CE CONDELAND ENGINEERING LTD.
CONSULTING ENGINEERS, PLANNERS, PROJECT MANAGERS

FUNCTIONAL SERVICING REPORT

FOR

PROPOSED RESIDENTIAL DEVELOPMENT

2147925 ONTARIO INC.

LOCATED IN THE HAMLET OF GLEN WILLIAMS

McMASTER STREET & MEAGAN DRIVE

TOWN OF HALTON HILLS (GEORGETOWN)

May 2009

C.E. FILE: 09-015

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A.0. INTRODUCTION

The 2147925 Ontario Inc. property is located south-west of McMaster Street and Meagan Drive and immediately south of the former railway line, in the Hamlet of Glen Williams, Town of Halton Hills. South-west of the property is Eighth (8^{th}) Line road. The site is surrounded by existing low density residential areas with open agricultural lands abutting the north-west limit. The site area is approximately 6.88 Hectares (17.00 Acres) in size and is irregular in shape. 2147925 Ontario Inc. proposes to develop the above site as a single family house development consisting of a total of 32 units. Refer to Appendix 'A' for the proposed Draft Plan of Subdivision as prepared by Mathews Planning and Management Ltd. which also includes a site location map (key plan).

In support of the proposed development, we provide this report to identify the methodology of the municipal servicing. This report will provide rationale and justification for proposed municipal services for the development; more specifically the report will substantiate the ability to provide municipal sanitary sewer, municipal water and a conceptual resolution for storm water management.

The conceptual engineering designs developed and evaluated herein for the provision of municipal servicing systems in support of the proposed development are in general conformity with good engineering practices and the guidelines and criteria of the Town of Halton Hills, Credit Valley Conservation Authority, and the Ministry of the Environment.

3.0 EXISTING TOPOGRAPHICAL CHARACTERISTICS AND DRAINAGE PATTERNS.

The natural topography for the site falls from the north at an approximate elevation of 275.00 metres to the south (at 271.00m) with average 1.0% slope.

The site for the most part is void of trees with the exception to the south boundary where there are small groupings of trees. Given the type of development proposed and the nature of disturbance related to construction activities and grading changes, we anticipate these trees can be preserved.

The site drains in four main directions. Approximately, 39% of the site (2.056 Ha) drains towards the existing ditch on 8th Line via two 450mm diameter culverts. The south part of the property, approximately (1.731 Ha) and (2.892 Ha) drains towards existing 450mm Dia. culvert located on the 8th line Road via existing ditches. The runoff is then captured by DICB which routes the flow using a 675mm Dia, concrete STM pipe located on the south side of 8th line running parallel with the eighth line. The final destination of the runoff is Silver Creek through road side ditches of Wildwood Road. The balance pf the of the site drains towards outlet 5 using existing ditch along former railway right-of way. Refer to figure 5, Pre-development Storm Drainage Plan in Appendix 'C' for an illustration of the existing drainage patterns.

C.0. SANITARY SEWAGE CONVEYANCE AND TREATMENT

C.1. Conveyance

To substantiate the ability to provide sanitary servicing for the 2147925 Ontario Inc. development a conceptual sanitary sewage conveyance system is detailed as follows.

A gravity sanitary sewer system is proposed to service all 32 lots of the subject development. The proposed outlet for this sewer will be the *future* sanitary sewer servicing the Eden Oak (Creditview Heights) Inc. subdivision located south-east of the subject lands. To convey sanitary sewage from the proposed development to the Eden Oak (Creditview Heights) Inc. sanitary system an external sanitary conveyance sewer is required. This external sewer is proposed to be constructed along the former railway corridor (now a public walkway) from the proposed road connection of Street A and Meagan Drive to the aforementioned Eden Oak subdivision. Refer to Appendix 'C' for Figure 1, Proposed Sanitary Sewer Conveyance indicating a schematic alignment of the proposed sanitary sewer overlaid on an aerial photograph / municipal mapping. Also identified on this plan is the existing Georgetown Investments Phase 2 subdivision located immediately east of the Eden Oak (Creditview Heights) Inc. subdivision which in turn provides the sanitary outlet connection for the Eden Oak sanitary system. Sanitary sewage is then conveyed via the existing downstream sanitary sewer system by gravity with eventual outlet to the ***John Street Sewage Pump Station*** located outside the Glen Williams Hamlet limits and within the Georgetown Urban Area.

Proposed Subdivision Sanitary Sewer Design

Refer to Appendix 'C' for Figure 2, Sanitary Drainage Area Plan detailing sanitary drainage catchments for the subject lands. As identified on the plan a proposed 200mm diameter sanitary sewer can easily accommodate sanitary flows from the proposed development. Also included on Figure 2 is the proposed sanitary sewer design chart and as indicated the invert elevation of the sewer at its upstream end (MH15A) is 271.316 metres which is approximately 3.1 metres below finished road grade, having more than sufficient depth to service the residential lots. The sewer design chart is extended well beyond the subject development limits to provide design information for the external sanitary sewers along existing municipal roads (Meagan Dr., Oak Ridge Dr., Wildwood Rd.), the public walkway, through the *future* Eden Oak (Creditview Heights) Inc. subdivision and up to the connection point to the existing sanitary sewer within the Georgetown Investments Phase 2 subdivision. It should be further noted that as part of the Eden Oak (Creditview Heights) inc. servicing options design, a single leg of the existing sanitary sewer on Gamble Street within Georgetown Investments Phase 2 is proposed to be flattened (from 4.7% to 1.0%) providing greater depth for the sanitary outlet connection. This option was adopted for the purpose of this report for the subject development. The sanitary sewer design chart demonstrates there is sufficient grade to service the subject lands via connection to the existing downstream sanitary system.

C.2. Treatment

Halton Region staff reported that the Georgetown Wastewater Treatment Plant (WWTP) has sufficient hydraulic capacity to accommodate the build out of the Georgetown urban area including the Hamlets of Norval, Stewarttown and Glen Williams.

D.0. WATER SUPPLY AND DISTRIBUTION

D.1. Water Supply

The subject development lies in an area that is serviced by an integrated water supply system that is fed by several ground water wells, specifically; the Cedervale Well field, the Princess Anne Well field, and the Lindsay Court Well. In addition, the Georgetown water Purification Plant (WPP) treats ground water pumped from the Cedervale well field.

Class EA projects and studies by the Region of Halton are on-going to investigate the feasibility of obtaining additional water supply for Georgetown and surrounding areas.

When additional water supply capacity is released by the Region the Town of Halton Hills will determine the allocation process.

As confirmed by the previous consultant for this development area, hydrant flow testing was conducted in June 2006 under the supervision of the Region of Halton. Static pressures of 38 psi were recorded at the hydrants located at the McMaster Street / Oak Ridge Drive and the Meagan Drive/McMaster Street intersections. The hydrants on Oak Ridge Drive are at an approximate elevation of 275 metres and with proposed grades for the subject development lots ranging from 0.50 to 2.50 metres lower, will serve to slightly increase the static pressure (0.7-3.5 psi) for the new lots. Further hydrant flow testing revealed a 4 psi drop in static pressure (residual pressure) at the Meagan Drive hydrant after opening the hydrant at McMaster Street, with a recorded flow of 88 U.S.GPM.

Although these measured pressures are slightly below the minimum Regional criteria of 40 psi they are typical for the area and therefore the proposed development will not adversely impact supply to the surrounding residential lands.

D.2. Water Distribution

Water servicing distribution for the subject development will be provided by the proposed installation of a 250mm diameter watermain along Street A. Refer to Figure 3, General Servicing Plan in Appendix 'C' for the proposed watermain alignment. As indicated on the plan the watermain will connect to existing 250mm diameter watermain stubs on both McMaster Street and Meagan Drive. In addition, a proposed interconnection to the existing 200mm/300mm diameter watermain on Eighth Line is shown from the subject lands via an existing 10 metre wide Regional servicing easement between existing residential properties. This interconnection will serve to improve fire flow pressures for the current development.

6.0. PROPOSED ROAD GRADE AND LOT GRADING DESIGN

6.1. Road Grade Design

Refer to Figure 4, Proposed Grading Plan enclosed in Appendix 'C' for the conceptual road and lot grading design for the subject development. As noted on the plan Street A is a "crescent" type road with grade connections to existing McMaster Street and Meagan Drive, along the subject land's north-east limit. The proposed road grade is designed to direct major storm overland flow from McMaster Street and Meagan Drive south-westerly to an overall low-point adjacent to the proposed Stormwater Management (SWM) Pond Block (Block 33). The Street A road connections to both McMaster Street and Meagan Drive will create a road high-point confirming that no external drainage from the existing municipal right-of-ways will be conveyed into the subject development. Due to downstream storm outlet constraints, we have elevated the proposed SWM Pond as much as possible and in doing so Street A has been designed with flatter grades (minimum of 0.50%) and requires "saw-backs" to ensure the overland flow route is maintained. "Saw-backs" refer to localized low-points designed to ensure minimum road grades are maintained for effective drainage while still providing major overland flow routing via cascading flows. It should also be noted that the proposed angle bends have been designed with centerline road grades of 1.0% or greater ensuring gutter longitudinal slopes on the outside radius of the bends are at a minimum of 0.70% for adequate drainage.

6.2. Lot Grading Design

As described in the preceding section and as illustrated on Figure 4 the road grades range from a minimum of 0.50% to a maximum of 1.0%. The road is somewhat elevated as compared with the perimeter of the development area where existing grades must be matched. Therefore the proposed

front lot grades are in general slightly higher than the rear lot grades. To accommodate this grading condition a split-lot drainage style is proposed for all of the residential lots. As indicated on the Proposed Grading Plan, Figure 4, the grade differential between the front and the rear is minimal which results in very common house styles. Back-splits and basement walkout styles will not likely be possible, unless forced by artificially raising the houses. As the majority of lots back onto existing surrounding properties rear yard drainage will have to be intercepted by rear lot swales and then captured by rear lot catchbasins to direct storm drainage to the proposed storm sewer system. The storm drainage design will be detailed in the next section of this report.

F.0. STORMWATER MANAGEMENT QUANTITY AND QUALITY CONTROL

F.1 Existing Conditions

Drainage from the subject lands is conveyed in four sub catchments as noted below, as discussed in Section B and illustrated in Figure 5, in Appendix 'C':

The Soil type in this area is "Oneida clay loam", which has a well draining characteristic as noted from the Halton County Soil Maps prepared by the Canadian Department of Agriculture.

F.2 Proposed Conditions

F.2.1 Quantity Control

Utilizing SWMHYMO 99 Version 4.02 program we have modeled the 2year, 5year, 25year, 50year, and the 100year SCS Storm events.

Below is the summary of the predevelopment flows for the various storm events in cubic meters per second.

Storm Event	300	301	302	303	303+304
2yr	0.12	0.023	0.11	0.19	0.30
5yr	0.154	0.029	0.141	0.243	0.384
10yr	0.194	0.032	0.172	0.293	0.466
25yr	0.304	0.056	0.275	0.472	0.747
50yr	0.340	0.063	0.307	0.529	0.836
100yr	0.381	0.07	0.344	0.591	0.934

Subcatchment 300 represents the north area of the plan which includes .200 Ha of external flow from the existing subdivision, Sub area 301 represents 0.287 Ha located centrally in the plan and drains through two existing homes fronting the 8th line . Sub Area 302 and 303, which represents a substantial portion of the subject lands , some 2.892 Ha, drains also to the eighth line, following existing swales on either side of an existing home on the 8th line. Eventually flows from area 302 and 303 cross the 8th line via culvert then captured by a DICB into an existing 675mm storm sewer running parallel with the 8th line falling towards Wildwood Road. We have combined the flows from sub area 302 and 303 for the purposes of comparison with post development conditions. It is our proposal to maintain some of the current outlets in order to meet the existing grading conditions surrounding the site. Alternatively, if the municipality prefers the removal of the extraneous flows, rear lot catchbasins could be introduced and the drainage would be diverted to the Proposed Storm Water Management Pond.

Under Post development conditions we have subdivided the area into three sub catchments, area 600, rear yard drainage, will outlet at the same location as area 300; area 601, again rear yard drainage, will outlet at the same location as area 301; and area 602 which includes the balance of the plan, roads, driveways, homes and front yard drainage, and will discharge to the pond, will compare with the combined pre-development flows of Sub area 302 and 303.

Below is the summary of the post-development flows for the various storm events in cubic meters per second.

	600	601	602
2yr	0.023	0.017	0.446

5yr	0.030	0.022	0.534
10yr	0.022	0.026	0.532
25yr	0.058	0.045	0.92
50yr	0.065	0.050	1.008
100yr	0.073	0.056	1.155

In our preliminary analysis we have used the subroutine "Compute Volume" to provide a volume required during the 100 year storm. Based on the output file found in Appendix "C "the total storage required is 1,800 cubic meters. At elevation 273.50 the total active storage available in the SWM pond is 2,000 cubic meters. Details of the pond design and control structure will be provided at Detailed Engineering Design stage.

F.2.2 Quality Control

For Outlet 4, Water Quality control for the subject lands will be addressed by storage and extended storage within the proposed pond,

Storage and Extended Storage

Quality control will be based on Level 1 or Enhanced Protection in accordance with Table 3.2 of the Storm Water Management Planning and Design Manual, March 2003.

Table 3.0 Quality Control Analysis

Watershed Area (Hectares)	Enhanced Protection Volume (cum) (140cum/Ha)	Extended Detention Volume (cum) (40cum/Ha)	Storage required (cum)
5.496	769.44	Included in 140cum/ha	769.44

Based on the preliminary base Pond elevation of 267.35 the Permanent Storage provided is 850 cu.m.

To ensure 24 Hour drawn down time plus 10% freebaord we are proposing to use ***IPEX*** Inlet Control Device (ICD) within the proposed control structure.

For Sub catchment areas 600 and 601, given the soil types, infiltration trenches along the rear lot lines will be feasible.

G.0. PROPOSED EROSION CONTROL MEASURES

Prior to the Building Construction Program, the installation of a silt control fence will be in place surrounding the disturbed area of the site with allowance for construction access. This will control the quality of runoff and localize the areas of intense erosion and sedimentation. The perimeter properties are to be protected via siltation control fence. Regular maintenance and all necessary repairs shall be performed including the safe disposal of all sediment material. Maintenance, which in most cases will require the removal of sediment and the installation of a new device, shall be conducted when the level of performance of the implemented control device is reduced to less than 40% of its initial capacity based on the Engineers observation.

H.0. CONCLUSIONS AND RECOMMENDATIONS

In summary, the existing municipal services are such that they can support the subject development.

On a basis of our investigation and examination, it is the conclusion of the writer that:

- The subject development can be drained for sanitary sewage purposes;
- The existing municipal water supply infrastructure is readily available to the subject development subject to Council allocation of capacity when it becomes available;
- Adequate storm drainage and storm water management facilities for both quantitative and qualitative can be provided within the subject development area to neutralize the impact of urbanized runoff.

Respectfully submitted by:

CONDELAND ENGINEERING LIMITED

Consulting Engineers, Planners, Project Managers

Muhamet K. Nenada
Project Engineer

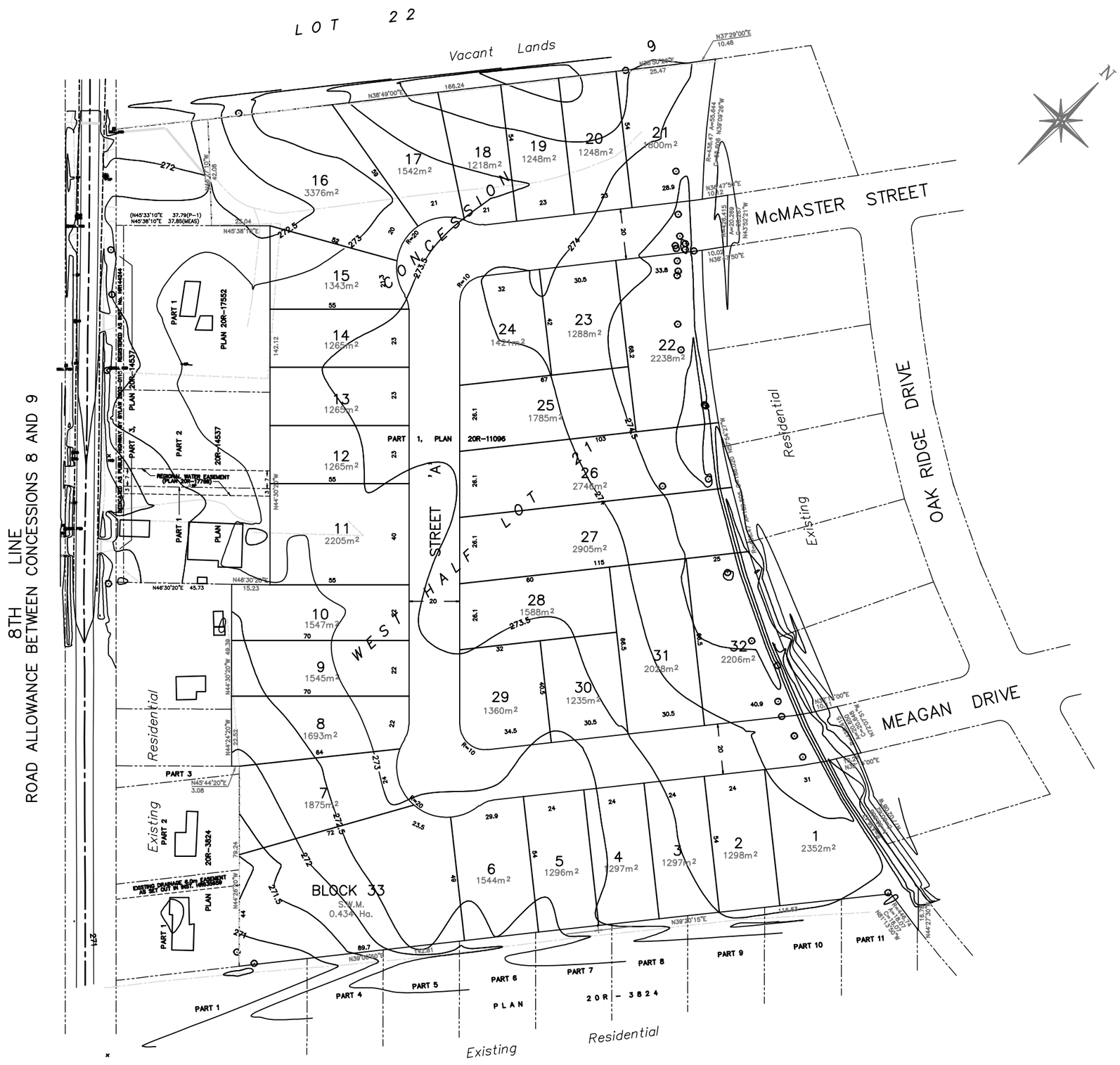
Michael Hall, P. Eng,
Senior Engineer

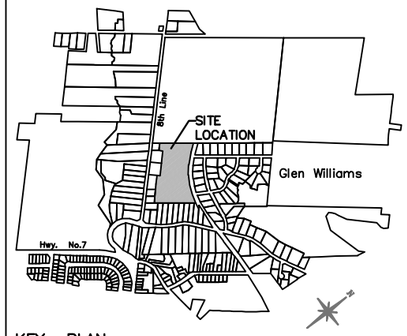
Robert DeAngelis, P. Eng,
President

LICENSED PROFESSIONAL ENGINEER
M. E. HALL
May 29/09
PROVINCE OF ONTARIO

APPENDIX 'A'

Draft Plan of Subdivision prepared
by Matthews Planning & Management Ltd.





KEY PLAN
NOT TO SCALE

DRAFT PLAN OF SUBDIVISION

OF

PART OF LOT 21
CONCESSION 9
(GEOGRAPHIC TOWNSHIP OF ESQUESING)
TOWN OF HALTON HILLS
REGIONAL MUNICIPALITY OF HALTON

SCALE: 1:750

25m 0 25 50m

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

GENERAL NOTES

LAND USE	LOTS/BLOCKS	AREA(Ha.)
SINGLE-DETACHED RESIDENTIAL (@ 5 UNITS/NET Ha.)	LOTS 1-32	5.432
STORMWATER MANAGEMENT POND	BLOCK 33	0.434
ROAD 20m RIGHT-OF-WAY x 472m LENGTH		1.020
TOTAL AREA		6.886 Hectares

ADDITIONAL NOTES

(UNDER SECTION 51 (2) OF THE PLANNING ACT)

INFORMATION REQUIRED BY CLAUSES a,b,c,e,f,g,j & l SHOWN ON DRAFT PLAN AND KEY PLAN.

(d) RESIDENTIAL, SWM POND
(h) MUNICIPAL SUPPLY TO BE MADE AVAILABLE
(i) CLAY LOAM
(k) FULL MUNICIPAL SERVICES TO BE MADE AVAILABLE

OWNERS CERTIFICATE

2147925 ONTARIO INC. BEING THE REGISTERED OWNERS OF THE SUBJECT LANDS HEREBY AUTHORIZE MATTHEWS PLANNING & MANAGEMENT LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

2147925 ONTARIO INC.

SURVEYORS CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

MAY 14, 2009

DAN C. DOLLIVER, ONTARIO LAND SURVEYOR
DOLLIVER SURVEYING INC.

CANADIAN INSTITUTE OF PLANNERS — MEMBER — INSTITUT CANADIEN DES URBANISTES
DAVID MATTHEWS

MATTHEWS PLANNING & MANAGEMENT LTD.
Consultants in Planning and Land Economics
1470 Hurontario Street, *Mississauga, Ontario*
L5G 3H4 *(905) 274-1047*

PLOTTED: MAY 29, 2009 FILE: DEVINS-R2.DWG

APPENDIX 'B'

Summary Output Files of SWMHYMO modeling

Pre-development 2year, 5year, 25year, 50 year, 100 year

Post-development 2year, 5year, 25year, 50 year, 100 year

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===========================================================================

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999   999  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9 9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9 9   9 Ver. 4.02
     S   W W   M   M  H   H    Y    M   M  O   O       9999  9999 July 1999
 SSSSS   W W   H   M  H   H    Y    M   M   OOO           9     9 =========
                                                      9   9 9   9 # 4377549
      StormWater Management HYdrologic Model           999   999  =========

 **************************************************************************
 *************************** SWMHYMO-99 Ver/4.02 **************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                  OTTHYMO-83 and OTTHYMO-89.                 *******
 **************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
 *******                  Ottawa,  Ontario: (613) 727-5199           *******
 *******                  Gatineau, Quebec: (819) 243-6858           *******
 *******                  E-Mail: swmhymo@jfsa.Com                   *******
 **************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: Condeland Engineering Limited                +++++++
 +++++++                Toronto                 SERIAL#:4377549      +++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 **************************************************************************
 *******               ++++++ PROGRAM ARRAY DIMENSIONS ++++++        *******
 *******               Maximum value for ID numbers  :     10        *******
 *******               Max. number of rainfall points:  15000        *******
 *******               Max. number of flow points    :  15000        *******
 **************************************************************************


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 **************************************************************************
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 * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE2YR.out    *
 * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE2YR.sum    *
 * User comments:                                                         *
 * 1:_____________________________________________________________________*
 * 2:_____________________________________________________________________*
 * 3:_____________________________________________________________________*
 **************************************************************************

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*#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
*#  Date          : 05-20-2009
*#  Modeller      : [ROBERT DE ANGELIS]
*#  Company       : Condeland Engineering Limited
*#  License #     :  4377549
*#****************************************************************************
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--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
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    NRUN  = 001
    NSTORM=   0
-----------------------------------------------------------------------------
001:0002---------------------------------------------------------------------
----------------------
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| 01:300    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .126

                                  New rainfall entered directly by user.
                                  TIME STEP= 5.00 min   # of STEPS= 200
                                  DURATION =16.67 hrs   TOTAL RAIN=  43.87 mm

                 TIME    RAIN |   TIME    RAIN |   TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |   hrs   mm/hr
                  .08  21.420 |   4.25   1.520 |   8.42   1.520 | 12.58    .760
                  .17   1.020 |   4.33   1.520 |   8.50   1.520 | 12.67    .760
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                  .42   1.020 |   4.58   1.520 |   8.75   1.520 | 12.92    .760
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                  .58   1.020 |   4.75   1.520 |   8.92   1.520 | 13.08    .760
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                 1.00   1.020 |   5.17   3.050 |   9.33   1.520 | 13.50    .760
                 1.08   1.020 |   5.25   3.050 |   9.42   1.520 | 13.58    .760
                 1.17   1.020 |   5.33   3.050 |   9.50   1.520 | 13.67    .760
                 1.25   1.020 |   5.42   3.050 |   9.58   1.520 | 13.75    .760
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                 2.67   1.020 |   6.83  10.670 |  11.00   1.020 | 15.17    .510
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                 2.83   1.020 |   7.00   6.600 |  11.17   1.020 | 15.33    .510
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                 3.75   1.520 |   7.92   2.790 |  12.08   1.020 | 16.25    .510
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                 4.08   1.520 |   8.25   2.790 |  12.42   1.020 | 16.58    .510
                 4.17   1.520 |   8.33   2.790 |  12.50   1.020 | 16.67    .510

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     PEAK FLOW        (cms)=     .123 (i)
     TIME TO PEAK     (hrs)=   10.667
     RUNOFF VOLUME     (mm)=   17.611
     TOTAL RAINFALL    (mm)=   43.873
     RUNOFF COEFFICIENT    =     .401

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
-----------------------------------------------------------------------------
001:0003---------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number      =     1.00
| IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
| DT=  5.0 min     |     Length       (m)=   45.00
--------------------     Slope      (m/m)= .01100
                         Manning n        =    .025

