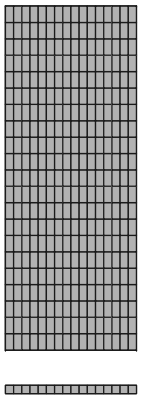
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



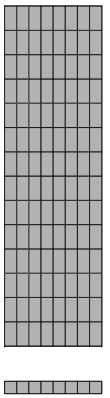
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

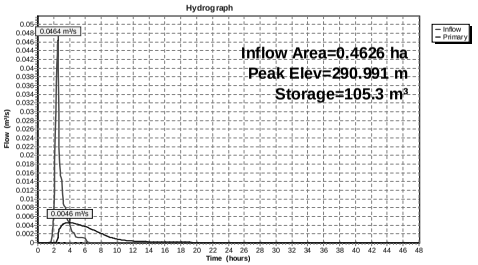
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 22 mm for 10-Year event
Inflow = 0.0745 m³/s @ 2.54 hrs, Volume= 0.217 Ml
Outflow = 0.0076 m³/s @ 4.10 hrs, Volume= 0.201 Ml, Atten= 90%, Lag= 93.7 min
Primary = 0.0076 m³/s @ 4.10 hrs, Volume= 0.201 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.502 m @ 4.10 hrs Surf.Area= 322.3 m² Storage= 153.8 m³

Plug-Flow detention time= 269.5 min calculated for 0.201 Ml (93% of inflow)
Center-of-Mass det. time= 261.5 min (440.9 - 179.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0076 m³/s @ 4.10 hrs HW=291.502 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0076 m³/s @ 1.71 m/s)

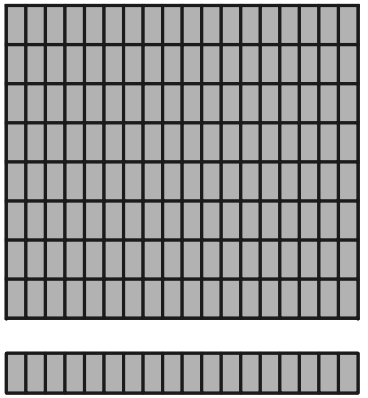
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



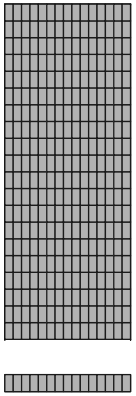
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

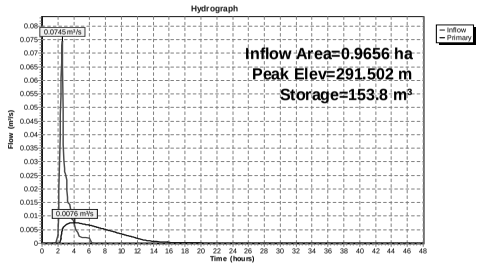
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

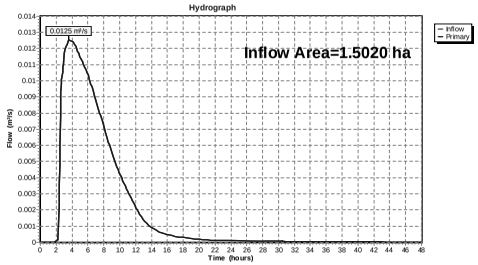


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 20 mm for 10-Year event
Inflow = 0.0125 m³/s @ 3.60 hrs, Volume= 0.300 Ml
Primary = 0.0125 m³/s @ 3.60 hrs, Volume= 0.300 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

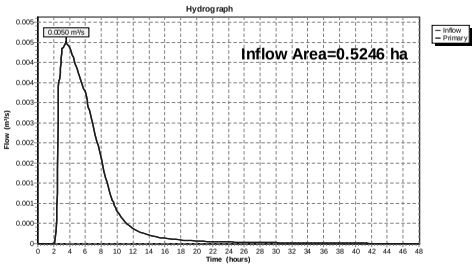


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 19 mm for 10-Year event
Inflow = 0.0050 m³/s @ 3.56 hrs, Volume= 0.098 Ml
Primary = 0.0050 m³/s @ 3.56 hrs, Volume= 0.098 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

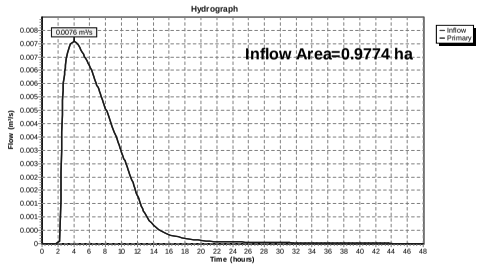


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 21 mm for 10-Year event
Inflow = 0.0076 m³/s @ 4.07 hrs, Volume= 0.202 Ml
Primary = 0.0076 m³/s @ 4.07 hrs, Volume= 0.202 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

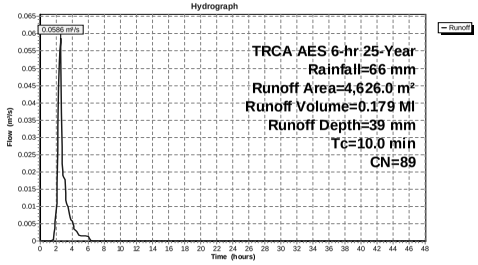
Runoff = 0.0586 m³/s @ 2.53 hrs, Volume= 0.179 Ml, Depth= 39 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 25-Year Rainfall=66 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

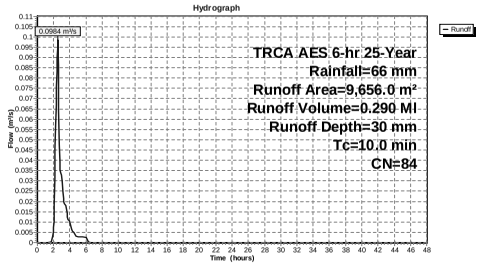
Runoff = 0.0984 m³/s @ 2.53 hrs, Volume= 0.290 Ml, Depth= 30 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 25-Year Rainfall=66 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

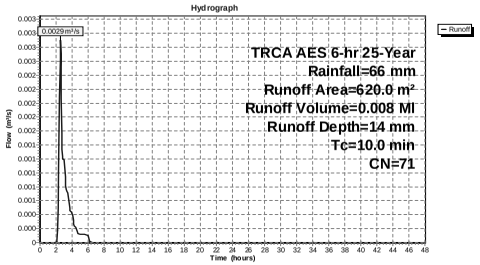
Runoff = 0.0029 m³/s @ 2.55 hrs, Volume= 0.008 Ml, Depth= 14 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 25-Year Rainfall=66 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

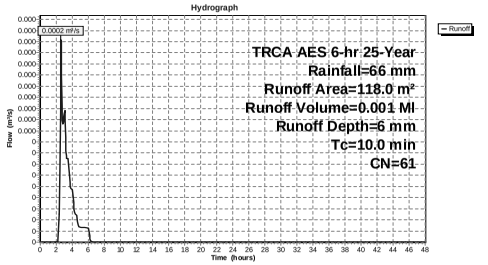
Runoff = 0.0002 m³/s @ 2.59 hrs, Volume= 0.001 Ml, Depth= 6 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 25-Year Rainfall=66 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 39 mm for 25-Year event
Inflow = 0.0586 m³/s @ 2.53 hrs, Volume= 0.179 Ml
Outflow = 0.0058 m³/s @ 4.00 hrs, Volume= 0.132 Ml, Atten= 90%, Lag= 88.7 min
Primary = 0.0058 m³/s @ 4.00 hrs, Volume= 0.132 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 291.084 m @ 4.00 hrs Surf.Area= 325.3 m² Storage= 134.1 m³

Plug-Flow detention time= 260.9 min calculated for 0.132 Ml (74% of inflow)
Center-of-Mass det. time= 240.2 min (412.0 - 171.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx 1** x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0058 m³/s @ 4.00 hrs HW=291.084 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0058 m³/s @ 1.32 m/s)

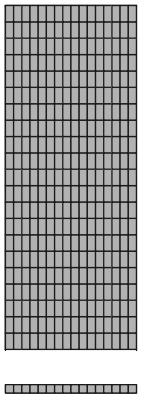
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



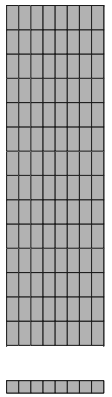
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

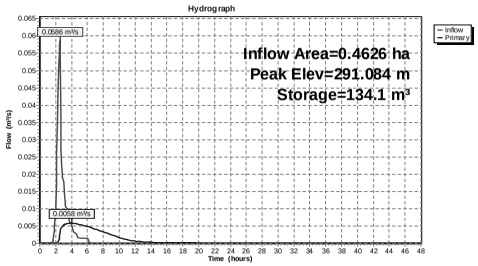
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 30 mm for 25-Year event
Inflow = 0.0984 m³/s @ 2.53 hrs, Volume= 0.290 Ml
Outflow = 0.0091 m³/s @ 4.11 hrs, Volume= 0.274 Ml, Atten= 91%, Lag= 94.6 min
Primary = 0.0091 m³/s @ 4.11 hrs, Volume= 0.274 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.689 m @ 4.11 hrs Surf.Area= 322.3 m² Storage= 211.0 m³

Plug-Flow detention time= 299.3 min calculated for 0.274 Ml (95% of inflow)
Center-of-Mass det. time= 290.9 min (467.9 - 177.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0091 m³/s @ 4.11 hrs HW=291.689 m (Free Discharge)
↳1=Orifice/Grate (Orifice Controls 0.0091 m³/s @ 2.06 m/s)

