

CONCEPTUAL SERVICING STUDY

Talos Homes

Richmond Square Subdivision

NOVATECH

Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

August 11, 2010

Revised: April 18, 2016

Revised: September 29, 2016

Ref: R-2010-104

Novatech File No. 109222



Engineers, Planners & Landscape Architects

September 29, 2016

City of Ottawa
110 Laurier Avenue West
Ottawa, Ontario
K1P 1J1

Attention: Kevin Hall
Project Manager Infrastructure Approvals, Planning and Growth
Management Department

Reference: Richmond Square Subdivision
11 King Street
Application Draft Plan of Subdivision
Our File No. 109222-6

The following Conceptual Servicing Study is prepared for the City of Ottawa in support of a Draft Plan of Subdivision application for the above-mentioned property.

The subject property consists of a vacant parcel of land located south of Perth Street, between Cockburn Street and King Street, in the Village of Richmond. The proposed development consists of 40 semi-detached residential dwellings on public streets.

Based on the findings of this Study, the proposed subdivision can be serviced with existing sanitary and storm sewers and by individual water wells.

This report has been revised based on City comments and is hereby submitted for approval.

If you have any questions as you complete your review, please do not hesitate to contact the undersigned.

NOVATECH

Cara Ruddle, P. Eng.
Project Manager

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1.0 INTRODUCTION

1.1 PURPOSE

Novatech has prepared this Conceptual Servicing Study in support of a Draft Plan of Subdivision application for a proposed residential development to be located at 11 King Street in the Village of Richmond, in the City of Ottawa. The proposed development will consist of 40 semi-detached residential dwellings.

This Conceptual Servicing Study will outline the servicing aspects of the proposal with respect to water, wastewater (sanitary) and stormwater and will also demonstrate how servicing for the development will be consistent with previous and on-going studies and initiatives for the Village of Richmond.

1.2 BACKGROUND

The Subject Property is located within the Village of Richmond, within the City of Ottawa (see Figure 1). The former Village of Richmond was annexed by the Township of Goulbourn in 1974. The Township of Goulbourn was subsequently included in the amalgamation of the City of Ottawa in 2001. It is understood that this site has never been developed and remains a vacant parcel within the village.

