DICA ELECTRONICS
160 INDUSTRIAL AVE
CARLETON PLACE, ONTARIO

STORMWATER AND SERVICING BRIEF

EEG PROJECT 11137
PREPARED BY:
EASTERN ENGINEERING GROUP INC.
NOV 2023

PROJECT

Eastern Engineering Group Inc. was retained by DICA Electronics to prepare servicing and grading plans for a new 598 m2 building on their existing site at 160 Industrial Ave, Carleton Place.

The project consists of construction of a new building in the north corner of the site currently grassed. The building will be an office and manufacturing area. A new water service will be connected from the existing water service to the site. A new sanitary service will be installed on the northwest side of building connecting to Bates Avenue sewers.

FIGURE 1: LOCATION

160 INDUSTRIAL DRIVE, CARLETON PLACE, ON

EXISTING CONDITIONS

The existing sites is the existing DICA building along with 2 asphalt parking areas. The remainder of the site is grassed. Services to the existing building are from Industrial Avenue (sanitary) and Smythe Ave (water). These services will remain. Stormwater flows naturally to the north west of the site to Bates Avenue. There are municipal ditches which drain the water northerly.

PROPOSED SERVICING

The new building will be serviced with a new 125mm sanitary service to Bates Avenue. A new connection will be required in the sanitary main. The building will have a new 25mm water service and curb stop from the existing water service to the DICA plant from Smythe Avenue.

All connections would be designed to meet the Ontario Building Code and Town of Carleton Place regulations for water and sanitary services.

SANITARY FLOWS

The expected sanitary flows from the property would only be the use of the toilet and sinks. There are 6 washrooms and a kitchen in the new building. There are expected to be 12 staff in the building. OBC flows are 75 L/day/person for sanitary loading. This would be a flow of 0.003 L/s (75/person/8 hours).

FIRE PROTECTION

There is a fire hydrant located on the north corner of the Smythe/Bates intersection which will provide fire fighting water to the site. The hydrant is 40m to the door on the north side of the new building.

Attached in Appendix A is the Fire Hydrant Flow Test results from Lowe Fire Protection. There was a flow test done on the adjacent hydrants to the site.

The results of the test show a residual pressure of 57 PSI during a 1 nozzle test, with a Pitot pressure of 50 PSI, and 630 GPM.

Test 2 was a 2 Nozzle test and provided a residual pressure of 47 PSI and Pitot pressure of 24/26 PSI at 1053 GPM.

This is sufficient flow for fire protection of the site.

PROPOSED STORMWATER MANAGEMENT

QUANTITY – PRE-DEVELOPMENT

The water quantity objective for the storage area is to not exceed the existing stormwater flows from this area. The flow is limited to the pre-development runoff rates. Please note that it is widely recognized that the rationale method typically overestimates peak runoff flows and as a result is an extremely conservative prediction method. Any facilities that are sized using results from the rationale method are expected to function in "real world" conditions.

The area being modified is the new building and associated sidewalk and drive area. The proposed change area is 0.0693 ha. The pre-development average runoff coefficient for the 5-year storm is 0.35. Cavg for post development is 0.90 for 5-year event.

The pre-development flow for the drainage area is calculated using the Rational Method.

$Q = 2.78\ C\ i\ A$ where Q = flow volume, m^3/s

C = runoff coefficient

i = rainfall intensity, mm/hr.

A = drainage area, ha.

= 0.0693 ha.

The time of concentration is estimated at 15 mins based on accepted municipal design standards for determination of allowable flow. Intensity Duration Frequency calculated using City of Ottawa values.

$i_5 = a / (t+b)^c$ a=998.071 b=6.053 c=0.814

i_5 = 83.56 mm/hr.

i_{100}=a / (t+b)^c a=1735.688 b=6.014 c = 0.820

i_{100} = 142.89 mm/hr.

Q_5 = 2.78 * .35* 0.0693 ha * 83.56 = 5.63 L/s

QUANTITY - POST DEVELOPMENT

The post development flows are calculated using Modified Rationale method for various times and rainfall intensities, to determine how much storage is required for each drainage area.