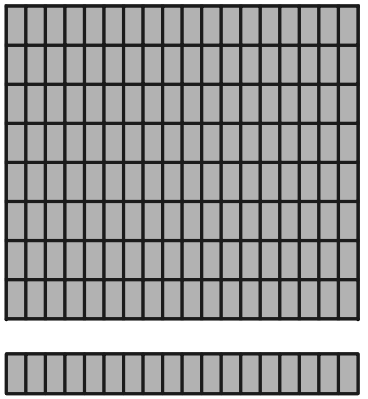
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



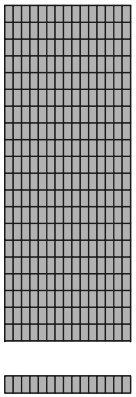
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

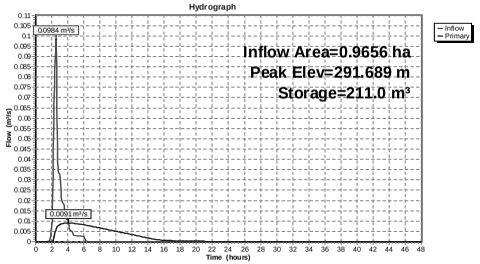
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

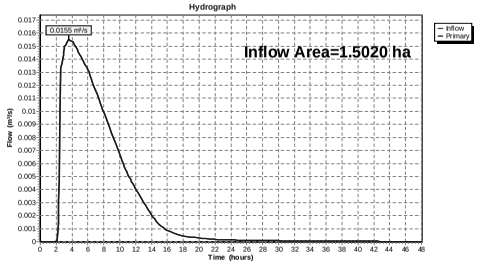


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 28 mm for 25-Year event
Inflow = 0.0155 m³/s @ 3.57 hrs, Volume= 0.415 Ml
Primary = 0.0155 m³/s @ 3.57 hrs, Volume= 0.415 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

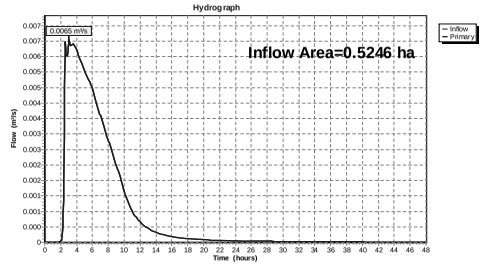


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 27 mm for 25-Year event
Inflow = 0.0065 m³/s @ 3.07 hrs, Volume= 0.141 Ml
Primary = 0.0065 m³/s @ 3.07 hrs, Volume= 0.141 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

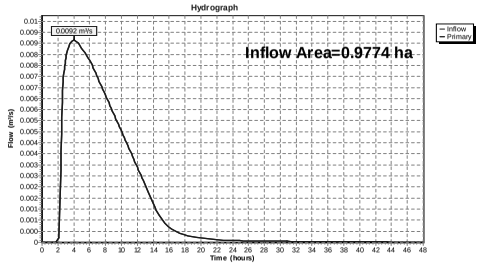


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 28 mm for 25-Year event
Inflow = 0.0092 m³/s @ 4.07 hrs, Volume= 0.274 Ml
Primary = 0.0092 m³/s @ 4.07 hrs, Volume= 0.274 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

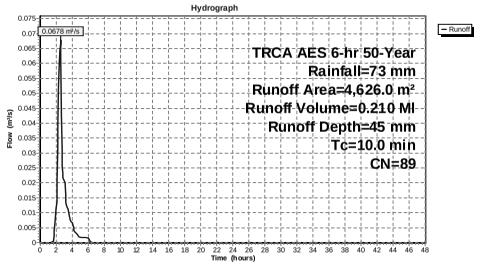
Runoff = 0.0678 m³/s @ 2.53 hrs, Volume= 0.210 Ml, Depth= 45 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 50-Year Rainfall=73 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

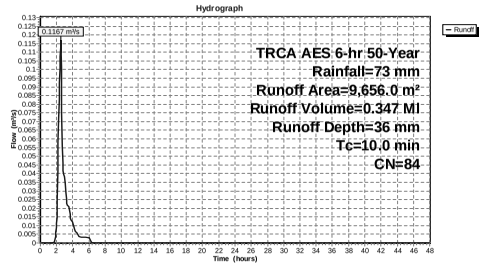
Runoff = 0.1167 m³/s @ 2.53 hrs, Volume= 0.347 Ml, Depth= 36 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 50-Year Rainfall=73 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

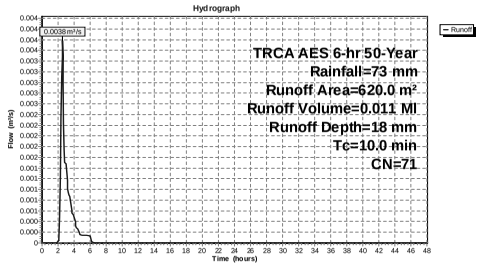
Runoff = 0.0038 m³/s @ 2.55 hrs, Volume= 0.011 Ml, Depth= 18 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 50-Year Rainfall=73 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

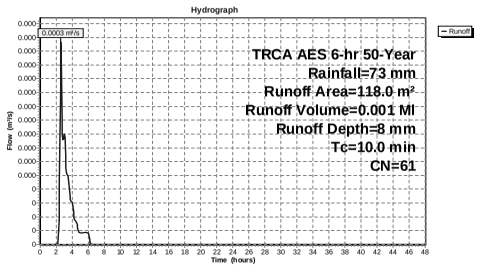
Runoff = 0.0003 m³/s @ 2.57 hrs, Volume= 0.001 Ml, Depth= 8 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 50-Year Rainfall=73 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 45 mm for 50-Year event
Inflow = 0.0678 m³/s @ 2.53 hrs, Volume= 0.210 Ml
Outflow = 0.0067 m³/s @ 3.99 hrs, Volume= 0.163 Ml, Atten= 90%, Lag= 87.9 min
Primary = 0.0067 m³/s @ 3.99 hrs, Volume= 0.163 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 291.159 m @ 3.99 hrs Surf.Area= 325.3 m² Storage= 157.2 m³

Plug-Flow detention time= 272.4 min calculated for 0.163 Ml (78% of inflow)
Center-of-Mass det. time= 251.3 min (422.1 - 170.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx 1** x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0067 m³/s @ 3.99 hrs HW=291.159 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0067 m³/s @ 1.51 m/s)

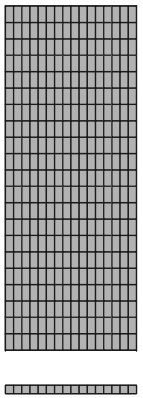
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



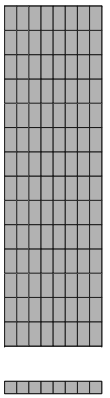
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

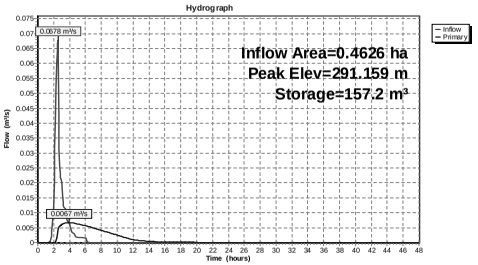
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 36 mm for 50-Year event
Inflow = 0.1167 m³/s @ 2.53 hrs, Volume= 0.347 Ml
Outflow = 0.0102 m³/s @ 4.12 hrs, Volume= 0.331 Ml, Atten= 91%, Lag= 95.4 min
Primary = 0.0102 m³/s @ 4.12 hrs, Volume= 0.331 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.840 m @ 4.12 hrs Surf.Area= 322.3 m² Storage= 257.1 m³

Plug-Flow detention time= 320.7 min calculated for 0.331 Ml (95% of inflow)
Center-of-Mass det. time= 313.3 min (489.1 - 175.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0102 m³/s @ 4.12 hrs HW=291.839 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0102 m³/s @ 2.30 m/s)

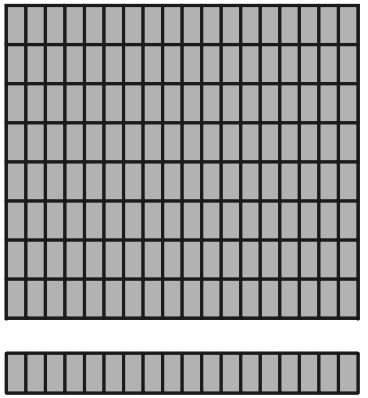
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



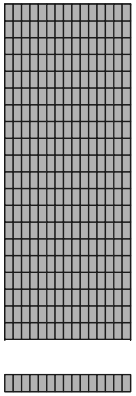
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

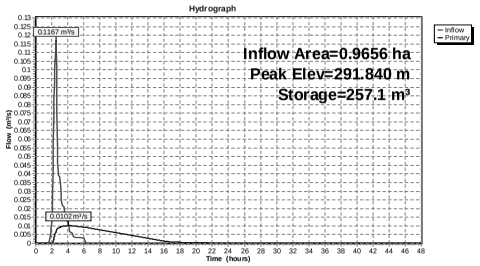
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