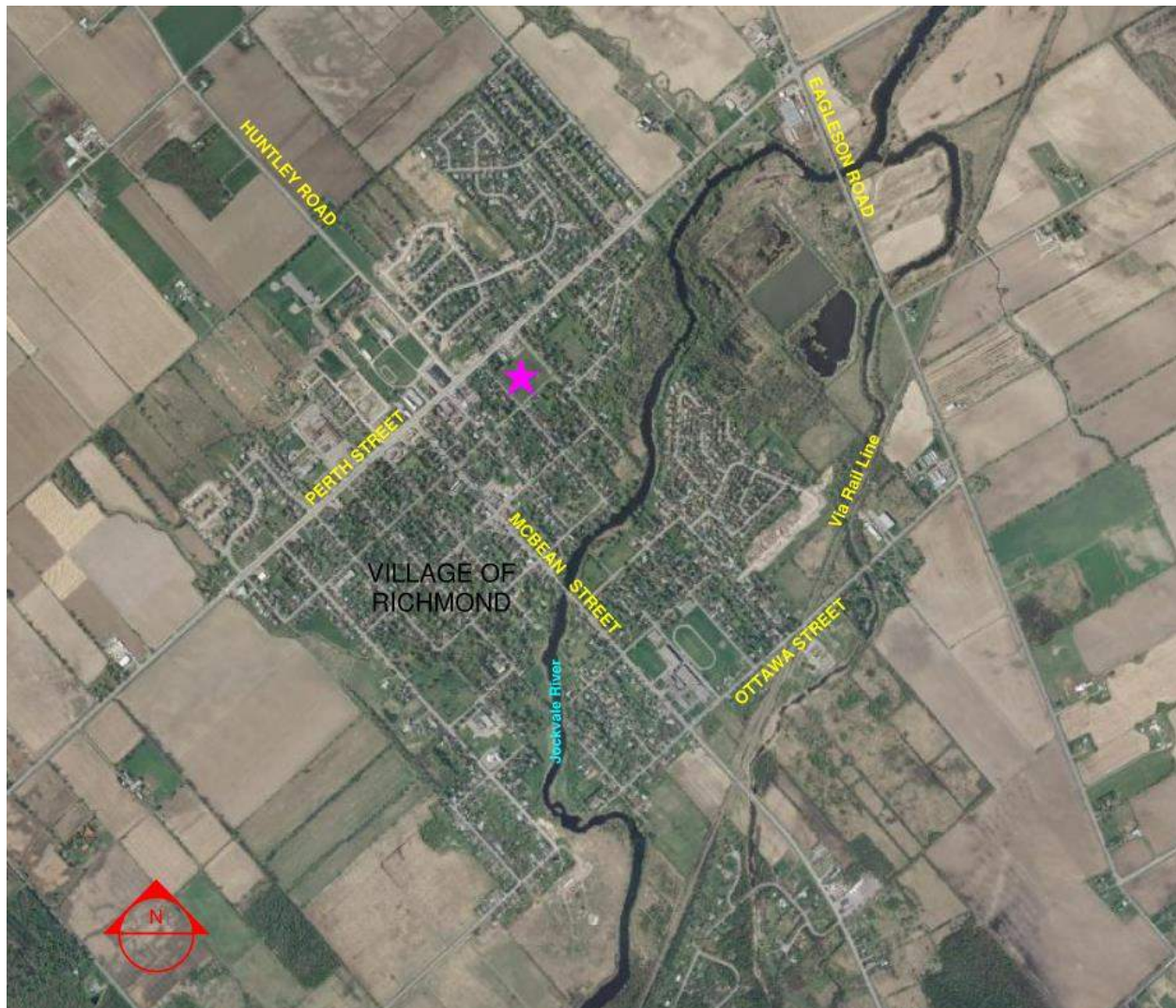


Figure 1 – Aerial Photo of Richmond, Ontario

1.3 LOCATION AND SITE DESCRIPTION

The Subject Property is near the intersection of Perth Street and King Street (see Figure 2). The site is currently a through-lot with frontage on two local streets, King Street on the east side and Cockburn Street on the west side. The south limit of the Subject Property is an unopened road allowance, which will be known as the Hamilton Street, when completed.

The Subject Property is approximately 1.59 hectares (3.9 acres) in size and has a frontage of approximately 120 metres on King Street and approximately 128 metres on Cockburn Street. The Subject Property also has approximately 131 metres of frontage along the future extension of Hamilton Street. The legal description for the Subject Property is Unit 59 and Part of Unit 56, Index Plan D-13, Geographic Township of Goulbourn, now in the City of Ottawa.



Figure 2 – Aerial view of subject property

The physical characteristics of the site are standard across the site. As shown in Figure 2, the property is vacant and has remained dormant in terms of past uses. In the late 1980's, the topsoil of the site was stripped in anticipation of new development and, at the time, the site was also used as staging area during the construction of sewers in the adjacent streets. The topsoil was stockpiled in the south-central part of the property.

Recently, the City of Ottawa passed a new Comprehensive Zoning By-law (By-law 2008-250). Included in the new Comprehensive Zoning By-law, is new mapping of floodplains, based on land elevations in proximity to watercourses.

As a result of the stripping of topsoil, portions of the Subject Property were below the elevation of the 1:100-year floodplain at the time the floodplain mapping was prepared. Subsequently, the Subject Property was shown as floodplain area in the Zoning By-law. Through discussions and acceptance by the Rideau Valley Conservation Authority, the site has been re-graded using the stockpiled topsoil to raise the site grade back to the original elevation, which is above the 1:100-year floodplain. Refer to Appendix A for RVCA approval. A Zoning By-law Amendment

has recently been passed by Ottawa City Council to recognize that the Subject Property is not within the 1:100-year floodplain.

1.4 CONSULTATION AND REFERENCE MATERIAL

A pre-consultation meeting was held with the City of Ottawa on December 16, 2009 at which time Novatech was advised of submission requirements. Subsequently, additional communication transpired regarding the need for a hydrogeological study and the City response confirmed the need for the hydrogeological study (copy of e-mail attached in Appendix B). At the December 16th meeting, the engineering representative identified that the recent study "Village of Richmond Alternative Sanitary and Storm Servicing Options", David McManus Engineering Ltd., Final August 2008 is to be referred to. This study did not provide the necessary data and criteria for the sanitary servicing for the Subject Property as it addressed future growth areas but did identify the criteria for stormwater drainage. The McManus study included detailed analysis of the Hamilton Drain system including modelling of the storm sewers and open channels.

Consequently, additional information was obtained in the form of a water and sanitary drainage study, "Village of Richmond Water & Sanitary Master Servicing Study, prepared by Stantec Consulting Ltd., dated July 22, 2011. This study identified the water and sanitary options for the existing, infill, and future development lands scenario and combinations thereof.