     <------------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME      FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)        (cms)       (m/s)        min
        .024    .144E+00        .001         .260        2.89
        .047    .402E+00        .004         .405        1.85
        .071    .725E+00        .008         .522        1.44
        .095    .110E+01        .015         .620        1.21
        .118    .150E+01        .024         .706        1.06
        .142    .194E+01        .034         .781         .96
        .166    .239E+01        .045         .847         .89
        .189    .286E+01        .058         .905         .83
        .213    .334E+01        .071         .956         .78
        .237    .382E+01        .085         .999         .75
        .261    .429E+01        .099        1.036         .72
        .284    .476E+01        .113        1.067         .70
        .308    .522E+01        .126        1.090         .69
        .332    .565E+01        .139        1.106         .68
        .355    .606E+01        .150        1.114         .67
        .379    .643E+01        .159        1.114         .67
        .403    .676E+01        .165        1.102         .68
        .426    .701E+01        .167        1.073         .70
        .450    .716E+01        .156         .979         .77
                                      <---- hydrograph ---->  <-pipe / channel->
                                  AREA    QPEAK   TPEAK  R.V.  MAX DEPTH  MAX VEL
                                  (ha)    (cms)   (hrs)  (mm)     (m)      (m/s)
    INFLOW : ID= 1:300            2.06     .123   10.67 17.611    .303     1.085
    OUTFLOW: ID= 8:culver         2.06     .120   10.67 17.611    .297     1.079


-----------------------------------------------------------------------------
001:0004---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=     .29   Curve Number   (CN)=81.00
| 02:301    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .063

     Unit Hyd Qpeak  (cms)=     .174

     PEAK FLOW        (cms)=     .023 (i)
     TIME TO PEAK     (hrs)=   10.667
     RUNOFF VOLUME     (mm)=   17.611
     TOTAL RAINFALL    (mm)=   43.873
     RUNOFF COEFFICIENT    =     .401

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
-----------------------------------------------------------------------------
001:0005---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    1.73   Curve Number   (CN)=81.00
| 03:302    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .115

     Unit Hyd Qpeak  (cms)=     .575

     PEAK FLOW        (cms)=     .110 (i)
     TIME TO PEAK     (hrs)=   10.667
     RUNOFF VOLUME     (mm)=   17.611
     TOTAL RAINFALL    (mm)=   43.873
     RUNOFF COEFFICIENT    =     .401

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
-----------------------------------------------------------------------------
001:0006---------------------------------------------------------------------
----------------------
| DESIGN NASHYD      |   Area     (ha)=    2.89   Curve Number   (CN)=81.00
| 04:303    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .109

     Unit Hyd Qpeak  (cms)=    1.013

     PEAK FLOW        (cms)=     .190 (i)
     TIME TO PEAK     (hrs)=   10.667
     RUNOFF VOLUME     (mm)=   17.611
     TOTAL RAINFALL    (mm)=   43.873
     RUNOFF COEFFICIENT    =     .401

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
-----------------------------------------------------------------------------
001:0007---------------------------------------------------------------------
--------------------
| ADD HYD (outlet) | ID: NHYD      AREA      QPEAK   TPEAK   R.V.     DWF
--------------------               (ha)      (cms)   (hrs)   (mm)    (cms)
                 ID1 03:302        1.73       .110   10.67   17.61     .000
                +ID2 04:303        2.89       .190   10.67   17.61     .000
                 ==================================================
                 SUM 10:outlet     4.62       .300   10.67   17.61     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----------------------------------------------------------------------------
001:0008---------------------------------------------------------------------
      FINISH
-----------------------------------------------------------------------------
*****************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0002 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0004 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0005 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0006 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
   Simulation ended on 2009-05-27     at 18:51:58
=============================================================================
```

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

SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
    S   W W   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
                                                     9   9  9   9 # 4377549
      StormWater Management HYdrologic Model          999    999  =========

***************************************************************************
************************** SWMHYMO-99 Ver/4.02 **************************
*******  A single event and continuous hydrologic simulation model  *******
*******     based on the principles of HYMO and its successors       *******
*******                OTTHYMO-83 and OTTHYMO-89.                    *******
***************************************************************************
******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
*******                  Ottawa,  Ontario: (613) 727-5199            *******
*******                  Gatineau, Quebec: (819) 243-6858            *******
*******                  E-Mail: swmhymo@jfsa.Com                    *******
***************************************************************************

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++ Licensed user: Condeland Engineering Limited                +++++++
+++++++                Toronto                   SERIAL#:4377549    +++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

***************************************************************************
*******             ++++++ PROGRAM ARRAY DIMENSIONS ++++++          *******
*******             Maximum value for ID numbers   :     10         *******
*******             Max. number of rainfall points:  15000         *******
*******             Max. number of flow points     :  15000         *******
***************************************************************************


********************  D E T A I L E D   O U T P U T  ********************
***************************************************************************
*       DATE: 2009-05-27     TIME: 19:02:13     RUN COUNTER: 000035       *
***************************************************************************
* Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE5YR.dat    *
* Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE5YR.out    *
* Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE5YR.sum    *
* User comments:                                                          *
* 1:______________________________________________________________________*
* 2:______________________________________________________________________*
* 3:______________________________________________________________________*
***************************************************************************

----------------------------------------------------------------------------
001:0001--------------------------------------------------------------------
*#***************************************************************************
*#  Project Name: [2147925 Ontario Limited]     Project Number: [09-015]
*#  Date          : 05-20-2009
*#  Modeller      : [ROBERT DE ANGELIS]
*#  Company       : Condeland Engineering Limited
*#  License #     :  4377549
*#***************************************************************************
--------------------
| START              |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
----------------------------------------------------------------------------
001:0002--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |    Area     (ha)=     2.06   Curve Number   (CN)=81.00
| 01:300    DT= 5.00 |    Ia        (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------    U.H. Tp(hrs)=     .126

                              New rainfall entered directly by user.
                              TIME STEP= 5.00 min   # of STEPS= 200
                              DURATION =16.67 hrs   TOTAL RAIN=  52.03 mm

                   TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                    .08  31.750 |   4.25   1.780 |   8.42   1.780 |  12.58   1.020
                    .17   1.270 |   4.33   1.780 |   8.50   1.780 |  12.67   1.020
                    .25   1.270 |   4.42   1.780 |   8.58   1.780 |  12.75   1.020
                    .33   1.270 |   4.50   1.780 |   8.67   1.780 |  12.83   1.020
                    .42   1.270 |   4.58   1.780 |   8.75   1.780 |  12.92   1.020
                    .50   1.270 |   4.67   1.780 |   8.83   1.780 |  13.00   1.020
                    .58   1.270 |   4.75   1.780 |   8.92   1.780 |  13.08   1.020
                    .67   1.270 |   4.83   1.780 |   9.00   1.780 |  13.17   1.020
                    .75   1.270 |   4.92   1.780 |   9.08   1.780 |  13.25   1.020
                    .83   1.270 |   5.00   1.780 |   9.17   1.780 |  13.33   1.020
                    .92   1.270 |   5.08   3.300 |   9.25   1.780 |  13.42   1.020
                   1.00   1.270 |   5.17   3.300 |   9.33   1.780 |  13.50   1.020
                   1.08   1.270 |   5.25   3.300 |   9.42   1.780 |  13.58   1.020
                   1.17   1.270 |   5.33   3.300 |   9.50   1.780 |  13.67   1.020
                   1.25   1.270 |   5.42   3.300 |   9.58   1.780 |  13.75   1.020
                   1.33   1.270 |   5.50   3.300 |   9.67   1.780 |  13.83   1.020
                   1.42   1.270 |   5.58   3.300 |   9.75   1.780 |  13.92   1.020
                   1.50   1.270 |   5.67   3.300 |   9.83   1.780 |  14.00   1.020
                   1.58   1.270 |   5.75   3.300 |   9.92   1.780 |  14.08   1.020
                   1.67   1.270 |   5.83   3.300 |  10.00   1.780 |  14.17   1.020
                   1.75   1.270 |   5.92   4.570 |  10.08   1.270 |  14.25    .760
                   1.83   1.270 |   6.00   4.570 |  10.17   1.270 |  14.33    .760
                   1.92   1.270 |   6.08   6.600 |  10.25   1.270 |  14.42    .760
                   2.00   1.270 |   6.17   6.600 |  10.33   1.270 |  14.50    .760
                   2.08   1.270 |   6.25  15.240 |  10.42   1.270 |  14.58    .760
                   2.17   1.270 |   6.33  15.240 |  10.50   1.270 |  14.67    .760
                   2.25   1.270 |   6.42  33.270 |  10.58   1.270 |  14.75    .760
                   2.33   1.270 |   6.50  33.270 |  10.67   1.270 |  14.83    .760
                   2.42   1.270 |   6.58  69.600 |  10.75   1.270 |  14.92    .760
                   2.50   1.270 |   6.67  69.600 |  10.83   1.270 |  15.00    .760
                   2.58   1.270 |   6.75  12.190 |  10.92   1.270 |  15.08    .760
                   2.67   1.270 |   6.83  12.190 |  11.00   1.270 |  15.17    .760
                   2.75   1.270 |   6.92   7.620 |  11.08   1.270 |  15.25    .760
                   2.83   1.270 |   7.00   7.620 |  11.17   1.270 |  15.33    .760
                   2.92   1.270 |   7.08   5.590 |  11.25   1.270 |  15.42    .760
                   3.00   1.270 |   7.17   5.590 |  11.33   1.270 |  15.50    .760
                   3.08   1.270 |   7.25   5.080 |  11.42   1.270 |  15.58    .760
                   3.17   1.270 |   7.33   5.080 |  11.50   1.270 |  15.67    .760
                   3.25   1.270 |   7.42   3.810 |  11.58   1.270 |  15.75    .760
                   3.33   1.270 |   7.50   3.810 |  11.67   1.270 |  15.83    .760
                   3.42   1.780 |   7.58   3.050 |  11.75   1.270 |  15.92    .760
                   3.50   1.780 |   7.67   3.050 |  11.83   1.270 |  16.00    .760
                   3.58   1.780 |   7.75   3.050 |  11.92   1.270 |  16.08    .760
                   3.67   1.780 |   7.83   3.050 |  12.00   1.270 |  16.17    .760
                   3.75   1.780 |   7.92   3.050 |  12.08   1.270 |  16.25    .760
                   3.83   1.780 |   8.00   3.050 |  12.17   1.270 |  16.33    .760
                   3.92   1.780 |   8.08   3.050 |  12.25   1.270 |  16.42    .760
                   4.00   1.780 |   8.17   3.050 |  12.33   1.270 |  16.50    .760
                   4.08   1.780 |   8.25   3.050 |  12.42   1.270 |  16.58    .760
                   4.17   1.780 |   8.33   3.050 |  12.50   1.270 |  16.67    .760

      Unit Hyd Qpeak  (cms)=     .623

      PEAK FLOW        (cms)=     .158 (i)
      TIME TO PEAK     (hrs)=   10.667
      RUNOFF VOLUME     (mm)=   23.192
      TOTAL RAINFALL    (mm)=   52.035
      RUNOFF COEFFICIENT   =      .446

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

       *** WARNING: Time step is too large for value of TP.
                    R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0003--------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number      =    1.00
| IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
| DT=  5.0 min     |     Length       (m)=   45.00
--------------------     Slope      (m/m)= .01100
                         Manning n        =    .025

      *** WARNING: MINIMUM PIPE SIZE REQUIRED =   453.09    (mm)
                   THIS SIZE WAS USED IN THE ROUTING.
                   THE CAPACITY OF THIS PIPE  =       .16   (cms)

       *** WARNING: New pipe size used for routing.
      <------------------- TRAVEL TIME TABLE ------------------->
         DEPTH       VOLUME      FLOW RATE     VELOCITY     TRAV.TIME
          (m)       (cu.m.)       (cms)         (m/s)         min
          .024      .146E+00      .001          .261         2.87
          .048      .407E+00      .004          .407         1.84
          .072      .735E+00      .009          .524         1.43
          .095      .111E+01      .015          .623         1.20
          .119      .152E+01      .024          .709         1.06
          .143      .197E+01      .034          .784          .96
          .167      .243E+01      .046          .851          .88
          .191      .290E+01      .059          .909          .82
          .215      .338E+01      .072          .960          .78
          .238      .387E+01      .086         1.004          .75
          .262      .435E+01      .101         1.041          .72
          .286      .483E+01      .115         1.071          .70
          .310      .529E+01      .129         1.095          .68
          .334      .573E+01      .142         1.111          .67
          .358      .614E+01      .153         1.120          .67
          .382      .652E+01      .162         1.119          .67
          .405      .685E+01      .168         1.107          .68
          .429      .711E+01      .170         1.078          .70
          .453      .726E+01      .158          .983          .76
                                        <---- hydrograph ---->   <-pipe / channel->
                                  AREA     QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                  (ha)     (cms)   (hrs)   (mm)      (m)      (m/s)
     INFLOW : ID= 1:300           2.06      .158   10.67 23.192      .372     1.119
     OUTFLOW: ID= 8:culver        2.06      .154   10.67 23.192      .364     1.119


----------------------------------------------------------------------------
001:0004--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |    Area     (ha)=      .29   Curve Number   (CN)=81.00
| 02:301    DT= 5.00 |    Ia        (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------    U.H. Tp(hrs)=     .063

      Unit Hyd Qpeak  (cms)=     .174

      PEAK FLOW        (cms)=     .029 (i)
      TIME TO PEAK     (hrs)=   10.667
      RUNOFF VOLUME     (mm)=   23.192
      TOTAL RAINFALL    (mm)=   52.035
      RUNOFF COEFFICIENT   =      .446

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

       *** WARNING: Time step is too large for value of TP.
                    R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0005--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |    Area     (ha)=     1.73   Curve Number   (CN)=81.00
| 03:302    DT= 5.00 |    Ia        (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------    U.H. Tp(hrs)=     .115

      Unit Hyd Qpeak  (cms)=     .575

      PEAK FLOW        (cms)=     .141 (i)
      TIME TO PEAK     (hrs)=   10.667
      RUNOFF VOLUME     (mm)=   23.192
      TOTAL RAINFALL    (mm)=   52.035
      RUNOFF COEFFICIENT   =      .446

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

       *** WARNING: Time step is too large for value of TP.
                    R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0006--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |    Area     (ha)=     2.89   Curve Number   (CN)=81.00
| 04:303    DT= 5.00 |    Ia        (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------    U.H. Tp(hrs)=     .109

      Unit Hyd Qpeak  (cms)=    1.013

      PEAK FLOW        (cms)=     .243 (i)
      TIME TO PEAK     (hrs)=   10.667
      RUNOFF VOLUME     (mm)=   23.192
      TOTAL RAINFALL    (mm)=   52.035
      RUNOFF COEFFICIENT   =      .446

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

       *** WARNING: Time step is too large for value of TP.
                    R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0007--------------------------------------------------------------------
--------------------
| ADD HYD (outlet) | ID: NHYD      AREA      QPEAK    TPEAK   R.V.     DWF
--------------------                (ha)      (cms)    (hrs)   (mm)    (cms)
                   ID1 03:302        1.73      .141    10.67  23.19     .000
                  +ID2 04:303        2.89      .243    10.67  23.19     .000
                   =================================================
                   SUM 10:outlet     4.62      .384    10.67  23.19     .000

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

----------------------------------------------------------------------------
001:0008--------------------------------------------------------------------
       FINISH
----------------------------------------------------------------------------
*****************************************************************************
      WARNINGS / ERRORS / NOTES
      -------------------------
 001:0002 DESIGN NASHYD
       *** WARNING: Time step is too large for value of TP.
                    R.V. may be ok.  Peak flow could be off.
 001:0003 ROUTE PIPE      ->
       *** WARNING: New pipe size used for routing.
 001:0004 DESIGN NASHYD
       *** WARNING: Time step is too large for value of TP.
                    R.V. may be ok.  Peak flow could be off.
 001:0005 DESIGN NASHYD
       *** WARNING: Time step is too large for value of TP.
                    R.V. may be ok.  Peak flow could be off.
```

```
00271>  001:0006 DESIGN NASHYD
00272>       *** WARNING: Time step is too large for value of TP.
00273>                    R.V. may be ok.  Peak flow could be off.
00274>    Simulation ended on 2009-05-27    at 19:02:14
00275> ===============================================================================
00276>
00277>
```

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

SSSSS  W   W  M   M  H   H  Y   Y  H   M   OOO        999    999  =========
S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
SSSSS  W W W  M H M  HHHHH    Y    H M M  O   O  ##  9   9  9   9 Ver. 4.02
    S   W W   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
                                                     9   9  9   9 # 4377549
     StormWater Hanagement HYdrologic Model           999    999  =========

*************************************************************************
************************** SWMHYMO-99 Ver/4.02 **************************
*******  A single event and continuous hydrologic simulation model  *******
*******     based on the principles of HYMO and its successors      *******
*******                OTTHYMO-83 and OTTHYMO-89.                   *******
*************************************************************************
******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
*******                  Ottawa,  Ontario: (613) 727-5199           *******
*******                  Gatineau, Quebec: (819) 243-6858           *******
*******                  E-Mail: swmhymo@jfsa.Com                   *******
*************************************************************************

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++ Licensed user: Condeland Engineering Limited                +++++++
+++++++                Toronto                 SERIAL#:4377549      +++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

*************************************************************************
*******            ++++++ PROGRAM ARRAY DIHENSIONS ++++++           *******
*******            Maximum value for ID numbers  :     10           *******
*******            Max. number of rainfall points:  15000           *******
*******            Max. number of flow points    :  15000           *******
*************************************************************************


********************   D E T A I L E D   O U T P U T   ******************
*************************************************************************
*       DATE: 2009-05-27      TIME: 19:03:51      RUN COUNTER: 000037     *
*************************************************************************
* Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE10YR.dat   *
* Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE10YR.out   *
* Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE10YR.sum   *
* User comments:                                                          *
* 1:______________________________________________________________________*
* 2:______________________________________________________________________*
* 3:______________________________________________________________________*
*************************************************************************

----------------------------------------------------------------------------
001:0001--------------------------------------------------------------------
*#****************************************************************************
*#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
*#  Date         : 05-20-2009
*#  Modeller     : [ROBERT DE ANGELIS]
*#  Company      : Condeland Engineering Limited
*#  License #    :  4377549
*#****************************************************************************
--------------------
| START              |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   1
           #  1=SCS10YR
----------------------------------------------------------------------------
001:0002--------------------------------------------------------------------
--------------------
| READ STORM         |     Filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
| Ptotal=  97.05 mm|     Comments: SCS Storm
--------------------
                  TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                   hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                   .08   1.700 |   6.08   3.009 |  12.08   4.658 |  18.08   2.329
                   .17   1.700 |   6.17   3.009 |  12.17   4.658 |  18.17   2.329
                   .25   1.700 |   6.25   3.009 |  12.25   4.658 |  18.25   2.329
                   .33   1.696 |   6.33   3.009 |  12.33   4.658 |  18.33   2.329
                   .42   1.696 |   6.42   3.009 |  12.42   4.658 |  18.42   2.329
                   .50   1.696 |   6.50   3.009 |  12.50   4.658 |  18.50   2.329
                   .58   1.700 |   6.58   3.009 |  12.58   4.076 |  18.58   2.329
                   .67   1.700 |   6.67   3.009 |  12.67   4.076 |  18.67   2.329
                   .75   1.700 |   6.75   3.009 |  12.75   4.076 |  18.75   2.329
                   .83   1.696 |   6.83   3.009 |  12.83   4.076 |  18.83   2.329
                   .92   1.696 |   6.92   3.009 |  12.92   4.076 |  18.92   2.329
                  1.00   1.696 |   7.00   3.009 |  13.00   4.076 |  19.00   2.329
                  1.08   1.700 |   7.08   3.688 |  13.08   4.076 |  19.08   2.329
                  1.17   1.700 |   7.17   3.688 |  13.17   4.076 |  19.17   2.329
                  1.25   1.700 |   7.25   3.688 |  13.25   4.076 |  19.25   2.329
                  1.33   1.696 |   7.33   3.688 |  13.33   4.076 |  19.33   2.329
                  1.42   1.696 |   7.42   3.688 |  13.42   4.076 |  19.42   2.329
                  1.50   1.696 |   7.50   3.688 |  13.50   4.076 |  19.50   2.329
                  1.58   1.700 |   7.58   3.688 |  13.58   3.688 |  19.58   2.329
                  1.67   1.700 |   7.67   3.688 |  13.67   3.688 |  19.67   2.329
                  1.75   1.700 |   7.75   3.688 |  13.75   3.688 |  19.75   2.329
                  1.83   1.696 |   7.83   3.688 |  13.83   3.688 |  19.83   2.329
                  1.92   1.696 |   7.92   3.688 |  13.92   3.688 |  19.92   2.329
                  2.00   1.696 |   8.00   3.688 |  14.00   3.688 |  20.00   2.329
                  2.08   1.992 |   8.08   4.852 |  14.08   3.059 |  20.08   1.797
                  2.17   1.992 |   8.17   4.852 |  14.17   3.059 |  20.17   1.797
                  2.25   1.992 |   8.25   4.852 |  14.25   3.059 |  20.25   1.797
                  2.33   1.988 |   8.33   4.852 |  14.33   3.055 |  20.33   1.793
                  2.42   1.988 |   8.42   4.852 |  14.42   3.055 |  20.42   1.793
                  2.50   1.988 |   8.50   4.852 |  14.50   3.055 |  20.50   1.793
                  2.58   1.992 |   8.58   6.794 |  14.58   3.059 |  20.58   1.797
                  2.67   1.992 |   8.67   6.794 |  14.67   3.059 |  20.67   1.797
                  2.75   1.992 |   8.75   6.794 |  14.75   3.059 |  20.75   1.797
                  2.83   1.988 |   8.83   6.794 |  14.83   3.055 |  20.83   1.793
                  2.92   1.988 |   8.92   6.794 |  14.92   3.055 |  20.92   1.793
                  3.00   1.988 |   9.00   6.794 |  15.00   3.055 |  21.00   1.793
                  3.08   1.992 |   9.08   9.511 |  15.08   3.059 |  21.08   1.797
                  3.17   1.992 |   9.17   9.511 |  15.17   3.059 |  21.17   1.797
                  3.25   1.992 |   9.25   9.511 |  15.25   3.059 |  21.25   1.797
                  3.33   1.988 |   9.33   9.511 |  15.33   3.055 |  21.33   1.793
                  3.42   1.988 |   9.42   9.511 |  15.42   3.055 |  21.42   1.793
                  3.50   1.988 |   9.50   9.511 |  15.50   3.055 |  21.50   1.793
                  3.58   1.992 |   9.58  22.904 |  15.58   3.059 |  21.58   1.797
                  3.67   1.992 |   9.67  22.904 |  15.67   3.059 |  21.67   1.797
                  3.75   1.992 |   9.75  22.904 |  15.75   3.059 |  21.75   1.797
                  3.83   1.988 |   9.83  59.395 |  15.83   3.055 |  21.83   1.793
                  3.92   1.988 |   9.92  59.395 |  15.92   3.055 |  21.92   1.793
                  4.00   1.988 |  10.00  59.395 |  16.00   3.055 |  22.00   1.793
                  4.08   2.380 |  10.08  13.199 |  16.08   2.329 |  22.08   1.797
                  4.17   2.380 |  10.17  13.199 |  16.17   2.329 |  22.17   1.797
                  4.25   2.380 |  10.25  13.199 |  16.25   2.329 |  22.25   1.797
                  4.33   2.376 |  10.33  13.199 |  16.33   2.329 |  22.33   1.793
                  4.42   2.376 |  10.42  13.199 |  16.42   2.329 |  22.42   1.793
                  4.50   2.376 |  10.50  13.199 |  16.50   2.329 |  22.50   1.793
                  4.58   2.380 |  10.58   7.958 |  16.58   2.329 |  22.58   1.797
                  4.67   2.380 |  10.67   7.958 |  16.67   2.329 |  22.67   1.797
                  4.75   2.380 |  10.75   7.958 |  16.75   2.329 |  22.75   1.797
                  4.83   2.376 |  10.83   7.958 |  16.83   2.329 |  22.83   1.793
                  4.92   2.376 |  10.92   7.958 |  16.92   2.329 |  22.92   1.793
                  5.00   2.376 |  11.00   7.958 |  17.00   2.329 |  23.00   1.793
                  5.08   2.380 |  11.08   5.823 |  17.08   2.329 |  23.08   1.797
                  5.17   2.380 |  11.17   5.823 |  17.17   2.329 |  23.17   1.797
                  5.25   2.380 |  11.25   5.823 |  17.25   2.329 |  23.25   1.797
                  5.33   2.376 |  11.33   5.823 |  17.33   2.329 |  23.33   1.793
                  5.42   2.376 |  11.42   5.823 |  17.42   2.329 |  23.42   1.793
                  5.50   2.376 |  11.50   5.823 |  17.50   2.329 |  23.50   1.793
                  5.58   2.380 |  11.58   5.823 |  17.58   2.329 |  23.58   1.797
                  5.67   2.380 |  11.67   5.823 |  17.67   2.329 |  23.67   1.797
                  5.75   2.380 |  11.75   5.823 |  17.75   2.329 |  23.75   1.797
                  5.83   2.376 |  11.83   5.047 |  17.83   2.329 |  23.83   1.793
                  5.92   2.376 |  11.92   5.047 |  17.92   2.329 |  23.92   1.793
                  6.00   2.376 |  12.00   5.047 |  18.00   2.329 |  24.00   1.793

----------------------------------------------------------------------------
001:0003--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    2.06   Curve Number   (CN)=81.00
| 01:300    DT= 5.00 |   Ia        (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .126