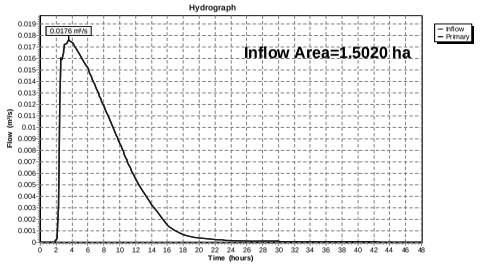


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 34 mm for 50-Year event
Inflow = 0.0176 m³/s @ 3.57 hrs, Volume= 0.506 Ml
Primary = 0.0176 m³/s @ 3.57 hrs, Volume= 0.506 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

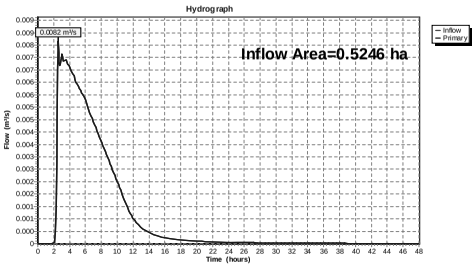


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 33 mm for 50-Year event
Inflow = 0.0082 m³/s @ 2.59 hrs, Volume= 0.174 Ml
Primary = 0.0082 m³/s @ 2.59 hrs, Volume= 0.174 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

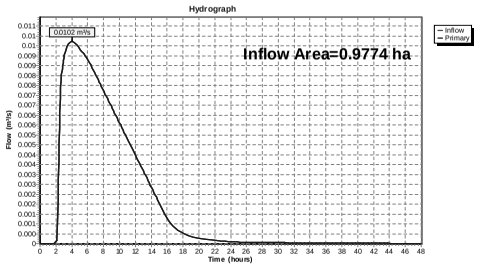


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 34 mm for 50-Year event
Inflow = 0.0102 m³/s @ 4.07 hrs, Volume= 0.332 Ml
Primary = 0.0102 m³/s @ 4.07 hrs, Volume= 0.332 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Summary for Subcatchment 1C: Commercial Lands

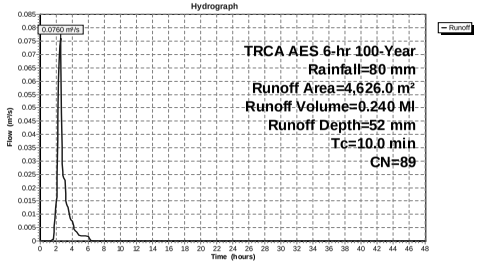
Runoff = 0.0760 m³/s @ 2.52 hrs, Volume= 0.240 Ml, Depth= 52 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 100-Year Rainfall=80 mm

Area (m²)	CN	Description
3,457.0	98	Paved parking, HSG D
1,169.0	61	>75% Grass cover, Good, HSG B
4,626.0	89	Weighted Average
1,169.0	61	25.27% Pervious Area
3,457.0	98	74.73% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 1C: Commercial Lands



Summary for Subcatchment 1R: Residential Lands

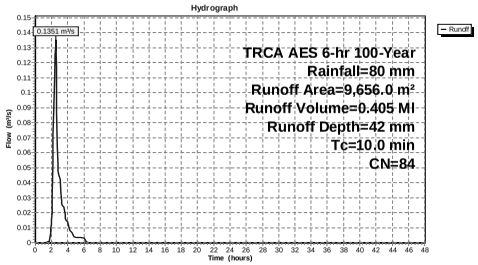
Runoff = 0.1351 m³/s @ 2.53 hrs, Volume= 0.405 Ml, Depth= 42 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 100-Year Rainfall=80 mm

Area (m²)	CN	Description
5,914.0	98	Paved parking, HSG D
3,742.0	61	>75% Grass cover, Good, HSG B
9,656.0	84	Weighted Average
3,742.0	61	38.75% Pervious Area
5,914.0	98	61.25% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1R: Residential Lands



Summary for Subcatchment 3S: Commercial Lands (Uncontrolled)

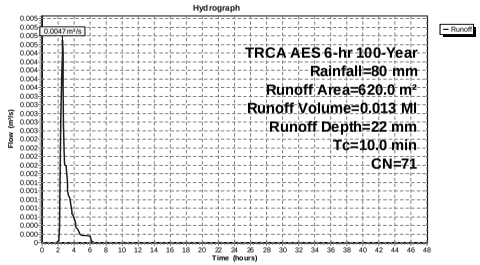
Runoff = 0.0047 m³/s @ 2.55 hrs, Volume= 0.013 Ml, Depth= 22 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 100-Year Rainfall=80 mm

Area (m²)	CN	Description
459.0	61	>75% Grass cover, Good, HSG B
161.0	98	Paved parking, HSG D
620.0	71	Weighted Average
459.0	61	74.03% Pervious Area
161.0	98	25.97% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 3S: Commercial Lands (Uncontrolled)



Summary for Subcatchment 4S: Residential Lands (Uncontrolled)

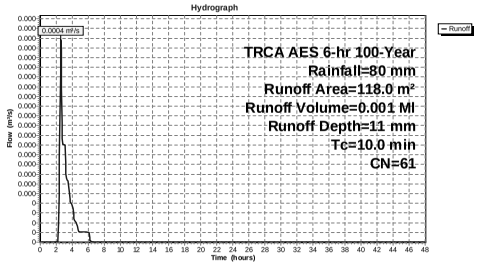
Runoff = 0.0004 m³/s @ 2.57 hrs, Volume= 0.001 Ml, Depth= 11 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
TRCA AES 6-hr 100-Year Rainfall=80 mm

Area (m²)	CN	Description
118.0	61	>75% Grass cover, Good, HSG B
118.0	61	100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 4S: Residential Lands (Uncontrolled)



Summary for Pond CS: Commercial Storage

Inflow Area = 0.4626 ha, 74.73% Impervious, Inflow Depth = 52 mm for 100-Year event
Inflow = 0.0760 m³/s @ 2.52 hrs, Volume= 0.240 Ml
Outflow = 0.0074 m³/s @ 4.03 hrs, Volume= 0.193 Ml, Atten= 90%, Lag= 90.3 min
Primary = 0.0074 m³/s @ 4.03 hrs, Volume= 0.193 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 291.235 m @ 4.03 hrs Surf.Area= 325.3 m² Storage= 180.7 m³

Plug-Flow detention time= 280.4 min calculated for 0.193 Ml (80% of inflow)
Center-of-Mass det. time= 263.3 min (433.1 - 169.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	290.650 m	0.0 m³	**9.64 mW x 25.30 mL x 0.61 mH Field A** 149.3 m³ Overall - 149.3 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	290.650 m	141.8 m³	**ACO StormBrixx 1** x 336 Inside #1 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 336 Chambers in 16 Rows
#3B	290.650 m	0.0 m³	**4.82 mW x 16.87 mL x 0.61 mH Field B** 49.8 m³ Overall - 49.8 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	290.650 m	47.3 m³	**ACO StormBrixx 1** x 112 Inside #3 Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³ Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³ 112 Chambers in 8 Rows
		189.1 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	290.800 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0074 m³/s @ 4.03 hrs HW=291.235 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.0074 m³/s @ 1.68 m/s)

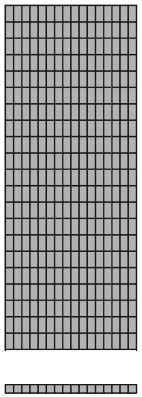
Pond CS: Commercial Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

21 Chambers/Row x 1.21 m Long = 25.30 m Row Length
16 Rows x 603 mm Wide = 9.64 m Base Width
612 mm Chamber Height = 0.61 m Field Height

336 Chambers x 0.42 m³ = 141.83 m³ Chamber Storage
336 Chambers x 0.44 m³ = 149.29 m³ Displacement

Chamber Storage = 141.83 m³ = 0.142 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 25.30 m x 9.64 m x 0.61 m



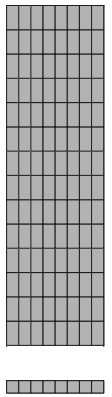
Pond CS: Commercial Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 1 (ACO StormBrixx®)
Inside= 603 mmW x 612 mmH => 0.350 m² x 1.21 mL = 0.42 m³
Outside= 603 mmW x 612 mmH => 0.369 m² x 1.21 mL = 0.44 m³

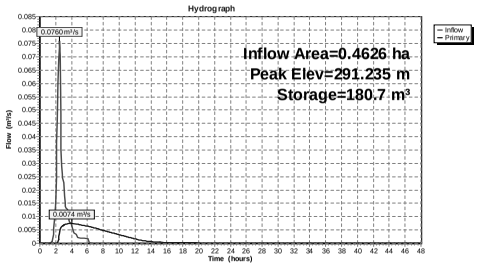
14 Chambers/Row x 1.21 m Long = 16.87 m Row Length
8 Rows x 603 mm Wide = 4.82 m Base Width
612 mm Chamber Height = 0.61 m Field Height

112 Chambers x 0.42 m³ = 47.28 m³ Chamber Storage
112 Chambers x 0.44 m³ = 49.76 m³ Displacement

Chamber Storage = 47.28 m³ = 0.047 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 16.87 m x 4.82 m x 0.61 m



Pond CS: Commercial Storage



Summary for Pond RS: Residential Storage

Inflow Area = 0.9656 ha, 61.25% Impervious, Inflow Depth = 42 mm for 100-Year event
Inflow = 0.1351 m³/s @ 2.53 hrs, Volume= 0.405 Ml
Outflow = 0.0112 m³/s @ 4.13 hrs, Volume= 0.389 Ml, Atten= 92%, Lag= 96.0 min
Primary = 0.0112 m³/s @ 4.13 hrs, Volume= 0.389 Ml

