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ÉCOLE ÉLÉMENTAIRE KANATA-STITTSVILLE SCHOOL
755 COPE DRIVE, STITTSVILLE, ON

SERVICING AND STORMWATER MANAGEMENT REPORT

APRIL 6, 2022
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SITE PLAN APPLICATION

PROJECT NO.: 219-00014-00
DATE: JULY 2022

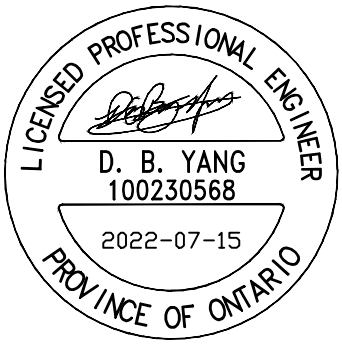
WSP CANADA INC.
2611 QUEESVIEW DRIVE, SUITE 300
OTTAWA, ON, CANADA, K2B 8K2

TEL.: +1 613-829-2800

WSP.COM

SIGNATURES

PREPARED AND REVIEWED BY



Ding Bang (Winston) Yang, P.Eng
Project Engineer

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1 GENERAL

1.1 EXECUTIVE SUMMARY

WSP was retained by Architecture | 49 to provide servicing, grading and stormwater management design services for the proposed new Stittsville Ecole Elementarie School on a 2.89 ha site located at the northeast corner of Dagenham Street and Cope Drive, in the proposed CRT Lands Phase 1 subdivision development within the Fernbank Community. The construction of services and base course asphalt is complete on Cope Drive and Dagenham Street, on which the school property will front. All services for the school site will be available from Dagenham Street. The subjected development is bounded by the Phase 1 of the subdivision development. The future Phase 2 subdivision development is proposed south and west sides of the school site, and this is currently under construction. This report outlines findings and calculations pertaining to the servicing of the proposed building with a gross building area of 3,803 square metres.

The proposed school building is a combination of one and two storey school building with gross floor area of 4,781 square metre and maximum building height will not be higher than 18 metres which is located at the southwest corner of the subjected site, northeast corner of the Cope Drive and Dagenham Street intersection. To the north of the proposed school building, there will be outdoor parking area. Once the school is going to expand, some of the green space will be converted for the future parking to the east. East of the school, there will be basketball court and portable classrooms. North of the school and basketball courts, there will be playground and practise football/soccer field. Since the proposed school and portable classrooms are located close to the Cope Drive and Dagenham Street R.O.W. These streets will be used as the fire route to service the school building and portable classrooms area.

The future additional parking lot to the east of the proposed parking areas will be constructed at a later time. The current grading and servicing design have been provided to allow for the future site plan changes with minimal changes to grading and servicing modifications only within the areas that will be impacted by the future development.

The surrounding neighbourhood is being developed by CRT Development Inc. with the IBI Group providing engineering design services. Information regarding the proposed municipal services was provided by IBI, as described in Design Brief – CRT Lands Phase 1 Fernbank Community, Project: 27970-5.2.2, Revised July 2017. Excerpts from the Design Brief are provided in Appendix A of this report.

Currently the land proposed for the building abuts the collector road Cope Drive which is located to the south of the subject site. The natural topography of the property in the vicinity of the collector road slopes from east to west towards the Angel Heights. Currently the land is vacant and primarily grass covered. The total study area was considered to be 2.89 ha in size. It is part of blocks 313 and 314, Geographic City of Ottawa. Based on the topographic survey, the site is sloping from the northeast corner to the southwest corner and will be draining toward Cope Drive and Dagenham Street Intersection. The existing piped stormwater system within CRT phase 1 subdivision development conveys drainage to Stormwater Pond 5 then discharges to the existing Flewellyn Drain south of Fernbank Road.

As per the CRT Land Phase 1 Design Brief by IBI Group, the following criteria apply: runoff from all storm events up to and including the 1:100 year event must be restricted to a calculated rate based on an imperviousness ratio of 0.50, 5 year simulated flow of 582 l/s. The subject site must provide sufficient storage to accommodate runoff from the 1:100 year event.

Stormwater quality control is not required for this site. Design of a drainage and stormwater management system in this development must be prepared in accordance with the following documents:

- Sewer Design Guidelines, City of Ottawa, October 2012;
- Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003; and
- Stormwater Management Facility Design Guidelines, City of Ottawa, April 2012

This report was prepared utilizing servicing design criteria obtained from the City of Ottawa and outlines the design for water, sanitary wastewater, and stormwater facilities, including stormwater management.

The format of this report matches that of the servicing study checklist found in Section 4 of the City of Ottawa's Servicing Study Guidelines for Development Applications, November 2009.

The following municipal services are available at the north property line as recorded from drawings received from IBI Group:
Cope Drive:

- 1800 mm storm sewer, 250mm sanitary sewer and 203mm watermain.

Dagenham Street:

- 900 mm storm sewer stub, 200mm sanitary sewer stub and 203mm watermain stub (Designed and prepared for the subject site).
- 975 mm storm sewer, 200mm sanitary sewer and 203mm watermain.

It is proposed that:

- On-site stormwater management systems, employing surface storage and roof storage will be provided to attenuate flow rates leaving the school site. Existing drainage patterns, previously established controlled flow rates and storm sewers will be maintained.

1.2 DATE AND REVISION NUMBER

This version of the report is the second revision, dated July 15, 2022.

1.3 LOCATION MAP AND PLAN

The proposed institutional development is located at 700 Cope Drive, Stittsville, Ontario at the location shown in Figure 1-1 below.

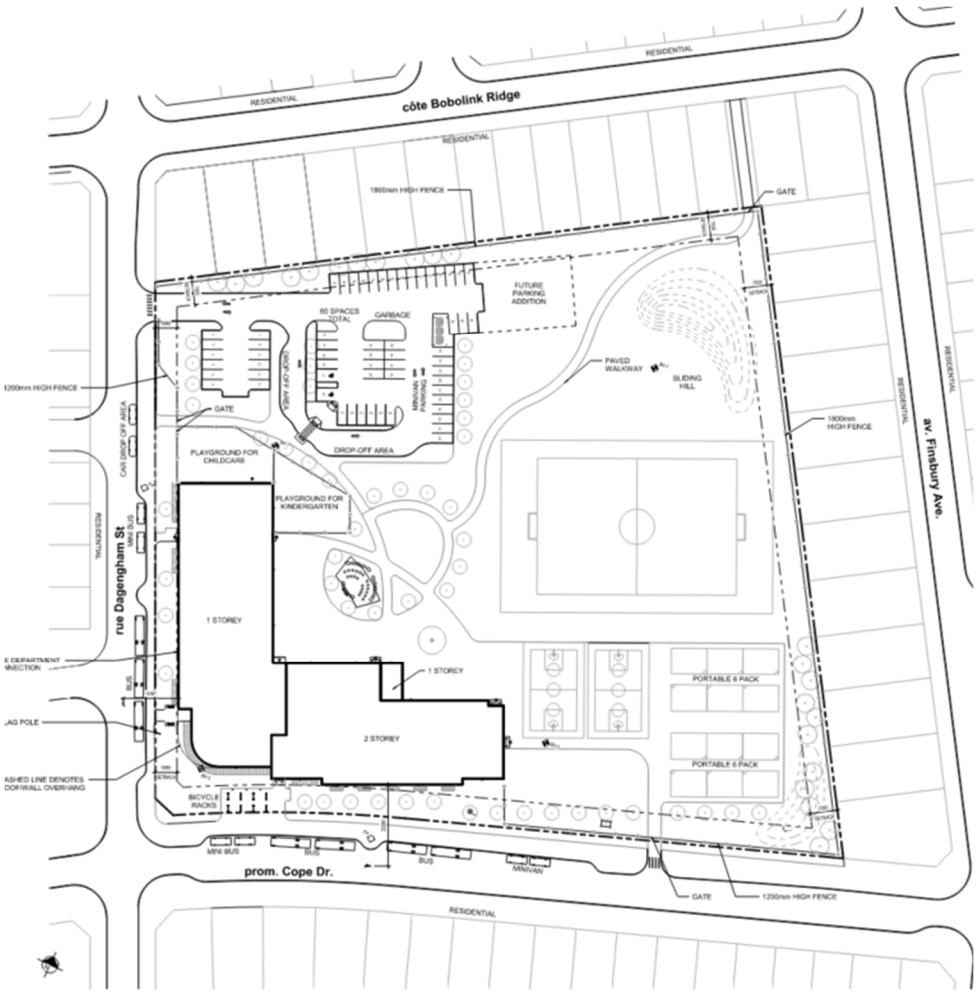


Figure 1-1 Site Location

1.4 ADHERENCE TO ZONING AND RELATED REQUIREMENTS

The proposed property use will be in conformance with zoning and related requirements prior to approval and construction and is understood to be in conformance with current zoning.

1.5 PRE-CONSULTATION MEETINGS

A pre-consultation meeting was held with the City of Ottawa on August 27, 2021. Notes from this meeting are provided in Appendix A.

1.6 HIGHER LEVEL STUDIES

The review for servicing has been undertaken in conformance with, and utilizing information from, the following documents:

- Ottawa Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa including:
    - Technical Bulletin ISDTB-2012-4 (20 June 2012)
    - Technical Bulletin ISDTB-2014-01 (05 February 2014)
    - Technical Bulletin PIEDTB-2016-01 (September 6, 2018)
    - Technical Bulletin ISDTB-2018-01 (21 March 2018)
    - Technical Bulletin ISDTB-2018-04 (27 June 2018)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
    - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
    - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Brief – CRT Land Phase 1 Fernbank Community, IBI Group, Project 27970-5.2.2, Revised July 2017. (Includes water, sanitary and storm servicing.)
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 1999.

1.7 STATEMENT OF OBJECTIVES AND SERVICING CRITERIA

The objective of the site servicing is to meet the requirements for the proposed modification of the site while adhering to the stipulations of the applicable higher-level studies and City of Ottawa servicing design guidelines.

1.8 AVAILABLE EXISTING AND PROPOSED INFRASTRUCTURE

Existing sanitary and storm sewers, and a watermain stubs have been provided from Dagenham Street to the west of frontage of the site. The sanitary sewer will extend from the existing stub to the proposed Elementary School. The storm sewer will be connected to the existing 900 mm stub, and flows from north to south. Water, sanitary and storm sewer stubs have already been provided to the property boundary during the time of construction of Dagenham Street. The works provided by the subdivision developer have already included the water valve and box at the property line, and all work within the right of way, excluding the driveway entrances. However, the water entry room is located at the back of the building not fronting to neither of Cope Drive or Dagenham Street, water service will be routed to the existing 203mm watermain along Cope Drive from the water entry room. Ultimately, the storm flows from Dagenham Street (servicing the school site) to the Cope Drive storm sewer are intended to be directed to a permanent stormwater management pond 5 that will provide quality and quantity treatment for some of the remaining undeveloped phases of the CRT subdivision, and including the school site. Quality control is not required on the school site, but quantity control is required to restrict the discharge for all events up to a 100 year event to the 5 year flow rate provided by IBI.

Site access for vehicles will be provided from Dagenham Street. The driveways being provided are two-way entrances at the west end.

1.9 ENVIRONMENTALLY SIGNIFICANT AREAS, WATERCOURSES AND MUNICIPAL DRAINS

There are no watercourses, municipal drains or environmentally significant areas on the site, but currently there are areas of environment significance on adjacent properties. The status of these areas will be changing as the area is developed. The building program proposed for the site is not subject to any restrictions associated with the surrounding lands.

1.10 CONCEPT LEVEL MASTER GRADING PLAN

The existing and proposed grading are shown on Drawings C03 - Grading Plan. Existing grading was identified in a topographic survey and is noted in the background of Drawings C03. The proposed grading will be reviewed by the geotechnical engineer. The geotechnical investigation was completed in November 18, 2013 by Paterson Group. The grading along the site boundaries bordering CRT lands have been coordinated with CRT's engineering consultant. The site topographic survey, provides evidence of direction of overland flow of the site. Minor grade changes will be made to grades at the development perimeter for the propsoed bus drop off lay-by location.

1.11 IMPACTS ON PRIVATE SERVICES

There are no existing domestic private services (septic system and well) located on the site. There are no neighbouring properties using private services.

1.12 DEVELOPMENT PHASING

No development phasing has been detailed for the site. The site plan does indicate possible future development of additional parking lots. The impervious area associated with the future development has been taken into account in the stormwater management calculations. The future hard surfaces take up a bit of the green space than the current condition, and therefore were conservatively used in the calculation of runoff.

1.13 GEOTECHNICAL SUTDY

A geotechnical investigation report has been prepared by Paterson Group. (Report PG3093-1, November 18, 2013), and its recommendations has been taken into account in developing the engineering specifications.

1.14 DRAWING REQUIREMENT

The engineering plans submitted for site plan approval will be in compliance with City requirements.

2 WATER DISTRIBUTION

2.1 CONSISTENCY WITH MASTER SERVICING STUDY AND AVAILABILITY OF PUBLIC INFRASTRUCTURE

There is an existing 203mm diameter municipal watermain along Cope Drive and Dagenham Street providing water to the property. The new elementary school will be protected with a supervised automatic fire protection sprinkler system and will require a 203mm diameter water service. The fire department connection is located at the east of the 1 storey building fronting to Dagenham Street. It is 45m away from the existing municipal FH on Dagenham Street. No changes are required to the existing City water distribution system to allow servicing for this property. Two connections and an isolation valve in between will be made to the existing 203 diameter municipal watermain on Cope Drive from the proposed development site. The Dual 203mm diameter private watermain services connecting the existing 200mm municipal watermain will provide redundancy for the school building. The dual 203mm dia. water services will be extended to the building mechanical room.

2.2 SYSTEM CONSTRAINTS AND BOUNDARY CONDITIONS

Boundary conditions have been provided by the City of Ottawa at two locations along the Trans Canada Trail 400mm watermain during the development of the CRT land subdivision. A fire flow of 225 l/s (13,500 l/min) was estimated for this institutional development from the hydraulic model provided by IBI Group. The IBI hydraulic modelling indicated the hydraulic pressure for different scenario conditions were shown below, based on fire flows and domestic demands estimated by IBI Group for the proposed institutional land.

Table 2-1: Boundary Conditions (IBI Design Brief)

BOUNDARY CONDITIONS		
SCENARIO	Head (m) @ Connection 1	Head (m) @ Connection 2
Basic Day (MAX HGL)	161.1	161.4
Peak Hour (MIN HGL)	154.7	154.8
Max Day + Fire Flow (ICI)	150.6	150.9

Table 2-2: IBI Hydraulic Modelling Results

Hydraulic Modelling Results @ CLA-36	
SCENARIO	Hydraulic Pressure (kPa)
Basic Day (MAX HGL)	525.7
Peak Hour (MIN HGL)	458.8
Max Day + Fire Flow (ICI)	280.8

An updated boundary condition has also been provided by the City of Ottawa at the connection location along Cope Drive. A revised fire flow of 117 l/s (7,000 l/min) was estimated for the proposed school with using the FUS calculation method.

Table 2-3: Boundary Conditions (New)

BOUNDARY CONDITIONS AT COPE DRIVE	
SCENARIO	Head (m) @ Connection 1
Basic Day (MAX HGL)	161.2
Peak Hour (MIN HGL)	156.5
Max Day + Fire Flow (ICI)	151.9

2.3 CONFIRMATION OF ADEQUATE DOMESTIC SUPPLY AND PRESSURE

Water demands are based on Table 4.2 of the Ottawa Design Guidelines – Water Distribution. As previously noted, the development is considered as institutional development, consisting of classroom, gymnasium and kitchen. A water demand calculation sheet is included in Appendix B, and the total water demands are summarized as follows:

	WSP (2018 Bulletin)	IBI Group
Average Day	0.94 l/s	1.67 l/s
Maximum Day	1.40 l/s	2.50 l/s
Peak Hour	2.53 l/s	4.50 l/s

The 2010 City of Ottawa Water Distribution Guidelines stated that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure — Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)

Fire Flow — During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.

Maximum Pressure — Maximum pressure at any point the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

Water pressure at municipal connection check:

Min. HGL @ Connection 1 – Pavement elevation = 156.5m – 104.40m = 52.10m = 510.80 kPa

Water pressure at building connection (at average day) check:

Max. HGL @ Connection 1 – Finished floor elevation = 161.2m – 107.78 = 53.42m = 523.74 kPa

Water pressure at building connection (at max. hour demand) check:

Min. HGL @ Connection 1 – Finished floor elevation = 156.5m-107.78m = 47.72m = 477.66 kPa

Water pressure at building connection (at max. day + fire demand):

(Max Day + Fire) HGL @ Connection 1 - Finished floor elevation = 151.9m-107.78m = 44.12m = 432.56 kPa

The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 477.66 kPa which exceed the minimum requirement of 276 kPa per the guidelines.

2.4 CONFIRMATION OF ADEQUATE FIRE FLOW PROTECTION

The fire flow rate has been calculated using the Fire Underwriters Survey (FUS) method. The method takes into account the type of building construction, the building occupancy, the use of sprinklers and the exposures to adjacent structures. Assuming fire resistive construction and a fully supervised sprinkler system, a fire flow demand of 7,000 l/min for the new elementary school has been calculated. The fire flow rate of 4,000 l/min (67 l/s) is calculated for the future portable classrooms. Copy of the FUS calculations are included in Appendix B.

The demand of 7,000 l/min can be delivered through two existing municipal fire hydrants. The existing two public hydrants are located at the west of the proposed building on Dagenham Street and south of the proposed building on Cope Drive. The one on Cope Drive is within 85 m of the FDC and is rated at 3800 l/min each. The one on Dagenham Street is within 45 m of the building FDC, and is rated at 5700 l/min. The two hydrants have a combined total of 9,500 l/min.