     Unit Hyd Qpeak  (cms)=     .623

     PEAK FLOW        (cms)=     .198 (i)
     TIME TO PEAK     (hrs)=   10.000
     RUNOFF VOLUME     (mm)=   58.853
     TOTAL RAINFALL    (mm)=   97.050
     RUNOFF COEFFICIENT    =     .606

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0004--------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|      PIPE Number      =     1.00
| IN= 1---> OUT= 8 |      Diameter    (mm)=  450.00
| DT=  5.0 min      |      Length       (m)=   45.00
--------------------      Slope      (m/m)= .01100
                          Manning n        =    .025

     *** WARNING: MINIMUM PIPE SIZE REQUIRED =   492.68    (mm)
                  THIS SIZE WAS USED IN THE ROUTING.
                  THE CAPACITY OF THIS PIPE  =      .20  (cms)

      *** WARNING: New pipe size used for routing.
     <------------------- TRAVEL TIME TABLE ------------------->
       DEPTH        VOLUME      FLOW RATE      VELOCITY     TRAV.TIME
        (m)        (cu.m.)        (cms)          (m/s)         min
       .026      .173E+00        .001           .276          2.72
       .052      .481E+00        .005           .431          1.74
       .078      .869E+00        .011           .554          1.35
       .104      .131E+01        .019           .659          1.14
       .130      .180E+01        .030           .750          1.00
       .156      .232E+01        .043           .829           .90
       .182      .287E+01        .057           .900           .83
       .207      .343E+01        .073           .961           .78
       .233      .400E+01        .090          1.015           .74
       .259      .458E+01        .108          1.062           .71
       .285      .515E+01        .126          1.101           .68
       .311      .571E+01        .144          1.133           .66
       .337      .626E+01        .161          1.158           .65
       .363      .678E+01        .177          1.175           .64
       .389      .726E+01        .191          1.184           .63
       .415      .771E+01        .203          1.183           .63
       .441      .810E+01        .211          1.171           .64
       .467      .841E+01        .213          1.140           .66
       .493      .858E+01        .198          1.039           .72
                                        <---- hydrograph ---->   <-pipe / channel->
                                  AREA     QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                                  (ha)     (cms)    (hrs)   (mm)      (m)      (m/s)
    INFLOW : ID= 1:300            2.06      .198    10.00 58.853      .404     1.183
    OUTFLOW: ID= 8:culver         2.06      .194    10.00 58.852      .398     1.184


----------------------------------------------------------------------------
001:0005--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=     .29   Curve Number   (CN)=81.00
| 02:301    DT= 5.00 |   Ia        (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .063

     Unit Hyd Qpeak  (cms)=     .174

     PEAK FLOW        (cms)=     .032 (i)
     TIME TO PEAK     (hrs)=   10.000
     RUNOFF VOLUME     (mm)=   58.852
     TOTAL RAINFALL    (mm)=   97.050
     RUNOFF COEFFICIENT    =     .606

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0006--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    1.73   Curve Number   (CN)=81.00
| 03:302    DT= 5.00 |   Ia        (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .115

     Unit Hyd Qpeak  (cms)=     .575

     PEAK FLOW        (cms)=     .172 (i)
     TIME TO PEAK     (hrs)=   10.000
     RUNOFF VOLUME     (mm)=   58.852
     TOTAL RAINFALL    (mm)=   97.050
     RUNOFF COEFFICIENT    =     .606

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0007--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    2.89   Curve Number   (CN)=81.00
| 04:303    DT= 5.00 |   Ia        (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .109

     Unit Hyd Qpeak  (cms)=    1.013

     PEAK FLOW        (cms)=     .293 (i)
     TIME TO PEAK     (hrs)=   10.000
     RUNOFF VOLUME     (mm)=   58.853
     TOTAL RAINFALL    (mm)=   97.050
     RUNOFF COEFFICIENT    =     .606

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0008--------------------------------------------------------------------
--------------------
| ADD HYD (outlet) | ID: NHYD      AREA      QPEAK    TPEAK   R.V.     DWF
--------------------                (ha)      (cms)    (hrs)   (mm)    (cms)
```

```
                 ID1 03:302        1.73     .172   10.00  58.85    .000
                +ID2 04:303        2.89     .293   10.00  58.85    .000
                 ================================================================
                 SUM 10:outlet     4.62     .466   10.00  58.85    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0009--------------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0003 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0004 ROUTE PIPE     ->
      *** WARNING: New pipe size used for routing.
 001:0005 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0006 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0007 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
   Simulation ended on 2009-05-27     at 19:03:51
================================================================================
```

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

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
     S   W W   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
 SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
                                                      9   9  9   9 # 4377549
      StormWater Management HYdrologic Model           999    999  =========

 **************************************************************************
 ************************** SWMHYMO-99 Ver/4.02 **************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                  OTTHYMO-83 and OTTHYMO-89.                 *******
 **************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                  Ottawa,  Ontario: (613) 727-5199           *******
 *******                  Gatineau, Quebec: (819) 243-6858           *******
 *******                  E-Mail: swmhymo@jfsa.Com                   *******
 **************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: Condeland Engineering Limited                +++++++
 +++++++                Toronto                 SERIAL#:4377549      +++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 **************************************************************************
 *******            ++++++ PROGRAM ARRAY DIMENSIONS ++++++           *******
 *******            Maximum value for ID numbers  :     10           *******
 *******            Max. number of rainfall points:  15000           *******
 *******            Max. number of flow points    :  15000           *******
 **************************************************************************


 ********************  D E T A I L E D   O U T P U T  ********************
 **************************************************************************
 *       DATE: 2009-05-27     TIME: 19:11:36     RUN COUNTER: 000039      *
 **************************************************************************
 * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE25YR.dat   *
 * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE25YR.out   *
 * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE25YR.sum   *
 * User comments:                                                          *
 * 1:______________________________________________________________________*
 * 2:______________________________________________________________________*
 * 3:______________________________________________________________________*
 **************************************************************************

-----------------------------------------------------------------------------
001:0001---------------------------------------------------------------------
*#***************************************************************************
*#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
*#  Date         : 05-20-2009
*#  Modeller     : [ROBERT DE ANGELIS]
*#  Company      : Condeland Engineering Limited
*#  License #    :  4377549
*#***************************************************************************
-------------------
| START             |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
-------------------   Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
-----------------------------------------------------------------------------
001:0002---------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    2.06   Curve Number   (CN)=81.00
| 01:300    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .126

                                 New rainfall entered directly by user.
                                 TIME STEP= 5.00 min   # of STEPS= 200
                                 DURATION =16.67 hrs   TOTAL RAIN=  79.95 mm

                   TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                    .08  42.680 |   4.25   2.790 |   8.42   2.790 |  12.58   1.520
                    .17   2.030 |   4.33   2.790 |   8.50   2.790 |  12.67   1.520
                    .25   2.030 |   4.42   2.790 |   8.58   2.790 |  12.75   1.520
                    .33   2.030 |   4.50   2.790 |   8.67   2.790 |  12.83   1.520
                    .42   2.030 |   4.58   2.790 |   8.75   2.790 |  12.92   1.520
                    .50   2.030 |   4.67   2.790 |   8.83   2.790 |  13.00   1.520
                    .58   2.030 |   4.75   2.790 |   8.92   2.790 |  13.08   1.520
                    .67   2.030 |   4.83   2.790 |   9.00   2.790 |  13.17   1.520
                    .75   2.030 |   4.92   2.790 |   9.08   2.790 |  13.25   1.520
                    .83   2.030 |   5.00   2.790 |   9.17   2.790 |  13.33   1.520
                    .92   2.030 |   5.08   5.080 |   9.25   2.790 |  13.42   1.520
                   1.00   2.030 |   5.17   5.080 |   9.33   2.790 |  13.50   1.520
                   1.08   2.030 |   5.25   5.080 |   9.42   2.790 |  13.58   1.520
                   1.17   2.030 |   5.33   5.080 |   9.50   2.790 |  13.67   1.520
                   1.25   2.030 |   5.42   5.080 |   9.58   2.790 |  13.75   1.520
                   1.33   2.030 |   5.50   5.080 |   9.67   2.790 |  13.83   1.520
                   1.42   2.030 |   5.58   5.080 |   9.75   2.790 |  13.92   1.520
                   1.50   2.030 |   5.67   5.080 |   9.83   2.790 |  14.00   1.520
                   1.58   2.030 |   5.75   5.080 |   9.92   2.790 |  14.08   1.520
                   1.67   2.030 |   5.83   5.080 |  10.00   2.790 |  14.17   1.520
                   1.75   2.030 |   5.92   7.110 |  10.08   2.030 |  14.25   1.020
                   1.83   2.030 |   6.00   7.110 |  10.17   2.030 |  14.33   1.020
                   1.92   2.030 |   6.08  10.410 |  10.25   2.030 |  14.42   1.020
                   2.00   2.030 |   6.17  10.410 |  10.33   2.030 |  14.50   1.020
                   2.08   2.030 |   6.25  23.370 |  10.42   2.030 |  14.58   1.020
                   2.17   2.030 |   6.33  23.370 |  10.50   2.030 |  14.67   1.020
                   2.25   2.030 |   6.42  51.560 |  10.58   2.030 |  14.75   1.020
                   2.33   2.030 |   6.50  51.560 |  10.67   2.030 |  14.83   1.020
                   2.42   2.030 |   6.58 107.440 |  10.75   2.030 |  14.92   1.020
                   2.50   2.030 |   6.67 107.440 |  10.83   2.030 |  15.00   1.020
                   2.58   2.030 |   6.75  18.800 |  10.92   2.030 |  15.08   1.020
                   2.67   2.030 |   6.83  18.800 |  11.00   2.030 |  15.17   1.020
                   2.75   2.030 |   6.92  11.680 |  11.08   2.030 |  15.25   1.020
                   2.83   2.030 |   7.00  11.680 |  11.17   2.030 |  15.33   1.020
                   2.92   2.030 |   7.08   8.380 |  11.25   2.030 |  15.42   1.020
                   3.00   2.030 |   7.17   8.380 |  11.33   2.030 |  15.50   1.020
                   3.08   2.030 |   7.25   8.130 |  11.42   2.030 |  15.58   1.020
                   3.17   2.030 |   7.33   8.130 |  11.50   2.030 |  15.67   1.020
                   3.25   2.030 |   7.42   5.590 |  11.58   2.030 |  15.75   1.020
                   3.33   2.030 |   7.50   5.590 |  11.67   2.030 |  15.83   1.020
                   3.42   2.790 |   7.58   4.830 |  11.75   2.030 |  15.92   1.020
                   3.50   2.790 |   7.67   4.830 |  11.83   2.030 |  16.00   1.020
                   3.58   2.790 |   7.75   4.830 |  11.92   2.030 |  16.08   1.020
                   3.67   2.790 |   7.83   4.830 |  12.00   2.030 |  16.17   1.020
                   3.75   2.790 |   7.92   4.830 |  12.08   2.030 |  16.25   1.020
                   3.83   2.790 |   8.00   4.830 |  12.17   2.030 |  16.33   1.020
                   3.92   2.790 |   8.08   4.830 |  12.25   2.030 |  16.42   1.020
                   4.00   2.790 |   8.17   4.830 |  12.33   2.030 |  16.50   1.020
                   4.08   2.790 |   8.25   4.830 |  12.42   2.030 |  16.58   1.020
                   4.17   2.790 |   8.33   4.830 |  12.50   2.030 |  16.67   1.020

     Unit Hyd Qpeak   (cms)=      .623

     PEAK FLOW        (cms)=      .309 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    44.587
     TOTAL RAINFALL    (mm)=    79.949
     RUNOFF COEFFICIENT   =      .558

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
-----------------------------------------------------------------------------
001:0003---------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number      =     1.00
| IN= 1---> OUT= 8 |     Diameter     (mm)=   450.00
| DT=  5.0 min     |     Length        (m)=    45.00
--------------------     Slope       (m/m)=   .01100
                         Manning n        =     .025

     *** WARNING: MINIMUM PIPE SIZE REQUIRED =   582.00   (mm)
                  THIS SIZE WAS USED IN THE ROUTING.
                  THE CAPACITY OF THIS PIPE  =      .31   (cms)

      *** WARNING: New pipe size used for routing.
     <------------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME     FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)       (cms)        (m/s)        min
        .031    .241E+00       .002         .308        2.43
        .061    .672E+00       .007         .481        1.56
        .092    .121E+01       .017         .619        1.21
        .123    .183E+01       .030         .736        1.02
        .153    .252E+01       .047         .838         .90
        .184    .324E+01       .067         .927         .81
        .214    .400E+01       .089        1.005         .75
        .245    .479E+01       .114        1.074         .70
        .276    .558E+01       .141        1.134         .66
        .306    .639E+01       .168        1.186         .63
        .337    .718E+01       .196        1.230         .61
        .368    .797E+01       .224        1.266         .59
        .398    .873E+01       .251        1.294         .58
        .429    .946E+01       .276        1.313         .57
        .459    .101E+02       .298        1.323         .57
        .490    .108E+02       .316        1.322         .57
        .521    .113E+02       .328        1.308         .57
        .551    .117E+02       .332        1.274         .59
        .582    .120E+02       .309        1.161         .65
                               <---- hydrograph ---->   <-pipe / channel->
                        AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                        (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 1:300    2.06     .309   10.67 44.587     .478     1.322
   OUTFLOW: ID= 8:culver 2.06     .304   10.67 44.587     .473     1.323


-----------------------------------------------------------------------------
001:0004---------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=     .29   Curve Number   (CN)=81.00
| 02:301    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .063

     Unit Hyd Qpeak   (cms)=      .174

     PEAK FLOW        (cms)=      .056 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    44.586
     TOTAL RAINFALL    (mm)=    79.949
     RUNOFF COEFFICIENT   =      .558

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
-----------------------------------------------------------------------------
001:0005---------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    1.73   Curve Number   (CN)=81.00
| 03:302    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .115

     Unit Hyd Qpeak   (cms)=      .575

     PEAK FLOW        (cms)=      .275 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    44.587
     TOTAL RAINFALL    (mm)=    79.949
     RUNOFF COEFFICIENT   =      .558

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
-----------------------------------------------------------------------------
001:0006---------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    2.89   Curve Number   (CN)=81.00
| 04:303    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .109

     Unit Hyd Qpeak   (cms)=     1.013

     PEAK FLOW        (cms)=      .472 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    44.587
     TOTAL RAINFALL    (mm)=    79.949
     RUNOFF COEFFICIENT   =      .558

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
-----------------------------------------------------------------------------
001:0007---------------------------------------------------------------------
--------------------
| ADD HYD (outlet) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------              (ha)     (cms)   (hrs)   (mm)    (cms)
                  ID1 03:302       1.73     .275   10.67  44.59     .000
                 +ID2 04:303       2.89     .472   10.67  44.59     .000
                  ==================================================
                  SUM 10:outlet    4.62     .747   10.67  44.59     .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----------------------------------------------------------------------------
001:0008---------------------------------------------------------------------
      FINISH
-----------------------------------------------------------------------------
*****************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0002 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0003 ROUTE PIPE      ->
      *** WARNING: New pipe size used for routing.
 001:0004 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0005 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
```

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

 SSSSS  W   W  H   M  H   H  Y   Y  M   M   OOO       999   999  =========
 S       W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9 9   9
 SSSSS   W W W  H M M  HHHHH    Y    M M M  O   O  ##  9   9 9   9 Ver. 4.02
     S    W W   H   M  H   H    Y    M   M  O   O      9999  9999 July 1999
 SSSSS    W W   H   M  H   H    Y    M   M   OOO          9     9 =========
                                                   9   9 9   9 # 4377549
      StormWater Management HYdrologic Model          999   999  =========

 **************************************************************************
 ************************** SWMHYMO-99 Ver/4.02 ***************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors     *******
 *******                OTTHYMO-83 and OTTHYMO-89.                  *******
 **************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                  Ottawa,  Ontario: (613) 727-5199          *******
 *******                  Gatineau, Quebec: (819) 243-6858          *******
 *******                  E-Mail: swmhymo@jfsa.Com                  *******
 **************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: Condeland Engineering Limited               +++++++
 +++++++                Toronto                SERIAL#:4377549      +++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 **************************************************************************
 *******              ++++++ PROGRAM ARRAY DIMENSIONS ++++++        *******
 *******              Maximum value for ID numbers  :     10        *******
 *******              Max. number of rainfall points:  15000        *******
 *******              Max. number of flow points    :  15000        *******
 **************************************************************************


 *******************   D E T A I L E D   O U T P U T   *******************
 **************************************************************************
 *        DATE: 2009-05-27     TIME: 19:27:05     RUN COUNTER: 000041     *
 **************************************************************************
 * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE50YR.dat   *
 * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE50YR.out   *
 * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE50YR.sum   *
 * User comments:                                                          *
 * 1:______________________________________________________________________*
 * 2:______________________________________________________________________*
 * 3:______________________________________________________________________*
 **************************************************************************

----------------------------------------------------------------------------
001:0001--------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
*#  Date         : 05-20-2009
*#  Modeller     : [ROBERT DE ANGELIS]
*#  Company      : Condeland Engineering Limited
*#  License #    :  4377549
*#*************************************************************************
--------------------
| START             |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
----------------------------------------------------------------------------
001:0002--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    2.06   Curve Number   (CN)=81.00
| 01:300     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .126

                                  New rainfall entered directly by user.
                                  TIME STEP= 5.00 min   # of STEPS= 200
                                  DURATION =16.67 hrs   TOTAL RAIN=  86.44 mm

               TIME     RAIN |   TIME     RAIN |   TIME     RAIN |   TIME     RAIN
                hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr
                .08   49.100 |   4.25    3.050 |   8.42    3.050 |  12.58    1.650
                .17    2.120 |   4.33    3.050 |   8.50    3.050 |  12.67    1.650
                .25    2.120 |   4.42    3.050 |   8.58    3.050 |  12.75    1.650
                .33    2.120 |   4.50    3.050 |   8.67    3.050 |  12.83    1.650
                .42    2.120 |   4.58    3.050 |   8.75    3.050 |  12.92    1.650
                .50    2.120 |   4.67    3.050 |   8.83    3.050 |  13.00    1.650
                .58    2.120 |   4.75    3.050 |   8.92    3.050 |  13.08    1.650
                .67    2.120 |   4.83    3.050 |   9.00    3.050 |  13.17    1.650
                .75    2.120 |   4.92    3.050 |   9.08    3.050 |  13.25    1.650
                .83    2.120 |   5.00    3.050 |   9.17    3.050 |  13.33    1.650
                .92    2.120 |   5.08    5.640 |   9.25    3.050 |  13.42    1.650
               1.00    2.120 |   5.17    5.640 |   9.33    3.050 |  13.50    1.650
               1.08    2.120 |   5.25    5.640 |   9.42    3.050 |  13.58    1.650
               1.17    2.120 |   5.33    5.640 |   9.50    3.050 |  13.67    1.650
               1.25    2.120 |   5.42    5.640 |   9.58    3.050 |  13.75    1.650
               1.33    2.120 |   5.50    5.640 |   9.67    3.050 |  13.83    1.650
               1.42    2.120 |   5.58    5.640 |   9.75    3.050 |  13.92    1.650
               1.50    2.120 |   5.67    5.640 |   9.83    3.050 |  14.00    1.650
               1.58    2.120 |   5.75    5.640 |   9.92    3.050 |  14.08    1.650
               1.67    2.120 |   5.83    5.640 |  10.00    3.050 |  14.17    1.650
               1.75    2.120 |   5.92    7.520 |  10.08    2.120 |  14.25    1.170
               1.83    2.120 |   6.00    7.520 |  10.17    2.120 |  14.33    1.170
               1.92    2.120 |   6.08   11.040 |  10.25    2.120 |  14.42    1.170
               2.00    2.120 |   6.17   11.020 |  10.33    2.120 |  14.50    1.170
               2.08    2.120 |   6.25   25.370 |  10.42    2.120 |  14.58    1.170
               2.17    2.120 |   6.33   25.370 |  10.50    2.120 |  14.67    1.170
               2.25    2.120 |   6.42   55.440 |  10.58    2.120 |  14.75    1.170
               2.33    2.120 |   6.50   55.440 |  10.67    2.120 |  14.83    1.170
               2.42    2.120 |   6.58  116.060 |  10.75    2.120 |  14.92    1.170
               2.50    2.120 |   6.67  116.060 |  10.83    2.120 |  15.00    1.170
               2.58    2.120 |   6.75   19.870 |  10.92    2.120 |  15.08    1.170
               2.67    2.120 |   6.83   19.870 |  11.00    2.120 |  15.17    1.170
               2.75    2.120 |   6.92   12.690 |  11.08    2.120 |  15.25    1.170
               2.83    2.120 |   7.00   12.690 |  11.17    2.120 |  15.33    1.170
               2.92    2.120 |   7.08    9.170 |  11.25    2.120 |  15.42    1.170
               3.00    2.120 |   7.17    9.170 |  11.33    2.120 |  15.50    1.170
               3.08    2.120 |   7.25    8.690 |  11.42    2.120 |  15.58    1.170
               3.17    2.120 |   7.33    8.690 |  11.50    2.120 |  15.67    1.170
               3.25    2.120 |   7.42    6.100 |  11.58    2.120 |  15.75    1.170
               3.33    2.120 |   7.50    6.100 |  11.67    2.120 |  15.83    1.170
               3.42    3.050 |   7.58    5.170 |  11.75    2.120 |  15.92    1.170
               3.50    3.050 |   7.67    5.170 |  11.83    2.120 |  16.00    1.170
               3.58    3.050 |   7.75    5.170 |  11.92    2.120 |  16.08    1.170
               3.67    3.050 |   7.83    5.170 |  12.00    2.120 |  16.17    1.170
               3.75    3.050 |   7.92    5.170 |  12.08    2.120 |  16.25    1.170
               3.83    3.050 |   8.00    5.170 |  12.17    2.120 |  16.33    1.170
               3.92    3.050 |   8.08    5.170 |  12.25    2.120 |  16.42    1.170
               4.00    3.050 |   8.17    5.170 |  12.33    2.120 |  16.50    1.170
               4.08    3.050 |   8.25    5.170 |  12.42    2.120 |  16.58    1.170
               4.17    3.050 |   8.33    5.170 |  12.50    2.120 |  16.67    1.000

     Unit Hyd Qpeak  (cms)=      .623

     PEAK FLOW        (cms)=      .346 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    49.923
     TOTAL RAINFALL    (mm)=    86.441
     RUNOFF COEFFICIENT   =      .578

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0003--------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number      =     1.00
| IN= 1---> OUT= 8 |     Diameter     (mm)=   450.00
| DT=  5.0 min     |     Length        (m)=    45.00
--------------------     Slope       (m/m)=  .01100
                         Manning n        =     .025

     *** WARNING: MINIMUM PIPE SIZE REQUIRED =   607.23    (mm)
                  THIS SIZE WAS USED IN THE ROUTING.
                  THE CAPACITY OF THIS PIPE  =       .35   (cms)

      *** WARNING: New pipe size used for routing.
     <------------------- TRAVEL TIME TABLE ------------------->
        DEPTH       VOLUME      FLOW RATE     VELOCITY    TRAV.TIME
         (m)       (cu.m.)        (cms)         (m/s)        min
        .032      .263E+00        .002          .317        2.36
        .064      .731E+00        .008          .495        1.52
        .096      .132E+01        .019          .637        1.18
        .128      .200E+01        .034          .757         .99
        .160      .274E+01        .052          .862         .87
        .192      .353E+01        .075          .954         .79
        .224      .436E+01        .100         1.034         .73
        .256      .521E+01        .128         1.105         .68
        .288      .608E+01        .158         1.167         .64
        .320      .695E+01        .189         1.220         .61
        .352      .782E+01        .220         1.265         .59
        .384      .867E+01        .251         1.302         .58
        .415      .950E+01        .281         1.331         .56
        .447      .103E+02        .309         1.351         .56
        .479      .110E+02        .334         1.361         .55
        .511      .117E+02        .354         1.360         .55
        .543      .123E+02        .368         1.346         .56
        .575      .128E+02        .372         1.311         .57
        .607      .130E+02        .346         1.195         .63
                                      <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK  R.V.   MAX DEPTH   MAX VEL
                                (ha)    (cms)   (hrs)  (mm)      (m)       (m/s)
    INFLOW : ID= 1:300          2.06     .346   10.67 49.923     .498      1.360
    OUTFLOW: ID= 8:culver       2.06     .340   10.67 49.923     .494      1.361


----------------------------------------------------------------------------
001:0004--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=     .29   Curve Number   (CN)=81.00
| 02:301     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .063

     Unit Hyd Qpeak  (cms)=      .174

     PEAK FLOW        (cms)=      .063 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    49.923
     TOTAL RAINFALL    (mm)=    86.441
     RUNOFF COEFFICIENT   =      .578

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0005--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    1.73   Curve Number   (CN)=81.00
| 03:302     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .115

     Unit Hyd Qpeak  (cms)=      .575

     PEAK FLOW        (cms)=      .307 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    49.923
     TOTAL RAINFALL    (mm)=    86.441
     RUNOFF COEFFICIENT   =      .578

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0006--------------------------------------------------------------------
---------------------
| DESIGN NASHYD       |   Area     (ha)=    2.89   Curve Number   (CN)=81.00
| 04:303     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=     .109

     Unit Hyd Qpeak  (cms)=     1.013

     PEAK FLOW        (cms)=      .529 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    49.923
     TOTAL RAINFALL    (mm)=    86.441
     RUNOFF COEFFICIENT   =      .578