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 291.994 m @ 4.13 hrs Surf.Area= 322.3 m² Storage= 304.5 m³

Plug-Flow detention time= 341.5 min calculated for 0.389 Ml (96% of inflow)
Center-of-Mass det. time= 335.0 min (509.4 - 174.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.000 m	0.0 m³	**10.85 mW x 9.64 mL x 1.22 mH Field A** 128.0 m³ Overall - 128.0 m³ Embedded = 0.0 m³ x 40.0% Voids
#2A	291.000 m	121.6 m³	**ACO StormBrixx 2** x 144 Inside #1 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 144 Chambers in 18 Rows
#3B	291.000 m	0.0 m³	**9.04 mW x 24.10 mL x 1.22 mH Field B** 266.6 m³ Overall - 266.6 m³ Embedded = 0.0 m³ x 40.0% Voids
#4B	291.000 m	253.3 m³	**ACO StormBrixx 2** x 300 Inside #3 Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³ Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³ 300 Chambers in 15 Rows
		374.8 m³	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.050 m	**75 mm Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0112 m³/s @ 4.13 hrs HW=291.994 m (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.0112 m³/s @ 2.53 m/s)

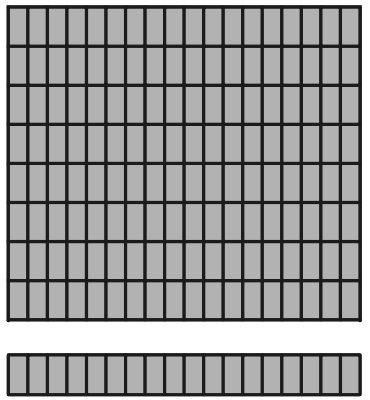
Pond RS: Residential Storage - Chamber Wizard Field A

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

8 Chambers/Row x 1.21 m Long = 9.64 m Row Length
18 Rows x 603 mm Wide = 10.85 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

144 Chambers x 0.84 m³ = 121.57 m³ Chamber Storage
144 Chambers x 0.89 m³ = 127.96 m³ Displacement

Chamber Storage = 121.57 m³ = 0.122 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 9.64 m x 10.85 m x 1.22 m



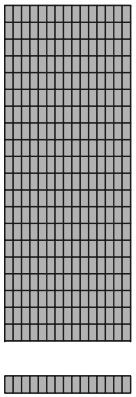
Pond RS: Residential Storage - Chamber Wizard Field B

Chamber Model = ACO StormBrixx 2 (ACO StormBrixx®)
Inside= 603 mmW x 1,224 mmH => 0.701 m² x 1.21 mL = 0.84 m³
Outside= 603 mmW x 1,224 mmH => 0.737 m² x 1.21 mL = 0.89 m³

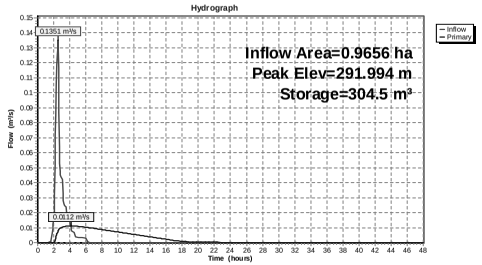
20 Chambers/Row x 1.21 m Long = 24.10 m Row Length
15 Rows x 603 mm Wide = 9.04 m Base Width
1,224 mm Chamber Height = 1.22 m Field Height

300 Chambers x 0.84 m³ = 253.26 m³ Chamber Storage
300 Chambers x 0.89 m³ = 266.59 m³ Displacement

Chamber Storage = 253.26 m³ = 0.253 Ml
Overall Storage Efficiency = 95.0%
Overall System Size = 24.10 m x 9.04 m x 1.22 m



Pond RS: Residential Storage

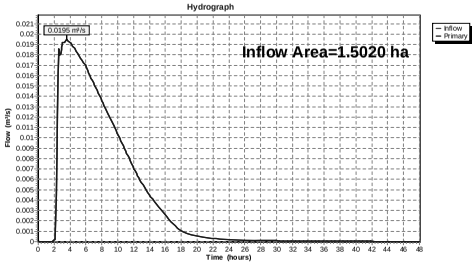


Summary for Link 2L: Development Total

Inflow Area = 1.5020 ha, 63.46% Impervious, Inflow Depth > 40 mm for 100-Year event
Inflow = 0.0195 m³/s @ 3.56 hrs, Volume= 0.597 Ml
Primary = 0.0195 m³/s @ 3.56 hrs, Volume= 0.597 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 2L: Development Total

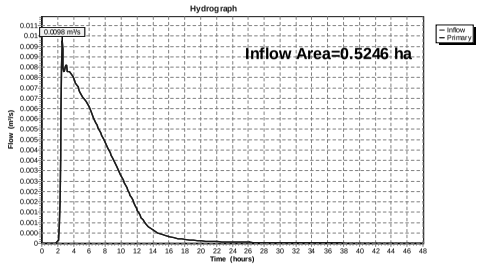


Summary for Link 3L: Commercial Total

Inflow Area = 0.5246 ha, 68.97% Impervious, Inflow Depth > 39 mm for 100-Year event
Inflow = 0.0098 m³/s @ 2.58 hrs, Volume= 0.207 Ml
Primary = 0.0098 m³/s @ 2.58 hrs, Volume= 0.207 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 3L: Commercial Total

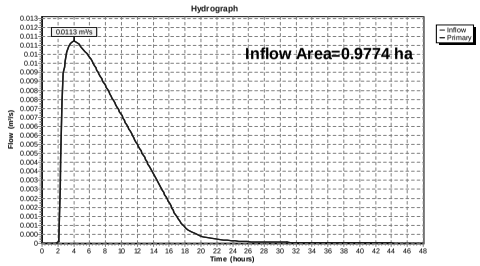


Summary for Link 4L: Residential Total

Inflow Area = 0.9774 ha, 60.51% Impervious, Inflow Depth > 40 mm for 100-Year event
Inflow = 0.0113 m³/s @ 4.07 hrs, Volume= 0.390 Ml
Primary = 0.0113 m³/s @ 4.07 hrs, Volume= 0.390 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 4L: Residential Total



Brief Stormceptor Sizing Report - Commercial Site

Project Information & Location			
Project Name	16114 Airport Road	**Project Number**	1599
City	Caledon	**State/ Province**	Ontario
Country	Canada	**Date**	2/8/2018
Designer Information		**EOR Information (optional)**	
Name	James Nelson	**Name**	
Company	Trafalgar Engineering Ltd	**Company**	
Phone #	905-338-3366	**Phone #**	
Email	jnelson@trafalgareng.com	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Commercial Site
Target TSS Removal (%)	80
TSS Removal (%) Provided	
Recommended Stormceptor Model	STC 750

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 300	70
STC 750	80
STC 1000	81
STC 1500	82
STC 2000	84
STC 3000	86
STC 4000	89
STC 5000	90
STC 6000	91
STC 9000	94
STC 10000	94
STC 14000	95
StormceptorMAX	Custom

Sizing Details

Drainage Area	
Total Area (ha)	0.46
Imperviousness %	85.00

Rainfall	
Station Name	TORONTO CENTRAL
State/Province	Ontario
Station ID #	0100
Years of Records	18
Latitude	43°37'N
Longitude	79°23'W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Up Stream Storage	
Storage (ha-m)	Discharge (cms)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

City of Toronto PSD		
Particle Diameter (microns)	Distribution %	Specific Gravity
10.0	20.0	2.65
30.0	10.0	2.65
50.0	10.0	2.65
95.0	20.0	2.65
265.0	20.0	2.65
1000.0	20.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
http://www.imbriumsystems.com/technical-specifications

Brief Stormceptor Sizing Report - Residential Component

Project Information & Location			
Project Name	16114 Airport Road	**Project Number**	1599
City	Caledon	**State/ Province**	Ontario
Country	Canada	**Date**	2/8/2018
Designer Information		**EOR Information (optional)**	
Name	James Nelson	**Name**	
Company	Trafalgar Engineering Ltd	**Company**	
Phone #	905-338-3366	**Phone #**	
Email	jnelson@trafalgareng.com	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Residential Component
Target TSS Removal (%)	80
TSS Removal (%) Provided	81
Recommended Stormceptor Model	STC 2000

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary		
Stormceptor Model	**% TSS Removal Provided**	**% Runoff Volume Captured Provided**
STC 300	65	80
STC 750	75	90
STC 1000	77	90
STC 1500	77	90
STC 2000	81	94
STC 3000	82	94
STC 4000	86	97
STC 5000	86	97
STC 6000	88	98
STC 9000	91	99
STC 10000	91	99
STC 14000	94	100
StormceptorMAX	Custom	Custom

Stormceptor®

FORTERRA

Sizing Details

Drainage Area	
Total Area (ha)	0.97
Imperviousness %	70.00

Rainfall	
Station Name	TORONTO CENTRAL
State/Province	Ontario
Station ID #	0100
Years of Records	18
Latitude	43°37'N
Longitude	79°23'W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	90.00
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Up Stream Storage	
Storage (ha-m)	Discharge (cms)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
http://www.imbriumsystems.com/technical-specifications

Appendix ‘E’