The demand of 4,000 l/min from the portable classrooms can also be met through the combination of two existing public hydrants on Cope Drive. The two hydrants have a combined total of 9,500 l/min.

The proposed building on site will be serviced by dual 203 mm services off the existing 203 mm watermain from Cope Drive. The services will run into the water entry room. The proposed building will be fully sprinklered and fire protection will be provided with the fire department Siamese connection within 45 m of the existing public fire hydrant from Dagenham Street. The Siamese connection is located on the west side of the building.

The boundary condition for Maximum Day and Fire Flow results in a pressure of 432.56 kPa at the ground floor level. In the guidelines, a minimum residual pressure of 140 kPa must be maintained in the distribution system for a fire flow and maximum day event. As a pressure of 432.56 kPa is achieved, the fire flow requirement is exceeded.

2.5 CHECK OF HIGH PRESSURE

High pressure is not a concern. The maximum water pressure inside the building at the connection is determined with the maximum HGL condition, resulting in a pressure of 523.74 kPa which is less than the 552 kPa threshold in the guideline in which pressure control is required. Based on this result, pressure control is not required for this building.

2.6 PHASING CONSTRAINTS

No development phasing has been detailed for the site. The site plan does indicate possible future development of additional parking lots. The projected occupancy load has been taken into account in the fire demand and water demand calculations. No phasing constraints exist.

2.7 RELIABILITY REQUIREMENTS

Two shut off valves are provided for the private watermain at the study boundary from Cope Drive. And two shut off valves are provided for the services connection before connecting to the building internal water system. Water can be supplied both sides of the Cope Drive, west and east and can be isolated.

2.8 NEED FOR PRESSURE ZONE BOUNDARY MODIFICATION

There is no need for a pressure zone boundary modification.

2.9 CAPABILITY OF MAJOR INFRASTRUCTURE TO SUPPLY SUFFICIENT WATER

The current infrastructure is capable of meeting the domestic demand based on City requirements and fire demand as determined by FUS requirements for the proposed building.

2.10 DESCRIPTION OF PROPOSED WATER DISTRIBUTION NETWORK

A 203 mm private watermain looping is proposed to be provided into the proposed elementary school. The two 203 mm private water services will be merge inside the building before connecting to the water meter. No private hydrant is required for this site.

2.11 OFF-SITE REQUIREMENTS

No off-site improvements to watermains, feedermains, pumping stations, or other water infrastructure are required to maintain existing conditions and service the adjacent developments.

2.12 CALCULATION OF WATER DEMANDS

Water demands were calculated as described in Sections 2.3 and 2.4 above.

2.13 MODEL SCHEMATIC

The water works consist dual building services, a model schematic is not required for this development.

3 WASTEWATER DISPOSAL

3.1 DESIGN CRITERIA

In accordance with the City of Ottawa's Sewer Design Guidelines, the following design criteria have been utilized in order to predict wastewater flows generated by the subject site and complete the sewer design;

- Minimum Velocity 0.6 m/s
- Maximum Velocity 3.0 m/s
- Manning Roughness Coefficient 0.013
- Total est. hectares institutional use 2.89
- Average sanitary flow for institutional use 28,000 L/Ha/day
- Commercial/Institutional Peaking Factor 1.5
- Infiltration Allowance (Total) 0.33 L/Ha/s
- Minimum Sewer Slopes – 200 mm diameter 0.32%

The area of 2.89 ha represents the lot area of the new building and immediate surrounding area to the sides of the new building. This is the sanitary collection area that is being considered to contribute to the new 200mm sanitary service extending from the existing 200mm sanitary sewer stub provided at the east side of the Dagenham Street to the new building.

3.2 CONSISTENCY WITH MASTER SERVICING STUDY

The outlet for the sanitary service from the proposed building is the 200 mm diameter municipal sewer on Dagenham Street.

The Ottawa Sewer Design Guidelines provide estimates of sewage flows based on institutional development.

The criteria to determine anticipated actual peak flow based on site used as described in Ottawa Sewer Design Guidelines Appendix 4-A are as follows;

- Institutional 28000 L/Ha/day = 0.324 L/Ha/s
- Peak flow = (0.324 L/Ha/s x 2.89 ha x 1.5 peaking factor) + 0.33 l/Ha/s x 2.89 ha = 2.36 L/s

The on-site sanitary sewer network has been designed in accordance with 2.36 L/s as described above.

3.3 REVIEW OF SOIL CONDITIONS

There are no specific local subsurface conditions that suggest the need for a higher extraneous flow allowance.

3.4 DESCRIPTION OF EXISTING SANITARY SEWER

The outlet sanitary sewer is the existing 200 mm diameter sewer on Dagenham Street. This local sewer will outlet to a 1500 mm diameter sanitary trunk sewer located in Abbott Street and the Trans Canada Trails, then discharge to the Hazeldean Pump Station.

3.5 VERIFICATION OF AVAILABLE CAPACITY IN DOWNSTREAM SEWER

The capacity of the downstream 200 mm diameter sewer at 0.35% slope is 19.42 l/s, which is adequate for the flow assumptions from the proposed site as noted above. This existing sewer was designed by IBI Group to service the proposed 2.89 ha of institutional land.

3.6 CALCULATIONS FOR NEW SANITARY SEWER

The 200 mm diameter sanitary service from the sanitary monitoring manhole 101 to the building will have a slope of 1.0 %, and a capacity of 32.80 l/s, with a velocity of 1.04 m/s. The 200 mm diameter sanitary service from the sanitary monitoring manhole 101 to the existing sanitary manhole on Dagenham Street have a slope of 0.35%, and a capacity of 19.42 l/s with a velocity of 0.62 m/s. The servicing pipe capacity exceeds the estimated peak sanitary flow rate of 2.36 L/s for the proposed development site.

3.7 DESCRIPTION OF PROPOSED SEWER NETWORK

The proposed sanitary sewer network on site will consist of a 200 mm diameter building service, and one new 1200 mm diameter manholes.

3.8 ENVIRONMENTAL CONSTRAINTS

There are no previously identified environmental constraints that impact the sanitary servicing design in order to preserve the physical condition of watercourses, vegetation, or soil cover, or to manage water quantity or quality.

3.9 PUMPING REQUIREMENTS

The proposed development will have no impact on existing pumping stations and will not require new pumping facilities.

3.10 FORCE-MAINS

No force-mains are required specifically for this development.

3.11 EMERGENCY OVERFLOWS FROM SANITARY PUMPING STATIONS

No pumping stations are required for this site, except as required internally for the plumbing design to service the lower area of the building.

3.12 SPECIAL CONSIDERATIONS

There is no known need for special considerations for sanitary sewer design related to existing site conditions.

4 SITE STORM SERVICING

4.1 EXISTING CONDITION

The subjected property is located within the Fernbank Community Development area east of Dagenham Street and north of Cope Drive. Most runoff from the institutional land is ultimately directed to a 1500 mm diameter trunk storm sewer which runs east to west along Cope Drive. The 1500 mm diameter storm sewer ultimately outlets to the stormwater management facility Pond 5. The available drainage outlet from the school site is the existing 900 mm diameter concrete storm sewer, located in the west side of the Dagenham Street, north of Cope Drive and Dagenham Street intersection.

Based on the IBI Design Brief, drainage released from the site to the City storm sewer is limited to 579.45 l/s. Flow exceeding this amount up to the 100-year storm have to be retained on the site. Drainage in excess of the minor system capacity currently flows overland to the Cope Drive and Dagenham Street intersection.

4.2 ANALYSIS OF AVAILABLE CAPACITY IN PUBLIC INFRASTRUCTURE

Using the Rational Method, with coefficient of 0.25 for pervious areas, 0.40 for playground, 0.75 for gravel areas and 0.9 for impervious areas, and a 10-minute time of concentration, results in an estimated 2-year flow of 124.69 l/s from this area. The receiving 900 mm diameter storm sewer has been designed with the capacity to accept 124.69 l/s from the school site. Capacity in the minor system is not a concern.

4.3 DRAINAGE DRAWING

Drawing C04 shows the detail site sewer network. Drawings C03 provides proposed grading and drainage, and include existing grading information. Drawing C05 and C06 provides a post-construction drainage sub-area plan, including both site and roof information. Site sub-area information is also provided on the storm sewer design sheet attached in Appendix C. An overall grading plan and Servicing plan have also been attached to Appendix C for reference.

4.4 WATER QUANTITY CONTROL OBJECTIVE

The water quantity objective for the site is to limit the flow release to 579.45 l/s. Excess flows above this limit for the school site up to those generated by the 100 year storm event from drainage on the school site are temporarily stored on site.

No provision is required on the school's site to accommodate any flow from the adjacent lands. All flows exceeding the defined minor system capacity and on-site storage capability will enter the major system, with overflow to the City right of way, on the west and south boundaries of the site.

The maximum overland runoff spill elevation for this site is 107.30, and tw0 240 and 290 mm dia. circular plate ICDs are proposed to be used on the outlet inside CBMH111 and CBMH117 to restrict the flow rate leaving the site to 495.38 l/s at 2.8 m head, based on the maximum spill elevation of 107.30. In theory, the runoff water will be detained on site up to the 100-yr rainfall event, and for those scenarios exceeding 100-yr rainfall event, the runoff water will be discharged offsite once all the available storage areas have reached their maximum capacities. The school site can provide a total of 143.95 m^3 of surface storage volume, but the required storage for 100-yr will be only 126.03 m^3. The ponded water will not reach the spill elevation under 100 year and lesser events. The site has more storage capacity than required as a result of the grading design. This will allow extra detention of water on the site during extreme events, and will reduce stress on the downstream stormwater management pond. If rain falls at a rate higher than the soccer field soil can absorb, then there will be surface ponding at the designated locations shown on the drawings. If the soccer field and landscaped areas allow for infiltration, the available

surface storage volume will be further increased. In theory, the use of lower runoff coefficients for landscaped surfaces already accounts for a certain degree of absorption in these areas.

4.5 WATER QUALITY CONTROL OBJECTIVE

The site is not required to achieve water quality objectives. Water quality objectives are achieved through downstream works as noted in the IBI Design Brief.

4.6 DESIGN CRITERIA

The stormwater system was designed following the principles of dual drainage, making accommodation for both major and minor flow.

Some of the key criteria include the following:

- Design Storm (minor system) — 1:2 year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
    - Landscaped Areas — C = 0.25
    - Playground Mulch Areas — C = 0.40
    - Gravel Areas — C = 0.75
    - Asphalt/Concrete — C = 0.90
    - Traditional Roof — C = 0.90
- Pipe Velocities — 0.80 m/s to 6.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads and service pipes)

4.7 PROPOSED MINOR SYSTEM

The detailed design for this site will maintain the existing storm sewer network to Dagenham Street and Cope Drive intersection of the development site. The drainage system consists of a series of manholes, catchbasins and storm sewers leading to the outlet manhole STMH118 at the west of the site. All drainage areas on the site are collected in the site piped drainage system.

It is also customary for larger buildings to be provided with piped storm services for roof drainage. There are no downspouts proposed. Separate outlet pipes are provided for foundation drains and roof drains, and therefore roof drainage will not negatively impact the foundation. The storm services are connected to the storm sewer downstream of CBMH111 and CBMH117 which is downstream of the controlled flow point, ensuring an unobstructed flow for these areas.

Using the above noted criteria, the existing on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated post development storm sewer drainage area plan are included in Appendix C.

4.8 STORMWATER MANAGEMENT

The subject site will be limited to a release rate of 579.45 l/s established by IBI Group, this will be achieved through the inlet control devices at the downstream of CBMH111 and CBMH117.

Flows generated that are in excess of the site's allowable release rate will be stored on site in surface storage areas or by the use of roof top storage and gradually released into the minor system so as not to exceed the site's allocation.

The maximum surface retention depth of the developed areas will be limited to 250mm during a 1:100 year event. Maximum ponding levels are 250mm prior to spill over. The maximum ponding elevation is 107.30m, which is well below the building ground floor level of 107.78m.

No surface ponding will occur during a 2 year event, and only minimal ponding will occur during a 5 year event.

Overland flow routes will be provided in the grading to permit emergency overland flow from the site. The overflow routes will eliminate any increase in ponding depth for events exceeding 100 years.

At certain locations within the site, the opportunity to store runoff is limited due to grading constraints and building geometry. These locations are located at the perimeter of the site where it is necessary to tie into public boulevards, and it is not always feasible to capture or store stormwater runoff.

The site grading and ponding has been designed to control water generated during the 1:100-year event, with no overflow leaving the site at this control level. Please refer to the SWM Calculations in Appendix C.

4.9 INLET CONTROLS

According the IBI Design Brief, the maximum allowable release rate for the 2.89 Ha site is 579.45 L/s.
As noted in Section 4.8, a small portion of the site will be left to discharge to the right of way at an uncontrolled rate.

$Q_{(uncontrolled)}$	= 2.78 x C x I_{100yr} x A	where:
C	= 0.32 (Weighted average post-development C)	
I_{100yr}	= Intensity of 100-year storm event (mm/hr)	
	= 1735.688/((Tc+6.014)^(0.82)); where T_c = 10 minutes	
A	= Area = 0.049 Ha	

Therefore, the uncontrolled release to the right of way can be determined as:

= 9.29 L/s

The maximum allowable release rate from the remainder of the site can then be determined as:

$Q_{(max\ allowable)} = Q_{(total\ allowable)} - Q_{(uncontrolled)}$

= 579.45 L/s – 9.29 L/s

= **570.16 L/s**

Based on the flow allowance at the outlet location, CBMH111 and CBMH117, inlet control devices (ICD) were chosen in the design. The design of the inlet control device is unique to the associated drainage areas and is determined based on a number of factors, including hydraulic head and allowable release rate. The inlet control device will be designed according to the manufacturer's design charts. The restrictions will cause the on-site catchbasins and manholes to surcharge, generating surface ponding in the parking and landscaped areas. Ponding locations and elevations are summarized on the drainage areas plan C05.

4.10 ON-SITE DETENTION

Any excess storm water up to the 100-year event is to be stored on-site in order to not surcharge the downstream municipal storm sewer system. Detention will be provided in parking and landscape areas and building rooftops, where feasible. As previously noted, the volume of storage is dependent on the characteristics of each individual drainage area. It should be

noted that greater than 0.30 m of vertical separation has been provided from all maximum ponding elevations to lowest building openings.

The following Table summarizes the on site storage requirements during the 1:100-year events.

Table 4-1: On-Site Storage Requirements

Total Area (Ha)	Location	Controlled/ Uncontrolled	Runoff Coefficient		Outlet Location	Total Storage Provided (m^3)	100-Year Controlled	
			2 & 5 Year	100 Year			Restricted Flow (L/s)	Required Storage (m^3)
1.271	Surface	Controlled	0.51	0.63	CBMH111	67.61	293.48	62.40
1.193	Surface	Controlled	0.45	0.52	CBMH117	76.34	201.90	63.63
0.375	Building Roof	Controlled	0.90	0.99	STMH118	140.69	23.94	128.68
0.018	Swale	Uncontrolled	0.29	0.35	DICB106	0.26	3.13	0
0.031	Swale	Uncontrolled	0.33	0.40	DICB112	1.28	6.16	0
TOTAL						**284.64**	**528.61**	**254.70**

In all instances the required storage is met with surface ponds which retain the stormwater and discharge at the restricted flow rate to the sewer system. Refer to the grading plan for storage information.

The following Table summarizes the inlet control devices to be utilized on the site. ICD pre-set flow curves can be found in Appendix C.

Table 4-2: ICD Type

Structure ID	PROPOSED ICD			
	100-YR Head	Flow (L/s)	Type	OUTLET DIA.
CBMH111	2.80	293.48	290 mm Dia. Circular ICD	450 mm Dia. CONC.
CBMH117	2.82	201.90	240 mm Dia. Circular ICD	375 mm Dia. PVC

As demonstrated above, the site uses new inlet control deviceS to restrict the 100 year storm event to the criteria approved by the City of Ottawa. Restricted stormwater will be contained onsite by utilizing surface ponding storage. In the 100 year event, there will be no overflow off-site from restricted areas.

The sum of restrictions on the site is 528.61 L/s, which is less than the maximum allowable release of 579.45 L/s noted in Section 4.9.

4.11 WATERCOURSES

The minor flow will be directed to Pond 5 and ultimately directed to the Flewellyn Drain, south of Fernbank Road.

4.12 PRE AND POST DEVELOPMENT PEAK FLOW RATES

Pre and post development peak flow rates for the impacted areas of the site have been noted in storm sewer design sheet.

4.13 DIVERSION OF DRAINAGE CATCHMENT AREAS

There will be no diversion of existing drainage catchment areas arising from the proposed work described in this report.

4.14 DOWNSTREAM CAPACITY WHERE QUANTITY CONTROL IS NOT PROPOSED

This checklist item is not applicable to this development as quantity control is provided.

4.15 IMPACTS TO RECEIVING WATERCOURSES

No significant negative impact is anticipated to downstream receiving watercourses due to proposed quantity and quality control measures, the separation of the site from the eventual receiving watercourse as a result of discharge through City owned sewers, and the planned stormwater management pond 5 on the north side of Fernbank Road.

4.16 MUNICIPAL DRAINS AND RELATED APPROVALS

There are no municipal drains on the site or associated with the drainage from the site.

4.17 MEANS OF CONVEYANCE AND STORAGE CAPACITY

The means of flow conveyance and storage capacity are described in Sections 4.7, 4.8, 4.9 and 4.10 above.

4.18 HYDRAULIC ANALYSIS

Hydraulic calculations for the site storm sewers are provided in the storm sewer design sheet.

4.19 IDENTIFICATION OF FLOODPLAINS

There are no designated floodplains on the site of this development.