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0007--------------------------------------------------------------------
--------------------
| ADD HYD (outlet) | ID: NHYD       AREA      QPEAK    TPEAK   R.V.     DWF
--------------------                (ha)      (cms)    (hrs)   (mm)    (cms)
                   ID1 03:302        1.73      .307    10.67   49.92    .000
                  +ID2 04:303        2.89      .529    10.67   49.92    .000
                   ==================================================
                   SUM 10:outlet     4.62      .836    10.67   49.92    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

----------------------------------------------------------------------------
001:0008--------------------------------------------------------------------
      FINISH
----------------------------------------------------------------------------
****************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0002 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0003 ROUTE PIPE      ->
      *** WARNING: New pipe size used for routing.
 001:0004 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0005 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
```

```
00271>  001:0006 DESIGN NASHYD
00272>        *** WARNING: Time step is too large for value of TP.
00273>                     R.V. may be ok.  Peak flow could be off.
00274>    Simulation ended on 2009-05-27     at 19:27:05
00275> ===============================================================================
00276>
00277>
```

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

SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO       999    999   =========
S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  9   9
SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
    S   W W   M   M  H   H    Y    M   M  O   O      9999   9999 July 1999
SSSSS   W W   M   M  H   H    Y    M   M   OOO          9      9 =========
                                                   9   9  9   9 # 4377549
     StormWater Management HYdrologic Model         999    999   =========

*************************************************************************
************************* SWMHYMO-99 Ver/4.02 ***************************
*******  A single event and continuous hydrologic simulation model  *******
*******     based on the principles of HYMO and its successors      *******
*******                 OTTHYMO-83 and OTTHYMO-89.                  *******
*************************************************************************
******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
*******                  Ottawa, Ontario: (613) 727-5199            *******
*******                  Gatineau, Quebec: (819) 243-6858           *******
*******                  E-Mail: swmhymo@jfsa.Com                   *******
*************************************************************************

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++ Licensed user: Condeland Engineering Limited              +++++++
+++++++                Toronto                 SERIAL#:4377549    +++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

*************************************************************************
*******            ++++++ PROGRAM ARRAY DIMENSIONS ++++++           *******
*******            Maximum value for ID numbers  :     10           *******
*******            Max. number of rainfall points:  15000           *******
*******            Max. number of flow points    :  15000           *******
*************************************************************************


*******************   D E T A I L E D   O U T P U T   *******************
*************************************************************************
*     DATE: 2009-05-27      TIME: 16:05:45      RUN COUNTER: 000030     *
*************************************************************************
* Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE100YR.dat  *
* Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE100YR.out  *
* Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE100YR.sum  *
* User comments:                                                        *
* 1:____________________________________________________________________*
* 2:____________________________________________________________________*
* 3:____________________________________________________________________*
*************************************************************************

----------------------------------------------------------------------------
001:0001--------------------------------------------------------------------
*#***************************************************************************
*#  Project Name: [2147925 Ontario Limited]     Project Number: [09-015]
*#  Date         : 05-20-2009
*#  Modeller     : [ROBERT DE ANGELIS]
*#  Company      : Condeland Engineering Limited
*#  License #    :  4377549
*#***************************************************************************
--------------------
| START              |   Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on        0
    METOUT=    2 (output = METRIC)
    NRUN  = 001
    NSTORM=    0
----------------------------------------------------------------------------
001:0002--------------------------------------------------------------------
---------------------
| DESIGN NASHYD        |   Area      (ha)=     2.06   Curve Number    (CN)=81.00
| 01:300     DT= 5.00 |   Ia        (mm)=    1.500   # of Linear Res.(N)= 3.00
---------------------    U.H. Tp(hrs)=     .126

                                     New rainfall entered directly by user.
                                     TIME STEP= 5.00 min    # of STEPS= 200
                                     DURATION =16.67 hrs    TOTAL RAIN=  93.48 mm

                     TIME     RAIN |   TIME     RAIN |   TIME     RAIN |   TIME     RAIN
                      hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr
                      .08   53.090 |   4.25    3.300 |   8.42    3.300 |  12.58    1.780
                      .17    2.290 |   4.33    3.300 |   8.50    3.300 |  12.67    1.780
                      .25    2.290 |   4.42    3.300 |   8.58    3.300 |  12.75    1.780
                      .33    2.290 |   4.50    3.300 |   8.67    3.300 |  12.83    1.780
                      .42    2.290 |   4.58    3.300 |   8.75    3.300 |  12.92    1.780
                      .50    2.290 |   4.67    3.300 |   8.83    3.300 |  13.00    1.780
                      .58    2.290 |   4.75    3.300 |   8.92    3.300 |  13.08    1.780
                      .67    2.290 |   4.83    3.300 |   9.00    3.300 |  13.17    1.780
                      .75    2.290 |   4.92    3.300 |   9.08    3.300 |  13.25    1.780
                      .83    2.290 |   5.00    3.300 |   9.17    3.300 |  13.33    1.780
                      .92    2.290 |   5.08    6.100 |   9.25    3.300 |  13.42    1.780
                     1.00    2.290 |   5.17    6.100 |   9.33    3.300 |  13.50    1.780
                     1.08    2.290 |   5.25    6.100 |   9.42    3.300 |  13.58    1.780
                     1.17    2.290 |   5.33    6.100 |   9.50    3.300 |  13.67    1.780
                     1.25    2.290 |   5.42    6.100 |   9.58    3.300 |  13.75    1.780
                     1.33    2.290 |   5.50    6.100 |   9.67    3.300 |  13.83    1.780
                     1.42    2.290 |   5.58    6.100 |   9.75    3.300 |  13.92    1.780
                     1.50    2.290 |   5.67    6.100 |   9.83    3.300 |  14.00    1.780
                     1.58    2.290 |   5.75    6.100 |   9.92    3.300 |  14.08    1.780
                     1.67    2.290 |   5.83    6.100 |  10.00    3.300 |  14.17    1.780
                     1.75    2.290 |   5.92    8.130 |  10.08    2.290 |  14.25    1.270
                     1.83    2.290 |   6.00    8.130 |  10.17    2.290 |  14.33    1.270
                     1.92    2.290 |   6.08   11.940 |  10.25    2.290 |  14.42    1.270
                     2.00    2.290 |   6.17   11.940 |  10.33    2.290 |  14.50    1.270
                     2.08    2.290 |   6.25   27.430 |  10.42    2.290 |  14.58    1.270
                     2.17    2.290 |   6.33   27.430 |  10.50    2.290 |  14.67    1.270
                     2.25    2.290 |   6.42   59.940 |  10.58    2.290 |  14.75    1.270
                     2.33    2.290 |   6.50   59.940 |  10.67    2.290 |  14.83    1.270
                     2.42    2.290 |   6.58  125.480 |  10.75    2.290 |  14.92    1.270
                     2.50    2.290 |   6.67  125.480 |  10.83    2.290 |  15.00    1.270
                     2.58    2.290 |   6.75   21.480 |  10.92    2.290 |  15.08    1.270
                     2.67    2.290 |   6.83   21.480 |  11.00    2.290 |  15.17    1.270
                     2.75    2.290 |   6.92   13.720 |  11.08    2.290 |  15.25    1.270
                     2.83    2.290 |   7.00   13.720 |  11.17    2.290 |  15.33    1.270
                     2.92    2.290 |   7.08    9.910 |  11.25    2.290 |  15.42    1.270
                     3.00    2.290 |   7.17    9.910 |  11.33    2.290 |  15.50    1.270
                     3.08    2.290 |   7.25    9.400 |  11.42    2.290 |  15.58    1.270
                     3.17    2.290 |   7.33    9.400 |  11.50    2.290 |  15.67    1.270
                     3.25    2.290 |   7.42    6.600 |  11.58    2.290 |  15.75    1.270
                     3.33    2.290 |   7.50    6.600 |  11.67    2.290 |  15.83    1.270
                     3.42    3.300 |   7.58    5.590 |  11.75    2.290 |  15.92    1.270
                     3.50    3.300 |   7.67    5.590 |  11.83    2.290 |  16.00    1.270
                     3.58    3.300 |   7.75    5.590 |  11.92    2.290 |  16.08    1.270
                     3.67    3.300 |   7.83    5.590 |  12.00    2.290 |  16.17    1.270
                     3.75    3.300 |   7.92    5.590 |  12.08    2.290 |  16.25    1.270
                     3.83    3.300 |   8.00    5.590 |  12.17    2.290 |  16.33    1.270
                     3.92    3.300 |   8.08    5.590 |  12.25    2.290 |  16.42    1.270
                     4.00    3.300 |   8.17    5.590 |  12.33    2.290 |  16.50    1.270
                     4.08    3.300 |   8.25    5.590 |  12.42    2.290 |  16.58    1.270
                     4.17    3.300 |   8.33    5.590 |  12.50    2.290 |  16.67    1.270

     Unit Hyd Qpeak   (cms)=      .623

     PEAK FLOW        (cms)=      .387 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    55.821
     TOTAL RAINFALL    (mm)=    93.480
     RUNOFF COEFFICIENT    =      .597

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0003--------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|       PIPE Number      =     1.00
| IN= 1---> OUT= 8 |       Diameter     (mm)=   450.00
| DT=  5.0 min     |       Length        (m)=    45.00
--------------------       Slope       (m/m)=   .01100
                           Manning n        =     .025

     *** WARNING: MINIMUM PIPE SIZE REQUIRED =    633.24   (mm)
                  THIS SIZE WAS USED IN THE ROUTING.
                  THE CAPACITY OF THIS PIPE  =        .39  (cms)

     *** WARNING: New pipe size used for routing.
     <------------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME     FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)       (cms)        (m/s)        min
        .033     .286E+00      .002         .326        2.30
        .067     .795E+00      .009         .509        1.47
        .100     .144E+01      .021         .655        1.14
        .133     .217E+01      .038         .779         .96
        .167     .298E+01      .059         .886         .85
        .200     .384E+01      .084         .981         .76
        .233     .474E+01      .112        1.063         .71
        .267     .567E+01      .143        1.136         .66
        .300     .661E+01      .176        1.200         .62
        .333     .756E+01      .211        1.255         .60
        .367     .850E+01      .246        1.301         .58
        .400     .943E+01      .281        1.339         .56
        .433     .103E+02      .314        1.369         .55
        .467     .112E+02      .346        1.389         .54
        .500     .120E+02      .373        1.399         .54
        .533     .127E+02      .396        1.399         .54
        .567     .134E+02      .411        1.384         .54
        .600     .139E+02      .416        1.348         .56
        .633     .142E+02      .387        1.229         .61
                                     <---- hydrograph ---->   <-pipe / channel->
                                  AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                  (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
    INFLOW : ID= 1:300            2.06     .387   10.67 55.821      .520     1.399
    OUTFLOW: ID= 8:culver         2.06     .381   10.67 55.821      .516     1.399


----------------------------------------------------------------------------
001:0004--------------------------------------------------------------------
---------------------
| DESIGN NASHYD        |   Area      (ha)=      .29   Curve Number    (CN)=81.00
| 02:301     DT= 5.00 |   Ia        (mm)=    1.500   # of Linear Res.(N)= 3.00
---------------------    U.H. Tp(hrs)=     .063

     Unit Hyd Qpeak   (cms)=      .174

     PEAK FLOW        (cms)=      .070 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    55.821
     TOTAL RAINFALL    (mm)=    93.480
     RUNOFF COEFFICIENT    =      .597

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0005--------------------------------------------------------------------
---------------------
| DESIGN NASHYD        |   Area      (ha)=     1.73   Curve Number    (CN)=81.00
| 03:302     DT= 5.00 |   Ia        (mm)=    1.500   # of Linear Res.(N)= 3.00
---------------------    U.H. Tp(hrs)=     .115

     Unit Hyd Qpeak   (cms)=      .575

     PEAK FLOW        (cms)=      .344 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    55.821
     TOTAL RAINFALL    (mm)=    93.480
     RUNOFF COEFFICIENT    =      .597

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0006--------------------------------------------------------------------
---------------------
| DESIGN NASHYD        |   Area      (ha)=     2.89   Curve Number    (CN)=81.00
| 04:303     DT= 5.00 |   Ia        (mm)=    1.500   # of Linear Res.(N)= 3.00
---------------------    U.H. Tp(hrs)=     .109

     Unit Hyd Qpeak   (cms)=     1.013

     PEAK FLOW        (cms)=      .591 (i)
     TIME TO PEAK     (hrs)=    10.667
     RUNOFF VOLUME     (mm)=    55.821
     TOTAL RAINFALL    (mm)=    93.480
     RUNOFF COEFFICIENT    =      .597

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

      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
----------------------------------------------------------------------------
001:0007--------------------------------------------------------------------
--------------------
| ADD HYD (outlet) | ID: NHYD      AREA      QPEAK    TPEAK   R.V.     DWF
--------------------               (ha)      (cms)    (hrs)   (mm)    (cms)
                 ID1 03:302        1.73       .344    10.67  55.82     .000
                +ID2 04:303        2.89       .591    10.67  55.82     .000
                ==================================================
                 SUM 10:outlet     4.62       .934    10.67  55.82     .000

  NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

----------------------------------------------------------------------------
001:0008--------------------------------------------------------------------
      FINISH
----------------------------------------------------------------------------
****************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
  001:0002 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
  001:0003 ROUTE PIPE       ->
      *** WARNING: New pipe size used for routing.
  001:0004 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
  001:0005 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
```

```
00271>  001:0006 DESIGN NASHYD
00272>        *** WARNING: Time step is too large for value of TP.
00273>                     R.V. may be ok.  Peak flow could be off.
00274>    Simulation ended on 2009-05-27     at 16:05:46
00275> ================================================================================
00276>
00277>
```

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

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999   999  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9 9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ## 9   9 9   9 Ver. 4.02
     S   W W   M   M  H   H    Y    M   M  O   O      9999  9999 July 1999
 SSSSS   W W   M   M  H   H    Y    M   M   OOO          9     9 =========
                                                     9   9 9   9 # 4377549
      StormWater Management HYdrologic Model          999   999  =========

 **************************************************************************
 ************************** SWMHYMO-99 Ver/4.02 ***************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                OTTHYMO-83 and OTTHYMO-89.                   *******
 **************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                  Ottawa,  Ontario: (613) 727-5199           *******
 *******                  Gatineau, Quebec: (819) 243-6858           *******
 *******                  E-Mail: swmhymo@jfsa.Com                   *******
 **************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: Condeland Engineering Limited                +++++++
 +++++++                Toronto                   SERIAL#:4377549    +++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 **************************************************************************
 *******             ++++++ PROGRAM ARRAY DIMENSIONS ++++++          *******
 *******             Maximum value for ID numbers  :     10          *******
 *******             Max. number of rainfall points:  15000          *******
 *******             Max. number of flow points    :  15000          *******
 **************************************************************************


 ********************  D E T A I L E D   O U T P U T  ********************
 **************************************************************************
 *       DATE: 2009-05-27     TIME: 18:52:11     RUN COUNTER: 000033      *
 **************************************************************************
 * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post2yr.dat   *
 * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post2yr.out   *
 * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post2yr.sum   *
 * User comments:                                                         *
 * 1:_____________________________________________________________________*
 * 2:_____________________________________________________________________*
 * 3:_____________________________________________________________________*
 **************************************************************************

----------------------------------------------------------------------------
001:0001--------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
*#  Date         : 11-08-2008
*#  Modeller     : [ROBERT DE ANGELIS]
*#  Company      : Condeland Engineering Limited
*#  License #    :  4377549
*#**************************************************************************
--------------------
| START             |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
----------------------------------------------------------------------------
001:0002--------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area    (ha)=     .58
| 01:600    DT= 5.00 |   Total Imp(%)=  20.00   Dir. Conn.(%)=  20.00
---------------------
                                   IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=          .12           .46
     Dep. Storage      (mm)=          .80          1.50
     Average Slope      (%)=        21.42         21.42
     Length             (m)=        62.24         40.00
     Mannings n            =         .013          .250

                                    New rainfall entered directly by user.
                                    TIME STEP= 5.00 min   # of STEPS= 199
                                    DURATION =16.58 hrs   TOTAL RAIN=  42.09 mm

                    TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                     hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                     .08   1.020 |   4.25   1.520 |   8.42   1.520 |  12.58    .760
                     .17   1.020 |   4.33   1.520 |   8.50   1.520 |  12.67    .760
                     .25   1.020 |   4.42   1.520 |   8.58   1.520 |  12.75    .760
                     .33   1.020 |   4.50   1.520 |   8.67   1.520 |  12.83    .760
                     .42   1.020 |   4.58   1.520 |   8.75   1.520 |  12.92    .760
                     .50   1.020 |   4.67   1.520 |   8.83   1.520 |  13.00    .760
                     .58   1.020 |   4.75   1.520 |   8.92   1.520 |  13.08    .760
                     .67   1.020 |   4.83   1.520 |   9.00   1.520 |  13.17    .760
                     .75   1.020 |   4.92   1.520 |   9.08   1.520 |  13.25    .760
                     .83   1.020 |   5.00   3.050 |   9.17   1.520 |  13.33    .760
                     .92   1.020 |   5.08   3.050 |   9.25   1.520 |  13.42    .760
                    1.00   1.020 |   5.17   3.050 |   9.33   1.520 |  13.50    .760
                    1.08   1.020 |   5.25   3.050 |   9.42   1.520 |  13.58    .760
                    1.17   1.020 |   5.33   3.050 |   9.50   1.520 |  13.67    .760
                    1.25   1.020 |   5.42   3.050 |   9.58   1.520 |  13.75    .760
                    1.33   1.020 |   5.50   3.050 |   9.67   1.520 |  13.83    .760
                    1.42   1.020 |   5.58   3.050 |   9.75   1.520 |  13.92    .760
                    1.50   1.020 |   5.67   3.050 |   9.83   1.520 |  14.00    .760
                    1.58   1.020 |   5.75   3.050 |   9.92   1.520 |  14.08    .760
                    1.67   1.020 |   5.83   4.060 |  10.00   1.020 |  14.17    .510
                    1.75   1.020 |   5.92   4.060 |  10.08   1.020 |  14.25    .510
                    1.83   1.020 |   6.00   5.840 |  10.17   1.020 |  14.33    .510
                    1.92   1.020 |   6.08   5.840 |  10.25   1.020 |  14.42    .510
                    2.00   1.020 |   6.17  13.210 |  10.33   1.020 |  14.50    .510
                    2.08   1.020 |   6.25  13.210 |  10.42   1.020 |  14.58    .510
                    2.17   1.020 |   6.33  28.960 |  10.50   1.020 |  14.67    .510
                    2.25   1.020 |   6.42  28.960 |  10.58   1.020 |  14.75    .510
                    2.33   1.020 |   6.50  60.450 |  10.67   1.020 |  14.83    .510
                    2.42   1.020 |   6.58  60.450 |  10.75   1.020 |  14.92    .510
                    2.50   1.020 |   6.67  10.670 |  10.83   1.020 |  15.00    .510
                    2.58   1.020 |   6.75  10.670 |  10.92   1.020 |  15.08    .510
                    2.67   1.020 |   6.83   6.600 |  11.00   1.020 |  15.17    .510
                    2.75   1.020 |   6.92   6.600 |  11.08   1.020 |  15.25    .510
                    2.83   1.020 |   7.00   4.830 |  11.17   1.020 |  15.33    .510
                    2.92   1.020 |   7.08   4.830 |  11.25   1.020 |  15.42    .510
                    3.00   1.020 |   7.17   4.570 |  11.33   1.020 |  15.50    .510
                    3.08   1.020 |   7.25   4.570 |  11.42   1.020 |  15.58    .510
                    3.17   1.020 |   7.33   3.300 |  11.50   1.020 |  15.67    .510
                    3.25   1.020 |   7.42   3.300 |  11.58   1.020 |  15.75    .510
                    3.33   1.520 |   7.50   2.790 |  11.67   1.020 |  15.83    .510
                    3.42   1.520 |   7.58   2.790 |  11.75   1.020 |  15.92    .510
                    3.50   1.520 |   7.67   2.790 |  11.83   1.020 |  16.00    .510
                    3.58   1.520 |   7.75   2.790 |  11.92   1.020 |  16.08    .510
                    3.67   1.520 |   7.83   2.790 |  12.00   1.020 |  16.17    .510
                    3.75   1.520 |   7.92   2.790 |  12.08   1.020 |  16.25    .510
                    3.83   1.520 |   8.00   2.790 |  12.17   1.020 |  16.33    .510
                    3.92   1.520 |   8.08   2.790 |  12.25   1.020 |  16.42    .510
                    4.00   1.520 |   8.17   2.790 |  12.33   1.020 |  16.50    .510
                    4.08   1.520 |   8.25   2.790 |  12.42   1.020 |  16.58    .510
                    4.17   1.520 |   8.33   1.520 |  12.50    .760 |

     Max.eff.Inten.(mm/hr)=       60.45          5.58
                over (min)         5.00         10.00
     Storage Coeff.  (min)=         .94 (ii)    11.93 (ii)
     Unit Hyd. Tpeak (min)=        5.00         10.00
     Unit Hyd. peak  (cms)=         .34           .10
                                                               *TOTALS*
     PEAK FLOW       (cms)=         .02           .00            .023 (iii)
     TIME TO PEAK    (hrs)=       10.58         10.67          10.583
     RUNOFF VOLUME    (mm)=       41.29          3.62          11.154
     TOTAL RAINFALL   (mm)=       42.09         42.09          42.088
     RUNOFF COEFFICIENT   =         .98           .09            .265
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  38.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
001:0003--------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number      =    1.00
| IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
| DT=  5.0 min     |     Length       (m)=   45.00
--------------------     Slope      (m/m)= .01100
                         Manning n        =   .025

     <------------------ TRAVEL TIME TABLE ------------------>
        DEPTH       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
         (m)       (cu.m.)       (cms)         (m/s)        min
        .024      .144E+00       .001          .260        2.89
        .047      .402E+00       .004          .405        1.85
        .071      .725E+00       .008          .522        1.44
        .095      .110E+01       .015          .620        1.21
        .118      .150E+01       .024          .706        1.06
        .142      .194E+01       .034          .781         .96
        .166      .239E+01       .045          .847         .89
        .189      .286E+01       .058          .905         .83
        .213      .334E+01       .071          .956         .78
        .237      .382E+01       .085          .999         .75
        .261      .429E+01       .099         1.036         .72
        .284      .476E+01       .113         1.067         .70
        .308      .522E+01       .126         1.090         .69
        .332      .565E+01       .139         1.106         .68
        .355      .606E+01       .150         1.114         .67
        .379      .643E+01       .159         1.114         .67
        .403      .676E+01       .165         1.102         .68
        .426      .701E+01       .167         1.073         .70
        .450      .716E+01       .156          .979         .77
                                    <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 1:600          .58     .023   10.58 11.154     .118       .704
   OUTFLOW: ID= 8:culver       .58     .025   10.58 11.154     .122       .715


----------------------------------------------------------------------------
001:0004--------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area    (ha)=     .38
| 02:601    DT= 5.00 |   Total Imp(%)=  20.00   Dir. Conn.(%)=  20.00
---------------------
                                   IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=          .08           .30
     Dep. Storage      (mm)=          .80          1.50
     Average Slope      (%)=          .50           .50
     Length             (m)=        50.20         40.00
     Mannings n            =         .013          .250

     Max.eff.Inten.(mm/hr)=       60.45         15.68
                over (min)         5.00         25.00
     Storage Coeff.  (min)=        2.54 (ii)    24.99 (ii)
     Unit Hyd. Tpeak (min)=        5.00         25.00
     Unit Hyd. peak  (cms)=         .29           .05
                                                               *TOTALS*
     PEAK FLOW       (cms)=         .01           .01            .017 (iii)
     TIME TO PEAK    (hrs)=       10.58         10.92          10.583
     RUNOFF VOLUME    (mm)=       41.29         16.45          21.415
     TOTAL RAINFALL   (mm)=       42.09         42.09          42.088
     RUNOFF COEFFICIENT   =         .98           .39            .509
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  81.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
001:0005--------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area    (ha)=    5.50
| 03:602    DT= 5.00 |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
---------------------
                                   IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=         2.75          2.75
     Dep. Storage      (mm)=          .80          1.50
     Average Slope      (%)=          .50           .50
     Length             (m)=       191.42         40.00
     Mannings n            =         .013          .250

     Max.eff.Inten.(mm/hr)=       60.45         14.00
                over (min)         5.00         30.00
     Storage Coeff.  (min)=        5.68 (ii)    29.16 (ii)
     Unit Hyd. Tpeak (min)=        5.00         30.00
     Unit Hyd. peak  (cms)=         .20           .04
                                                               *TOTALS*
     PEAK FLOW       (cms)=         .42           .07            .446 (iii)
     TIME TO PEAK    (hrs)=       10.58         11.00          10.583
     RUNOFF VOLUME    (mm)=       41.29         16.45          28.867
     TOTAL RAINFALL   (mm)=       42.09         42.09          42.088
     RUNOFF COEFFICIENT   =         .98           .39            .686

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  81.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
001:0006--------------------------------------------------------------------
--------------------
| COMPUTE VOLUME    |
| ID:03  (602   )   |               DISCHARGE      TIME
--------------------                  (cms)        (hrs)
      *** WARNING: No storage required, RelRate > Inflow Qp.
----------------------------------------------------------------------------
001:0007--------------------------------------------------------------------
      FINISH
----------------------------------------------------------------------------
****************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
```