Caledon East Wetland Complex Catchment Basin

Caledon East Wetland Complex Roll #21240500010570000000

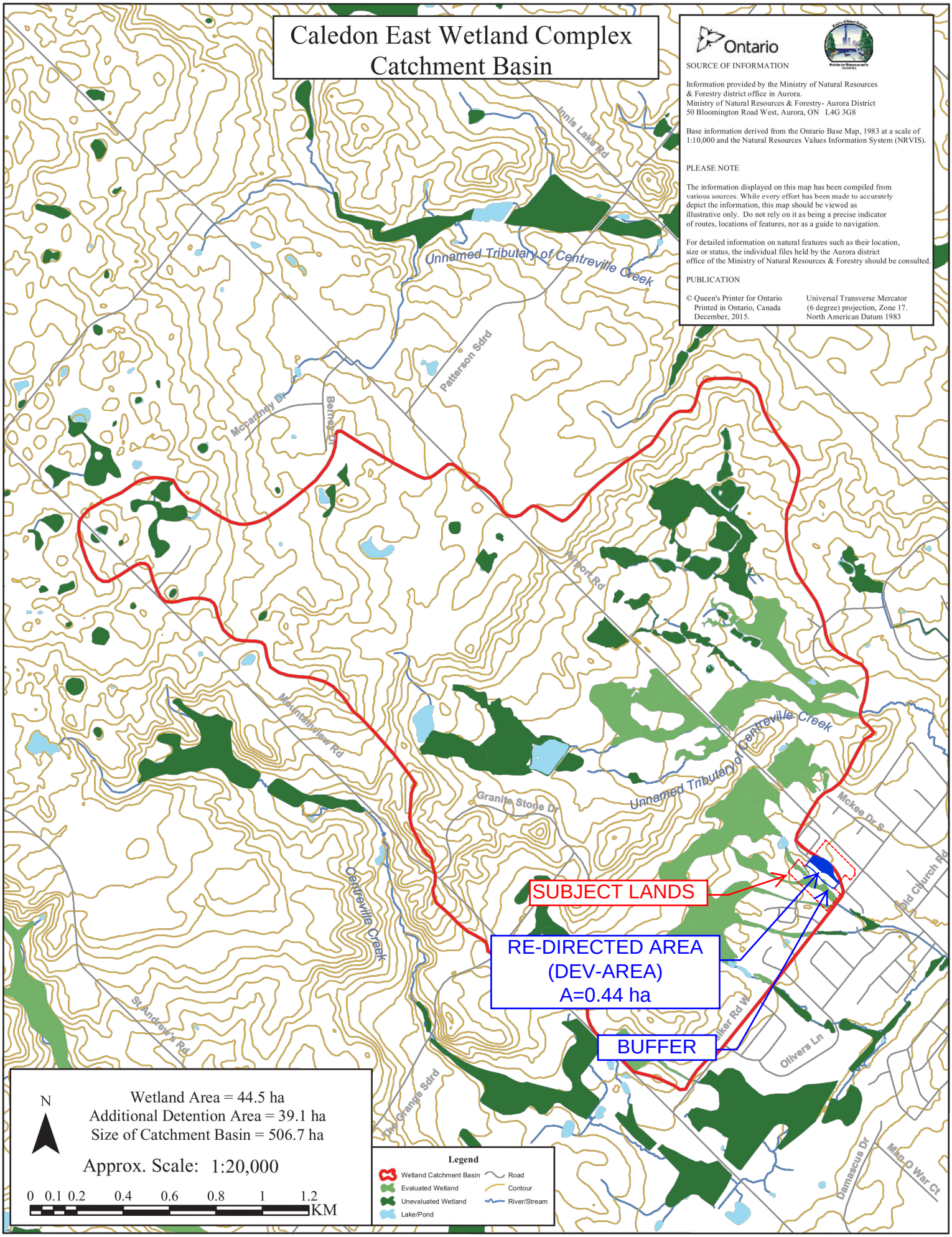
Pre-Development Model Subcatchment Areas (Figure 3)

Post-Development Model Subcatchment Areas (Figure 4)

Model Parameters

Interpreted Groundwater Flow (R.J. Burnside)

EPA SWMM Model Input File


Caledon East Wetland Complex
Catchment Basin
Ontario
SOURCE OF INFORMATION
Information provided by the Ministry of Natural Resources
& Forestry district office in Aurora.
Ministry of Natural Resources & Forestry- Aurora District
50 Bloomington Road West, Aurora, ON L4G 3G8
Base information derived from the Ontario Base Map, 1983 at a scale of 1:10,000 and the Natural Resources Values Information System (NRVIS).
PLEASE NOTE
The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should be viewed as illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation.
For detailed information on natural features such as their location, size or status, the individual files held by the Aurora district office of the Ministry of Natural Resources & Forestry should be consulted.
PUBLICATION
© Queen's Printer for Ontario
Printed in Ontario, Canada
December, 2015.
Universal Transverse Mercator
(6 degree) projection, Zone 17.
North American Datum 1983
Innis Lake Rd
Unnamed Tributary of Centreville Creek
Patterson Sdrd
McCartney Dr
Bethesda Dr
Airport Rd
Mountainview Rd
Granite Stone Dr
Centreville Creek
Unnamed Tributary of Centreville Creek
Mckee Dr S
Old Church Rd
SUBJECT LANDS
RE-DIRECTED AREA
(DEV-AREA)
A=0.44 ha
BUFFER
Walker Rd W
Olivers Ln
St Andrew's Rd
The Grange Sdrd
Damascus Dr
Main O War Ct
N
Wetland Area = 44.5 ha
Additional Detention Area = 39.1 ha
Size of Catchment Basin = 506.7 ha
Approx. Scale: 1:20,000
0 0.1 0.2 0.4 0.6 0.8 1 1.2
KM
Legend
Wetland Catchment Basin
Evaluated Wetland
Unevaluated Wetland
Lake/Pond
Road
Contour
River/Stream

Ontario

Scale 1:1,500 (approx.)

0 25 50 100 150 200 M

FILE ID:2015-78-ST

Legend

- Watercourse
- MNRF Evaluated Wetland
- Subject Lands
- Parcel Fabric
- c S17 Wetland Vegetation Community

PUBLICATION

Cartography by Aurora District Geomatics.

Universal Transverse Mercator (6 degree) projection, Zone 17. North American Datum 1983

SOURCE OF INFORMATION

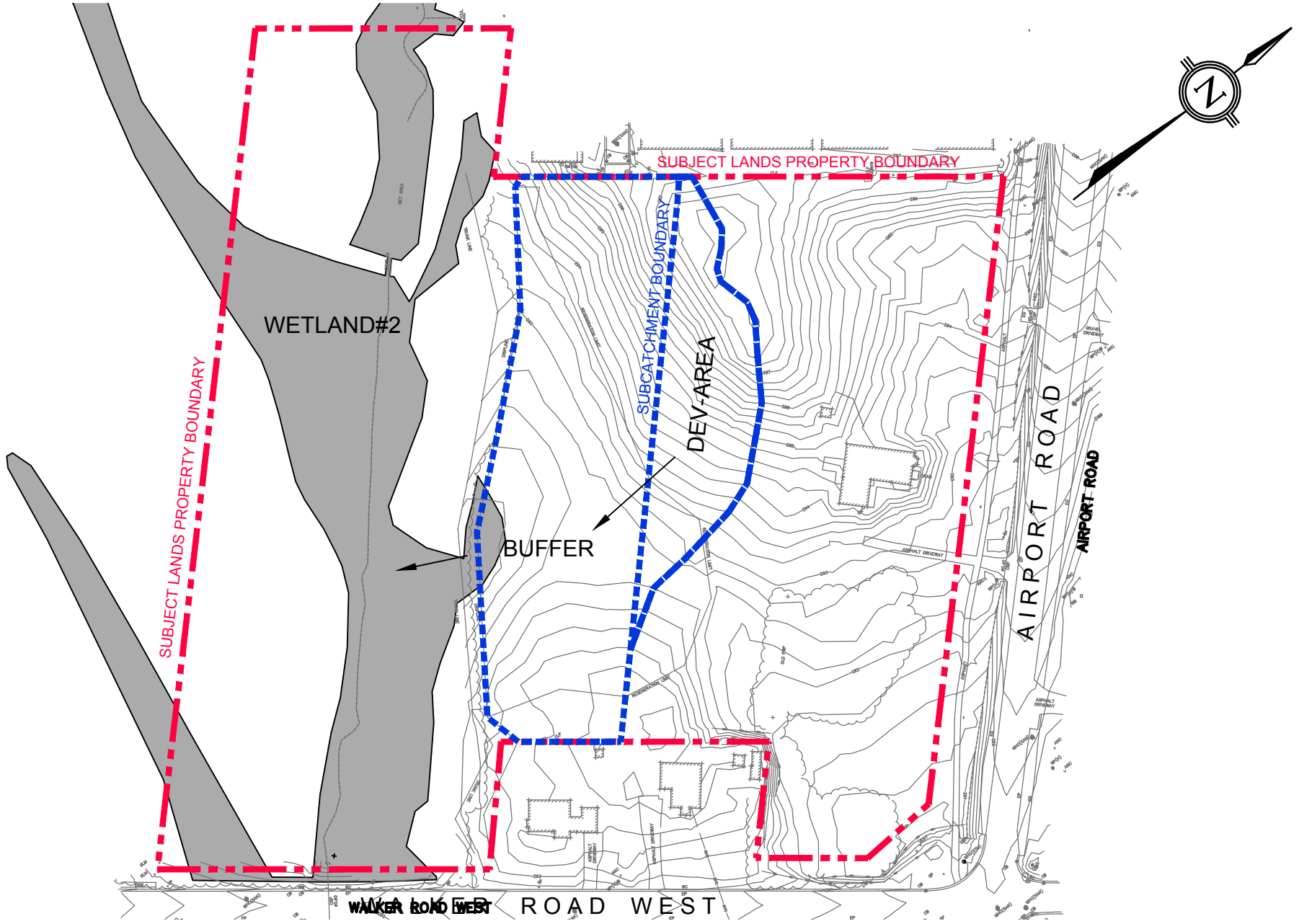
Information provided by the Ministry of Natural Resources & Forestry district office in Aurora.
Ministry of Natural Resources & Forestry- Aurora District 50 Bloomington Road West, Aurora, ON L4G 3G8

Base information derived from the Ontario Base Map, 1983 at a scale of 1:10,000 and the Natural Resources Values Information System (NRVIS).