The Master Servicing Study gives the following recommendations:

- Water Servicing – existing and infill development are to be serviced by private wells until a connection to a communal system is warranted (Section 4.6 and Section 7.5.1).
- Wastewater Servicing – existing and infill development will continue to be serviced by the existing pump station within Richmond (Section 8.3.1).

The Master Servicing Study outlines the subject property as an infill area but does not display the entire area, see figure 5.4 from the Master Servicing Study in Appendix A for reference. This is due to previous site grading with stockpiles of material within the site. A Cut/Fill Application was submitted and approved by the RVCA and the site was re-graded so that the subject property is above the 1:100 year floodline. The revised floodline is shown on Figure A1 in Appendix A. Correspondence with the RVCA is also included in Appendix A.

2.0 THE PROPOSAL

2.1 SEMI-DETACHED RESIDENTIAL

The proposed development is a 40-unit residential development on two public streets, Hamilton Street (which is proposed to be built as part of this development) and a new street connecting King Street and Cockburn Street. Individual units are designed to have a minimum of 290 square metres of lot area and a minimum of 9.0 metres of frontage. Figure 3 shows the Subdivision Concept Plan.

3.0 SERVICING

3.1 WATER

As indicated previously the Master Servicing Study recommends that existing and infill development continue to be serviced by private wells until a communal system is required.

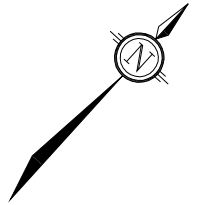
A Hydrogeological Assessment for Private Services was prepared by Paterson Group Inc., dated February 2010 (Updated January 2016). This report indicates that there are two water resource aquifers in the area: the Upper Oxford Formation aquifer and the Lower March-Nepean Formation aquifer. The preferred aquifer is the Lower March Formation. The report concludes that the site is suitable for the proposed development. The report recommends that a warning clause be used to notify of elevated sodium levels and the potential use of water softeners to reduce hardness.

Therefore, it is feasible to service the proposed development with individual private wells as recommended in the Master Servicing Study.

3.2 SANITARY

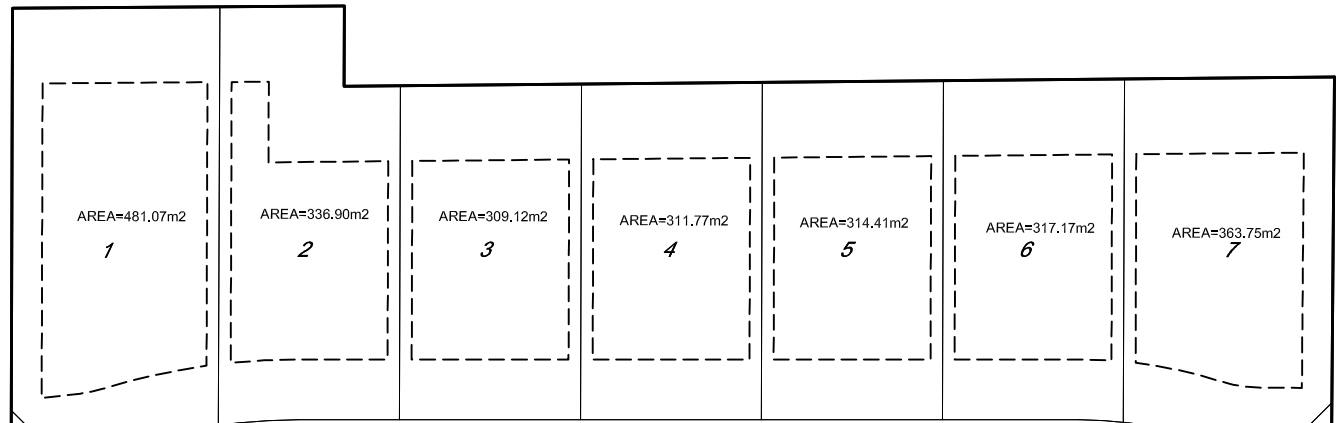
The Village of Richmond is serviced by a sanitary sewer collection system with a pumping station that outlets via a forcemain along Eagleson Road connecting to the City of Ottawa Glen Cairn Trunk Sewer at just south of Hazeldean/Robertson Roads in Kanata. Existing sanitary sewers lie within the roadway on King Street and within the unopened Hamilton Street roadway.

