Stantec

Memo

To:	Dan Eusebi Guelph ON Office	From:	Devin Smith, Trevor Fraser Waterloo ON Office
File:	160961321	Date:	January 31, 2020

Reference: Ottawa Airport Lands – Parcel C, Ottawa, Ontario, Stormwater Management (SWM) Analysis

This SWM Analysis documents site conditions and outlines the SWM strategy in support of the proposed development of an aggregate excavation pit on lands owned by the Ottawa Airport (hereafter referred to as 'the site'). The site is approximately 38 ha and is known as Parcel C which is an unaddressed parcel of land located on Albion Road (Ottawa Regional Rd 25) in the City of Ottawa, Ontario (Appendix A).

BACKGROUND

The site is a semi-rectangular plot of agricultural/pastoral land. It is bounded by Albion Road on the east, semi-vegetated former extraction lands to the south, mixed forest and wetland to the west, and a golf course to the north. The site is bisected northwest to southeast by a hydroelectric right-of-way (ROW) and includes three high voltage transmission towers.

The site topography is varying with an elevation of roughly 110 m above mean sea level (AMSL) near the western boundary, rising to a central north-south mound extending to 117 m AMSL, and an elevation of approximately 114 m AMSL near the eastern boundary (Gorrell, 2006). The ground surface decreases to the west of the site with the edge of the mapped wetland at an elevation of approximately 108 m AMSL. The areas proposed to be developed for aggregate extraction are generally the higher ground within the site and surrounding land.

The site is primarily located at the eastern boundary of the Lower Rideau River watershed within the Mosquito Creek subwatershed with about 3 ha of the southeastern portion of the Site in the South Nation Watershed. Surface water flows west within the Mosquito Creek subwatershed to the Rideau River.

In preparation of this SWM Analysis, the following documents and reports have been used for reference:

- *Aggregate Assessment and Resource Management Plan, Ottawa International Airport Holdings. Report No. 05310.* Gorrell Resource Investigations, 2006.
- *Draft Site Plan for the Ottawa Airport Pit.* Harrington-McAvan, 2019.
- *Level 1 Hydrogeological Review, Ottawa Airport Lands – Parcel C, Ottawa, Ontario.* Stantec, December 2019.
- *Low Impact Development Stormwater Management Planning and Design Guide,* Credit Valley Conservation (CVC) and Toronto and Region Conservation Authority (TRCA), 2011.
- *The Physiography of Southern Ontario*. Ontario: Ministry of Natural Resources. Chapman, L.G. and D.F. Putnam. 1984.
- *Resource Investigation OIAA Lands, 2014. Project 14-195. Draft.* Houle Chevrier Engineering Ltd. 2014.

Reference: **Ottawa Airport Lands – Parcel C, Ottawa, Ontario, Stormwater Management (SWM) Analysis**

- *Saturated Hydraulic Conductivity in Relation to Soil Texture.* United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS), n.d.
- *Short Duration Rainfall Intensity-Duration-Frequency Data – Ottawa MacDonald-Cartier International Airport, Ontario.* Environment Canada, 2014.
- *Stormwater Management Planning and Design Manual*. Ministry of the Environment and Climate Change (MOECC), 2003.
- *Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV.* Ontario Geological Survey 2010.

STORMWATER MANAGEMENT CRITERIA

No site-specific SWM criteria have been provided by the City; however, based on experience and similar site requirements, typical SWM Criteria were assumed to be applicable and are as follows:

- *Water Quantity Control:*
    - Control the post-development peak flow runoff to the pre-development peak flow runoff for the 25 mm, 2-, 10-, 50- and 100-year event over the disturbed site area.
    - Maintain wetland functions by sustaining volume contributions to the adjacent wetland through surface water and/or groundwater volumes
- *Water Quality Control:*
    - Provide enhanced water quality control in accordance with the Ministry of Environment, Conservation and Parks (MECP) guidelines by providing the long-term average removal of 80% Total Suspended Solids for post-development flows.

At the time of submission of this memo, surface water and/or groundwater data was not available for the wetland located to the immediate west of the Site.

HYDROLOGIC MODELING

A hydrologic model was prepared to simulate drainage conditions for the site. Stormwater Management Hydrologic Model (SWMHYMO) was used to predict flows for the existing and proposed development conditions and analyze how the development of the aggregate reserves will impact local hydrology.

To quantify changes in the hydrologic regime from existing to proposed conditions, the 4-hour, 25 mm Chicago storm and the 2-, 10-, 50- and 100-year, 24-hour SCS design storms were modelled. The SCS storm data and intensity-duration-frequency curves used in the analysis are published by Environment Canada for the Ottawa MacDonald-Cartier International Airport, approximately 5 km north east of the Site.

EXISTING CONDITIONS

The site proposed for development has a higher elevation than much of the surrounding landscape, and under existing conditions all runoff drains away from the site during precipitation events. The land use is

currently vacant pasture/fallow with a hydroelectric transmission corridor transecting the site. Slopes on the site range from approximately 2.5% to 4.5%. The steeper areas are along the centrally located north-south high point and along the west side of the site draining to the wetland. Existing catchment boundaries are shown in Appendix B - Figure 1 and are summarized below:

Catchment 101 – 6.27 ha on the west side of Site, draining west directly into the wetland

Catchment 102 – 8.58 ha in the south west corner of Site, draining south west into wetland

Catchment 103 – 5.16 ha centrally located along the northern perimeter of the Site, draining north east to golf course

Catchment 104 – 7.31 ha located in a central/east portion of Site, draining north west to golf course

Catchment 105 – 2.70 ha on the northern corner of Site draining north west to golf course

Catchment 106 – 8.39 ha in the southeast corner of Site draining south to undeveloped land

Regional physiography is influenced by the historic Ottawa River valley and varies from clay plain to sand plain with extensive drumlins to the south (Chapman and Putnam 1984). The Study Area consists primarily of glaciofluvial deposits of sand and gravel with a small area of organic deposits underlying the forested wetland to the west of the Site (Ontario Geological Survey 2010). A linear feature of a beach ridge and near shore bar is mapped along the western boundary of the Site (Ontario Geological Survey 2010). Investigations at the Site by Houle (2014) confirmed deposits of sands, and sands and gravels underlain by a silty clay. To estimate the curve numbers for modelling purposes, the Site soils were classified as Hydrologic Group A (well-draining soils).

PROPOSED CONDITIONS

The site is being developed in two stages. In the first stage, Area A will be excavated for aggregate extraction and then stabilized. The second stage involves the excavation, aggregate extraction, and stabilization of Area B in a similar manner. Please refer to the Site Plan in Appendix A delineating Areas A and B. The Rehabilitation Plan included in Appendix A shows proposed grades following rehabilitation. At the time of the preparation of this memo, it is assumed that stabilization will generally include the even spreading and replacement of stripped overburden, followed by replacement of stripped topsoil. In the ultimate conditions, Areas A and B will be excavated to bottom elevations between 109.2 and 110.8 mAMSL, corresponding to 1.5m above the groundwater table, and then stabilized. A north-south high point will divide surface drainage on site, with 13.53 hectares draining west to the wetland and 21.49 hectares draining to a low point within Area B which will be infiltrated within the proposed excavation. The drainage divide under proposed conditions generally corresponds to the proposed division between Areas A and B and is slightly west of the existing north-south high point. There will be no increase to impervious coverage across the site upon completion of the aggregate extraction operations and the stabilization of the site. The proposed catchment boundaries are shown in Appendix B - Figure 2, and are described below:

Catchment A – Area A (13.53 ha) - Area generally corresponding to Phase 1 of aggregate extraction, draining west to the wetland

Catchment B – Area B (21.49 ha) - depression resulting from Phase 2 of aggregate extraction

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Catchment 201 – 1.12 ha along the northern perimeter of Site, draining north to golf course

Catchment 202 – 1.50 ha along the eastern perimeter of Site, draining east towards Albion Road

Catchment 203 – 0.76 ha along the southern perimeter of Site, draining south to undeveloped

Due to the sequencing of site development, there will be an interim condition where Area A is excavated to the proposed bottom elevation, and Area B remains undisturbed with the exception of an access road leading to Area A. Due to the existing topography in the footprint of Area B, this interim phase will not impact the flows of undisturbed areas.

STORMWATER ANALYSIS RESULTS

Overland surface water flows are reduced under the proposed conditions due to the change in topography associated with site development. Under existing conditions, the site sheds all runoff away from the centrally located highpoint to the surrounding lands; however, under proposed conditions the site will retain and infiltrate the majority of stormwater. Upon completion of the aggregate extraction and subsequent site stabilization, the area generally corresponding to the footprint of Area B will become a local depression receiving no external runoff (i.e., internal drainage only). Precipitation falling in the footprint of this area will directly infiltrate as groundwater recharge. Area B accounts for roughly 56% of the Site by area so the increase in infiltration and groundwater contributions under proposed conditions is substantial.

The SWMHYMO modelling parameters and data files used in the analysis are included in Appendix C. Results of the hydrologic model are shown in Table 1 below:

Table 1: Summary of Existing and Proposed Surface Water Flows

	Existing Flows (L/s)			Proposed Flows (L/s)			% Reduction		
Storm Event	To Wetland	To Golf Course	Other External	To Wetland	To Golf Course	Other External	To Wetland	To Golf Course	Other External
25 mm	47	43	18	37	9	16	21	79	11
2-year	160	142	57	124	28	53	23	80	7
10-year	391	345	140	302	68	128	23	80	9
50-year	656	580	235	507	114	215	23	80	9
100-year	783	692	281	605	136	255	23	80	9

As presented in Table 1, overland flow draining west to the wetland is reduced by approximately 23%, and flow draining north to the golf course is reduced by approximately 80% for all events in the proposed conditions. Although this is a large reduction by comparison of peak flows, it is important to note that infiltration volumes account for a large component of runoff volume following storm events given that the majority of the site is sand. The site was modelled using an assumed infiltration rate of 100 mm/hour (USDA) (CVC, TRCA, 2011), representing a conservative estimate for sandy soils. Higher infiltration rates that may exist within the site would result in reduced peak flow rates from the site. Based on the proposed use of the

site and supported by the results of the SWMHYMO model, any reduction in surface water contributions to the wetland will be countered by the increase in groundwater contributions through infiltration across the site, meaning the total volume of water to the adjacent wetland will remain the same under proposed conditions. Under the proposed conditions, approximately 56% of the site will infiltrate runoff from all rainfall events to the groundwater and contribute to the preservation of wetland functions.