```
00271>  001:0002 DESIGN STANDHYD
00272>       *** WARNING: Storage Coefficient is smaller than DT!
00273>                    Use a smaller DT or a larger area.
00274>  001:0004 DESIGN STANDHYD
00275>       *** WARNING: Storage Coefficient is smaller than DT!
00276>                    Use a smaller DT or a larger area.
00277>  001:0006 COMPUTE VOLUME
00278>       *** WARNING: No storage required, RelRate > Inflow Qp.
00279>    Simulation ended on 2009-05-27     at 18:52:12
00280> ===============================================================================
00281>
00282>
```

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

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
     S   W W   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
 SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
                                                      9   9  9   9 # 4377549
      StormWater Management HYdrologic Model           999    999  =========

 ************************************************************************
 ************************* SWMHYMO-99 Ver/4.02 **************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                  OTTHYMO-83 and OTTHYMO-89.                 *******
 ************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                  Ottawa,  Ontario: (613) 727-5199           *******
 *******                  Gatineau, Quebec: (819) 243-6858           *******
 *******                  E-Mail: swmhymo@jfsa.Com                   *******
 ************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: Condeland Engineering Limited                +++++++
 +++++++                Toronto               SERIAL#:4377549        +++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ************************************************************************
 *******            ++++++ PROGRAM ARRAY DIMENSIONS ++++++           *******
 *******            Maximum value for ID numbers  :     10           *******
 *******            Max. number of rainfall points:  15000           *******
 *******            Max. number of flow points    :  15000           *******
 ************************************************************************


 ******************    D E T A I L E D   O U T P U T    ******************
 ************************************************************************
 *       DATE: 2009-05-27     TIME: 19:02:01     RUN COUNTER: 000034     *
 ************************************************************************
 * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post5yr.dat  *
 * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post5yr.out  *
 * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post5yr.sum  *
 * User comments:                                                         *
 * 1:_____________________________________________________________________*
 * 2:_____________________________________________________________________*
 * 3:_____________________________________________________________________*
 ************************************************************************

---------------------------------------------------------------------------
001:0001-------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
*#  Date         : 11-08-2008
*#  Modeller     : [ROBERT DE ANGELIS]
*#  Company      : Condeland Engineering Limited
*#  License #    :  4377549
*#**************************************************************************
--------------------
| START              |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 00I
    NSTORM=   0
---------------------------------------------------------------------------
001:0002-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area     (ha)=      .58
| 01:600    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
---------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=        .12            .46
     Dep. Storage      (mm)=        .80           1.50
     Average Slope      (%)=      31.75          31.75
     Length             (m)=      62.24          40.00
     Mannings n            =       .013           .250

                               New rainfall entered directly by user.
                               TIME STEP= 5.00 min   # of STEPS= 199
                               DURATION =16.58 hrs   TOTAL RAIN=  49.39 mm

                  TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                   hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                   .08   1.270 |   4.25   1.780 |   8.42   1.780 |  12.58   1.020
                   .17   1.270 |   4.33   1.780 |   8.50   1.780 |  12.67   1.020
                   .25   1.270 |   4.42   1.780 |   8.58   1.780 |  12.75   1.020
                   .33   1.270 |   4.50   1.780 |   8.67   1.780 |  12.83   1.020
                   .42   1.270 |   4.58   1.780 |   8.75   1.780 |  12.92   1.020
                   .50   1.270 |   4.67   1.780 |   8.83   1.780 |  13.00   1.020
                   .58   1.270 |   4.75   1.780 |   8.92   1.780 |  13.08   1.020
                   .67   1.270 |   4.83   1.780 |   9.00   1.780 |  13.17   1.020
                   .75   1.270 |   4.92   1.780 |   9.08   1.780 |  13.25   1.020
                   .83   1.270 |   5.00   3.300 |   9.17   1.780 |  13.33   1.020
                   .92   1.270 |   5.08   3.300 |   9.25   1.780 |  13.42   1.020
                  1.00   1.270 |   5.17   3.300 |   9.33   1.780 |  13.50   1.020
                  1.08   1.270 |   5.25   3.300 |   9.42   1.780 |  13.58   1.020
                  1.17   1.270 |   5.33   3.300 |   9.50   1.780 |  13.67   1.020
                  1.25   1.270 |   5.42   3.300 |   9.58   1.780 |  13.75   1.020
                  1.33   1.270 |   5.50   3.300 |   9.67   1.780 |  13.83   1.020
                  1.42   1.270 |   5.58   3.300 |   9.75   1.780 |  13.92   1.020
                  1.50   1.270 |   5.67   3.300 |   9.83   1.780 |  14.00   1.020
                  1.58   1.270 |   5.75   3.300 |   9.92   1.780 |  14.08   1.020
                  1.67   1.270 |   5.83   4.570 |  10.00   1.270 |  14.17    .760
                  1.75   1.270 |   5.92   4.570 |  10.08   1.270 |  14.25    .760
                  1.83   1.270 |   6.00   6.600 |  10.17   1.270 |  14.33    .760
                  1.92   1.270 |   6.08   6.600 |  10.25   1.270 |  14.42    .760
                  2.00   1.270 |   6.17  15.240 |  10.33   1.270 |  14.50    .760
                  2.08   1.270 |   6.25  15.240 |  10.42   1.270 |  14.58    .760
                  2.17   1.270 |   6.33  33.270 |  10.50   1.270 |  14.67    .760
                  2.25   1.270 |   6.42  33.270 |  10.58   1.270 |  14.75    .760
                  2.33   1.270 |   6.50  69.600 |  10.67   1.270 |  14.83    .760
                  2.42   1.270 |   6.58  69.600 |  10.75   1.270 |  14.92    .760
                  2.50   1.270 |   6.67  12.190 |  10.83   1.270 |  15.00    .760
                  2.58   1.270 |   6.75  12.190 |  10.92   1.270 |  15.08    .760
                  2.67   1.270 |   6.83   7.620 |  11.00   1.270 |  15.17    .760
                  2.75   1.270 |   6.92   7.620 |  11.08   1.270 |  15.25    .760
                  2.83   1.270 |   7.00   5.590 |  11.17   1.270 |  15.33    .760
                  2.92   1.270 |   7.08   5.590 |  11.25   1.270 |  15.42    .760
                  3.00   1.270 |   7.17   5.080 |  11.33   1.270 |  15.50    .760
                  3.08   1.270 |   7.25   5.080 |  11.42   1.270 |  15.58    .760
                  3.17   1.270 |   7.33   3.810 |  11.50   1.270 |  15.67    .760
                  3.25   1.270 |   7.42   3.810 |  11.58   1.270 |  15.75    .760
                  3.33   1.780 |   7.50   3.050 |  11.67   1.270 |  15.83    .760
                  3.42   1.780 |   7.58   3.050 |  11.75   1.270 |  15.92    .760
                  3.50   1.780 |   7.67   3.050 |  11.83   1.270 |  16.00    .760
                  3.58   1.780 |   7.75   3.050 |  11.92   1.270 |  16.08    .760
                  3.67   1.780 |   7.83   3.050 |  12.00   1.270 |  16.17    .760
                  3.75   1.780 |   7.92   3.050 |  12.08   1.270 |  16.25    .760
                  3.83   1.780 |   8.00   3.050 |  12.17   1.270 |  16.33    .760
                  3.92   1.780 |   8.08   3.050 |  12.25   1.270 |  16.42    .760
                  4.00   1.780 |   8.17   3.050 |  12.33   1.270 |  16.50    .760
                  4.08   1.780 |   8.25   3.050 |  12.42   1.270 |  16.58    .760
                  4.17   1.780 |   8.33   1.780 |  12.50   1.020 |

     Max.eff.Inten.(mm/hr)=      69.60           7.43
                      over (min)        5.00          10.00
     Storage Coeff.  (min)=         .79 (ii)      9.50 (ii)
     Unit Hyd. Tpeak (min)=        5.00          10.00
     Unit Hyd. peak  (cms)=         .34            .12
                                                               *TOTALS*
     PEAK FLOW        (cms)=        .02            .01            .028 (iii)
     TIME TO PEAK     (hrs)=      10.58          10.67          10.583
     RUNOFF VOLUME     (mm)=      48.59           4.96          13.686
     TOTAL RAINFALL    (mm)=      49.39          49.39          49.389
     RUNOFF COEFFICIENT   =         .98            .10            .277
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  38.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0003-------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number      =    1.00
| IN= 1---> OUT= 8 |     Diameter     (mm)=  450.00
| DT=  5.0 min     |     Length        (m)=   45.00
--------------------     Slope       (m/m)= .01100
                         Manning n        =    .025

     <------------------ TRAVEL TIME TABLE ------------------>
       DEPTH       VOLUME     FLOW RATE    VELOCITY    TRAV.TIME
        (m)       (cu.m.)       (cms)        (m/s)        min
        .024     .144E+00       .001         .260        2.89
        .047     .402E+00       .004         .405        1.85
        .071     .725E+00       .008         .522        1.44
        .095     .110E+01       .015         .620        1.21
        .118     .150E+01       .024         .706        1.06
        .142     .194E+01       .034         .781         .96
        .166     .239E+01       .045         .847         .89
        .189     .286E+01       .058         .905         .83
        .213     .334E+01       .071         .956         .78
        .237     .382E+01       .085         .999         .75
        .261     .429E+01       .099        1.036         .72
        .284     .476E+01       .113        1.067         .70
        .308     .522E+01       .126        1.090         .69
        .332     .565E+01       .139        1.106         .68
        .355     .606E+01       .150        1.114         .67
        .379     .643E+01       .159        1.114         .67
        .403     .676E+01       .165        1.102         .68
        .426     .701E+01       .167        1.073         .70
        .450     .716E+01       .156         .979         .77
                                    <---- hydrograph ---->  <-pipe / channel->
                               AREA     QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)     (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 1:600           .58      .028   10.58 13.686     .130       .739
   OUTFLOW: ID= 8:culver        .58      .030   10.58 13.686     .133       .752


---------------------------------------------------------------------------
001:0004-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area     (ha)=      .38
| 02:601    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
---------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=        .08            .30
     Dep. Storage      (mm)=        .80           1.50
     Average Slope      (%)=        .50            .50
     Length             (m)=      50.20          40.00
     Mannings n            =       .013           .250

     Max.eff.Inten.(mm/hr)=      69.60          23.22
                      over (min)        5.00          20.00
     Storage Coeff.  (min)=        2.40 (ii)     21.59 (ii)
     Unit Hyd. Tpeak (min)=        5.00          20.00
     Unit Hyd. peak  (cms)=         .30            .05
                                                               *TOTALS*
     PEAK FLOW        (cms)=        .01            .01            .022 (iii)
     TIME TO PEAK     (hrs)=      10.58          10.83          10.583
     RUNOFF VOLUME     (mm)=      48.59          21.34          26.790
     TOTAL RAINFALL    (mm)=      49.39          49.39          49.389
     RUNOFF COEFFICIENT   =         .98            .43            .542
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  81.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0005-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area     (ha)=     5.50
| 03:602    DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
---------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       2.75           2.75
     Dep. Storage      (mm)=        .80           1.50
     Average Slope      (%)=        .50            .50
     Length             (m)=     191.42          40.00
     Mannings n            =       .013           .250

     Max.eff.Inten.(mm/hr)=      69.60          19.94
                      over (min)        5.00          25.00
     Storage Coeff.  (min)=        5.37 (ii)     25.75 (ii)
     Unit Hyd. Tpeak (min)=        5.00          25.00
     Unit Hyd. peak  (cms)=         .21            .04
                                                               *TOTALS*
     PEAK FLOW        (cms)=        .48            .10            .534 (iii)
     TIME TO PEAK     (hrs)=      10.58          10.92          10.583
     RUNOFF VOLUME     (mm)=      48.59          21.34          34.964
     TOTAL RAINFALL    (mm)=      49.39          49.39          49.389
     RUNOFF COEFFICIENT   =         .98            .43            .708

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  81.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0006-------------------------------------------------------------------
--------------------
| COMPUTE VOLUME     |
| ID:03  (602   )    |                 DISCHARGE       TIME
--------------------                     (cms)        (hrs)
      *** WARNING: No storage required, RelRate > Inflow Qp.
---------------------------------------------------------------------------
001:0007-------------------------------------------------------------------
      FINISH
---------------------------------------------------------------------------
***************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
```

```
00271>  001:0002 DESIGN STANDHYD
00272>       *** WARNING: Storage Coefficient is smaller than DT!
00273>                    Use a smaller DT or a larger area.
00274>  001:0004 DESIGN STANDHYD
00275>       *** WARNING: Storage Coefficient is smaller than DT!
00276>                    Use a smaller DT or a larger area.
00277>  001:0006 COMPUTE VOLUME
00278>       *** WARNING: No storage required, RelRate > Inflow Qp.
00279>    Simulation ended on 2009-05-27     at 19:02:01
00280> ================================================================================
00281>
00282>
```

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

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO       999   999  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9 9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ## 9   9 9   9 Ver. 4.02
     S   W W   M   M  H   H    Y    M   M  O   O      9999  9999 July 1999
 SSSSS   W W   M   M  H   H    Y    M   M   OOO          9     9 =========
                                                     9   9 9   9 # 4377549
       StormWater Management HYdrologic Model         999   999  =========

 *************************************************************************
 *************************** SWMHYMO-99 Ver/4.02 *************************
 *******  A single event and continuous hydrologic simulation model *******
 *******     based on the principles of HYMO and its successors    *******
 *******                OTTHYMO-83 and OTTHYMO-89.                 *******
 *************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.         *******
 *******                  Ottawa,  Ontario: (613) 727-5199          *******
 *******                  Gatineau, Quebec: (819) 243-6858          *******
 *******                  E-Mail: swmhymo@jfsa.Com                  *******
 *************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: Condeland Engineering Limited              +++++++
 +++++++                Toronto              SERIAL#:4377549       +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 *************************************************************************
 *******             ++++++ PROGRAM ARRAY DIMENSIONS ++++++        *******
 *******             Maximum value for ID numbers  :     10        *******
 *******             Hax. number of rainfall points:  15000        *******
 *******             Hax. number of flow points    :  15000        *******
 *************************************************************************


 ********************   D E T A I L E D   O U T P U T   ******************
 *************************************************************************
 *       DATE: 2009-05-27     TIME: 19:03:32     RUN COUNTER: 000036     *
 *************************************************************************
 * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post10yr.dat *
 * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post10yr.out *
 * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post10yr.sum *
 * User comments:                                                        *
 * I:____________________________________________________________________*
 * 2:____________________________________________________________________*
 * 3:____________________________________________________________________*
 *************************************************************************

---------------------------------------------------------------------------
001:0001-------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
*#  Date          : 11-08-2008
*#  Modeller      : [ROBERT DE ANGELIS]
*#  Company       : Condeland Engineering Limited
*#  License #     :  4377549
*#*************************************************************************
--------------------
| START              |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =    .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   1
            #  1=SCS10YR
---------------------------------------------------------------------------
001:0002-------------------------------------------------------------------
--------------------
| READ STORM         |     Filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
| Ptotal=  97.05 mm|     Comments: SCS Storm
--------------------
                  TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                   hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                   .08   1.700 |   6.08   3.009 |  12.08   4.658 |  18.08   2.329
                   .17   1.700 |   6.17   3.009 |  12.17   4.658 |  18.17   2.329
                   .25   1.700 |   6.25   3.009 |  12.25   4.658 |  18.25   2.329
                   .33   1.696 |   6.33   3.009 |  12.33   4.658 |  18.33   2.329
                   .42   1.696 |   6.42   3.009 |  12.42   4.658 |  18.42   2.329
                   .50   1.696 |   6.50   3.009 |  12.50   4.658 |  18.50   2.329
                   .58   1.700 |   6.58   3.009 |  12.58   4.076 |  18.58   2.329
                   .67   1.700 |   6.67   3.009 |  12.67   4.076 |  18.67   2.329
                   .75   1.700 |   6.75   3.009 |  12.75   4.076 |  18.75   2.329
                   .83   1.696 |   6.83   3.009 |  12.83   4.076 |  18.83   2.329
                   .92   1.696 |   6.92   3.009 |  12.92   4.076 |  18.92   2.329
                  1.00   1.696 |   7.00   3.009 |  13.00   4.076 |  19.00   2.329
                  1.08   1.700 |   7.08   3.688 |  13.08   4.076 |  19.08   2.329
                  1.17   1.700 |   7.17   3.688 |  13.17   4.076 |  19.17   2.329
                  1.25   1.700 |   7.25   3.688 |  13.25   4.076 |  19.25   2.329
                  1.33   1.696 |   7.33   3.688 |  13.33   4.076 |  19.33   2.329
                  1.42   1.696 |   7.42   3.688 |  13.42   4.076 |  19.42   2.329
                  1.50   1.696 |   7.50   3.688 |  13.50   4.076 |  19.50   2.329
                  1.58   1.700 |   7.58   3.688 |  13.58   3.688 |  19.58   2.329
                  1.67   1.700 |   7.67   3.688 |  13.67   3.688 |  19.67   2.329
                  1.75   1.700 |   7.75   3.688 |  13.75   3.688 |  19.75   2.329
                  1.83   1.696 |   7.83   3.688 |  13.83   3.688 |  19.83   2.329
                  1.92   1.696 |   7.92   3.688 |  13.92   3.688 |  19.92   2.329
                  2.00   1.696 |   8.00   3.688 |  14.00   3.688 |  20.00   2.329
                  2.08   1.992 |   8.08   4.852 |  14.08   3.059 |  20.08   1.797
                  2.17   1.992 |   8.17   4.852 |  14.17   3.059 |  20.17   1.797
                  2.25   1.992 |   8.25   4.852 |  14.25   3.059 |  20.25   1.797
                  2.33   1.988 |   8.33   4.852 |  14.33   3.055 |  20.33   1.793
                  2.42   1.988 |   8.42   4.852 |  14.42   3.055 |  20.42   1.793
                  2.50   1.988 |   8.50   4.852 |  14.50   3.055 |  20.50   1.793
                  2.58   1.992 |   8.58   6.794 |  14.58   3.059 |  20.58   1.797
                  2.67   1.992 |   8.67   6.794 |  14.67   3.059 |  20.67   1.797
                  2.75   1.992 |   8.75   6.794 |  14.75   3.059 |  20.75   1.797
                  2.83   1.988 |   8.83   6.794 |  14.83   3.055 |  20.83   1.793
                  2.92   1.988 |   8.92   6.794 |  14.92   3.055 |  20.92   1.793
                  3.00   1.988 |   9.00   6.794 |  15.00   3.055 |  21.00   1.793
                  3.08   1.992 |   9.08   9.511 |  15.08   3.059 |  21.08   1.797
                  3.17   1.992 |   9.17   9.511 |  15.17   3.059 |  21.17   1.797
                  3.25   1.992 |   9.25   9.511 |  15.25   3.059 |  21.25   1.797
                  3.33   1.988 |   9.33   9.511 |  15.33   3.055 |  21.33   1.793
                  3.42   1.988 |   9.42   9.511 |  15.42   3.055 |  21.42   1.793
                  3.50   1.988 |   9.50   9.511 |  15.50   3.055 |  21.50   1.793
                  3.58   1.992 |   9.58  22.904 |  15.58   3.059 |  21.58   1.797
                  3.67   1.992 |   9.67  22.904 |  15.67   3.059 |  21.67   1.797
                  3.75   1.992 |   9.75  22.904 |  15.75   3.059 |  21.75   1.797
                  3.83   1.988 |   9.83  59.395 |  15.83   3.055 |  21.83   1.793
                  3.92   1.988 |   9.92  59.395 |  15.92   3.055 |  21.92   1.793
                  4.00   1.988 |  10.00  59.395 |  16.00   3.055 |  22.00   1.793
                  4.08   2.380 |  10.08  13.199 |  16.08   2.329 |  22.08   1.797
                  4.17   2.380 |  10.17  13.199 |  16.17   2.329 |  22.17   1.797
                  4.25   2.380 |  10.25  13.199 |  16.25   2.329 |  22.25   1.797
                  4.33   2.376 |  10.33  13.199 |  16.33   2.329 |  22.33   1.793
                  4.42   2.376 |  10.42  13.199 |  16.42   2.329 |  22.42   1.793
                  4.50   2.376 |  10.50  13.199 |  16.50   2.329 |  22.50   1.793
                  4.58   2.380 |  10.58   7.958 |  16.58   2.329 |  22.58   1.797
                  4.67   2.380 |  10.67   7.958 |  16.67   2.329 |  22.67   1.797
                  4.75   2.380 |  10.75   7.958 |  16.75   2.329 |  22.75   1.797
                  4.83   2.376 |  10.83   7.958 |  16.83   2.329 |  22.83   1.793
                  4.92   2.376 |  10.92   7.958 |  16.92   2.329 |  22.92   1.793
                  5.00   2.376 |  11.00   7.958 |  17.00   2.329 |  23.00   1.793
                  5.08   2.380 |  11.08   5.823 |  17.08   2.329 |  23.08   1.797
                  5.17   2.380 |  11.17   5.823 |  17.17   2.329 |  23.17   1.797
                  5.25   2.380 |  11.25   5.823 |  17.25   2.329 |  23.25   1.797
                  5.33   2.376 |  11.33   5.823 |  17.33   2.329 |  23.33   1.793
                  5.42   2.376 |  11.42   5.823 |  17.42   2.329 |  23.42   1.793
                  5.50   2.376 |  11.50   5.823 |  17.50   2.329 |  23.50   1.793
                  5.58   2.380 |  11.58   5.823 |  17.58   2.329 |  23.58   1.797
                  5.67   2.380 |  11.67   5.823 |  17.67   2.329 |  23.67   1.797
                  5.75   2.380 |  11.75   5.823 |  17.75   2.329 |  23.75   1.797
                  5.83   2.376 |  11.83   5.047 |  17.83   2.329 |  23.83   1.793
                  5.92   2.376 |  11.92   5.047 |  17.92   2.329 |  23.92   1.793
                  6.00   2.376 |  12.00   5.047 |  18.00   2.329 |  24.00   1.793

---------------------------------------------------------------------------
001:0003-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD     |   Area     (ha)=      .58
| 01:600    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=        .12          .46
     Dep. Storage      (mm)=        .80         1.50
     Average Slope      (%)=        .50          .50
     Length             (m)=      62.24        40.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=      59.39         6.06
              over (min)          5.00        35.00
     Storage Coeff.   (min)=      2.91 (ii)   35.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak   (cms)=       .28          .03
                                                              *TOTALS*
     PEAK FLOW        (cms)=       .02          .01             .022 (iii)
     TIME TO PEAK     (hrs)=     10.00        10.50           10.000
     RUNOFF VOLUME     (mm)=     96.25        17.90           33.572
     TOTAL RAINFALL    (mm)=     97.05        97.05           97.050
     RUNOFF COEFFICIENT    =       .99          .18             .346
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  38.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0004-------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number     =     1.00
| IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
| DT=  5.0 min      |     Length       (m)=   45.00
--------------------     Slope      (m/m)= .01100
                         Manning n       =    .025

    <------------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME     FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)       (cms)        (m/s)        min
        .024    .144E+00       .001         .260        2.89
        .047    .402E+00       .004         .405        1.85
        .071    .725E+00       .008         .522        1.44
        .095    .110E+01       .015         .620        1.21
        .118    .150E+01       .024         .706        1.06
        .142    .194E+01       .034         .781         .96
        .166    .239E+01       .045         .847         .89
        .189    .286E+01       .058         .905         .83
        .213    .334E+01       .071         .956         .78
        .237    .382E+01       .085         .999         .75
        .261    .429E+01       .099        1.036         .72
        .284    .476E+01       .113        1.067         .70
        .308    .522E+01       .126        1.090         .69
        .332    .565E+01       .139        1.106         .68
        .355    .606E+01       .150        1.114         .67
        .379    .643E+01       .159        1.114         .67
        .403    .676E+01       .165        1.102         .68
        .426    .701E+01       .167        1.073         .70
        .450    .716E+01       .156         .979         .77
                                    <---- hydrograph ---->  <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 1:600         .58     .022   10.00 33.572      .113      .685
   OUTFLOW: ID= 8:culver      .58     .022    9.92 33.572      .114      .686


---------------------------------------------------------------------------
001:0005-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD     |   Area     (ha)=      .38
| 02:601    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=        .08          .30
     Dep. Storage      (mm)=        .80         1.50
     Average Slope      (%)=        .50          .50
     Length             (m)=      50.20        40.00
     Mannings n            =       .013         .250

     Max.eff.Inten.(mm/hr)=      59.39        32.18
              over (min)          5.00        20.00
     Storage Coeff.   (min)=      2.56 (ii)   19.40 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak   (cms)=       .29          .06
                                                              *TOTALS*
     PEAK FLOW        (cms)=       .01          .02             .026 (iii)
     TIME TO PEAK     (hrs)=     10.00        10.17           10.000
     RUNOFF VOLUME     (mm)=     96.25        58.85           66.332
     TOTAL RAINFALL    (mm)=     97.05        97.05           97.050
     RUNOFF COEFFICIENT    =       .99          .61             .683
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  81.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0006-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD     |   Area     (ha)=     5.50
| 03:602    DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
---------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      2.75         2.75
     Dep. Storage      (mm)=        .80         1.50
     Average Slope      (%)=        .50          .50
     Length             (m)=    191.42        40.00
     Mannings n            =       .013         .250

     Hax.eff.1nten.(mm/hr)=      59.39        28.34
              over (min)          5.00        25.00
     Storage Coeff.   (min)=      5.72 (ii)   23.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak   (cms)=       .20          .05
                                                              *TOTALS*
     PEAK FLOW        (cms)=       .43          .15             .532 (iii)
```