NOTE

The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should be viewed as illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation.

For detailed information on natural features such as their location, size or status, the individual files held by the Aurora district office of the Ministry of Natural Resources & Forestry should be consulted.



PROJECT TITLE

16114 AIRPORT ROAD

TOWN OF CALEDON

TRAFALGAR ENGINEERING LTD.

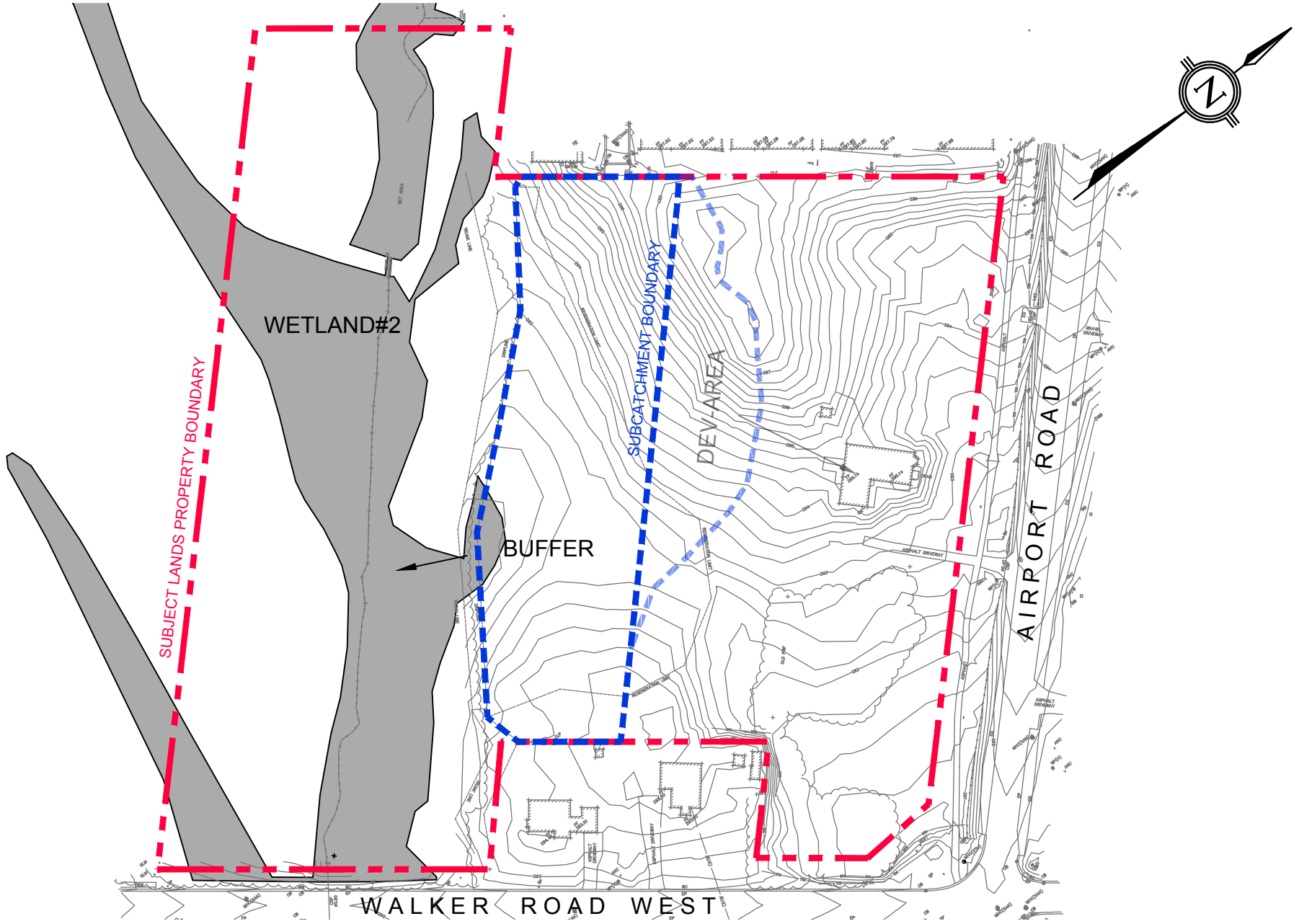
TEL: (905) 338-3366 FAX: (905) 338-7734

tel@trafalgareng.com

DRAWING TITLE

PRE-DEVELOPMENT SUBCATCHMENT AREA PLAN

DESIGN BY	JN	SCALE	1:1500	FIGURE No.	FIGURE 3
DRAWN BY	SP	CAD FILE	1599-FIG2-3.DWG	DATE	08/02/2018



PROJECT TITLE

16114 AIRPORT ROAD
TOWN OF CALEDON

TRAFALGAR ENGINEERING LTD.
TEL: (905) 338-3366 FAX: (905) 338-7734
tel@trafalgareng.com

DRAWING TITLE
POST-DEVELOPMENT SUBCATCHMENT AREA PLAN

DESIGN BY	JN	SCALE	1:1500	FIGURE No.	FIGURE 3
DRAWN BY	SP	CAD FILE	1599-FIG2-3.DWG	DATE	08/02/2018

Model Parameters

E.1 Groundwater

Groundwater modelling is not a part of the simulation.

E.2 Evaporation

Evaporation is calculated by the software using the Hargreaves method. Reference may be made to the EPA SWMM Reference Manual, Volume I: Hydrology section 4.2 for further detail. The evaporation is determined using the temperature data provided by TRCA.

E.3 Infiltration

Parameters used with the Green-Ampt infiltration method are obtained from Tables 4-7 and 4-8 from the EPA SWMM Reference Manual, attached. Parameter values are interpolated in Table 4-7 based on the hydraulic conductivity of the soil. Typical values of maximum moisture deficit (Initial Deficit) are provided in Table 4-8 from the EPA SWMM Reference Manual based on soil type. The Initial Deficit used in the simulation is selected based on approximate soil type (between Sandy Loam and Loamy Sand, by hydraulic conductivity).

E.4 Rainfall and Climate Data

All rainfall and climate data for the simulation period is obtained from TRCA.

E.5 Subcatchment Geometry and Properties

Subcatchment Properties

Subcatchment	Area (ha)	Width (m)	Slope (%)	% Imp.	n, Imp.	n, Per.	Dep. Storage, Imp. (mm)	Dep. Storage, Per. (mm)
DEV-AREA	0.439	105	9	0	0.015	0.035	2	5
BUFFER	0.441	155	4	0	0.015	0.035	2	5

Infiltration Parameters

Subcatchment	Suction Head (mm)	Hydraulic Conductivity (mm/hr)	Initial Deficit (Fraction)
DEV-AREA	98.4	15.5	0.33
BUFFER	98.4	15.5	0.33

Table 4-7 Green-Ampt parameters for different soil classes (Rawls et al., 1983)

(Numbers in parentheses are ± one standard deviation from the parameter value shown.)

Soil Class	Porosity, ϕ	Effective Porosity, ϕ_e*	Wetting Front Suction Head, ψ_s (in)	Saturated Hydraulic Conductivity, K_s (in/hr)
Sand	0.437 (0.374–0.500)	0.417 (0.354–0.480)	1.95 (0.38–9.98)	4.74
Loamy sand	0.437 (0.363–0.506)	0.401 (0.329–0.473)	2.41 (0.53–11.00)	1.18
Sandy loam	0.453 (0.351–0.555)	0.412 (0.283–0.541)	4.33 (1.05–17.90)	0.43
Loam	0.463 (0.375–0.551)	0.434 (0.334–0.534)	3.50 (0.52–23.38)	0.13
Silt loam	0.501 (0.420–0.582)	0.486 (0.394–0.578)	6.57 (1.15–37.56)	0.26
Sandy clay loam	0.398 (0.332–0.464)	0.330 (0.235–0.425)	8.60 (1.74–42.52)	0.06
Clay loam	0.464 (0.409–0.519)	0.309 (0.279–0.501)	8.22 (1.89–35.87)	0.04
Silty clay loam	0.471 (0.418–0.524)	0.432 (0.347–0.517)	10.75 (2.23–51.77)	0.04
Sandy clay	0.430 (0.370–0.490)	0.321 (0.207–0.435)	9.41 (1.61–55.20)	0.02
Silty clay	0.479 (0.425–0.533)	0.423 (0.334–0.512)	11.50 (2.41–54.88)	0.02
Clay	0.475 (0.427–0.523)	0.385 (0.269–0.501)	12.45 (2.52–61.61)	0.01

*Effective porosity is the difference between the porosity ϕ and the residual moisture content ϕ_r that remains after a saturated soil is allowed to drain thoroughly.