Infiltration volumes for Area B under the proposed conditions are shown for the range of modelled events in Table 2:

Table 2: Infiltration Volumes Yielded by Area B

Storm Event	Depth (mm)	Infiltration Volume – Area B (m^3)
25mm	25.0	5373
2-year	49.4	10617
10-year	79.2	17022
50-year	105.4	22653
100-year	116.5	25038

Surface water and/or groundwater data is not currently available for the wetland located west of the Site; however, groundwater levels within the wetland are anticipated to be similar to levels on the site. are anticipated to be present within the wetland. The wetland and the shallow groundwater are likely hydraulically connected (Stantec 2019). Regional mapping was not available for shallow groundwater conditions; however, shallow groundwater may mimic surface water flow and flow to the west (Stantec, 2019).

WATER QUALITY CONTROL

Under proposed conditions, the majority of stormwater on site will be contained within the depression left by the aggregate extraction activities and will infiltrate. Following stabilization, overland flows to the wetland will have similar characteristics to existing conditions and flows around the perimeter of the Site will remain unchanged from existing conditions. Water quality controls are not necessary as roughly 56% of the Site (Catchment B) will be clean water infiltrating and replenishing the groundwater, and flows leaving the perimeter of the Site (Area A and Catchments 201 – 204) should not be exposed to sources of contamination or disturbance of site soils.

LIMITATIONS

This document entitled, “Ottawa Airport Lands – Parcel C, Ottawa, Ontario – Stormwater Management (SWM) Analysis“ was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Thomas Cavanagh Construction Ltd. (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such

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third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

CLOSING

Based on the preceding stormwater analysis, the following conclusions can be made:

- Water quantity controls are not necessary as there is no increase in flow rates across all rainfall events
- Water quality control measures are not necessary as stormwater landing on the Site can be considered clean and will leave the site with quality unchanged or remain on-site until infiltrated.
- The volume of infiltration to the groundwater will account for any reduction in event-based surface water flow, sustaining the existing stormwater volumes to the wetland.

We trust this stormwater analysis is sufficient to address your current requirements. Should you have any questions or comments related to this design, please do not hesitate to contact the undersigned at your convenience.

STANTEC CONSULTING LTD.

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Project Manager, Community Development
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Attachment: Appendix A, Study Area
Appendix B, Existing and Proposed Catchments
Appendix C, SWMHYMO Parameters and Data Files

APPENDIX A

Study Area, Site Plan, and Rehabilitation Plan

Stantec

Legend

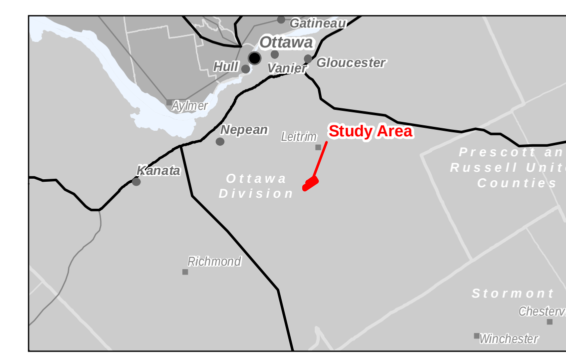
- Site Boundary
- Setback Limit
- Monitoring Well (Houle Chevrier Engineering, 2014)
- Test Pit (Houle Chevrier Engineering, 2014)
- Hydro Tower
- Cross-Section Location
- Wetland, Not evaluated per OWES
- Subject Property Boundary

0 100 200 metres

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



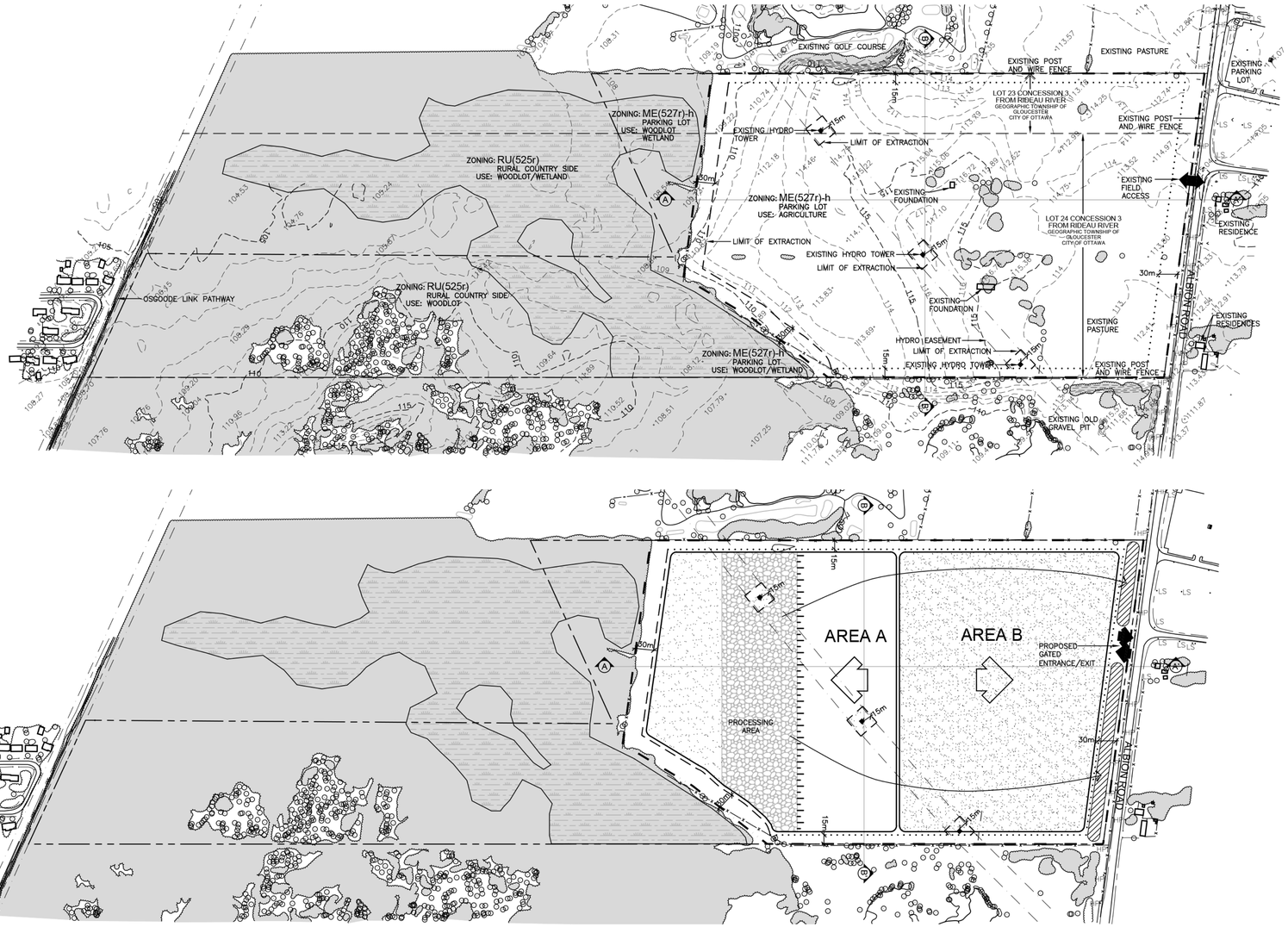
Project Location
City of Ottawa

160961321 REVA
Prepared by CMC on 2019-11-20
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
1

Title
Study Area



PHASE A

PHASE A NOTES

1. ESTABLISH ENTRANCE/ EXIT FROM ALBION ROAD WHERE SHOWN ON SITE PLANS, ACCORDING TO MUNICIPAL STANDARDS AND APPROVALS.
2. PRIOR TO EXTRACTION COMMENCING IN AREA A, UPGRADE (IF NECESSARY) THE FENCING ON THE BOUNDARY OF THE GRAVEL PIT. ALL FENCING SHALL BE MAINTAINED.
3. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA A AND USE THE MATERIAL TO CONSTRUCT ACOUSTIC BERMS AS SHOWN. EXCESS MATERIAL MAY BE STOCKPILED ON THE PIT FLOOR OR USED TO BEGIN PROGRESSIVE REHABILITATION.
4. BEGIN EXTRACTION IN AREA A IN DIRECTION SHOWN. TEMPORARY STOCKPILES MAY BE LOCATED ON PIT FLOOR NEAR THE PIT FACE DURING EXCAVATION OF AGGREGATE.
5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

PHASE B (NOT SHOWN)

PHASE B NOTES

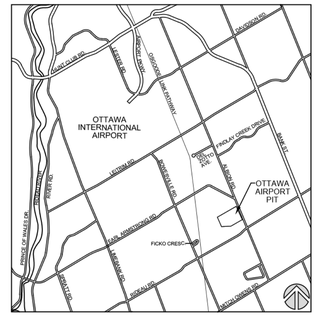
1. COMPLETE EXTRACTION IN AREA A.
2. BEGIN STRIPPING TOPSOIL AND/OR OVERBURDEN SEPARATELY FROM AREA B AND USE THE MATERIAL TO BEGIN PROGRESSIVE REHABILITATION OF AREA A.
3. COMPLETE REHABILITATION OF AREA A AND EXTRACTION OF AREA B.
4. COMPLETE REHABILITATION IN AREA B USING MATERIAL STORED IN BERMS.
5. REMOVE ALL EQUIPMENT, STRUCTURES AND SCRAP FROM THE SITE AND REHABILITATE ALL HAUL ROADS.

TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

ARCHAEOLOGICAL ASSESSMENT - ---------- DATED---------- SHOULD DEEPLY BURIED ARCHAEOLOGICAL MATERIAL BE FOUND ON THE PROPERTY DURING DEVELOPMENT ACTIVITIES, THE MINISTRY OF CULTURE SHOULD BE NOTIFIED IMMEDIATELY AT (519) 675-7742.. IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING EXCAVATION, THE PROPONENT SHOULD IMMEDIATELY CONTACT BOTH THE MINISTRY OF CULTURE AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS, (416) 326-3414."