4.20 FILL CONSTRAINTS

There are no known fill constraints applicable to this site related to any floodplain. The site is generally being raised higher relative to existing conditions. No fill constraints related to soil conditions are anticipated, as confirmed in the geotechnical report.

5 SEDIMENT AND EROSION CONTROL

5.1 GENERAL

During construction, existing storm sewer system can be exposed to sediment loadings. A number of construction techniques designed to reduce unnecessary construction sediment loadings will be used including;

- Filter cloths will remain on open surface structures such as manholes and catchbasins until these structures are commissioned and put into use;
- Installation of silt fence, where applicable, around the perimeter of the proposed work area.
- The installation of straw bales within existing drainage features surround the site;
- Bulkhead barriers will be installed in the outlet pipes;

During construction of the services, any trench dewatering using pumps will be fitted with a "filter sock." Thus, any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filter sock as needed including sediment removal and disposal.

All catchbasins, and to a lesser degree, manholes, convey surface water to sewers. Consequently, until the surrounding surface has been completed, these structures will be covered to prevent sediment from entering the minor storm sewer system. These measures will stay in place and be maintained during construction and build-out until it is appropriate to remove them.

During construction of any development both imported and native soils are placed in stockpiles. Mitigative measures and proper management to prevent these materials entering the sewer system are needed.

During construction of the deeper watermains and sewers, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally placed before any catchbasins are installed.

Refer to the Erosion and Sedimentation Control Plan C12 provided in Appendix D.

6 APPROVAL AND PERMIT REQUIREMENTS

6.1 GENERAL

The proposed development is subject to site plan approval and building permit approval.

No approvals related to municipal drains are required.

No permits or approvals are anticipated to be required from the Ontario Ministry of Transportation, National Capital Commission, Parks Canada, Public Works and Government Services Canada, or any other provincial or federal regulatory agency.

7 CONCLUSION CHECKLIST

7.1 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the proposed development can meet all provided servicing constraints and associated requirements. It is recommended that this report be submitted to the City of Ottawa in support of the application for site plan approval.

7.2 COMMENTS RECEIVED FROM REVIEW AGENCIES

This is a second submission, first round comments have been addressed.

APPENDIX

A

- PRE-CONSULTATION MEETING NOTES
- DESIGN BRIEF BY IBI GROUP (EXCERPTS ATTACHED)
- IBI GROUP GRADING PLANS FOR CRT LANDS

Pre-Consultation Meeting Notes

Site Address: 755 Cope Drive
Location: Virtual - Microsoft Teams
Meeting Date: August 27, 2021

Attendees: Colette Gorni – Planner, City of Ottawa
Mark Young – Planner (Urban Design), City of Ottawa
Jessica Valic – Project Manager (Infrastructure), City of Ottawa
Matthew Hayley – Planner (Environmental), City of Ottawa
Adrian Van Wyk – Planner (Heritage), City of Ottawa
Jeffrey Ren – Co-op Student, City of Ottawa
Claire Lee – Co-op Student, City of Ottawa
Justyna Garbos – WSP
Jill MacDonald – WSP
Winston Yang – WSP
Jie Chen – Architecture49
Marc Henri Gauthier – Architecture49
Marc-André Hogue – CEPEO

Regrets: Kersten Nitsche – Planner (Parks), City of Ottawa
Molly Smith – Planner, City of Ottawa
Mark Richardson – Planning Forester, City of Ottawa
Josiane Gervais – Project Manager (Transportation), City of Ottawa
Eric Lalande – RVCA

Applicant Comments:

1. The applicant is proposing to construct a two-storey Conseil des écoles publiques de l'Est de l'Ontario (CEPEO) elementary school and daycare
2. The school is an ‘L’ shape with a height of two storeys along Cope Drive and one storey along Dagenham Street; the main entrance is located on Dagenham Street.
3. Lay-bys are proposed along both frontages and 61 parking spaces are proposed in a parking lot off of Dagenham Street; both Drive lay-bys will serve school buses and minibuses while a small section of the Dagenham Street lay-by will serve the parents who are dropping off children at the daycare
4. A gated access is proposed off of Cope Drive to access the garbage enclosure; fencing will surround the entire property
5. The initial pre-application consultation submission showed fewer details; new details added to the site plan presented include additional paved areas and

pathways, the garbage enclosure has been moved, and the lay-by along Dagenham Street was elongated

Policies & Designations

1. The site is designation ‘General Urban Area’ on Schedule B of the Official Plan.
2. The site is zoned I1B/R1Z (Minor Institutional, Subzone B / First Density Residential, Subzone Z)
    a. ‘School’ is a permitted use of the I1 Zone.
    b. I1B Subzone sets out the performance standards for the site in Table 107B.
3. Parking is to be provided at the rates specified for Area C on Schedule 1A:
    a. School, other – 1.5 spaces per classroom (includes portables)
    b. Daycare – 2 per 100 m^2 of gross floor area
4. Bicycle parking is to be provided at the rates specified in Table 111A of the Zoning By-law:
    a. 1 per 100 m^2 of gross floor area
5. Dagengham Street is considered the front lot line.
6. Please ensure that the submission takes into account appropriate Official Plan policies that are applicable at the time of the submission of the application
    a. If a complete application is received by no later than the day before the new Official Plan is adopted (October 2021), it will be processed on the basis of existing Official Plan policy provided it is consistent with the 2020 Provincial Policy Statement
    b. Applications received after the day before the new Official Plan is adopted (October 2021), will be reviewed and evaluated on the basis of the policies of the new Official Plan, which is consistent with the 2020 Provincial Policy Statement

Planning

1. The proposed development is subject to Site Plan Control, and will require Complex (Manager Approval, Public Consultation) application. Application form, timeline and fees can be found here.
2. Please explore further opportunities for tree planting throughout the site.
3. Refer to Section 110(c) of the Zoning By-law for provisions related to outdoor refuse collection and loading areas.

4. Provide more information on how snow storage will be handled. If being stored on site, please show snow storage areas on the plan.
5. For your reference, a similar school site along Cope Drive, the OCDSB elementary school located at 480 Cope Drive, was recently approved; approved plans and studies can be found here.
6. Please ensure that all land uses are considered when calculating parking requirements. It does not appear that the proposed daycare use was included in the calculations.
7. Pursuant to Section 14(f) of Parkland Dedication By-law 2009-95, as amended, the proposed development at 755 Cope Drive is not required to convey parkland or money in-lieu of parkland.
8. Instructions for application submission during COVID-19 can be found here.
9. You are encouraged to contact the Ward Councillor, Councillor Glen Gower, at Glen.Gower@ottawa.ca about the proposal.

Please contact Colette Gorni, Planner (File Lead), at Colette.Gorni@ottawa.ca if you have any questions or require additional information relating to the comments above.

Urban Design

1. A design brief is required. Please see attached terms of reference.
2. The lay-bys need to be designed to work with the planned cross sections for both the local and collector roadways. The sidewalks should remain within the right of way. Consideration should be given to placing the more significant lay-by on Cope Drive.
3. Tree planting should be provided along all four sides of the site.
4. Landscape buffering should be provided between any parking areas and the public realm and residential land uses.
5. Re-orientation of the soccer field should be considered.
6. There is a public walkway block located in the north east corner of the site. A pathway connection from the school to this block should be provided.

Please contact Mark Young, Planner (Urban Design), at Mark.Young@ottawa.ca if you have any questions or require additional information relating to the comments above.

Engineering

General

1. This development falls under the requirements set out in the **Fernbank Master Servicing Study**/Community Design Plan.
2. This parcel was identified as Block 649 of the Phase 1 CRT Lands.

Infrastructure

Water:

3. Available Watermain – Existing 203mm (PVC) stubs are available on Cope Dr and Dagenham St (please use one of these existing stubs for water service connection).
4. Boundary Condition – Request prior to first submission. Contact assigned City Infrastructure Project Manager with the following information:
    a. Location of service(s)
    b. Type of development
    c. Fire flow (per FUS method – include FUS calculation sheet with boundary condition request – boundary conditions will not be requested without fire flow calculations)
    d. Average Daily Demand (l/s)
    e. Maximum Hourly Demand (l/s)
    f. Maximum Daily Demand (l/s)

Sanitary:

5. Available Sanitary Sewer – Existing 200mm (PVC) stubs are available on Cope Dr and Dagenham St (please use one of these existing stubs for sanitary service connection).

Storm:

6. Available Storm Sewer – Existing stubs are available on Cope Dr and Dagenham St (please use one of these existing stubs for sanitary service) connection:
    a. Cope Dr stub – 900mm (Conc)
    b. Dagenham St stub – Size unknown – Connects to 525mm (Conc) storm main
7. Stormwater Management
    a. Quantity Control:
        i. Refer to Fernbank MSS for Stormwater Management measures applicable to this site
        ii. Control to the 5-year storm event
        iii. If underground/inline stormwater storage is proposed, an average release rate equal to 50% of the determined peak allowable rate

must be used. Otherwise, disregard the underground/inline storage as available storage or provide modeling to support the proposed design. The reasoning for this restriction is that the discharge rate at full storage is not representative of the discharge rate for more frequent storm events. Halving the discharge rate compensates for the inaccuracies of the modified rational method when underground storage is used.

iv. Please note that the minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s in order to reduce the likelihood of plugging.

v. Provide both pre and post development stormwater management plans, showing individual drainage areas and their respective coefficient.

vi. If roof storage is proposed, please provide a roof drainage plan showing the 5- and 100-year storm ponding levels. Include the roof drain type, opening settings, and flow rate.

vii. Per Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 there shall be no surface ponding on private parking areas during the 2-year storm rainfall event.

viii. Provide any SW modelling files with the first submission.

b. Quality Control: Please consult with the Rideau Valley Conservation Authority (RVCA) regarding water quality control restrictions for the subject site. Include correspondence in servicing report.

c. Ministry of Environment, Conservation, and Parks (MECP): Designer to determine if approval for sewage works under Section 53 of OWRA is required and to determine the type of application required. Reviews will be done through Transfer of Review or Direct Submission.

Phase 1 & 2 Environmental Site Assessments

8. Phase I ESA is a requirement; Phase II ESA requirement will be dependent on the result of the Phase I ESA.

9. As per the Ministry of the Environment, Guide for Completing Phase One Environmental Site Assessments under Ontario Regulation 153/04, dated June 2011, the date the last work was done on the records review, interviews and site reconnaissance for a Phase I Environmental Site Assessment (ESA) can be no more than 18 months old or an update is required.

10. Phase I ESA must include Ecolog ERIS Report.

11. Phase I ESAs and Phase II ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Geotechnical Investigation

12. Geotechnical Report is required for development proposal.

13. The Geotechnical Report shall also speak to any proposed underground stormwater storage and provide confirmation that the site subsurface characteristics (groundwater table elevation, soil type) are appropriate. Of note, the high groundwater table must be 1.0m above the bottom of any proposed storage system per MECP requirements.

Exterior Lighting

14. If exterior light fixtures are proposed, provide a plan showing the location of all exterior fixtures and include a table providing fixture details (make, model, mounting heights). All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), resulting in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). Provide certification letter from a relevant Professional Engineer.

General Information

15. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications

16. Servicing and site works shall be in accordance with the following documents:

    a. Ottawa Sewer Design Guidelines (October 2012) (including subsequent Technical Bulletins)

    b. Ottawa Design Guidelines – Water Distribution (2010) (including subsequent Technical Bulletins)

    c. Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)

    d. Ottawa Standard Tender Documents (latest version)

17. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

18. Any proposed work in utility easements requires written consent of easement owner.
19. **All submitted report and plan pdf documents to be flattened and unsecured to allow for editing and ease of use.**
20. All documents prepared by Engineers shall be signed and dated on the seal.

Please contact Jessica Valic, Infrastructure Project Manager, at Jessica.Valic@ottawa.ca if you have any questions or require additional information relating to the comments above.

Environmental Planning

1. Bird-safe Design: Given the scale of the proposal (mid to high rise) the proposal will need to review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans
2. Landscaping: The OP Section 4.9 has some policies addressing energy conservation through design - in particular for this site, I would recommend considering shading of outdoor space to combat urban heat island and to provide some opportunities for shaded outdoor amenities like outdoor classrooms and limiting the use of black asphalt. Try to maximize tree planting to provide shade.
3. Street trees are also important and should be provided.
4. Location of the playgrounds adjacent to drop-offs is not ideal due to vehicle idling and air pollution. Please look at this and find options to either increase separation between the two or mitigate. More information available from Birgit Isernhagen birgit.isernhagen@ottawa.ca

Please contact Matthew Hayley, Environmental Planner, at Matthew.Hayley@ottawa.ca if you have any questions or require additional information relating to the comments above.

Transportation

1. Follow Traffic Impact Assessment Guidelines
    - As per Screening Form, a TIA is required. Please submit the Scoping Report at your earliest convenience to Josiane.Gervais@ottawa.ca

- Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package and/or monitoring report (if applicable).
- The lay-by areas proposed would be reviewed along with the TIA. Note that the lay-bys would trigger an RMA, as such request base mapping as soon as possible. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services) .

2. Corner clearances should follow minimum distances set out within TAC Figure 8.8.2.
3. Sidewalks are to be provided along property frontage on Dagenham St and Cope Dr and shown on the site plan.
4. On site plan:
   - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
   - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
   - Turning movement diagrams required for internal movements (loading areas, garbage).
   - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
   - Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)
   - Provide dedicated pedestrian pathways from the parking areas to the building.
   - Sidewalk is to be continuous across access as per City Specification 7.1.
   - Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.
   - Grey out any area that will not be impacted by this application.
5. As the proposed site is institutional and for general public use, AODA legislation applies. Consider using the City's Accessibility Design Standards as a reference for AODA requirements.
6. Noise Impact Studies required for the following:
   - Road
   - Stationary, if there will be any exposed mechanical equipment due to the proximity to neighboring noise sensitive land uses.

Please contact Josiane Gervais, Transportation Project Manager, at Josiane.Gervais@ottawa.ca if you have any questions or require additional information relating to the comments above.

Forestry

A Tree Conservation Report (TCR) is required if there any trees greater than 10cm in diameter located on the site. If so, please refer the below requirements.

TCR Requirements

1. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City

    a. An approved TCR is a requirement of Site Plan approval.

    b. The TCR may be combined with eh LP provided all information is supplied

2. As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.

3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR

    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester

    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit

4. The TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition

5. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)

6. The TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site

7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained

8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca

    a. The location of tree protection fencing must be shown on a plan

b. Show the critical root zone of the retained trees

c. If excavation will occur within the critical root zone, please show the limits of excavation

9. The City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

RVCA

1. The RVCA has no concerns. The only comment is as part of the stormwater report provide confirmation that the site will tie into the downstream stormwater facility and will achieve water quality protection through downstream facilities prior to outletting to a natural watercourse.

Next Steps

Please refer to the links to Guide to preparing studies and plans and fees for further information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please do not hesitate to Colette Gorni, at Colette.Gorni@ottawa.ca, if you have any questions.

REPORT
PROJECT: 27970-5.2.2

DESIGN BRIEF
CRT LANDS PHASE 1
FERNBANK COMMUNITY

Prepared for CRT DEVELOPMENT INC.
by IBI GROUP

JULY 2017

AREA ID	AREA (HA)	MH	D/S SEGMENT	IMP RATIO	LENGTH (M)	WIDTH (M)	AVAIL. STORAGE (CU-M)	5 YEAR SIMULATED FLOW (L/S) *07-PH1-5CH.OUT & 07-PH1A-5CH.OUT*	ICD RESTRICTION (L/S)
S177	0.14	MH177	RG	0.79	49	98	N/A	29	9.4[1]
S176	0.14	MH176	S175	0.79	96	96	N/A	29	7.62[1]
INST2	6.57	MH176	S175	0.50	739	1478	618[2]	822	801.37
S175	0.42	MH175	S174	0.79	109	218	9.23	82	118.66[4]
S174	0.25	MH174	S173	0.79	68	136	14.44	51	57.18[4]
S173	0.75	MH173	S172	0.79	80	160	14.78	140	156.12[4]
INST1	2.88	MH172	S172	0.86	324	648	326[2]	582	579.45
S172	0.23	MH172	PH2	0.79	65	130	18.32	47	52.88[4]
S135A	0.14	MH135	S135B	0.79	75	75	N/A	29	16.77[1]
S135B	0.12	MH135	S134A	0.79	81	81	0.95[6]	23	46.36[4]
S134C	0.06	MH134	S134A	0.79	60	60	N/A	13	9.26[1]
S136A	0.11	MH136A	S134B	0.79	82	82	N/A	23	14.42[1]
S134B	0.14	MH134	S134A	0.79	77	77	N/A	27	22.21[1]
R151A	0.18	MH151A	R134	0.50	48	96	N/A	24.17	24.17
R134	0.21	MH134	S134A	0.50	56	112	N/A	28.2	28.2
S134A	0.19	MH134	S140	0.79	58	116	5.87	35	75.86[4]
S151A	0.1	MH151A	S150A	0.79	80	80	N/A	21	13.53[1]
S150A	0.28	MH150	S140	0.79	74	148	N/A	54	35.75[1]
S150B	0.04	MH150	S140	0.79	22	22	0.40[6]	8	9.17[4]
R125B	0.19	MH125	R140	0.50	47	94	N/A	25.39	25.39
R140	0.21	MH140	S140	0.50	50	100	N/A	27.98	27.98
S140	0.25	MH140	S124	0.79	78	156	17.74	50	104.9[4]
S125	0.39	MH125	S124	0.79	103	206	19.83	80	88.89[4]
R131	0.2	MH131	R130A	0.50	51	102	N/A	26.78	26.78
R130A	0.16	MH130	R130B	0.50	39	78	N/A	21.36	21.36
R130B	0.17	MH130	S130	0.50	38	76	N/A	22.55	22.55
S124	0.26	MH124	S180A	0.79	69	138	15.52	53	59.47[4]
S130	0.35	MH130	S180A	0.79	100	200	15.27	72	80.28[4]
R125A	0.16	MH125	R124B	0.50	78	78	N/A	21.33	21.33
R124B	0.16	MH124	S180A	0.50	86	86	N/A	21.47	21.47
R180A	0.09	MH180	R181	0.50	43	43	N/A	12	12
S180A	0.19	MH180	S180B	0.79	65	65	9.97	37	103.71[3]
R181	0.09	MH181	S181	0.50	43	43	N/A	12	12
S180B	0.18	MH180	S181	0.79	65	65	10.67	36	101.83[3]
S181	0.14	MH181	PH2	0.79	69	138	30.43	30	93.49[3]
S170A	0.27	MH170	S171	0.79	75	150	17.58	55	61.9[3]
RES3A	3.26	MH170	S171	0.66	367	734	81.50[7]	522	583
S171	0.26	MH171	PH2	0.79	74	148	29.26	54	259.83[3]
PARK1	1.27	MH132	S132	0.00	143	286	N/A	29.66	29.66
R112A	0.12	MH112	R112B	0.50	62	62	N/A	16.07	16.07
R112B	0.06	MH112	S132	0.50	28	28	N/A	7.99	7.99
S132	0.24	MH132	S113	0.79	32.5	65	44.45	54	116.8[3]
S112	0.27	MH112	S113	0.79	70	140	10.79	55	61.57[4]
S113	0.27	MH113	S114	0.79	70	140	4.29	55	61.57[4]
S114	0.24	MH114	S120	0.79	70	140	19.69	50	55.33[4]
R114A	0.32	MH114	R114B	0.50	65	130	N/A	42.14	42.14
R114B	0.18	MH114	S114	0.50	30	60	N/A	23.33	23.33
S122	0.31	MH122	S120	0.79	82	164	34.71	63	70.84[4]
R102	0.21	MH102	R103B	0.50	56	112	N/A	28.2	28.2
R103B	0.16	MH103	R104B	0.50	36	72	N/A	21.24	21.24
R104B	0.19	MH104	R104C	0.50	38	76	N/A	24.99	24.99
R104C	0.17	MH104	S104	0.50	39	78	N/A	21.36	21.36
S120	0.28	MH120	S105A	0.79	85	170	41.25	58	111.71[3]
S110	0.09	MH110C	S103	0.79	80	80	2.96	19	19[1]
S102	0.09	MH102	S103	0.79	80	80	3.02	19	21.31[4]