The proposed subdivision will include a sanitary sewer in the proposed subdivision roadway with a connection to the sanitary sewer in King Street. Lots fronting on Hamilton Street will be serviced directly to the sanitary sewer in that street. This servicing approach will be consistent with Master Servicing Study.

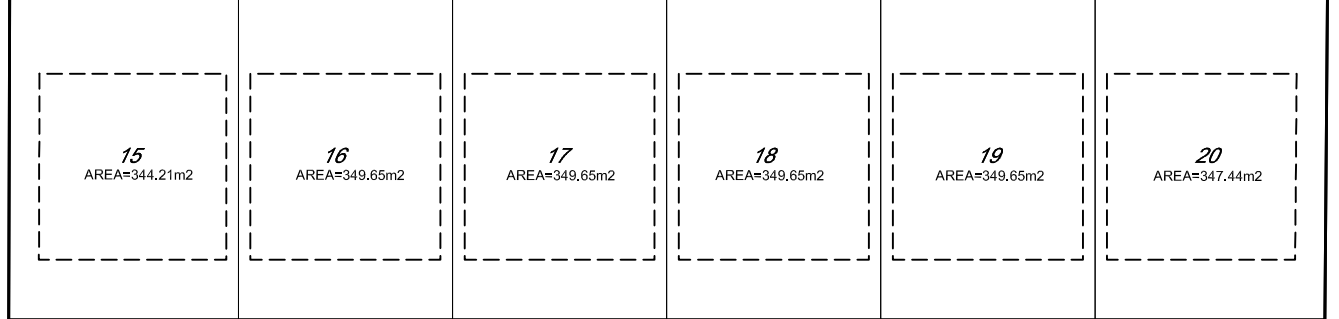
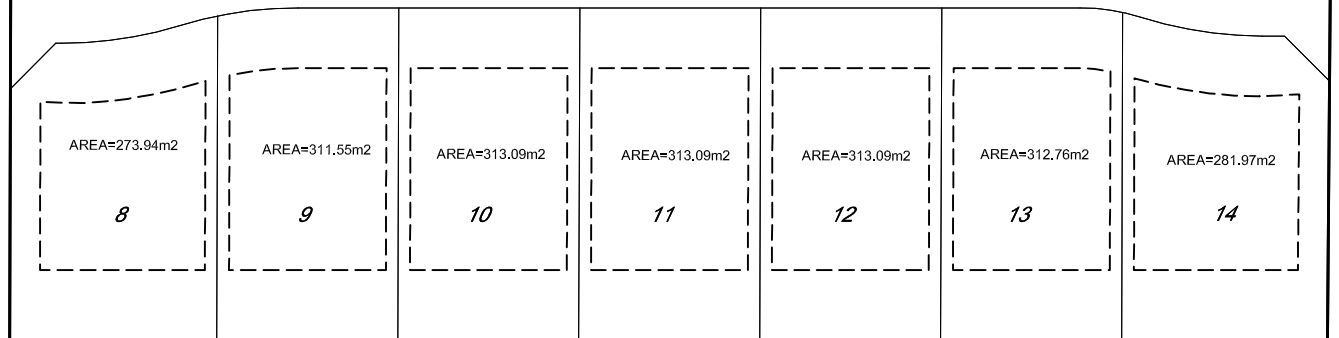


COCKBURN STREET

KING STREET



STREET ONE



HAMILTON STREET

LEGEND

- PROPOSED PROPERTY LIMIT
- PROPOSED CURB
- PROPOSED C_o OF ROAD
- PROPOSED BUILDING ENVELOPE
- ZONING SETBACKS:**
- FRONT YARD = 6.0m
- REAR YARD = 7.5m
- INTERIOR SIDE YARD = 1.5m
- EXTERIOR SIDE YARD = 3.0m



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VILLAGE OF RICHMOND

SUBDIVISION CONCEPT
 PLAN

| | | |
|----------|--------|----------|
| MAR 2016 | 109222 | FIGURE 3 |
|----------|--------|----------|

The Master Servicing Study recommended that existing and infill development within the Village of Richmond will continue to be serviced by the existing pump station and that the existing pump station has adequate capacity. The existing lagoons will continue to be used as storage during snowmelt and extreme wet weather events. The existing collection system will require some upgrades but none are required within the system immediately servicing the subject development. Supporting information from the Master Servicing Study is included in Appendix C.

The Master Servicing Study estimated flows from the subject site to be 2.2 L/s based on the zoning. Sanitary flows from the proposed development are calculated to be 2.3 L/s. This increase in sanitary flows is considered negligible. Calculations are included in Appendix D.