KEY MAP



LEGEND

- BOUNDARY OFGRAVEL PIT
- LOT LINE
- PARCEL LINE
- REGULATORY SETBACK LINE
- LIMIT OF EXTRACTION
- EASEMENT LINE
- EXISTING FENCE
- EXISTING 5m CONTOUR LINE (225)
- EXISTING 1m CONTOUR LINE (224)
- EXISTING SPOT ELEVATION (228.60)
- EXISTING VEGETATION
- EXISTING WETLAND
- EXTRACTION FACE
- BERM (MIN. HEIGHT AS SHOWN)
- UNDISTURBED AREA
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- LOCATION OF CROSS SECTION (A)
- EXISTING HYDRO POLE (HP)
- DIRECTION OF SURFACE WATER DRAINAGE
- MONITORING WELLS INSTALLED BY PREVIOUS OWNER DATE - UNKNOWN (MW1)
- EXISTING ENTRANCE/ EXIT
- DIRECTION OF EXTRACTION
- DIRECTION OF TOPSOIL AND OVERBURDEN MOVEMENT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- EXISTING ELEVATION (296.00) / PROPOSED ELEVATION (286.00)

NO.	DATE	REVISIONS	OWNER	HM

Pre Approval Review

NO.	DATE	REVISIONS	OWNER	HM

Site Plan Amendments

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

CAVANAGH
OTTAWA AIRPORT PIT

PART OF LOTS 23 AND 24, CONCESSION 3 FROM RIDEAU RIVER GEOGRAPHIC TOWNSHIP OF GLOUCESTER CITY OF OTTAWA

Scale 1:4000 (0 50 100 150m)	**North**	**Stamp** DRAFT
Drawing Status PRELIMINARY FOR DISCUSSION		
Drawn S.B.	**Checked** M.H.	**Issue Date**
Drawing Title EXISTING FEATURES AND OPERATIONAL PLAN		**Project Number** 19-27
		Drawing Number 1 OF 2

FILE NAME: 19-27/COMP/1927-1.DWG
PLOT DATE: SEPTEMBER 23, 2019

EXISTING FEATURES NOTES

GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSISTS OF 2 DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.

LICENCE INFORMATION

3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE CITY OF OTTAWA.
4. APPLICANT:
   THOMAS CAVANAGH CONSTRUCTION LTD.
   9094 CAVANAUGH ROAD,
   ASHTON, ONTARIO
   K0A 1B0
5. TOTAL AREA OF GRAVEL PIT: 38.4 ha
   TOTAL AREA TO BE EXTRACTED: 33.0 ha
   TOTAL AREA TO REHABILITATED: 33.0 ha

BASE INFORMATION

6. PROPERTY BOUNDARY INFORMATION FOR PART OF LOTS 23 AND 24, CONCESSION 3 FROM, FROM RIDEAU RIVER, CITY OF OTTAWA WAS OBTAINED FROM ARNETT, KENNEDY, RIDDELL AND JASON SURVEYING LTD. LEGAL SURVEY, DATED NOVEMBER 24, 1988. ALL ELEVATIONS ARE GEODETIC AND ABOVE SEA LEVEL (ASL).

   THE SITE WAS FIELD CHECKED BY ----------, ----------.

7. ZONING INFORMATION OBTAINED FROM SCHEDULE 'A', MUNICIPALITY OF STRATHROY-CARADOC ZONING BY-LAW NO. 43-08, KEY MAP NO. 29, DATED FEBRUARY 2019.

HYDROGEOLOGICAL INFORMATION

8. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY----------, DATED -----.
9. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE AT ±--m ABOVE SEA LEVEL (A.S.L.) BASED ON THE HYDROGEOLOGICAL REPORT (SEE ABOVE).

TECHNICAL REPORTS

10. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM REPORTS BY ---------- ---------- DATED -----(REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
11. NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY ---------- ---------- DATED ---- (REFER TO SHEET - FOR TECHNICAL RECOMMENDATIONS).
12. ARCHAEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY---------- DATED ---------- (REFER TO SHEET 1 OF 2 FOR TECHNICAL RECOMMENDATIONS).

OPERATIONS NOTES

GENERAL INFORMATION

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND MAY SLIGHTLY VARY WITH MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY SPECIFIC OR EQUAL TIME PERIOD.

   EXTRACTION SHALL GENERALLY FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT. NOT WITHSTANDING THE EXTRACTION AND REHABILITATION PROCESS ABOVE, DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING.

EXTRACTION/PROCESSING/HAULING INFORMATION

2. TOTAL AREA TO BE EXTRACTED IS 33.8 HECTARES.
3. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS ---------- TONNES.

   EXTRACTION OF SAND AND GRAVEL WILL TAKE PLACE IN ONE OR TWO BENCHES, WITH A MAXIMUM HEIGHT OF ±6 METRES. THE GROUNDWATER TABLE IS ESTIMATED TO BE BETWEEN ± ----- AND ---- ASL (SEE ----- GROUNDWATER SCIENCE CORP.)

   OTHER SITE ACTIVITIES WILL INCLUDE STRIPPING AND REHABILITATION, OPERATIONAL EQUIPMENT MAY INCLUDE TRUCKS, LOADERS, EXCAVATOR, BACKHOES, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT. PRODUCT STOCKPILES WILL BE LOCATED ON THE PIT FLOOR. MATERIAL FROM OTHER PROPERTIES MAY BE IMPORTED INTO THE SITE FOR BLENDING CUSTOM PRODUCTS AND/OR RESALE.

4. OFFICE/STORAGE BUILDING AND/OR SCALE/SCALEHOUSE MAY BE CONSTRUCTED WHERE SHOWN. .

HYDROGEOLOGICAL INFORMATION

5. THE WATER TABLE ELEVATION VARIES ACROSS THIS LICENCE FROM APPROXIMATELY ±---- - ± -----m ABOVE SEA LEVEL (A.S.L.), BASED ON THE -------- HYDROGEOLOGICAL REPORT (SEE ABOVE). REFER TO SECTIONS ON SHEET 2 OF 2.
6. SURFACE DRAINAGE WILL BE DIRECTED TO LOW AREAS FOR WATER TO INFILTRATE INTO THE GRANULAR MATERIALS ON THE PIT FLOOR. THERE WILL BE NO OFF-SITE DITCHING/ DISCHARGE.

NOISE MITIGATION INFORMATION

7. HOURS OF OPERATION:

SITE PREPARATION AND REHABILITATION:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
EXCAVATION AND PROCESSING	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
SHIPPING:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS

AIR QUALITY INFORMATION

1. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

SITE MANAGEMENT INFORMATION

MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION

2. EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

FENCING INFORMATION

3. BOUNDARIES OF THE GRAVEL PIT THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 2 EXISTING FEATURES. SILT FENCING WILL BE CONSTRUCTED ONCE STRIPPING OCCURS WITHIN 50m OF THE SETBACKS ADJACENT TO THE NATURAL HERITAGE FEATURES IDENTIFIED ON SITE. ALL FENCING SHALL BE MAINTAINED UNTIL FINAL REHABILITATION IS COMPLETE.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

4. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS WHERE SHOWN AND STOCKPILES ON PIT FLOOR CLOSE TO EXTRACTION FACE.

BERM INFORMATION

14. BERMS SHALL CREATE AN EFFECTIVE VISUAL BARRIER AND BE A MINIMUM OF ±2.5 METRES ABOVE THE EXISTING GRADE. BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 2 OF 2. ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN, NOTE #7) IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION.
15. ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND REHABILITATE THE SITE. TOPSOIL CAN BE TEMPORARILY STOCKPILED ON THE PIT FLOOR.

SCRAP STORAGE INFORMATION

16. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WILL BE STORED IN THE PROCESSING AREA, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND NOT WITHIN 30m OF ANY BODY OF WATER AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. STUMPS/ WOODY MATERIAL MAY BE CHIPPED AND USED FOR SOIL ENHANCEMENT DURING PROGRESSIVE REHABILITATION. TREES WILL BE HARVESTED AND SOLD AS LUMBER OR UTILIZED FOR FIREWOOD AND/ OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

17. FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE AGGREGATE PROCESSING EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD. ALL SPILLS TO THE ENVIRONMENT MUST BE REPORTED TO THE SPILLS ACTION CENTRE OF MECP. ANY SPILL SHALL BE REMOVED AND DISPOSED OF AT AN APPROPRIATE MECP APPROVED FACILITY.

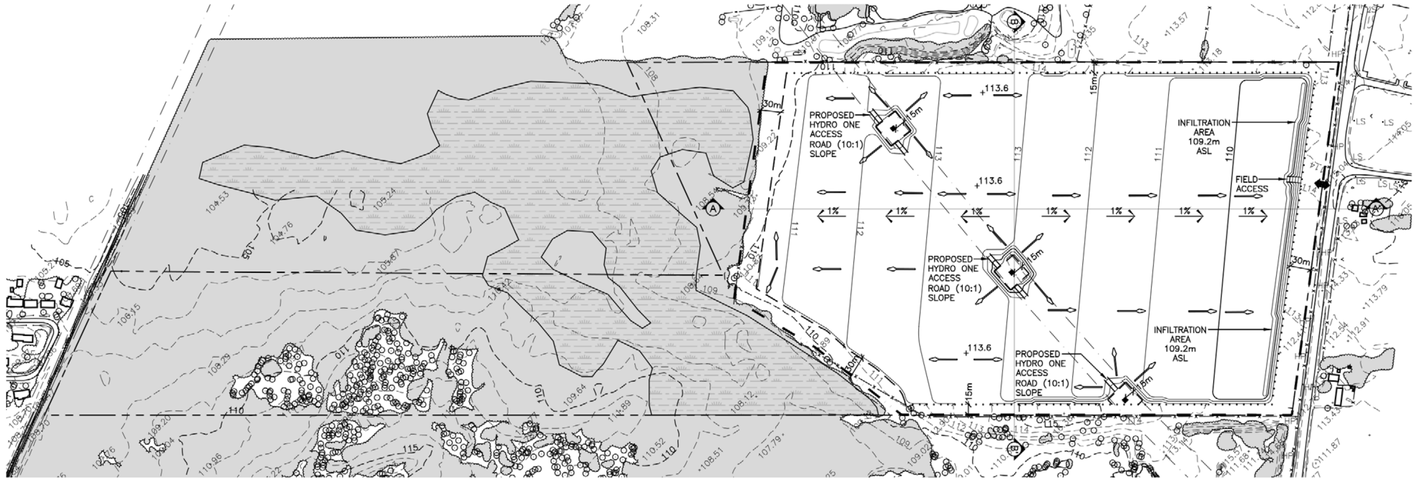
IMPORTATION OF FILL INFORMATION

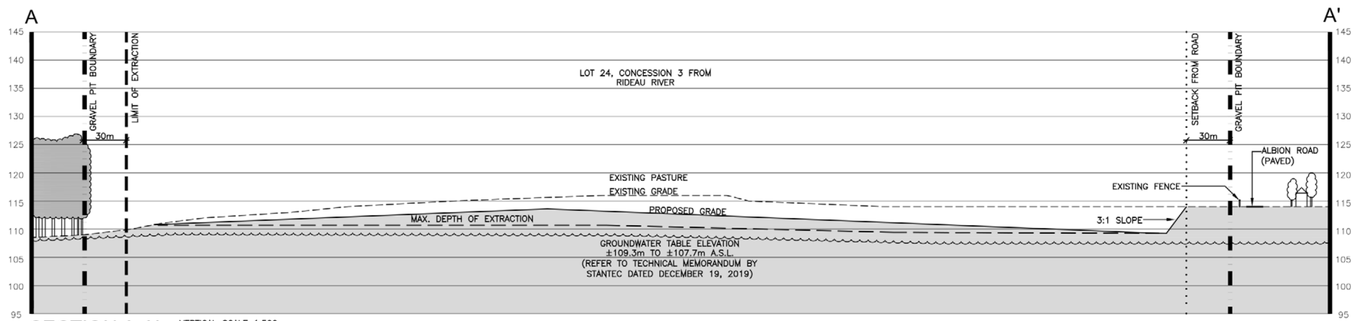
18. IN ORDER TO MAXIMIZE RESOURCE RECOVERY, IMPORTATION OF CLEAN INERT FILL (EG. TOPSOIL AND/OR OVERBURDEN) MAY BE IMPORTED TO FACILITATE AGRICULTURAL REHABILITATION.

