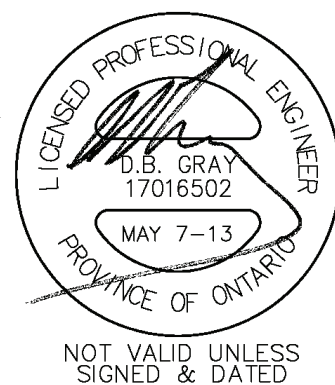


SERVICING BRIEF

1003 Prince of Wales Drive
Ottawa, Ontario

Report No. 12069-SB

May 7, 2013



D. B. GRAY ENGINEERING INC.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

1052 Karsh Drive,
Ottawa, Ontario.
K1G 4N1

Tel: (613) 249-8044
Fax: (613) 249-9815
email: dbgray@rogers.com

SERVICING BRIEF

1003 Prince of Wales Drive
Ottawa, Ontario

The following Servicing Brief is a description of the services for a proposed seven lot residential development consisting of detached houses. It will be a freehold development with common elements located on 2178 sq.m. of land at 1003 Prince of Wales Drive in Ottawa.

Since the proposed services are crossing more than one property (i.e. the common elements) it is expected that a Ministry of Environment Environmental Compliance Approval (ECA) will be required.

Refer to drawing SG-1, SG-2, SS-1 and SS-2, prepared by D. B. Gray Engineering Inc.

Water Supply for Fire Fighting:

There is an existing fire hydrant in the municipal right-of-way in front of the proposed development located between 33 m and 90 m from the front of the proposed houses. A proposed 150mm watermain will supply an on-site fire hydrant near the end proposed private road. It will be located between 15 m and 45 m from the front of the proposed houses.

A fire demand of 45 l/s (2,700 L/min) at 138 kPa is required as per "Required Minimum Water Supply Flow Rate" as calculated using the Ontario Building Code - Appendix A - Article A-3.2.5.7 "Water Supply For Fire Fighting".

Therefore, with a maximum daily demand of 0.8 l/s (see below under Water Service) the Max. Day + Fire Flow demand is 45.8 l/s.

Based on computer model simulation of the boundary conditions received from the city, the HGL during 45.8 l/s fire flow conditions is 111.1 m which calculates to be 329 kPa (48 psi). Since the pressure is above 138 kPa (20 psi) there is an adequate water supply for fire fighting.

Water Service:

The proposed 150 mm private watermain will connect to an existing 200mm municipal watermain in the Prince of Wales Drive right-of-way.

Based on the City of Ottawa and Ministry of the Environment Design Guidelines the daily average flow is 0.08 l/s with a maximum daily and maximum hourly demand of 0.79 and 1.18 l/s respectively.

Based on computer model simulation of the boundary conditions received from the city, the minimum HGL (hydraulic grade line) is 125.5 m and the maximum is 135.5 m. With these HGLs the water pressure is calculated to vary from 456 kPa to 522 kPa (68 to 88 psi). The minimum pressure is acceptable for the proposed development. Since the water pressure can be above 80 psi at times it is recommended that pressure reducing valves be installed immediately downstream of the water meters.

Sanitary Service:

Based on the City of Ottawa Sewer Design Guidelines for a residential development (7 detached dwelling units – 3.4 persons per unit – 350 l/person/day – 4.0 peaking factor); and a 0.24 l/s/ha infiltration flow; the post development flow is calculated to be 0.45 l/s.

This flow will be adequately handled by the proposed 200mm sanitary sewers which range from 0.65% slope (11.9 l/s capacity) to 6.0% slope (83.8 l/s capacity). The proposed sanitary service will connect to an existing manhole located approximately 4 m from the south-east corner of the property in the lands adjacent to the canal. The size and slope of this sanitary sewer is not known and will require further investigation. This existing sanitary sewer connects to the 1050 mm Mooney's Bay Collector sewer located in the lands adjacent to the canal.

The 0.45 l/s increase in sanitary flows is expected to have a negligible impact on the collector...

Stormwater:

The stormwater quantity control measures required for this site are based on the criteria that the release rate for post-development storm events is equal to or less than the flow produced by the pre-development conditions. (See Stormwater Management Report No. 12069-SWM, prepared by D. B. Gray Engineering Inc.)