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : **CRT LANDS**
LOCATION : **CITY OF OTTAWA**
DEVELOPER : **CRT DEVELOPMENT INC.**

FILE: 27970.5.7
DATE: 2/9/2017
DESIGN: LME

NODE	RESIDENTIAL UNITS SF	RESIDENTIAL UNITS TH	POP'N	NON-RESIDENTIAL COM (Ha)	NON-RESIDENTIAL IND (Ha)	NON-RESIDENTIAL INS (Ha)	AVERAGE DAILY DEMAND (l/s) Res.	AVERAGE DAILY DEMAND (l/s) Non-res.	AVERAGE DAILY DEMAND (l/s) Total	MAXIMUM DAILY DEMAND (l/s) Res.	MAXIMUM DAILY DEMAND (l/s) Non-res.	MAXIMUM DAILY DEMAND (l/s) Total	MAXIMUM HOURLY DEMAND (l/s) Res.	MAXIMUM HOURLY DEMAND (l/s) Non-res.	MAXIMUM HOURLY DEMAND (l/s) Total	FIRE DEMAND (l/s)
CLA-02	15		51				0.21		0.21	0.52		0.52	1.14		1.14	166.7
CLA-03	14		48				0.19		0.19	0.48		0.48	1.06		1.06	166.7
CLA-04	9		31				0.12		0.12	0.31		0.31	0.68		0.68	166.7
CLA-05	8		27				0.11		0.11	0.28		0.28	0.61		0.61	166.7
CLA-06		17	46				0.19		0.19	0.46		0.46	1.02		1.02	166.7
CLA-07	2	15	47				0.19		0.19	0.48		0.48	1.05		1.05	166.7
CLA-08	17		58				0.23		0.23	0.59		0.59	1.29		1.29	166.7
CLA-09	9		31				0.12		0.12	0.31		0.31	0.68		0.68	166.7
CLA-10	17		58				0.23		0.23	0.59		0.59	1.29		1.29	166.7
CLA-11	16		54				0.22		0.22	0.55		0.55	1.21		1.21	166.7
CLA-12	11		37				0.15		0.15	0.38		0.38	0.83		0.83	166.7
CLA-13	20		68				0.28		0.28	0.69		0.69	1.52		1.52	166.7
CLA-14		28	76				0.31		0.31	0.77		0.77	1.68		1.68	166.7
CLA-15		30	81				0.33		0.33	0.82		0.82	1.80		1.80	166.7
CLA-16			170				0.69		0.69	1.72		1.72	3.79		3.79	166.7
CLA-20		24	65				0.26		0.26	0.66		0.66	1.44		1.44	166.7
CLA-21		13	35				0.14		0.14	0.36		0.36	0.78		0.78	166.7
CLA-22	14		48				0.19		0.19	0.48		0.48	1.06		1.06	166.7
CLA-23		9	24				0.10		0.10	0.25		0.25	0.54		0.54	166.7
CLA-24	13		44				0.18		0.18	0.45		0.45	0.98		0.98	166.7
CLA-25	6		20				0.08		0.08	0.21		0.21	0.45		0.45	166.7
CLA-26			109				0.44		0.44	1.10		1.10	2.43		2.43	166.7
CLA-27	9		31				0.12		0.12	0.31		0.31	0.68		0.68	166.7
CLA-28	18		61				0.25		0.25	0.62		0.62	1.36		1.36	166.7
CLA-28A			68				0.28		0.28	0.69		0.69	1.52		1.52	
CLA-29	7		24				0.10		0.10	0.24		0.24	0.53		0.53	166.7
CLA-30	10		34				0.14		0.14	0.34		0.34	0.76		0.76	166.7
CLA-31	12		41				0.17		0.17	0.41		0.41	0.91		0.91	166.7
CLA-32	15		51				0.21		0.21	0.52		0.52	1.14		1.14	166.7
CLA-32A			68				0.28		0.28	0.69		0.69	1.52		1.52	
CLA-33	12		41				0.17		0.17	0.41		0.41	0.91		0.91	166.7
CLA-34	16		54				0.22		0.22	0.55		0.55	1.21		1.21	166.7
CLA-35	5		17				0.07		0.07	0.17		0.17	0.38		0.38	166.7
CLA-36	13		44			2.88	0.18	1.67	1.85	0.45	2.50	2.95	0.98	4.50	5.48	225.0
CLA-37	16		54				0.22		0.22	0.55		0.55	1.21		1.21	166.7
CLA-38	8		27			6.53	0.11	3.78	3.89	0.28	5.67	5.94	0.61	10.20	10.81	225.0
CLA-54	11		37				0.15		0.15	0.38		0.38	0.83		0.83	166.7
CLA-55		30	81				0.33		0.33	0.82		0.82	1.80		1.80	166.7
TOTALS	**323**	**166**	**1962**			**9.41**			**13.39**			**28.04**			**58.41**	

ASSUMPTIONS

RESIDENTIAL DENSITIES

- SF 3.4 p/p/u
- TH 2.7 p/p/u
- High Density 90.0 p/p/ha

AVERAGE DAILY DEMAND

- Residential 350 l/cap/day
- Commercial 30,000 l/ha/day
- Industrial 35,000 l/ha/day
- Institutional 50,000 l/ha/day

MAXIMUM DAILY DEMAND

- Residential 875 l/cap/day
- Commercial 45,000 l/ha/day
- Industrial 52,500 l/ha/day
- Institutional 75,000 l/ha/day

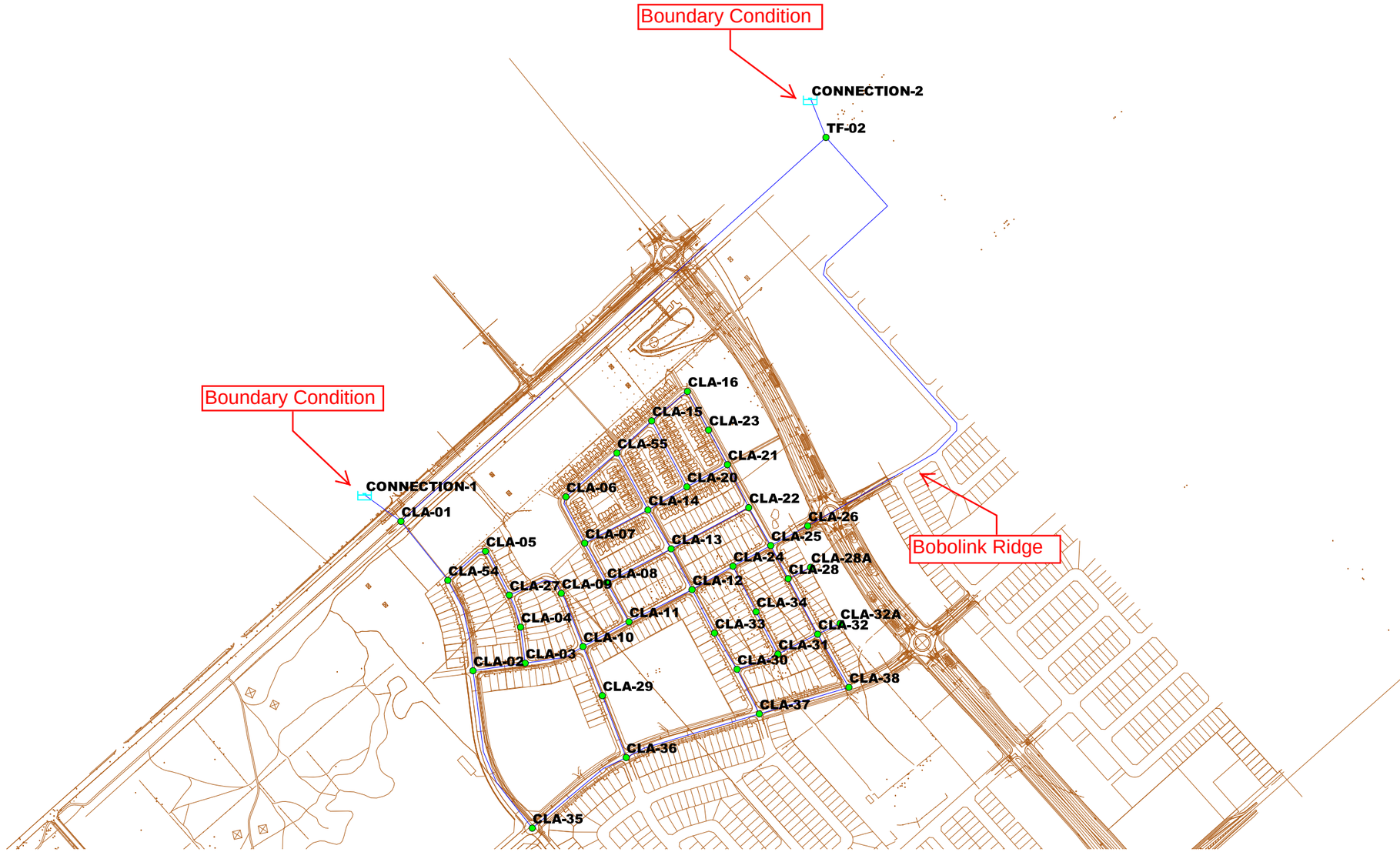
MAXIMUM HOURLY DEMAND

- Residential 1,925 l/cap/day
- Commercial 81,000 l/ha/day
- Industrial 94,500 l/ha/day
- Institutional 135,000 l/ha/day

FIRE DEMANDS

- SF 166.7 l/s
- TH 166.7 l/s
- ICI 225.0 l/s

Phase 1 Node ID's



Date: Thursday, February 09, 2017

Basic Day (Max HGL) - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		CLA-01	0.00	107.60	161.10	524.26
2		CLA-02	0.21	107.70	161.10	523.30
3		CLA-03	0.19	107.80	161.10	522.34
4		CLA-04	0.12	107.70	161.10	523.32
5		CLA-05	0.11	108.10	161.10	519.38
6		CLA-06	0.19	107.00	161.11	530.24
7		CLA-07	0.19	108.55	161.11	515.05
8		CLA-08	0.23	108.30	161.11	517.50
9		CLA-09	0.12	108.10	161.10	519.40
10		CLA-10	0.23	108.05	161.11	519.91
11		CLA-11	0.22	108.15	161.11	518.97
12		CLA-12	0.15	108.35	161.11	517.05
13		CLA-13	0.28	109.20	161.11	508.70
14		CLA-14	0.31	109.20	161.11	508.69
15		CLA-15	0.33	105.90	161.11	541.03
16		CLA-16	0.69	105.55	161.11	544.46
17		CLA-20	0.26	108.50	161.11	515.55
18		CLA-21	0.14	108.25	161.11	518.03
19		CLA-22	0.19	109.10	161.12	509.72
20		CLA-23	0.10	109.00	161.11	510.67
21		CLA-24	0.18	108.75	161.12	513.17
22		CLA-25	0.08	108.80	161.12	512.74
23		CLA-26	0.44	109.00	161.14	510.95
24		CLA-27	0.12	108.00	161.10	520.37
25		CLA-28	0.25	108.60	161.12	514.62
26		CLA-28A	0.28	108.60	161.12	514.62
27		CLA-29	0.10	107.50	161.10	525.27
28		CLA-30	0.14	107.95	161.11	520.89
29		CLA-31	0.17	108.05	161.11	519.92
30		CLA-32	0.21	108.15	161.11	518.94
31		CLA-32A	0.28	108.15	161.11	518.94
32		CLA-33	0.17	108.00	161.11	520.43
33		CLA-34	0.22	108.00	161.11	520.45
34		CLA-35	0.07	107.40	161.10	526.24
35		CLA-36	1.85	107.45	161.10	525.72
36		CLA-37	0.22	107.85	161.10	521.81
37		CLA-38	3.89	108.30	161.10	517.38
38		CLA-54	0.15	107.90	161.10	521.33
39		CLA-55	0.33	106.60	161.11	534.17
40		TF-02	0.00	108.00	161.40	523.27

Peak Hour - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		CLA-01	0.00	107.60	154.70	461.54
2		CLA-02	1.14	107.70	154.41	457.73
3		CLA-03	1.06	107.80	154.37	456.39
4		CLA-04	0.68	107.70	154.38	457.38
5		CLA-05	0.61	108.10	154.46	454.25
6		CLA-06	1.02	107.00	154.24	462.93
7		CLA-07	1.05	108.55	154.25	447.82
8		CLA-08	1.29	108.30	154.27	450.45
9		CLA-09	0.68	108.10	154.35	453.20
10		CLA-10	1.29	108.05	154.33	453.53
11		CLA-11	1.21	108.15	154.30	452.27
12		CLA-12	0.83	108.35	154.29	450.21
13		CLA-13	1.52	109.20	154.26	441.56
14		CLA-14	1.68	109.20	154.24	441.38
15		CLA-15	1.80	105.90	154.24	473.65
16		CLA-16	3.79	105.55	154.24	477.08
17		CLA-20	1.44	108.50	154.24	448.21
18		CLA-21	0.78	108.25	154.25	450.74
19		CLA-22	1.06	109.10	154.26	442.54
20		CLA-23	0.54	109.00	154.24	443.36
21		CLA-24	0.98	108.75	154.29	446.28
22		CLA-25	0.45	108.80	154.29	445.80
23		CLA-26	2.43	109.00	154.32	444.12
24		CLA-27	0.68	108.00	154.38	454.49
25		CLA-28	1.36	108.60	154.25	447.33
26		CLA-28A	1.52	108.60	154.25	447.31
27		CLA-29	0.53	107.50	154.30	458.61
28		CLA-30	0.76	107.95	154.23	453.47
29		CLA-31	0.91	108.05	154.23	452.48
30		CLA-32	1.14	108.15	154.21	451.37
31		CLA-32A	1.52	108.15	154.21	451.36
32		CLA-33	0.91	108.00	154.25	453.20
33		CLA-34	1.21	108.00	154.25	453.17
34		CLA-35	0.38	107.40	154.39	460.42
35		CLA-36	5.48	107.45	154.27	458.83
36		CLA-37	1.21	107.85	154.22	454.38
37		CLA-38	10.81	108.30	154.18	449.60
38		CLA-54	0.83	107.90	154.55	457.11
39		CLA-55	1.80	106.60	154.24	466.80
40		TF-02	0.00	108.00	154.80	458.60