    IMPORTED MATERIAL SHALL MEET THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S PARAMETERS UNDER TABLE "1" OF MECP'S "SOIL, GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ENVIRONMENTAL PROTECTION ACT".

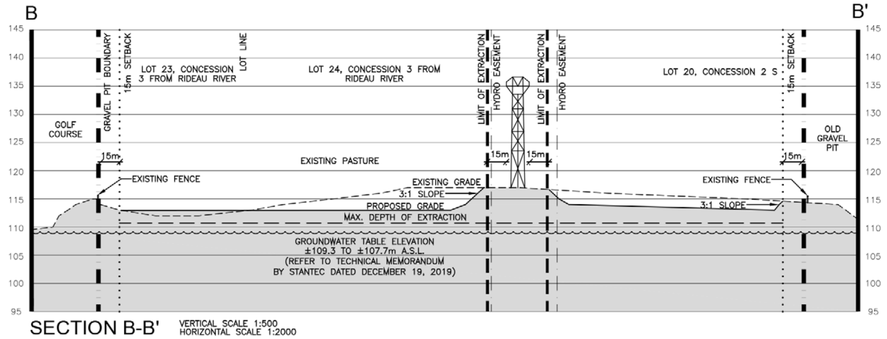
    SAMPLING AND TESTING OF ALL IMPORTED MATERIAL SHALL BE PERFORMED AT SOURCE PRIOR TO THE IMPORTATION OF MATERIAL ONTO THE LICENSED SITE BY A QP UNDER EPA. A QP SHALL ALSO DESIGN A FILL MONITORING PROGRAM.

    DETAILED RECORDS SHALL BE KEPT OF THE AMOUNT OF MATERIAL BROUGHT ON SITE FOR REHABILITATION AND THE TESTING RESULTS OF ALL SAMPLES.

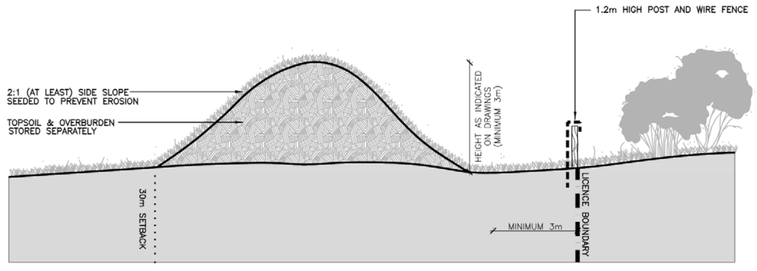




SECTION A-A' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000



SECTION B-B' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000



TYPICAL BERM SECTION
N.T.S.

REHABILITATION NOTES

GENERAL INFORMATION

1. REFER TO SHEET 2 OF 2 FOR SECTIONS, SHEET 1 OF 2 FOR OPERATIONS AND PHASING DIAGRAMS AND NOTES AND SHEET 2 OF 2 FOR FINAL REHABILITATION AND NOTES.
2. PROPERTY SHALL BE REHABILITATED TO:
   AGRICULTURE 33 HA

HYDROGEOLOGICAL INFORMATION

3. IT IS ANTICIPATED THAT THE GROUNDWATER ELEVATION ACROSS THE SITE WILL REMAIN RELATIVELY UNCHANGED AT ±109.3m TO 107.7m A.S.L. (REFER TO HYDROGEOLOGICAL TECHNICAL MEMORANDUM)
4. ALL SURFACE DRAINAGE WILL BE DIRECTED TO THE LOW AREAS REMAINING ON THE PIT FLOOR ON SITE SO THAT THE WATER CAN INFILTRATE INTO THE GRANULAR MATERIALS. THERE WILL BE NO SURFACE DISCHARGE TO --

SIDESLOPE/MEADOW REHABILITATION INFORMATION

GRADING INFORMATION

5. REHABILITATED SLOPES WITHIN THE LICENCED AREA WILL BE CONSTRUCTED AS SHOWN ON THE CROSS SECTIONS. REHABILITATION OF ABOVE WATER SLOPES SHALL BE BY BACKFILLING (MINIMUM 3:1) AND/OR CUT AND FILL METHOD USING AVAILABLE ON SITE OVERBURDEN AND TOPSOIL FROM WITHIN THE LICENSED AREA AND/OR CLEAN INERT IMPORTED FILL THAT MEETS THE REGULATION 347 (MOE'S GUIDELINES UNDER TABLE "F").

   AVAILABLE OVERBURDEN REPLACED WILL BE APPROXIMATELY 200mm THICK.

   REFER TO DRAWING - OF -, SECTIONS, FOR MORE INFORMATION ON BACKFILLING AND CREATION OF REHABILITATED SIDESLOPES.

TOPSOILING INFORMATION

6. ALL AVAILABLE TOPSOIL ON THE SITE WILL REMAIN TO BE USED FOR REHABILITATION OF THIS SITE. AVAILABLE TOPSOIL REPLACED WILL BE APPROXIMATELY 200-300mm THICK.

VEGETATION STABILIZATION INFORMATION

7. TOPSOIL SHALL BE SEEDED WITH A MIXTURE OF GRASSES AND LEGUMES THAT MAY INCLUDE THE FOLLOWING AT A RATE OF APPROXIMATELY 125KG/HA.
   BUCKWHEAT RED CLOVER WHITE CLOVER
   TALL FESCUE ANNUAL RYE

REHABILITATION TO AGRICULTURAL FIELDS INFORMATION

8. DEEP RIPPING OF FIELDS SHALL BE PERFORMED TO ELIMINATE COMPACTION (WHERE REQUIRED).
9. SPREADING OF AVAILABLE SUBSOIL/ OVERBURDEN AND ROUGH GRADING.
10. SPREADING OF AVAILABLE TOPSOIL AND FINE GRADING.
11. REMOVAL OF STONES LARGER THAN 100mm.
12. SEED AREAS WITH SEED MIXTURE NOTED ABOVE. ALL VEGETATION PLANTED SHALL BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.
13. MATERIAL FROM OTHER PROPERTIES (EG. MANURE AND/ OR TOPSOIL) MAY BE IMPORTED INTO THE SITE FOR SOIL ENHANCEMENT USING STANDARD AGRICULTURAL PRACTICES.

SETBACK REHABILITATION INFORMATION

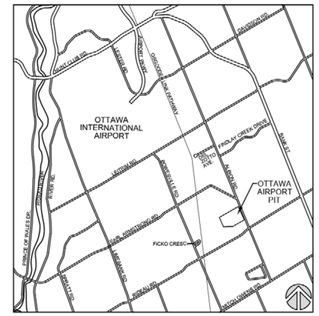
14. AFTER SIDESLOPES ARE CREATED AND REQUIRED BERMS ARE REMOVED FROM SETBACKS, THESE AREAS WILL BE IMMEDIATELY STABILIZED WITH A SUITABLE GROUNDCOVER AND THEN CULTIVATED THE FOLLOWING SPRING.

SECTION NOTES

GENERAL INFORMATION

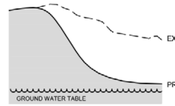
1. SECTION LINES ARE INDICATED ON DRAWINGS 1 AND 2.

KEY MAP



LEGEND

- BOUNDARY OF GRAVEL PIT
- PARCEL LINE
- SETBACK LINE
- LIMIT OF EXTRACTION
- EASEMENT LINE
- EXISTING FENCE
- EXISTING HYDRO POLE
- 225 EXISTING 5m CONTOUR LINE
- DIRECTION OF SURFACE WATER DRAINAGE
- 224 EXISTING 1m CONTOUR LINE
- 225 PROPOSED 5m CONTOUR LINE
- MW1 MONITORING WELLS INSTALLED BY ----- DATE -----
- 224 PROPOSED 1m CONTOUR LINE
- LOCATION OF CROSS SECTION
- EXISTING SPOT ELEVATION
- EXISTING WETLAND
- EXISTING VEGETATION