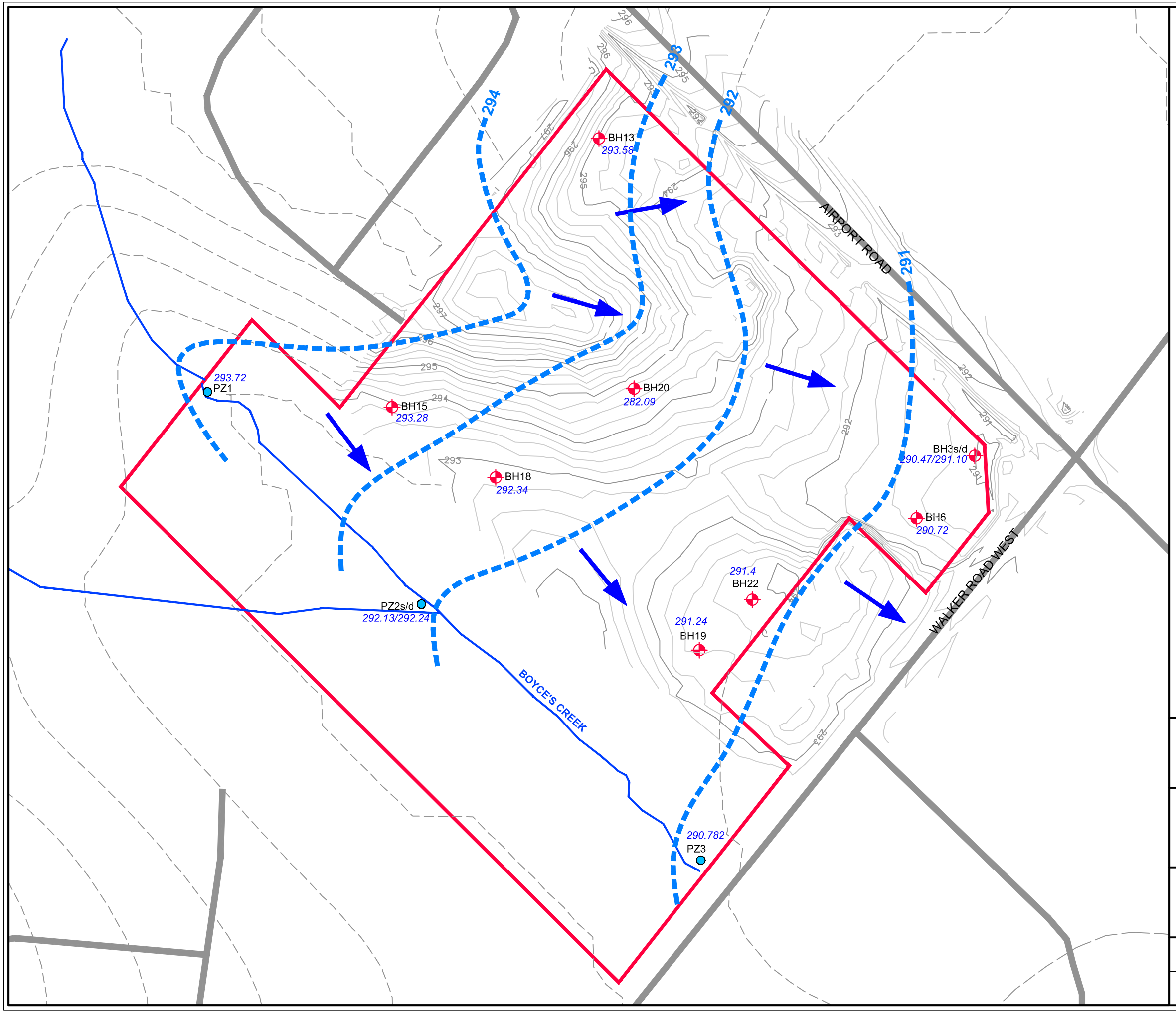
Maximum Moisture Deficit (θ_{dmax})

The maximum moisture deficit, θ_{dmax} is defined as the difference between the moisture content at saturation and at the start of the simulation. Because this parameter is the most sensitive of the three parameters for estimates of runoff from pervious areas (Brakensiek and Onstad, 1977), some care should be taken in determining the best θ_{dmax} value to use. The saturated moisture content is approximately equal to the soil's porosity ϕ (i.e., the fraction of voids), assuming one ignores the 5 - 10% of trapped air that typically exists at saturation. After a saturated soil is allowed to drain thoroughly, the residual moisture content that remains is ϕ_r. The effective porosity ϕ_e is defined as $\phi - \phi_r$ and can be used to represent θ_{dmax} for dry antecedent conditions. Typical values of ϕ_e are included in the Rawls et al. (1983) data set listed in Table 4-7.

Sandy soils tend to have lower porosities than clay soils, but drain to lower moisture contents between storms because the water is not held so strongly in the soil pores. Consequently, values of θ_{dmax} for dry antecedent conditions tend to be higher for sandy soils than for clay soils. Table 4-8, derived from Clapp and Hornberger (1973), is another source of θ_{dmax} values for various soil types.

Table 4-8 Typical values of θ_{dmax} for various soil types.

Soil Texture	Typical θ_{dmax} at Soil Wilting Point
Sand	0.34
Sandy Loam	0.33
Silt Loam	0.32
Loam	0.31
Sandy Clay Loam	0.26
Clay Loam	0.24
Clay	0.21



LEGEND

- SUBJECT LANDS
- WATERCOURSE
- WOODED AREA
- CONTOUR (0.5m intervals - masl_
- CONTOUR (1m intermals)
- MONITORING WELL (TERRAPROBE, 2016)
- DRIVE POINT PIEZOMETER (RJB, 2016)
- INTERPRETED GROUNDWATER CONTOUR (masl)
- 289.45 MEASURED WATER LEVEL (MAY 11 2017)
- INTERPRETED GROUNDWATER FLOW DIRECTION

Sources:
1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Site contours provided by David B. Searles Surveying Ltd., July 21, 2016.
4. Regional contours created from 2002 Dem file, MNR.

N

0 25 50 75 100
Metres

BURNSIDE

Client / Report

SHACCA CALEDON HOLDINGS INC.
CALEDON EAST, ONTARIO

2017 MONITORING UPDATE

Figure Title

INTERPRETED GROUNDWATER FLOW

Drawn	Checked	Date	Figure No.
SK	SC	December 2017	2
Scale		Project No.	
1:1,250		300039242	

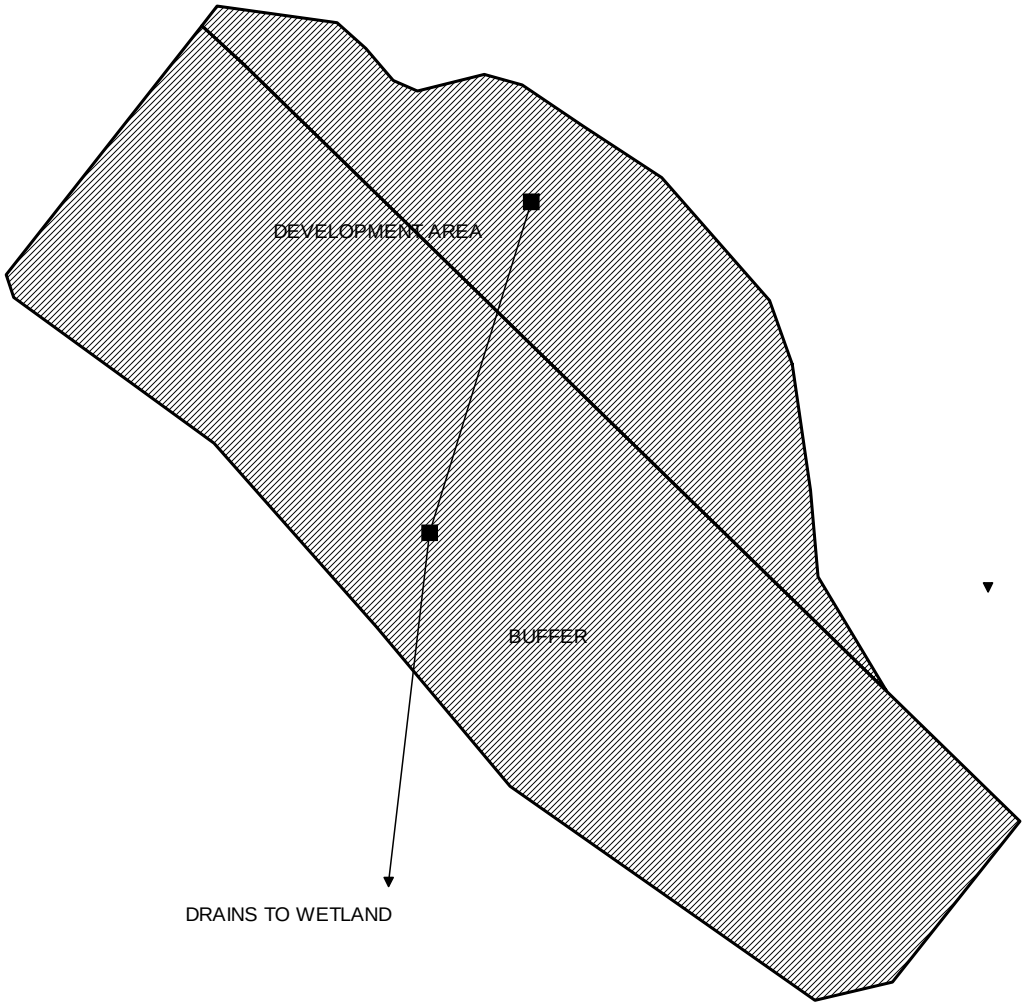
File Name:N:\gel\Shared Work Areas\039242 Shacca \ 039242 GWF 2017 Letter Update.dwg Date Plotted: December 4, 2017 - 4:20 PM