Max Day + Fire - Fireflow Design Report

		ID	Total Demand (L/s)	Critical Node 1 ID	Critical Node 1 Pressure (kPa)	Critical Node 1 Head (m)	Adjusted Fire-Flow (L/s)	Available Flow @Hydrant (L/s)	Critical Node 2 ID	Critical Node 2 Pressure (kPa)	Critcal Node 2 Head (m)	Adjusted Available Flow (L/s)	Design Flow (L/s)
1		CLA-02	167.19	CLA-14	396.31	148.14	630.98	586.28	CLA-02	139.97	121.98	586.28	586.28
2		CLA-03	167.15	CLA-14	392.70	147.87	586.75	541.31	CLA-03	139.97	122.08	541.31	541.31
3		CLA-04	166.98	CLA-04	263.96	134.64	223.39	223.39	CLA-04	139.96	121.98	223.39	223.39
4		CLA-05	166.95	CLA-05	229.91	131.56	203.20	203.20	CLA-05	139.96	122.38	203.20	203.20
5		CLA-06	167.13	CLA-06	306.72	138.30	258.66	258.68	CLA-06	139.96	121.28	258.69	258.66
6		CLA-07	167.15	CLA-07	320.91	141.30	287.47	287.47	CLA-07	139.96	122.83	287.47	287.47
7		CLA-08	167.26	CLA-08	349.21	143.94	336.17	336.17	CLA-08	139.96	122.58	336.17	336.17
8		CLA-09	166.98	CLA-09	190.07	127.50	184.72	184.72	CLA-09	139.96	122.38	184.72	184.72
9		CLA-10	167.26	CLA-14	387.92	147.64	541.97	514.93	CLA-10	139.96	122.33	514.94	514.94
10		CLA-11	167.22	CLA-14	382.73	147.21	500.77	490.29	CLA-11	139.96	122.43	490.29	490.29
11		CLA-12	167.05	CLA-13	381.53	147.28	491.15	470.51	CLA-12	139.96	122.63	470.52	470.52
12		CLA-13	167.36	CLA-13	316.09	141.46	285.92	285.92	CLA-13	139.96	123.48	285.92	285.92
13		CLA-14	167.44	CLA-14	294.92	139.30	259.10	259.13	CLA-14	139.96	123.48	259.13	259.10
14		CLA-15	167.49	CLA-15	327.60	139.33	275.89	275.89	CLA-15	139.96	120.18	275.89	275.89
15		CLA-16	168.39	CLA-16	324.52	138.67	270.80	270.83	CLA-16	139.96	119.83	270.83	270.80
16		CLA-20	167.33	CLA-20	263.36	135.38	226.86	226.86	CLA-20	139.96	122.78	226.87	226.86
17		CLA-21	167.03	CLA-21	325.97	141.51	292.36	292.36	CLA-21	139.96	122.53	292.36	292.36
18		CLA-22	167.15	CLA-22	340.75	143.87	330.26	330.26	CLA-22	139.96	123.38	330.26	330.26
19		CLA-23	166.92	CLA-23	311.50	140.79	278.00	278.00	CLA-23	139.96	123.28	278.00	278.00
20		CLA-24	167.12	CLA-24	381.05	147.64	462.70	462.70	CLA-24	139.96	123.03	462.71	462.70
21		CLA-25	166.88	CLA-22	380.75	147.65	480.81	470.21	CLA-25	139.96	123.08	470.21	470.21
22		CLA-26	167.77	CLA-26	378.99	147.68	459.94	459.94	CLA-26	139.96	123.28	459.95	459.94
23		CLA-27	166.98	CLA-27	275.17	136.08	232.57	232.57	CLA-27	139.96	122.28	232.57	232.57
24		CLA-28	167.29	CLA-28	340.36	143.33	322.37	322.37	CLA-28	139.96	122.88	322.37	322.37
25		CLA-29	166.91	CLA-29	209.30	128.86	192.54	192.54	CLA-29	139.96	121.78	192.54	192.54
26		CLA-30	167.01	CLA-30	281.56	136.68	239.14	239.15	CLA-30	139.96	122.23	239.15	239.14
27		CLA-31	167.08	CLA-31	282.20	136.85	240.23	240.24	CLA-31	139.96	122.33	240.24	240.23
28		CLA-32	167.19	CLA-32	324.59	141.27	290.82	290.82	CLA-32	139.96	122.43	290.82	290.82
29		CLA-33	167.08	CLA-33	221.78	130.63	199.47	199.47	CLA-33	139.96	122.28	199.47	199.47
30		CLA-34	167.22	CLA-34	211.63	129.60	194.61	194.61	CLA-34	139.96	122.28	194.61	194.61
31		CLA-35	166.84	CLA-35	375.23	145.69	384.66	384.65	CLA-35	139.96	121.68	384.66	384.66
32		CLA-36	227.95	CLA-36	249.80	132.94	292.31	292.31	CLA-36	139.96	121.73	292.32	292.31
33		CLA-37	225.55	CLA-37	224.01	130.71	271.34	271.34	CLA-37	139.96	122.13	271.34	271.34
34		CLA-38	230.94	CLA-38	186.04	127.29	253.61	253.61	CLA-38	139.96	122.58	253.61	253.61
35		CLA-54	167.05	CLA-14	408.38	149.57	855.64	780.75	CLA-54	139.97	122.18	780.76	780.76
36		CLA-55	167.49	CLA-55	319.77	139.23	271.31	271.31	CLA-55	139.96	120.88	271.31	271.31

Max Day + Fire ICI Lands - Fireflow Design Report

		ID	Total Demand (L/s)	Critical Node 1 ID	Critical Node 1 Pressure (kPa)	Critical Node 1 Head (m)	Adjusted Fire-Flow (L/s)	Available Flow @Hydrant (L/s)	Critical Node 2 ID	Critical Node 2 Pressure (kPa)	Critcal Node 2 Head (m)	Adjusted Available Flow (L/s)	Design Flow (L/s)
1		CLA-36	227.95	CLA-36	228.55	130.77	280.83	280.83	CLA-36	139.96	121.73	280.83	280.83
2		CLA-37	225.55	CLA-37	202.79	128.54	260.40	260.41	CLA-37	139.96	122.13	260.41	260.40
3		CLA-38	230.94	CLA-38	164.84	125.12	243.39	243.39	CLA-38	139.96	122.58	243.39	243.39

IBI GROUP
IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: CRT DEVELOPMENT
LOCATION: CITY OF OTTAWA
CLIENT: CRT DEVELOPMENT INC.

LOCATION				RESIDENTIAL									ICI AREAS							INFILTRATION ALLOWANCE			TOTAL FLOW	PROPOSED SEWER DESIGN						
				UNIT TYPES				AREA	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)						PEAK FLOW (L/s)	AREA (Ha)		FLOW		CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	SF	SD	TH	APT	(Ha)	IND	CUM			INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM		IND	CUM	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)		L/s	(%)
EMBANKMENT STREET	128AB	128A	188A	16				0.74	52.8	52.8	4.00	0.86		0.00		0.00		0.00	0.00	0.74	0.74	0.21	1.06	27.59	98.00	200	0.65	0.851	26.52	96.15
EMBANKMENT STREET	188A	188A	189A	11				0.52	36.3	89.1	4.00	1.44		0.00		0.00		0.00	0.00	0.52	1.26	0.35	1.80	27.59	74.80	200	0.65	0.851	25.79	93.49
BLOCK 344	RES.3	192A	189A					1.52	136.8	136.8	4.00	2.22		0.00		0.00		0.00	0.00	1.52	1.52	0.43	2.64	20.24	40.00	200	0.35	0.624	17.60	86.95
EMBANKMENT STREET	189A	189A	190A	14				0.69	46.2	272.1	4.00	4.41		0.00		0.00		0.00	0.00	0.69	3.47	0.97	5.38	20.24	92.53	200	0.35	0.624	14.86	73.42
EMBANKMENT STREET		190A	176A	0				0.00	0.0	272.1	4.00	4.41		0.00		0.00		0.00	0.00	0.00	3.47	0.97	5.38	20.24	10.78	200	0.35	0.624	14.86	73.42
BLOCK 345	INST.2	BULKHEAD	176A	0				0.00	0.0	0.0	4.00	0.00	6.53	6.53		0.00		0.00	5.67	6.53	6.53	1.83	7.50	20.24	21.00	200	0.35	0.624	12.75	62.97
COPE DRIVE	176A	176A	175A	3				0.63	9.9	282.0	4.00	4.57		6.53		0.00		0.00	5.67	0.63	10.63	2.98	13.21	20.24	76.03	200	0.35	0.624	7.03	34.72
COPE DRIVE	175A	175A	174A	5				0.46	16.5	298.5	4.00	4.84		6.53		0.00		0.00	5.67	0.46	11.09	3.11	13.61	20.24	84.94	200	0.35	0.624	6.63	32.76
BELSIZE WAY	127AB	127A	185A	11				0.53	36.3	36.3	4.00	0.59		0.00		0.00		0.00	0.00	0.53	0.53	0.15	0.74	27.59	88.50	200	0.65	0.851	26.85	97.33
BELSIZE WAY	185A	185A	186A	13				0.59	42.9	79.2	4.00	1.28		0.00		0.00		0.00	0.00	0.59	1.12	0.31	1.60	27.59	83.61	200	0.65	0.851	25.99	94.21
PINNER ROAD	191A	191A	186A	3				0.24	9.9	9.9	4.00	0.16		0.00		0.00		0.00	0.00	0.24	0.24	0.07	0.23	27.59	43.00	200	0.65	0.851	27.36	99.17
PINNER ROAD	186A	186A	187A	5				0.35	16.5	105.6	4.00	1.71		0.00		0.00		0.00	0.00	0.35	1.71	0.48	2.19	20.24	70.39	200	0.35	0.624	18.05	89.18
PINNER ROAD		187A	183A	0				0.00	0.0	105.6	4.00	1.71		0.00		0.00		0.00	0.00	0.00	1.71	0.48	2.19	20.24	9.00	200	0.35	0.624	18.05	89.18
FINSBURY AVENUE	182A	182A	183A	16				0.97	52.8	52.8	4.00	0.86		0.00		0.00		0.00	0.00	0.97	0.97	0.27	1.13	32.46	117.13	200	0.90	1.001	31.33	96.53
FINSBURY AVENUE	183A	183A	184A	4				0.33	13.2	171.6	4.00	2.78		0.00		0.00		0.00	0.00	0.33	3.01	0.84	3.62	20.24	65.71	200	0.35	0.624	16.62	82.10
FINSBURY AVENUE		184A	174A	0				0.00	0.0	171.6	4.00	2.78		0.00		0.00		0.00	0.00	0.00	3.01	0.84	3.62	20.24	17.89	200	0.35	0.624	16.62	82.10
COPE DRIVE	174A	174A	173A	7				0.47	23.1	493.2	3.98	7.95		6.53		0.00		0.00	5.67	0.47	14.57	4.08	17.69	31.02	82.90	250	0.25	0.612	13.33	42.96
COPE DRIVE	173A	173A	172A	6				0.41	19.8	513.0	3.97	8.25		6.53		0.00		0.00	5.67	0.41	14.98	4.19	18.11	31.02	76.02	250	0.25	0.612	12.91	41.62
BLOCK 313	INST.1	BULKHEAD	172A	0				0.00	0.0	0.0	4.00	0.00	2.88	2.88		0.00		0.00	2.50	2.88	2.88	0.81	3.31	20.24	16.00	200	0.35	0.624	16.94	83.67
COPE DRIVE	172A	172A	171B	3				0.23	9.9	522.9	3.96	8.40		9.41		0.00		0.00	8.17	0.23	18.09	5.07	21.63	31.02	36.96	250	0.25	0.612	9.39	30.27
COPE DRIVE	171B	171B	171A	2				0.22	6.6	529.5	3.96	8.50		9.41		0.00		0.00	8.17	0.22	18.31	5.13	21.79	31.02	41.21	250	0.25	0.612	9.23	29.75
DAGENHAM STREET	180A	180A	181A	7				0.50	23.1	23.1	4.00	0.37		0.00		0.00		0.00	0.00	0.50	0.50	0.14	0.51	20.24	90.00	200	0.35	0.624	19.73	97.46
DAGENHAM STREET	181A	181A	171A	0				0.11	0.0	23.1	4.00	0.37		0.00		0.00		0.00	0.00	0.11	0.61	0.17	0.55	20.24	67.50	200	0.35	0.624	19.70	97.31
COPE DRIVE	171A	171A	170B	1				0.17	3.3	555.9	3.95	8.90		9.41		0.00		0.00	8.17	0.17	19.09	5.35	22.41	45.12	37.91	300	0.20	0.618	22.71	50.33
COPE DRIVE	170B	170B	170A	3				0.25	9.9	565.8	3.95	9.04		9.41		0.00		0.00	8.17	0.25	19.34	5.42	22.63	45.12	43.98	300	0.20	0.618	22.49	49.84
BLOCK 312	RES.3A	BULKHEAD	sewer	0				3.26	195.6	195.6	4.00	3.17		0.00		0.00		0.00	0.00	3.26	3.26	0.91	4.08	20.24	16.22	200	0.35	0.624	16.16	79.83
COPE DRIVE	170A	170A	110A	6				0.62	19.8	781.2	3.87	12.24		9.41		0.00		0.00	8.17	0.62	23.22	6.50	26.91	45.12	120.00	300	0.20	0.618	18.21	40.36
GOLDHAWK DRIVE	306A	SOUTH	303A	31				1.83	102.3	102.3	4.00	1.66		0.00		0.00		0.00	0.00	1.83	1.83	0.51	2.17							
STREET NO. 26	304A	WEST	303A	14				0.69	46.2	46.2	4.00	0.75		0.00		0.00		0.00	0.00	0.69	0.69	0.19	0.94							
GOLDHAWK DRIVE	303A	303A	302A	10				0.62	33.0	181.5	4.00	2.94		0.00		0.00		0.00	0.00	0.62	3.14	0.88	3.82	20.24	94.58	200	0.35	0.624	16.42	81.13
Future Street	RES.5, 5A, Park3	EAST	302A					23.97	1421.4	1421.4	3.70	21.28		0.00		0.00		0.00	0.00	23.97	23.97	6.71	28.00							
GOLDHAWK DRIVE	302A	302A	301A	10				0.56	33.0	1635.9	3.65	24.20		0.00		0.00		0.00	0.00	0.56	27.67	7.75	31.95	50.44	70.68	300	0.25	0.691	18.49	36.66
GOLDHAWK DRIVE	301A	301A	207A	6				0.37	19.8	1655.7	3.65	24.47		0.00		0.00		0.00	0.00	0.37	28.04	7.85	32.32	50.44	70.00	300	0.25	0.691	18.12	35.93
STREET NO. 2	RES.4	EAST	207A					13.88	832.8	832.8	3.85	12.99		0.00		0.00		0.00	0.00	13.88	13.88	3.89	16.87							
GOLDHAWK DRIVE	207A	207A	206A	17				0.86	56.1	2544.6	3.50	36.10		0.00		0.00		0.00	0.00	0.86	42.78	11.98	48.08	70.84	107.19	375	0.15	0.621	22.76	32.13
GOLDHAWK DRIVE	206A	206A	205A	12				0.69	39.6	2584.2	3.50	36.60		0.00		0.00		0.00	0.00	0.69	43.47	12.17	48.78	70.84	106.61	375	0.15	0.621	22.07	31.15
GOLDHAWK DRIVE	205A	205A	110A	5				0.44	16.5	2600.7	3.49	36.81		0.00		0.00		0.00	0.00	0.44	43.91	12.29	49.11	70.84	100.61	375	0.15	0.621	21.73	30.68

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.3	p/p/u				
TH/SD	2.5	p/p/u	INST	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	COM	50,000	L/Ha/day	1.5
Low	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart
Med	75	p/p/Ha				
High	90	p/p/Ha				

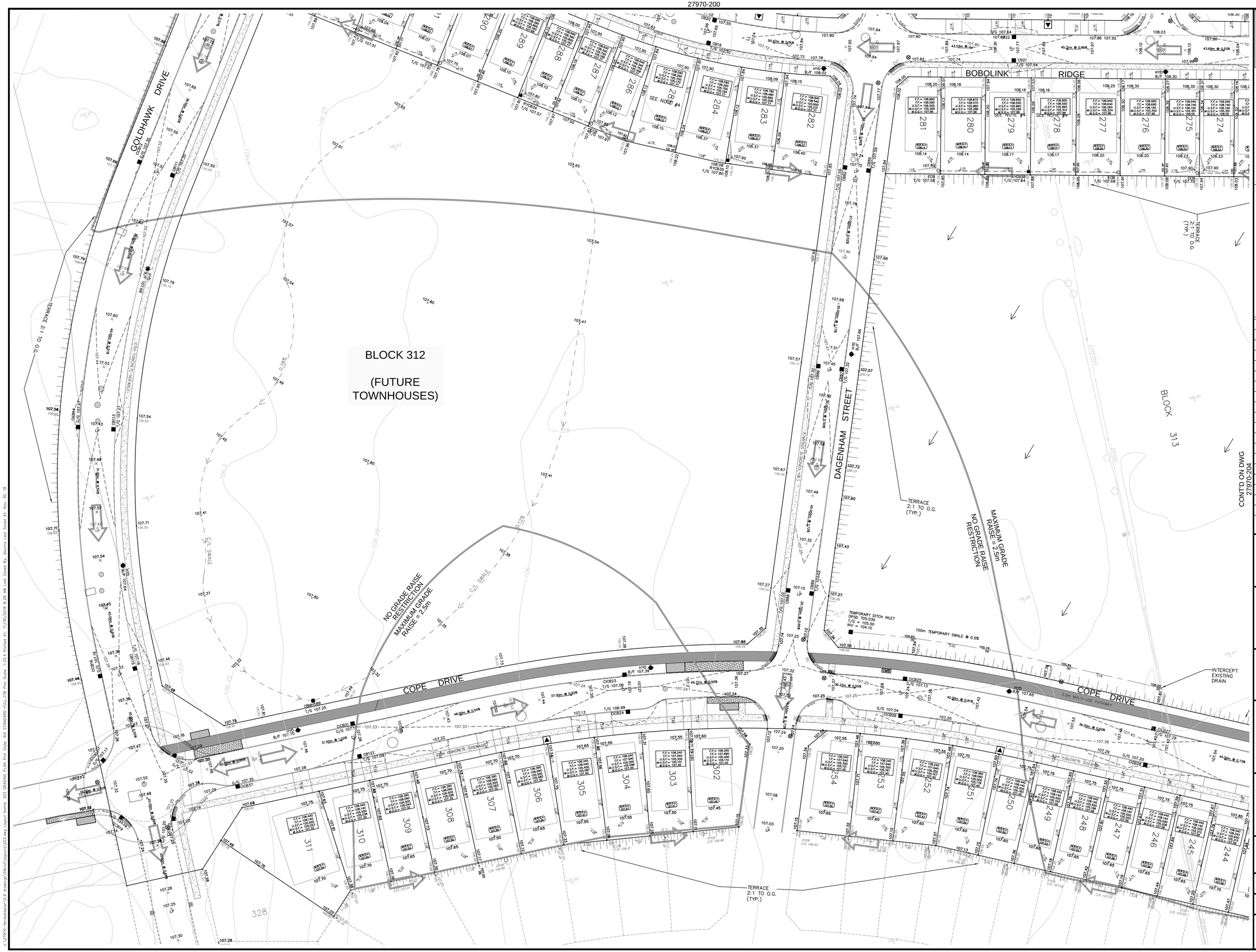
Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: J.I.M.
Checked: P.K.
Dwg. Reference: 27970 - 501, 501A, 501B

No.	Revision	Date
1.	Submission No. 1 to City of Ottawa	2013-08-29
2.	Submission No. 2 to City of Ottawa	2014-01-22
3.	Submission No. 3 to City of Ottawa	2014-08-22
4.	Submission No. 4 to City of Ottawa	2015-06-15
5.	Submission No. 5 to City of Ottawa	2016-11-10
6.	Submission for MOE Approval	2017-02-10
7.	Resubmission for MOE Approval	2017-07-14

File Reference: 27970.5.7.1
Date: 2017-07-14
Sheet No: 3 of 4

CONT'D ON DWG
27970-200



REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed _____

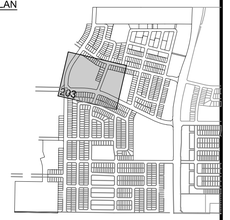
Date _____ 2018

Plan Number _____

NOTES:

1. GRADING IS BASED ON THE SHOWN BUILDING FOOTPRINTS AND SETBACKS AS PROVIDED BY BUILDER. VARIANCES FROM THE PROPOSED, MAY REQUIRE MODIFICATIONS TO THE DRIVEWAY SLOPES AND/OR PROPOSED INTERNAL GRADING INCLUDING BUT NOT LIMITED TO REAR YARD TERRACING.
2. PROPOSED REARYARD DRAINAGE SYSTEMS TO BE CONSTRUCTED AS PER STANDARD CITY DETAILS.
3. SEE 27970-200 FOR SWALE GRADING AND LOTS GRADING DETAILS
4. FRONT OF GARAGE IS TO BE SET BACK 4.5m.