EXISTING VEGETATION

NO.	DATE	REVISIONS	OWNER	HM

Pre Approval Review

NO.	DATE	REVISIONS	OWNER	HM

Site Plan Amendments

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

CAVANAGH
OTTAWA AIRPORT PIT

PART OF LOTS 23 AND 24, CONCESSION 3 FROM RIDEAU RIVER
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

Scale 1:4000
0 50 100 150m

North

Stamp DRAFT

Drawing Status PRELIMINARY FOR DISCUSSION

Drawn S.B. **Checked** M.H. **Issue Date**

Drawing Title SECTIONS, DETAILS AND REHABILITATION PLAN

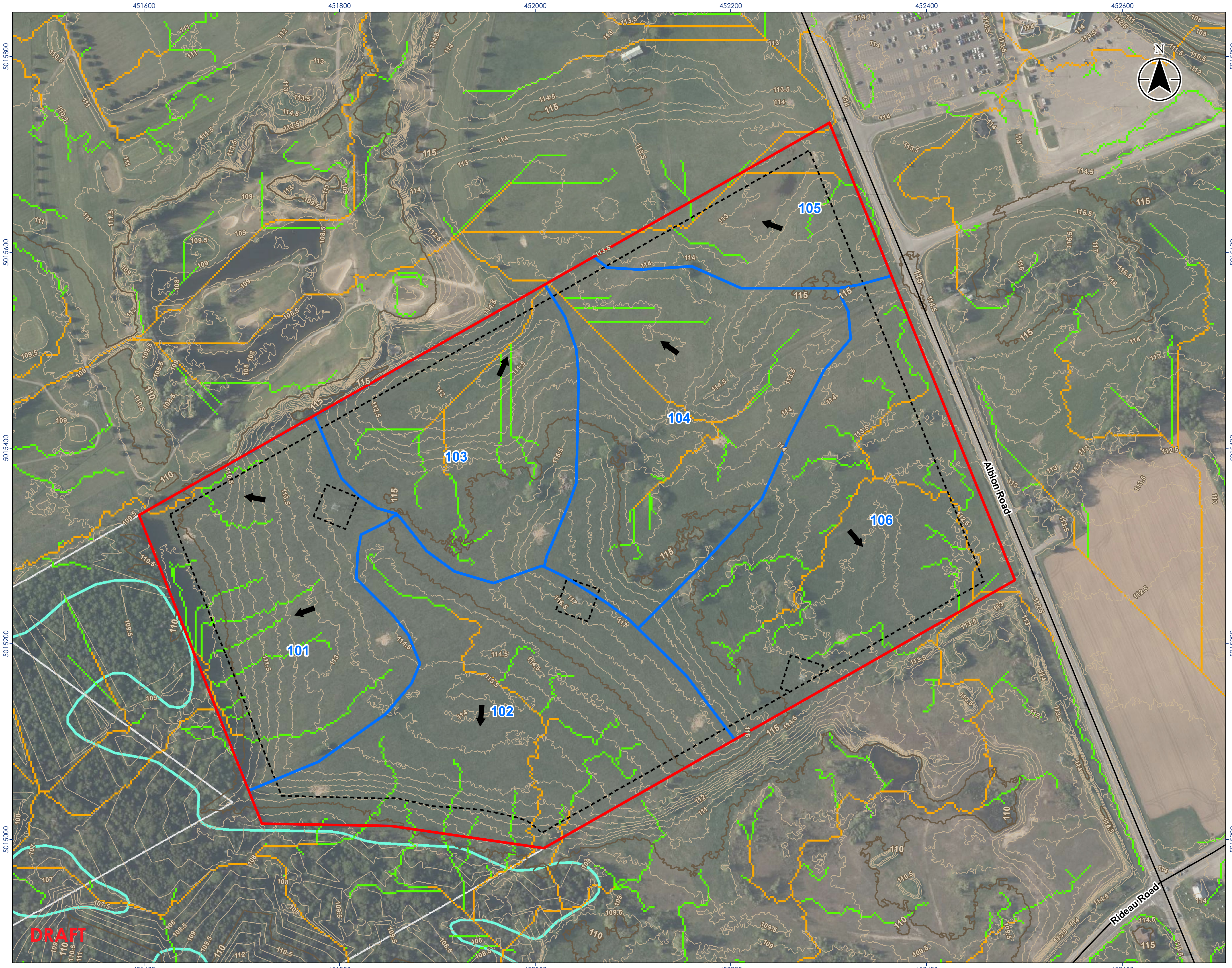
Project Number 19-27

Drawing Number 2 OF 2

FILE NAME: 19-27/COMP/1927-2.DWG
PLOT DATE: JANUARY 22, 2020

APPENDIX B

Existing and Proposed Catchments



Stantec

Legend

- Approximate Direction of Surface Water Flow
- Site Boundary
- Setback Limit
- Catchment Boundary
- Subject Property Boundary
- Wetland, Not evaluated per OWES
- Contours (0.5 m Intervals)

Flow Accumulation (Modeled)

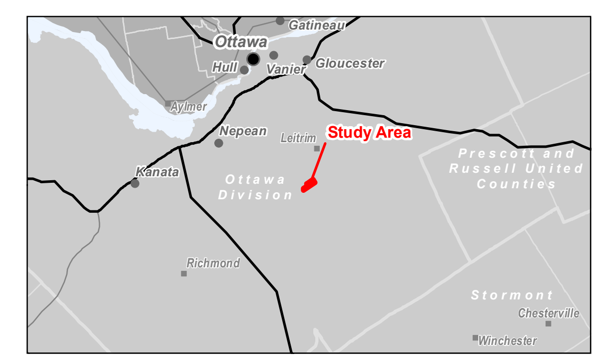
- None
- Low
- Moderate

0 100 200 metres

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



Project Location
City of Ottawa

160961321 REVA
Prepared by DH on 2020-01-16
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL
AGGREGATE AT OMCIAA PARCEL C

Figure No.
1

Title
Existing Catchments

451600 451800 452000 452200 452400 452600

5015800 5015600 5015400 5015200 5015000

201 202 203 A B

Albion Road

Rideau Road

N

DRAFT

Stantec

Legend

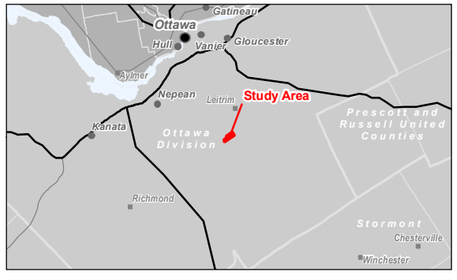
- Site Boundary
- Setback Limit
- Catchment Boundary
- Subject Property Boundary
- Wetland, Not evaluated per OWES

0 100 200 metres

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2019. Imagery Date, 2017.



Project Location
City of Ottawa

160961321 REVA
Prepared by DH on 2020-01-23
Technical Review by ABC on yyyy-mm-dd

Client/Project
OTTAWA INTERNATIONAL AIRPORT AUTHORITY
EXTRACTION AND PROCCESSING OF MINERAL AGGREGATE AT OMCIAA PARCEL C

Figure No.
2

DRAFT

Title
Proposed Catchments

V:\01609\active\160961321\03_data\gis_cad\gis\mxds\Water Resources\report_figures\SWM\160961321_Fig02_Proposed_Catchments.mxd Revised: 2020-01-23 By: dharvey

APPENDIX C

SWMHYMO Parameters and Data Files

Subject: **Curve Number Determination - Ottawa Airport Lands - Parcel C, Ottawa, ON**
Project: **Ottawa Airport Pit**
Site: **Ottawa, ON**
Project No.: **160961321**
Client: **Thomas Cavanagh Construction Ltd.**
Date: **January 21, 2020**

TABLE OF CURVE NUMBERS (CN's)								
Land Use		Hydrologic Soil Type						Source
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	65	71	75	78	USDA
Woodlot	"Fair"	36	48	60	67	73	76	79	USDA
Lawns	"Good"	39	50	61	68	74	77	80	USDA
Pasture/Range		49	55	60	70	79	82	84	USDA
Crop - SR + CR	"Good"	64	70	75	79	82	84	85	USDA
Long Grass		55	60	65	72	79	82	84	USDA
Bare Soil (Fallow)		77	82	86	89	91	93	94	USDA
Impervious		98	98	98	98	98	98	98	USDA
Wetland		50	50	50	50	50	50	50	USDA

USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Compexes

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101	100							100
102	100							100
103	100							100
104	100							100
105	100							100
106	100							100

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Long Grass	Bare Soil	Wetland	Impervious	Total
101				100						100
102				100						100
103				100						100
104				100						100
105				100						100
106				100						100

CURVE NUMBER (CN) - Existing Conditions											
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Long Grass	Bare Soil	Wetland	Impervious	Weighted CN w/o imp	Weighted CN w/ imp
101				49						49	49
102				49						49	49
103				49						49	49
104				49						49	49
105				49						49	49
106				49						49	49

Notes: AMC II assumed - AMC III Conversion Per Soil Conservation Service Curve Number (SCS-CN) Methodology (Mishra, Surendra and Vijay P. Sing (2003))
Hydrological Soil Groups taken from MTO Drainage Manual

Subject: **Curve Number Determination - Ottawa Airport Lands - Parcel C, Ottawa, ON**
Project: **Ottawa Airport Pit**
Site: **Ottawa, ON**
Project No.: **160961321**
Client: **Thomas Cavanagh Construction Ltd.**
Date: **January 27, 2020**

TABLE OF CURVE NUMBERS (CN's)								
Land Use		Hydrologic Soil Type						Source
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	65	71	75	78	USDA
Woodlot	"Fair"	36	48	60	67	73	76	79	USDA
Lawns	"Good"	39	50	61	68	74	77	80	USDA
Pasture/Range		49	55	60	70	79	82	84	USDA
Crop - SR + CR	"Good"	64	70	75	79	82	84	85	USDA
Long Grass		55	60	65	72	79	82	84	USDA
Bare Soil (Fallow)		77	82	86	89	91	93	94	USDA
Impervious		98	98	98	98	98	98	98	USDA
Wetland		50	50	50	50	50	50	50	USDA

USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Compexes

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
A	100							100
B	100							100
201	100							100
202	100							100
203	100							100

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Long Grass	Bare Soil	Wetland	Impervious	Total
A				100						100
B				100						100
201				100						100
202				100						100
203				100						100

CURVE NUMBER (CN) - Proposed Conditions											
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Long Grass	Bare Soil	Wetland	Impervious	Weighted CN w/o imp	Weighted CN w/ imp
A				49						49	-
B				49						49	-
201				49						49	-
202				49						49	-
203				49						49	-

Notes: AMC II assumed - AMC III Conversion Per Soil Conservation Service Curve Number (SCS-CN) Methodology (Mishra, Surendra and Vijay P. Sing (2003))
Hydrological Soil Groups taken from MTO Drainage Manual

160961321 - Ottawa Airport Pit
SWMHYMO Parameters

Catchment Number	SWMHYMO Command	Area (ha)	CN	TIMP (%)	XIMP (%)	Rise (m)	Length (m)	Slope (%)	Tc (hrs)	Tp (hrs)
Existing										
101	DESIGN NASHYD	6.27	49	0	0	4.5	150	3.0	0.4	0.25
102	DESIGN NASHYD	8.58	49	0	0	4.0	400	1.0	1.0	0.59
103	DESIGN NASHYD	5.16	49	0	0	2.5	250	1.0	0.8	0.46
104	DESIGN NASHYD	7.31	49	0	0	3.5	350	1.0	0.9	0.55
105	DESIGN NASHYD	2.70	49	0	0	1.5	150	1.0	0.6	0.36
106	DESIGN NASHYD	8.39	49	0	0	2.0	400	0.5	1.2	0.74
		38.40								
Proposed										
A	DESIGN NASHYD	13.53	49	0	0	2.8	280	1.0	0.8	0.49
B	DESIGN NASHYD	21.49	49	0	0	4.0	420	1.0	1.0	0.61
201	DESIGN NASHYD	1.12	49	0	0	0.5	15	3.3	0.1	0.08
202	DESIGN NASHYD	1.50	49	0	0	1.0	30	3.3	0.2	0.11
203	DESIGN NASHYD	0.76	49	0	0	0.5	15	3.3	0.1	0.08
		38.40								

SWMHYMO Parameter Notes:

TIMP — Total percent impervious

XIMP — Percent impervious directly connected

Time of Concentration calculated using the SCS Lag Equation (For areas greater than 100 ha)

$Tc = [259L^{0.8} [(1000 / CN) - 9]^{0.7}] / [1900S^{0.5}]$

Where: L = Length of Overland Flow (m)
CN = SCS Curve Number
S = Slope (%)

Time of Concentration calculated using the Airport Method (For areas less than 100 ha)