3.3 STORMWATER

The Subject Property is located near the downstream end of the Hamilton Drain system. The McManus study (modelling by J.F. Sabourin and Associates Inc.) identified capacity issues for the existing sewers and channels and recommends (Sections 3.4 and 4.) that the flows directed to the sewer system be limited to the 1:2-year pre-development flows. Major system flows were also examined and surface flows in excess of sewer system inlet flows are conveyed along the Hamilton drain to its outlet to the Jock River, approximately 100m south of the proposed subdivision on King Street. Existing storm sewers lie within the roadway on King Street south of Hamilton Street and within the unopened Hamilton Street roadway.

The proposed subdivision will be serviced by a storm sewer in the proposed street 1 roadway with a connection to the storm sewer in King Street at the corner of Hamilton Street. Lots fronting on Hamilton Street will be serviced directly to the existing storm sewer in that street. Refer to Figure 4 Conceptual Servicing Plan for details.

As indicated previously, it is understood that stormwater management will be required, providing both quantity control and quality control to an enhanced level or 80% removal of total suspended solids. However, the regulatory 1:100-year floodplain borders the southeast side of the site at an elevation of 93.78. Due to the close proximity of 100-year floodplain elevation with respect to the site elevation, it creates some challenges for stormwater management. During the spring snowmelt or 100-year storm event condition, surface storage volumes are limited and underground storage is not available.

Therefore, the following is the proposal for storm servicing and stormwater management. The site can be divided into four drainage areas.

- Lots 1 to 7 back onto existing properties that front onto Perth Street. This rear drainage area will consist of grassed back yards and roof drainage that will be directed to grassed areas. Therefore, this area would require minimal quantity control and quality control. It

is proposed to drain the rear yard by a swale to a rear yard catchbasin that could connect to the existing City storm sewer system along Cockburn Street or to the existing ditch along King Street.