KEYPLAN



No.	REVISIONS	By	Date
18			
17			
16	ADD CMB LOCATIONS	JIM	18:11:29
15	ADD SIDEWALK AN DAGENHAM SOUTH OF BOBOLINK RIDGE	JIM	18:10:17
14	REVISED AS PER CITY COMMENTS	JIM	18:09:26
13	REVISED AS PER CITY COMMENTS	JIM	18:09:24
12	REVISED PER NEW TOWNHOUSE BLOCK 2018-05-23	JIM	18:05:31
11	REVISED PER NEW AOV LEGAL 2018-04-25	JIM	18:05:15
10	REVISED GRADING FOR LOTS 295-301	JIM	18:03:16
9	ISSUED FOR CONSTRUCTION	JIM	17:09:18
8	ISSUED FOR TENDER	JIM	17:07:20
7	RESUBMISSION FOR MOE APPROVAL	JIM	17:07:14
6	SUBMISSION FOR MOE APPROVAL	JIM	17:02:10
5	SUBMISSION #5 FOR CITY REVIEW	JIM	16:11:10
4	SUBMISSION #4 FOR CITY REVIEW	JIM	15:06:15
3	SUBMISSION #3 FOR CITY REVIEW	JIM	14:08:22
2	SUBMISSION #2 FOR CITY REVIEW	JIM	14:01:22
1	SUBMISSION #1 FOR CITY REVIEW	JIM	13:08:29

CRT DEVELOPMENT INC.

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

CRT LANDS
FERNBANK COMMUNITY
PHASE 1

PROFESSIONAL ENGINEER
J. I. MOFFATT
2018/11/29
PROVINCE OF ONTARIO

N

Drawing Title

GRADING PLAN

Scale: 1:500

Design	Date
J.I.M.	OCTOBER '12
Drawn	Checked
M.M.	P.K.
Project No.	Drawing No.
27970	203

D07-16-11-0003

#17366

CONT'D ON DWG 27970-202

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ____________________

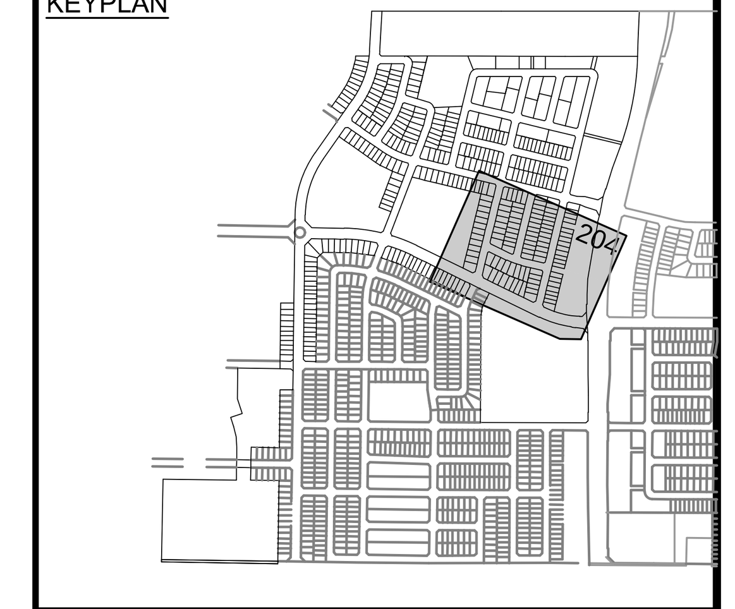
Date ____________________ 2018

Plan Number ____________________

NOTES:

1. GRADING IS BASED ON THE SHOWN BUILDING FOOTPRINTS AND SETBACKS AS PROVIDED BY BUILDER. VARIANCES FROM THE PROPOSED, MAY REQUIRE MODIFICATIONS TO THE DRIVEWAY SLOPES AND/OR PROPOSED INTERNAL GRADING INCLUDING BUT NOT LIMITED TO REAR YARD TERRACING.
2. PROPOSED REARYARD DRAINAGE SYSTEMS TO BE CONSTRUCTED AS PER STANDARD CITY DETAILS.
3. SEE 27970–200 FOR SWALE GRADING AND LOTS GRADING DETAILS
4. FRONT OF GARAGE IS TO BE SET BACK 4.5m.
5. THE MAXIMUM MAJOR STORM AREA FOR BLOCK 356 DRAINING TO ROBERT GRANT AVENUE IS 0.34 ha.
6. THE MAXIMUM MAJOR STORM AREA FOR BLOCK 357 DRAINING TO ROBERT GRANT AVENUE IS 0.19 ha.

KEYPLAN



No.	REVISIONS	By	Date
19	ADD CMB LOCATIONS	JIM	18:11:29
18	ADDED NOISE WALL NOTE PER CITY COMMENTS	JIM	18:10:31
17	REVISED NOISE BARRIER	JIM	18:10:30
16	REVISED FUTURE HIGH SCHOOL BLOCK NUMBER TO 345	JIM	18:10:26
15	ADD SIDEWALK ON FINSBURY AND ADDED NOISE WALLS	JIM	18:10:17
14	REVISED AS PER OC TRANSPO	JIM	18:09:27
13	REVISED AS PER CITY COMMENTS	JIM	18:09:24
12	REVISED PER NEW AOV LEGAL 2018–04–25	JIM	18:05:15
11	NOISE BARRIER ADDED AT LOT 266	JIM	18:04:10
10	REVISED AS PER HYDRO DESIGN	JIM	18:03:26
9	ISSUED FOR CONSTRUCTION	JIM	17:09:18
8	ISSUED FOR TENDER	JIM	17:07:20
7	RESUBMISSION FOR MOE APPROVAL	JIM	17:07:14
6	SUBMISSION FOR MOE APPROVAL	JIM	17:02:10
5	SUBMISSION #5 FOR CITY REVIEW	JIM	16:11:10
4	SUBMISSION #4 FOR CITY REVIEW	JIM	15:06:15
3	SUBMISSION #3 FOR CITY REVIEW	JIM	14:08:22
2	SUBMISSION #2 FOR CITY REVIEW	JIM	14:01:22
1	SUBMISSION #1 FOR CITY REVIEW	JIM	13:08:29

CRT DEVELOPMENT INC.

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Project Title

CRT LANDS
FERNBANK COMMUNITY
PHASE 1

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
2018/11/29
PROVINCE OF ONTARIO

N

Drawing Title

GRADING PLAN

Scale 1:500

Design	Date
J.I.M.	OCTOBER '12
Drawn	Checked
M.M.	P.K.
Project No.	Drawing No.
27970	204

D07-16-11-0003

#17366

APPENDIX

B

- FIRE UNDERWRITERS SURVEY – FIRE FLOW CALCULATION FOR BUILDING
- FIRE UNDERWRITERS SURVEY – FIRE FLOW CALCULATION FOR PORTABLE CLASSROOM
- WATER DEMAND CALCULATION
- UPDATED BOUNDARY CONDITION

Fire Flow Design Sheet (FUS)
New Stittsville Ecole Elementary School
730 Cope Drive
Stittsville, ON
WSP Project No. 219-00014-00
Date: 18-Feb-22

New Ecole Elementary School
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 1999

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for wood construction (structure essentially combustible)
- 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
- 0.8 for noncombustible construction (unprotected metal structural components, masonry or metal walls)
- 0.6 for fire-resistive construction (fully protected frame, floors, roof)

A = total floor area in square metres (including all storeys, but excluding basements at least 50% below grade)

A = 4781 m^2
C = 0.8
F = 12169.5 L/min

rounded off to 12,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 12,000 = 10,200 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System -40% x 10,200 = -4,080 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	5%

Side 1	65	0%	north side
Side 2	98	0%	east side
Side 3	43	5%	south side
Side 4	32	5%	west side
		10%	(Total shall not exceed 75%)

Increase due to separation 10% x 10,200 = 1,020 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 7,000 L/min (Rounded to nearest 1000 L/min)
or **117 L/sec**
or 1,849 gpm (us)
or 1,540 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 1991
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
New Stittsville Ecole Elementary School
730 Cope Drive
Stittsville, ON
WSP Project No. 219-00014-00

Date: 18-Feb-22

(Future Portable Classrooms 3 in a row)
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 1999

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for wood construction (structure essentially combustible)
- 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
- 0.8 for noncombustible construction (unprotected metal structural components, masonry or metal walls)
- 0.6 for fire-resistive construction (fully protected frame, floors, roof)

A = total floor area in square metres (including all storeys, but excluding basements at least 50% below grade)

A = 215 m^2
C = 1.0
F = 3225.8 L/min

rounded off to 3,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 3,000 = 2,550 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 2,550 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	5%

Side 1	125	0%	north side
Side 2	20	15%	east side
Side 3	3	25%	south side
Side 4	28	10%	west side
		50%	(Total shall not exceed 75%)

Increase due to separation 50% x 2,550 = 1,275 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 4,000 L/min (Rounded to nearest 1000 L/min)
or **67 L/sec**
or 1,057 gpm (us)
or 880 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 1991
by Fire Underwriters Survey

Water Demand Calculation Sheet

Project:	**New Stittsville Ecole Elementary School**	**Date:**	**2022-02-18**
Location:	**730 Cope Drive, Stittsville, ON**	**Design:**	**D.B.Y**
WSP Project No.	**219-00014-00**	**Page:**	**1 of 1**

Proposed Buildings	Residential				Non-Residentail			Average Daily			Maximum Daily			Maximum Hourly			Fire
	Units			Beds	Industrial	Institutional	Commercial	Demand (l/s)			Demand (l/s)			Demand (l/s)			Demand
	SF	APT	ST		(ha)	(ha)	(ha)	Res.	Non-Res.	Total	Res.	Non-Res.	Total	Res.	Non-Res.	Total	(l/min)
New Stittsville HS						2.89			0.94	0.94		1.40	1.40		2.53	2.53	7,000

Population Densities

Single Family	3.4	person/unit
Semi-Detached	2.7	person/unit
Duplex	2.3	person/unit
Townhome (Row)	2.7	person/unit
Bachelor Apartment	1.4	person/unit
1 Bedroom Apartment	1.4	person/unit
2 Bedroom Apartment	2.1	person/unit
3 Bedroom Apartment	3.1	person/unit
4 Bedroom Apartment	4.1	person/unit
Avg. Apartment	1.8	person/unit

Average Daily Demand

Residentail	280	l/cap/day
Industrial	35000	l/ha/day
Institutional	28000	l/ha/day
Commercial	28000	l/ha/day

Maximum Daily Demand

Residential	2.5	x avg. day
Industrial	1.5	x avg. day
Institutional	1.5	x avg. day
Commercial	1.5	x avg. day

Maximum Hourly Demand

Residential	2.2	x max. day
Industrial	1.8	x max. day
Institutional	1.8	x max. day
Commercial	1.8	x max. day

Boundary Conditions
755 Cope Dr

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	56	0.94
Maximum Daily Demand	84	1.40
Peak Hour	152	2.53
Fire Flow Demand #1	6,000	100.00

Location

Results

Connection 1 – Cope Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.2	77.5
Peak Hour	156.5	70.8
Max Day plus Fire 1	151.9	64.3

Ground Elevation = 106.7 m

Notes

1. A second connection to the watermain, separated by an isolation valve, is required to decrease vulnerability of the water system in case of breaks.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

APPENDIX

C

- STORM SEWER DESIGN SHEET
- STORM DRAINAGE AREA PLAN C05
- STORM DRAINAGE AREA PLAN ROOF C06
- FLOW CONTROL ROOF DRAINAGE DECLARATION
- STORMWATER MANAGEMENT CALCULATIONS
- DWG C03 – GRADING PLAN
- DWG C04 - SERVICING PLAN

STORM SEWER DESIGN SHEET

New Stittsville Ecole Elementary School
730 Cope Drive, Stittsville, ON
Project: 219-00014-00
Date: February, 2022