$Tc = [3.26 (1.1-C) L^{0.5}] / S^{0.33}$

Where: C = Runoff Coefficient = 0.2 for undeveloped areas
L = Length of Overland Flow (m)
S = Slope (%)

Time to Peak — $Tp = 0.6Tc$

CN calculated for pervious areas only for CALIB STANDHYD. CN is a weighed average for CALIB NASHYD

```
2     Metric units
*#************************************************************************
*#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321]
*#  Date        : January 2020
*#  Modeller    : [D. Smith]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#************************************************************************
*#  Site hydrologic analysis.  Existing conditions model.
*#
*#  Storms: 2,5,25,50,100yr, DT=1 min
*#
*#  Soil type based on Investigations performed by Houle (2014);
*#     deposits of sands, sands and gravels, underlain by a silty clay
*#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(45
19'N,75 40'W)
*#  Hydrologic analysis performed to determine existing flows on site
*#
*#************************************************************************
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[1]
*#                   ["24hII.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|-------------------------------------------------------|
READ STORM          STORM_FILENAME=["STORM.001"]
*%-----------------|-------------------------------------------------------|
*# ======================================================================
*#    EXISTING CONDITIONS MODEL
*#************************************************************************
*#    Catchment 101 - Western portion of site draining west into wetland
*#************************************************************************
DESIGN NASHYD       ID=[1], NHYD=["101"], DT=[1]min, AREA=[6.27](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.25]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*#    Catchment 102 - South west side of site, drains south west into wetland
*#************************************************************************
DESIGN NASHYD       ID=[2], NHYD=["102"], DT=[1]min, AREA=[8.58](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.59]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*#    Catchment 103 - central portion of northern site boundary, draining north
east to golf course
*#************************************************************************
DESIGN NASHYD       ID=[3], NHYD=["103"], DT=[1]min, AREA=[5.16](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.46]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
```

```
*#************************************************************************
*#    Catchment 104 - east/central portion of site, drains north west to golf
course
*#************************************************************************
DESIGN NASHYD       ID=[4], NHYD=["104"], DT=[1]min, AREA=[7.31](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.55]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|--------------------------------------------------------|
*#************************************************************************
*#    Catchment 105 - northern corner of site draining north west to golf course
*#************************************************************************
DESIGN NASHYD       ID=[5], NHYD=["105"], DT=[1]min, AREA=[2.7](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.36]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*#************************************************************************
*#    Catchment 106 - South east corner of site draining south to undeveloped land

*#************************************************************************
DESIGN NASHYD       ID=[6], NHYD=["106"], DT=[1]min, AREA=[8.39](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.74]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|--------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2]
*#                    ["24hV.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|--------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[3]
*#                    ["24hX.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|--------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[4]
*#                    ["24hXXV.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|--------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[5]
*#                    ["24hL.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|--------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[6]
*#                    ["24hC.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|--------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[7]
*#                    ["25mm4hr.stm"] <--storm filename, one per line for NSTORM
time
*%-----------------|--------------------------------------------------------|
FINISH
```

```
   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO       999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                         9   9  9   9   # 4730904
         StormWater Management HYdrologic Model           999    999    =========

 ********************************************************************************
 ***************************** SWMHYMO Ver/4.05  ********************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
 ********************************************************************************
 ******** Distributed by:  J.F. Sabourin and Associates Inc.           *********
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 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 ********************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
 +++++++++                Kitchener             SERIAL#:4730904       +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

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

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****-----------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).   *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).   *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.            *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).      *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).      *****
 *****     *:  see WARNING or NOTE message printed at end of run.        *****
 *****    **:  see  ERROR  message printed at end of run.                *****
 ********************************************************************************
 ********************************************************************************
```



```
 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

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

 **********************   S U M M A R Y   O U T P U T   **********************
 ********************************************************************************
 *         DATE: 2020-01-20     TIME: 10:14:19     RUN COUNTER: 000214         *
 ********************************************************************************
 * Input   filename: C:\SWMHYMO\Cavanagh\Ex2.dat                                *
 * Output  filename: C:\SWMHYMO\Cavanagh\Ex2.out                                *
 * Summary filename: C:\SWMHYMO\Cavanagh\Ex2.sum                                *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************


#*******************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*******************************************************************************
#  Site hydrologic analysis.  Existing conditions model.
#
#  Storms: 2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine existing flows on site
#
#*******************************************************************************
 RUN:COMMAND#

001:0001-------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]

001:0002-------------------------------------------------------------------------
-
     READ STORM
```



```
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT=  49.40]
# ==============================================================================
#    EXISTING CONDITIONS MODEL
#*******************************************************************************
#    Catchment 101 - Western portion of site draining west into wetland
#*******************************************************************************

001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:101            6.27     .091 No_date   12:09    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .25:DT= 1.00]
#*******************************************************************************
#    Catchment 102 - South west side of site, drains south west into wetland
#*******************************************************************************

001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:102            8.58     .069 No_date   12:33    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .59:DT= 1.00]
#*******************************************************************************
#    Catchment 103 - central portion of northern site boundary, draining north
#*******************************************************************************

001:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      03:103            5.16     .049 No_date   12:23    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .46:DT= 1.00]
#*******************************************************************************
#    Catchment 104 - east/central portion of site, drains north west to golf co
#*******************************************************************************

001:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:104            7.31     .062 No_date   12:30    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .55:DT= 1.00]
#*******************************************************************************
#    Catchment 105 - northern corner of site draining north west to golf course
#*******************************************************************************
```



```
001:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:105            2.70     .031 No_date   12:16    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .36:DT= 1.00]
#*******************************************************************************
#    Catchment 106 - South east corner of site draining south to undeveloped la
#*******************************************************************************

001:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:106            8.39     .057 No_date   12:43    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .74:DT= 1.00]
  ** END OF RUN :   1

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




 RUN:COMMAND#

002:0001-------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   2 ]
#*******************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*******************************************************************************
#  Site hydrologic analysis.  Existing conditions model.
#
#  Storms: 2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
```

```
#  Hydrologic analysis performed to determine existing flows on site
#
#*****************************************************************************

002:0002----------------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT=  67.30]
# ============================================================================
#    EXISTING CONDITIONS MODEL
#*****************************************************************************
#    Catchment 101 - Western portion of site draining west into wetland
#*****************************************************************************

002:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:101            6.27     .165 No_date   12:09   13.11
.195
      [CN= 49.0: N= 3.00]
      [Tp=  .25:DT= 1.00]
#*****************************************************************************
#    Catchment 102 - South west side of site, drains south west into wetland
#*****************************************************************************

002:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:102            8.58     .124 No_date   12:32   13.11
.195
      [CN= 49.0: N= 3.00]
      [Tp=  .59:DT= 1.00]
#*****************************************************************************
#    Catchment 103 - central portion of northern site boundary, draining north
#*****************************************************************************

002:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      03:103            5.16     .089 No_date   12:23   13.11
.195
      [CN= 49.0: N= 3.00]
      [Tp=  .46:DT= 1.00]
#*****************************************************************************
#    Catchment 104 - east/central portion of site, drains north west to golf co
#*****************************************************************************

002:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
```



```
     DESIGN NASHYD      04:104            7.31     .111 No_date   12:29   13.11
.195
      [CN= 49.0: N= 3.00]
      [Tp=  .55:DT= 1.00]
#*****************************************************************************
#    Catchment 105 - northern corner of site draining north west to golf course
#*****************************************************************************

002:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:105            2.70     .055 No_date   12:16   13.11
.195
      [CN= 49.0: N= 3.00]
      [Tp=  .36:DT= 1.00]
#*****************************************************************************
#    Catchment 106 - South east corner of site draining south to undeveloped la
#*****************************************************************************

002:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:106            8.39     .103 No_date   12:43   13.11
.195
      [CN= 49.0: N= 3.00]
      [Tp=  .74:DT= 1.00]
  ** END OF RUN :   2

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




 RUN:COMMAND#

003:0001----------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   3 ]
#*****************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*****************************************************************************
```



```
#  Site hydrologic analysis.  Existing conditions model.
#
#  Storms: 2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine existing flows on site
#
#*****************************************************************************

003:0002----------------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT=  79.20]
# ============================================================================
#    EXISTING CONDITIONS MODEL
#*****************************************************************************
#    Catchment 101 - Western portion of site draining west into wetland
#*****************************************************************************

003:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:101            6.27     .223 No_date   12:09   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .25:DT= 1.00]
#*****************************************************************************
#    Catchment 102 - South west side of site, drains south west into wetland
#*****************************************************************************

003:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:102            8.58     .168 No_date   12:32   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .59:DT= 1.00]
#*****************************************************************************
#    Catchment 103 - central portion of northern site boundary, draining north
#*****************************************************************************

003:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      03:103            5.16     .120 No_date   12:22   17.65
.223
      [CN= 49.0: N= 3.00]
```



```
      [Tp=  .46:DT= 1.00]
#*****************************************************************************
#    Catchment 104 - east/central portion of site, drains north west to golf co
#*****************************************************************************

003:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:104            7.31     .150 No_date   12:29   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .55:DT= 1.00]
#*****************************************************************************
#    Catchment 105 - northern corner of site draining north west to golf course
#*****************************************************************************

003:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:105            2.70     .075 No_date   12:16   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .36:DT= 1.00]
#*****************************************************************************
#    Catchment 106 - South east corner of site draining south to undeveloped la
#*****************************************************************************

003:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:106            8.39     .140 No_date   12:43   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .74:DT= 1.00]
  ** END OF RUN :   3

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




 RUN:COMMAND#

004:0001----------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   4 ]
```

```
#******************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#******************************************************************************
#  Site hydrologic analysis.  Existing conditions model.
#
#  Storms: 2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine existing flows on site
#
#******************************************************************************

004:0002------------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT=  94.30]
# ============================================================================
#    EXISTING CONDITIONS MODEL
#******************************************************************************
#    Catchment 101 - Western portion of site draining west into wetland
#******************************************************************************

004:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:101            6.27     .306 No_date   12:09   24.11
.256
      [CN= 49.0: N= 3.00]
      [Tp=  .25:DT= 1.00]
#******************************************************************************
#    Catchment 102 - South west side of site, drains south west into wetland
#******************************************************************************

004:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:102            8.58     .231 No_date   12:32   24.11
.256
      [CN= 49.0: N= 3.00]
      [Tp=  .59:DT= 1.00]
#******************************************************************************
#    Catchment 103 - central portion of northern site boundary, draining north
```



```
#******************************************************************************

004:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      03:103            5.16     .165 No_date   12:22   24.11
.256
      [CN= 49.0: N= 3.00]
      [Tp=  .46:DT= 1.00]
#******************************************************************************