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        YES
SKIP_STEADY_STATE    NO

START_DATE           05/23/1986
START_TIME           00:00:00
REPORT_START_DATE    05/23/1986
REPORT_START_TIME    00:00:00
END_DATE             11/01/2007
END_TIME             23:59:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         1.14
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
TEMPERATURE
DRY_ONLY         NO

[TEMPERATURE]
;;Data Element     Values
FILE               "test Daily_Temp.dat"
WINDSPEED FILE
SNOWMELT           0 0.5 0.6 295 43.9 19
ADC IMPERVIOUS     1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
ADC PERVIOUS       1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
RG-1             VOLUME    1:00     1.0      FILE       "615HMAK_Hourly_Prec tel.dat" STA01
    MM

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope
CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- --------
-------- ----------------
DEV-AREA         RG-1             DIVERTED         0.220    0        105      9.0      0

BUFFER           RG-1             WETLAND          0.652    0        155      4.0      0
```

```
[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted

;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
DEV-AREA         0.015      0.035      2.00       5.00       25         OUTLET
BUFFER           0.015      0.035      2.00       5.00       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DEV-AREA         98.4       15.5       0.33
BUFFER           98.4       15.5       0.33

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
WETLAND          290.39     NORMAL                      NO
DIVERTED         0          FREE                        NO

[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   YES
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 590582.721 4858184.289 590734.609 4858334.328
Units      Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
WETLAND          590642.160         4858207.488
DIVERTED         590724.353         4858247.795

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DEV-AREA         590697.393         4858278.387
DEV-AREA         590694.360         4858287.092
DEV-AREA         590679.505         4858303.962
DEV-AREA         590668.709         4858310.997
DEV-AREA         590660.524         4858316.619
DEV-AREA         590655.233         4858318.041
DEV-AREA         590646.136         4858315.854
DEV-AREA         590642.749         4858317.190
DEV-AREA         590639.059         4858321.668
DEV-AREA         590634.979         4858325.086
DEV-AREA         590618.635         4858327.508
DEV-AREA         590616.446         4858324.728
DEV-AREA         590622.158         4858319.501
DEV-AREA         590710.380         4858233.614
DEV-AREA         590701.028         4858249.127
DEV-AREA         590700.042         4858261.163
BUFFER           590622.158         4858319.501
BUFFER           590616.446         4858324.728
BUFFER           590589.625         4858290.656
BUFFER           590590.753         4858287.498
BUFFER           590618.275         4858267.621
BUFFER           590640.396         4858242.408
BUFFER           590658.866         4858220.399
BUFFER           590700.682         4858191.109
```

```
BUFFER           590711.254         4858193.586
BUFFER           590728.707         4858215.772

[SYMBOLS]
;;Gage            X-Coord            Y-Coord
;;--------------- ------------------ ------------------
RG-1             590590.543         4858320.150

[LABELS]
;;X-Coord          Y-Coord            Label
590614.155         4858204.562        "DRAINS TO WETLAND" "" "Arial" 10 0 0
590626.277         4858298.190        "DEVELOPMENT AREA" "" "Arial" 10 0 0
590658.461         4858242.598        "BUFFER" "" "Arial" 10 0 0
```

05/23/1986 01:00:00



EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 2
Number of nodes 2
Number of links 0
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG-1	P:\1599 Shacca\Storm Water Management\Water Balance\615HMAK_Hourly_Prec tel.dat		

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
DEV-AREA	0.22	105.00	0.00	9.0000	RG-1	BUFFER
BUFFER	0.65	155.00	0.00	4.0000	RG-1	WETLAND

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
WETLAND	OUTFALL	290.39	0.00	0.0	
DIVERTED	OUTFALL	0.00	0.00	0.0	

****
Rainfall File Summary
****

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	05/23/1986	11/01/2007	60 min	6337	0	0

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:

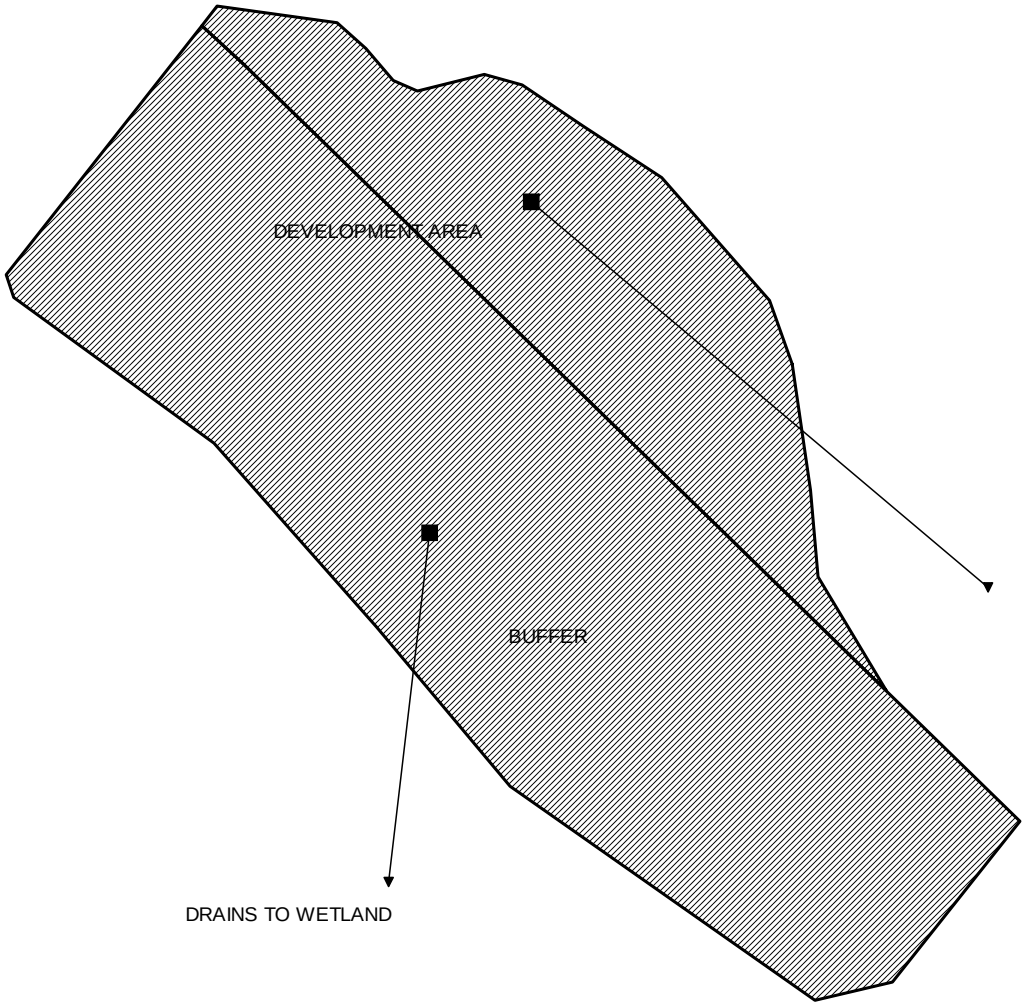
```
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Surcharge Method ......... EXTRAN
Starting Date ............ 05/23/1986 00:00:00
Ending Date .............. 11/01/2007 23:59:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
```

****
Control Actions Taken
****

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	8.259	9471.100
Evaporation Loss	0.001	0.983
Infiltration Loss	8.256	9468.008
Surface Runoff	0.002	2.862
Final Storage	0.000	0.000
Continuity Error (%)	-0.008	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.002	0.025
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.002	0.025
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Analysis begun on: Thu Oct 10 11:44:14 2019
Analysis ended on: Thu Oct 10 11:44:20 2019
Total elapsed time: 00:00:06


DEVELOPMENT AREA
BUFFER
DRAINS TO WETLAND

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 2
Number of nodes 2
Number of links 0
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
RG-1	P:\1599 Shacca\Storm Water Management\Water Balance\615HMAK_Hourly_Prec tel.dat		

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
DEV-AREA	0.22	105.00	0.00	9.0000	RG-1	DIVERTED
BUFFER	0.65	155.00	0.00	4.0000	RG-1	WETLAND

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
WETLAND	OUTFALL	290.39	0.00	0.0	
DIVERTED	OUTFALL	0.00	0.00	0.0	

****
Rainfall File Summary
****

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	05/23/1986	11/01/2007	60 min	6337	0	0

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:

```
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Surcharge Method ......... EXTRAN
Starting Date ............ 05/23/1986 00:00:00
Ending Date .............. 11/01/2007 23:59:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00


**********
Control Actions Taken
**********


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         8.259      9471.100
Evaporation Loss .........         0.001         0.972
Infiltration Loss ........         8.256      9467.434
Surface Runoff ...........         0.003         3.385
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -0.007


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.003         0.030
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.003         0.030
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


**************************
Analysis begun on:  Thu Oct 10 11:42:37 2019
Analysis ended on:  Thu Oct 10 11:42:43 2019
Total elapsed time: 00:00:06
```