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW											PROPSOED SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.25	C= 0.35	C= 0.40	C= 0.60	C= 0.75	C= 0.90	IND 2.78AC	CUM 2.78 AC	INLET (min)	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (100) (mm/hr)	BLDG FLOW (L/s)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	MATERIAL PIPE	SIZE (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME IN PIPE	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
POST-DEVELOPMENT																														
To Cope Drive																														
Stittsville ES	S-101	CB101	CBMH101	0.111					0.007	0.095	0.095	10.00	10.47	76.81	104.19	178.56		7.27				7.27	PVC DR-35	200.0	1.00	29.20	32.83	1.04	0.47	25.56	77.86%
Stittsville ES	S-102	CBMH101	CBMH102	0.061					0.007	0.060	0.155	10.47	10.95	75.06	101.79	174.41		11.60				11.60	PVC DR-35	250.0	0.50	25.05	42.09	0.86	0.49	30.49	72.44%
Stittsville ES	S-103	CBMH102	CBMH103	0.067						0.047	0.201	10.95	11.62	73.33	99.41	170.29		14.75				14.75	PVC DR-35	300.0	0.40	34.55	61.22	0.87	0.67	46.47	75.91%
Stittsville ES	S-104	CBMH103	CBMH106	0.018					0.079	0.210	0.411	11.62	12.10	71.10	96.35	165.00		29.24				29.24	PVC DR-35	300.0	0.40	25.20	61.22	0.87	0.49	31.98	52.23%
Stittsville ES	S-105	CB102	CBMH104	0.117					0.002	0.086	0.086	10.00	10.63	76.81	104.19	178.56		6.63				6.63	PVC DR-35	200.0	1.00	39.45	32.83	1.04	0.63	26.20	79.81%
Stittsville ES	S-106	CBMH104	CBMH105	0.119					0.010	0.108	0.194	10.63	11.26	74.47	100.98	173.00		14.45				14.45	PVC DR-35	250.0	0.50	32.25	42.09	0.86	0.63	27.64	65.67%
Stittsville ES	S-107	CBMH105	CBMH106						0.053	0.133	0.327	11.26	11.63	72.29	97.99	167.83		23.61				23.61	PVC DR-35	250.0	0.50	19.05	42.09	0.86	0.37	18.48	43.90%
Stittsville ES	S-108	CBMH106	CBMH107						0.049	0.123	0.861	12.10	12.71	69.57	94.25	161.37		59.87				59.87	PVC DR-35	375.0	0.30	31.85	96.13	0.87	0.61	36.26	37.72%
Stittsville ES	S-109	CB103	CBMH107	0.030					0.044	0.131	0.131	10.00	10.24	76.81	104.19	178.56		10.06				10.06	PVC DR-35	200.0	1.00	14.85	32.83	1.04	0.24	22.77	69.37%
Stittsville ES	S-111	CB104	CBMH108	0.076		0.026			0.029	0.154	0.154	10.00	10.45	76.81	104.19	178.56		11.85				11.85	PVC DR-35	250.0	1.00	33.00	59.53	1.21	0.45	47.68	80.09%
Stittsville ES	S-112	CB105	CBMH108	0.005		0.025			0.083	0.239	0.239	10.00	10.54	76.81	104.19	178.56		18.35				18.35	PVC DR-35	250.0	1.00	39.25	59.53	1.21	0.54	41.18	69.17%
Stittsville ES	S-113	CBMH108	CBMH109	0.008		0.033			0.032	0.122	0.516	10.54	10.89	74.79	101.42	173.77		38.56				38.56	PVC DR-35	300.0	0.40	18.10	61.22	0.87	0.35	22.66	37.02%
Stittsville ES	S-110	CBMH107	CBMH110	0.030					0.033	0.103	1.095	12.71	13.03	67.75	91.75	157.04		74.17				74.17	PVC DR-35	375.0	0.30	16.25	96.13	0.87	0.31	21.95	22.84%
Stittsville ES	S-114	CBMH109	CBMH110	0.009		0.002			0.033	0.091	0.607	10.89	11.19	73.55	99.72	170.82		44.62				44.62	PVC DR-35	375.0	0.30	15.75	96.13	0.87	0.30	51.51	53.59%
Stittsville ES	S-115	CBMH110	CBMH111	0.014		0.038			0.021	0.105	1.806	13.03	13.28	66.86	90.53	154.93		120.74				120.74	CONC CL-100D	450.0	0.40	17.30	180.50	1.13	0.25	59.76	33.11%
Stittsville ES	S-116	DICB106	CBMH111-STMH118	0.017					0.001	0.014	0.014	10.00	10.01	76.81	104.19	178.56		1.10				1.10	PVC DR-35	200.0	1.00	0.75	32.83	1.04	0.01	31.73	96.65%
		CBMH111	STMH118							0.000	1.820	13.28	14.01	66.15	89.56	153.25		120.41				120.41	CONC CL-100D	450.0	0.40	49.70	180.50	1.13	0.73	60.09	33.29%
Stittsville ES	S-117	RYCB107	CBMH112	0.480						0.334	0.334	10.00	10.33	76.81	104.19	178.56		25.62				25.62	PVC DR-35	300.0	0.40	16.90	61.22	0.87	0.33	35.60	58.15%
Stittsville ES	S-118	CB108	CBMH112	0.031					0.068	0.192	0.192	10.00	10.33	76.81	104.19	178.56		14.72				14.72	PVC DR-35	200.0	1.00	20.85	32.83	1.04	0.33	18.11	55.16%
Stittsville ES		CBMH112	CBMH113							0.000	0.525	10.33	10.72	75.55	102.47	175.57		39.68				39.68	PVC DR-35	300.0	0.40	19.95	61.22	0.87	0.38	21.54	35.18%
Stittsville ES	S-119	CBMH113	CBMH114	0.005					0.248	0.624	1.149	10.72	11.17	74.16	100.55	172.26		85.22				85.22	PVC DR-35	375.0	0.40	27.05	111.00	1.00	0.45	25.78	23.22%
Stittsville ES	S-120	DICB109	CBMH114	0.102						0.071	0.071	30.00	30.44	40.04	53.93	91.87		2.84				2.84	PVC DR-35	200.0	1.00	27.80	32.83	1.04	0.44	29.99	91.35%
Stittsville ES	S-121	CBMH114	STMH115	0.100					0.043	0.177	1.397	30.44	30.84	39.65	53.39	90.95		55.40				55.40	PVC DR-35	375.0	0.30	20.70	96.13	0.87	0.40	40.73	42.37%
Stittsville ES	S-122	DICB110	STMH115-CBMH116	0.058					0.002	0.045	0.045	10.00	10.02	76.81	104.19	178.56		3.48				3.48	PVC DR-35	200.0	1.00	1.49	32.83	1.04	0.02	29.35	89.40%
Stittsville ES		STMH115	CBMH116							0.000	1.443	30.84	32.37	39.31	52.93	90.15		56.70				56.70	PVC DR-35	375.0	0.30	79.95	96.13	0.87	1.53	39.43	41.02%
Stittsville ES	S-123	CB111	CBMH116-CBMH117	0.043					0.013	0.062	0.062	10.00	10.06	76.81	104.19	178.56		4.79				4.79	PVC DR-35	200.0	1.00	3.50	32.83	1.04	0.06	28.04	85.40%
Stittsville ES		CBMH116	CBMH117							0.000	1.505	32.37	32.73	38.04	51.20	87.18		57.24				57.24	PVC DR-35	375.0	0.30	18.40	96.13	0.87	0.35	38.89	40.45%
Stittsville ES	S-124	DICB112	CBMH117-STMH118	0.027					0.004	0.029	0.029	20.00	20.01	52.03	70.25	119.95		1.50				1.50	PVC DR-35	200.0	1.00	0.70	32.83	1.04	0.01	31.33	95.44%
Stittsville ES		CBMH117	STMH118							0.000	1.534	32.73	33.48	37.76	50.82	86.53		57.91				57.91	PVC DR-35	375.0	0.30	39.20	96.13	0.87	0.75	38.22	39.76%
Stittsville ES		STMH118	*Ex. STMH*							0.000	3.354	33.48	33.68	37.18	50.03	85.18		124.69				124.69	CONC CL-100D	*900.0*	*0.16*	*13.92*	724.86	1.14	0.20	600.16	82.80%

Definition:
Q=2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall Intensity in millimeters per hour (mm/hr)
i = 732.951/(TC+6.199)^0.810 — 2 Year
i = 1174.184/(TC+6.014)^0.816 — 5 Year
i = 1735.688/(TC+6.014)^0.820 — 100 Year

Notes:
1. Mannings coefficient (n) = 0.013

Time-of-Concentration in the Swale
FAA Equation: t (min) = 3.258 [(1.1 - C) L^0.5 / S^.33]
Where: Longest Watercourse Length, L (m). S (%)
Runoff Coef.C = 0.25 Impervious

No.	L (m)	S %
1	26	1.50

Tc= 10.00 min

Designed: D.B.Y.
Checked: D.B.Y.
Dwg. Reference: CXX

No.	Revision	Date
1.	City Submission No. 1	2022-02-18

File Reference: 219-00014-00
Date: 2022-02-18
Sheet No: 1 of 1

WSP
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO
CANADA K2B 8K2
T: 613-829-2800
F: 613-829-8299
WWW.WSP.COM

ARCHITECT:
ARCHITECTURE 49
1345 ROSEMOUNT AVENUE
CORNWALL, ONTARIO, CANADA K6J 3E5
TEL: 613-933-5602 | FAX: 613-936-0335 | ARCHITECTURE49.COM

SEAL:
LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2022-07-15
PROVINCE OF ONTARIO

NORTH

CLIENT:
Conseil des écoles publiques de l'Est de l'Ontario

CLIENT REF. #: –

PROJECT:
ÉCOLE ÉLÉMENTAIRE KANATA-STITTSVILLE

KEY PLAN:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
	8	15 JUL 2022	REVISED AS PER CITY COMMENTS
	7	06 APR 2022	ISSUED FOR SPA
	6	21 MAR 2022	ISSUED FOR BID AND PERMIT
	5	14 JAN 2022	ISSUED FOR 90% CD REVIEW
	4	19 NOV 2021	ISSUED FOR 85% CD REVIEW
	3	24 SEP 2021	ISSUED FOR 60% CD REIVEW
	2	27 AUG 2021	RE-ISSUE FOR 30% CD REVIEW
	1	04 AUG 2021	30% CD REVIEW

PROJECT NO: 219-00014-00
DATE: JULY 2022
ORIGINAL SCALE: 1:400
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm
DESIGNED BY: D.Y.
DRAWN BY: J.T.
CHECKED BY: D.Y.

DISCIPLINE: CIVIL

TITLE:
DRAINAGE AREA PLAN

SHEET NUMBER: C05
SHEET #: 5 OF 7

ISSUE: ISSUED FOR SPA
DATE OF: 2022-07-15
REV #: 0

D07-12-22-0058

#18734

WATTS	Adjustable Accutrol Weir Tag: ____________	Adjustable Flow Control for Roof Drains

ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.

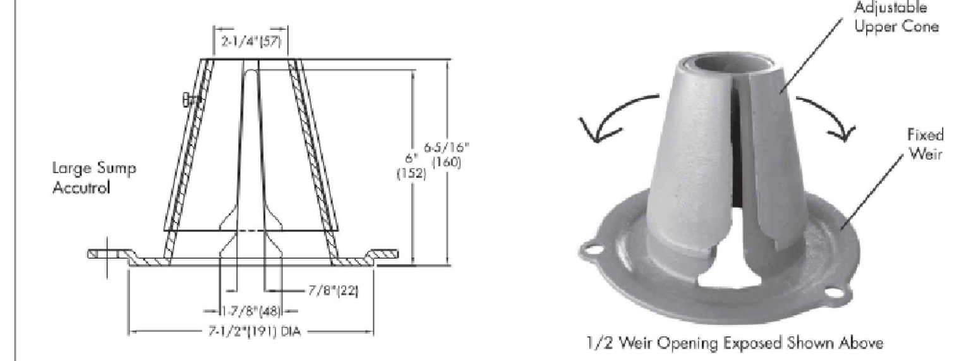

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name ____________ Contractor ____________
Job Location ____________ Contractor's P.O. No. ____________
Engineer ____________ Representative ____________

WATTS
A Watts Water Technologies Company

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

ES-WD-RD-ACCUTROLADJ-CAN 1615

Roof Drains Areas and Storage Volume Table

Roof Drainage #	Roof Area m²	Ponding Area m²	Ponding Depth m	Ponding Volume m³	Release Rate L/s
RD1	206.56	154.92	0.15	7.75	1.26
RD2	206.59	154.94	0.15	7.75	1.26
RD3	197.15	147.86	0.15	7.39	1.26
RD4	197.15	147.86	0.15	7.39	1.26
RD5	197.15	147.86	0.15	7.39	1.26
RD6	197.15	147.86	0.15	7.39	1.26
RD7	197.16	147.87	0.15	7.39	1.26
RD8	242.58	181.94	0.15	9.10	1.26
RD9	186.14	139.61	0.15	6.98	1.26
RD10	224.03	168.02	0.15	8.40	1.26
RD11	218.37	163.78	0.15	8.19	1.26
RD12	250.69	188.02	0.15	9.40	1.26
RD13	211.17	158.38	0.15	7.92	1.26
RD14	210.98	158.24	0.15	7.91	1.26
RD15	63.04	47.28	0.15	2.36	1.26
RD16	192.46	144.35	0.15	7.22	1.26
RD17	192.23	144.17	0.15	7.21	1.26
RD18	186.26	139.70	0.15	6.98	1.26
RD19	174.85	131.14	0.15	6.56	1.26
Total	3751.7	2813.783		140.69	23.94

wsp
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO
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F: 613-829-8299
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ARCHITECT:
ARCHITECTURE 49
1345 ROSEMOUNT AVENUE
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DESIGNED BY: D.Y.
DRAWN BY: J.T.
CHECKED BY: D.Y.
DISCIPLINE: CIVIL
TITLE: ROOF DRAINAGE AREA PLAN
SHEET NUMBER: C06
SHEET #: 6 OF 7
ISSUE: ISSUED FOR SPA
REV #: 0
DATE OF: 2022-07-15

D07-12-22-0058

#18734

New Stittsville Ecole Elementary School
755 Cope Drive, Stittsville, ON
Project: 219-00014-00
Date: February, 2022

Stormwater Management Summary

Drainage Area I.D.	Location	Sub Area (ha)	Avg. Composite 'C' 5 yr	Avg. Composite 'C' 100 yr	Outlet Location	5 Year Uncontrolled/ Controlled Release (L/s)	5 year Storage Required (m^3)	100 Year Uncontrolled/ Controlled Release (L/s)	100 year Storage Required (m^3)	Total Storage Provided (m^3)
Total Allowable Release Rate (IBI GROUP, 2017)								**579.45**		
CONTROLLED										
S101-S115	CBMH111	1.271	0.51	0.63	DAGEHAM STREET	277.28	0.00	293.48	62.40	67.61
S117-S123	STMH115	1.193	0.45	0.52	DAGEHAM STREET	190.86	0.00	201.90	63.63	76.34
S-BLDG	ROOF	0.375	0.90	0.99	DAGEHAM STREET	23.94	50.37	23.94	128.68	140.69
UNCONTROLLED										
S116	DICB106	0.018	0.29	0.35	DAGEHAM STREET	1.51		3.13		
S124	DICB112	0.031	0.330	0.40	DAGEHAM STREET	2.96		6.16		
			Maximum Release Rate (WSP, 2022)					**528.61**		
Total		2.888				496.55	50.37	528.61	254.70	284.64

New Stittsville Ecole Elementary School
755 Cope Drive, Stittsville, ON
Project: 219-00014-00
Date: February, 2022

Pre-Deleveopment (IBI Group, 2017)
Table 1a - Allowable Release Rate (Pre-Development)

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.25)/A_{tot}$

5 Year Event

	C	Intensity	Area
5 Year	0.50	104.19	2.890
2.78CIA=	418.55		
	418.55	L/s	

*Use a 10.00 minute time of concentration for 5 year

DDSWMM Parameters (IBI Group, 2017)

Area ID	Area (HA)	MH	D/S Segment	IMP Ratio	Length (m)	Width (m)	Avail. Storage (m^3)	5 Year Simulated Flow (L/s)	ICD Restriction (L/s)
INST1	2.88	MH172	S172	0.86	324	648	326	582	579.45

Note: *Assumed ponding volume. Assumes that on-site storage will be provided up to the 100 year 3 hour Chicago event

Equations:

Flow Equation

Q = 2.78 x C x I x A

Where:

C is the runoff coefficient

I is the intensity of rainfall, City of Ottawa IDF

Rainfall Intensity = $998.071/(T+6.053)^{\wedge -0.814}$ T= time in minutes

A is the total drainage area

New Stittsville Ecole Elementary School
755 Cope Drive, Stittsville, ON
Project: 219-00014-00
Date: February, 2022

TABLE 2a - Storage Required for New Stittsville Ecole Elementary School (CBMH111)

Maximum Allowable Release Rate to Pond 5:
579.45 l/s

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt	0.482	0.90	**0.51**	0.99	**0.63**
1.271	Playground	0.124	0.40		0.94	
	Grass	0.665	0.25		0.31	

*Areas are approximate based on Architectural site plan and Storm Draiange Area Plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

1.271 = Area(ha)
0.51 = C
579.5 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**104.19**	**187.76**	**277.28**	**-89.52**	**-53.71**	**67.61**
	20	70.25	126.59	277.28	-150.69	-180.83	67.61
	30	53.93	97.18	277.28	-180.10	-324.19	67.61
5 YEAR	40	44.18	79.62	277.28	-197.66	-474.39	67.61
	50	37.65	67.85	277.28	-209.43	-628.29	67.61
	60	32.94	59.36	277.28	-217.92	-784.50	67.61

Orifice #1 Sizing
CBMH111

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
5 Year	277.28	2.50	0.066	257	290
100 Year	293.48	2.80	0.066	257	290

Orifice Control Sizing
Q = 0.6 x A x (2gh)1/2
Where:
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, $9.81 m/s^2$
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

QUANTITY STORAGE REQUIREMENTS - 100 Year

1.271 = Area(ha)
0.63 = *C
579.5 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**178.56**	**397.48**	**293.48**	**104.00**	**62.40**	**67.61**
	20	119.95	267.01	293.48	-26.47	-31.76	67.61
100 YEAR	30	91.87	204.50	293.48	-88.98	-160.16	67.61
	40	75.15	167.28	293.48	-126.20	-302.89	67.61
	50	63.95	142.36	293.48	-151.12	-453.35	67.61
	60	55.89	124.42	293.48	-169.06	-608.60	67.61
	70	49.79	110.83	293.48	-182.65	-767.11	67.61

Orifice Invert =	104.360 m
Ponding Elevation @ 100 year=	107.300 m
Ponding Elevation @ 5 year=	107.000 m

Note: Orifice #1 is located on the downstream invert of CBMH111

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

New Stittsville Ecole Elementary School
755 Cope Drive, Stittsville, ON
Project: 219-00014-00
Date: February, 2022

TABLE 2b - Storage Required for New Stittsville Ecole Elementary School (CBMH117)

Maximum Allowable Release Rate to Pond 5:
579.45 l/s

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt	0.374	0.90	**0.45**	0.99	**0.52**
1.193	Gravel	0.000	0.75		0.94	
	Grass	0.819	0.25		0.31	

*Areas are approximate based on Architectural site plan and Storm Draiange Area Plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

1.193 = Area(ha)
0.45 = C
579.5 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**104.19**	**155.50**	**190.86**	**-35.36**	**-21.21**	**76.34**
	20	70.25	104.85	190.86	-86.01	-103.22	76.34
	30	53.93	80.48	190.86	-110.38	-198.68	76.34
5 YEAR	40	44.18	65.94	190.86	-124.92	-299.80	76.34
	50	37.65	56.20	190.86	-134.66	-403.99	76.34
	60	32.94	49.17	190.86	-141.69	-510.10	76.34

Orifice #2 Sizing
CBMH117

Event	Flow (L/s)	Head (m)	ORIFICE AREA(m^2)	SQUARE (1-side mm)	CIRC (mmØ)
5 Year	190.86	2.52	0.045	213	240
100 Year	201.90	2.82	0.045	213	240

Orifice Control Sizing
$Q = 0.6 \times A \times (2gh)1/2$
Where:
Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, $9.81 m/s^2$
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

QUANTITY STORAGE REQUIREMENTS - 100 Year

1.193 = Area(ha)
0.52 = *C
579.5 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	**178.56**	**307.94**	**201.90**	**106.04**	**63.63**	**76.34**
	20	119.95	206.87	201.90	4.97	5.96	76.34
100 YEAR	30	91.87	158.44	201.90	-43.46	-78.24	76.34
	40	75.15	129.60	201.90	-72.30	-173.53	76.34
	50	63.95	110.30	201.90	-91.61	-274.82	76.34
	60	55.89	96.40	201.90	-105.50	-379.82	76.34
	70	49.79	85.87	201.90	-116.03	-487.34	76.34