#    Catchment 104 - east/central portion of site, drains north west to golf co
#******************************************************************************

004:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:104            7.31     .207 No_date   12:29   24.11
.256
      [CN= 49.0: N= 3.00]
      [Tp=  .55:DT= 1.00]
#******************************************************************************
#    Catchment 105 - northern corner of site draining north west to golf course
#******************************************************************************

004:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:105            2.70     .103 No_date   12:15   24.11
.256
      [CN= 49.0: N= 3.00]
      [Tp=  .36:DT= 1.00]
#******************************************************************************
#    Catchment 106 - South east corner of site draining south to undeveloped la
#******************************************************************************

004:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:106            8.39     .192 No_date   12:42   24.11
.256
      [CN= 49.0: N= 3.00]
      [Tp=  .74:DT= 1.00]
  ** END OF RUN :   4

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



 RUN:COMMAND#
```



```
005:0001------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   5 ]
#******************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#******************************************************************************
#  Site hydrologic analysis.  Existing conditions model.
#
#  Storms: 2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine existing flows on site
#
#******************************************************************************

005:0002------------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT= 105.40]
# ============================================================================
#    EXISTING CONDITIONS MODEL
#******************************************************************************
#    Catchment 101 - Western portion of site draining west into wetland
#******************************************************************************

005:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:101            6.27     .374 No_date   12:09   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .25:DT= 1.00]
#******************************************************************************
#    Catchment 102 - South west side of site, drains south west into wetland
#******************************************************************************

005:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
```



```
-
     DESIGN NASHYD      02:102            8.58     .282 No_date   12:32   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .59:DT= 1.00]
#******************************************************************************
#    Catchment 103 - central portion of northern site boundary, draining north
#******************************************************************************

005:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      03:103            5.16     .202 No_date   12:22   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .46:DT= 1.00]
#******************************************************************************
#    Catchment 104 - east/central portion of site, drains north west to golf co
#******************************************************************************

005:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:104            7.31     .252 No_date   12:29   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .55:DT= 1.00]
#******************************************************************************
#    Catchment 105 - northern corner of site draining north west to golf course
#******************************************************************************

005:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:105            2.70     .126 No_date   12:15   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .36:DT= 1.00]
#******************************************************************************
#    Catchment 106 - South east corner of site draining south to undeveloped la
#******************************************************************************

005:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:106            8.39     .235 No_date   12:42   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .74:DT= 1.00]
  ** END OF RUN :   5

*******************************************************************************
```

```
 RUN:COMMAND#

006:0001-----------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   6 ]
#*************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*************************************************************************
#  Site hydrologic analysis.  Existing conditions model.
#
#  Storms: 2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine existing flows on site
#
#*************************************************************************

006:0002-----------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT= 116.50]
# ========================================================================
#    EXISTING CONDITIONS MODEL
#*************************************************************************
#    Catchment 101 - Western portion of site draining west into wetland
#*************************************************************************

006:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:101            6.27     .446 No_date   12:09   34.86
.299
```



```
      [CN= 49.0: N= 3.00]
      [Tp=  .25:DT= 1.00]
#*************************************************************************
#    Catchment 102 - South west side of site, drains south west into wetland
#*************************************************************************

006:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:102            8.58     .337 No_date   12:32   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .59:DT= 1.00]
#*************************************************************************
#    Catchment 103 - central portion of northern site boundary, draining north
#*************************************************************************

006:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      03:103            5.16     .241 No_date   12:22   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .46:DT= 1.00]
#*************************************************************************
#    Catchment 104 - east/central portion of site, drains north west to golf co
#*************************************************************************

006:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:104            7.31     .301 No_date   12:29   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .55:DT= 1.00]
#*************************************************************************
#    Catchment 105 - northern corner of site draining north west to golf course
#*************************************************************************

006:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:105            2.70     .150 No_date   12:15   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .36:DT= 1.00]
#*************************************************************************
#    Catchment 106 - South east corner of site draining south to undeveloped la
#*************************************************************************

006:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
```



```
     DESIGN NASHYD      06:106            8.39     .281 No_date   12:42   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .74:DT= 1.00]
  ** END OF RUN :   6

*************************************************************************
```



```
 RUN:COMMAND#

007:0001-----------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   7 ]
#*************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*************************************************************************
#  Site hydrologic analysis.  Existing conditions model.
#
#  Storms: 2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine existing flows on site
#
#*************************************************************************

007:0002-----------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=10.00:SDUR=   4.00:PTOT=  25.00]
# ========================================================================
#    EXISTING CONDITIONS MODEL
#*************************************************************************
```



```
#    Catchment 101 - Western portion of site draining west into wetland
#*************************************************************************

007:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:101            6.27     .026 No_date    1:46    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .25:DT= 1.00]
#*************************************************************************
#    Catchment 102 - South west side of site, drains south west into wetland
#*************************************************************************

007:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:102            8.58     .021 No_date    2:18    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .59:DT= 1.00]
#*************************************************************************
#    Catchment 103 - central portion of northern site boundary, draining north
#*************************************************************************

007:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      03:103            5.16     .015 No_date    2:06    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .46:DT= 1.00]
#*************************************************************************
#    Catchment 104 - east/central portion of site, drains north west to golf co
#*************************************************************************

007:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:104            7.31     .019 No_date    2:14    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .55:DT= 1.00]
#*************************************************************************
#    Catchment 105 - northern corner of site draining north west to golf course
#*************************************************************************

007:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:105            2.70     .009 No_date    1:56    1.92
.077
      [CN= 49.0: N= 3.00]
```

```
      [Tp=  .36:DT= 1.00]
#******************************************************************************
#    Catchment 106 - South east corner of site draining south to undeveloped la
#******************************************************************************

007:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:106            8.39     .018 No_date    2:32    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .74:DT= 1.00]

007:0002---------------------------------------------------------------------------
-
      FINISH
-------------------------------------------------------------------------------
--
*******************************************************************************
**
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2020-01-20     at 10:14:22
===============================================================================
==
```

```
2     Metric units
*#************************************************************************
*#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321]
*#  Date        : January 2020
*#  Modeller    : [D. Smith]
*#  Company     : Stantec Consulting Ltd. (Kitchener)
*#  License #   :  4730904
*#************************************************************************
*#  Site hydrologic analysis.  Proposed conditions model.
*#
*#  Storms: 25mm,2,5,25,50,100yr, DT=1 min
*#
*#  Soil type based on Investigations performed by Houle (2014);
*#     deposits of sands, sands and gravels, underlain by a silty clay
*#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(45
19'N,75 40'W)
*#  Hydrologic analysis performed to determine storage required on site
*#
*#************************************************************************
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[1]
*#                   ["24hII.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|-------------------------------------------------------|
READ STORM          STORM_FILENAME=["STORM.001"]
*%-----------------|-------------------------------------------------------|
*# ======================================================================
*#    PROPOSED CONDITIONS MODEL
*#************************************************************************
*#    Catchment A - Area A - Phase 1 of aggregate extraction, draining west
*#                           to wetland
*#************************************************************************
DESIGN NASHYD       ID=[1], NHYD=["A"], DT=[1]min, AREA=[13.53](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.49]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*#    Catchment B - Area B - depression in ground from Phase 2 of
*#                           aggregate extraction
*#************************************************************************
DESIGN NASHYD       ID=[2], NHYD=["B"], DT=[1]min, AREA=[21.49](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.61]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|-------------------------------------------------------|
*#************************************************************************
*#    Catchment 201 - Northern perimeter of site, draining north to golf course
*#************************************************************************
DESIGN NASHYD       ID=[4], NHYD=["201"], DT=[1]min, AREA=[1.13](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.08]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
```

```
*%-----------------|---------------------------------------------------------|
*#*****************************************************************************
*#    Catchment 202 - Eastern perimeter of site, drainging east towards AlbionRd
*#*****************************************************************************
DESIGN NASHYD       ID=[5], NHYD=["202"], DT=[1]min, AREA=[1.50](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.11]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|---------------------------------------------------------|
*#*****************************************************************************
*#    Catchment 203 - Southern perimeter of site, draining south to old pit
*#*****************************************************************************
DESIGN NASHYD       ID=[6], NHYD=["203"], DT=[1]min, AREA=[0.76](ha),
                    DWF=[0](cms), CN/C=[49], TP=[0.08]hrs,
                    RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
*%-----------------|---------------------------------------------------------|
*#*****************************************************************************
ROUTE RESERVOIR     IDout=[9],   NHYD=["B"],  IDin=[2],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                    (cms) - (ha-m)
                                  [   0.0   , 0.0000]
                                  [   5.970 , 2.06  ]
                                  [   5.970 , 4.12 ]
                                  [   5.970 , 6.70 ]
                                  [   5.970 , 13.58 ]
                                  [   5.970 , 24.75 ]
                                  [   5.970 , 40.23 ]
                                  [   -1  ,  -1  ]  (max twenty pts)
                          IDovf=[   ], NHYDovf=[   ]

*#*****************************************************************************
*%-----------------|---------------------------------------------------------|
*#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2]
*#                    ["24hV.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[3]
*#                   ["24hX.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|---------------------------------------------------------|
*#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[4]
*#                   ["24hXXV.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[5]
*#                   ["24hL.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[6]
*#                   ["24hC.stm"] <--storm filename, one per line for NSTORM time
*%-----------------|---------------------------------------------------------|
START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[7]
```

```
*#                   ["25mm4hr.stm"] <--storm filename, one per line for NSTORM
time
*%-----------------|-------------------------------------------------------------|
FINISH
```

```
   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO       999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                         9   9  9   9   # 4730904
         StormWater Management HYdrologic Model           999    999    =========

 *****************************************************************************
 ***************************** SWMHYMO Ver/4.05  *****************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
 *****************************************************************************
 ******** Distributed by:  J.F. Sabourin and Associates Inc.           *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 *****************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
 +++++++++                Kitchener             SERIAL#:4730904       +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

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

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****-------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).   *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).    *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.             *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       *****
 *****     *:  see WARNING or NOTE message printed at end of run.         *****
 *****    **:  see  ERROR  message printed at end of run.                 *****
 *****************************************************************************
 *****************************************************************************
```



```
 ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

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

 **********************   S U M M A R Y   O U T P U T   **********************
 *****************************************************************************
 *         DATE: 2020-01-23     TIME: 15:53:46     RUN COUNTER: 000219         *
 *****************************************************************************
 * Input   filename: C:\SWMHYMO\Cavanagh\Pr3.dat                              *
 * Output  filename: C:\SWMHYMO\Cavanagh\Pr3.out                              *
 * Summary filename: C:\SWMHYMO\Cavanagh\Pr3.sum                              *
 * User comments:                                                             *
 * 1:_________________________________________________________________________*
 * 2:_________________________________________________________________________*
 * 3:_________________________________________________________________________*