```
00271>      TIME TO PEAK     (hrs)=      10.00        10.25        10.000
00272>      RUNOFF VOLUME     (mm)=      96.25        58.85        77.551
00273>      TOTAL RAINFALL    (mm)=      97.05        97.05        97.050
00274>      RUNOFF COEFFICIENT   =        .99          .61          .799
00275>
00276>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00277>            CN* =  81.0    Ia = Dep. Storage  (Above)
00278>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00279>            THAN THE STORAGE COEFFICIENT.
00280>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00281>
00282> ---------------------------------------------------------------------------
00283> 001:0007----------------------------------------------------------------------
00284> --------------------
00285> | COMPUTE VOLUME   |
00286> | ID:03   (602    )  |              DISCHARGE       TIME
00287> --------------------                 (cms)         (hrs)
00288>       *** WARNING: No storage required, RelRate > Inflow Qp.
00289> ---------------------------------------------------------------------------
00290> 001:0008----------------------------------------------------------------------
00291>       FINISH
00292> ---------------------------------------------------------------------------
00293> ***************************************************************************
00294>      WARNINGS / ERRORS / NOTES
00295>      -------------------------
00296>  001:0003 DESIGN STANDHYD
00297>       *** WARNING: Storage Coefficient is smaller than DT!
00298>                    Use a smaller DT or a larger area.
00299>  001:0005 DESIGN STANDHYD
00300>       *** WARNING: Storage Coefficient is smaller than DT!
00301>                    Use a smaller DT or a larger area.
00302>  001:0007 COMPUTE VOLUME
00303>       *** WARNING: No storage required, RelRate > Inflow Qp.
00304>    Simulation ended on 2009-05-27     at 19:03:33
00305> ===========================================================================
00306>
00307>
```

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

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999   999  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9 9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ## 9   9 9   9 Ver. 4.02
     S   W W   M   M  H   H    Y    M   M  O   O      9999  9999 July 1999
 SSSSS   W W   M   M  H   H    Y    M   M   OOO          9     9 =========
                                                     9   9 9   9 # 4377549
      StormWater Management HYdrologic Model          999   999  =========

 *************************************************************************
 ************************* SWMHYMO-99 Ver/4.02 ***************************
 *******  A single event and continuous hydrologic simulation model *******
 *******     based on the principles of HYMO and its successors     *******
 *******                  OTTHYMO-83 and OTTHYMO-89.                *******
 *************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                  Ottawa,  Ontario: (613) 727-5199          *******
 *******                  Gatineau, Quebec: (819) 243-6858          *******
 *******                  E-Mail: swmhymo@jfsa.Com                  *******
 *************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: Condeland Engineering Limited              +++++++
 +++++++                Toronto               SERIAL#:4377549      +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 *************************************************************************
 *******              ++++++ PROGRAM ARRAY DIMENSIONS ++++++         *******
 *******              Maximum value for ID numbers  :     10         *******
 *******              Max. number of rainfall points:  15000         *******
 *******              Max. number of flow points    :  15000         *******
 *************************************************************************


 *******************   D E T A I L E D   O U T P U T   *******************
 *************************************************************************
 *       DATE: 2009-05-27     TIME: 19:11:20     RUN COUNTER: 000038     *
 *************************************************************************
 * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post25yr.dat  *
 * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post25yr.out  *
 * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post25yr.sum  *
 * User comments:                                                          *
 * 1:______________________________________________________________________*
 * 2:______________________________________________________________________*
 * 3:______________________________________________________________________*
 *************************************************************************

--------------------------------------------------------------------------------
001:0001------------------------------------------------------------------------
*#*******************************************************************************
*#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
*#  Date          : 11-08-2008
*#  Modeller      : [ROBERT DE ANGELIS]
*#  Company       : Condeland Engineering Limited
*#  License #     :  4377549
*#*******************************************************************************
--------------------
| START              |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on         0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
--------------------------------------------------------------------------------
001:0002------------------------------------------------------------------------
----------------------
| DESIGN STANDHYD     |   Area    (ha)=     .58
| 01:600    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
----------------------
                                  IMPERVIOUS    PERVIOUS (i)
     Surface Area       (ha)=         .12          .46
     Dep. Storage       (mm)=         .80         1.50
     Average Slope       (%)=       42.68        42.68
     Length              (m)=       62.24        40.00
     Mannings n             =        .013         .250

                                    New rainfall entered directly by user.
                                    TIME STEP= 5.00 min   # of STEPS= 199
                                    DURATION =16.58 hrs   TOTAL RAIN=  76.39 mm

                    TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                     hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                     .08   2.030 |   4.25   2.790 |   8.42   2.790 |  12.58   1.520
                     .17   2.030 |   4.33   2.790 |   8.50   2.790 |  12.67   1.520
                     .25   2.030 |   4.42   2.790 |   8.58   2.790 |  12.75   1.520
                     .33   2.030 |   4.50   2.790 |   8.67   2.790 |  12.83   1.520
                     .42   2.030 |   4.58   2.790 |   8.75   2.790 |  12.92   1.520
                     .50   2.030 |   4.67   2.790 |   8.83   2.790 |  13.00   1.520
                     .58   2.030 |   4.75   2.790 |   8.92   2.790 |  13.08   1.520
                     .67   2.030 |   4.83   2.790 |   9.00   2.790 |  13.17   1.520
                     .75   2.030 |   4.92   2.790 |   9.08   2.790 |  13.25   1.520
                     .83   2.030 |   5.00   5.080 |   9.17   2.790 |  13.33   1.520
                     .92   2.030 |   5.08   5.080 |   9.25   2.790 |  13.42   1.520
                    1.00   2.030 |   5.17   5.080 |   9.33   2.790 |  13.50   1.520
                    1.08   2.030 |   5.25   5.080 |   9.42   2.790 |  13.58   1.520
                    1.17   2.030 |   5.33   5.080 |   9.50   2.790 |  13.67   1.520
                    1.25   2.030 |   5.42   5.080 |   9.58   2.790 |  13.75   1.520
                    1.33   2.030 |   5.50   5.080 |   9.67   2.790 |  13.83   1.520
                    1.42   2.030 |   5.58   5.080 |   9.75   2.790 |  13.92   1.520
                    1.50   2.030 |   5.67   5.080 |   9.83   2.790 |  14.00   1.520
                    1.58   2.030 |   5.75   5.080 |   9.92   2.790 |  14.08   1.520
                    1.67   2.030 |   5.83   7.110 |  10.00   2.030 |  14.17   1.020
                    1.75   2.030 |   5.92   7.110 |  10.08   2.030 |  14.25   1.020
                    1.83   2.030 |   6.00  10.410 |  10.17   2.030 |  14.33   1.020
                    1.92   2.030 |   6.08  10.410 |  10.25   2.030 |  14.42   1.020
                    2.00   2.030 |   6.17  23.370 |  10.33   2.030 |  14.50   1.020
                    2.08   2.030 |   6.25  23.370 |  10.42   2.030 |  14.58   1.020
                    2.17   2.030 |   6.33  51.560 |  10.50   2.030 |  14.67   1.020
                    2.25   2.030 |   6.42  51.560 |  10.58   2.030 |  14.75   1.020
                    2.33   2.030 |   6.50 107.440 |  10.67   2.030 |  14.83   1.020
                    2.42   2.030 |   6.58 107.440 |  10.75   2.030 |  14.92   1.020
                    2.50   2.030 |   6.67  18.800 |  10.83   2.030 |  15.00   1.020
                    2.58   2.030 |   6.75  18.800 |  10.92   2.030 |  15.08   1.020
                    2.67   2.030 |   6.83  11.680 |  11.00   2.030 |  15.17   1.020
                    2.75   2.030 |   6.92  11.680 |  11.08   2.030 |  15.25   1.020
                    2.83   2.030 |   7.00   8.380 |  11.17   2.030 |  15.33   1.020
                    2.92   2.030 |   7.08   8.380 |  11.25   2.030 |  15.42   1.020
                    3.00   2.030 |   7.17   8.130 |  11.33   2.030 |  15.50   1.020
                    3.08   2.030 |   7.25   8.130 |  11.42   2.030 |  15.58   1.020
                    3.17   2.030 |   7.33   5.590 |  11.50   2.030 |  15.67   1.020
                    3.25   2.030 |   7.42   5.590 |  11.58   2.030 |  15.75   1.020
                    3.33   2.790 |   7.50   4.830 |  11.67   2.030 |  15.83   1.020
                    3.42   2.790 |   7.58   4.830 |  11.75   2.030 |  15.92   1.020
                    3.50   2.790 |   7.67   4.830 |  11.83   2.030 |  16.00   1.020
                    3.58   2.790 |   7.75   4.830 |  11.92   2.030 |  16.08   1.020
                    3.67   2.790 |   7.83   4.830 |  12.00   2.030 |  16.17   1.020
                    3.75   2.790 |   7.92   4.830 |  12.08   2.030 |  16.25   1.020
                    3.83   2.790 |   8.00   4.830 |  12.17   2.030 |  16.33   1.020
                    3.92   2.790 |   8.08   4.830 |  12.25   2.030 |  16.42   1.020
                    4.00   2.790 |   8.17   4.830 |  12.33   2.030 |  16.50   1.020
                    4.08   2.790 |   8.25   4.830 |  12.42   2.030 |  16.58   1.020
                    4.17   2.790 |   8.33   2.790 |  12.50   1.520 |

     Max.eff.Inten.(mm/hr)=      107.44         19.17
                over (min)        5.00          5.00
     Storage Coeff.  (min)=        .61 (ii)     6.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00          5.00
     Unit Hyd. peak  (cms)=        .34           .19
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .03           .02             .055 (iii)
     TIME TO PEAK    (hrs)=      10.58         10.58           10.583
     RUNOFF VOLUME    (mm)=      75.59         11.46           24.289
     TOTAL RAINFALL   (mm)=      76.39         76.39           76.392
     RUNOFF COEFFICIENT   =        .99           .15             .318
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  38.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0003------------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number     =     1.00
| IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
| DT=  5.0 min     |     Length       (m)=   45.00
--------------------     Slope      (m/m)= .01100
                         Manning n       =    .025

     <------------------- TRAVEL TIME TABLE ------------------->
       DEPTH       VOLUME      FLOW RATE    VELOCITY    TRAV.TIME
        (m)        (cu.m.)       (cms)        (m/s)        min
       .024      .144E+00       .001         .260         2.89
       .D47      .402E+00       .004         .405         1.85
       .071      .725E+00       .008         .522         1.44
       .095      .110E+01       .015         .620         1.21
       .118      .150E+01       .024         .706         1.06
       .142      .194E+01       .034         .781          .96
       .166      .239E+01       .045         .847          .89
       .189      .286E+01       .058         .905          .83
       .213      .334E+01       .071         .956          .78
       .237      .382E+01       .085         .999          .75
       .261      .429E+01       .099        1.036          .72
       .284      .476E+01       .113        1.067          .70
       .308      .522E+01       .126        1.090          .69
       .332      .565E+01       .139        1.106          .68
       .355      .606E+01       .150        1.114          .67
       .379      .643E+01       .159        1.114          .67
       .403      .676E+01       .165        1.102          .68
       .426      .701E+01       .167        1.073          .70
       .450      .716E+01       .156         .979          .77
                                     <---- hydrograph ---->   <-pipe / channel->
                               AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 1:600          .58     .055   10.58 24.289      .184      .892
   OUTFLOW: ID= 8:culver       .58     .058   10.58 24.289      .190      .907


--------------------------------------------------------------------------------
001:0004------------------------------------------------------------------------
----------------------
| DESIGN STANDHYD     |   Area    (ha)=     .38
| 02:601    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
----------------------
                                  IMPERVIOUS    PERVIOUS (i)
     Surface Area       (ha)=         .08          .30
     Dep. Storage       (mm)=         .80         1.50
     Average Slope       (%)=         .50          .50
     Length              (m)=       50.20        40.00
     Mannings n             =        .013         .250

     Max.eff.Inten.(mm/hr)=      107.44         53.97
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       2.02 (ii)    15.71 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .31           .07
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .02           .03             .045 (iii)
     TIME TO PEAK    (hrs)=      10.58         10.75           10.583
     RUNOFF VOLUME    (mm)=      75.59         41.71           48.487
     TOTAL RAINFALL   (mm)=      76.39         76.39           76.392
     RUNOFF COEFFICIENT   =        .99           .55             .635
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  81.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0005------------------------------------------------------------------------
----------------------
| DESIGN STANDHYD     |   Area    (ha)=    5.50
| 03:602    DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
----------------------
                                  IMPERVIOUS    PERVIOUS (i)
     Surface Area       (ha)=        2.75         2.75
     Dep. Storage       (mm)=         .80         1.50
     Average Slope       (%)=         .50          .50
     Length              (m)=      191.42        40.00
     Mannings n             =        .013         .250

     Max.eff.Inten.(mm/hr)=      107.44         46.65
                over (min)        5.00         20.00
     Storage Coeff.  (min)=       4.51 (ii)    19.02 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .23           .06
                                                              *TOTALS*
     PEAK FLOW       (cms)=        .77           .23             .920 (iii)
     TIME TO PEAK    (hrs)=      10.58         10.83           10.583
     RUNOFF VOLUME    (mm)=      75.59         41.71           58.651
     TOTAL RAINFALL   (mm)=      76.39         76.39           76.392
     RUNOFF COEFFICIENT   =        .99           .55             .768
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  81.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
001:0006------------------------------------------------------------------------
--------------------
| COMPUTE VOLUME    |
| ID:03  (602   )  |                 DISCHARGE      TIME
--------------------                   (cms)        (hrs)
      *** WARNING: No storage required, RelRate > Inflow Qp.
--------------------------------------------------------------------------------
001:0007------------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
*********************************************************************************
```

```
00271>      WARNINGS / ERRORS / NOTES
00272>      -------------------------
00273>  001:0002 DESIGN STANDHYD
00274>       *** WARNING: Storage Coefficient is smaller than DT!
00275>                    Use a smaller DT or a larger area.
00276>  001:0004 DESIGN STANDHYD
00277>       *** WARNING: Storage Coefficient is smaller than DT!
00278>                    Use a smaller DT or a larger area.
00279>  001:0005 DESIGN STANDHYD
00280>       *** WARNING: Storage Coefficient is smaller than DT!
00281>                    Use a smaller DT or a larger area.
00282>  001:0006 COMPUTE VOLUME
00283>       *** WARNING: No storage required, RelRate > Inflow Qp.
00284>    Simulation ended on 2009-05-27     at 19:11:21
00285> ================================================================================
00286>
00287>
```

```
==========================================================================
SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
    S   W W   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
                                                     9   9  9   9 # 4377549
     StormWater Management HYdrologic Model           999    999  =========
*************************************************************************
************************** SWMHYMO-99 Ver/4.02 **************************
*******  A single event and continuous hydrologic simulation model  *******
*******     based on the principles of HYMO and its successors      *******
*******                  OTTHYMO-83 and OTTHYMO-89.                 *******
*************************************************************************
******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
*******                  Ottawa,  Ontario: (613) 727-5199            *******
*******                  Gatineau, Quebec: (819) 243-6858            *******
*******                  E-Mail: swmhymo@jfsa.Com                    *******
*************************************************************************
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++ Licensed user: Condeland Engineering Limited                 +++++++
+++++++                Toronto               SERIAL#:4377549         +++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
*************************************************************************
*******            ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *******
*******            Maximum value for ID numbers  :    10             *******
*******            Max. number of rainfall points:  15000            *******
*******            Max. number of flow points    :  15000            *******
*************************************************************************
********************   D E T A I L E D   O U T P U T   ********************
*************************************************************************
*       DATE: 2009-05-27     TIME: 19:26:51     RUN COUNTER: 000040       *
*************************************************************************
* Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post50yr.dat  *
* Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post50yr.out  *
* Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post50yr.sum  *
* User comments:                                                          *
* 1:______________________________________________________________________*
* 2:______________________________________________________________________*
* 3:______________________________________________________________________*
*************************************************************************
---------------------------------------------------------------------------
001:0001-------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
*#  Date        : 11-08-2008
*#  Modeller    : [ROBERT DE ANGELIS]
*#  Company     : Condeland Engineering Limited
*#  License #   :  4377549
*#*************************************************************************
--------------------
| START              |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
---------------------------------------------------------------------------
001:0002-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area     (ha)=      .58
| 01:600     DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
---------------------
                                 IMPERVIOUS    PERVIOUS (i)
     Surface Area       (ha)=          .12          .46
     Dep. Storage       (mm)=          .80         1.50
     Average Slope       (%)=        49.10        49.10
     Length              (m)=        62.24        40.00
     Mannings n             =         .013         .250

                                  New rainfall entered directly by user.
                                  TIME STEP= 5.00 min   # of STEPS= 199
                                  DURATION =16.58 hrs   TOTAL RAIN=  82.35 mm

              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .08   2.120 |   4.25   3.050 |   8.42   3.050 |  12.58   1.650
               .17   2.120 |   4.33   3.050 |   8.50   3.050 |  12.67   1.650
               .25   2.120 |   4.42   3.050 |   8.58   3.050 |  12.75   1.650
               .33   2.120 |   4.50   3.050 |   8.67   3.050 |  12.83   1.650
               .42   2.120 |   4.58   3.050 |   8.75   3.050 |  12.92   1.650
               .50   2.120 |   4.67   3.050 |   8.83   3.050 |  13.00   1.650
               .58   2.120 |   4.75   3.050 |   8.92   3.050 |  13.08   1.650
               .67   2.120 |   4.83   3.050 |   9.00   3.050 |  13.17   1.650
               .75   2.120 |   4.92   3.050 |   9.08   3.050 |  13.25   1.650
               .83   2.120 |   5.00   5.640 |   9.17   3.050 |  13.33   1.650
               .92   2.120 |   5.08   5.640 |   9.25   3.050 |  13.42   1.650
              1.00   2.120 |   5.17   5.640 |   9.33   3.050 |  13.50   1.650
              1.08   2.120 |   5.25   5.640 |   9.42   3.050 |  13.58   1.650
              1.17   2.120 |   5.33   5.640 |   9.50   3.050 |  13.67   1.650
              1.25   2.120 |   5.42   5.640 |   9.58   3.050 |  13.75   1.650
              1.33   2.120 |   5.50   5.640 |   9.67   3.050 |  13.83   1.650
              1.42   2.120 |   5.58   5.640 |   9.75   3.050 |  13.92   1.650
              1.50   2.120 |   5.67   5.640 |   9.83   3.050 |  14.00   1.650
              1.58   2.120 |   5.75   5.640 |   9.92   3.050 |  14.08   1.650
              1.67   2.120 |   5.83   7.520 |  10.00   2.120 |  14.17   1.170
              1.75   2.120 |   5.92   7.520 |  10.08   2.120 |  14.25   1.170
              1.83   2.120 |   6.00  11.040 |  10.17   2.120 |  14.33   1.170
              1.92   2.120 |   6.08  11.020 |  10.25   2.120 |  14.42   1.170
              2.00   2.120 |   6.17  25.370 |  10.33   2.120 |  14.50   1.170
              2.08   2.120 |   6.25  25.370 |  10.42   2.120 |  14.58   1.170
              2.17   2.120 |   6.33  55.440 |  10.50   2.120 |  14.67   1.170
              2.25   2.120 |   6.42  55.440 |  10.58   2.120 |  14.75   1.170
              2.33   2.120 |   6.50 116.060 |  10.67   2.120 |  14.83   1.170
              2.42   2.120 |   6.58 116.060 |  10.75   2.120 |  14.92   1.170
              2.50   2.120 |   6.67  19.870 |  10.83   2.120 |  15.00   1.170
              2.58   2.120 |   6.75  19.870 |  10.92   2.120 |  15.08   1.170
              2.67   2.120 |   6.83  12.690 |  11.00   2.120 |  15.17   1.170
              2.75   2.120 |   6.92  12.690 |  11.08   2.120 |  15.25   1.170
              2.83   2.120 |   7.00   9.170 |  11.17   2.120 |  15.33   1.170
              2.92   2.120 |   7.08   9.170 |  11.25   2.120 |  15.42   1.170
              3.00   2.120 |   7.17   8.690 |  11.33   2.120 |  15.50   1.170
              3.08   2.120 |   7.25   8.690 |  11.42   2.120 |  15.58   1.170
              3.17   2.120 |   7.33   6.100 |  11.50   2.120 |  15.67   1.170
              3.25   2.120 |   7.42   6.100 |  11.58   2.120 |  15.75   1.170
              3.33   3.050 |   7.50   5.170 |  11.67   2.120 |  15.83   1.170
              3.42   3.050 |   7.58   5.170 |  11.75   2.120 |  15.92   1.170
              3.50   3.050 |   7.67   5.170 |  11.83   2.120 |  16.00   1.170
              3.58   3.050 |   7.75   5.170 |  11.92   2.120 |  16.08   1.170
              3.67   3.050 |   7.83   5.170 |  12.00   2.120 |  16.17   1.170
              3.75   3.050 |   7.92   5.170 |  12.08   2.120 |  16.25   1.170
              3.83   3.050 |   8.00   5.170 |  12.17   2.120 |  16.33   1.170
              3.92   3.050 |   8.08   5.170 |  12.25   2.120 |  16.42   1.170
              4.00   3.050 |   8.17   5.170 |  12.33   2.120 |  16.50   1.170
              4.08   3.050 |   8.25   5.170 |  12.42   2.120 |  16.58   1.000
              4.17   3.050 |   8.33   3.050 |  12.50   1.650 |

     Max.eff.Inten.(mm/hr)=      116.06        22.12
               over (min)         5.00         5.00
     Storage Coeff.  (min)=        .56 (ii)     5.50 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=        .34          .20
                                                             *TOTALS*
     PEAK FLOW        (cms)=        .04          .02            .061 (iii)
     TIME TO PEAK     (hrs)=      10.58        10.58          10.583
     RUNOFF VOLUME     (mm)=      81.55        13.20          26.868
     TOTAL RAINFALL    (mm)=      82.35        82.35          82.349
     RUNOFF COEFFICIENT   =         .99          .16            .326
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  38.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0003-------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number      =     1.00
| IN= 1---> OUT= 8 |     Diameter     (mm)=   450.00
| DT=  5.0 min     |     Length        (m)=    45.00
--------------------     Slope       (m/m)=   .01100
                         Manning n        =     .025

     <------------------ TRAVEL TIME TABLE ------------------>
       DEPTH      VOLUME     FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)      (cms)        (m/s)         min
        .024    .144E+00      .001         .260          2.89
        .047    .402E+00      .004         .405          1.85
        .071    .725E+00      .008         .522          1.44
        .095    .110E+01      .015         .620          1.21
        .118    .150E+01      .024         .706          1.06
        .142    .194E+01      .034         .781           .96
        .166    .239E+01      .045         .847           .89
        .189    .286E+01      .058         .905           .83
        .213    .334E+01      .071         .956           .78
        .237    .382E+01      .085         .999           .75
        .261    .429E+01      .099        1.036           .72
        .284    .476E+01      .113        1.067           .70
        .308    .522E+01      .126        1.090           .69
        .332    .565E+01      .139        1.106           .68
        .355    .606E+01      .150        1.114           .67
        .379    .643E+01      .159        1.114           .67
        .403    .676E+01      .165        1.102           .68
        .426    .701E+01      .167        1.073           .70
        .450    .716E+01      .156         .979           .77
                                  <---- hydrograph ---->  <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.  MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)     (m)      (m/s)
     INFLOW : ID= 1:600      .58     .061   10.58 26.868     .196      .919
     OUTFLOW: ID= 8:culver   .58     .065   10.58 26.868     .203      .933

---------------------------------------------------------------------------
001:0004-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area     (ha)=      .38
| 02:601     DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
---------------------
                                 IMPERVIOUS    PERVIOUS (i)
     Surface Area       (ha)=          .08          .30
     Dep. Storage       (mm)=          .80         1.50
     Average Slope       (%)=          .50          .50
     Length              (m)=        50.20        40.00
     Mannings n             =         .013         .250

     Max.eff.Inten.(mm/hr)=      116.06        60.38
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       1.96 (ii)    15.05 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .31          .07
                                                             *TOTALS*
     PEAK FLOW        (cms)=        .02          .03            .050 (iii)
     TIME TO PEAK     (hrs)=      10.58        10.75          10.583
     RUNOFF VOLUME     (mm)=      81.55        46.55          53.548
     TOTAL RAINFALL    (mm)=      82.35        82.35          82.349
     RUNOFF COEFFICIENT   =         .99          .57            .650
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  81.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0005-------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |   Area     (ha)=     5.50
| 03:602     DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
---------------------
                                 IMPERVIOUS    PERVIOUS (i)
     Surface Area       (ha)=         2.75         2.75
     Dep. Storage       (mm)=          .80         1.50
     Average Slope       (%)=          .50          .50
     Length              (m)=       191.42        40.00
     Mannings n             =         .013         .250

     Max.eff.Inten.(mm/hr)=      116.06        52.23
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       4.37 (ii)    18.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .23          .06
                                                             *TOTALS*
     PEAK FLOW        (cms)=        .84          .26           1.008 (iii)
     TIME TO PEAK     (hrs)=      10.58        10.75          10.583
     RUNOFF VOLUME     (mm)=      81.55        46.55          64.048
     TOTAL RAINFALL    (mm)=      82.35        82.35          82.349
     RUNOFF COEFFICIENT   =         .99          .57            .778
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  81.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0006-------------------------------------------------------------------
--------------------
| COMPUTE VOLUME     |
| ID:03  (602   )    |                DISCHARGE      TIME
--------------------                    (cms)        (hrs)
            START CONTROLLING AT          .467       10.416
            INFLOW HYD. PEAKS AT         1.008       10.583
            STOP  CONTROLLING AT          .934       10.598

            REQUIRED STORAGE VOLUME (ha.m.)=     .0081
            TOTAL HYDROGRAPH VOLUME (ha.m.)=     .3520
```

```
00271>            % OF HYDROGRAPH TO STORE       =   2.2931
00272>
00273>            NOTE:  Storage was computed to reduce the Inflow
00274>                   peak to     .934  (cms).
00275>
00276> ------------------------------------------------------------------------------
00277> 001:0007----------------------------------------------------------------------
00278>       FINISH
00279> ------------------------------------------------------------------------------
00280> ******************************************************************************
00281>      WARNINGS / ERRORS / NOTES
00282>      -------------------------
00283>  001:0002 DESIGN STANDHYD
00284>       *** WARNING: Storage Coefficient is smaller than DT!
00285>                    Use a smaller DT or a larger area.
00286>  001:0004 DESIGN STANDHYD
00287>       *** WARNING: Storage Coefficient is smaller than DT!
00288>                    Use a smaller DT or a larger area.
00289>  001:0005 DESIGN STANDHYD
00290>       *** WARNING: Storage Coefficient is smaller than DT!
00291>                    Use a smaller DT or a larger area.
00292>    Simulation ended on 2009-05-27     at 19:26:51
00293> ==============================================================================
00294>
00295>
```