Orifice Invert =	104.360	m
Ponding Elevation @ 100 year=	107.300	m
Ponding Elevation @ 5 year=	107.000	m

Note: Orifice #2 is located on the downstream invert of CBMH117

Equations:

Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

New Stittsville Ecole Elementary School
755 Cope Drive, Stittsville, ON
Project: 219-00014-00
Date: February, 2022

TABLE 3 - Proposed Roof Drains

Allowable Release Rate

Total Roof Area =	0.375	Ha
Total Roof Ponding Area =	2813.783	m^2
Ponding Depth =	0.07 ~ 0.15	m
The flow rate through each Roof Drain will be =	5 ~ 25.0	gpm
	0.32 ~ 1.58	L/s
Number of Roof Drains =	19.00	
Total flow rate =	23.94	

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" x 1.25	$C_{100\ avg}$
Total	Asphalt		0.90	**0.90**	0.99	**0.99**
0.375	Roof	0.375	0.90		0.99	
	Grass		0.25		0.31	

*Areas are approximate based on Architectural site plan

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$
$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.375 = Area(ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd (m^3)	Storage Available* (m^3)
	10	104.19	97.76	23.94	73.82	44.29	140.69
	20	**70.25**	**65.91**	**23.94**	**41.97**	**50.37**	**140.69**
5 YEAR	30	53.93	50.60	23.94	26.66	47.98	140.69
	40	44.18	41.46	23.94	17.52	42.04	140.69
	50	37.65	35.33	23.94	11.39	34.16	140.69

QUANTITY STORAGE REQUIREMENTS - 100 Year

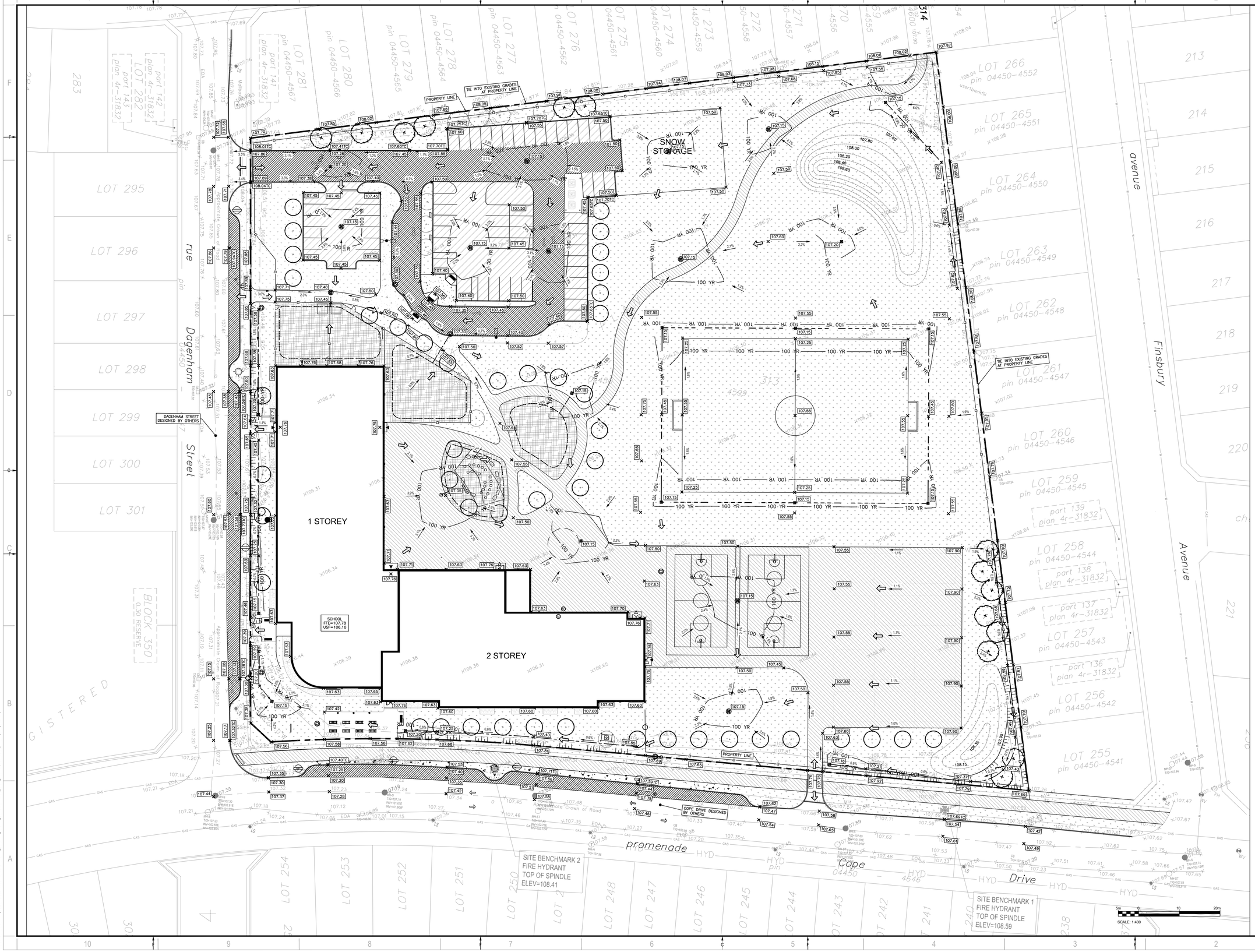
0.375 = Area(ha)
0.99 = *C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd (m^3)	Storage Available (m^3)
	10	178.56	184.29	23.94	160.35	96.21	140.69
	20	119.95	123.80	23.94	99.86	119.83	140.69
100 YEAR	30	91.87	94.81	23.94	70.87	127.57	140.69
	40	**75.15**	**77.56**	**23.94**	**53.62**	**128.68**	**140.69**
	50	63.95	66.01	23.94	42.07	126.20	140.69
	60	55.89	57.69	23.94	33.75	121.49	140.69
	70	49.79	51.39	23.94	27.45	115.28	140.69

*Storage available is calculated using roof ponding area mulitplied by the maximum ponding depth, and divided by 3 for a conical pond.
**Refer to roof drains area and storage volume table on DWG C13 for details

Equations:

Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area



wsp
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO
CANADA K2B 8K2
T: 613-829-2800
F: 613-829-8299
WWW.WSP.COM

ARCHITECT:
ARCHITECTURE | 49
1345 ROSEMOUNT AVENUE
CORNWALL, ONTARIO, CANADA K6J 3E5
TEL: 613-933-5602 | FAX: 613-936-0335 | ARCHITECTURE49.COM

SEAL:

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2022-07-15
PROVINCE OF ONTARIO

NORTH

CLIENT:
Conseil des écoles publiques de l'Est de l'Ontario

CLIENT REF. #: --

PROJECT:
ÉCOLE ÉLÉMENTAIRE
KANATA-STITTSVILLE

KEY PLAN:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
	8	15 JUL 2022	REVISED AS PER CITY COMMENTS
	7	06 APR 2022	ISSUED FOR SPA
	6	21 MAR 2022	ISSUED FOR BID AND PERMIT
	5	14 JAN 2022	ISSUED FOR 90% CD REVIEW
	4	19 NOV 2021	ISSUED FOR 85% CD REVIEW
	3	24 SEP 2021	ISSUED FOR 60% CD REIVEW
	2	27 AUG 2021	RE-ISSUE FOR 30% CD REVIEW
	1	04 AUG 2021	30% CD REVIEW

PROJECT NO.: 219-00014-00
DATE: JULY 2022
ORIGINAL SCALE: 1:400
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE
25mm
DESIGNED BY: D.Y.
DRAWN BY: J.T.
CHECKED BY: D.Y.
DISCIPLINE: CIVIL
TITLE: GRADING PLAN
SHEET NUMBER: C03
SHEET #: 3 OF 7
ISSUE: ISSUED FOR SPA
REV #: 0
DATE OF: 2022-07-15

D07-12-22-0058
#18734

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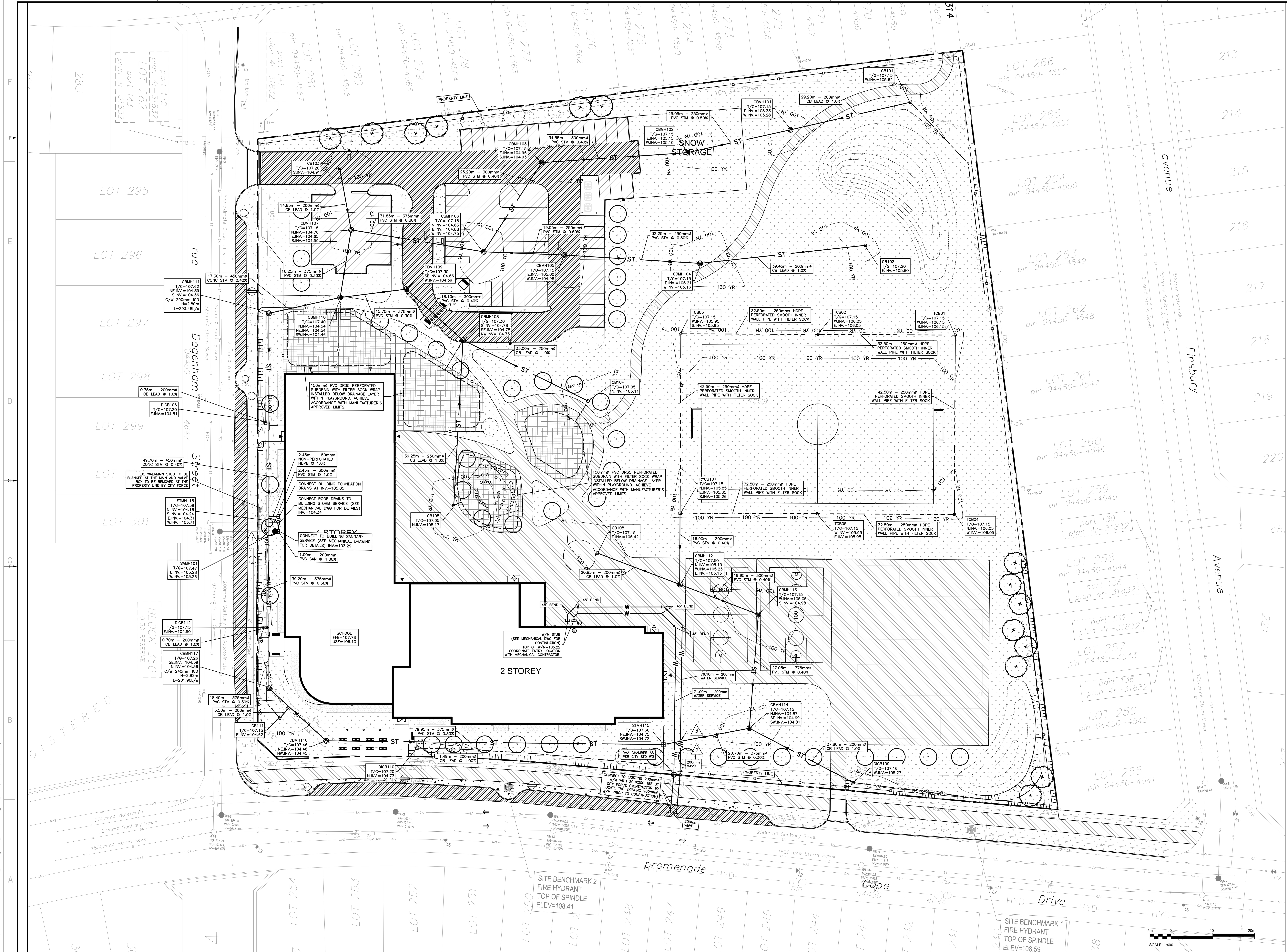

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	1	04 AUG 2021	30% CD REVIEW

PROJECT NO: 219-00014-00
DATE: JULY 2022
ORIGINAL SCALE: 1:400
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm
DESIGNED BY: D.Y.
DRAWN BY: J.T.
CHECKED BY: D.Y.

DISCIPLINE: CIVIL

TITLE:

SERVICING PLAN

SHEET NUMBER: C04
SHEET #: 4 OF 7

ISSUE: ISSUED FOR SPA
DATE OF: 2022-07-15
REV #: 0

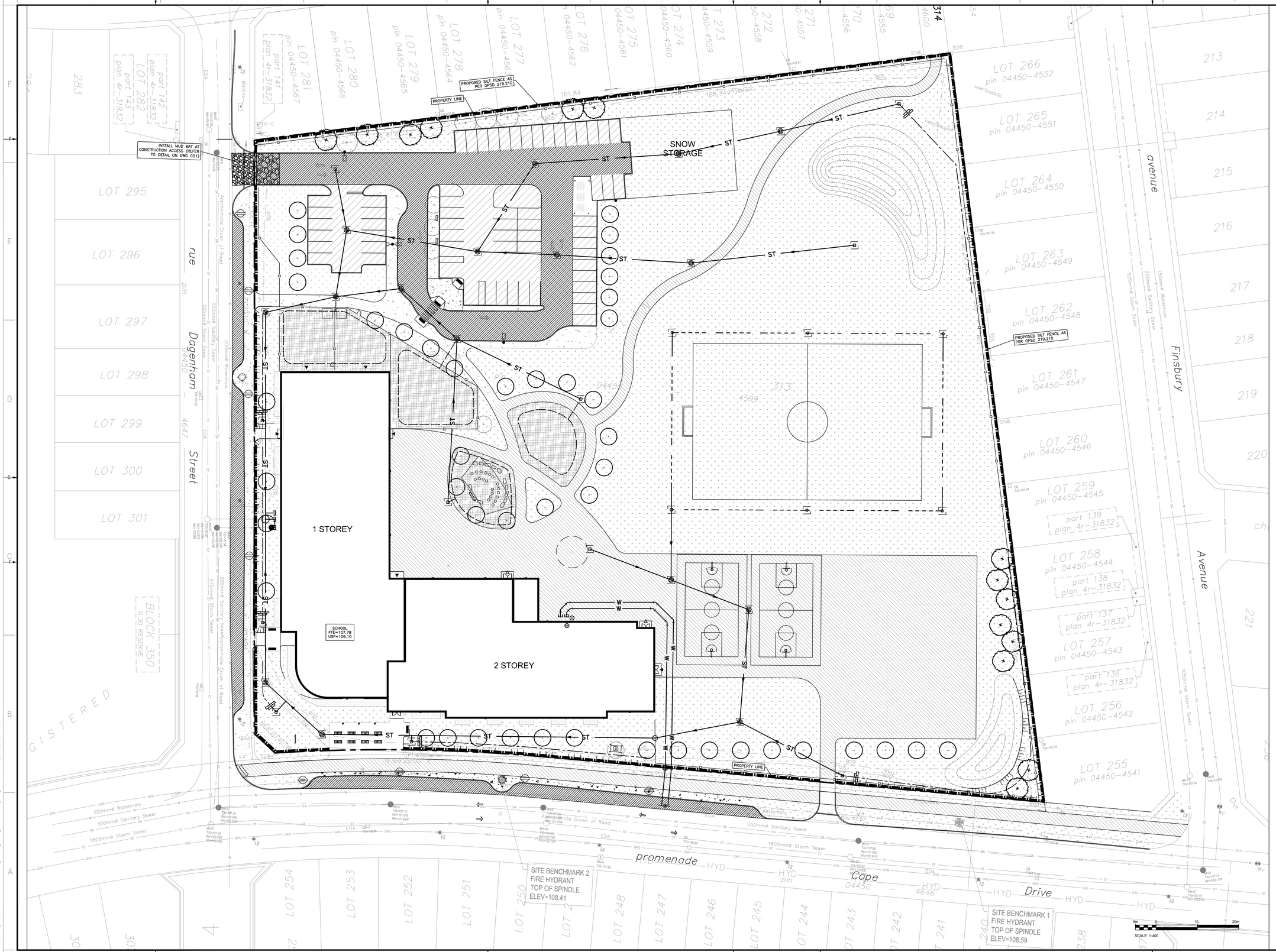
D07-12-22-0058

#18734

APPENDIX

D

- EROSION AND SEDIMENTATION CONTROL PLAN C07



wsp
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO
CANADA K2B 8K2
T: 613-829-2800
F: 613-829-8299
WWW.WSP.COM

ARCHITECT:
ARCHITECTURE | 49
1345 ROSEMOUNT AVENUE
CORNWALL, ONTARIO, CANADA K6J 3E5
TEL: 613-933-5602 | FAX: 613-936-0335 | ARCHITECTURE49.COM

SEAL:
LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2022-07-15
PROVINCE OF ONTARIO

NORTH

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CLIENT REF. #: --

PROJECT:
ÉCOLE ÉLÉMENTAIRE
KANATA-STITTSVILLE

KEY PLAN:

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IS	RE	DATE	DESCRIPTION
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	6	21 MAR 2022	ISSUED FOR BID AND PERMIT
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	4	19 NOV 2021	ISSUED FOR 85% CD REVIEW
	3	24 SEP 2021	ISSUED FOR 60% CD REIVEW
	2	27 AUG 2021	RE-ISSUE FOR 30% CD REVIEW
	1	04 AUG 2021	30% CD REVIEW

PROJECT NO: 219-00014-00
DATE: JULY 2022
ORIGINAL SCALE: 1:400
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE
DESIGNED BY: D.Y.
DRAWN BY: J.T.
CHECKED BY: D.Y.
25mm

DISCIPLINE: CIVIL

TITLE:
EROSION AND SEDIMENTATION CONTROL PLAN

SHEET NUMBER: C07
SHEET #: 7 OF 7

ISSUE: ISSUED FOR SPA
REV #: 0
DATE OF: 2022-07-15

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D07-12-22-0058

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APPENDIX

E

- SUBMISSION CHECK LIST