 *****************************************************************************


#*****************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*****************************************************************************
#  Site hydrologic analysis.  Proposed conditions model.
#
#  Storms: 25mm,2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine storage required on site
#
#*****************************************************************************
 RUN:COMMAND#

001:0001-------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]

001:0002-------------------------------------------------------------------------
-
     READ STORM
```



```
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT=  49.40]
# ============================================================================
#    PROPOSED CONDITIONS MODEL
#*****************************************************************************
#    Catchment A - Area A - Phase 1 of aggregate extraction, draining west
#                           to wetland
#*****************************************************************************

001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:A             13.53     .124 No_date   12:25    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .49:DT= 1.00]
#*****************************************************************************
#    Catchment B - Area B - depression in ground from Phase 2 of
#                           aggregate extraction
#*****************************************************************************

001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:B             21.49     .168 No_date   12:34    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .61:DT= 1.00]
#*****************************************************************************
#    Catchment 201 - Northern perimeter of site, draining north to golf course
#*****************************************************************************

001:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:201            1.13     .028 No_date   12:01    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#*****************************************************************************
#    Catchment 202 - Eastern perimeter of site, draingin east towards AlbionRd
#*****************************************************************************

001:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:202            1.50     .034 No_date   12:02    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .11:DT= 1.00]
#*****************************************************************************
```



```
#    Catchment 203 - Southern perimeter of site, draining south to old pit
#*****************************************************************************

001:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:203            .76     .019 No_date   12:01    7.35
.149
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#*****************************************************************************

001:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     ROUTE RESERVOIR -> 02:B             21.49     .168 No_date   12:34    7.35
n/a
      [RDT= 1.00] out<- 09:B             21.49     .106 No_date   13:16    7.35
n/a
     {MxStoUsed=.3647E-01}
#*****************************************************************************
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2
#                    ["24hV.stm"] <--storm filename, one per line for NSTORM ti
  ** END OF RUN :   2

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




 RUN:COMMAND#

003:0001-------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   3 ]
#*****************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*****************************************************************************
#  Site hydrologic analysis.  Proposed conditions model.
#
#  Storms: 25mm,2,5,25,50,100yr, DT=1 min
```

```
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine storage required on site
#
#******************************************************************************

003:0002-----------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT=  79.20]
# ============================================================================
#    PROPOSED CONDITIONS MODEL
#******************************************************************************
#    Catchment A - Area A - Phase 1 of aggregate extraction, draining west
#                          to wetland
#******************************************************************************

003:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:A             13.53     .302 No_date   12:25   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .49:DT= 1.00]
#******************************************************************************
#    Catchment B - Area B - depression in ground from Phase 2 of
#                           aggregate extraction
#******************************************************************************

003:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:B             21.49     .411 No_date   12:34   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .61:DT= 1.00]
#******************************************************************************
#    Catchment 201 - Northern perimeter of site, draining north to golf course
#******************************************************************************

003:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:201            1.13     .068 No_date   12:01   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
```



```
#******************************************************************************
#    Catchment 202 - Eastern perimeter of site, drainging east towards AlbionRd
#******************************************************************************

003:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:202            1.50     .082 No_date   12:02   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .11:DT= 1.00]
#******************************************************************************
#    Catchment 203 - Southern perimeter of site, draining south to old pit
#******************************************************************************

003:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:203             .76     .046 No_date   12:01   17.65
.223
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#******************************************************************************

003:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     ROUTE RESERVOIR -> 02:B           21.49     .411 No_date   12:34   17.65
n/a
      [RDT= 1.00] out<- 09:B           21.49     .258 No_date   13:16   17.65
n/a
     {MxStoUsed=.8892E-01}
#******************************************************************************
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2
#                    ["24hV.stm"] <--storm filename, one per line for NSTORM ti
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[4
#                   ["24hXXV.stm"] <--storm filename, one per line for NSTORM t
  ** END OF RUN :   4

*******************************************************************************
```



```
 RUN:COMMAND#

005:0001-----------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
```



```
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   5 ]
#******************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#******************************************************************************
#  Site hydrologic analysis.  Proposed conditions model.
#
#  Storms: 25mm,2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#     deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine storage required on site
#
#******************************************************************************

005:0002-----------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT= 105.40]
# ============================================================================
#    PROPOSED CONDITIONS MODEL
#******************************************************************************
#    Catchment A - Area A - Phase 1 of aggregate extraction, draining west
#                          to wetland
#******************************************************************************

005:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:A             13.53     .507 No_date   12:24   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .49:DT= 1.00]
#******************************************************************************
#    Catchment B - Area B - depression in ground from Phase 2 of
#                           aggregate extraction
#******************************************************************************

005:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:B             21.49     .690 No_date   12:33   29.31
```



```
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .61:DT= 1.00]
#******************************************************************************
#    Catchment 201 - Northern perimeter of site, draining north to golf course
#******************************************************************************

005:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:201            1.13     .114 No_date   12:01   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#******************************************************************************
#    Catchment 202 - Eastern perimeter of site, drainging east towards AlbionRd
#******************************************************************************

005:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:202            1.50     .138 No_date   12:02   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .11:DT= 1.00]
#******************************************************************************
#    Catchment 203 - Southern perimeter of site, draining south to old pit
#******************************************************************************

005:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:203             .76     .077 No_date   12:01   29.31
.278
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#******************************************************************************

005:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     ROUTE RESERVOIR -> 02:B           21.49     .690 No_date   12:33   29.31
n/a
      [RDT= 1.00] out<- 09:B           21.49     .432 No_date   13:15   29.31
n/a
     {MxStoUsed=.1492E+00}
#******************************************************************************
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2
#                    ["24hV.stm"] <--storm filename, one per line for NSTORM ti
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[4
#                   ["24hXXV.stm"] <--storm filename, one per line for NSTORM t
  ** END OF RUN :   5
```

```
*******************************************************************************




 RUN:COMMAND#

006:0001------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   6 ]
#*****************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*****************************************************************************
#  Site hydrologic analysis.  Proposed conditions model.
#
#  Storms: 25mm,2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#    deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine storage required on site
#
#*****************************************************************************

006:0002------------------------------------------------------------------------
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=15.00:SDUR=  24.00:PTOT= 116.50]
# ============================================================================
#    PROPOSED CONDITIONS MODEL
#*****************************************************************************
#    Catchment A - Area A - Phase 1 of aggregate extraction, draining west
#                          to wetland
#*****************************************************************************

006:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
```



```
-
     DESIGN NASHYD      01:A             13.53     .605 No_date   12:24   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .49:DT= 1.00]
#*****************************************************************************
#    Catchment B - Area B - depression in ground from Phase 2 of
#                          aggregate extraction
#*****************************************************************************

006:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:B             21.49     .824 No_date   12:33   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .61:DT= 1.00]
#*****************************************************************************
#    Catchment 201 - Northern perimeter of site, draining north to golf course
#*****************************************************************************

006:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:201            1.13     .136 No_date   12:01   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#*****************************************************************************
#    Catchment 202 - Eastern perimeter of site, drainging east towards AlbionRd
#*****************************************************************************

006:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:202            1.50     .164 No_date   12:02   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .11:DT= 1.00]
#*****************************************************************************
#    Catchment 203 - Southern perimeter of site, draining south to old pit
#*****************************************************************************

006:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:203             .76     .091 No_date   12:01   34.86
.299
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#*****************************************************************************
```



```
006:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     ROUTE RESERVOIR -> 02:B             21.49     .824 No_date   12:33   34.86
n/a
      [RDT= 1.00] out<- 09:B             21.49     .516 No_date   13:15   34.86
n/a
     {MxStoUsed=.1782E+00}
#*****************************************************************************
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2
#                    ["24hV.stm"] <--storm filename, one per line for NSTORM ti
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[4
#                   ["24hXXV.stm"] <--storm filename, one per line for NSTORM t
  ** END OF RUN :   6

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




 RUN:COMMAND#

007:0001------------------------------------------------------------------------
-
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   7 ]
#*****************************************************************************
#  Project Name: [Parcel C - Ottawa Airport Lands]  Project Number: [1602961321
#  Date        : January 2020
#  Modeller    : [D. Smith]
#  Company     : Stantec Consulting Ltd. (Kitchener)
#  License #   :  4730904
#*****************************************************************************
#  Site hydrologic analysis.  Proposed conditions model.
#
#  Storms: 25mm,2,5,25,50,100yr, DT=1 min
#
#  Soil type based on Investigations performed by Houle (2014);
#    deposits of sands, sands and gravels, underlain by a silty clay
#  Rainfall obtained from Env. Canada. Ottawa MacDonald-Cartier Int'l Airport.(
#  Hydrologic analysis performed to determine storage required on site
#
#*****************************************************************************

007:0002------------------------------------------------------------------------
```



```
-
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=10.00:SDUR=   4.00:PTOT=  25.00]
# ============================================================================
#    PROPOSED CONDITIONS MODEL
#*****************************************************************************
#    Catchment A - Area A - Phase 1 of aggregate extraction, draining west
#                          to wetland
#*****************************************************************************

007:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      01:A             13.53     .037 No_date    2:08    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .49:DT= 1.00]
#*****************************************************************************
#    Catchment B - Area B - depression in ground from Phase 2 of
#                          aggregate extraction
#*****************************************************************************

007:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      02:B             21.49     .052 No_date    2:20    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .61:DT= 1.00]
#*****************************************************************************
#    Catchment 201 - Northern perimeter of site, draining north to golf course
#*****************************************************************************

007:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      04:201            1.13     .009 No_date    1:32    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#*****************************************************************************
#    Catchment 202 - Eastern perimeter of site, drainging east towards AlbionRd
#*****************************************************************************

007:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      05:202            1.50     .010 No_date    1:34    1.92
.077
      [CN= 49.0: N= 3.00]
```

```
      [Tp=  .11:DT= 1.00]
#******************************************************************************
#    Catchment 203 - Southern perimeter of site, draining south to old pit
#******************************************************************************

007:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     DESIGN NASHYD      06:203             .76     .006 No_date    1:32    1.92
.077
      [CN= 49.0: N= 3.00]
      [Tp=  .08:DT= 1.00]
#******************************************************************************

007:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
-
     ROUTE RESERVOIR -> 02:B             21.49     .052 No_date    2:20    1.92
n/a
      [RDT= 1.00] out<- 09:B             21.49     .036 No_date    3:16    1.92
n/a
     {MxStoUsed=.1227E-01}
#******************************************************************************
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[2
#                    ["24hV.stm"] <--storm filename, one per line for NSTORM ti
#START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[4
#                   ["24hXXV.stm"] <--storm filename, one per line for NSTORM t

007:0002---------------------------------------------------------------------------
-
      FINISH
-------------------------------------------------------------------------------
--
*******************************************************************************
**
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2020-01-23     at 15:53:48
===============================================================================
==
```