The unrestricted flowrate resulting from one in five year storm event will produce a peak flow of 30.6 l/s which will be adequately handled by a proposed storm sewer (300 mm @ 0.34% - 58.8 l/s capacity).

However an inlet control device (ICD) located at the outlet pipe of an on-site manhole will restrict the flow and force the stormwater to back up into an on-site depressed grassed area (the stormwater detention area). Stormwater released through the (ICD) will be restricted to the maximum flow of 9.1 l/s during the 1:5 year storm event.

Conclusions:

1. There is an adequate water supply for fire fighting.
2. The existing water pressure is adequate for the proposed development.
3. Since it is estimated that the water pressure can be above 80 psi at times it is recommended that pressure reducing valves be installed.
4. The proposed private watermain is adequately sized to serve the development.
5. The expected sanitary sewage flow will be adequately handled by the proposed sanitary sewers.
6. The increase in sanitary flows contributing to the existing 1050mm Mooney's Bay Collector is expected to have a negligible impact.
7. The size and slope of the existing sanitary sewer connecting to the collector is not known and will require further investigation.
8. The stormwater quantity control is based on the criteria that the release rate for post-development storm events is equal to or less than the flow produced by the existing conditions.
9. The unrestricted flowrate produced by a one in five year storm event will be adequately handled by a proposed storm sewer.
10. It is expected that a Ministry of Environment Certificate of Approval will be required because the proposed services cross more than one property.

1003 Prince of Wales Drive
Ottawa, Ontario

Water Supply for Fire-Fighting Calculations:

A fire demand of 2,700 L/min (45 l/s) is required as per "Required Minimum Water Supply Flow Rate" as calculated using the Ontario Building Code - Appendix A - Article A-3.2.5.7 "Water Supply For Fire Fighting".

Fire Protection Water Supply $Q = KVS_{Tot}$

$S_{Tot} = 1.0 + S_{Side1} + S_{Side2} + S_{Side3} + S_{Side1} + S_{Side4}$

Spatial Coefficient		Exposure Distance	
		m	
S_{Side1}	0.5	3.5	(to north property line)
S_{Side2}	0.5	1.2	(to east property line)
S_{Side3}	0.5	2.4	(to south property line)
S_{Side4}	0.5	1.2	(to west property line)
S_{Tot}	3.0		
	2.0	maximum	

K (Water Supply Coefficient)
23 As per A-3.2.5.7. Table 1 (Group C Occupancy / Combustible construction with floor assembly fire separations but no fire resistance ratings as per OBC 3.2.2.)

V (Building Volume)		Average	
	Area	Height	Volume
	sq.m.	m	cu.m.
Attic	93	1.34	125
2nd Floor:	93	2.85	265
1st Floor:	93	3.04	283
Basement:	55	2.67	147
Garage:	38	3.39	129
			948 cu.m.
Q =	KVS_{Tot}		
Q =	43,611 L		

Required Minimum Water Supply Flow Rate 2,700 L/min 45 L/sec
(As per A-3.2.5.7. Table 2)

1003 Prince of Wales Drive
Ottawa, Ontario
Water Demand

	Number of Units	Persons Per Unit	Population
UNIT TYPE:			
Single Family:	6	3.4	20

DAILY AVERAGE

350	litres / person / day				
5.0	l / min	0.08	l / sec	1.3	Usgpm

MAXIMUM DAILY DEMAND

9.5	(Peaking Factor for a equivalent population of 20: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)				
47.1	l / min	0.79	l / sec	12.4	Usgpm

MAXIMUM HOURLY DEMAND

14.3	(Peaking Factor for a equivalent population of 20: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)				
70.9	l / min	1.18	l / sec	18.7	Usgpm

Subject:	Prince of Wales Dr_1003 – Boundary Conditions & Fire Flows
From:	Robertson, Syd (Syd.Robertson@ottawa.ca)
To:	dbgray@rogers.com;
Cc:	kentb@hobinarc.com;
Date:	Tuesday, October 9, 2012 11:59:54 AM

Hi Doug:

The following are boundary conditions, HGL, for hydraulic analysis at 1003 Prince of Wales Drive (see attached PDF for location).

