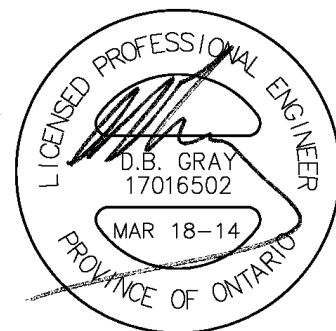


SERVICING BRIEF

5264 Fernbank Road
Kanata (Ottawa), Ontario

Report No. 13054-SB

March 10, 2014
Revised March 18, 2014



NOT VALID UNLESS
SIGNED & DATED

D. B. GRAY ENGINEERING INC.

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

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SERVICING BRIEF

5264 Fernbank Road
Kanata (Ottawa), Ontario

This Servicing Brief is a description of the services of a proposed a proposed automotive sales and repair development located on 6,803 sq.m. of land at 5264 Fernbank Road at the corner of Eagleson Road in Kanata. The proposed building is slab-on-grade and 742 sq.m. in area. The property is currently low lying and wooded. It backs onto Cell 2 of the Monahan Drain Constructed Wetlands (reference Monahan Drain Constructed Wetlands Phase 2 Final Design Report prepared by Novatech Engineering Consultants Ltd. revised February 14, 2007, File No. 1303031A-1).

Refer to drawing to drawings C-1 to C-3, prepared by D. B. Gray Engineering Inc.

Water Supply for Fire Fighting:

There are two existing fire hydrants in the Fernbank Road municipal right-of-way near the proposed development. One is near the proposed Fernbank Road intersection, approximately 72 to 80 m walking distance from the entrances on the west façade of the proposed building. The other is near the Fernbank / Eagleson Road intersection is approximately 27 to 55 m from the entrances on the east façade of the proposed building. This second hydrant is near the top of a 1.25 m embankment with a 3:1 slope and may be of limited use during a fire event.

A fire flow requirement of 100 l/s (6,000 L/min) is required, as calculated as per the Fire Underwriter Survey "Water Supply For Fire Protection".

Based on computer model simulation of the boundary conditions received from the city, the HGL during 100 l/s fire flow conditions at Fernbank Road at Eagleson Road is 156.6 m which calculates to be 594 kPa (86 psi). Since the pressure is above 138 kPa (20 psi) there is an adequate water supply for fire fighting.

Water Service:

The proposed water service will connect to an existing 300mm municipal watermain in Fernbank Road.

Based on the AWWA water flow demand curve and an estimated water pressure at the meter of 414 kPa (60 psi), the peak demand is expected to be 3.2 l/s (403 L/min). The AWWA method calculates the instantaneous demand and is used to size the water service. This peak demand will produce an acceptable velocity of 1.6 m/s in the proposed 50mm water service connection.

Based on the City of Ottawa Design Guidelines the daily average consumption rate for a commercial development is 28,000 litres per day per hectare. Based on this figure the daily average flow for the 0.68 hectare subject property is 0.7 l/s. Based on this flowrate and 1.5 and 1.8 peaking factors (as per the City of Ottawa Design Guidelines) a maximum daily demand of 1.0 l/s and a maximum hourly demand of 1.2 l/s are calculated.

In summary, we requested, from the city, the boundary conditions in the area of the Fernbank / Eagleson Road intersection based on the following:

- Average Daily Demand: 0.7 l/s.
- Maximum Daily Demand: 1.0 l/s.
- Maximum Hourly Demand: 1.2 l/s
- Fire Flow Demand: 100 l/s
- Maximum Daily + Fire Flow Demand 101.0 l/s

Based on computer model simulation of the boundary conditions received from the city, the minimum HGL (hydraulic grade line) is 156.5 m and the maximum is 163.5 m. With these HGLs the water pressure at the water meter is calculated to vary from 595 kPa to 664 kPa (86 to 96 psi). Since the water pressure is above 80 psi it is recommended that a pressure reducing valve (PRV) be installed immediately downstream of the water meter. A pressure check at during construction is recommended. With a PRV the expected range of water pressures are acceptable for the proposed development.

Sanitary Service:

Based on the City of Ottawa Sewer Design Guidelines for a commercial property (50,000 l/ ha / day; 1.5 peaking factor; and a 0.24 l/s infiltration flow) the post development flow is calculated to be 0.78 l/s. This flow will be adequately handled by the proposed sanitary sewer service (150mm @ 1% - 15.9 l/s capacity). The proposed sanitary service will connect to an existing 450mm municipal sanitary sewer (@ 0.42% - 115.2 l/s capacity) in Fernbank Road. The 0.78 l/s increase in sanitary flows contributing to the existing 450mm sanitary sewer is expected to have a negligible impact given its capacity of 115.2 l/s.

Stormwater:

The city has referred to Novatech's Monahan Drain report for water quantity control: The allowable impervious area is 0.20; runoff above 0.20 is to be attenuated and stored on-site. As such, the stormwater quantity control measures are based on the criteria that the release rate for post-development storm events is equal to or less than the flow produced using a runoff coefficient of 0.20. (See Stormwater Management Report No. 13054-SWM, prepared by D. B. Gray Engineering Inc.)

The municipal storm sewers in the area are not sufficiently deep to service the subject development (the springline of the 450mm storm sewer Fernbank Road is approximately 93.85m and the springline of the 600mm storm sewer in Eagleson Road is approximately 93.50m). As such we are proposing to outlet directly to the constructed wetland at an invert elevation of 93.07. Since a new outlet is required, the RVCA advises that a permit under O.Reg 174/06 may be required.

The unrestricted flowrate resulting from one in five year storm event will produce a peak flow of 119.1 l/s which will be adequately handled by a proposed storm sewer (450mm @ 0.20% - 133.0 l/s capacity). However an inlet control device (ICD) located at the outlet pipe of manhole CB/MH-1 will control the release of stormwater off the site. The ICD will restrict the flow and force the stormwater to back up onto the surface above the catch basins. Stormwater released through the (ICD) will be restricted to the maximum flow of 27.3 l/s during the one in five year storm event. Stormwater released through the ICD will be conveyed off the site via a 450mm storm sewer discharging to Cell 2 of the Monahan Drain Constructed Wetlands located immediately to the south of the property.

Since the stormwater management facility is located on an automotive development it is expected that the Ministry of Environment will consider it to be located on industrial lands and an Environmental Compliance Approval (ECA) will be required. Also, since a new storm outlet is proposed it is expected that an ECA will be required.

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 calculated that the water pressure is above 80 psi it is recommended that a pressure reducing valve be installed.
4. The proposed water service connection is adequately sized to serve the development.
5. The expected sanitary sewage flow will be adequately handled by the proposed sanitary sewer service connection.
6. The increase in sanitary flows contributing to the existing 450mm municipal sanitary sewer is expected to have a negligible impact.
7. The unrestricted flowrate produced by a one in five year storm event will be adequately handled by a proposed storm sewer.
8. It is expected that a Ministry of Environment Certificate of Approval (ECA) will be required.

5264 Fernbank Road Ottawa, Ontario Fire Flow Requirements

A fire flow requirement of 6,000 L/min (100 l/s) is required as calculated as per Fire Underwriter Survey "Water Supply For Fire Protection".

Fire Protection Water Supply

$$F = 220 C A^{0.5}$$

F = the required fire flow in litres per minute

C = coefficient related to the type of construction

= 1.5 for wood frame construction (combustible construction)

= 1.0 for ordinary construction (masonry wall, combustible floor and interior)

= 0.8 for non-combustible construction (unprotected structural components)

= 0.6 for non-combustible construction (protected structural components, floor and roof)

= 0.6

A = floor area = 742 sq.m.

$$F = 3,596 \text{ L/min}$$

= 6,000 L/min (rounded off to the nearest 1,000 L/min)

0% Change for Combustible (Commercial)

$$= 6,000 \text{ L/min}$$

0% Reduction to above for Fully Automated Sprinkler Protection

$$= 6,000 \text{ L/min}$$

Added to above Contents Fire Hazard for Separation Exposed Buildings

5% Side 1 30.1 to 45m

0% Side 2 > 45m

0% Side 3 > 45m

0% Side 4 > 45m

5% Total Increase for Exposure (maximum 75%)

$$= 6,300 \text{ L/min}$$

F = 6,000 L/min (rounded off to the nearest 1,000 L/min)

$$= 100 \text{ l/s}$$

100.0 l/s

Required fire flow requirement as per Fire Underwriter Survey
Maximum Daily Domestic Demand

1.0 l/s

101.0 l/s

Required Minimum Water Supply Flow Rate
(MAX DAY + FIRE FLOW)

Elevation at Fire Hydrant: 95.89 m ASL
(at Fernbank Rd entrance)

MAX DAY + 100 l/s FIRE FLOW: 156.6 m ASL

Static Pressure at Fire Hydrant

86 psi 595 kPa

Elevation at Fire Hydrant: 96 m ASL
(at Fernbank Rd / Eagleson Rd)

MAX DAY + 100 l/s FIRE FLOW: 156.6 m ASL

Static Pressure at Fire Hydrant

86 psi 594 kPa

5254 Fernbank Road Ottawa, Ontario

Water Demand

WATER FIXTURE VALUE
(AWWA Manual M22 - Sizing Water Service Lines and Meters)

	No.	F.V.	Total
Bathtub	0	8	0
Toilet - tank	4	4	16
Toilet - flush valve	0	35	0
Lavs.	4	1.5	6
Urinal - pedestal flush valve	0	35	0
Urinal - wall flush valve	0	16	0
Shower	0	2.5	0
K. Sink	1	2.2	2.2
Dishwasher	0	2	0
Clothes Washer	1	6	6
Commercial Sink	0	4	0
J. Sink	1	4	4
Commercial Dishwasher	0	4	0
Commercial Washer	0	4	0
Hose 1/2 in	2	5	10
			44.2

Peak Demand (fig 4-2 or 4-3 AWWA M22) 44 USgpm

Pressure @ Meter 414 kPa 60 psi (assumed)
 Pressure Factor (table 4-1 AWWA M22) 1.00

Peak Demand 44 USgpm

Irrigation - hose 1/2 in 1 6 USgpm (includes pressure factor)
 (assume no hose bibs operating)

TOTAL PEAK DEMAND 189 l/min 50 USgpm 3.2 l/sec

Nominal Size 2.0 in 50 mm
5.3 ft/s 1.6 m/s

DAILY AVERAGE

COMMERCIAL: 28,000 l/gross ha / day (as per Ottawa Design Guidelines)
0.68 ha (land area)
19040 l / day
8 hour day
40 l / min 0.7 l/sec 10.5 USgpm

MAXIMUM DAILY DEMAND 1.5 (Peaking Factor as per Ottawa Design Guidelines)

60 l/min 1.0 l/sec 15.7 USgpm

MAXIMUM HOURLY DEMAND 1.8 (Peaking Factor as per Ottawa Design Guidelines)

71 l/min 1.2 l/sec 18.9 USgpm

Elevation of Water Meter: 95.77 m ASL
 Finish Floor Elevation: 94.87 m ASL

Static Pressure at Water Meter

MINIMUM HGL: 156.5 m ASL 86 psi 595 kPa

MAXIMUM HGL: 163.5 m ASL 96 psi 664 kPa

From: "Kuruville, Santhosh" <Santhosh.Kuruville@ottawa.ca>
To: 'DOUGLAS GRAY' <dbgray@rogers.com>
Sent: Tuesday, March 18, 2014 7:46:49 AM
Subject: RE: 5264 Fernbank Rd

Hi Doug,

The following are boundary conditions, HGL, for hydraulic analysis at 5264 Fernbank (zone 3W) assumed to be connected to the 305mm on Fernbank (see attached PDF for location).

Minimum HGL = 156.5m

Maximum HGL = 163.5m; the estimated ground elevation is 95.8m, the maximum pressure is estimated to be 96.2 psi which is more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

MaxDay + Fire Flow (100 L/s) = 156.6m

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.

Santhosh

From: DOUGLAS GRAY [mailto:dbgray@rogers.com]
Sent: Wednesday, March 12, 2014 12:19 PM
To: Kuruville, Santhosh
Subject: 5264 Fernbank Rd

Hi Santhosh

Please provide the boundary conditions at 5264 Fernbank Rd (at Eagleson Road - see attached map). I have calculated the following expected demands for the based on a commercial (automotive) development on 0.68 ha of land.

Average daily demand: 0.7 l/s.
Maximum daily demand: 1.0 l/s.
Maximum hourly daily demand: 1.2 l/s
Fire Flow demand: 100 l/s
Fire Flow + Max Day: 101.0 l/s

Thanks, Doug

D. B. GRAY ENGINEERING INC.

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

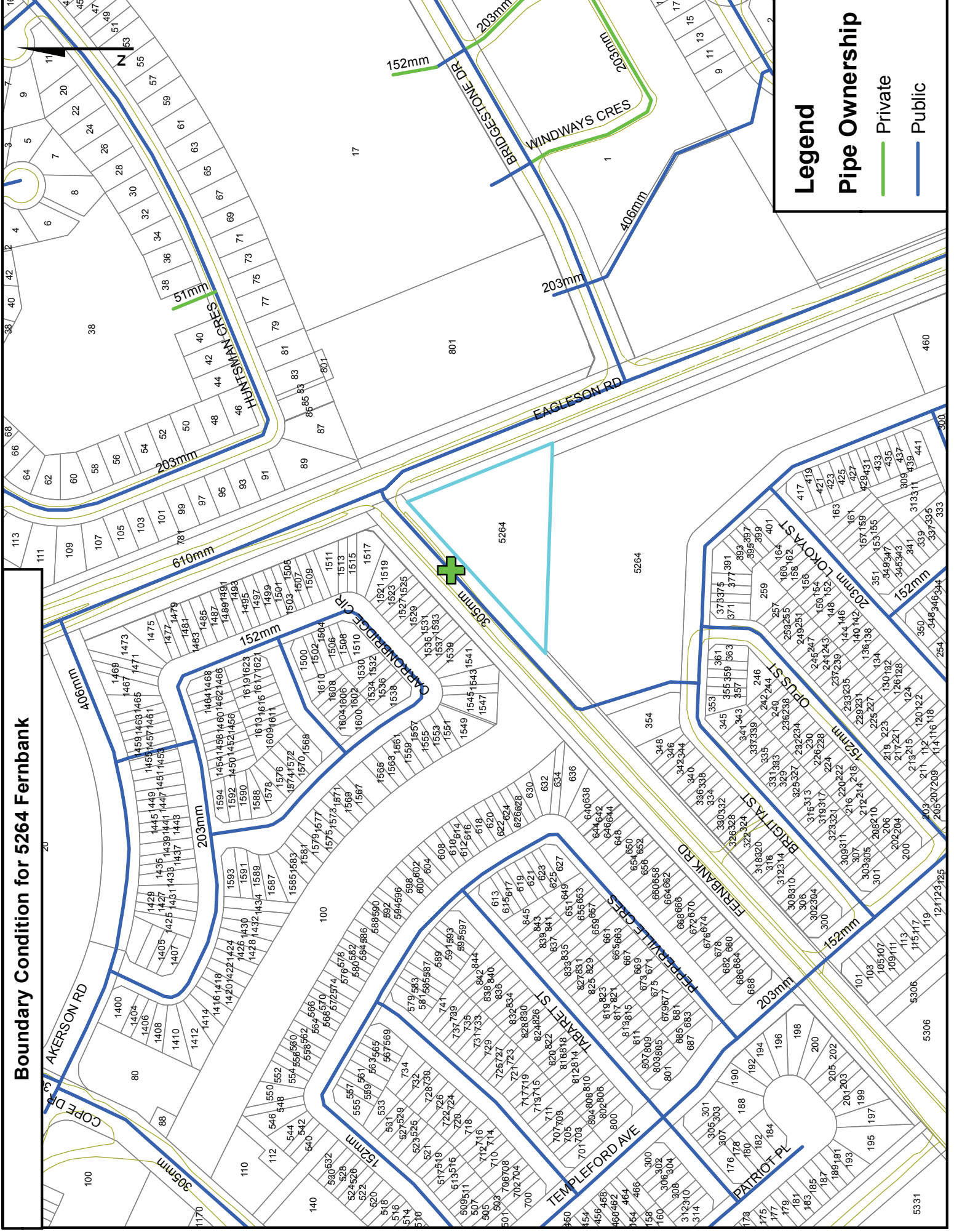
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Boundary Condition for 5264 Fernbank



Legend

Pipe Ownership

- Private (Green line)
- Public (Blue line)

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
To: DOUGLAS GRAY <dbgray@rogers.com>
Sent: Monday, March 17, 2014 5:26:14 PM
Subject: RE: 5254 Fernbank Rd

Hello Doug, this site is within the catchment area for the approved Monahan Drain Constructed Wetland Facility [Cell 2] MDP. It is my understanding that quality controls are provided by the municipal facility for this site, and the MDP dictates the quantity controls required. The RVAC generally defers to city staff to implement the MDP as designed, however we are aware that the Monahan Drain Constructed Wetland Facility is currently undergoing a retrofit design due to performance issues. I don't know if that affects the development of this site at this time or not....check with City of Ottawa staff.

I don't know if the site will connect with municipal sewers in the road or will outlet directly to the pond at the rear. If a new outlet is required, please let me know as a permit under O.Reg 174/06 may be required. Jocelyn

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From: DOUGLAS GRAY [mailto:dbgray@rogers.com]
Sent: Monday, March 10, 2014 10:49 AM
To: Jocelyn Chandler
Subject: 5254 Fernbank Rd

Hi Jocelyn

I am working on a proposed car dealership development located on 6803 sq.m. of land at 5254 Fernbank Rd at the corner of Eagleson Rd in Kanata.

The property backs onto the Monahan Drain.

Attached is a location map and an aerial photo.

Please comment and provide recommendations concerning the stormwater quality criteria for this site.

Regards, Doug

D. B. GRAY ENGINEERING INC.
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dbgray@rogers.com

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 C-1 & C-2

Plan showing the site and location of all existing services: see drawings C-1

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: see page 21 of Stormwater Management Report

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 C-1

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 drawings C-1 & C-2, the Stormwater Management Report and Servicing Brief (Monahan Drain Constructed Wetlands)

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 C-3

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 available
- **Property limits:** included
 - **including bearings and dimensions:** not 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 & 3 of 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 3 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. see page 6 of Servicing Brief

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 drawings C-1 & C-2

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 C-1

Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed: MOE has been contacted but the pre-application consultation record is not yet been issued

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 C-1 & C-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 C-1 & C-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 2.6 on drawing C-3

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 been contacted but no comments have been received

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