The post development runoff coefficient is 0.90 for 5-year event. The allowable release rate from area is 5.63 L/s (5 year).

5 Year Storage – A=0.0693ha, c=0.90, Q allowable 5.63 L/s

Tc (min.)	I (mm/hr.)	Q (L/s)	Qallow (L/s)	Net Runoff (L/s)	Storage (m^3)
5	141.178505	24.47874	5.63	18.85	5.65
10	104.193034	18.06588	5.63	12.44	7.46
15	83.5571943	14.48786	5.63	8.86	7.97
20	70.2511175	12.18074	5.63	6.55	7.86
25	60.8960518	10.55868	5.63	4.93	7.39

100 Year Storage – A=0.0693ha, c=0.90, Q allowable 5.63 L/s

Tc (min.)	I (mm/hr.)	Q (L/s)	Qallow (L/s)	Net Runoff (L/s)	Storage (m^3)
15	142.894168	24.77622	5.63	19.15	17.23
20	119.95043	20.79804	5.63	15.17	18.20
25	103.847078	18.0059	5.63	12.38	18.56
30	91.8681869	15.9289	5.63	10.30	18.54
35	82.5785621	14.31818	5.63	8.69	18.25

Therefore, based on Modified Rationale Method, the storage requirement for 5 year is 7.97 m3 and for 100 year 18.56 m3.

Using the 1.25 x for stormwater storage, the requirement is 23.2 m3.

STORAGE PROVIDED

The site storage requirements are achieved with the use of above ground stormwater storage on the lot in a grassed area.

The above ground storage is with a 0.3m basin at the north west corner of site. The basin is a shallow sloped basin with an outlet pipe which will control flows. The area of the basin is 79.47 m2 and the depth is 0.3m max. The volume in the basin is 23.84 m3 which is more than the required 23.2 m3. This is also using the 1.25 x the runoff coefficient for the 100 year storm which equates to a C value.

OUTLET CONTROL PIPE

The outlet control structure will be an 150mm dia pipe at a slope of 0.25% which using Manning Flow calculation allows an outlet flow of approx. 5.9 L/s.

EROSION AND SEDIMENT CONTROL MEASURES

Objectives

The objectives of the Erosion and Sedimentation Control are to minimize disturbance of the site, minimize the time that disturbed earth areas are exposed to runoff and wind and prevent the migration of eroded material off site.

The following measures shall be enacted to provide erosion and sedimentation control:

- A light duty silt fence shall be constructed around the site adjacent to all areas of earth excavation.
- Excavated areas for the access and parking areas shall be immediately covered with granular materials.

- Final grading of landscaped areas shall be done after the building, access areas and drainage facilities are completed and shall include covering with topsoil, hydroseed and mulch.
- Only areas required for construction shall be disturbed.

The erosion control measures shall remain in place until revegetation has been achieved. The barriers shall be monitored and reported on weekly and maintained as required. The Contractor shall remove the sediment and erosion control measures upon completion of construction and after revegetation has occurred.

After construction is complete the Owner will be responsible for maintaining the works.

The Sediment and Erosion Control Plan shall be considered a 'living document' that may need to be changed or adjusted during the life of the project to be effective.

MAINTENANCE

The owner will have maintenance staff review the site periodically during routine maintenance. Staff will remove any leaves, debris, etc from swales and retention basin. Grass to be kept mowed to the heights as prescribed in the CVC Manual for basin and swales. Approximately 100mm to 150mm high. Manholes and catchbasins in the parking lot will need to be cleaned out as required in the sumps on an annual basis.

Typical maintenance elements will involve:
• Routine inspection of the swale profile to identify any areas of obvious increased sediment deposition, scouring of the swale invert from storm flows, rill erosion of the swale batters from lateral inflows.
• Routine inspection of inlet points (if the swales does not have distributed inflows), surcharge pits and field inlet pits to identify any areas of scour, litter build up and blockages.
• Removal of sediment where it is impeding the conveyance of the swale and/ or smothering the swale vegetation, and if necessary, reprofiling of the swale and revegetating to original design specification.
• Repairing any damage to the swale profile resulting from scour, erosion or vehicle damage.