Minimum HGL = 125.5 m

Maximum HGL = 135.5 m; the estimated ground elevation is 77.5 m, the maximum pressure is estimated to be 82.5 psi which is more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

IMPORTANT: The MaxDay (0.79L/s) and Fire Flow (183 L/s or 117 L/s) cannot be provided at this location

Available Fire Flow = 68 L/s assuming a residual of 20 psi and a ground elevation of 77.5 m

Fire-Flow Scenario 3 (45L/s)

Max Day + FF = 111.1 m assuming a fire flow of 45 L/s

These are for current conditions and are based on computer model simulation.

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.

Also please note the following attached documents relating to the above noted site:

- 1. Boundary Condition Location Plan
- 2. Fire Flow data.

Please give me a call if you have any questions.

Thanks,

Syd Robertson, C.E.T.**Project Manager, Infrastructure Approvals**

DRP, Urban Services Branch, Outer Core

Planning & Growth Management Department

110 Laurier Ave. W., 4th Floor E

Ottawa, ON K1P 1J1

(613) 580-2424 ext/poste 27916

Syd.Robertson@ottawa.ca

www.ottawa.ca

From: DOUGLAS GRAY [mailto:dbgray@rogers.com]

Sent: October 4, 2012 8:07 AM

To: Robertson, Syd

Cc: Kent Bugatsch

Subject: 1003 Prince of Wales Dr

Hi Syd

I require boundary conditions for a proposed 5 to 6 lot residential development located at 1003 Prince of Wales Dr (see attached map).

I have calculated the following demands:

Average daily demand: 0.08 l/s.

Maximum daily demand: 0.79 l/s.

Maximum hourly daily demand: 1.18 l/s.

For the fire flow requirements we are looking at three different scenarios:

Scenario 1: 183 l/s

Scenario 2: 117 l/s

Scenario 3: 45 l/s

Please provide the boundary conditions for each scenario.

Thanks,

Doug

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Ottawa, Ontario

K1G 4N1

Tel: 613-249-8044

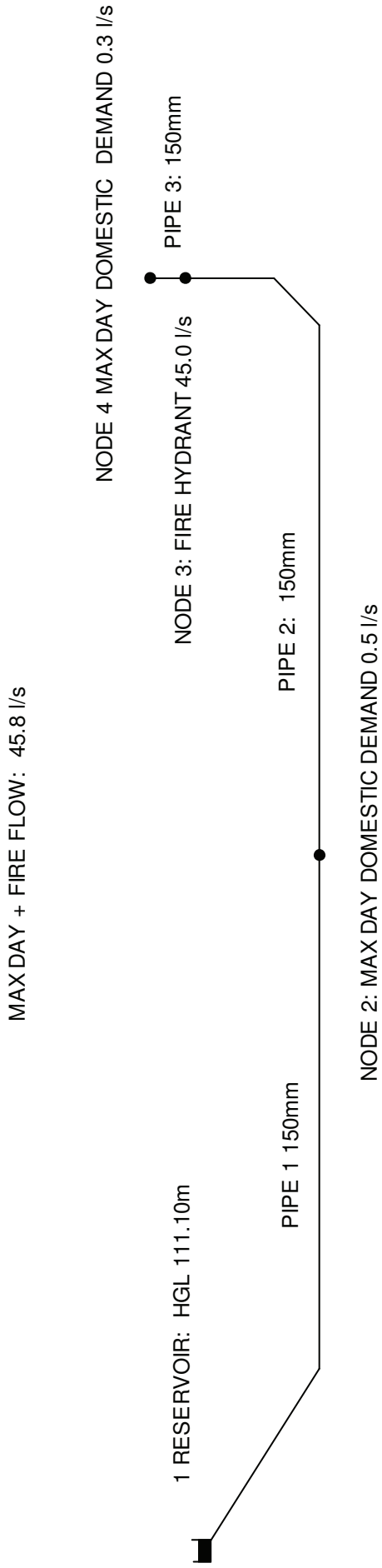
Fax: 613-249-9815

dbgray@rogers.com

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MAX HOURLY DOMESTIC DEMAND: 1.2 l/s