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

SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
    S   W W   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
                                                     9   9  9   9 # 4377549
     StormWater Management HYdrologic Model           999    999  =========

**************************************************************************
************************* SWMHYMO-99 Ver/4.02 ****************************
*******  A single event and continuous hydrologic simulation model  *******
*******      based on the principles of HYMO and its successors     *******
*******                OTTHYMO-83 and OTTHYMO-89.                   *******
**************************************************************************
******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
*******                  Ottawa, Ontario: (613) 727-5199            *******
*******                  Gatineau, Quebec: (819) 243-6858           *******
*******                  E-Mail: swmhymo@jfsa.Com                   *******
**************************************************************************

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++ Licensed user: Condeland Engineering Limited                +++++++
+++++++                  Toronto                SERIAL#:4377549    +++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

**************************************************************************
*******             ++++++ PROGRAM ARRAY DIMENSIONS ++++++          *******
*******             Maximum value for ID numbers  :     10          *******
*******             Max. number of rainfall points:  15000          *******
*******             Max. number of flow points    :  15000          *******
**************************************************************************


*******************    D E T A I L E D   O U T P U T    ******************
**************************************************************************
*        DATE: 2009-05-27      TIME: 16:06:18      RUN COUNTER: 000031   *
**************************************************************************
* Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post100y.dat  *
* Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post100y.out  *
* Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post100y.sum  *
* User comments:                                                          *
* 1:______________________________________________________________________*
* 2:______________________________________________________________________*
* 3:______________________________________________________________________*
**************************************************************************

----------------------------------------------------------------------------
001:0001--------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [214925 ONTARIO LIMITED]     Project Number: [09-015]
*#  Date        : 11-08-2008
*#  Modeller    : [ROBERT DE ANGELIS]
*#  Company     : Condeland Engineering Limited
*#  License #   :  4377549
*#**************************************************************************
--------------------
| START              |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
--------------------    Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
    TZERO =  4.00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
----------------------------------------------------------------------------
001:0002--------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |    Area     (ha)=      .58
| 01:600    DT= 5.00 |    Total Imp(%)=    20.00   Dir. Conn.(%)=    20.00
---------------------
                                  IMPERVIOUS     PERVIOUS (i)
     Surface Area      (ha)=          .12           .46
     Dep. Storage      (mm)=          .80          1.50
     Average Slope      (%)=        53.09         53.09
     Length             (m)=        62.24         40.00
     Mannings n            =         .013          .250

                                  New rainfall entered directly by user.
                                  TIME STEP= 5.00 min    # of STEPS= 199
                                  DURATION =16.58 hrs    TOTAL RAIN=  89.06 mm

                TIME     RAIN |  TIME     RAIN |  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr
                 .08    2.290 |  4.25    3.300 |  8.42    3.300 | 12.58    1.780
                 .17    2.290 |  4.33    3.300 |  8.50    3.300 | 12.67    1.780
                 .25    2.290 |  4.42    3.300 |  8.58    3.300 | 12.75    1.780
                 .33    2.290 |  4.50    3.300 |  8.67    3.300 | 12.83    1.780
                 .42    2.290 |  4.58    3.300 |  8.75    3.300 | 12.92    1.780
                 .50    2.290 |  4.67    3.300 |  8.83    3.300 | 13.00    1.780
                 .58    2.290 |  4.75    3.300 |  8.92    3.300 | 13.08    1.780
                 .67    2.290 |  4.83    3.300 |  9.00    3.300 | 13.17    1.780
                 .75    2.290 |  4.92    3.300 |  9.08    3.300 | 13.25    1.780
                 .83    2.290 |  5.00    6.100 |  9.17    3.300 | 13.33    1.780
                 .92    2.290 |  5.08    6.100 |  9.25    3.300 | 13.42    1.780
                1.00    2.290 |  5.17    6.100 |  9.33    3.300 | 13.50    1.780
                1.08    2.290 |  5.25    6.100 |  9.42    3.300 | 13.58    1.780
                1.17    2.290 |  5.33    6.100 |  9.50    3.300 | 13.67    1.780
                1.25    2.290 |  5.42    6.100 |  9.58    3.300 | 13.75    1.780
                1.33    2.290 |  5.50    6.100 |  9.67    3.300 | 13.83    1.780
                1.42    2.290 |  5.58    6.100 |  9.75    3.300 | 13.92    1.780
                1.50    2.290 |  5.67    6.100 |  9.83    3.300 | 14.00    1.780
                1.58    2.290 |  5.75    6.100 |  9.92    3.300 | 14.08    1.780
                1.67    2.290 |  5.83    8.130 | 10.00    2.290 | 14.17    1.270
                1.75    2.290 |  5.92    8.130 | 10.08    2.290 | 14.25    1.270
                1.83    2.290 |  6.00   11.940 | 10.17    2.290 | 14.33    1.270
                1.92    2.290 |  6.08   11.940 | 10.25    2.290 | 14.42    1.270
                2.00    2.290 |  6.17   27.430 | 10.33    2.290 | 14.50    1.270
                2.08    2.290 |  6.25   27.430 | 10.42    2.290 | 14.58    1.270
                2.17    2.290 |  6.33   59.940 | 10.50    2.290 | 14.67    1.270
                2.25    2.290 |  6.42   59.940 | 10.58    2.290 | 14.75    1.270
                2.33    2.290 |  6.50  125.480 | 10.67    2.290 | 14.83    1.270
                2.42    2.290 |  6.58  125.480 | 10.75    2.290 | 14.92    1.270
                2.50    2.290 |  6.67   21.480 | 10.83    2.290 | 15.00    1.270
                2.58    2.290 |  6.75   21.480 | 10.92    2.290 | 15.08    1.270
                2.67    2.290 |  6.83   13.720 | 11.00    2.290 | 15.17    1.270
                2.75    2.290 |  6.92   13.720 | 11.08    2.290 | 15.25    1.270
                2.83    2.290 |  7.00    9.910 | 11.17    2.290 | 15.33    1.270
                2.92    2.290 |  7.08    9.910 | 11.25    2.290 | 15.42    1.270
                3.00    2.290 |  7.17    9.400 | 11.33    2.290 | 15.50    1.270
                3.08    2.290 |  7.25    9.400 | 11.42    2.290 | 15.58    1.270
                3.17    2.290 |  7.33    6.600 | 11.50    2.290 | 15.67    1.270
                3.25    2.290 |  7.42    6.600 | 11.58    2.290 | 15.75    1.270
                3.33    3.300 |  7.50    5.590 | 11.67    2.290 | 15.83    1.270
                3.42    3.300 |  7.58    5.590 | 11.75    2.290 | 15.92    1.270
                3.50    3.300 |  7.67    5.590 | 11.83    2.290 | 16.00    1.270
                3.58    3.300 |  7.75    5.590 | 11.92    2.290 | 16.08    1.270
                3.67    3.300 |  7.83    5.590 | 12.00    2.290 | 16.17    1.270
                3.75    3.300 |  7.92    5.590 | 12.08    2.290 | 16.25    1.270
                3.83    3.300 |  8.00    5.590 | 12.17    2.290 | 16.33    1.270
                3.92    3.300 |  8.08    5.590 | 12.25    2.290 | 16.42    1.270
                4.00    3.300 |  8.17    5.590 | 12.33    2.290 | 16.50    1.270
                4.08    3.300 |  8.25    5.590 | 12.42    2.290 | 16.58    1.270
                4.17    3.300 |  8.33    3.300 | 12.50    1.780 |

     Max.eff.Inten.(mm/hr)=      125.48          25.60
                      over (min)      5.00            5.00
     Storage Coeff.  (min)=         .53 (ii)        5.08 (ii)
     Unit Hyd. Tpeak (min)=        5.00            5.00
     Unit Hyd. peak  (cms)=         .34             .21
                                                              *TOTALS*
     PEAK FLOW       (cms)=         .04             .03         .069 (iii)
     TIME TO PEAK    (hrs)=       10.58           10.58       10.583
     RUNOFF VOLUME    (mm)=       88.26           15.27       29.868
     TOTAL RAINFALL   (mm)=       89.06           89.06       89.056
     RUNOFF COEFFICIENT   =         .99             .17         .335
     *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN* =  38.0    Ia = Dep. Storage  (Above)
    (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
         THAN THE STORAGE COEFFICIENT.
   (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
001:0003--------------------------------------------------------------------
--------------------
| ROUTE PIPE culver|     PIPE Number      =     1.00
| IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
| DT=  5.0 min     |     Length       (m)=   45.00
--------------------     Slope      (m/m)= .01100
                         Manning n        =    .025

     <------------------ TRAVEL TIME TABLE ------------------>
       DEPTH      VOLUME     FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)       (cms)        (m/s)        min
       .024     .144E+00       .001         .260        2.89
       .047     .402E+00       .004         .405        1.85
       .071     .725E+00       .008         .522        1.44
       .095     .110E+01       .015         .620        1.21
       .118     .150E+01       .024         .706        1.06
       .142     .194E+01       .034         .781         .96
       .166     .239E+01       .045         .847         .89
       .189     .286E+01       .058         .905         .83
       .213     .334E+01       .071         .956         .78
       .237     .382E+01       .085         .999         .75
       .261     .429E+01       .099        1.036         .72
       .284     .476E+01       .113        1.067         .70
       .308     .522E+01       .126        1.090         .69
       .332     .565E+01       .139        1.106         .68
       .355     .606E+01       .150        1.114         .67
       .379     .643E+01       .159        1.114         .67
       .403     .676E+01       .165        1.102         .68
       .426     .701E+01       .167        1.073         .70
       .450     .716E+01       .156         .979         .77
                                     <---- hydrograph ---->  <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
    INFLOW : ID= 1:600         .58     .069   10.58 29.868      .209      .947
    OUTFLOW: ID= 8:culver      .58     .073   10.58 29.868      .217      .962



----------------------------------------------------------------------------
001:0004--------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |    Area     (ha)=      .38
| 02:601    DT= 5.00 |    Total Imp(%)=    20.00   Dir. Conn.(%)=    20.00
---------------------
                                  IMPERVIOUS     PERVIOUS (i)
     Surface Area      (ha)=          .08           .30
     Dep. Storage      (mm)=          .80          1.50
     Average Slope      (%)=          .50           .50
     Length             (m)=        50.20         40.00
     Mannings n            =         .013          .250

     Max.eff.Inten.(mm/hr)=      125.48          67.67
                      over (min)      5.00           15.00
     Storage Coeff.  (min)=        1.90 (ii)       14.41 (ii)
     Unit Hyd. Tpeak (min)=        5.00           15.00
     Unit Hyd. peak  (cms)=         .32             .08
                                                              *TOTALS*
     PEAK FLOW       (cms)=         .03             .04         .056 (iii)
     TIME TO PEAK    (hrs)=       10.58           10.75       10.583
     RUNOFF VOLUME    (mm)=       88.26           52.10       59.332
     TOTAL RAINFALL   (mm)=       89.06           89.06       89.056
     RUNOFF COEFFICIENT   =         .99             .59         .666
     *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN* =  81.0    Ia = Dep. Storage  (Above)
    (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
         THAN THE STORAGE COEFFICIENT.
   (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
001:0005--------------------------------------------------------------------
---------------------
| DESIGN STANDHYD    |    Area     (ha)=     5.50
| 03:602    DT= 5.00 |    Total Imp(%)=    50.00   Dir. Conn.(%)=    50.00
---------------------
                                  IMPERVIOUS     PERVIOUS (i)
     Surface Area      (ha)=         2.75          2.75
     Dep. Storage      (mm)=          .80          1.50
     Average Slope      (%)=          .50           .50
     Length             (m)=       191.42         40.00
     Mannings n            =         .013          .250

     Max.eff.Inten.(mm/hr)=      125.48          67.67
                      over (min)      5.00           15.00
     Storage Coeff.  (min)=        4.24 (ii)       16.75 (ii)
     Unit Hyd. Tpeak (min)=        5.00           15.00
     Unit Hyd. peak  (cms)=         .24             .07
                                                              *TOTALS*
     PEAK FLOW       (cms)=         .91             .32        1.155 (iii)
     TIME TO PEAK    (hrs)=       10.58           10.75       10.583
     RUNOFF VOLUME    (mm)=       88.26           52.10       70.179
     TOTAL RAINFALL   (mm)=       89.06           89.06       89.056
     RUNOFF COEFFICIENT   =         .99             .59         .788
     *** WARNING: Storage Coefficient is smaller than DT!
                  Use a smaller DT or a larger area.

     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN* =  81.0    Ia = Dep. Storage  (Above)
    (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
         THAN THE STORAGE COEFFICIENT.
   (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
001:0006--------------------------------------------------------------------
--------------------
| COMPUTE VOLUME    |
| ID:03  (602   )   |                   DISCHARGE        TIME
--------------------                      (cms)          (hrs)
              START CONTROLLING AT         .243         10.251
              INFLOW HYD. PEAKS AT        1.155         10.583
              STOP  CONTROLLING AT         .934         10.624

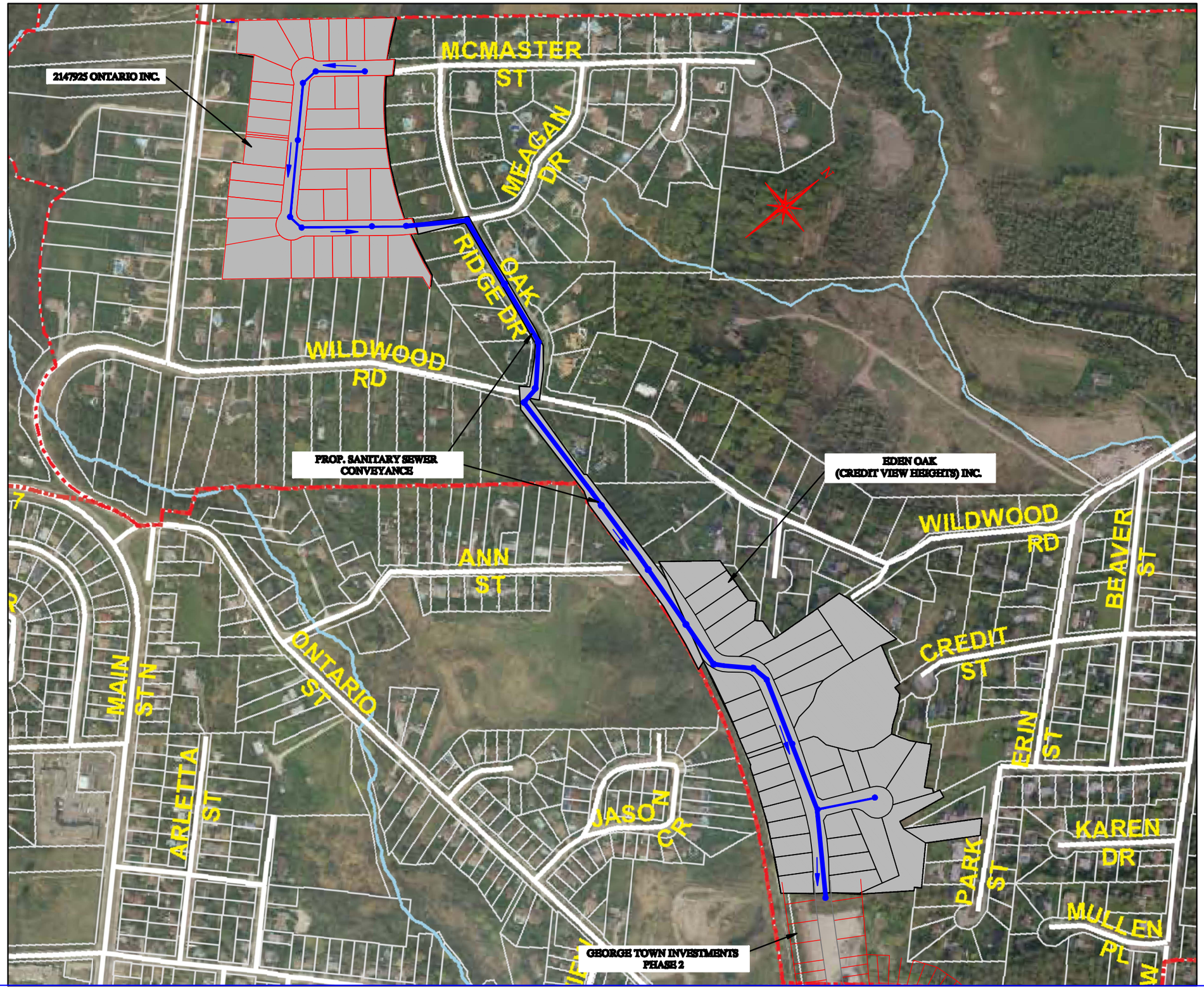
              REQUIRED STORAGE VOLUME (ha.m.)=      .0180
              TOTAL HYDROGRAPH VOLUME (ha.m.)=      .3857
```