• Tilling of the surface if there is evidence of clogging.
• Clearing of blockages to inlet or outlets.
• Regular watering/ irrigation of vegetation until plants are established and actively growing
• Mowing of turf or slashing of vegetation (if required) to preserve the optimal design height for the vegetation.
• Removal and management of invasive weeds.
• Removal of plants that have died and replacement with plants of equivalent size and species as detailed in the plant schedule.
• Pruning to remove dead or diseased vegetation material and to stimulate new growth.
• Litter and debris removal.
• Vegetation pest monitoring and control.

Maintenance personnel and asset managers will use this plan to ensure the stormwater facilities continue to function as designed.

The maintenance plans and forms must address the following:
• inspection and maintenance frequency
• data collection/ storage requirements (i.e. during inspections)
• detailed cleanout procedures (main element of the plans) including:
    − maintenance techniques
    − occupational health and safety
    − public safety
    − environmental management considerations
    − disposal requirements (of material removed)
    − access issues

Prepared by:
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Colin A. Jardine, P. Eng

APPENDIX A

FIRE HYDRANT FLOW TEST RESULTS

LOWE
FIRE PROTECTION INC.
2435 Holly Lane, Suite 101
Ottawa, Ontario K1V 7P2
TEL: (613) 739-5693
FAX: (613) 739-2922

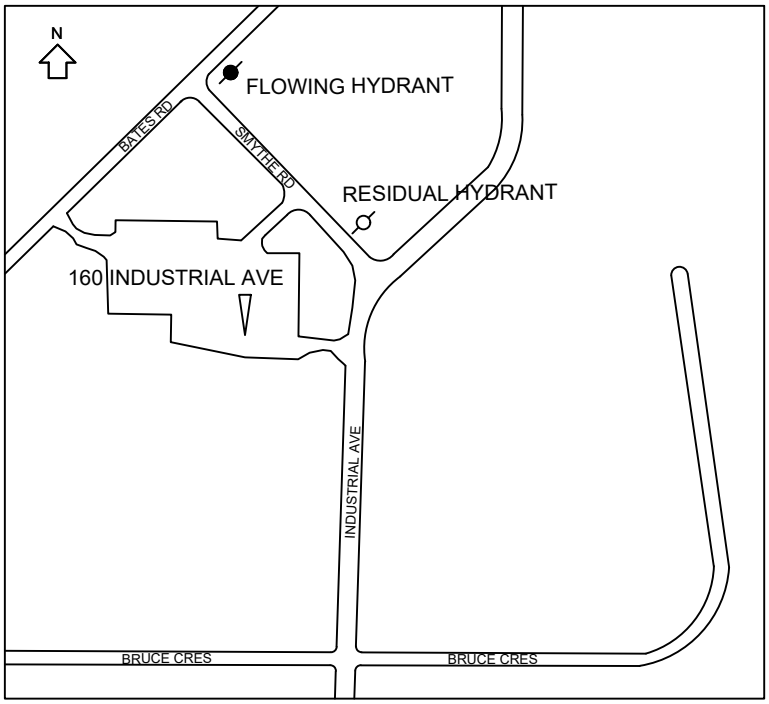
FIRE HYDRANT FLOW TEST RESULTS

DATE : OCT 30, 2023 TIME : 9:00 AM

LOCATION : 160 INDUSTRIAL AVE

CARLETON PLACE, ON

TEST BY : CAMERON AND LI



STATIC PRESSURE : 63 PSI

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1 3/4"	57	50	630
2	2	1 3/4"	47	34/36	1053

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160 INDUSTRIAL AVE	OFFICE : OTTAWA	2 OF 2
CARLETON PLACE, ON	TEST BY : LOWE FIRE PROTECTION INC.	
BY: CAMERON DODGE/LIJUN ZHAO	TEST CONDUCTED: 30/10/2023 @ 9:00 AM	

STATIC : 63 PSI
57 PSI @ 630 GPM
47 PSI @ 1053 GPM