NODE 4 MAX HOURLY DOMESTIC DEMAND 0.5 l/s

NODE 3: FIRE HYDRANT 0.0 l/s

PIPE 3: 150mm

1 RESERVOIR: HGL 125.5m

PIPE 2: 150mm

PIPE 1 150mm

NODE 2: MAX HOURLY DOMESTIC DEMAND 0.7 l/s



1003 Prince of Wales Drive
Ottawa, Ontario

HIGH PRESSURE CHECK - MAX HGL:135.5

		Elevation	Head	Pressure		
		m	m	m	psi	kPa
Road		77.50	135.50	58.00	82.5	569
Lot 1		76.53	135.50	58.97	83.9	578
Lot 7		73.75	135.50	61.75	87.8	605

EPANET HYDRAULIC MODELLING RESULTS

MAX DAY + FIRE FLOW: 45.8 l/s - HGL: 111.1

Node ID	Demand	Head	Elevation	Pressure		
	l/s	m	m	m	psi	kPa
1 Reservoir	-45.8	111.10	77.50	33.60	47.8	329
2 Domestic Demand	0.5	107.04	76.53	30.51	43.4	299
3 Fire Hydrant	45.0	104.38	74.20	30.18	42.9	296
4 Domestic Demand	0.3	104.38	73.75	30.63	43.6	300

Link ID	Diameter	Length	Roughness	Loss Coeff.	Flow	Velocity
	mm	m			l/s	m/s
Pipe 1	150	45.0	100	2.40	45.80	2.59
Pipe 2	150	33.9	100	0.80	45.30	2.56
Pipe 3	150	2.0	100	0.60	0.30	0.02

MAX HOURLY DEMAND: 1.2 l/s - MIN HGL : 125.5

Node ID	Demand	Head	Elevation	Pressure		
	l/s	m	m	m	psi	kPa
1 Reservoir	-1.2	125.50	77.50	48.00	68.3	471
2 Domestic Demand	0.7	125.50	76.53	48.97	69.6	480
3 Fire Hydrant	0.0	125.50	74.20	51.30	72.9	503
4 Domestic Demand	0.5	125.49	73.75	51.74	73.6	507

Link ID	Diameter	Length	Roughness	Loss Coeff.	Flow	Velocity
	mm	m			l/s	m/s
Pipe 1	150	45.0	100	2.40	1.20	0.07
Pipe 2	150	33.9	100	0.80	0.50	0.03
Pipe 3	150	2.0	100	0.60	0.50	0.03

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email: dbgray@rogers.com

SANITARY SEWER DESIGN FORM

Average Daily Flows:

Residential:	350	l / capita / day
Commercial:	50,000	l / ha / day
Institutional:	50,000	l / ha / day
Light Industrial:	35,000	l / ha / day
Heavy Industrial:	55,000	l / ha / day

Peaking Factor:

Residential (Harmon Equation):
 $P = \text{Population} / 1000$

$$\frac{4 + p^{0.5}}{2}$$

PROJECT: 1003 Prince of Wales Dr, Ottawa

Designed By: DBG

15-Apr-13

Page: 1 of 1

[illegible]

City of Ottawa Servicing Study Checklist

General Content

Executive Summary (for large reports only): not applicable

Date and revision number of the report: see page 1 of Servicing Brief

Location map and plan showing municipal address, boundary, and layout of proposed development: see drawings SG-1, SG-2, SS-1 & SS-2.

Plan showing the site and location of all existing services: see drawings SG-1, SG-2, SS-1 & SS-2.

Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere: not applicable

Summary of Pre-consultation Meetings with City and other approval agencies: not applicable

Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria: not applicable

Statement of objectives and servicing criteria: see page 1 of Servicing Brief

Identification of existing and proposed infrastructure available in the immediate area: see drawings SG-1, SG-2, SS-1 & SS-2.

Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available). see page 2 of Servicing Brief (Rideau Canal)

Concept level master grading plan to confirm existing and proposed grades in the development and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths: not applicable

Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts: not applicable

Proposed phasing of the development, if applicable: not applicable

Reference to geotechnical studies and recommendations concerning servicing: see note 1.5 on drawing SG-2

All preliminary and formal site plan submissions should have the following information:

- **Metric scale:** included
- **North arrow:** included
 - **(including construction North):** not included
- **Key Plan:** included
- **Name and contact information of applicant and property owner:** not included
- **Property limits:** included
 - **including bearings and dimensions:** included
- **Existing and proposed structures and parking areas:** included
- **Easements, road widening and rights-of-way:** included
- **Adjacent street names:** included

Development Servicing Report: Water

Confirm consistency with Master Servicing Study, if available: not applicable

Availability of public infrastructure to service proposed development: see page 2 of Servicing Brief

Identification of system constraints: see page 2 of Servicing Brief

Confirmation of adequate domestic supply and pressure: see page 2 of Servicing Brief

Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow locations throughout the development: see page 2 Servicing Brief

Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves: see page 2 of Servicing Brief

Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design: not applicable

Address reliability requirements such as appropriate location of shut-off valves: not applicable

Check on the necessity of a pressure zone boundary modification:. not applicable

Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range: not applicable

Description of the proposed water distribution network, including locations of proposed connections to the existing systems, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions: not applicable

Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation: not applicable

Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines: see page 2 of Servicing Brief

Provision of a model schematic showing the boundary conditions locations, streets , parcels, and building locations for reference: not applicable

Development Servicing Report: Wastewater

Summary of proposed design criteria: see page 3 of Servicing Brief

(Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure): not applicable

Confirm consistency with Master Servicing Study and /or justification for deviations: not applicable

Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and conditions of sewers: not applicable

Descriptions of existing sanitary sewer available for discharge of wastewater from proposed development: see page 3 of Servicing Brief

Verify available capacity in downstream sanitary sewer and / or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable): not applicable

Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix C) format. not applicable

Description of proposed sewer network including sewers, pumping stations, and forcemains: see page 3 of Servicing Brief

Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality): not applicable

Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development: not applicable

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity: not applicable

Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding: not applicable

Special considerations such as contamination, corrosive environment etc: not applicable

Development Servicing Report: Stormwater Checklist

Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property): see page 3 of Servicing Brief

Analysis of available capacity in existing public infrastructure. not applicable

A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern: see drawing SG-1

Water quality control objective (e/g/ controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects: see Stormwater Management Report

Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements: see Stormwater Management Report

Descriptions of the references and supporting information.

Set-back from private sewage disposal systems. not applicable

Watercourse and hazard lands setbacks: see drawing SG-1

Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed: not available

Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists: not applicable

Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period). see drawing SG-1 & SG-2 and Stormwater Management Report

Identification of watercourses within the proposed development and how watercourses will be protected, or , if necessary, altered by the proposed development with applicable approvals. see drawing SG-1 & SG-2 and Stormwater Management Report

Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions: see Stormwater Management Report

Any proposed diversion of drainage catchment areas from one outlet to another. : not applicable

Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities. : not applicable

If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event: not applicable

Identification of potential impacts to receiving watercourses: see Stormwater Management Report

Identification of municipal drains and related approval requirements. : not applicable

Descriptions of how the conveyance and storage capacity will be achieved for the development: see page 3 of Servicing Brief

100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading:

Inclusion of hydraulic analysis including hydraulic grade line elevations. : not applicable

Description of approach to erosion and sediment control during construction for the protection of receiving watercourses of drainage corridors: see notes 2.1 to 2.5 on drawing SG-2

Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplains elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current: not applicable

Identification of fill constraints related to floodplain and geotechnical investigation. : not applicable

Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act: the Rideau Conservation Authority has not been contacted

Application for Certificate of Approval (CofA) under the Ontario Water Resources Act:

Changes to Municipal Drains. : not applicable

Other permits (National Capital commission, Parks Canada, public Works and Government Services Canada, Ministry of transportation etc.) : not applicable

Conclusion Checklist

Clearly stated conclusions and recommendations: see page 3 of Servicing Brief

Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario: included