```
00271>            % OF HYDROGRAPH TO STORE       =   4.6703
00272>
00273>            NOTE:  Storage was computed to reduce the Inflow
00274>                   peak to     .934  (cms).
00275>
00276> --------------------------------------------------------------------------------
00277> 001:0007--------------------------------------------------------------------------
00278>       FINISH
00279> --------------------------------------------------------------------------------
00280> ********************************************************************************
00281>      WARNINGS / ERRORS / NOTES
00282>      -------------------------
00283>  001:0002 DESIGN STANDHYD
00284>       *** WARNING: Storage Coefficient is smaller than DT!
00285>                    Use a smaller DT or a larger area.
00286>  001:0004 DESIGN STANDHYD
00287>       *** WARNING: Storage Coefficient is smaller than DT!
00288>                    Use a smaller DT or a larger area.
00289>  001:0005 DESIGN STANDHYD
00290>       *** WARNING: Storage Coefficient is smaller than DT!
00291>                    Use a smaller DT or a larger area.
00292>    Simulation ended on 2009-05-27     at 16:06:18
00293> ================================================================================
00294>
00295>
```

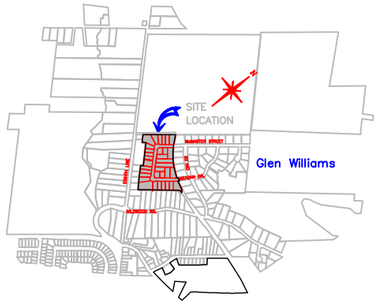
APPENDIX 'C'

Conceptual Design Figures

- Fig. 1, Proposed Sanitary Sewer Conveyance
- Fig. 2, Sanitary Drainage Area Plan
- Fig. 3, General Servicing Plan
- Fig. 4, Proposed Grading Plan
- Fig. 5, Pre-development Storm Drainage Area Plan
- Fig. 6, Post-development Storm Drainage Area Plan



KEY PLAN



Town of Halton Hills

NOT TO SCALE

REVISION BLOCK	DATE	APPR. BY

TOWN OF HALTON HILLS

ENGINEERING DEPARTMENT

Halton — The Regional Municipality of Halton

REGION OF HALTON FILE NO.

PROFESSIONAL ENGINEER M.E.HALL 9-Jun-09 PROVINCE OF ONTARIO

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING

DATE:

CONDELAND ENGINEERING LTD.

Consulting Engineers and Project Managers

65 RICALDI DRIVE, SUITE 103, NORTH YORK, ON., M9L 1E8 — PH-CALS: (416) 745-0855, FAX: (416) 745-0719

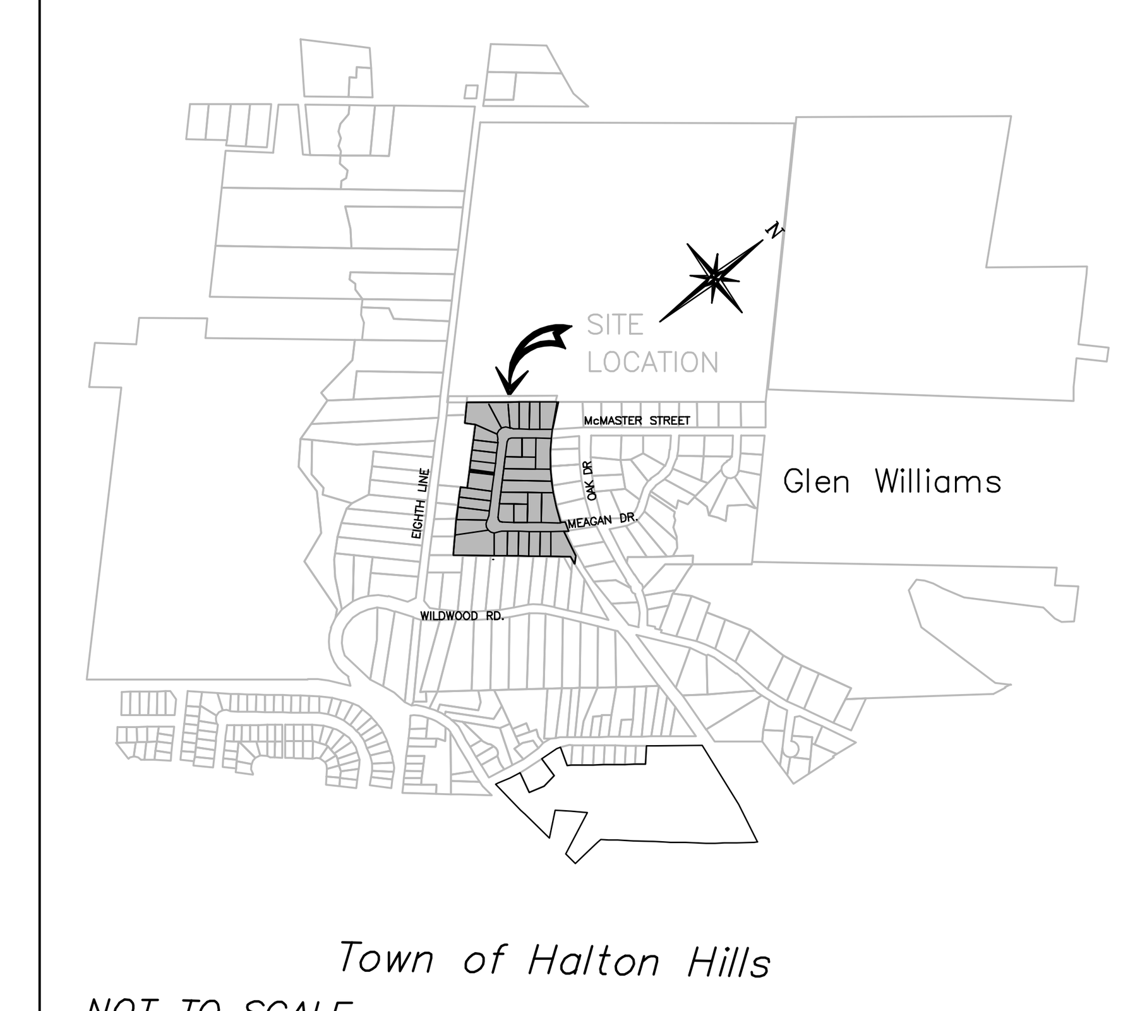
2147925 ONTARIO INC.

PROPOSED SANITARY SEWER CONVEYANCE

DESIGNED BY: M.K.N.	DATE: June 2009	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 1	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE

Y:\2009\09-215\CAD\DWG\09-215-STREET.DWG 2 June 2009

09-215-FIGURE 1



0.522 HA — SANITARY TRIBUTARY AREA (HA)
8 — POPULATION
TRIBUTARY AREA BOUNDARY

STREET	FROM MH #	TO MH #	NO. OF UNITS	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR	PEAK DAY FLOW =(6)(7)/314 (L/s)	SECTION AREA (ha)	ACCUMULATED AREA (ha)	INFILTRATION (L/s)	TOTAL FLOW =(8)+(11) (L/s)	PIPE DIAMETER (mm)	TYPE OF PIPE	PIPE LENGTH (m)	SLOPE (%)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	ACTUAL FLOW VELOCITY (m/s)	UPPER END INVERT (m)	UPPER END MH LOSSES (m)	LOWER END INVERT (m)	REMARKS %FULL
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
OUTLET GAMBLE STREET																						
2147925 ONTARIO INC.																						
STREET "A"	MH15A	MH14A	7	28	28	4.36	0.369	1.241	1.241	0.35	0.74	200	PVC	90.00	1.00%	32.77	1.04	0.52	271.316		270.416	2.3%
"	MH14A	MH13A	2	8	36	4.34	0.498	0.553	1.794	0.51	1.01	200	PVC	15.14	0.50%	23.17	0.74	0.52	270.386	0.03	270.310	4.4%
"	MH13A	MH12A	6	24	60	4.30	0.821	1.150	2.944	0.84	1.66	200	PVC	90.00	0.50%	23.17	0.74	0.52	270.280	0.03	269.830	7.2%
"	MH12A	MH11A	6	24	84	4.26	1.141	1.328	4.272	1.22	2.36	200	PVC	90.00	0.50%	23.17	0.74	0.52	269.800	0.03	269.350	10.2%
"	MH11A	MH10A	1	4	88	4.26	1.193	0.239	4.511	1.29	2.48	200	PVC	16.74	0.50%	23.17	0.74	0.52	269.320	0.03	269.237	10.7%
"	MH10A	MH09A	4	16	104	4.24	1.404	0.668	5.179	1.48	2.89	200	PVC	44.40	0.50%	23.17	0.74	0.52	269.207	0.03	268.985	12.5%
"	MH09A	MH08A	6	24	128	4.21	1.717	1.167	6.346	1.81	3.53	200	PVC	90.00	0.50%	23.17	0.74	0.52	268.955	0.03	268.505	15.2%
MEAGAN DRIVE																						
"	MH08A/MH110A	MH109A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	77.76	0.50%	23.17	0.74	0.52	265.799	0.025	265.410	15.2%
OAK RIDGE DRIVE																						
"	MH109A	MH108A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	110.34	0.50%	23.17	0.74	0.52	265.380	0.03	264.828	15.2%
"	MH108A	MH107A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	89.45	0.50%	23.17	0.74	0.52	264.798	0.03	264.351	15.2%
"	MH107	MH106	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	21.30	0.50%	23.17	0.74	0.52	264.321	0.03	264.215	15.2%
"	MH106A	MH105A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	72.26	0.50%	23.17	0.74	0.52	264.185	0.03	263.823	15.2%
	MH05A	MH104A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	25.64	0.50%	23.17	0.74	0.52	263.793	0.03	263.665	15.2%
PUBLIC WALKWAY																						
	MH104A	MH103A	0	0	128	4.21	1.717	0.000	0.000	0.00	1.72	200	PVC	90.00	0.50%	23.17	0.74	0.52	263.635	0.03	263.185	7.4%
"	MH103A	MH102A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	90.00	0.50%	23.17	0.74	0.52	263.155	0.03	262.705	15.2%
"	MH102A	MH101A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	90.00	0.50%	23.17	0.74	0.52	262.680	0.025	262.230	15.2%
EDEN OAK (CREDIT VIEW HEIGHTS) INC.																						
STREE "A"	MH1/2A	MH1/1A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	16.30	0.50%	23.17	0.74	0.52	261.907	0.025	261.825	15.2%
"	MH1/1A	MH1A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	49.18	0.50%	23.17	0.74	0.52	261.800	0.025	261.555	15.2%
"	MH1A	MH2A	4	16	144	4.20	1.925	0.974	7.320	2.09	4.02	200	PVC	76.35	0.50%	23.17	0.74	0.52	261.530	0.025	261.148	17.3%
"	MH2A	MH3A	0	0	144	4.20	1.925	0.000	7.320	2.09	4.02	200	PVC	13.27	0.50%	23.17	0.74	0.40	261.123	0.025	261.056	17.3%
"	MH3A	MH4A	2	8	152	4.19	2.028	0.557	7.877	2.25	4.28	200	PVC	38.16	0.50%	23.17	0.74	0.50	261.031	0.025	260.841	18.5%
"	MH4A	MH5A	0	0	152	4.19	2.028	0.000	7.877	2.25	4.28	200	PVC	21.00	0.50%	23.17	0.74	0.50	260.816	0.025	260.711	18.5%
"	MH5A	MH6A	7	28	180	4.16	2.387	1.313	9.190	2.63	5.02	200	PVC	90.00	0.50%	23.17	0.74	0.51	260.686	0.025	260.236	21.6%
"	MH6A	MH8A	6	24	204	4.14	2.693	0.956	10.146	2.90	5.59	200	PVC	90.00	0.50%	23.17	0.74	0.52	260.211	0.025	259.761	24.1%
	MH7A	MH8A	4	16	16	4.39	0.224	1.140	1.140	0.33	0.55	200	PVC	61.42	1.00%	32.77	1.04	0.55	260.425	0.075	259.811	1.7%
STREET "B"																						
	MH8A	MH9A	4	16	220	4.13	2.895	0.569	11.855	3.39	6.29	200	PVC	59.43	0.50%	23.17	0.74	0.56	259.736	0.025	259.438	27.1%
"	MH9A	EX.MH24A	4	16	236	4.12	3.097	0.568	12.423	3.55	6.65	200	PVC	46.29	0.50%	23.17	0.74	0.57	259.188	0.25	258.957	28.7%
GEORGE TOWN INVESTMENT PHASE 2																						
	EX.MH24A	EX.MH23A	0	0	236	4.12	3.097	0.000	12.423	3.55	6.65	200	PVC	59.70	1.00%	32.77	1.04	1.22	258.877	0.08	258.280	20.3%
GAMBLE STREET	EX.MH23A	EX.MH22A		29	265	4.10	3.461	0.530	12.953	3.70	7.17	200	PVC	90.00	3.74%	63.37	2.02	1.25	256.20		254.83	11.3%
"	EX.MH22A	EX.MH21A		48	313	4.07	4.058	0.880	13.833	3.96	8.01	200	PVC	60.10	4.27%	67.71	2.16	1.36	254.75		252.18	11.8%

As per SAN Drainage Plan "Georgetown Investments" Phase 2 PB-04-6842-SA1

NOTES:

DESIGN FLOW FACTOR, M = 3.183x10^-3 L/sec per person equivalent to 275 L per day per person
PEAKING FACTOR = $1 + 14/(4+P^{1/2})$
WHERE P = POP. IN 1000's — 0.286 L/s/ha
WET WEATHER INFILTRATION — 55.00 person/ha
Halton criteria

M.K.N.
M.E.H.
2-Jun-09

REGION OF HALTON
ENGINEERING AND PUBLIC WORKS DEPARTMENT
SANITARY SEWER DESIGN SHEET
SHEET 1 OF 1

REVISION	BLOCK	DATE	APPR. BY

TOWN OF HALTON HILLS
ENGINEERING DEPARTMENT

Halton — The Regional Municipality of Halton
REGION OF HALTON FILE NO.

LICENSED PROFESSIONAL ENGINEER — M.E.HALL — 2-Jun-09 — PROVINCE OF ONTARIO

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

DIRECTOR OF DEVELOPMENT/TRANSPORTATION ENGINEERING
DATE:

CONDELAND ENGINEERING LTD.
Consulting Engineers and Project Managers
85 IRONDALE DRIVE, SUITE 100
NORTH YORK, ON., M9L 2S6
PHONE: (416) 745-0833
FAX: (416) 745-0179

2147925 ONTARIO INC.

SANITARY DRAINAGE AREA PLAN

DESIGNED BY: M.K.N. | DATE: June 2009 | CHECKED BY: M.E.H.
DRAWN BY: M.K.N. | FIGURE 2
SCALES HOR 1:750 | Sheet: 1 of 1 | TOWN FILE

Y:\09015\CARLSON\DRAWINGS\09-015-PROP SAN TRIB PLAN.DWG
09-015-FIGURE 2 — 2 June 2009

STREET	FROM MH #	TO MH #	NO. OF UNITS	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR	PEAK DAY FLOW = (6)(7)/314 (L/s)	SECTION AREA (ha)	ACCUMULATED AREA (ha)	INFILTRATION (L/s)	TOTAL FLOW = (8) + (11) (L/s)	PIPE DIAMETER (mm)	TYPE OF PIPE	PIPE LENGTH (m)	SLOPE (%)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	ACTUAL FLOW VELOCITY (m/s)	UPPER END INVERT (m)	UPPER END MH LOSSES (m)	LOWER END INVERT (m)	REMARKS %FULL
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
OUTLET GAMBLE STREET																						
2147925 ONTARIO INC.																						
STREET "A"	MH15A	MH14A	7	28	28	4.36	0.389	1.241	1.241	0.35	0.74	200	PVC	90.00	1.00%	32.77	1.04	0.52	271.316		270.416	2.3%
"	MH14A	MH13A	2	8	36	4.34	0.498	0.553	1.794	0.51	1.01	200	PVC	15.14	0.50%	23.17	0.74	0.52	270.386	0.03	270.310	4.4%
"	MH13A	MH12A	6	24	60	4.30	0.821	1.150	2.944	0.84	1.66	200	PVC	90.00	0.50%	23.17	0.74	0.52	270.280	0.03	269.830	7.2%
"	MH12A	MH11A	6	24	84	4.26	1.141	1.328	4.272	1.22	2.36	200	PVC	90.00	0.50%	23.17	0.74	0.52	269.800	0.03	269.350	10.2%
"	MH11A	MH10A	1	4	88	4.26	1.193	0.239	4.511	1.29	2.48	200	PVC	16.74	0.50%	23.17	0.74	0.52	269.320	0.03	269.237	10.7%
"	MH10A	MH09A	4	16	104	4.24	1.404	0.668	5.179	1.48	2.89	200	PVC	44.40	0.50%	23.17	0.74	0.52	269.207	0.03	268.985	12.5%
"	MH09A	MH08A	6	24	128	4.21	1.717	1.167	6.346	1.81	3.53	200	PVC	90.00	0.50%	23.17	0.74	0.52	268.955	0.03	268.505	15.2%
MEAGAN DRIVE																						
"	MH08A/MH110A	MH109A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	77.76	0.50%	23.17	0.74	0.52	265.799	0.025	265.410	15.2%
OAK RIDGE DRIVE																						
"	MH109A	MH108A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	110.34	0.50%	23.17	0.74	0.52	265.380	0.03	264.828	15.2%
"	MH108A	MH107A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	89.45	0.50%	23.17	0.74	0.52	264.798	0.03	264.351	15.2%
"	MH107	MH106	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	21.30	0.50%	23.17	0.74	0.52	264.321	0.03	264.215	15.2%
"	MH106A	MH105A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	72.26	0.50%	23.17	0.74	0.52	264.185	0.03	263.823	15.2%
	MH05A	MH104A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	25.64	0.50%	23.17	0.74	0.52	263.793	0.03	263.665	15.2%
PUBLIC WALKWAY																						
	MH104A	MH103A	0	0	128	4.21	1.717	0.000	0.000	0.00	1.72	200	PVC	90.00	0.50%	23.17	0.74	0.52	263.635	0.03	263.185	7.4%
"	MH103A	MH102A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	90.00	0.50%	23.17	0.74	0.52	263.155	0.03	262.705	15.2%
"	MH102A	MH101A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	90.00	0.50%	23.17	0.74	0.52	262.680	0.025	262.230	15.2%
EDEN OAK (CREDIT VIEW HEIGHTS) INC.																						
STREE **"A"**	MH1/2A	MH1/1A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	16.30	0.50%	23.17	0.74	0.52	261.907	0.025	261.825	15.2%
"	MH1/1A	MH1A	0	0	128	4.21	1.717	0.000	6.346	1.81	3.53	200	PVC	49.18	0.50%	23.17	0.74	0.52	261.800	0.025	261.555	15.2%
"	MH1A	MH2A	4	16	144	4.20	1.925	0.974	7.320	2.09	4.02	200	PVC	76.35	0.50%	23.17	0.74	0.52	261.530	0.025	261.148	17.3%
"	MH2A	MH3A	0	0	144	4.20	1.925	0.000	7.320	2.09	4.02	200	PVC	13.27	0.50%	23.17	0.74	0.40	261.123	0.025	261.056	17.3%
"	MH3A	MH4A	2	8	152	4.19	2.028	0.557	7.877	2.25	4.28	200	PVC	38.16	0.50%	23.17	0.74	0.50	261.031	0.025	260.841	18.5%
"	MH4A	MH5A	0	0	152	4.19	2.028	0.000	7.877	2.25	4.28	200	PVC	21.00	0.50%	23.17	0.74	0.50	260.816	0.025	260.711	18.5%
"	MH5A	MH6A	7	28	180	4.16	2.387	1.313	9.190	2.63	5.02	200	PVC	90.00	0.50%	23.17	0.74	0.51	260.686	0.025	260.236	21.6%
"	MH6A	MH8A	6	24	204	4.14	2.693	0.956	10.146	2.90	5.59	200	PVC	90.00	0.50%	23.17	0.74	0.52	260.211	0.025	259.761	24.1%
	MH7A	MH8A	4	16	16	4.39	0.224	1.140	1.140	0.33	0.55	200	PVC	61.42	1.00%	32.77	1.04	0.55	260.425	0.075	259.811	1.7%
STREET **"B "**																						
	MH8A	MH9A	4	16	220	4.13	2.895	0.569	11.855	3.39	6.29	200	PVC	59.43	0.50%	23.17	0.74	0.56	259.736	0.025	259.438	27.1%
"	MH9A	EX.MH24A	4	16	236	4.12	3.097	0.568	12.423	3.55	6.65	200	PVC	46.29	0.50%	23.17	0.74	0.57	259.188	0.25	258.957	28.7%
GEORGE TOWN INVESTMENT PHASE 2																						
	EX.MH24A	EX.MH23A	0	0	236	4.12	3.097	0.000	12.423	3.55	6.65	200	PVC	59.70	1.00%	32.77	1.04	1.22	258.877	0.08	258.280	20.3%
GAMBLE STREET	EX.MH23A	EX.MH22A		29	265	4.10	3.461	0.530	12.953	3.70	7.17	200	PVC	90.00	3.74%	63.37	2.02	1.25	258.20		254.83	11.3%
"	EX.MH22A	EX.MH21A		48	313	4.07	4.058	0.880	13.833	3.96	8.01	200	PVC	60.10	4.27%	67.71	2.16	1.36	254.75		252.18	11.8%

As per SAN Drainage Plan "Georgetown Investments" Phase 2 PB-04-6842-SA1

NOTES:

DESIGN FLOW FACTOR, M = 3.183x 10^-3 L/sec per person equivalent to 275 L per day per person
PEAKING FACTOR = $1 + 14/(4+P^{(1/2)})$
WHERE P = POP. IN 1000's
WET WEATHER INFILTRATION 0.286 L/s/ha
Halton criteria 55.00 person/ha

M.K.N.
M.E.H.
2-Jun-09

REGION OF HALTON

ENGINEERING AND PUBLIC WORKS DEPARTMENT

SANITARY SEWER DESIGN SHEET

SHEET 1 OF 1

KEY PLAN

Town of Halton Hills

NOT TO SCALE

REVISION	BLOCK	DATE	APPR. BY

TOWN OF HALTON HILLS

ENGINEERING DEPARTMENT

Halton — The Regional Municipality of Halton

REGION OF HALTON FILE NO.

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

LICENSED PROFESSIONAL ENGINEER — M.E.HALL — 2-Jun-09 — PROVINCE OF ONTARIO

DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING

DATE:

CONDELAND ENGINEERING LTD.

Consulting Engineers and Project Managers

85 IRONDALE DRIVE, SUITE 100
NORTH YORK, ON., M9L 2S6

PHONE: (416) 745-0833
FAX: (416) 745-0179

2147925 ONTARIO INC.

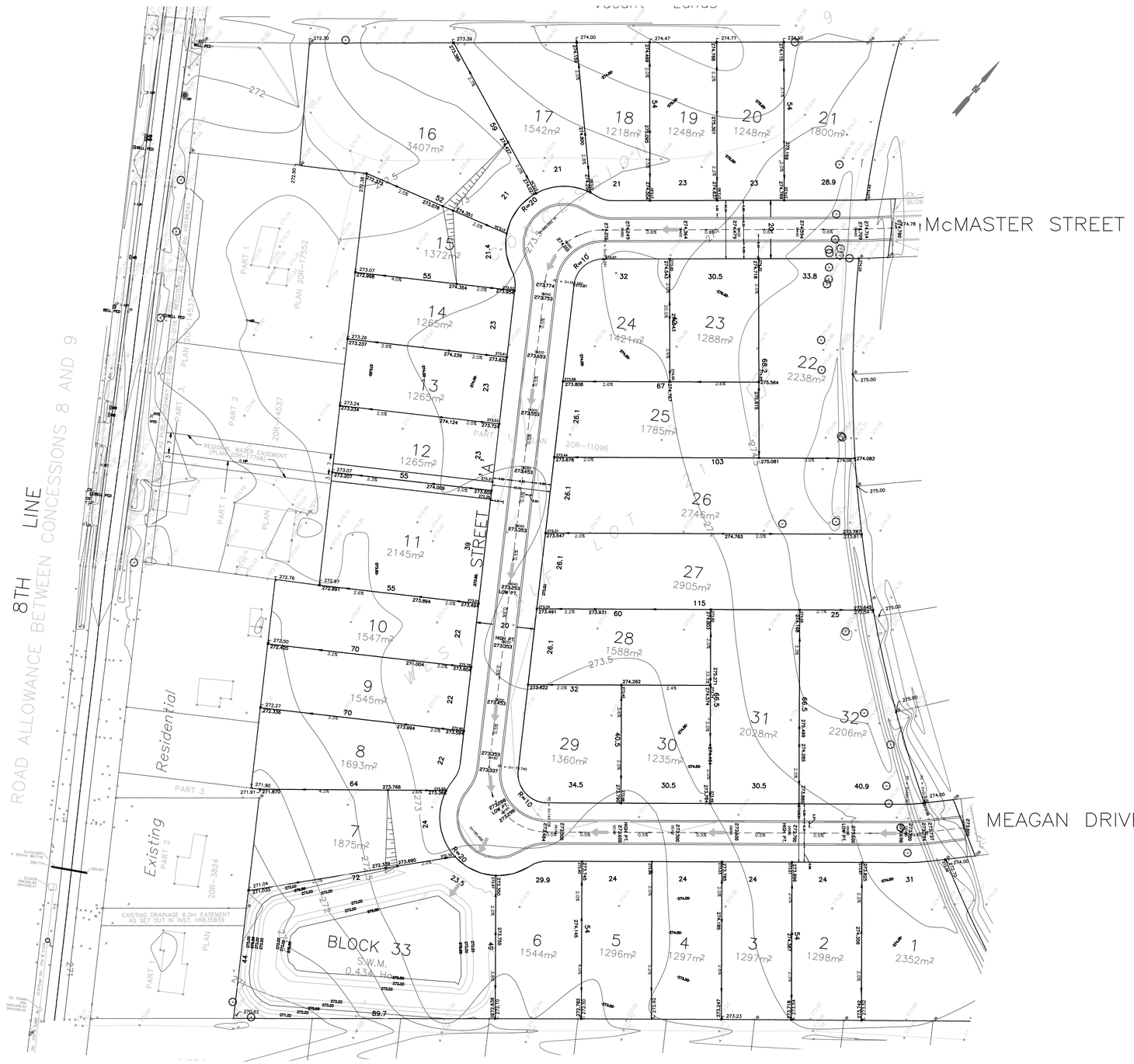
GENERAL SERVICING PLAN

DESIGNED BY: M.K.N.	DATE: June 2009	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 3	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE

Y:\09015\CARLSON\DRAWINGS\09015 GALL.DWG

2 June 2009

09-015-FIGURE 3



KEY PLAN

Town of Halton Hills

NOT TO SCALE

REVISION	BLOCK	DATE	APPR. BY

TOWN OF HALTON HILLS

ENGINEERING DEPARTMENT

Halton — The Regional Municipality of Halton

REGION OF HALTON FILE NO.

LICENSED PROFESSIONAL ENGINEER M.E.HALL 2-Jun-09 PROVINCE OF ONTARIO

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING

DATE:

CONDELAND ENGINEERING LTD.

Consulting Engineers and Project Managers

85 IRONDALE DRIVE, SUITE 100, NORTH YORK, ON., M9L 2S6

PHONE: (416) 745-0833

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2147925 ONTARIO INC.

PROPOSED GRADING PLAN

DESIGNED BY: M.K.N.	DATE: June 2009	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 4	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE

Y:\09015\CARLSON\DRAWINGS\09015 GRADING.DWG

2 June 2009

09-015-FIGURE 4

OUTLET 2		OUTLET 1		EXTERNAL
300	301	302	303	304
0.2640 HA	0.2870 HA	1.7310 HA	2.8920 HA	0.2000 HA
1.5390 HA				
0.0530 HA				
1.8560 HA	0.2870 HA	1.7310 HA	2.8920 HA	0.2000 HA

KEY PLAN

Town of Halton Hills

NOT TO SCALE

1.000HA / 0.25 STORM TRIBUTARY AREA HA / RUNOFF COEFFICIENT

300 SUB CATCHMENT AREA ID.

TRIBUTARY AREA BOUNDARY

REVISION BLOCK	DATE	APPR. BY

TOWN OF HALTON HILLS

ENGINEERING DEPARTMENT

Halton — The Regional Municipality of Halton

REGION OF HALTON FILE NO.

LICENCED PROFESSIONAL ENGINEER M.E.HALL 2-Jun-09 PROVINCE OF ONTARIO

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING

DATE:

CONDELAND ENGINEERING LTD.

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85 IRONDALE DRIVE, SUITE 100
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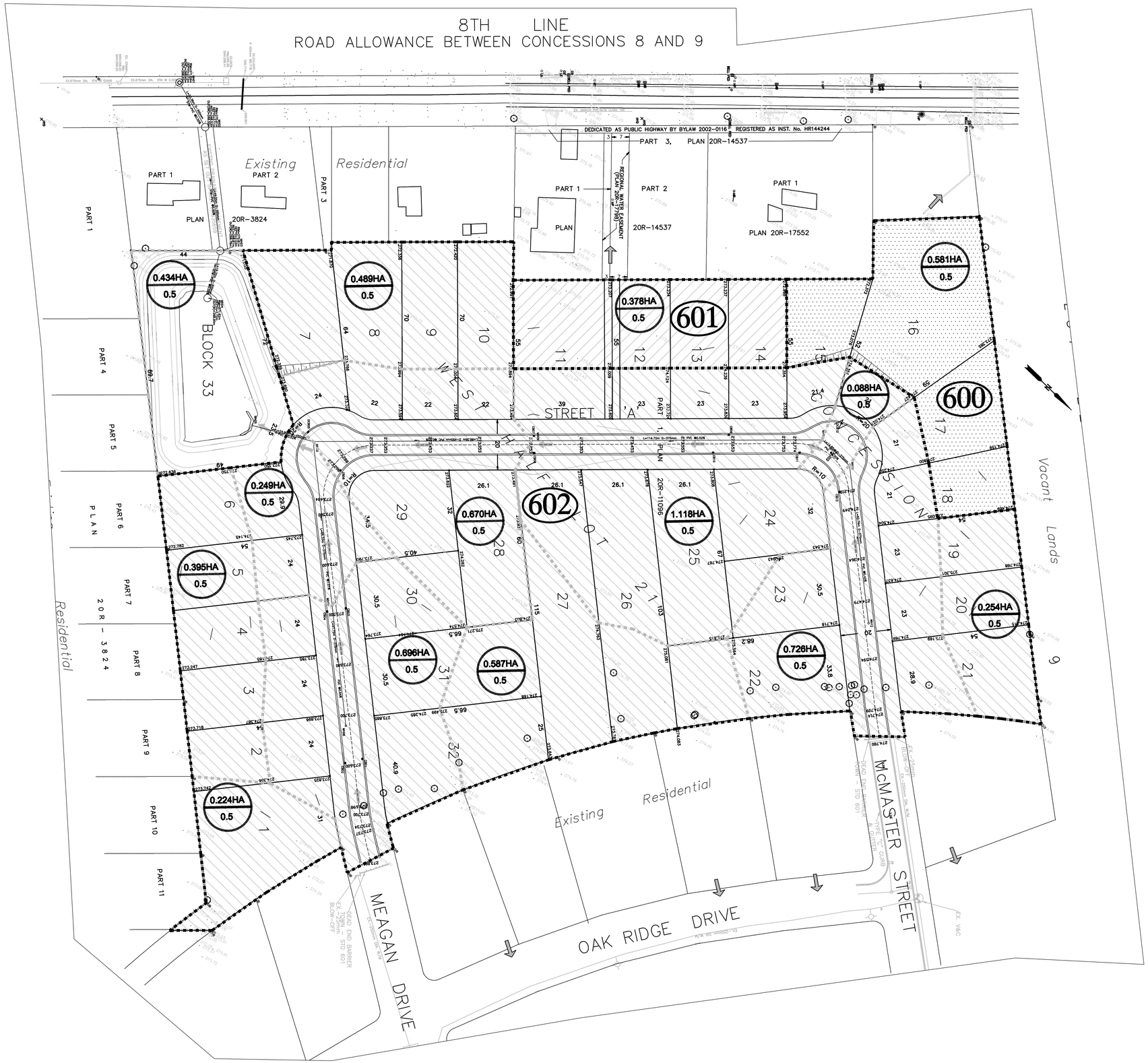
2147925 ONTARIO INC.

PRE DEVELOPMENT STORM DRAINAGE AREA PLAN

DESIGNED BY: M.K.N.	DATE: June 2009	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 5	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE



Town of Halton Hills

NOT TO SCALE

TRIBUTARY AREA BOUNDARY

1.050 HA / 0.5 STORM TRIBUTARY AREA (HA) RUNOFF COEFFICIENT

600 SUB CATCHMENT AREA ID.

REVISION	BLOCK	DATE	APPR.

TOWN OF HALTON HILLS

ENGINEERING DEPARTMENT

Halton — The Regional Municipality of Halton

REGION OF HALTON FILE NO.

PROFESSIONAL ENGINEER M.E.HALL 2-Jun-09 PROVINCE OF ONTARIO

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING

DATE:

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2147925 ONTARIO INC.

POST DEVELOPMENT STORM DRAINAGE AREA PLAN

DESIGNED BY: M.K.N.	DATE: June 2009	CHECKED BY: M.E.
DRAWN BY: M.K.N.	FIGURE 6	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE