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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

FORMASIAN DEVELOPMENT CORP. 1919 MAPLE GROVE ROAD

CITY OF OTTAWA

PROJECT NO.: 16-861

JULY 2021 – REV 4

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
1919 MAPLE GROVE ROAD

FORMASIAN DEVELOPMENT CORP.

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JULY 2021 – REV 4

CITY OF OTTAWA
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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Formasian Development Corp. to prepare a Functional Servicing and Stormwater Management report in support of the application Plan of Subdivision at 1919 Maple Grove Road.

The subject property is located within the City of Ottawa urban boundary, in the Stittsville ward. As illustrated in ***Figure 1***, the subject property is located north of the Maple Grove Road and Johnwoods Street intersection. Comprised of a single parcel of land, the subject property measures approximately ***6.73 ha*** and is zoned Development Reserve (DR). The subject site is within the Kanata West Master Servicing Study (***KWMSS***) and was contemplated as residential lands, as shown by ***FIG. 2.1*** located in ***Drawings/Figures***.

Figure 1: Site Location

The proposed Plan of Subdivision would allow for the development of six 4-storey residential buildings in two blocks, seventy-two home lots and six municipal right-of-ways. The development contemplates ***18*** townhome lots; ***44*** semi-detached lots; and ***450*** apartment units. The development contemplates above ground parking and underground parking with access from Maple Grove Road and to the adjacent developments. A copy of the conceptual site plan and associated site statistics prepared by 110 Architects is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail to demonstrate that the proposed subdivision is supported by existing municipal services as outlined by the ***KWMSS***.

1.1 Existing Conditions

The existing site is predominantly vacant and vegetated parcel of land. There is a single detached residence on the South side of the parcel. The elevations range between 106.49 m and 107.31 m with a grade change of 0.82 m from the Northeast to the Southwest corner of the property.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal right-of-ways:

Maple Grove Road:

- 305 mm diameter PVC watermain;
- 200 mm diameter PVC sanitary sewer tributary to the Kanata West Pump Station;
- 375 mm diameter PVC sanitary sewer tributary to the Kanata West Pump Station;
- 375 mm diameter PVC storm sewer tributary to the Kanata West Stormwater Pond 4;
- 2100 mm diameter concrete storm sewer tributary to the Kanata West Stormwater Pond 4.

1.2 Required Permits / Approvals

The contemplated development is subject to the Plan of Subdivision process for creation of the lots, road opening approval process for the municipal streets and site plan control approval process for the multi-unit buildings.

The contemplated development proposes new right-of-ways complete with sanitary and storm sewers and as a result the Ministry of the Environment, Conservation and Parks (MECP) requires an Environment Compliance Application (ECA) to be submitted under the Transfer of Review process.

As indicated by the Geotechnical Investigation (***Geotechnical Report***) prepared by Paterson Group, a temporary MECP permit to take water (PTTW) may be required if more than 400,000 L/day of ground and/or surface water is required to be pumped during construction. A minimum of 4-5 months should be allotted to complete the PTTW process under the MECP's jurisdiction. Further inspection is to be completed at the detailed design stage.

As indicated by the ***Geotechnical Report***, if 50,000 L/day to 400,000 L/day of ground and/or surface water is required to be pumped during construction, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of 2-4 weeks should be allotted to complete the EASR process. Further inspection is to be completed at the detailed design stage.

It is noted that an existing drainage feature crosses the subject site. Based on a previous development along Maple Grove, existing drainage that was previously tributary to the drainage feature has been redirected towards the municipal sewers. The Mississippi Valley Conservation Authority (***MVCA***) has been contacted to confirm that approvals will not be required to decommission the drainage feature, however this coordination is still in progress. Approvals are not anticipated for the following as the swale is not a significant drainage feature for the following reasons:

- Given that the site tributary to the swale located on the 1919 Maple Grove Drive property has been redeveloped and no longer utilizes the swale, the swale no longer conveys flow from multiple parcels.

- The significant drainage feature is located on the adjacent property, 195 Huntmar Drive, North of the 1919 Maple Grove Drive development and as such a headwater study has been included as part of D01-01-16-0015 application.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report:

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002,* October 2012.
  (City Standards)

  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-01*)

  - **Technical Bulletin ISTB-2018-04**
    City of Ottawa, June 27, 2018.
    (*ISTB-2018-04*)

- **Ottawa Design Guidelines – Water Distribution,**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)

  - **Technical Bulletin ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (*ISDTB-2018-02*)

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Ontario Building Code Compendium,**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
  (OBC)

- **Kanata West Master Servicing Study,**
  Stantec Consulting Ltd., June 16, 2006.
  (KWMSS)

- **Kanata West Pump Station Flow Development Background,**
  Stantec Consulting Ltd., June 12, 2012.
  (KWPS Memo)

- **Geotechnical Investigation,**
  Paterson Group, July 20, 2018.
  (Geotechnical Report)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 3W pressure zone, as shown by the Pressure Zone map included in ***Appendix B***. Based on available City mapping, a 305 mm watermain exists within the Maple Grove Road right-of-way.

The ***KWMSS*** contemplated the site to be serviced via the 305 mm diameter watermain within the Maple Grove Road right-of-way, as shown by the *Watermain Final Concept* drawing (***WM-1***) included in ***Appendix B***.

3.2 Water Supply Servicing Design

It is anticipated that the contemplated development would be serviced from an internal watermain network with a connection to the existing 305 mm watermain within the Maple Grove Road right-of-way. Based on coordination with City staff, the internal watermain network will connect to the 250 mm diameter watermain within future Stittsville Main Street. A valve box will exist between the two Maple Grove Road connection locations. A conceptual Watermain Servicing Plan (***Drawing 4***) is included in ***Drawings/Figures***.

In accordance with City of Ottawa technical bulletin ISDTB-2014-02, redundant service connections will be required due to an estimated design flow of greater than ***50 m^3/day***. To provide a looped connection, it is anticipated connections to the adjacent development will be made. In the scenario where adjacent development is unavailable, a second connection to the existing watermain within Maple Grove Road will be made. Based on coordination with City staff, it is anticipated that a third future connection will be provided via the Phase 2, 195 Huntmar Drive Development as noted in the correspondence included within ***Appendix B***.

Based on the ***Water Supply Guidelines***, 49 single dwelling units on a permanent basis and 75 single dwelling units on a temporary basis are permitted on a dead-end watermain should the Sub-division be constructed in phases, noting that the above conditions rely on the available water pressure supplied to the development. In addition, the looped connection must be provided within two years.

Table 1 summarizes the ***Water Supply Guidelines*** employed in the preparation of the preliminary water demand estimate.

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Townhomes/Semi-Detached	2.7 P/unit
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	2.5 x Average Daily *
Residential Maximum Hourly	5.5 x Average Daily *
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa
Daily average based on Appendix 4-A from **Water Supply Guidelines* *** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.* *-Table updated to reflect ISD-2010-2*	

Table 2 summarizes the anticipated water supply demand and boundary conditions for the two proposed connection to the 305 mm diameter watermain within Maple Grove Drive, based on the ***Water Supply Guidelines***.

Table 2
Summary of Anticipated Water Demand and Boundary Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] Connection 1 (m H_2O / kPa)	Boundary Condition[2] Connection 2 (m H_2O / kPa)
Average Daily Demand	185.9	53.0 / 519.9	52.9 / 518.9
Max Day + Fire Flow	464.7 + 19,000 = 19,464.7	39.3 / 385.5	39.1 / 383.6
Peak Hour	1022.4	48.7 / 477.7	48.6 / 476.8
1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations. Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 107.9 m at Connection 1 and 108m at Connection 2. See ***Appendix B.***			

Fire flow requirements are to be determined in accordance with City of Ottawa ***Water Supply Guidelines*** and the Ontario Building Code.

Fire flow requirements were estimated per City of Ottawa Technical Bulletin ***ISTB-2018-02***. The following parameters were assumed:

- Type of construction - Ordinary Construction;
- Occupancy type – Limited Combustibility;
- Sprinkler Protection – Supervised Sprinklered System (Apartment and Retirement Residence) and Non-Sprinklered System (Townhomes).

The above assumptions result in an estimated fire flow of approximately ***19,000 L/min***, noting that actual building materials selected will affect the estimated flow. A certified fire protection system specialist shall be employed to design the building fire suppression system(s) and confirm the actual fire flow demand.

Section 6.5.1 of the ***KWMSS*** summarizes the estimated fire flow requirements used in sizing the trunk infrastructure. Residential and Mixed Use/Commercial development assumed a fire flow requirement of ***6,000 L/min*** and ***13,000 L/min*** respectively, in the design of the future watermain network. Based on the ***KWMSS***, the residual pressure of the Stittsville Tank under a fire flow of ***13,000 L/min*** remains above 45 psi (310 kPa).

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in the boundary request correspondence included in ***Appendix B***.

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow demand for the demands as indicated by the correspondence in ***Appendix B***. The minimum and maximum pressures fall within the required range identified in ***Table 1***.

Detailed design of the site watermain infrastructure will ensure that pressures are respected within the City ranges.

3.3 Water Supply Conclusion

The City provided both the anticipated minimum and maximum water pressures, as well as the estimated water pressure during fire flow demand for the demands as indicated by the correspondence in ***Appendix B***. The minimum and maximum pressures fall within the required range identified in ***Table 1***.

It is anticipated that the contemplated development would be serviced from an internal watermain network with a looped connection to the existing 305 mm watermain within the Maple Grove Road right-of-way and to the adjacent development. Detailed design of the site watermain infrastructure will ensure that pressures are respected within the City’s required ranges.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the Kanata West Pump Station catchment area, as shown by the *Preferred Waste-Water Option* drawing (***S-1***) included in ***Appendix C***. Based on available City mapping, a 375 mm diameter sanitary sewer exists within the Maple Grove Road right-of-way. A 600 mm diameter sanitary sewer is located downstream of the subject site near the Maple Grove Road and Montserrat Street intersection.

Sanitary capacity for the site is outlined by the ***KWMSS***. *Section 4.3* of the ***KWMSS*** discusses overall sanitary services for the Kanata West lands, which includes the site. The site falls within the ***20.03 ha*** area 26, as shown by the *Preferred Waste-Water Option* drawing (***S-1***) and was contemplated to outlet to a 600 mm diameter sanitary sewer within Maple Grove Road. The ***KWMSS*** sanitary drainage plan and the corresponding Sanitary Sewer Calculation Sheet for the ultimate sanitary sewers are included in ***Appendix C***.

Based on the land use plan from the ***KWMSS***, the site has been identified as a residential area. *Section 4.4* of the ***KWMSS*** outlines the design criteria used to size the ultimate sanitary infrastructure servicing the site; residential areas assumed a flow rate of ***350 L/Person/Day***. Refer to the extracted from section 4.4 of ***KWMSS*** included in ***Appendix C*** for further information regarding the design criteria utilized.

Stantec has prepared a report outlining the design criteria and associated catchment areas to be supported by the Kanata West Pump Station. As shown by the *KWMSS Drainage Allocations* prepared by Stantec included in ***Appendix C***, the subject site is to be serviced via the Kanata West Pump Station. Refer to the Kanata West Pump Station Flow Development Background Memorandum (***KWPS Memo***) for further details.

Table 3 demonstrates the existing peak flow from the existing residence. See ***Appendix C*** for associated calculations.

Table 3
Summary of Existing Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	**0.35**
Estimated Peak Dry Weather Flow	**0.39**
Estimated Peak Wet Weather Flow	**2.27**

Based on the site area of ***20.03 ha***, specified by drawing ***S-1*** included in ***Appendix C***, ***23.70 L/s*** of flow has been allotted to the development lands. As the subject site in a 6.73 portion of the area outlined within the KWMSS, the allotted flow rate for the development is estimated at ***8.0 L/s***.

4.2 Wastewater Design

It is anticipated that the contemplated development will connect to the existing 375 mm sanitary sewer within the Maple Grove Road right-of-way in the vicinity of the Johnwoods Street and Maple Grove Road intersection. A conceptual Sanitary Servicing Plan (***Drawing 3***) is included in ***Drawings/Figures***.

Table 4 summarizes the ***City Standards*** employed in the design of the preliminary wastewater sewer system. Design criteria for the Maple Grove Trunk Sewer calculation was extracted from section 4.4 of ***KWMSS*** and is included in ***Appendix C***.

Table 4
Wastewater Design Criteria

Design Parameter	Value
Single Family Home (Existing)	3.4 P/unit
Residential Townhomes	2.7 P/unit
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0 Harmon Correction Factor 0.8
Infiltration and Inflow Allowance	0.33 L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 5 demonstrates the anticipated peak flow from the contemplated development. See ***Appendix C*** for associated calculations.

Table 5
Summary of Anticipated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	**3.43**
Estimated Peak Dry Weather Flow	**10.41**
Estimated Peak Wet Weather Flow	**12.29**

The estimated peak wet weather sanitary flow, based on the concept plan provided in ***Drawings/Figures,*** is ***12.29 L/s***. As a result, there is a proposed ***4.29 L/s*** increase in peak wet weather sanitary flow from the contemplated development. See ***Appendix C*** for associated calculations.

As part of the Maple Grove Reconstruction, a sanitary analysis was conducted and is outlined by the *Sanitary Drainage Plan* prepared by David Schaeffer Engineering Ltd. (Project No. 10-451) dated July 2011.

Based on the sanitary analysis, the controlling section of the local sewer system is located at the intersection of Maple Grove Road and Santolina Street (section 105A-106A) with an available residual capacity of ***32.0 L/s***. The Sanitary Drainage Plan and associated calculation sheet are included in ***Appendix C***.

The analysis above indicates that sufficient capacity is available in the local sewers to accommodate the estimated ***4.29 L/s*** increase in peak wet weather sanitary flow from the contemplated development.

4.3 Wastewater Servicing Conclusions

Contemplated by the ***KWPS Memo*** prepared by Stantec Consulting Ltd., the site lies within the Kanata West Pump Station collection area.

Based on the sanitary analysis prepared by David Schaeffer Engineering Ltd. in support of the Maple Grove road reconstruction, sufficient capacity is available in the local sewers to accommodate the anticipated ***12.29 L/s*** peak wet weather flow from the contemplated development.

The proposed wastewater design conforms to all relevant ***City Standards***.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system and is located within the Carp River sub-watershed. As such, approvals for proposed development are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Carp River watershed, and is therefore subject to review by the MVCA.

The ***KWMSS*** contemplated the site to be services via a 1950 mm diameter storm sewer running within the Maple Grove Road right-of-way, as shown by the *Model Schematic Storm Drainage Major System* (***ST-MJ***) drawing located in ***Appendix D.*** The ultimate outlet of the storm sewers servicing the site is the ***KWMSS*** stormwater management facility Pond 4, constructed in 2015.

Minor system storm sewer criteria for the site is outlined by *Storm Drainage Plan* prepared by David Schaeffer Engineering Ltd. (Project No. 12-644) in support of the Pond 4 construction, where the site is located within the 17.39ha of Area A6 (A-1).

Major system flow is discussed in *Section 5.10* of the ***KWMSS***. As shown by ***ST-MJ*** included in ***Drawings/Figures***, the site is included in drainage area A-1. This drainage area is surrounded by arterial roads on two sides; per City standards, no overland flow is permitted to cross arterial roads during a 100-year event. Therefore, A-1 is required to contain the 100-year storm onsite. Storage methods anticipated are discussed in section ***5.3***.

As indicated by the ***KWMSS***, the subject site is to meet a target infiltration rate of 104 mm/yr and 73 mm/yr for areas with moderate and low recharge, respectively. To meet these infiltration rates, the following best management practices (BMP's) are recommended:

- Subsurface Infiltration;
- Biofilters;
- Wet ponds; and
- Dry ponds.

Low Impact Development (***LID***) methodologies, will be determined during the detailed design phase of the site. A water balance may be required during detailed design to assess the functionality of the LID system.

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were contemplated within the ***KWMSS*** and within the ***KWMSS*** Pond 4 design prepared by David Schaeffer Engineering Ltd., where the proposed development is required to:

- Meet an allowable release rate based on a Rational Method Coefficient of 0.60, employing the City of Ottawa IDF parameters for a 5-year storm with a time of concentration equal to 15 minutes;
- Attenuate all storms up to and including the City of Ottawa 100-year design event on site. Sufficient volume to contain 100-year event onsite is required;
- Onsite quality controls are not anticipated as the site is tributary to Pond 4 per the ***KWMSS*** where quality will be provided.

Based on the above, the allowable release rate for the proposed development is ***937.1 L/s***.

5.3 Proposed Stormwater Management System

It is contemplated that the stormwater outlet from the proposed development will be to the 2100 mm diameter storm sewer within Maple Grove Road, as shown by ***ST-MJ*** located in ***Appendix D***. A conceptual Storm Servicing Plan (***Drawing 2***) is included in ***Drawings/Figures***.

To meet the stormwater objectives the proposed development may contain a combination of roof top flow attenuation along with surface and subsurface storage.

Table 6 summarizes post-development flow rates. The following storage requirement estimate assumes that approximately 10% of the development area will be directed to the outlet without flow attenuation. The c-value for the development was estimated as 0.65 which is standard for a typical development. These areas will be compensated for in areas with flow attenuation controls.

Table 6
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m^3)	(L/s)	(m^3)
Unattenuated Areas	127	0	271	0
Attenuated Areas	312	547	666	1168
Total	**439**	**547**	**937**	**1168**

It is anticipated that approximately ***1,168 m³*** of storage will be required on site to attenuate flow to the established release rate of ***937.1 L/s***; storage calculations are contained within ***Appendix D***.

Approximately 115 m^3 of storage can be provided via road sags per 100 m of road. The development proposes 820 m of road therefore, approximately 940 m^3 of storage can be provided within the future right-of-ways. The apartment and park blocks will need to provide the balance of storage via internal cistern storage, rooftop storage and/or surface storage. Actual storage volumes will need to be confirmed at the detailed design stage based on a number of factors, including grading constraints.

In accordance with Section 5.6 of the ***KWMSS***, a water balance may need to be prepared during detail design to determine the optimal ***LIDs*** for the specific development. ***LIDs*** are to be designed and constructed in accordance with the MECP's SWM Planning and Design Manual (March 2003). Please refer to ***Contemplated Storm Servicing Plan*** included in the ***Drawing and Figures*** folder for contemplated ***LID*** locations.

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm in accordance with the *Storm Drainage Plan* prepared by David Schaeffer Engineering Ltd. (Project No. 12-644) in support of the Pond 4 construction. The post-development allowable release rate was calculated as ***937.1 L/s***, it is estimated that ***1,168 m^3*** of storage will be required to meet this release rate.

Onsite quality controls are not anticipated as the outlet to the site is the Pond 4 per the ***KWMSS***.

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies for approval.

6.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Formasian Development Corp. to prepare a Functional Servicing and Stormwater Management report in support of the application for Sub-division at 1919 Maple Grove Road. The preceding report outlines the following:

- Based on boundary conditions provided by the City, the existing municipal water infrastructure is capable of providing the contemplated development with water within the City's required pressure range;
- The FUS method for estimating fire flow indicated ***19,000 L/min*** is required for the contemplated development;
- The contemplated development is anticipated to have a peak wet weather flow of ***12.29 L/s***. Based on the sanitary analysis conducted, the existing municipal sewer infrastructure has sufficient capacity to support the development;
- Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm, in accordance with the *Storm Drainage Plan* prepared by David Schaeffer Engineering Ltd. (Project No. 12-644) in support of the Pond 4 construction. As a result, the post-development allowable release rate was calculated as ***937.1 L/s***;
- It is contemplated that stormwater objectives may be met through storm water retention via roof top, surface, and subsurface storage. It is anticipated that ***1,168 m^3*** of onsite storage will be required to attenuate flow to the established release rate above;
- Onsite quality controls are not anticipated as the site is tributary to the Pond 4 per the ***KWMSS*** where quality controls will be provided;
- The Ministry of the Environment, Conservation and Parks (MECP) requires an Environmental Compliance Application (ECA) for new storm and sanitary sewers within the future municipal right-of-ways.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Adam D. Fobert, P.Eng.

Prepared by,
David Schaeffer Engineering Ltd.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

16-861 09/08/2019

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	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 defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 1.1, 3.1, 4.1, 5.1
☐	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).	N/A
☐	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management 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.	N/A
☐	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.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 2.1
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	Drawings/Figures

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.2, 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	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 at locations throughout the development.	Section 3.2
☐	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.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	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	Section 3.2, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (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).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐	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 condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	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)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	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).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 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)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity 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.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.2
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	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.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	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.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	N/A
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	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 the approval authority for the Lakes and Rivers Improvement ct. 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.	Section 5.1
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 7.0
☐	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	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

Charlotte Kelly

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: June 25, 2020 4:37 PM
To: Charlotte Kelly
Cc: Alison Gosling
Subject: RE: 1919 Maple Grove Road - Boundary Condition Request
Attachments: FW: 1919 Maple Grove Road - Boundary Condition Request

Hi Kelly,

Please see attached email for the boundary conditions.

If you have any questions, please let me know.

Thanks,

Santhosh

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: June 19, 2020 9:01 AM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Alison Gosling <AGosling@dsel.ca>
Subject: 1919 Maple Grove Road - Boundary Condition Request

Good Morning Santhosh,

We would like to kindly request updated boundary conditions for the contemplated development at 1919 Maple Grove Road development using the following anticipated development demands:

1. Location of Service / Street Number: 1919 Maple Grove Road
2. Type of development and the amount of fire flow required for the contemplated development:
   - Type of development: The contemplated development includes 62 townhomes/semi-detached units and 450 residential units.
   - Contemplated Connections:
     - Dual Connection to the 305 mm diameter watermain within Maple Grove Road
   - Fire demand based on Technical Bulletin ISTB-2018-02 has been used to estimate a max fire demand of ***19,000 L/min***. Refer to the attached for detailed calculations.

Demand	L/min	L/s
Avg. Daily	185.9	3.10
Max Day	464.7	7.75
Peak Hour	1022.4	17.04

Please let us know if you have any questions.

Thank-you,

Charlotte Kelly, E.I.T.
Junior Engineering Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

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APPENDIX B

Water Supply

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7	18	49
Townhouse	2.7	44	119
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4	225	315
2 Bedroom	2.1	225	473
3 Bedroom	3.1		0
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	956	267.7	185.9	669.2	464.7	1472.2	1022.4

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate		Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Commercial floor space	2.5	$L/m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Office	75	$L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
			Total I/CI Demand	0.0	0.0	0.0	0.0	0.0	0.0
			Total Demand	**267.7**	**185.9**	**669.2**	**464.7**	**1472.2**	**1022.4**

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

SOUTH EAST NW APARTMENT BUILDING

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C 1 *Type of Construction Coefficient per FUS Part II, Section 1*

A 17052.0 m^2 *Total floor area based on FUS Part II section 1*

Fire Flow 28728.3 L/min

29000.0 L/min *rounded to the nearest 1,000 L/min*

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow **24650.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction **-12325 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	**S.D**	**Lw**	**Ha**	**LH**	**EC**
N	Ordinary - Unprotected Openings	20.1m-30m	31	4	124	10%
S	Ordinary - Unprotected Openings	20.1m-30m	14	3	42	7%
E	Ordinary - Unprotected Openings	20.1m-30m	60	4	240	10%
W	Ordinary - Unprotected Openings	>45m	21	4	84	0%
		% Increase				**27%** *value not to exceed 75%*

Increase **6655.5 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure (maximum 5 stories)
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow 18980.5 L/min *fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*

19000.0 L/min *rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by ________________.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

NORTH WEST SW APARTMENT BUILDING

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	9976.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	21973.6 L/min	
	22000.0 L/min	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	**18700.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction	**-9350 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC
N	Ordinary - Unprotected Openings	10.1m-20m	31	4	124	15%
S	Ordinary - Unprotected Openings	20.1m-30m	16	3	48	7%
E	Ordinary - Unprotected Openings	10.1m-20m	150	3	450	15%
W	Ordinary - Unprotected Openings	20.1m-30m	60	4	240	10%
		% Increase				**47%** *value not to exceed 75%*

Increase	**8789.0 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure (maximum 5 stories)
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	18139.0 L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	18000.0 L/min	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _________________.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

NORTH WEST CENTRAL APARTMENT BUILDING

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	5760.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow 16696.8 L/min
17000.0 L/min *rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow **14450.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction **-7225 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC
N	Ordinary - Unprotected Openings	>45m	0	0	0	0%
S	Ordinary - Unprotected Openings	20.1m-30m	31	4	124	10%
E	Ordinary - Unprotected Openings	10.1m-20m	90	3	270	15%
W	Ordinary - Unprotected Openings	20.1m-30m	60	4	240	10%
		% Increase				**35%** *value not to exceed 75%*

Increase **5057.5 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure (maximum 5 stories)
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow 12282.5 L/min *fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
12000.0 L/min *rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by ________________.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

SOUTH WEST CENTRAL APARTMENT BUILDING

1. Base Requirement

$$F = 220C\sqrt{A}$$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	4168.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	14203.2 L/min	
	14000.0 L/min	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow **11900.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction **-5950 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC
N	Ordinary - Unprotected Openings	>45m	0	0	0	0%
S	Ordinary - Unprotected Openings	20.1m-30m	31	4	124	10%
E	Ordinary - Unprotected Openings	10.1m-20m	90	3	270	15%
W	Ordinary - Unprotected Openings	20.1m-30m	60	4	240	10%
		% Increase				**35%** *value not to exceed 75%*

Increase **4165.0 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure (maximum 5 stories)
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	10115.0 L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	10000.0 L/min	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by ________________.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

NORTH EAST CENTRAL APARTMENT BUILDING

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	4168.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	14203.2	L/min	
	14000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%
Fire Flow	**11900.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%
Reduction	**-5950 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC
N	Ordinary - Unprotected Openings	>45m	0	0	0	0%
S	Ordinary - Unprotected Openings	20.1m-30m	31	4	124	10%
E	Ordinary - Unprotected Openings	10.1m-20m	90	3	270	15%
W	Ordinary - Unprotected Openings	20.1m-30m	60	4	240	10%
		% Increase				**35%** *value not to exceed 75%*

Increase	**4165.0 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure (maximum 5 stories)
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	10115.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	10000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _________________.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

SOUTH EAST CENTRAL APARTMENT BUILDING

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	5760.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	16696.8 L/min	
	17000.0 L/min	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	**14450.0 L/min**

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Sprinklered - Supervised -50%

Reduction	**-7225 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC
N	Ordinary - Unprotected Openings	>45m	0	0	0	0%
S	Ordinary - Unprotected Openings	20.1m-30m	31	4	124	10%
E	Ordinary - Unprotected Openings	10.1m-20m	90	3	270	15%
W	Ordinary - Unprotected Openings	20.1m-30m	60	4	240	10%
		% Increase				**35%** *value not to exceed 75%*

Increase	**5057.5 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure (maximum 5 stories)
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	12282.5 L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	12000.0 L/min	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _________________.
-Calculations based on Fire Underwriters Survey - Part II

Boundary Conditions Unit Conversion

Connection1:

	Height (m)	Elevation (m	m H_2O	PSI	kPa
Avg. DD	160.9	107.9	53.0	75.4	519.9
Fire Flow	147.2	107.9	39.3	55.9	385.5
Peak Hour	156.6	107.9	48.7	69.3	477.7

Connection 2:

	Height (m)	Elevation (m	m H_2O	PSI	kPa
Avg. DD	160.9	108	52.9	75.3	518.9
Fire Flow	147.1	108	39.1	55.6	383.6
Peak Hour	156.6	108	48.6	69.1	476.8

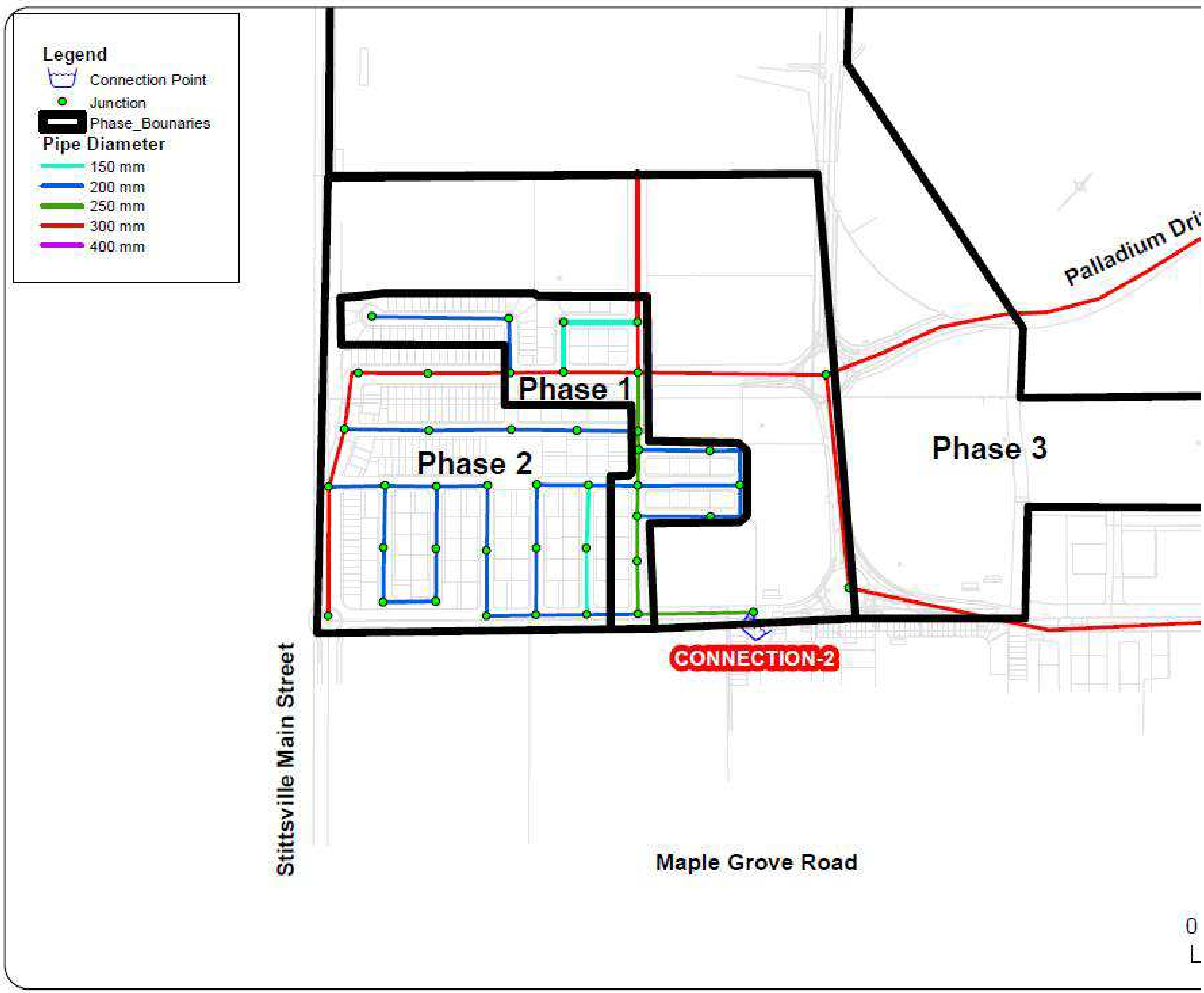
Charlotte Kelly

From: Bougadis, John <John.Bougadis@ottawa.ca>
Sent: June 25, 2020 4:14 PM
To: Kuruvilla, Santhosh
Cc: Simard, Lyndsey
Subject: FW: 1919 Maple Grove Road - Boundary Condition Request
Attachments: 1919 Maple Grove Road_Boundary Conditions_24 June2020.docx

Hi Santhosh,

See attached. Comments:

- The City expects a future third connection from Phase 2 of 195 Huntmar (see below).
- The FUS calc is based on an apartment unit. The email from DSEL below states townhomes and semi-detached units (see highlighted text in email below).
- An isolation valve between connection 1 and 2 is required.



John
x14990

From: Simard, Lyndsey <lyndsey.simard@ottawa.ca>
Sent: June 24, 2020 12:25
To: Bougadis, John <John.Bougadis@ottawa.ca>
Subject: RE: 1919 Maple Grove Road - Boundary Condition Request

Hi John,

Please find the attached boundary conditions.

Cheers,

Lyndsey

From: Bougadis, John <John.Bougadis@ottawa.ca>
Sent: June 19, 2020 10:12
To: Simard, Lyndsey <lyndsey.simard@ottawa.ca>
Subject: FW: 1919 Maple Grove Road - Boundary Condition Request

John
x14990

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: June 19, 2020 10:03
To: Bougadis, John <John.Bougadis@ottawa.ca>
Subject: FW: 1919 Maple Grove Road - Boundary Condition Request

Good morning John,

Please provide the boundary conditions for the subject application.

Thanks,

Santhosh

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: June 19, 2020 9:01 AM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Alison Gosling <AGosling@dsel.ca>
Subject: 1919 Maple Grove Road - Boundary Condition Request

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ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Good Morning Santhosh,

We would like to kindly request updated boundary conditions for the contemplated development at 1919 Maple Grove Road development using the following anticipated development demands:

1. Location of Service / Street Number: 1919 Maple Grove Road
2. Type of development and the amount of fire flow required for the contemplated development:
    - Type of development: The contemplated development includes 62 townhomes/semi-detached units and 450 residential units.
    - Contemplated Connections:
        - Dual Connection to the 305 mm diameter watermain within Maple Grove Road
    - Fire demand based on Technical Bulletin ISTB-2018-02 has been used to estimate a max fire demand of ***19,000 L/min***. Refer to the attached for detailed calculations.

Demand	L/min	L/s
Avg. Daily	185.9	3.10
Max Day	464.7	7.75
Peak Hour	1022.4	17.04

Please let us know if you have any questions.

Thank-you,

Charlotte Kelly, E.I.T.
Junior Engineering Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

Boundary Conditions
1919 Maple Grove Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	186	3.10
Maximum Daily Demand	465	7.75
Peak Hour	1,022	17.04
Fire Flow Demand #1	19,020	317.00

Location

Results

Connection 1 – Maple Grove Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.9	75.4
Peak Hour	156.6	69.2
Max Day plus Fire 1	147.2	55.8

[1] Ground Elevation = 107.9 m

Connection 2 – Maple Grove Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.9	75.2
Peak Hour	156.6	69.0
Max Day plus Fire 1	147.1	55.5

[1] Ground Elevation = 108.0 m

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.

Watermain Final Concept

Kanata West Master Servicing Study


SUBJECT SITE
HIGHWAY 417
HIGHWAY 417
CAMPEAU DRIVE EXTENSION
FEEDMILL CREEK
RIVER CARP RIVER
HUNTMAR ROAD
MAPLE GROVE ROAD
PALLADIUM DRIVE
RAPID TRANSIT
SILVER SEVEN ROAD
TERRY FOX DRIVE
DIDSBURY ROAD
POOLE CREEK
ALON STREET
JOHN STREET
SWEETNAM
IBER ROAD
CONNECT EXISTING 305mm WATERMAIN TO PROPOSED 610mm WATERMAIN
CONNECT EXISTING 203mm WATERMAIN TO PROPOSED 305mm WATERMAIN
305mm
406mm
610mm
203mm
Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa ON Canada
K1Z 7T1
Tel. 613.722.4420
Fax. 613.722.2799
www.stantec.com
Stantec
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The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing – any errors or omissions shall be reported to Stantec Consulting Ltd. without delay
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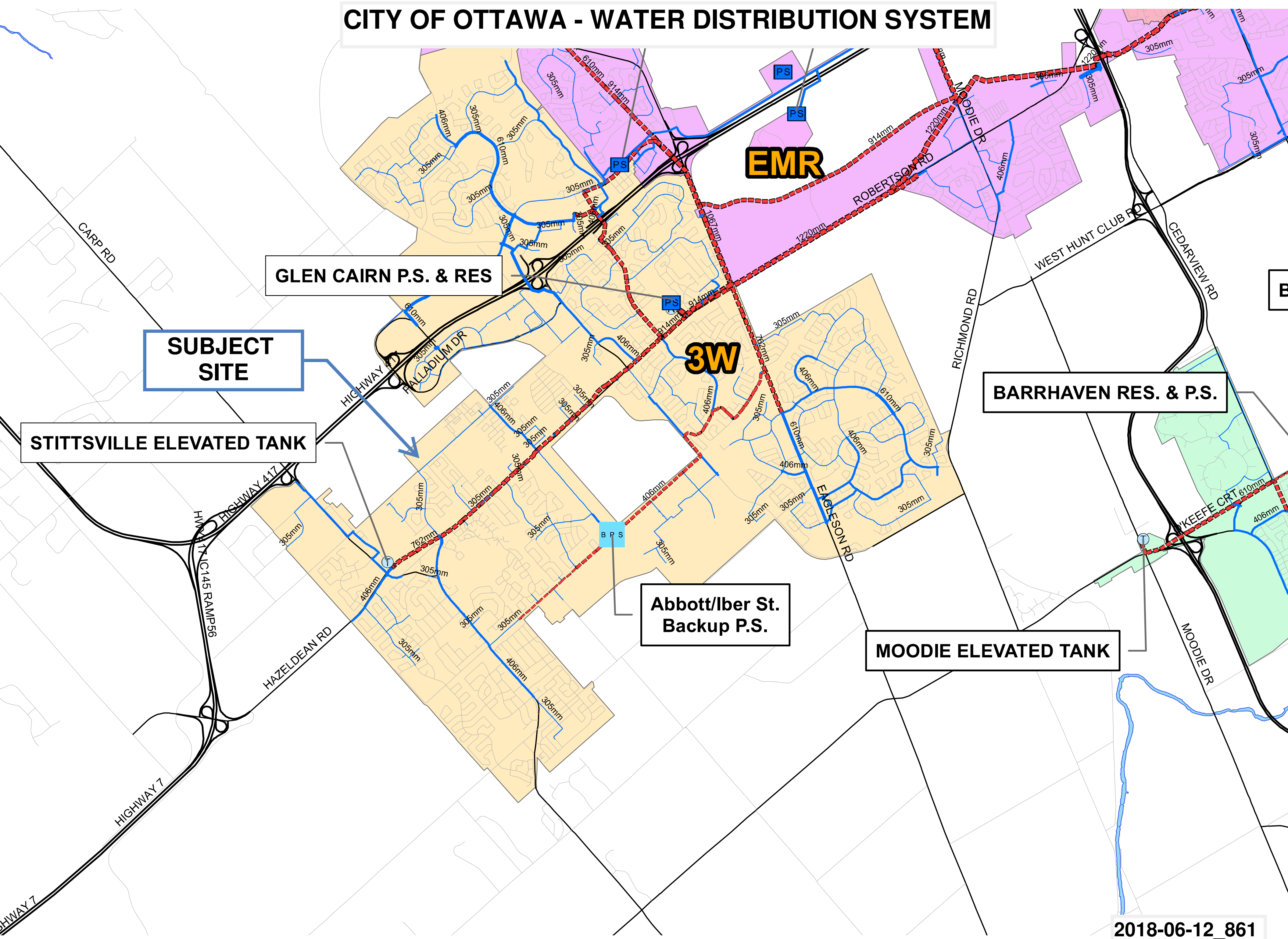
Legend
KANATA–WEST CONCEPT PLAN BOUNDARY
EXISTING WATERMAIN
EXISTING 610mm WATERMAIN TO BE UPGRADED TO 914mm
EXISTING 610mm WATERMAIN TO BE UPGRADED TO 762mm
PROPOSED 610mm DIA. WATERMAIN
PROPOSED 406mm DIA. WATERMAIN
PROPOSED 305mm DIA. WATERMAIN
PROPOSED 203mm DIA. WATERMAIN
Notes
INTERNAL WATERMAIN SIZE ARE EXPECTED TO VARY FROM 152mm TO 305mm.
CCL/IBI
5 REVISED FOR DEC.21/05 SUBMISSION GBU SJP DEC.21/05
4 REVISED AS PER CITY COMMENTS (Sept.16/05) GBU MAF OCT.28/05
3 REVISED WATER DISTRIBUTION NETWORK GBU S.J.P. AUG 09/05
2 REVISED POND 1 AREA NI MAF JUNE 09/05
1 REVISED LOTTING FOR TARTAN AND MATTAMY BCB SJP JAN.18/05
Revision By Appd. Date
File Name:
Dwn. Chkd. Dsgn. Date
Seals
Client/Project
Kanata West Concept Plan
Master Servicing Study
Ottawa, Ontario
Title
Watermain
Final Concept
Project No. 60400406
Scale 1:7500
0 75 225 375m
Drawing No. WM-1
Sheet 2 of 7
Revision 5


CITY OF OTTAWA - WATER DISTRIBUTION SYSTEM
SUBJECT SITE
GLEN CAIRN P.S. & RES
STITTSVILLE ELEVATED TANK
Abbott/Iber St. Backup P.S.
MOODIE ELEVATED TANK
BARRHAVEN RES. & P.S.
EMR
3W
HIGHWAY 417
HIGHWAY 7
HAZELDEAN RD
CARP RD
PALLADIUM DR
ROBERTSON RD
MOODIE DR
EAGLESON RD
RICHMOND RD
WEST HUNT CLUB RD
CEDARVIEW RD
HWY 417 IC145 RAMP56
2018-06-12_861

APPENDIX C

Wastewater Collection

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area	6.730	**ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.34**	**L/s**
Infiltration / Inflow (Wet)	**1.88**	**L/s**
Infiltration / Inflow (Total)	**2.22**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4	1	4
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**4**	
Average Domestic Flow	**0.01**	**L/s**
Peaking Factor	**3.76**	
Peak Domestic Flow	**0.05**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$		0.00
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow	**0.00**
Peak Institutional / Commercial Flow	0.00
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.00**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**0.35**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**0.39**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**2.27**	**L/s**

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

DSEL

Site Area	6.730	**ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.34**	**L/s**
Infiltration / Inflow (Wet)	**1.88**	**L/s**
Infiltration / Inflow (Total)	**2.22**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7	18	49
Townhouse	2.7	44	119
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4	225	315
2 Bedroom	2.1	225	473
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**956**	
Average Domestic Flow	**3.10**	**L/s**
Peaking Factor	**3.25**	
Peak Domestic Flow	**10.07**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$		0.00
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow	**0.00**
Peak Institutional / Commercial Flow	0.00
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.00**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**3.43**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**10.41**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**12.29**	**L/s**

SANITARY SEWER CALCULATION SHEET

CLIENT: **Formasian Development Corp.**
LOCATION: **1919 Maple Grove Road**
FILE REF: **16-861**
DATE: **11-Aug-20**

DESIGN PARAMETERS

Avg. Daily Flow Res.	280 L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.33 L/s/ha	
Avg. Daily Flow Comm	28,000 L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60 m/s full flowing	
Avg. Daily Flow Instit.	28,000 L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00 m/s full flowing	
Avg. Daily Flow Indust	35,000 L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location: Area ID	Location: Up	Location: Down	Residential: Area (ha)	Number of Units by type: Singles	Semi's	Town's	Apt's	Pop.	Cumulative Area (ha)	Cumulative Pop.	Peak. Fact. (-)	Q_{res} (L/s)	Commercial: Area (ha)	Commercial: Accu. Area (ha)	Institutional: Area (ha)	Institutional: Accu. Area (ha)	Industrial: Area (ha)	Industrial: Accu. Area (ha)	Q_{C+I+I} (L/s)
Hazeldean/Huntmar Trunk Sewer	11	12	113.140	1881				6395.0	113.140	6395.0	3.14	65.16	33.50	33.50		0.00	3.44	3.44	31.9
	12	10	33.730	939				3193.0	146.870	9588.0	2.97	92.37	10.89	44.39		0.00	17.61	21.05	55.6
Maple Grove Road Trunk Sewer	10	10A	36.130	899				3057.0	183.000	12645.0	2.85	116.91		44.39		0.00	12.15	33.20	65.4
Carp River Trunk Sewer	13	10A	38.720	1162				3951.0	38.720	3951.0	3.34	42.74		44.39		0.00	20.24	53.44	81.8
		10A						0.0	0.000	0.0	4.00	0.00	0.75	0.75		0.00		0.00	0.7
	10A	KWPS						0.0	0.000	0.0	4.00	0.00		0.00		0.00		0.00	0.0

Location: Area ID	Location: Up	Location: Down	Infiltration: Total Area (ha)	Infiltration: Accu. Area (ha)	Infiltration Flow (L/s)	Total Flow (L/s)	Pipe Data: DIA (mm)	Slope (%)	Length (m)	$A_{hydraulic}$ (m^2)	R (m)	Velocity (m/s)	Q_{cap} (L/s)	Q / Q full (-)
Hazeldean/Huntmar Trunk Sewer	11	12	164.210	164.210	45.979	143.01	675	0.40	775.0	0.358	0.169	1.55	554.8	0.26
	12	10	62.230	226.440	63.403	211.36	750	0.20	950.0	0.442	0.188	1.13	497.9	0.42
Maple Grove Road Trunk Sewer	10	10A	48.280	274.720	76.922	259.26	825	0.20	1000.0	0.535	0.206	1.20	641.9	0.40
Carp River Trunk Sewer	13	10A	58.960	58.960	16.509	141.08	600	0.25	1000.0	0.283	0.150	1.09	307.0	0.46
		10A	0.750	0.750	0.210	0.86	250	0.35	100.0	0.049	0.063	0.72	35.2	0.02
	10A	KWPS		334.430	93.640	755.57	1050	0.20	30.0	0.866	0.263	1.47	1273.7	0.59

SANITARY SEWER CALCULATION SHEET

CLIENT: **Formasian Development Corp.**
LOCATION: **1919 Maple Grove Road**
FILE REF: **16-861**
DATE: **12-Jun-18**

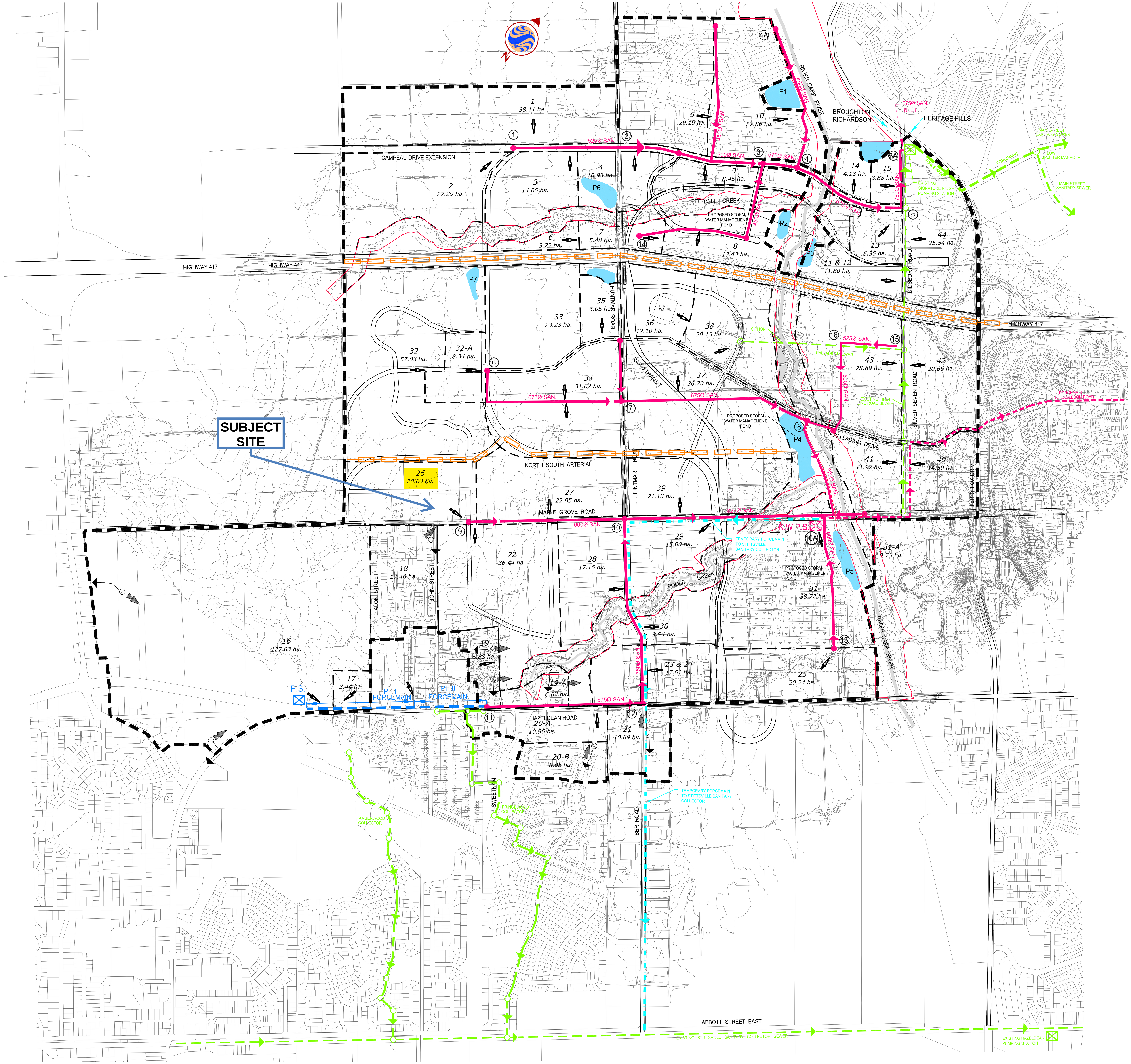
DESIGN PARAMETERS

Avg. Daily Flow Res.	350 L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.28 L/s/ha		
Avg. Daily Flow Comm	50,000 L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60 m/s full flowing		
Avg. Daily Flow Instit.	50,000 L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00 m/s full flowing		
Avg. Daily Flow Indust.	35,000 L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013		

Location			Residential Area and Population										Commercial		Institutional		Industrial			Infiltration				Pipe Data								
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative		Peak.	Q_{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q_{C+I+I}	Total	Accu.	Infiltration	Total	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full	Qres
									Area	Pop.	Fact.			Area		Area		Area		Area	Area	Flow	Flow									
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)	(L/s)
Maple Grove Road Trunk Sewer	9	10	102.660	2823				9598.0	102.660	9598.0	2.97	115.57		0.00		0.00		0.00	0.0	102.660	102.660	28.745	144.31	600	0.40	775.0	0.283	0.150	1.37	388.3	0.37	244.0
	10	10A	220.460	4881				16595.0	323.120	26193.0	2.54	269.03	45.14	45.14		0.00	53.44	53.44	82.5	333.170	435.830	122.032	473.54	825	0.20	1000.0	0.535	0.206	1.20	641.9	0.74	168.4
	10A	KWPS						0.0	323.120	26193.0	2.54	269.03		45.14		0.00		53.44	82.5	0.000	435.830	122.032	473.54	1050	0.20	30.0	0.866	0.263	1.41	1221.2	0.39	747.7

Preferred Waste-Water Master Servicing Study

Kanata West Master Servicing Study



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CCL/IBI
Cumming Cockburn Limited
1770 WOODWARD DR., OTTAWA (613)225-1311

Legend

- ULTIMATE MAJOR DRAINAGE LIMIT
- SUBCATCHMENT AREAS
- PROPOSED TRUNK SEWER
- PROPOSED FORCEMAIN
- TEMPORARY FORCEMAIN
- PROPOSED STITTSVILLE PUMPING STATION AND FORCEMAIN
- EXISTING TRUNK SEWER
- MAJOR DRAINAGE SPLIT
- NODES
- EXISTING PUMPING STATION AND FORCEMAIN (TO BE DECOMMISSIONED)
- 44 25.54 ha. INPUT POINT AND AREA IN HECTARES
- EXISTING PUMPING STATION GRAVITY OUTLET

	Revision	By	Appd.	Date
5	REVISED FOR DEC.21/05 SUBMISSION	G.B.U.	S.J.P.	05:12:21
4	REVISED TRUNK SEWER FROM 16 TO KWPS	R.W.W.	R.W.W.	05:10:05
3	ARROWS FOR EXIST. PUMP STATIONS ADDED	R.W.W.	R.W.W.	05:08:09
2	REPORT JUNE 2005	R.W.W.	R.W.W.	05:06:07
1	REPORT APR. 2005	R.W.W.	R.W.W.	05:04:20

File Name:

Dwn. Chkd. Dsgn. Date

Seals

Client/Project

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

Title

Preferred Waste-Water Option

Project No. 60400406

Scale 1:7500 0 75 225 375m

Drawing No. S-I

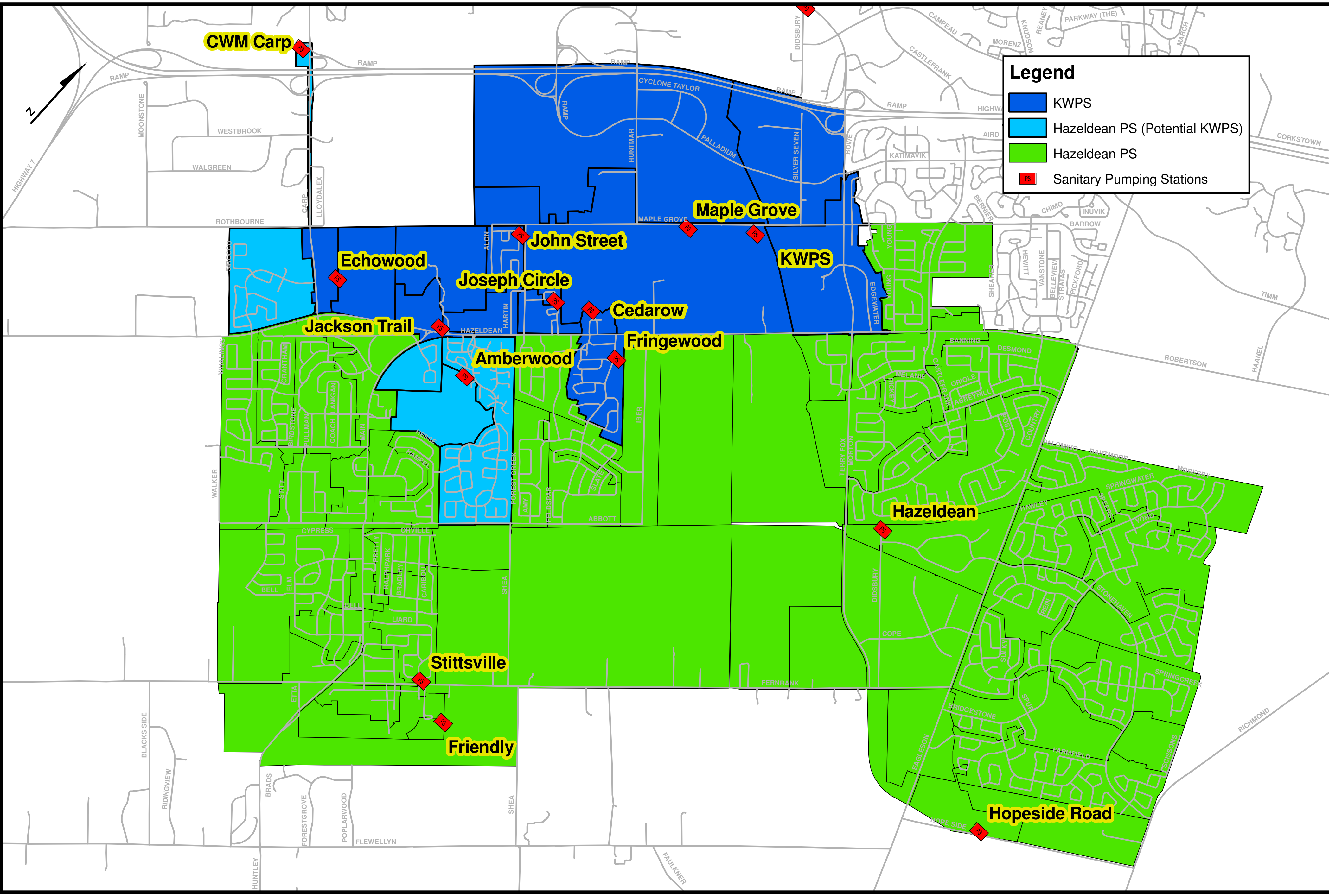
Sheet 7 of 7

Revision 5

KWMSS Drainage Allocations

Stantec Consulting Ltd.

August 2012
1634-01026



1:40,000

0 500 1,000 2,000 Meters

Stantec

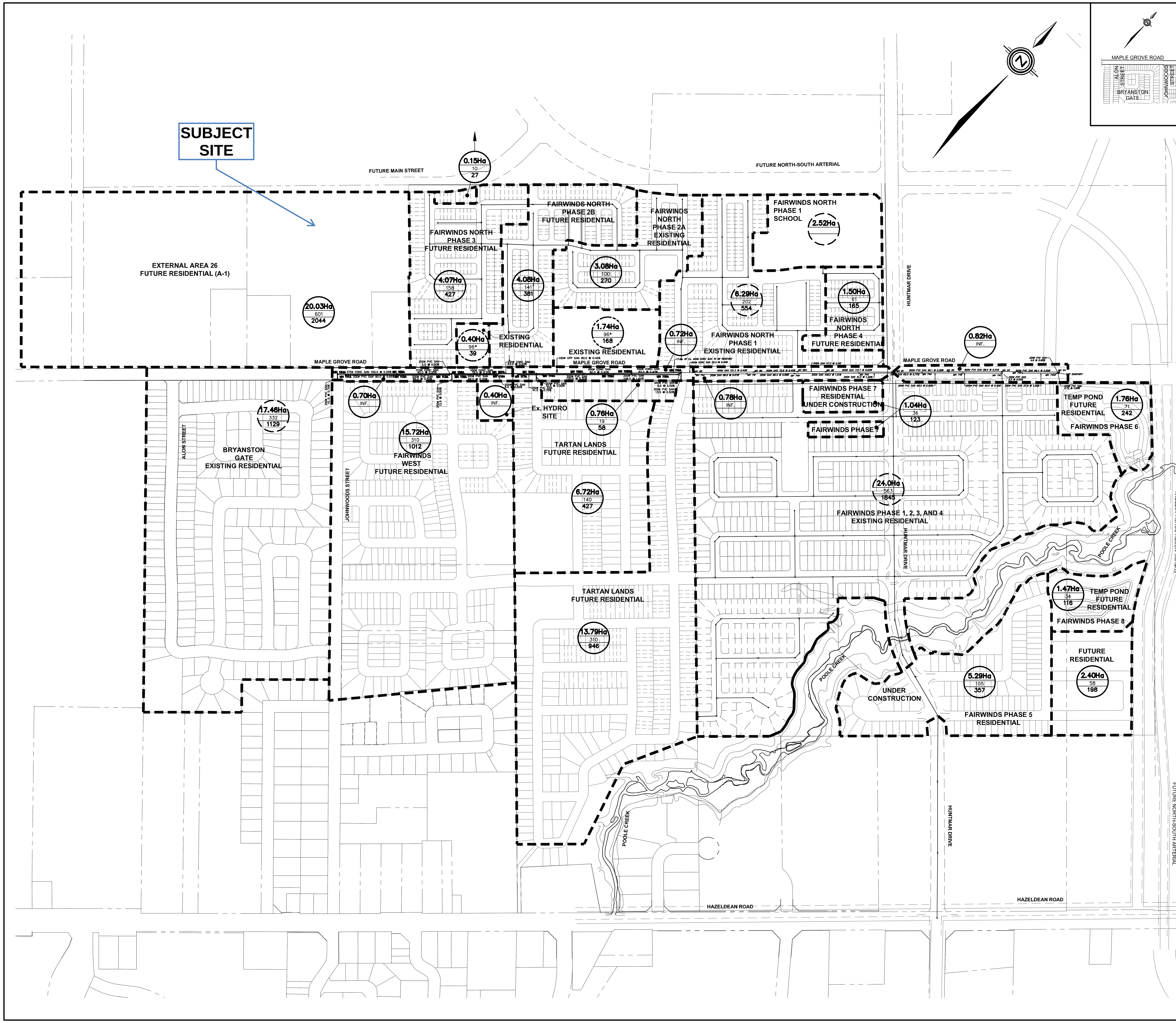
Client/Project City of Ottawa
WUCWC (1634-01026)

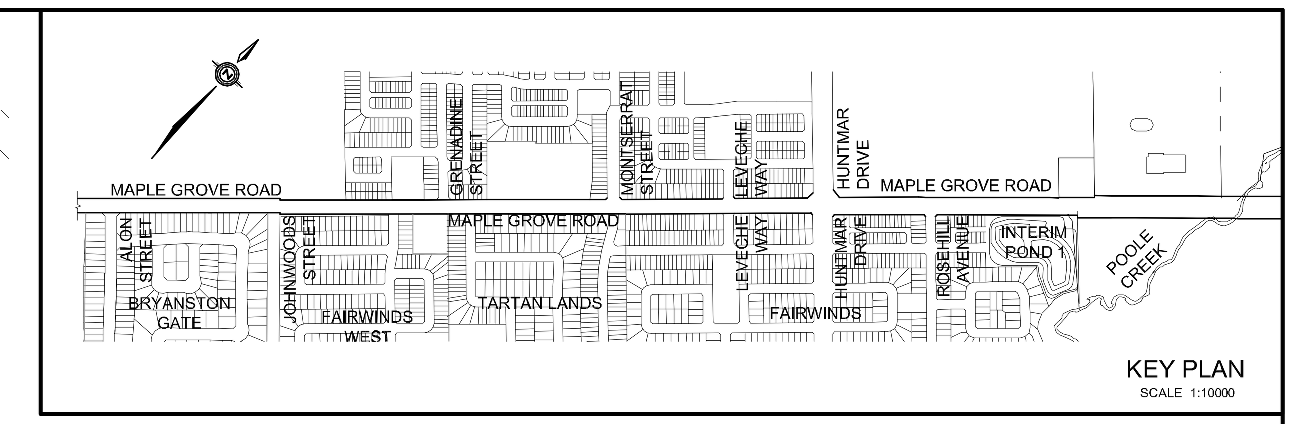
Figure No. 2

Title KWMSS Drainage Allocations

Sanitary Drainage Plan (Project No. 10-451)
Reconstruction of Maple Grove Road

David Schaeffer Engineering





LEGEND

0.82Ha / 20 / 111 — DRAINAGE AREA IN HECTARES; UNIT NUMBER; POPULATION (3.4 PERSON PER UNIT FOR SINGLE HOUSE). (2.7 PERSON PER UNIT FOR TOWNHOUSE).

0.40Ha / 96* / 39 — EXISTING DRAINAGE AREA IN HECTARES; DENSITY (PERSONS PER HA); POPULATION

0.82Ha / 111 — EXTERNAL DRAINAGE AREA IN HECTARES; POPULATION

SANITARY SEWER TRIBUTARY BOUNDARY

SANITARY TRIBUTARY SUB-CATCHMENT BOUNDARY

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 05-10-439-02, SURVEY DATED JULY 6, 2011 AND PROJECT No. 0X-10-628-02, SURVEY DATED NOVEMBER 27, 2008 AND PROJECT No. 06-10-561-01-00, SURVEY DATED FEBURARY 24, 2008 AND PROJECT No. 06-10-628-00, SURVEY DATED MARCH 29, 2007.

TOPOGRAPHIC INFORMATION PROVIDED BY STANTEC CONSULTING LIMITED AND WEBSTER & SIMMONDS SURVEYING LIMITED, FILE No. 161610660-111 RECEIVED ON DECEMBER 1, 2006.

LEGAL INFORMATION

CALCULATED R-PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 07-10-820-00, SURVEY DATED MAY 30, 2012.

BENCH MARK No. 0011988U502

TOWNSHIP: STITTSVILLE
CONCRETE CULVERT ALONG HAZELDEAN ROAD, 1.3 KM NE OF ROAD INTERSECTION WITH MAIN ST NORTH. BRASS CAP SET ON TOP OF CONC CULVERT, SOUTH SIDE OF THE ROAD, 30 CM WEST OF EASTERLY EXTREMITY, 30 CM NORTH OF THE SOUTH FACE, SLIGHTLY BELOW ROAD LEVEL.
ELEVATION = 106.039 m

No.	BY	DATE	DESCRIPTION	BY
5	Z.L.	13-01-04	REVISED SANITARY BETWEEN MH's 105A-107A, 112A-106A, 115A-116A, 118A-119A	
4	Z.L.	12-05-31	4th SUBMISSION	
3	Z.L.	12-04-13	3rd SUBMISSION	
2	Z.L.	12-02-14	2nd SUBMISSION	
1	Z.L.	11-08-02	1st SUBMISSION	

CITY OF OTTAWA

PROJECT No. 10-451

LICENSED PROFESSIONAL ENGINEER
Z. LI
13-01-04
PROVINCE OF ONTARIO

SANITARY DRAINAGE PLAN

MATTAMY (FAIRWINDS NORTH) LIMITED

RECONSTRUCTION OF MAPLE GROVE ROAD

david schaeffer engineering ltd
120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

DRAWN BY: W.L./C.M.	CHECKED BY: K.M.	DRAWING NO.	SHEET NO.
DESIGNED BY: K.M.	CHECKED BY: Z.L.		6
SCALE: 1:3000	DATE: JULY 2011		

SANITARY SEWER CALCULATION SHEET

Ottawa

Manning's n=0.013

LOCATION: STREET	LOCATION: FROM M.H.	LOCATION: TO M.H.	RESIDENTIAL: AREA (ha)	RESIDENTIAL: UNITS	RESIDENTIAL: POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	COMM AREA (ha)	COMM ACCU. AREA (ha)	INDUST AREA (ha)	INDUST ACCU. AREA (ha)	INSTIT AREA (ha)	ACCU. AREA (ha)	C+I+I PEAK FLOW (l/s)	INFILTRATION TOTAL AREA (ha)	INFILTRATION ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	PIPE DIST (m)	PIPE DIA (mm)	PIPE SLOPE (%)	PIPE CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
MAPLE GROVE ROAD																											
			20.03	601	2044	20.03	2044										20.03	20.03									
	104A	105A	17.46	332	1129	37.49	3173	3.42	43.96								17.46	37.49	10.497	54.46	100.0	375	0.25	87.67	0.62	0.79	0.83
	105A	106A	0.70	0	0	38.19	3173	3.42	43.96								0.70	38.19	10.693	54.65	101.0	375	0.25	87.67	0.62	0.79	0.83
			0.40		39	38.59	3212										0.40	38.59									
			0.40	0	0	38.99	3212										0.40	38.99									
	106A	107A	15.72	310	1012	54.71	4224	3.31	56.64								15.72	54.71	15.319	71.96	70.0	450	0.20	127.50	0.56	0.80	0.82
	107A	108A	0.72	0	0	55.43	4224	3.31	56.64								0.72	55.43	15.520	72.16	63.0	450	0.20	127.50	0.57	0.80	0.82
	108A	109A	6.72	140	427	62.15	4651	3.27	61.61								6.72	62.15	17.402	79.01	80.0	450	0.40	180.32	0.44	1.13	1.09
	109A	1090A	1.74		168	63.89	4819	3.26	63.64								1.74	63.89	17.889	81.53	80.0	450	0.40	180.32	0.45	1.13	1.10
	1090A	110A				63.89	4819	3.26	63.64								0.00	63.89	17.889	81.53	83.0	450	0.40	180.32	0.45	1.13	1.10
			0.76	19	58	64.65	4877										0.76	64.65									
	110A	Ex. 88	13.79	310	946	78.44	5823	3.18	75.01								13.79	77.68	21.750	96.76	22.0	600	0.40	388.33	0.25	1.37	1.14
	Ex. 88	Ex. 89	0.78	0	0	79.22	5823	3.18	75.01								0.78	78.46	21.969	96.98	101.3	600	0.40	388.33	0.25	1.37	1.14
			4.07	158	427	83.29	6250										4.07	82.53									
			4.08	141	381	87.37	6631										4.08	86.61									
			3.08	100	270	90.45	6901										3.08	89.69									
			2.52			92.97	6901																				
			6.29	202	554	99.26	7455										6.29	95.98									
	Ex. 89	Ex. 89A	1.50	61	165	100.76	7620	3.07	94.76								1.50	97.48	27.294	122.05	72.8	600	0.40	388.33	0.31	1.37	1.21
	Ex. 89A	Ex. 90				100.76	7620	3.07	94.76								0.00	97.48	27.294	122.05	47.2	600	0.40	388.33	0.31	1.37	1.21
	Ex. 90	Ex. 91				100.76	7620	3.07	94.76								0.00	97.48	27.294	122.05	112.7	600	0.62	483.47	0.25	1.71	1.42
			0.82	0	0	101.58	7620										0.82	98.30									
			1.04	36	123	102.62	7743										1.04	98.52									
			1.76	71	242	104.38	7985										1.76	100.28									
			24.00	563	1845	128.38	9830										24.00	124.28									
			2.40	58	198	130.78	10028										2.40	126.68									
			5.29	105	357	136.07	10385										5.29	131.97									
	Ex. 91	Ex. 92	1.47	34	116	137.54	10501	2.93	124.64								1.47	133.44	37.363	162.00	96.1	825	0.28	759.56	0.21	1.42	1.12
	Ex. 92	Ex. 93				137.54	10501	2.93	124.64								0.00	133.44	37.363	162.00	88.9	825	0.51	1025.11	0.16	1.92	1.39
	Ex. 93	Ex. 94				137.54	10501	2.93	124.64								0.00	133.44	37.363	162.00	96.4	825	0.50	1015.01	0.16	1.90	1.39

LICENSED PROFESSIONAL ENGINEER
Z. LI
PROVINCE OF ONTARIO

DESIGN PARAMETERS

Average Daily Flow =	350	l/p/day	Industrial Peak Factor = as per MOE Graph		
Commercial/Institution Flow =	50000	L/ha/da	Extraneous Flow =	0.280	L/s/ha
Industrial Flow =	35000	L/ha/da	Minimum Velocity =	0.760	m/s
Max Res. Peak Factor =	4.00		Manning's n =	0.013	
Commercial/Institution peak Factor =	1.50		Townhouse coeff=	2.7	
			Single house coeff=	3.4	

Designed: K.M.

Checked: Z.L.

Dwg. Reference: Sanitary Drainage Plan, Dwg. No. 6

PROJECT: **RECONSTRUCTION OF MAPLE GROVE ROAD**

LOCATION: **City of Ottawa**

File Ref: 10-451

Date: May, 2012

Sheet No. 1 of 1

451_san3.xls

Economy (E) 25%

The reconstruction of the Signature Ridge Pumping Station is significantly more than the costs to upgrade the existing station.

Caring and Healthy Community (CHC) 25%

In terms of the impact on the Community, there are no significant differences between the two alternatives.

Natural Environment (NE) 14%

There are no significant differences between the two options with respect to impacts to the natural environment. Both alternatives require the construction of an emergency overflow to the Carp River. Impacts to surface water quality as a result of potential station overflows during an emergency situation are not expected to occur. Should an overflow occur for either alternative, the impacts would be mitigated by a SWM pond. Increases in CO_2 emissions as a result of the use of diesel generators during power failures or maintenance procedures will be negligible and are similar in both alternatives.

4.2.6.3 Selection of Preferred Signature Ridge Pumping Station Alternative

Based on the above evaluation, the Signature Ridge Pumping Station Alternative I, station upgrade, is selected as the preferred alternative. This alternative maximizes the use of existing infrastructure and offers the most flexibility in phasing of the works with the least amount of capital expenditure or impacts.

4.2.6.4 Summary

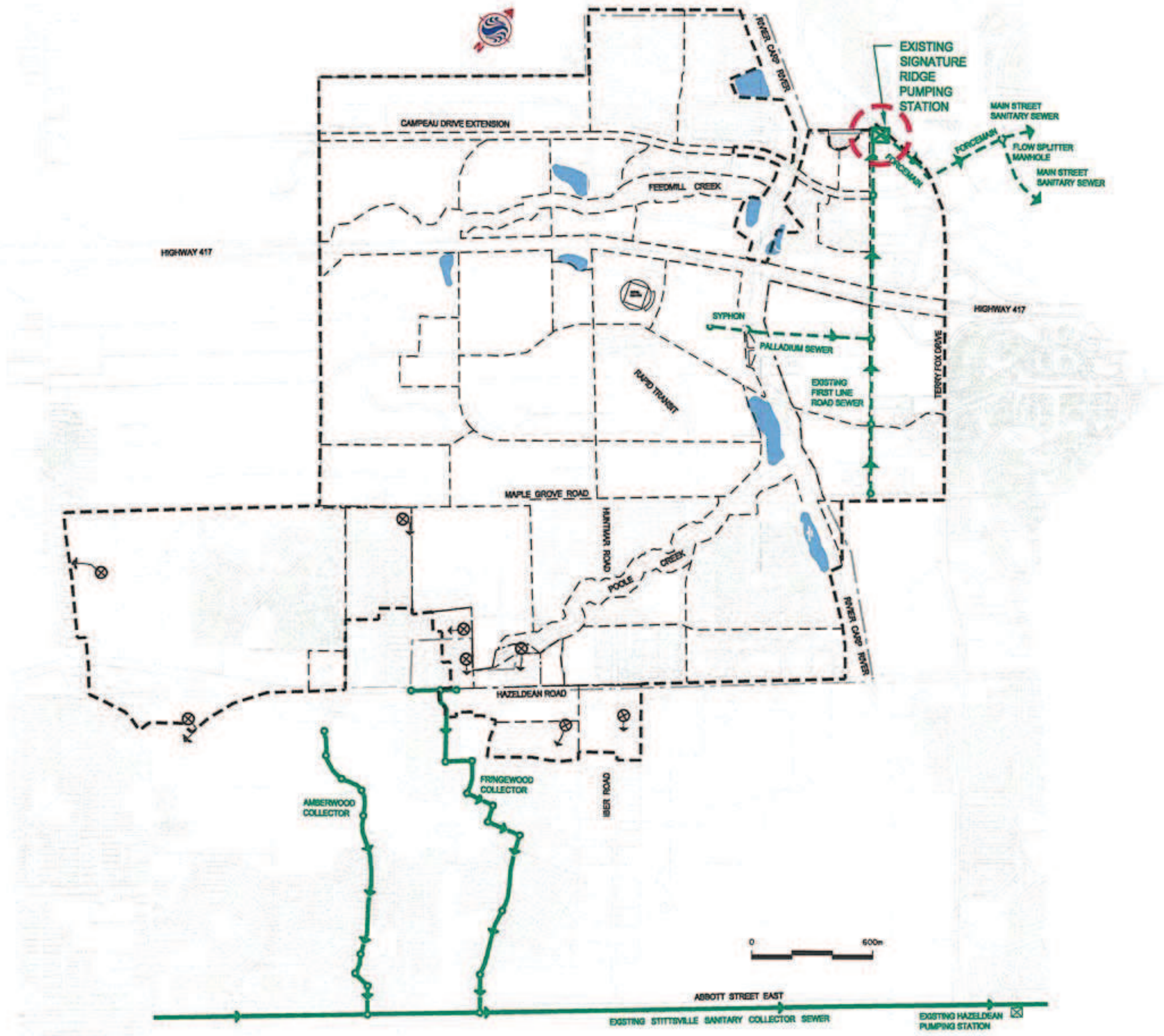
The preferred alternatives selected for the wastewater outlet, the internal servicing system, the temporary forcemain, the trunk sewer alignment, and the Signature Ridge Pumping Station have been used to develop a comprehensive wastewater servicing plan for the KWCP. This servicing plan is discussed in future detail in the following section of this report.

4.3 Preferred Sanitary Sewer Servicing Plan

Section 4.2 has detailed the selection of preferred alternatives for the major infrastructure required to provide sanitary sewer service to the KWCP. These preferred alternatives have been used to develop a Master Sanitary Servicing Plan for the area. This plan is illustrated on **Drawing S-1** (appended to this report). The major features of this plan are:

(i.) An upgraded Signature Ridge Pumping Station (SRPS) to service all the KWCP lands north of the Queensway, the existing urban area north of the Queensway currently proposed to drain to the SRPS, and the Broughton/Richardson Interstitial lands. A spreadsheet detailing the exact areas and flows tributary to the SRPS is included in **Figure 4.2-1**.

The 400 l/sec peak flow capacity identified in **Figure 4.2-1** for the upgraded SRPS, is consistent with the findings of the R.V. Anderson Report titled "Signature Ridge Pumping Station Upgrades Feasibility Study".



SIGNATURE RIDGE PUMPING STATION LOCATION

Legend:

- Ultimate Drainage Limit
- Existing Stittsville Sewer
- Existing Trunk Sewer
- Existing Pumping Station and Forcemain (To be Decommissioned)

Stantec

CCL Cumming Cockburn Limited /IBI

MAY 2006

FIG. 4.1-9

TABLE 4.1-6

CCL/IBI

Kanata West Wastewater - Temporary Forcemain/Trunk Sewer/Signature Ridge Alternatives

Criteria		Indicators	Weighting	Rationale for Relative Weights	Signature Ridge PS Alternative	
					Upgrade	Rebuild
CONSTRUCTABILITY/FUNCTIONALITY			36%		24	16
CO1.1	Geotechnical Issues and Construction Risks	Potential for encountering poor soils and/or elevated groundwater conditions.	7%	Alt. II requires reconstruction of the pumping station in very soft clays where Alt. I does not require reconstruction of the wet well.	3	1
CO1.2	Infrastructure Requirements	Extent of works required.	7%	Alt. I only requires upgrading of hardware within the existing pumping station.	4	1
CO1.3	Operational Impacts	Amount of maintenance intensive infrastructure required.	6%		3	3
CO1.4	Construction Scheduling	Impact of construction on development timing.	4%	Alt. I can be phased to suit development timing where Alt. II requires a lengthy total reconstruction program.	4	2
CO1.5	Property Acquisition	Ease of property acquisition. (Depends on status of lands and adjacent lands, i.e. vacant, leased or owner occupied.)	2%	Alt. II requires property acquisition for a new station because existing station will have to remain in service during construction.	5	2
CO1.6	System Reliability	Proximity of a storm sewer, SWM or other surface water for emergency overflow	6%		3	3
CO1.7	Servicing Flexibility	Ease of accommodating potential changes in servicing plans.	5%	Alt. II can be built to accommodate changes where Alt. I is designed to the maximum.	2	4
ECONOMY			25%		19	12
E1	Potential to Use Combined Service Corridor	Length and area of combined service corridor.	6%		3	3
E2	Efficiency of Use of Existing Infrastructure	Use of exisitng capacity	5%	Alt. I maximizes the use of the existing station.	5	2
E3	Energy Consumption	Pumping requirements	4%		3	3
E5	Impact on Agriculture	Agriculture area likely to be affected by infrastructure.	2%		3	3
E9	Capital Cost	Estimated cost of construction.	8%	Alt. II is significantly more expensive to construct.	5	1
CARING AND HEALTHY COMMUNITIES			25%		12	9
C3	Displacement of Residents, Community/Recreation Features and Institutions.	Affects areas of residence, institutions or businesses.	6%		4	4
C4	Disruption to Existing Community	Extent of works affecting existing residences and businesses and visibility of additional infrastructure.	11%	Alt. 1 requires only internal up-grades and will have minimal construction traffic or related impacts.	4	3
C9	Consistency with Planned Land Use and Infrastructure	Compatibility with City land use, design guidelines and infrastructure servicing corridor planning (Kanata West Roadwork Environmental Study Report and Storm Sewer and Watermain Needs).	8%	Alt. I maximizes use of currently planned infrastructure by upgrading existing station to its maximum potential.	4	2
NATURAL ENVIRONMENT			14%		14	14
N1	Impact on Significant Natural Features	Loss of natural area due to installation of works.	3%		3	3
N3	Impact on Aquatic Systems	Potential impact on fish habitat due to installation of works.	3%		3	3
N4	Impact on Quality and Quantity of Surface Water and Groundwater	Potential impact on water quality in the Carp River resulting from rare emergency overflows to the SWM pond due to pump station failure.	3%		3	3
N5	Impact on Global Warming	Difference in carbon dioxide emissions resulting from occasional use of diesel generator.	1%		2	2
N6	Effects on Urban Greenspace, Open Space and Vegetation (i.e.trees,shrubs,etc.)	Disruption to greenspace and trees.	5%		3	3
Total Score			100%		3.60	2.48
Ranking					1	2
Estimated Capital Cost (in $million)					1	4

Evaluation Ranking
1 -2 High or Negative Impact
3 Moderate or No Impact
4-5 Low or Positive Impact

Description of Alternatives
Signature Ridge PS Alternative 1 - Rebuild
Signature Ridge PS Alternative II - Upgrade

The Signature Ridge Pumping Station is currently not equipped with catastrophic failure protection in the form of a gravity overflow. A hydraulic analysis of the proposed sewer system was therefore completed to evaluate the potential for providing a gravity overflow. This analysis demonstrates that catastrophic protection can be provided by gravity. The analysis is included in **Appendix 4.2** and demonstrates that overflows to the existing stormwater management pond on First Line Road and to Pond I can provide the necessary level of protection.

(ii.) A single new pumping station and forcemain located south of Maple Grove Road and west of the Carp River.

This new pumping station ultimately services all the KWCP south of Highway 417, the lands south of the 417 originally tributary to the SRPS, and the lands in the Village of Stittsville, along Hazeldean Road which are currently unserviceable by gravity to the Stittsville Sanitary Sewer System. This new pumping station has also been designed to accommodate the decommissioning of up to eight small public and private pumping stations along Hazeldean Road without deepening the Kanata West system. **Figure 4.2-1** details the exact areas and flows from Stittsville which will ultimately be tributary to the new pumping station. The areas are also illustrated on **Drawing S-1**.

Figures 4.2-3 and 4.2-4 illustrate a conceptual layout and cross-section for the new pumping station and **Appendix 4.3** details the conceptual design of the pumping station.

The new pumping station will temporarily outlet to the Stittsville Collector Sewer via a temporary forcemain in Huntmar Road and Iber Road. This temporary forcemain is designed to accommodate a flow of 190 l/sec (approximately 3,000 units). The temporary outlet will be located entirely within a public right-of-way. The single 405 mm diameter forcemain used for the initial outlet can be kept in service for long-term use as an emergency back up outlet. Rationale on the availability of capacity in the Stittsville Collector Sewer is attached as **Appendix 4.1**.

The permanent outlet for the new pumping station consists of a forcemain leading from the pumping station to the Glen Cairn Collector Sewer east of Eagleson Road. The preferred route for this forcemain in along Maple Grove Road to Silver Seven Road; along the east side of Silver Seven Road, in an easement, in the undeveloped lands between Maple Grove Road and Palladium Drive; easterly along Palladium Drive to Katimavik Road; and easterly along the north side of Katimavik Road, in the corridor for the unbuilt westbound lanes of Katimavik Road, to Eagleson Road and the Glen Cairn Collector Sewer. The location of the new pumping station is in close proximity to Stormwater Management Ponds 4 and 5. This provides catastrophic failure protection to the new pumping station in the form of a gravity overflow. The hydraulic analysis of this overflow system is attached as **Appendix 4.2**.

The preferred sanitary sewer system also includes a gravity sewer, which collects flow from several minor internal sanitary sewers and directs this flow to the new pumping station location. As illustrated on **Drawing S-1** this minor collector sewer runs parallel to the west side of the Carp River corridor between Maple Grove Road and Palladium Drive, crossing under the Carp River by boring beneath the river. The sewer extends northerly to intercept flows from Silver Seven Road and diverts them from the Signature Ridge Pumping Station. The inclusion of this north south sewer is a key element in eliminating the need for double pumping within Kanata

SANITARY SEWER DESIGN SHEET
PROJECT : Kanata West Servicibility Study
LOCATION : CITY OF OTTAWA

PAGE 1 OF 1
PROJECT: 3598-LD-03
DATE: April 2005
DESIGN: JIM
FILE: 3598LD.sewers.XLS

MODEL 1 ULTIMATE (population based criteria..ICI simultaneous peaking)

LOCATION STREET	FROM MH	TO MH		TOTAL AREA (Ha)	RESIDENTIAL APPLIC AREA (Ha)	UNIT/Ha	TOTAL UNITS	POPULATION INDIV	POPULATION ACCUM	PEAK FACTOR	PEAK FLOW (l/s)	EMPLOYMENT/RETAIL/BUSINESS PARK/OPEN SPACES APPLIC AREA (Ha)	ACCUM AREA (Ha)	TOTAL AREA (Ha)	FLOW RATE (l/Ha/d)	PEAK FLOW INDIV (l/s)	PEAK FLOW ACCUM (l/s)	PEAK FLOW TOTAL (l/s)	INFILTRATION AREA (Ha) INDIV	AREA (Ha) CUMUL	TOTAL CUMUL	PEAK FLOW (l/s)	TOTAL FLOW (l/s)	PROPOSED SEWER CAPACITY l/s	VELOCITY (full) m/s	LGTH. (m)	PIPE (mm)	GRADE %	AVAIL. CAP. (%)	HARMON PF	ACTUAL q/Q	va/Vf	ACTUAL VELOCITY (m/s)
Campeau Drive Trunk Sewer	1	2	Area 1 (PBP)	38.11								38.11	38.11		35000	23.16	23.16		38.11	38.11													
			Area 2 (PBP)	27.29								27.29	65.40		35000	16.58	39.74		27.29	65.40													
			Area 3 Ext Employment	14.05								14.05	79.45		50000	12.20	51.94		14.05	79.45													
			Area 4 HP Employment	10.93								10.93	90.38	90.38	50000	9.49	61.42	61.42	10.93	90.38	90.38	25.31	86.73	283.79	1.27	525.0	525	0.40	69.44%		0.306	0.730	0.927
	2	3	Area 5 Residential	29.19	29.19	19	555	1664	1664	3.65	24.58			90.38				61.42	29.19	29.19										3.65			
			Area 9 Ext Employment	8.45							24.58	8.45	8.45	98.83	50000	7.34	7.34	68.76	8.45	128.02	128.02	35.85	129.18	286.61	0.98	700.0	600	0.20	54.93%		0.451	0.830	0.815
	14	3	Area 6/8 Ext Employment	16.65								16.65	16.65		50000	14.45	14.45		16.65	16.65													
			Area 7 HP Employment	5.48								5.48	22.13	22.13	50000	4.76	19.21	19.21	5.48	22.13	22.13	6.20	25.41	148.74	0.91	910.0	450	0.25	82.92%		0.171	0.630	0.571
	3	4							1664	3.65	24.58	0.00	0.00	120.96		0.00	0.00	87.97	0.00	0.00	150.15	42.04	154.59	392.29	1.06	300.0	675	0.20	60.59%	3.65	0.394	0.790	0.839
	4A	4	Area 10 Residential	27.86	27.86	19	529	1588	1588	3.66	23.55								27.86	27.86	27.86	7.80	31.36	148.74	0.91	750.0	450	0.25	78.92%	3.66	0.211	0.660	0.598
	4	5	14 Mixed Use	4.13	1.76	50	88	263	3515	3.38	48.17	2.37	2.37	123.33	35000	1.44	1.44	89.41	4.13	4.13	182.14	51.00	188.58	392.29	1.06	450.0	675	0.20	51.93%	3.38	0.481	0.840	0.892
	Queensway	5	Area 13 Community Retail	6.35								6.35	6.35	6.35	35000	3.86	3.86	3.86	6.35														
			Area 11/12 Mixed Use	11.80	5.02	50	251	752	752	3.88	11.81	6.79	13.14	13.14	35000	4.12	7.98	7.98	11.80	18.15	18.15	5.08	24.88	43.88	0.87	420.0	250	0.50	43.31%	3.88	0.567	0.860	0.762
	5	5A	Area 15 Community Retail	3.88				0	4267	3.31	57.19	3.88			35000	2.36			3.88											3.31			
First Line Road Sewer			Area 44	25.54							57.19	25.54	29.42	165.89	35000	15.52	17.88	115.27	25.54	29.42	229.71	64.32	236.77	519.43	1.14	300.0	750	0.20	54.42%		0.456	0.830	0.945
				229.71							57.19							115.27				64.32	236.77										
Signature Ridge		5A	Area 100 Residential	90.20	90.20	19	1714	5141	5141	3.23	67.35	0.00																		3.23			
Signature Ridge		5A	Area 100 Non-Residential	4.88							67.35	4.88	4.88	4.88	50000	4.24	4.24	4.24	95.08	95.08	95.08	26.62	98.21										
Intersticial Lands & Broughton/Richardson		5A																					65.00										
Total To SRPS	**5A**	**SRPS**		**324.79**	**154.02**		**3136**		**9409**		**124.54**	**170.77**						**119.51**			**324.79**	**90.94**	**399.98**	**580.53**	**1.27**	**30.0**	**750**	**0.25**	**31.10%**	2.98	0.689	0.940	1.197
Palladium Drive Trunk Sewer	6	7	Area 32 (PBP)	57.03								57.03	57.03		50000	49.51	49.51		57.03	57.03													
			Area 32A Park	8.34								8.34	65.37		0	0.00	49.51		8.34	65.37													
			Area 33/34 Ext Employment	54.85								54.85	120.22	120.22	50000	47.61	97.12	97.12	54.85	120.22	120.22												
	7	8	Area 37 Mixed Use	36.70	15.60	50	780	2340	2340	3.53	33.47	21.10	21.10	141.32	50000	18.32	18.32	115.44	36.70	36.70	156.92	43.94	192.85	455.83	1.23	925.0	675	0.27	57.69%	3.53	0.423	0.810	1.000
				156.92	15.60		780		2340		33.47	141.32						115.44	156.92		156.92	43.94	192.85							3.53			
Corel Centre Etc. (Existing Sewer) *		16	Area 35 HP Employment	6.05								6.05	6.05		30000	3.15	3.15		6.05														
		16	Area 36 (Corel Centre)																			30.00											
		16	Area 38 Exten Employment	20.15								20.15	26.20	26.20	14400	5.04	8.19	8.19	20.15	26.20	26.20	7.34	45.52				*Existing*						
First Line Road Sewer	15	16	Area 40 Employment	14.59								14.59	14.59		35000	8.87	8.87		14.59	14.59													
			Area 41 Employment	11.97								11.97	26.56		35000	7.27	16.14		11.97	26.56													
			Area 42 Employment	20.66								20.66	47.22		35000	12.55	28.69		20.66	47.22													
			Area 43 Employment	28.89								28.89	76.11	76.11	35000	17.55	46.25	46.25	28.89	76.11	76.11	21.31	67.56	224.35	1.00	525.0	525	0.25	69.89%		0.301	0.730	0.733
Carp River Trunk	16	8	Nothing To Add	102.31	15.60		780		2340	3.53	33.47	102.31	102.31	102.31	0	0.00	54.44	54.44	0.00	102.31	102.31	28.65	113.08	286.61	0.98	400.0	600	0.20	60.54%	3.53	0.395	0.790	0.776
Carp River Trunk	8	10A	Nothing To Add	259.23	15.60		780		2340		33.47	0.00	0.00	243.63		0.00	0.00	169.87	0.00	139.01	259.23	109.92	305.93	579.95	1.05	550.0	825	0.15	47.25%	3.53	0.528	0.860	0.904
Marle Grove Road Trunk Sewer	9	10	Area 18/19 Exist. Residential	23.34	23.34	19	443	1330	1330										23.34	23.34										3.72			
			Area 22/26/27 Residential	79.32	79.32	30	2380	7139	8469	3.03	103.82								79.32	102.66	102.66	28.74	132.56	405.11	1.39	775.0	600	0.40	67.28%	3.03	0.327	0.740	1.027
Hazeldean/Huntmar Trunk Sewer	11	12	Area 16/20 Residential	99.01	99.01	19	1881	5644	5644	3.20	73.06								99.01	99.01										3.20			
			Area 16/20 Commercial	33.50								33.50	33.50	33.50	50000	29.08	29.08	29.08	33.50	132.51													
			Area 16/20 Open Space	14.13								14.13							14.13	146.64													
			Area 17 Ex. Commercial	3.44							73.06	3.44	36.94	36.94	35000	2.09	31.17	31.17	3.44	150.08	150.08	42.02	146.26	554.82	1.50	775.0	675	0.40	73.64%		0.264	0.700	1.051
	12	10	Area 21 Exist. Employment	10.89								10.89	10.89	10.89	50000	9.45	9.45		10.89	10.89													
			Area 19A Exist Residential	6.63	6.63	19	126	378									9.45		6.63	17.52													
			Area 23/24 Community Retail	17.61								17.61	28.50	28.50	35000	10.70	20.15	51.32	17.61	35.13													
			Area 28/30 Residential	27.10	27.10	30	813	2439	8460	3.03	103.72	0.00	0.00	65.44				51.32	27.10	62.23	212.31	59.45	214.49	519.43	1.14	950.0	750	0.20	58.71%	3.03	0.413	0.800	0.911
Marle Grove Road Trunk Sewer	10	10A	Area 39 Mixed Use	21.13	8.98	50	449	1347				12.15	12.15	77.59	35000	7.38	7.38	58.71	21.13														
			Area 29 Residential	15.00	15.00	30	450	1350	19627	2.66	211.54							58.71	15.00	36.13	351.10	98.31	368.56	669.89	1.21	1000.0	825	0.20	44.98%	2.66	0.550	0.870	1.056
Carp River Trunk Sewer	13	10A	Area 25 Community Retail	20.24								20.24	20.24	20.24	35000	12.30	12.30	12.30	20.24														
			Area 31 residential	38.72	38.72	30	1162	3485	3485	3.39	47.80							12.30	38.72	58.96	58.96	16.51	76.61	320.17	1.10	1000.0	600	0.25	76.07%	3.39	0.239	0.680	0.746
		10A	Area 31A (PBP)	0.75								0.75	0.75	0.75	50000	0.65	0.65	0.65	0.75	0.75	0.75	0.21	0.86	36.69	0.72	100.0	250	0.35	97.65%		0.023	0.340	0.246
Pumping Station 2 to KWPS	**10A**	**KWPS**		**670.04**	**313.70**		**8484**		**25451**		**292.82**	**356.34**						**241.53**			**670.04**	**224.95**	**759.29**	**1273.71**	**1.43**	**30.0**	**1050**	**0.20**	**40.39%**	2.55	0.596	0.900	1.283
STUDY TOTALS				994.83	467.72		11620		34860			527.11																		2.41			

Average Daily Per capita Flow Rate =	350 l/cap/d
Infiltration Allowance Flow Rate =	0.28 l/sec/Ha

Residential Peaking Factor = 1+(14/(4+(P^0.5))), P=Pop. in 1000's, Max of 4

Population density per unit =	3.00
PF For Employment/Retail/Business Park =	1.50

Mixed-Uses Assumes: 15% Community Retail, 42.5% Business Park and 42.5% Residential

Revision No. 1:	April 01, 2005	Revision No. 6:	Oct. 14, 2005
Revision No. 2:	April 11, 2005	Revision No. 7:	Nov. 10, 2005
Revision No. 3:	April 21, 2005	Revision No. 8:	Nov. 11, 2005
Revision No. 4:	June 07, 2005	Revision No. 9:	Apr. 19, 2006
Revision No. 5:	August 10, 2005		

Stantec CCL/IBI

FIG. 4.2-1

SANITARY SEWER DESIGN SHEET
PROJECT : Kanata West Servicibility Stury
LOCATION : CITY OF OTTAWA

PROJECT: 3598-LD-03
DATE: Apr 2005
DESIGN: JIM
FILE: 3598LD.sewers.XLS

PHASE 1 SIGNATURE RIDGE (population based criteria..ICI simultaneous peaking)

LOCATION: STREET	FROM MH	TO MH		TOTAL AREA (Ha)	RESIDENTIAL: APPLIC AREA (Ha)	UNIT/Ha	TOTAL UNITS	POPULATION INDIV	POPULATION ACCUM	PEAK FACTOR	PEAK FLOW (l/s)	EMPLOYMENT/RETAIL/BUSINESS PARK/OPEN SPACES: APPLIC AREA (Ha)	ACCUM AREA (Ha)	TOTAL AREA (Ha)	FLOW RATE (l/Ha/d)	PEAK FLOW INDIV (l/s)	PEAK FLOW ACCUM (l/s)	PEAK FLOW TOTAL (l/s)	INFILTRATION: AREA (Ha) INDIV	AREA (Ha) CUMUL	TOTAL CUMUL	PEAK FLOW (l/s)	TOTAL FLOW (l/s)	PROPOSED SEWER: CAPACITY l/s	VELOCITY (full) m/s	LGTH. (m)	PIPE (mm)	GRADE %	AVAIL. CAP. (%)
Campeau Drive Trunk Sewer	1	2	Area 1 (PBP)	0.00								0.00	0.00		35000	0.00	0.00		0.00	0.00									
			Area 2 (PBP)	0.00								0.00	0.00		35000	0.00	0.00		0.00	0.00									
			Area 3 Ext Employment	0.00								0.00	0.00		50000	0.00	0.00		0.00	0.00									
			Area 4 HP Employment	0.00								0.00	0.00	0.00	50000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	283.79	1.27	500.0	525	0.40	100.00%
	2	3	Area 5 Residential	29.19	29.19	19	555	1664	1664	3.65	24.58			0.00				0.00	29.19	29.19									
			Area 9 Ext Employment	0.00							24.58	0.00	0.00		50000	0.00	0.00	0.00	0.00	0.00	29.19	8.17	32.75	286.61	0.98	700.0	600	0.20	88.57%
	14	3	Area 6/8 Ext Employment	0.00								0.00	0.00	0.00	50000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			Area 7 HP Employment	0.00								0.00	0.00	0.00	50000	0.00	0.00	0.00	0.00	0.00				148.74	0.91	920.0	450	0.25	100.00%
	3	4							1664	3.65	24.58	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	29.19	8.17	32.75	200.67	0.90	150.0	675	0.20	83.68%
	4A	4	Area 10 Residential	27.86	27.86	19	529	1588	1588	3.66	23.55								27.86	27.86	27.86	7.80	31.36	34.00	0.67	750.0	450	0.25	7.76%
	4	5	14 Mixed Use	4.13	1.76	50	88	263	3515	3.38	48.17	2.37	2.37	123.33	35000	1.44	1.44	1.44	4.13	4.13	61.18	17.13	66.74	200.67	0.90	600.0	750	0.20	66.74%
Corel Centre Etc. (Existing Sewer)		15	Area 35 HP Employment	6.05								6.05	6.05		30000	3.15	3.15		6.05										
			Area 36 (Corel Centre)																			30.00							
			Area 38 Exten Employment	20.15								20.15	26.20	26.20	14400	5.04	8.19	8.19	20.15	26.20	26.20	7.34	45.52				*Existing*		
First Line Road Sewer		15	Area 40 Employment	14.59								14.59	14.59		35000	8.87	8.87		14.59	14.59									
			Area 41 Employment	11.97								11.97	26.56		35000	7.27	16.14		11.97	26.56									
			Area 42 Employment	20.66								20.66	47.22		35000	12.55	28.69		20.66	47.22									
			Area 43 Employment	28.89								28.89	76.11	76.11	35000	17.55	46.25	46.25	28.89	76.11	76.11	21.31	67.56	*100.21*	*0.88*	*694.0*	*375*	*0.30*	*32.59%*
Totals South Of Queensway To SRPS	**15**	**5A**		**102.31**	**0.00**		**0**		**0**		**0.00**	**102.31**						**54.44**	**102.31**		**102.31**	**58.65**	**113.08**	**203.90**	**1.24**	**230.0**	**450**	**0.47**	**44.54%**
	Queensway	5	Area 13 Community Retail	6.35								6.35	108.66		35000	3.86	58.29		6.35	6.35									
			Area 11/12 Mixed Use	11.80	5.02	50	251	752	752	3.88	11.81	6.79	115.45	115.45	35000	4.12	62.42	62.42	11.80	18.15	120.46	63.73	137.96	*203.90*	*1.24*	*420.0*	*450*	*0.47*	*32.34%*
	5	5A	Area 15 Community Retail	3.88								3.88	119.33		35000	2.36	64.77		3.88	124.34									
			Area 44	25.54							59.98	25.54	144.87	268.20	35000	15.52	81.73	81.73	25.54	149.88	211.06	89.10	230.81	*519.43*	*1.14*	*300.0*	*750*	*0.20*	*55.56%*
				149.88																		63.73	63.73						
Heritage Hills		5A	Area 100 Residential	90.20	90.20	19	1714	5141	5141	3.23	67.35	0.00							90.20										
Heritage Hills		5A	Area 100 Non-Residential	4.88							67.35	4.88	4.88	4.88	50000	4.24	4.24	4.24	4.88	95.08	95.08	26.62	98.21						
Broughton-Richardson / Interstitial		5A																					65.00						
Total To SRPS	**5A**	**SRPS**		**306.14**	**154.03**		**3136**		**9409**		**127.33**	**152.12**						**85.97**			**306.14**	**115.72**	**394.02**	**625.68**	**1.37**	**30.0**	**750**	**0.29**	**37.03%**

Average Daily Per capita Flow Rate = 350 l/cap/d
Infiltration Allowance Flow Rate = 0.28 l/sec/Ha
Residential Peaking Factor = 1+(14/(4+(P^0.5))), P=Pop. in 1000's, Max of 4
Population density per unit = 3.00
P. F. For Employment/Retail/Business Park = 1.50
Mixed Uses Assumes: 15% Community Retail, 42.5% Business Park and 42.5% Residential

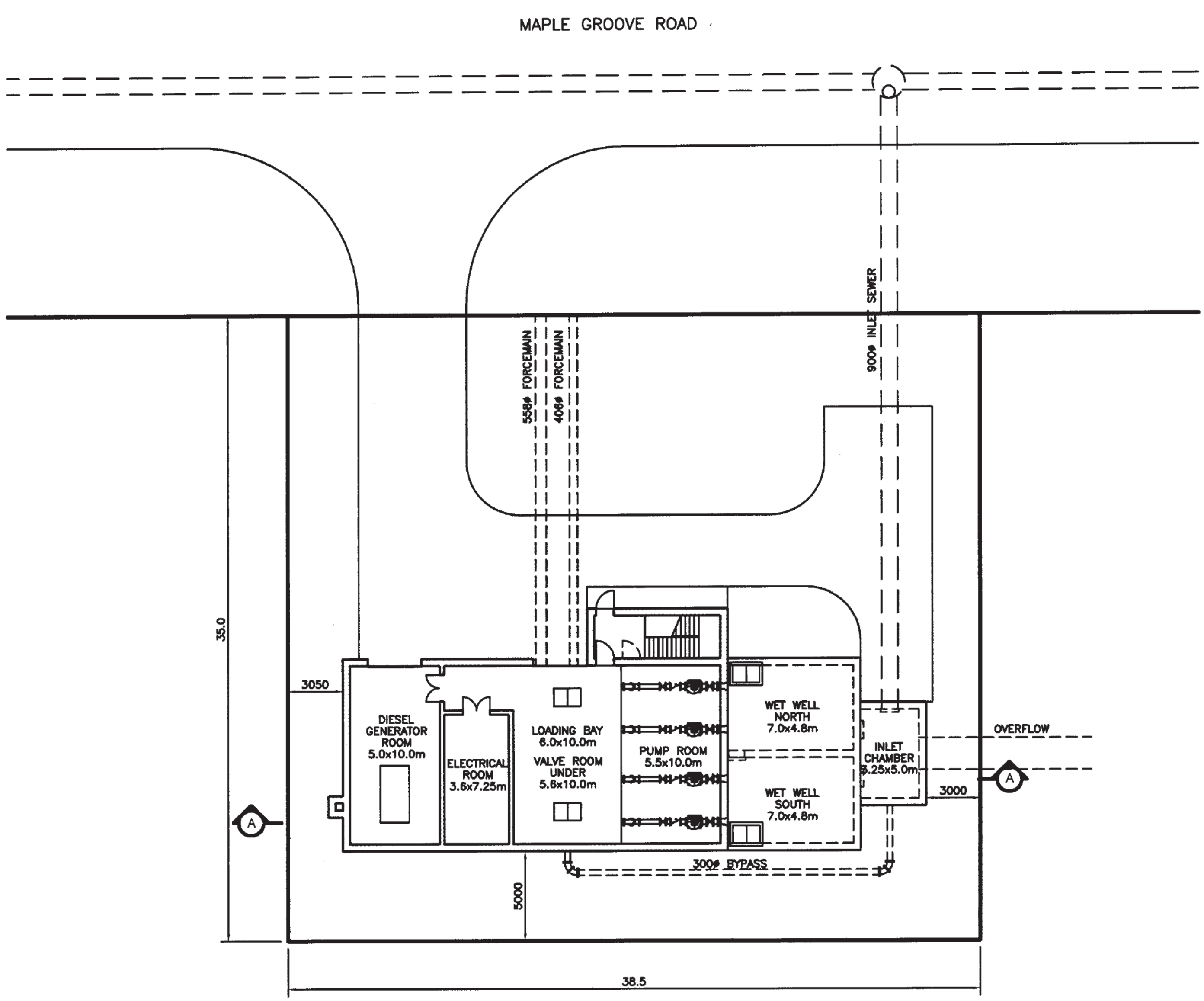
Note: Sewer from node 5 to SRPS is existing and is to be replaced.

Revision No. 1: April 11, 2005
Revision No. 2: April 20, 2005
Revision No. 3: June 07, 2005
Revision No. 4: Oct. 14, 2005
Revision No. 5: Feb. 15, 2006

Stantec CCL/IBI

FIG. 4.2-2

CONCEPTUAL PUMPING STATION SITE PLAN



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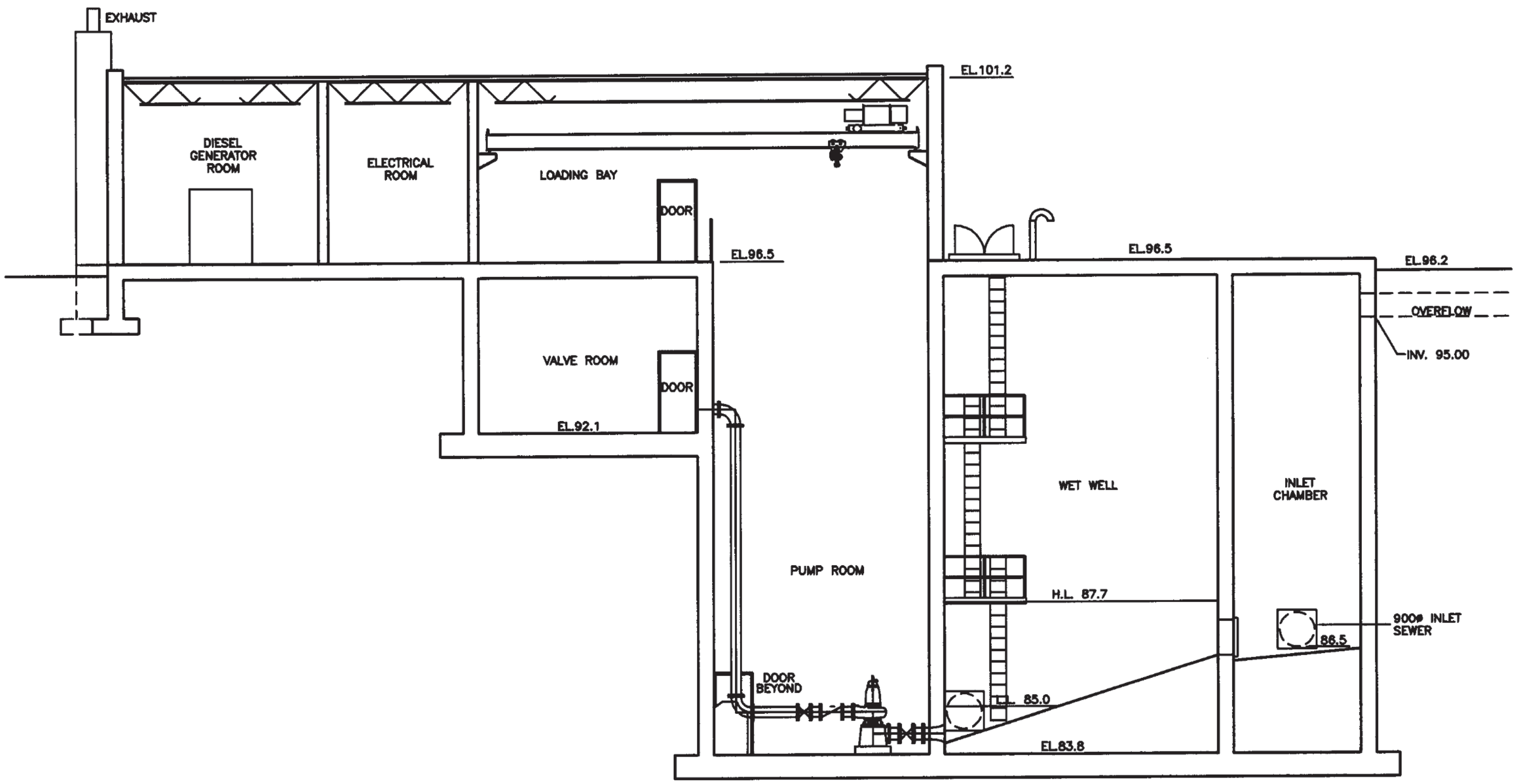
CCL/IBI
Cumming Cockburn Limited

MAY 2006

FIG. 4.2-3

CONCEPTUAL PUMPING STATION SECTION



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MAY 2006

FIG. 4.2-4

West. The alignment of this minor collector sewer in a north-south direct along the east limit of the development area also allows the internal sanitary sewer system to parallel the storm sewer system throughout the development area. This is a critical element in providing a coordinated and cost effective servicing scheme, which can accommodate the phased development of the KWCP over several years. The location of this sewer also facilitates the decommissioning of the Palladium Siphon and avoids placing this sewer in an area of significant fill. It also places the sewer in a designated corridor that can be graded to provide a minimum of 1.5 meters of freeboard between the 1:100 year flood level of the Carp River and the top of the covers in the access chambers. All pond outlets to the Carp River are above the 1:100 year flood plain, as well as the water elevations associated with the historical storm events analyzed in the Flood Characterization and Flood Level Analysis, prepared on CH2MHill. A designated corridor width of 20 meters is recommended for this sewer between Maple Grove Road and Palladium Drive.

Drawing S-1 also illustrates the overall major sanitary sewer system for the entire KWCP including tributary areas, pipe sizes, external pumping stations, which are to be decommissioned, and the proposed outlet location for these existing systems.

A profile of the trunk sanitary sewer system is included in the appendices of this report. These profiles illustrate the proposed elevation of the sanitary sewers relative to the storm sewers demonstrating the coordinated design of these two systems.

4.4 Design Criteria

The following City of Ottawa design guidelines were used in the preparation of the sanitary sewer analysis provided in this report:

Residential Average Daily Flow Rate	350 L/P Day
Residential Peak Factor	Modified Harmon Formula
Business Park Flow Rates	35,000 L/Ha/Day
Employment Area Flow Rate	50,000 L/Ha/Day
Business Park / Employment Peak Factor	1.5
Infiltration Rate	0.28 L/Sec/Day

4.5 Construction Phasing

It is anticipated that the build out of the KWCP will take many years. The high capital cost of the associated infrastructure dictates that a phased construction approach will be required. Servicing studies completed previously for the area have provided the framework for the phased construction of the wastewater system, which included the use of residual capacity in the existing sanitary sewer system in Stittsville. The following is a brief description of the proposed construction phasing plan, which builds on previous studies, incorporates recent construction proposals for the developers group, and incorporates additional, detailed analysis of the existing Stittsville sanitary system.

Figure 4.2-5 illustrates the area identified as Phase I in terms of wastewater servicing. Area "A" includes the area, which will be tributary to the Signature Ridge Pumping Station in the short term. This drainage area ultimately requires the expansion of the Signature Ridge Pumping Station to 400 l/sec, assumes that the lands south of Highway 417 currently draining to this pumping station will continue to do so in the short term, and that these lands will build out. This scheme also accommodates build out of the Broughton/Richardson and Interstitial Lands as part of Phase I (see **Figure 4.2-2** for details of this analysis). A regular flow monitoring program

1.0 Introduction

1.1 BACKGROUND

The Kanata West Pumping Station (KWPS) will serve as the primary pumping facility providing wastewater servicing for the Kanata West Concept Plan (KWCP) development.

Located between Stittsville and Kanata, the KWCP is a major component of urban growth in the western portion of the City of Ottawa. The development is being planned as a mixed-use community that will include a population of approximately 17,000 persons in 6,300 households, 24,000 jobs and approximately 1 million square metres of commercial space. The approved KWCP includes the transportation network and servicing infrastructure required to support the identified land use plan. This includes a rapid transit corridor, a number of primary arterial roads, minor arterial roads, major collector roads, water, sewers, stormwater management and watercourse corridors.

The Kanata West Pump Station and Forcemains will provide sanitary servicing for Kanata West south of Hwy 417 and adjacent areas in Stittsville. The KWPS will convey wastewater from the pumping station to the existing Glen Cairn Trunk Sewer on Eagleson Road. The pumping station location and general operational requirements were specified in the *Kanata West Pump Station and Forcemains Functional Design Report* (Stantec, August 8, 2012) which built on the *Kanata West Concept Plan – Master Servicing Study* (Stantec/CCL IBI Group, 2006) and the *Kanata West Master Servicing Study Update 2010* (Stantec/CCL IBI Group, 2010).

The preliminary design was not advanced after completion of the functional design confirmation until the land for the preferred pump station site was secured and the ultimate station inflow was confirmed in April 2013. Key differences between the functional design and preliminary design are summarized in **Section 2.2**.

1.2 SCOPE OF WORK AND PURPOSE OF REPORT

The purpose of this report and the associated drawings is to present the preliminary design of the KWPS and forcemains including, but not limited to, the following.

- Detail the civil, architectural, process, electrical and instrumentation requirements and preliminary design layout for the KWPS;
- Provide a preliminary process control philosophy for operation and phasing of the pump station;
- Develop preliminary forcemain plan and profile drawings showing the preferred alignment, Carp River crossing, Watts Creek crossing, and major intersection crossings;

- Detail the proposed construction staging and construction impact mitigation measures;
- Provide preliminary geotechnical and hydrogeological recommendations/considerations and their impact on structural design and construction methods;
- Provide an opinion of probable capital construction and operation and maintenance costs for construction of the proposed works;
- Provide a preliminary construction schedule for completion of the proposed works.

1.3 RELATED DOCUMENTS AND REPORTS

The following documents and reports were reviewed during the KWPS preliminary design:

- *Kanata West Pump Station and Forcemains Functional Design Report* (Stantec, August 8, 2012)
- *Kanata West Concept Plan – Master Servicing Study* (Delcan/Stantec/CCL IBI Group, 2006)
- *Kanata West Master Servicing Study Update 2010* (Delcan/Stantec/CCL IBI Group, 2010)
- *Implementation Plan Kanata West Development Area* (Declan, July, 2010)
- *West Urban Community Technical Memorandum* (Stantec, June 28, 2012)
- *West Urban Community – Wastewater Collection System Master Servicing Plan - Study* (R.V. Anderson Limited/Stantec, July 2012)
- *Fernbank Community Sanitary Trunk Sewer Design Report* (Novatech, November 14, 2011)
- *Kanata West Transportation Master Plan Update and Amendment 2010* (Delcan, July 12, 2012)
- *Carp River Restoration Plan – Widening Alternatives* (Greenland, May, 2010)
- *City of Ottawa Sewer Design Guidelines* (City of Ottawa, October 2012)
- *Design Guidelines for Sewage Works 2008* (Ministry of the Environment, 2008)
- *West End Odour and Corrosion Master Plan* (Stantec/OCTC, March, 2004)

2.0 Pumping Station Drainage Area and Design Flows

2.1 CATCHMENT AREA AND DESIGN FLOWS

A technical memorandum titled *Kanata West Pump Station Flow Development Background* (Stantec, June 28, 2012) outlines the KWPS flow projections and associated catchment areas, which is included in **Appendix H**.

The KWPS is expected to receive flows from a large portion of the western community development area. These flows will include diverted flows from the Stittsville and/or Fernbank Trunk Sewers. The exact timing of flow diversions from the Stittsville and/or Fernbank trunk sewers is not known at this time. **Figure 2-1** identifies the catchment area for the KWPS**.**

Since the firm capacity of the station will not be reached until 2031, incoming flows will increase in various phases as summarized below. The phases noted below are based on inflow to the station (not time/years) and are intended to aide City Operations with operational changes to suit increasing flow conditions over the life of the PS. The Phases represent specific flow thresholds at which point operational changes will be required at the pump station for efficient operation.

- **Phase 1:** Immediately following pump station startup, flow is diverted from the existing temporary Fairwinds (Mattamy) pump station located on Maple Grove Rd. to the KWPS (Average Dry Weather Flow: 50L/s; Peak Wet Weather Flow: 134L/s).
- **Phase 2 & 3:** Flow from development growth and diverted flows from the Stittsville and/or Fernbank trunk sewers (Average Dry Weather Flow: 238L/s to 258L/s; Peak Wet Weather Flow: 715L/s to 760L/s). These phases will require operational control modifications at the KWPS, which are described in further detail later in this report.
- **Phase 4:** Ultimate peak inflow to the KWPS from development growth in the catchment areas (Average Dry Weather Flow: 417L/s; Peak Wet Weather Flow: 1250/s).

Table 2-1 below summarizes the influent peak and average flows to the KWPS. The ultimate flows (2031 conditions) are extracted from the *Kanata West Pump Station and Forcemains Functional Design Report (Stantec, August 8, 2012)* and the *West Urban community Sanitary Sewer Servicing Technical Memorandum (Stantec, May 4, 2012)*.

Table 2-1: Station Design Flows

	Pumping Capacity (L/s)	Average Flow (L/s)
Phase 1 (Post KWPS Startup)	525	50
Phase 2	715	238
Phase 3	760	253
Phase 4 (Ultimate)	1250	417

Phase 1 average flow is based on existing data from the Mattamy/Fairwinds PS. Phase 2-4 average flow is based on a factor of 0.33 of the pumping capacity.

Since the exact timing of the phases described above are not known, the preliminary design must account for the station's ability to handle a range of flow conditions. This would allow future development to be accommodated in a cost effective manner to suit projected flows for ultimate conditions without the need for equipment upgrades or reconstruction at great expense. Further details with respect to station operation during the phases are provided later in this report. The phases described above are based on influent flow rates to the station. Permanent inflow monitoring at the station will be used to determine when changes to station operation (i.e. increased setpoints, two wet well operation, etc.) will be implemented.

The KWPS will discharge to the Glen Cairn trunk sewer on Eagleson Road. The capacity of the Glen Cairn trunk sewer to accept the additional flow from the KWPS was reviewed as part of the *West Urban Community – Wastewater Collection System Master Servicing Plan - Study* (R.V. Anderson Limited, July 2012). The timing for when connection to the Glen Cairn trunk sewer would be permitted will need to be reviewed with the City during the detailed design.

It is our understanding that the downstream Tri-Township Collector, which the Glen Cairn Trunk Sewer discharges to, is currently nearing its conveyance capacity. Construction of the North Kanata Trunk (NKT) must be completed prior KWPS startup to ensure adequate capacity is provided within the Tri-Township Collector.

2.2 KEY DIFFERENCES FROM FUNCTIONAL DESIGN TO PRELIMINARY DESIGN

There were several major changes from the functional design to the preliminary design. The key changes and associated notes are summarized below:

- **Pump Station Location**: The PS was moved from the previously identified land parcel as the parcel was determined to be of insufficient size. Additionally, the parcel was located within an area sought after for SWF Pond #5. The new PS site is located west of the SWF Pond #5 and immediately south of Maple Grove Road.

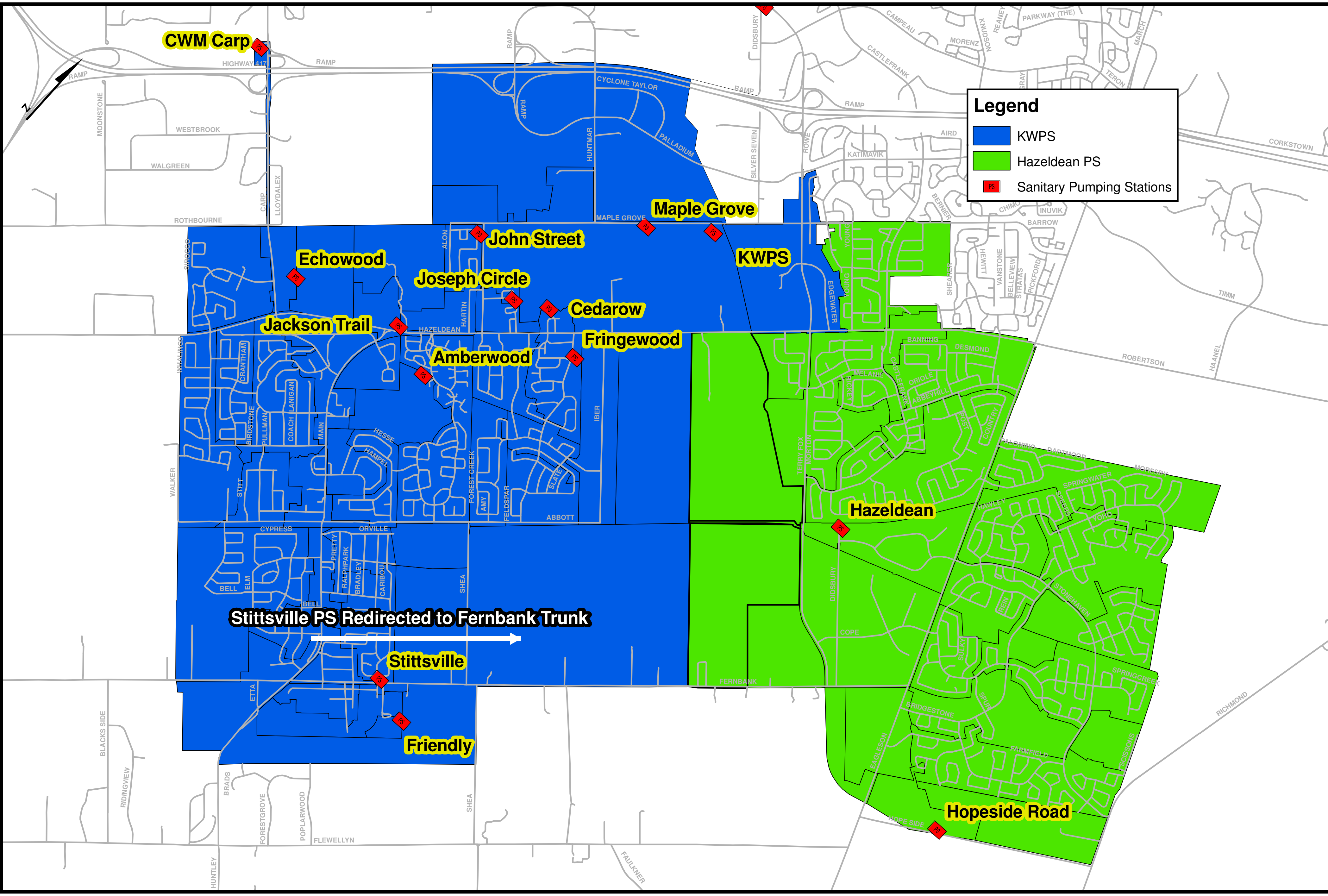
- **Wet Well Elevation**: The elevation was lowered, as requested by City Operations during the functional design TAC meeting, to prevent any backwater impact by the wet well on the incoming sewer. The wet well was lowered by 3.4m.

- **Inlet Flow Monitoring**: Permanent inflow monitoring was included as requested by City Operations during the functional design TAC meeting to track growth in the catchment area and to monitor incoming flows. This will allow for operational modifications (and potential upgrades) as inflows increase.

- **Geotechnical Information**: The preliminary results of the geotechnical investigation found difficult ground and ground water conditions at the PS. Consequently, the opinion of probable cost now includes additional works including rock anchors, piles, watertight shoring (i.e. sheet piling, secant walls, or slurry walls), increased groundwater control systems and unsatisfactory soil disposal. .

- **Wet Well Shape**: A circular wet well is proposed within this preliminary design versus the rectangular shape previously proposed. This is proposed to reduce cost and risk during construction as a result of the poor ground conditions. An analysis between rectangular and circular arrangement will be completed at the detailed design stage.

August 2012
1634-01026



1:40,000

0 500 1,000 2,000 Meters

Stantec

Client/Project	City of Ottawa WUCWC (1634-01026)
Figure No.	2-1
Title	Stittsville & Fernbank Trunks Diverted to KWPS

3.0 Pumping Station and Forcemain Process Design

3.1 DESIGN CONSTRAINTS

The following major design constraints were identified during the preliminary design process:

- The inlet sewer elevation at the MH upstream of the KWPS on Maple Grove (coming from the west) will be E.L 86.78m as set out in the *Kanata West Master Servicing Study Update 2010* (KWMSS*)*;
- The 100 year water level within the adjacent stormwater management pond (Pond #5) is E.L 94.94m as identified in the *KWMSS Update 2010*;
- The pump station and supporting infrastructure must be contained within the allocated property parcel previously agreed to with the Kanata West Owner's Group (KWOG) following completion of the Functional Design by Stantec in 2012;
- Emergency overflow must be in place prior to startup of the KWPS as identified in the *KWMSS Update 2010*; and
- The forcemain alignment and depth along Maple Grove Road at the crossing of the Carp River must be designed to accommodate the future Maple Grove road expansion identified in the *Kanata West Transportation Master Plan Update and Amendment* (Delcan, July 2012).

3.2 DESIGN CRITERIA

The following design criteria have been taken into consideration for the preliminary design of the pumping station and associated works:

- Design should comply with requirements of the *City of Ottawa Sewer Design Guidelines and MOE Design Guidelines for Sewage Works (2008);*
- Equipment and station operation should be as simple as possible to minimize the risk of controller, equipment or Operator error/failure during operation in addition to incorporation of an emergency overflow and redundancy features (i.e. dual forcemains, split wet wells, etc.);
- The design should minimize the impact of construction activities and station operation on the natural heritage features and landscaping;
- The capital and operation/maintenance costs should be minimized while respecting operational and design constraints/criteria;

- The pump station should be able to operate under a wide range of flow conditions as outlined in **Section 2.0** with minimal operator effort required and minimal to no equipment upgrades/construction;
- Minimize the potential for odour production and corrosion as a result of pump station and forcemain operation; and
- The pumping station and site should be designed to blend in with the future surrounding community both functionally and aesthetically.

3.3 INLET SEWER

Inflow to the KWPS will be conveyed by an inlet sewer connecting the sewer along Maple Grove Road to the KWPS. Details regarding the Maple Grove sewer are provided in **Section 4.1**. A 1200mmØ sewer is proposed from a MH on the Maple Grove sewer to the KWPS. The inlet sewer's elevation is dictated by the proposed elevation of the future 825mmØ SAN sewer along Maple Grove east of the KWPS site. The proposed elevation of the sewer in question is E.L 86.78m as indicated on various drawings provided by the City of Ottawa, correspondence with the City of Ottawa during the preliminary design process, and the *KWMSS*.

The inlet sewer hydraulic details are summarized in **Table 3-1.** Additional details regarding the all KWPS pipe sizing is provided in **Appendix B**.

Table 3-1: Inlet Sewer Details

Sewer Location	Details
Inlet Sewer from SAMH#2 (Maple Grove Road) to KWPS	1200mmØ @ 0.20%
	SAMH#2 Invert E.L 86.78m
	Inlet Chamber Invert E.L 86.64m
	Freeflow Capacity = 1744L/s

Permanent inflow monitoring is proposed on the inlet sewer upstream of the KWPS. The flow monitoring system will be housed within a precast chamber on the inlet sewer within the station property.

3.4 PUMPING STATION TYPE SELECTION

The recommended pump station type, based on the recommendation of the *City of Ottawa Sewer Design Guidelines, Section 7.2.2.2* for a station with flows greater than 450L/s and a wet well depth greater than 12m, is a dry pit/wet well with submersible pumps in the dry pit.

In order to improve the City's ability to service the pump station once in operation, it is recommended to have two (2) fully separated wet wells. The pump station will be provided with redundant bar screening channels, with one dedicated to each wet well.

4.0 Pumping Station and Forcemain Civil Design

4.1 MAPLE GROVE SEWER

A new sewer is proposed along Maple Grove Road to convey wastewater from the existing Mattamy/Fairwinds pumping station west of Poole Creek to the KWPS. This sewer will intercept and convey flow currently being directed to the Fairwinds PS as well as future flows diverted from the Stittsville/Fernbank diversion sewer.

The proposed sewer will connect to a previously installed SAMH located immediately west of Poole Creek. An 825mmØ sewer is proposed from the existing SAMH, below Poole Creek to a proposed SAMH#1 east of Poole Creek. SAMH#1 is proposed to be equipped with a stub for the future connection of the Stittsville/Fernbank diversion sewer. From SAMH#1 to a proposed SAMH#2 (on Maple Grove Road immediately north of the KWPS), the pipe is proposed to be 1050mmØ in order to convey the additional future flows from the diversion sewer to the KWPS.

SAMH#2 will be the junction point for the new 1050mmØ sewer coming from the west along Maple Grove and the future 825mmØ SAN coming from the east along Maple Grove. . The proposed elevation of the future 825mmØ SAN is E.L 86.78m at SAMH#2. As such an external drop is proposed on the west side of SAMH#2 for the 1050mmØ sewer.

Based on discussions with a local Contractor, when the 825mmØ was installed on Maple Grove from Fairwinds PS to Poole Creek, the Contractor encountered very poor soil conditions. The soil/groundwater conditions were such that the Contractor ultimately had to install pre-stressed concrete cylinder pipe (PCCP) versus standard reinforced concrete sewer pipe to resist buckling at the joints and uplift during trench installation. Therefore at this preliminary design stage, it is proposed to use similar pipe.

4.1.1 Poole Creek Crossing

In order to cross below Poole Creek, a 70m trenchless installation is proposed. The most suitable trenchless method for the sewer installation will be dependent on the results of the geotechnical investigation currently being completed for this area.

4.2 PUMP STATION

4.2.1 Site Grading

The pumping station will be located immediately west of the future SWF Pond #5 on Maple Grove Rd.

The top of the wet wells and buildings are proposed to be located a minimum of 1.2m above the 100 year flood (E.L 94.94m within Pond #5 as identified in the *KWMSS Update 2010*).

10.0 Approvals and Permitting

10.1 MINISTRY OF THE ENVIRONMENT

10.1.1 Environmental Compliance Approval

An Environmental Compliance Approval (ECA) will be required for the new KWPS (Sewage and Air/Noise) and for the new Maple Grove Sewer (Sewage). The following stages are proposed with respect to obtaining an Environmental Compliance Approval (ECA) for the new KWPS:

- A pre-consultation meeting with the regional MOE office will be held following completion of the preliminary design.

- During the 90% detailed design stage, the ECA application(s) will be submitted and will confirm the final scope of works.

10.1.2 Permit to Take Water (PTTW)

It is anticipated that a PTTW (or potentially multiple PTTWs) will be required for construction of the KWPS, Maple Grove sewer and forcemains. PTTW applications will be completed, following the City's requirements, during the 90% design stage and submitted on behalf of the City of Ottawa. The MOE will issue a draft PTTW(s) in the name of the City, which will be transferred to the Contractor(s) upon commencement of construction.

10.2 MISSISSIPPI VALLEY CONSERVATION AUTHORITY (MVCA) REQUIREMENTS AND APPROVALS

A pre-consultation meeting will be held with the MVCA following completion of the preliminary design to determine the necessary approvals and installation methods for the Poole Creek, Carp River and Watts Creek crossings.

10.3 SITE PLAN CONTROL AND BUILDING PERMIT

A Building Permit will be required since this is a new structure. Coordination with the City of Ottawa and submission of the Building Permit application will be completed during the detailed design stage.

Site Plan Approval would typically be required where the new works includes construction of a new building structure greater than $200m^2$ and construction of a new paved parking area. In the case of the KWPS, it will likely be exempt as it is a City project, however following completion of the preliminary design, the City Site Plan Approvals group will be contacted to confirm. During the 90% detailed design stage, a pre-consultation meeting will be held with City of Ottawa staff to ensure that the proposed design conforms to the Site Plan Approval requirements, even if exempt.

APPENDIX D

Stormwater Management

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012

Target Flow Rate

Area	6.73	ha
C	0.60	Rational Method runoff coefficient
t_c	15.0	min
	5-year	
i	83.6	mm/hr
Q	937.2	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area	0.67	ha
C	0.65	Rational Method runoff coefficient

	5-year					**100-year**				
t_c (min)	**i (mm/hr)**	**Q_{actual} (L/s)**	**$Q_{release}$ (L/s)**	**Q_{stored} (L/s)**	**V_{stored} (m^3)**	**i (mm/hr)**	**Q_{actual}* (L/s)**	**$Q_{release}$ (L/s)**	**Q_{stored} (L/s)**	**V_{stored} (m^3)**
10.0	104.2	126.6	126.6	0.0	0.0	178.6	271.2	271.2	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Total Area	6.06	ha
C	0.65	Rational Method runoff coefficient

	5-year					**100-year**				
t_c (min)	**i (mm/hr)**	**Q_{actual} (L/s)**	**$Q_{release}$ (L/s)**	**Q_{stored} (L/s)**	**V_{stored} (m^3)**	**i (mm/hr)**	**Q_{actual} (L/s)**	**$Q_{release}$ (L/s)**	**Q_{stored} (L/s)**	**V_{stored} (m^3)**
10	104.2	1139.5	310.9	828.6	497.1	178.6	2441.0	666.0	1774.9	1065.0
15	83.6	913.8	311.6	602.2	542.0	142.9	1953.4	666.0	1287.4	1158.7
20	70.3	768.3	312.1	456.2	547.5	120.0	1639.8	666.0	973.7	1168.5
25	60.9	666.0	312.4	353.5	530.3	103.8	1419.6	666.0	753.6	1130.4
30	53.9	589.8	312.8	277.0	498.6	91.9	1255.9	666.0	589.9	1061.7
35	48.5	530.6	313.0	217.6	456.9	82.6	1128.9	666.0	462.9	972.0
40	44.2	483.2	313.3	169.9	407.8	75.1	1027.3	666.0	361.2	867.0
45	40.6	444.3	313.5	130.8	353.2	69.1	943.9	666.0	277.9	750.4
50	37.7	411.8	313.7	98.1	294.3	64.0	874.3	666.0	208.3	624.8
55	35.1	384.1	313.9	70.2	231.8	59.6	815.1	666.0	149.1	491.9
60	32.9	360.3	314.0	46.2	166.5	55.9	764.1	666.0	98.1	353.1
65	31.0	339.5	314.2	25.3	98.8	52.6	719.7	666.0	53.7	209.3
70	29.4	321.2	314.3	6.9	29.0	49.8	680.6	666.0	14.6	61.4
75	27.9	305.0	314.4	0.0	0.0	47.3	646.0	666.0	0.0	0.0
80	26.6	290.5	314.6	0.0	0.0	45.0	615.0	666.0	0.0	0.0
85	25.4	277.4	314.7	0.0	0.0	43.0	587.2	666.0	0.0	0.0
90	24.3	265.6	314.8	0.0	0.0	41.1	562.0	666.0	0.0	0.0
95	23.3	254.9	314.9	0.0	0.0	39.4	539.1	666.0	0.0	0.0
100	22.4	245.0	315.0	0.0	0.0	37.9	518.1	666.0	0.0	0.0
105	21.6	236.0	315.1	0.0	0.0	36.5	498.9	666.0	0.0	0.0
110	20.8	227.7	315.2	0.0	0.0	35.2	481.2	666.0	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

5-year $Q_{attenuated}$	**312.05**	**L/s**	**100-year $Q_{attenuated}$**	**666.02**	**L/s**
5-year Max. Storage Required	**547.5**	**m^3**	**100-year Max. Storage Required**	**1168.5**	**m^3**

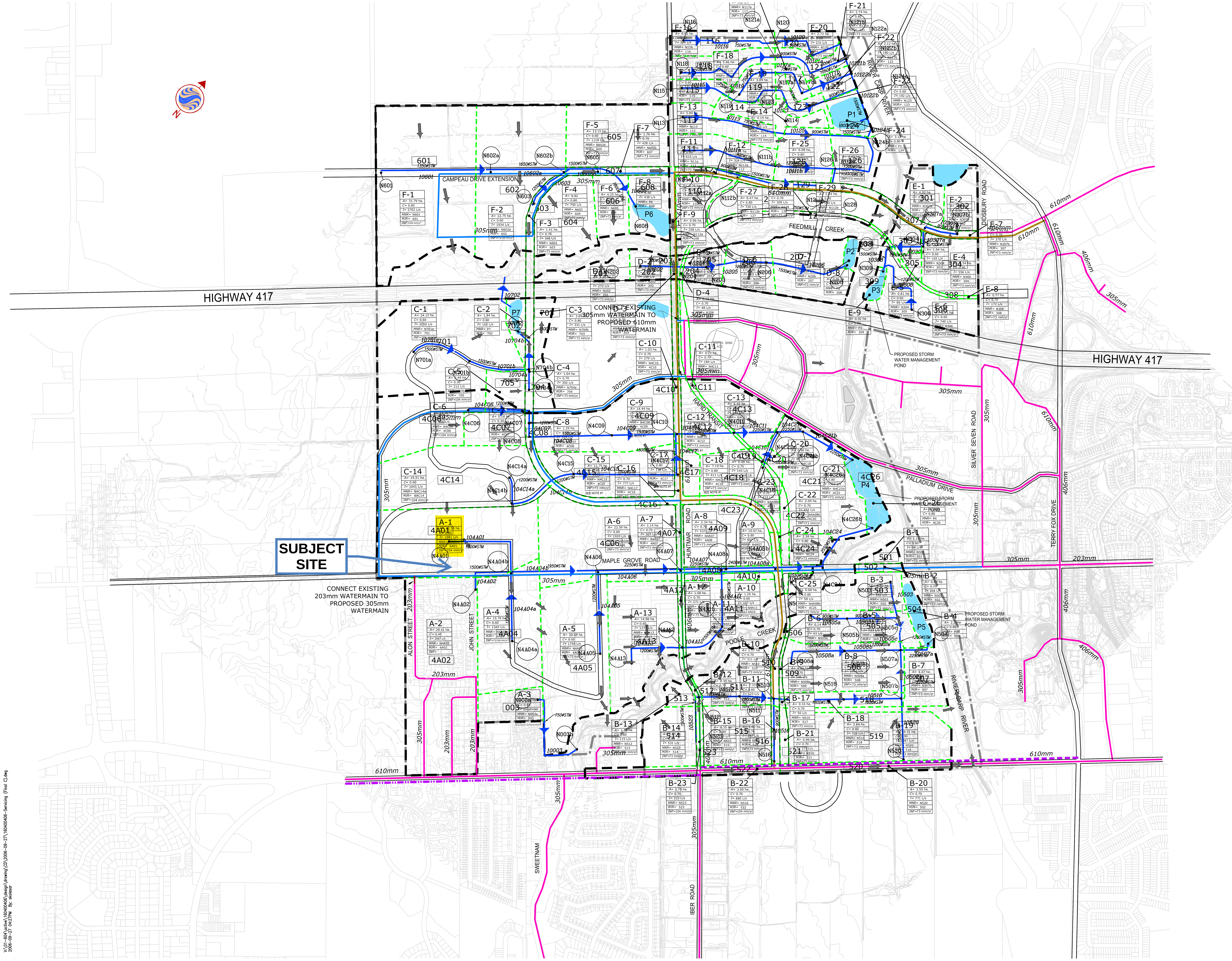
Summary of Release Rates and Storage Volumes

Control Area	**5-Year Release Rate (L/s)**	**5-Year Storage (m^3)**	**100-Year Release Rate (L/s)**	**100-Year Storage (m^3)**
Unattenuated Areas	127	0	271	0
Attenutated Areas	312	547	666	1168
Total	**439**	**547**	**937**	**1168**

								Sewer Data								
Area ID	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**I**	**Q**	**DIA**	**Slope**	**Length**	**$A_{hydraulic}$**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**
	(ha)	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(mm)**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**
A1	2.020	0.65	1.31	1.31	10.0	104.2	380.0	675	0.25	146	0.358	0.169	1.17	420.3	2.1	0.90
A2	0.178	0.65	0.12	1.43	12.1	94.4	374.6	675	0.25	56	0.358	0.169	1.17	420.3	0.8	0.89
					12.9											
A3	2.405	0.65	1.56	1.56	10.0	104.2	452.3	750	0.20	138	0.442	0.188	1.13	497.9	2.0	0.91
A4	0.128	0.65	0.08	1.65	12.0	94.5	432.2	750	0.20	11	0.442	0.188	1.13	497.9	0.2	0.87
A5	0.071	0.65	0.05	1.69	12.2	93.8	441.1	750	0.20	22.5	0.442	0.188	1.13	497.9	0.3	0.89
A6	0.112	0.65	0.07	1.76	12.5	92.5	453.3	750	0.20	40	0.442	0.188	1.13	497.9	0.6	0.91
					13.1											
A7	0.860	0.65	0.56	3.75	13.1	90.1	939.6	900	0.30	101	0.636	0.225	1.56	991.5	1.1	0.95
					14.2											
A8	0.444	0.65	0.29	0.29	10.0	104.2	83.5	375	0.25	101	0.110	0.094	0.79	87.7	2.1	0.95
			0.00	0.29	12.1	94.2	75.5	375	0.25	40	0.110	0.094	0.79	87.7	0.8	0.86
					13.0											
A9	0.460	0.65	0.30	4.34	14.2	86.2	1039.3	900	0.40	36	0.636	0.225	1.80	1144.9	0.3	0.91
					14.5											

Storage Drainage Major System (ST-MJ)

Kanata West Master Servicing Study



Stantec Consulting Ltd.
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Fax. 613.722.2799
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Stantec

Legend

	KANATA–WEST CONCEPT PLAN BOUNDARY
	POND DRAINAGE BOUNDARY
	STORM SEWER DRAINAGE LIMIT
	OVERLAND FLOW DIRECTION
207	OVERLAND FLOW SEGMENT NUMBER

CCL/IBI
1770 WOODWARD DR., OTTAWA (613)225-1311

2	REVISED FOR DEC.21/05 SUBMISSION	GBU	SJP	DEC.21/05
1	REVISED AS PER CITY COMMENTS (Sept.16/05)	GBU	MAF	OCT.28/05
Revision		By	Appd.	Date

File Name: 160400406	LTM	MAF	MAF	AUG./05
	Dwn.	Chkd.	Dsgn.	Date

Seals

Client/Project

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

Title

MODEL SCHEMATIC
STORM DRAINAGE MAJOR SYSTEM

Project No. 60400406

Scale 1:7500 0 75 225 375m

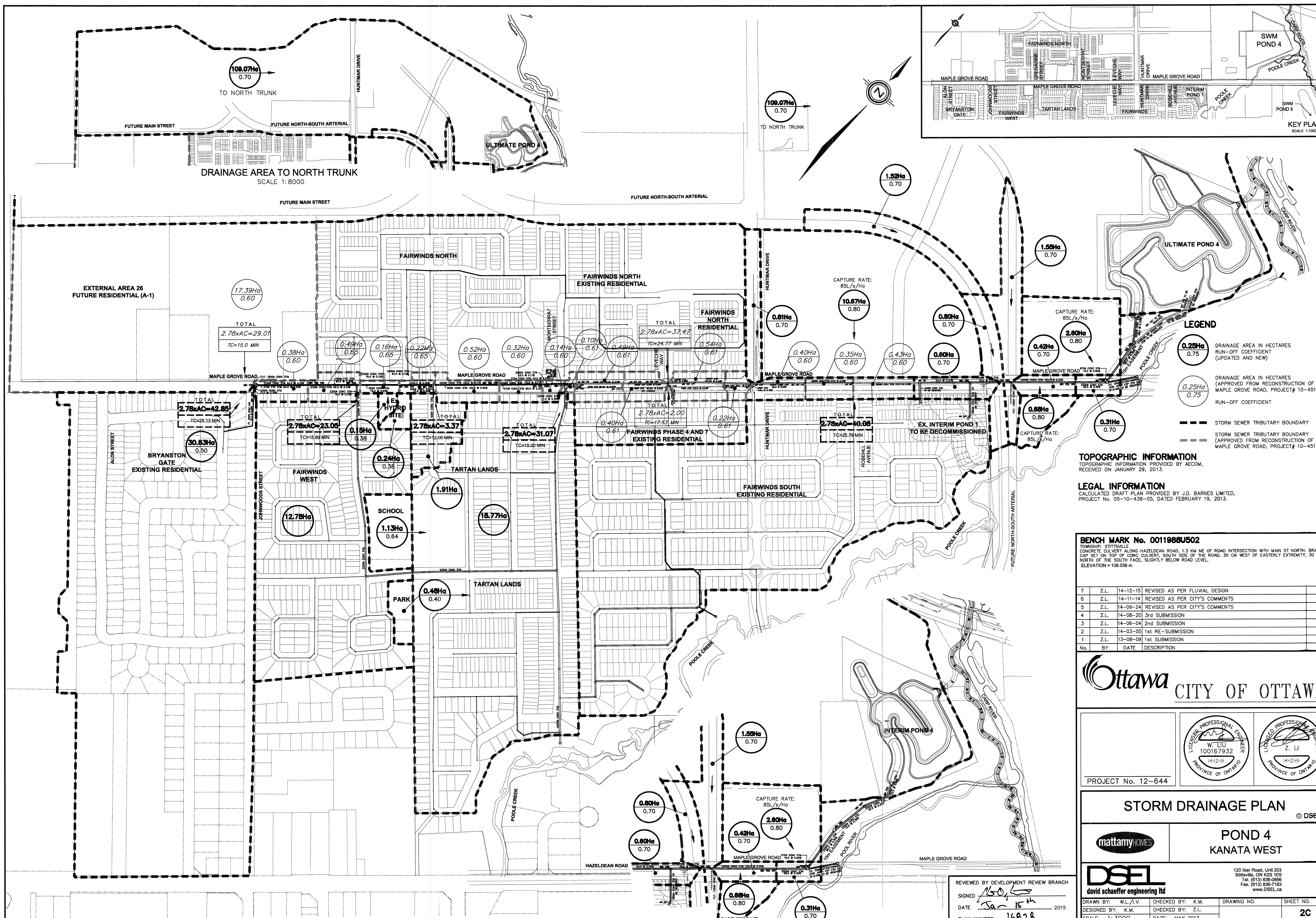
Drawing No. ST-MJ

Sheet 5 of 7

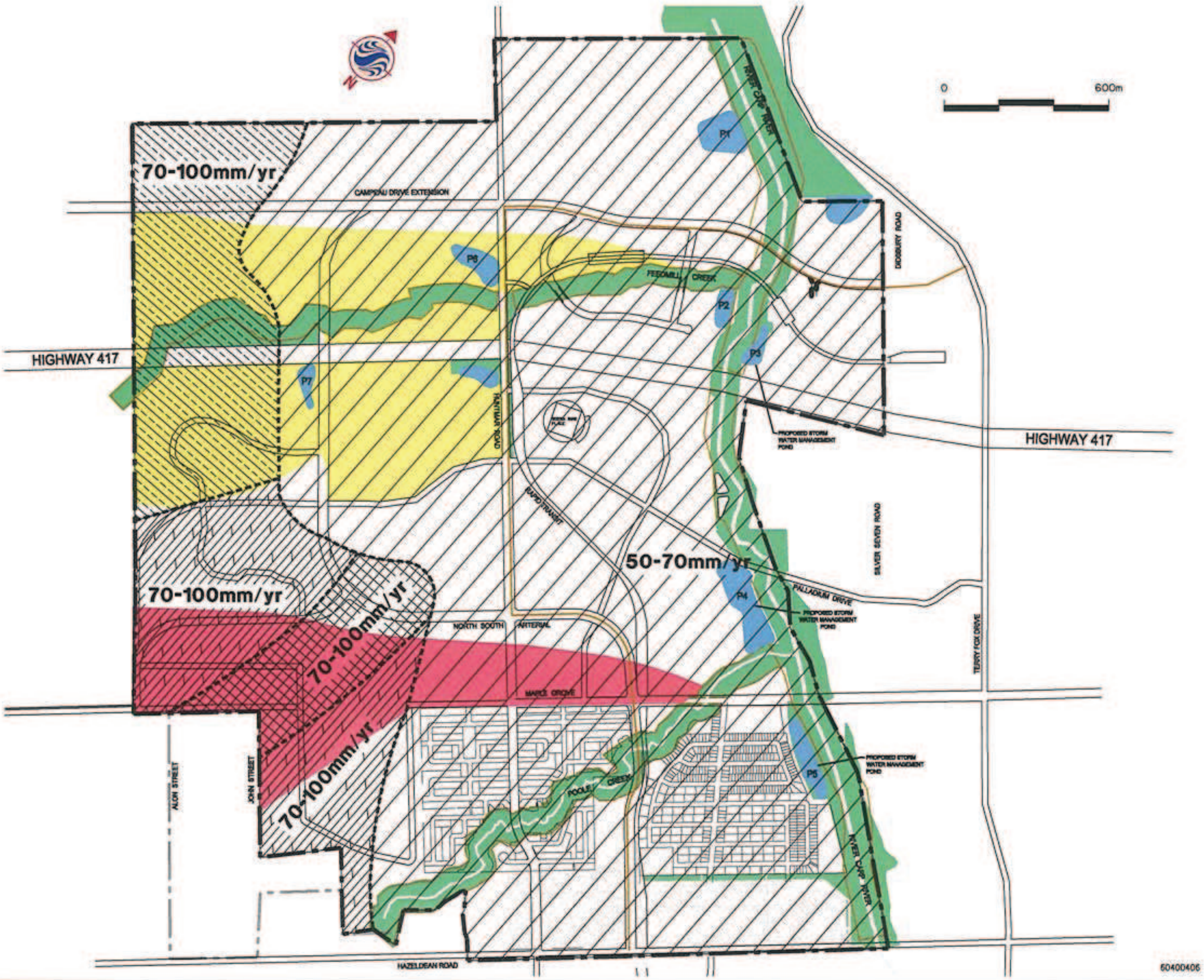
Revision 2

Storm Drainage Plan
Kanata West Pond 4

David Schaeffer Engineering Ltd.



M:\12644\Subm_3\Drawings\02C_644_Stm_Drainage.dwg, 02C, 15/01/2015 11:59:01 AM, VY



INFILTRATION TARGETS

SOIL TYPE	RECHARGE
FINE SAND	MODERATE
PALEOZOIC BEDROCK	MODERATE
TILL	MODERATE
CLAY	LOW

Kanata-West Concept Plan Boundary

Area Tributary To Feedmill Creek (Existing Conditions)

Area Tributary To Maple Grove Ditch System and Poole Creek (Existing Conditions)

OPEN SPACE

NOTE:
SOIL TYPES AND RECHARGE POTENTIAL FROM CARP RIVER WATERSHED/SUBWATERSHED STUDY BY ROBINSON CONSULTANTS INC. 2004.
TARGET INFILTRATION RATES OBTAINED FROM ENVIRONMENTAL FACT SHEETS FROM 2004 REPORT.

Stantec

CCL/IBI

MAY 2006

FIG. 5.4

Table 8B
Summary of SWM Pond 4 Operating Characteristics
(Ultimate, Restrictive Downstream Conditions)

Pond Component	Pond Inflow (1) (m^3/s)	Lower Elevation (m)	Upper Elevation (m)	Volume Used (2) (m^3)	Allowable Outflow (3) (m^3/s)	Pond Outflow (m^3/s)
Permanent Pool	N/A	90.700	93.200	53815	N/A	N/A
Quality Control	N/A	93.200	93.480	11132	N/A	0.056
Extended Detention	N/A	93.480	94.200	43005	N/A	0.279
25 mm 3-Hour Chicago	12.012	93.200	94.190	42537	N/A	0.000
2-Year, 12-Hour SCS	13.488	94.190	94.318	48861	N/A	1.821
5-Year, 12-Hour SCS	19.407	94.318	94.473	56778	N/A	6.294
10-Year, 12-Hour SCS	23.058	94.473	94.552	60907	17.282	9.192
25-Year, 12-Hour SCS	27.772	94.552	94.643	65704	N/A	13.390
50-Year, 12-Hour SCS	30.749	94.643	94.695	68420	N/A	16.745
100-Year, 12-Hour SCS	32.636	94.695	94.739	70723	20.015	19.907
July 1st, 1979 Event	34.833	94.739	94.786	73235	N/A	23.620
August 4th, 1988 Event	33.741	94.739	94.773	72566	N/A	22.614
August 8th, 1996 Event	25.575	94.739	94.673	67271	N/A	15.286

(1) Pond inflow taken as a direct summation of major and minor flows to the pond.
(2) Volumes used are active storage only for all pond components except the permanent pool.
(3) Based quantity control of 10- and 100-year release rates to match ***KWMSS***.

With the proposed controls described in the following sections, the above modelling results show that the actual provided 10- and 100-year release rates do not exceed the allowable release rates simulated in the ***KWMSS*** under interim and ultimate conditions.

The 100-year pond levels of 94.714 m and 94.739 m under interim and ultimate conditions, respectively, do not exceed the 94.74 m level simulated in the ***KWMSS***, and a 0.3 m freeboard above this pond level is provided to the top of berm around the pond at 95.05 m. Note that the maximum pond level is 94.786 m during the July 1st 1979 historical event under ultimate conditions. The elevation of the top of berm (95.05 m) is above this pond level, and thus the water is contained within the pond.

6.0 INTERIM POND COMPONENTS

Refer to the provided ***Drawings 3 and 5 to 8*** for detailed design drawings and cross-sections of Pond 4 and components under interim conditions.

6.1 Sediment Forebay

The proposed facility has been equipped with two sediment forebay(s) in order to improve the pollutant removal by allowing the larger particles to settle out prior to entering the main cell of the pond. Only the south forebay will receive flows requiring treatment under interim conditions, wherein only the south trunk sewer and areas tributary to it are developed. The south forebay has been designed with a length-to-width ratio of greater than 2:1 and does not exceed one-third of the permanent pool area, as required in the ***SWMP Design Manual***.

Pond 4 obtains flows through one 2550 mm diameter circular pipe at 0.3% slope to the south forebay. The forebay has been sized to meet the greater of the settling and dispersion criteria, as stated in the ***SWMP Design Manual***. Calculations for the minimum dispersion length, settling length and the average velocity have been included in Calculation Sheet C-2 of ***Appendix C*** for interim conditions. Note that the forebay does not quite meet average velocity requirements based on the average forebay width, as the width of the forebay has been set to meet City of Ottawa specifications for cleaning and maintenance, such that the access roads are no more than 15.0 m from the centre of the forebay.

The forebay has been provided with a permanent pool of 2.0 m depth to minimize the potential for re-suspension. In accordance with City of Ottawa criteria, the forebay has been graded at 5:1 above the permanent pool level. A permeable forebay berm has been set 0.30 m below the permanent pool water level.

6.2 Permanent Pool

In accordance with the ***SWMP Design Manual***, the pond should have a permanent pool depth between 1.0 and 3.0 metres. The proposed facility has been designed with a permanent pool depth of 2.5 m.

The permanent pool has been sized in accordance with the requirements of the ***SWMP Design Manual***, Table 3.2, normal protection level for wet pond, 37% imperviousness, as follows:

$$(92.00\ m^3/ha - 40\ m^3/ha) \times 278.288\ ha = 14{,}471\ m^3$$

The proposed facility has a permanent pool volume of 29,736 m^3 under interim conditions.

The slopes in the permanent pool will be graded with side slopes of 4:1, with minor localized variations. As per the City of Ottawa design criteria, the side slopes adjacent to the maintenance access road have been graded at 5:1 maximum. In general, and in accordance with the City of Ottawa criteria, the grading above and below the permanent pool elevation has been graded at 5:1 in order to address public safety concerns. The proposed pond grading is shown on ***Drawing 3***.

6.3 Baseflow Augmentation

As requested by MVCA, a vertical circular 200 mm diameter baseflow augmentation orifice at an invert of 93.20 m is provided to control the first 0.2 m of active storage to a drawdown time of 2.4 days under interim conditions. The calculation of baseflow augmentation drawdown time is provided in Tables C-3 and C-4 of ***Appendix C*** for interim conditions

The baseflow augmentation volumes provided are greater than or equal to 10% of the 100-year active storage volume, where:

4044 m^3 baseflow augmentation : 3625 m^3 10% of 100-year active storage

This is consistent with the conceptual design of the ***KWMSS***.

6.4 Quality Control

The extended detention storage has been sized based on 40 m^3/ha in accordance with the ***SWMP Design Manual*** requirements. If the required quality control volume was based on the entire 278.288 ha drainage area to be conservative, it would be calculated as follows:

$$40\ m^3/ha \times 278.288\ ha = 11{,}132\ m^3$$

This required quality control volume is contained within the extended detention volume under interim conditions.

6.5 Extended Detention

A vertical circular 350 mm diameter quality control orifice at an invert of 93.40 m will provide a drawdown time of 2.8 days for the required 11,132 m^3 of water quality volume. The calculation of extended detention drawdown time is provided in Tables C-3 and C-4 of ***Appendix C*** for interim conditions. The pond will operate with a maximum extended detention storage depth of 1.00 m at an elevation of 94.20 m (22,288 m^3) under interim conditions, as per the ***KWMSS***.

The extended detention component has been provided with side slopes of 5:1 with minor localized variations, as illustrated in ***Drawings 5, 5A and 5B***. Side slopes of 5:1 have been applied to the pond area for 3 m on either side of the permanent pool. The extended detention outlet is illustrated on ***Drawings 6*** **to 8**.

6.6 Quantity Control

Quantity control for the 2- to 10-year events under interim conditions will be provided by the top of a 9 m x 3 m drop inlet structure, acting as a 24 m long perimeter weir at an invert of 94.20 m. This weir was added to the design at the City's request to ensure that flow will only spill over the broad-crested weir described below for events exceeding the 10-year level. Note that the elevation of this quantity control weir is equal to the 100-year flood level of 94.20 m at the pond outlet (as per the ***Mississippi Valley Flood Plain Mapping Study***, Cumming-Cockburn and Associates Limited, December 1983).

Quantity control above the 10-year level will be provided under interim conditions by a 30 m long weir (as specified in the ***KWMSS***) set in the pond berm at an elevation of 94.60 m.

Calculations in support of the quantity control weirs are provided in Table C-5 (free outfall conditions), Table C-6 (restrictive downstream conditions) and Calculation Sheet C-1 of ***Appendix C*** for interim conditions. The details of the quantity control weirs are provided in ***Drawing 3***.

6.7 Conveyance of Emergency Overflows

In the event of a blockage or a storm greater than the design horizon, the 30 m long quantity control weir is sufficiently sized to act as an emergency overflow weir.

6.8 Access Road

Access roads, including reinforced grass service roads, have been provided in each facility in order to facilitate routine inspection and maintenance activities. The access road has a constant cross slope of 2%.

7.0 ULTIMATE POND COMPONENTS

Refer to the provided ***Drawings 4 to 8*** for detailed design drawings and cross-sections of Pond 4 and components under ultimate conditions.

7.1 Sediment Forebay

The proposed facility has been equipped with two sediment forebay(s) in order to improve the pollutant removal by allowing the larger particles to settle out prior to entering the main cell of the pond. The forebays have been designed with length-to-width ratios of greater than 2:1 and do not exceed one-third of the permanent pool area, as required in the ***SWMP Design Manual***.

Pond 4 obtains flows through two inlet pipes: one 2550 mm diameter circular pipe at 0.3% slope to the south forebay and one pipe (to be designed by others) to the north forebay. The forebays have been sized to meet the greater of the settling and dispersion criteria, as stated in the ***SWMP Design Manual***. Calculations for the minimum dispersion length, settling length and the average velocity have been included in Calculation Sheets D-2 and D-3 of ***Appendix D*** for ultimate conditions. Note that the forebays do not quite meet average velocity requirements based on the average forebay widths, as the widths of the forebays have been set to meet City of Ottawa specifications for cleaning and maintenance, such that the access roads are no more than 15.0 m from the centre of the forebays.

The forebays have been provided with a permanent pool of 2.0 m depth to minimize the potential for re-suspension. In accordance with City of Ottawa criteria, the forebays have been graded at 5:1 above the permanent pool level. A permeable forebay berm has been set 0.30 m below the permanent pool water level.

7.2 Permanent Pool

In accordance with the ***SWMP Design Manual***, the pond should have a permanent pool depth between 1.0 and 3.0 metres. The proposed facility has been designed with a permanent pool depth of 2.5 m.

The permanent pool has been sized in accordance with the requirements of the ***SWMP Design Manual***, Table 3.2, normal protection level for wet pond, 62% imperviousness, as follows:

$$(119.33\ m^3/ha - 40\ m^3/ha) \times 278.288\ ha = 22{,}078\ m^3$$

The proposed facility has a permanent pool volume of 53,815 m^3 under ultimate conditions.

The slopes in the permanent pool will be graded with side slopes of 4:1, with minor localized variations. As per the City of Ottawa design criteria, the side slopes adjacent to the maintenance access road have been graded at 5:1 maximum. In general, and in accordance with the City of Ottawa criteria, the grading above and below the permanent pool elevation has been graded at 5:1 in order to address public safety concerns. The proposed pond grading is shown on ***Drawing 4***.

7.3 Baseflow Augmentation

As requested by MVCA, a vertical circular 200 mm diameter baseflow augmentation orifice at an invert of 93.20 m is provided to control the first 0.2 m of active storage to drawdown times of 4.7 days under ultimate conditions. The calculation of baseflow augmentation drawdown time is provided in Tables D-3 and D-4 of ***Appendix C*** for ultimate conditions.

The baseflow augmentation volumes provided are greater than or equal to 10% of the 100-year active storage volume, where:

7930 m^3 baseflow augmentation : 7072 m^3 10% of 100-year active storage

This is consistent with the conceptual design of the ***KWMSS***.

7.4 Quality Control

The extended detention storage has been sized based on 40 m^3/ha in accordance with the ***SWMP Design Manual*** requirements. The required quality control volume for the 278.288 ha drainage area is calculated as follows:

$$40\ m^3/ha \times 278.288\ ha = 11{,}132\ m^3$$

The quality control volume is contained within the extended detention volume under ultimate conditions.

7.5 Extended Detention

A vertical circular 350 mm diameter quality control orifice at an invert of 93.40 m will provide a drawdown time of 4.9 days for the required 11,132 m^3 of water quality volume. The calculation of extended detention drawdown time is provided in Tables D-3 and D-4 of ***Appendix D*** for ultimate conditions. The pond will operate with a maximum extended detention storage depth of 1.00 m at an elevation of 94.20 m (43,005 m^3) under ultimate conditions, as per the ***KWMSS***.

The extended detention component has been provided with side slopes of 5:1 with minor localized variations, as illustrated in ***Drawings 5B, 5E and 5F***. Side slopes of 5:1 have been applied to the pond area for 3 m on either side of the permanent pool. The extended detention outlet is illustrated on ***Drawings 6* to *8***.

7.6 Quantity Control

Quantity control for the 2- to 10-year events under ultimate conditions will be provided by the top of a 9 m x 3 m drop inlet structure, acting as a 24 m long perimeter weir at an invert of 94.20 m. This weir was added to the design at the City's request to ensure that flow will only spill over the broad-crested weir described below for events exceeding the 10-year level. Note that the elevation of this quantity control weir is equal to the 100-year flood level of 94.20 m at the pond outlet (as per the ***Mississippi Valley Flood Plain Mapping Study***, Cumming-Cockburn and Associates Limited, December 1983).

Quantity control above the 10-year level will be provided under interim conditions by a 30 m long weir (as specified in the ***KWMSS***) set in the pond berm at an elevation of 94.60 m.

DRAWINGS / FIGURES

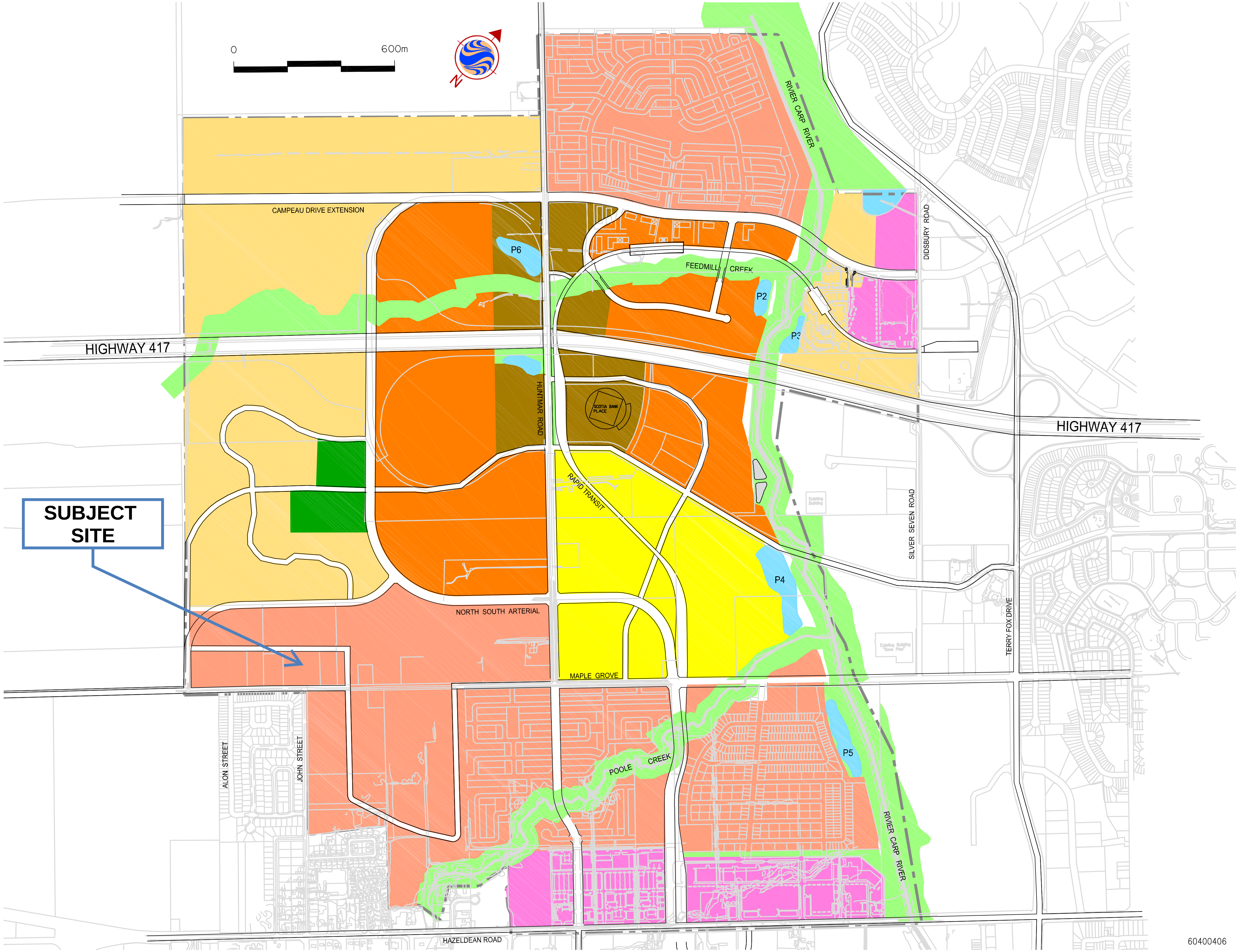
Site Population Estimate

Phase	Building Types	Gross Building Area	Gross Floor Area	Storeys	bedrooms	p/unit	number of units	number of occupants
1	Town Houses			3	2	2.7	4	11
2	Town Houses			3	2	2.7	14	38
3	Semidetached and town homes			3	3	3.4	24	82
4	Semidetached			3	3	3.4	20	68
5	Apartment Buildings	4964	19856	4	1	1.4	95	133
					2	2.1	95	200
6	Apartment Buildings	6757	27028	4	1	1.4	130	182
					2	2.1	130	273
Total								**987**

Kanata West Land Use (FIG. 2.1)

Kanata West Master Servicing Study

LAND USE PLAN



Kanata-West Concept Plan Boundary

PRESTIGE BUSINESS PARK

OPEN SPACE

COMMUNITY RETAIL

DISTRICT PARK

RESIDENTIAL

MIXED USE

HIGH PROFILE EMPLOYMENT

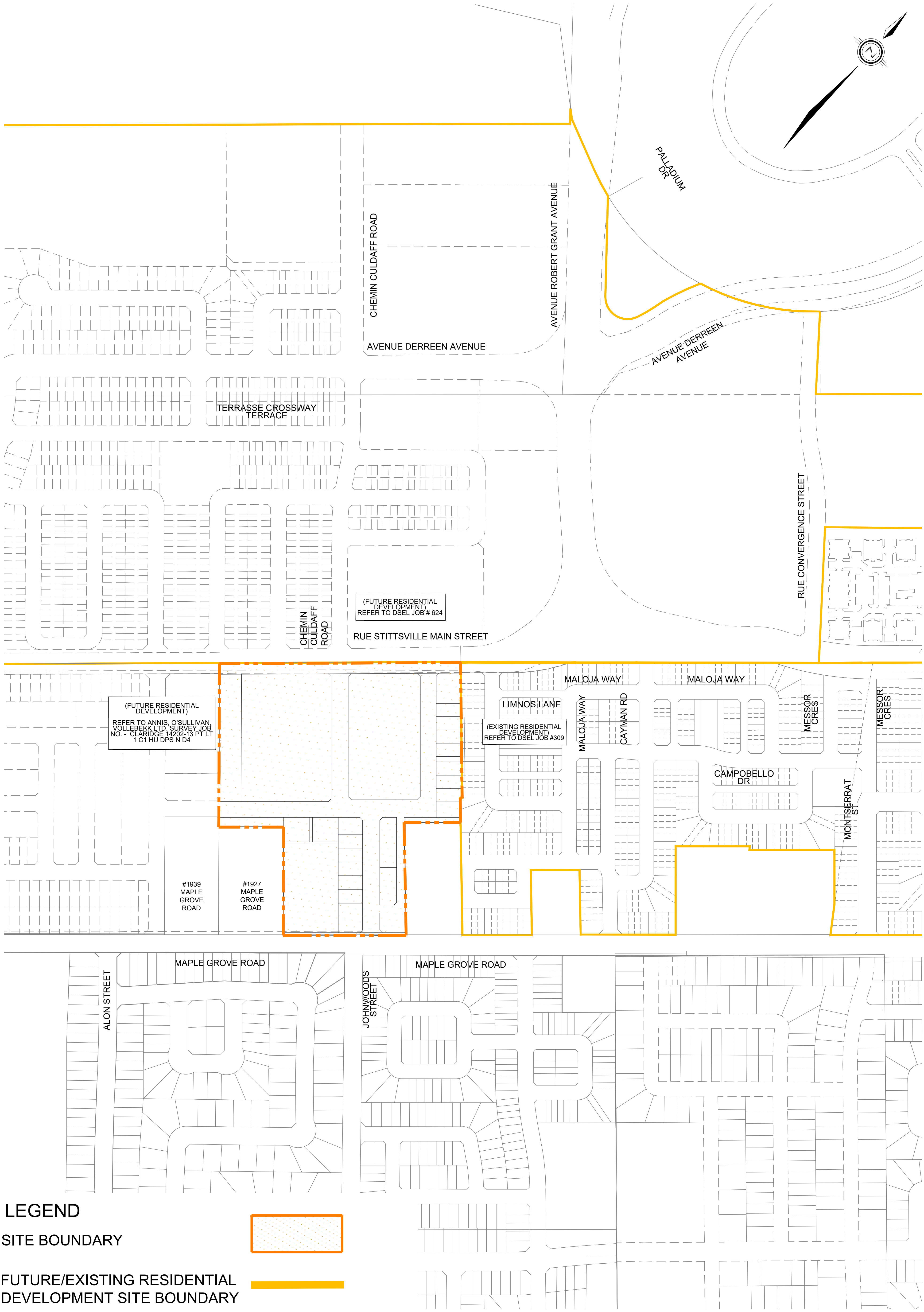
EXTENSIVE EMPLOYMENT

Stantec

CCL/IBI Cumming Cockburn Limited

MAY 2006

FIG. 2.1



LEGEND

SITE BOUNDARY

FUTURE/EXISTING RESIDENTIAL DEVELOPMENT SITE BOUNDARY

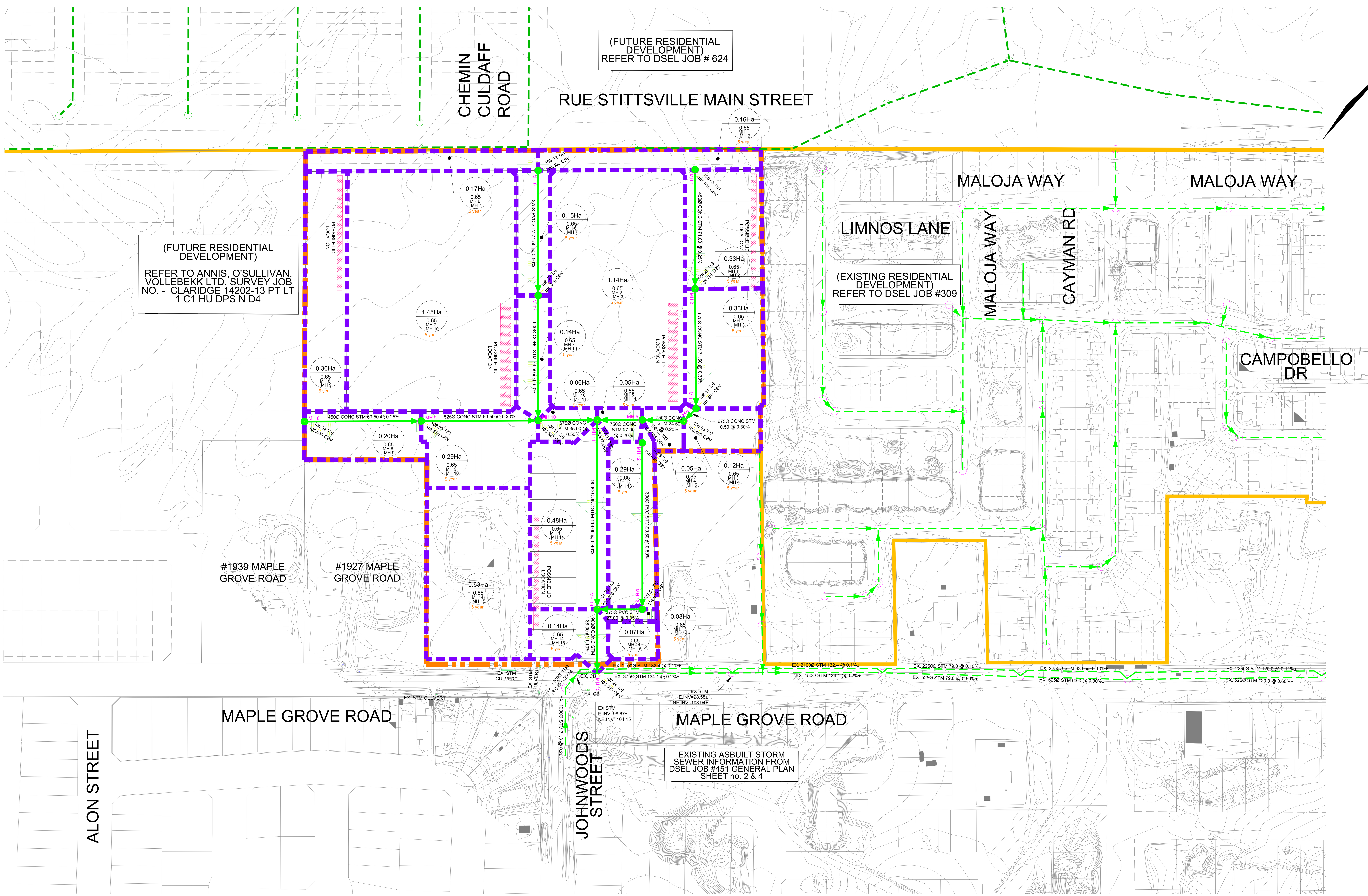
DSEL
david schaeffer engineering ltd

120 Iber Road, Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

FORMASIAM 1919 MAPLE GROVE
CITY OF OTTAWA

KEY PLAN

SCALE:	1:4000	PROJECT No.:	16-861
DATE:	AUGUST 2020	FIGURE:	1



LEGEND

SUBJECT LANDS	STORM DRAINAGE AREA
STORM TRUNK	EXISTING STORM DRAINAGE AREA
EXISTING STORM SEWER	OVERLAND FLOW ROUTE
FUTURE STORM SEWER	PROPOSED STORM MANHOLE

101.87 T/G 94.522 OBV — TOP OF GRATE, PROPOSED STORM OBVERT

EXISTING STORM MANHOLE

FUTURE STORM MANHOLE

6.07Ha — STORM DRAINAGE AREA
0.55 — RUN-OFF COEFFICIENT
MH 150 — UPSTREAM MH
MH 153 — DOWNSTREAM MH
5-YEAR — STORM FREQUENCY

DSEL
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120 Iber Road, Unit 103
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FORMASIAM 1919 MAPLE GROVE

CITY OF OTTAWA

STORM SERVICING PLAN

SCALE:	1:1000	PROJECT No.:	16-861
DATE:	AUGUST 2020	DRAWING:	2

LEGEND

- SUBJECT LANDS
- SANITARY TRUNK
- EXISTING SANITARY SEWER
- FUTURE SANITARY SEWER
- SANITARY DRAINAGE AREA
- EXTERNAL SANITARY DRAINAGE AREA
- SANITARY MANHOLE
- FUTURE SANITARY MANHOLE

2.7 / 0.37Ha / 10 / 27 / MH 2A / MH 3A / Residential:

- POPULATION PER UNIT
- SANITARY DRAINAGE AREA
- NUMBER OF UNITS
- TOTAL POPULATION
- UPSTREAM MANHOLE
- DOWNSTREAM MANHOLE
- TRIB TYPE

107.37 T/G / 103.024 OBV:

- TOP OF GRATE
- PROPOSED SANITARY OBVERT

DSEL david schaeffer engineering ltd 120 Iber Road, Unit 103 Stittsville, Ontario, K2S 1E9 Tel. (613) 836-0856 Fax. (613) 836-7183 www.DSEL.ca	FORMASIAM 1919 MAPLE GROVE CITY OF OTTAWA	SANITARY SERVICING PLAN SCALE: 1:1000 PROJECT No.: 16-861 DATE: AUGUST 2020 DRAWING: 3

LEGEND

- SUBJECT LANDS
- PROPOSED LOCAL WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN BY OTHERS
- PLUG

david schaeffer engineering ltd
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Fax. (613) 836-7183
www.DSEL.ca

FORMASIAM 1919
MAPLE GROVE

CITY OF OTTAWA

WATERMAIN SERVICING PLAN

SCALE:	1:1000	PROJECT No.:	16-861
DATE:	AUGUST 2020	DRAWING:	4

LEGEND

	SUBJECT LANDS
	STORM OVERLAND FLOW ARROW
192.85	PROPOSED CENTERLINE ELEVATION
193.50	PROPOSED ELEVATION
193.50	EXISTING ELEVATION
244.50	EXISTING CONTOUR ELEVATION
[192.85]	FUTURE CENTERLINE ELEVATION

CUT-FILL DEPTH ALONG CENTER LINE:

CUT DEPTH (m)		FILL DEPTH (m)
0 - 0.5	2.5 - 3.0	0 - 0.5
0.5 - 1.0	3.0 - 3.5	0.5 - 1.0
1.0 - 1.5	3.5 - 4.0	1.0 - 1.5
1.5 - 2.0	4.0 - 4.5	1.5 - 2.0
2.0 - 2.5	> 4.5	2.0 - 2.5

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FORMASIAM 1919 MAPLE GROVE

CITY OF OTTAWA

GRADING PLAN

SCALE:	1:1000	PROJECT No.:	16-861
DATE:	AUGUST 2020	DRAWING:	5