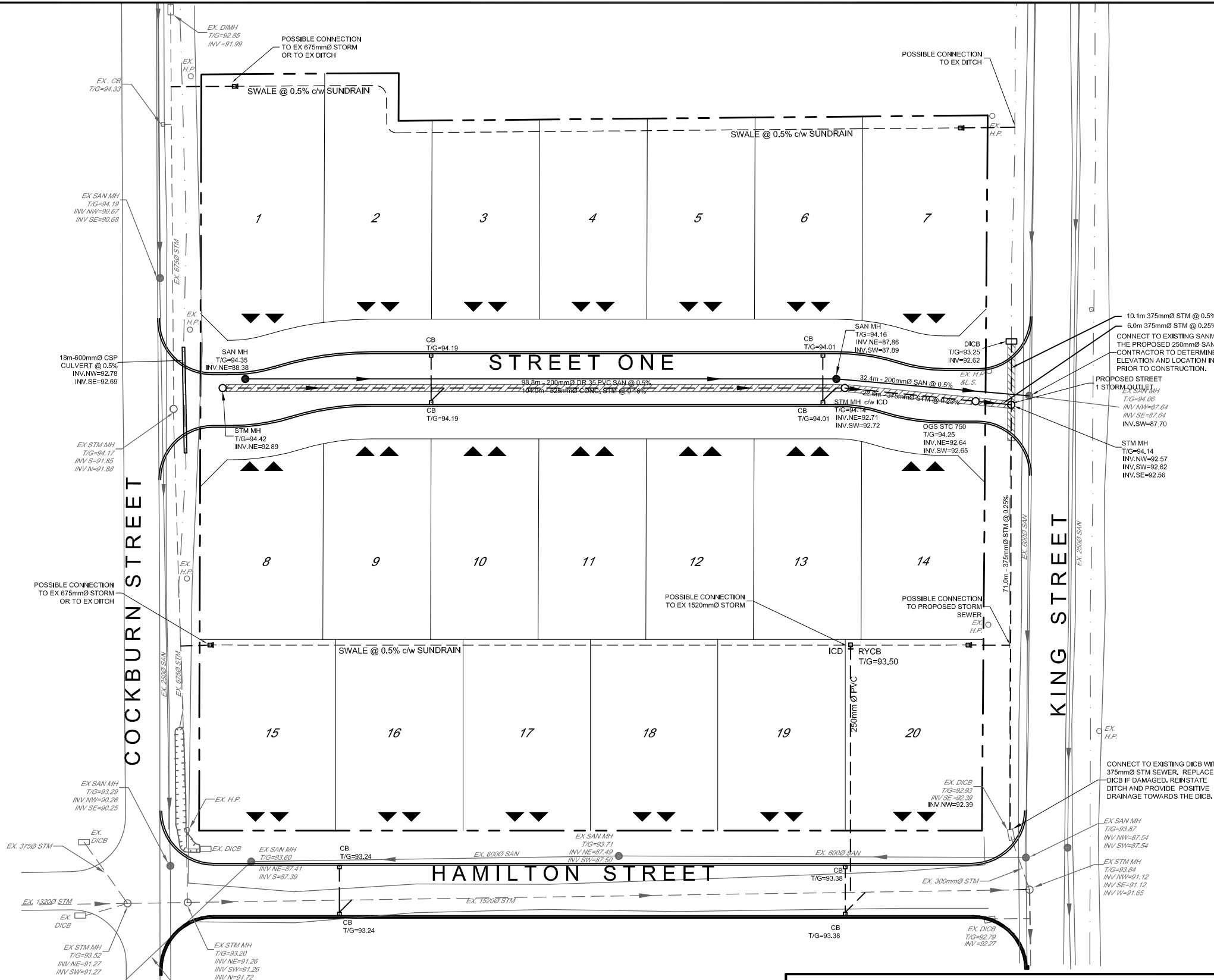
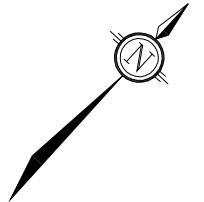
- Lots 1 to 7 and lots 8 to 14 front onto proposed Street 1. A storm sewer is proposed within the Street 1 Right-Of-Way to service this drainage area. Quantity control of stormwater can be provided for this drainage area with a super-pipe and surface ponding for rainfall events that are not affected by the floodplain elevation. Quality control of stormwater can be provided by an OGS unit. It is also proposed to continue a storm sewer below the existing roadside ditch along the west side of King Street and connect to the existing storm sewer system at the existing DICB at the intersection of King Street and Hamilton Street.
- The rear yards of Lots 8 to 14 and 15 to 20 will sheet drain to a proposed rear yard swale system. This rear drainage area will consist of grassed back yards and roof drainage that will be directed to grassed areas. Therefore, this area would require minimal quantity control and quality control. This system can outlet directly to the existing storm sewer system on either Cockburn Street or Hamilton Street or to the existing roadside ditch along King Street or Cockburn Street.
- Lots 15 to 20 front onto Hamilton Street. The front yards of these lots will sheet drain to Hamilton Street. This area includes grassed front lawns and driveways and will drain to the existing City storm sewer system on Hamilton Street. Therefore, there is limited opportunity for stormwater management for this drainage area.

Refer to Figure 4 - Conceptual Servicing Plan and Figure A2 – Conceptual SWM Plan in Appendix E for the drainage area information.

Best Management Practices should be implemented to reduce transport of sediments and promote on-site groundwater recharge. All side and rear yard drainage will be collected in rear yard swales and the rear yard swales will be constructed at minimum slopes where possible. Roof leaders will be directed to grassed areas to promote infiltration and groundwater recharge.

Since the regulatory 1:100-year floodline is above the proposed footings in the development, the basements will not be serviced with gravity service laterals but rather the weeping tile will drain to sump pumps to be pumped to the proposed storm sewer in the subdivision roadway and the existing storm sewer in Hamilton Street. The proposed residential building openings will be at least 0.3m above the 1:100-year regulatory floodline. Figure 4 outlines the conceptual servicing for the proposed subdivision and preliminary stormwater management calculations are provided in Appendix E.

An overland flow route will also be provided to the surrounding municipal right-of-ways.



LEGEND

- PROPOSED PROPERTY LIMIT
- PROPOSED CURB
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY AND STORM LOT SERVICES LOCATION
- PROPOSED SANITARY MH
- PROPOSED STORM MH
- PROPOSED CATCHBASIN
- PROPOSED SEWER FLOW DIRECTION
- PROPOSED SEWER INSULATION
- EXISTING DITCH INLET CB
- EXISTING SEWER FLOW DIRECTION
- EXISTING STORM MH
- EXISTING SANITARY MH



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VILLAGE OF RICHMOND

CONCEPTUAL SERVICING PLAN

APR 2016 109222 FIGURE 4

M:\2009\109222\CADD\Design\109222-GP.dwg, Servicing Concept, Sep 08, 2016 - 12:04pm, mtheohiak

3.4 SITE GRADING

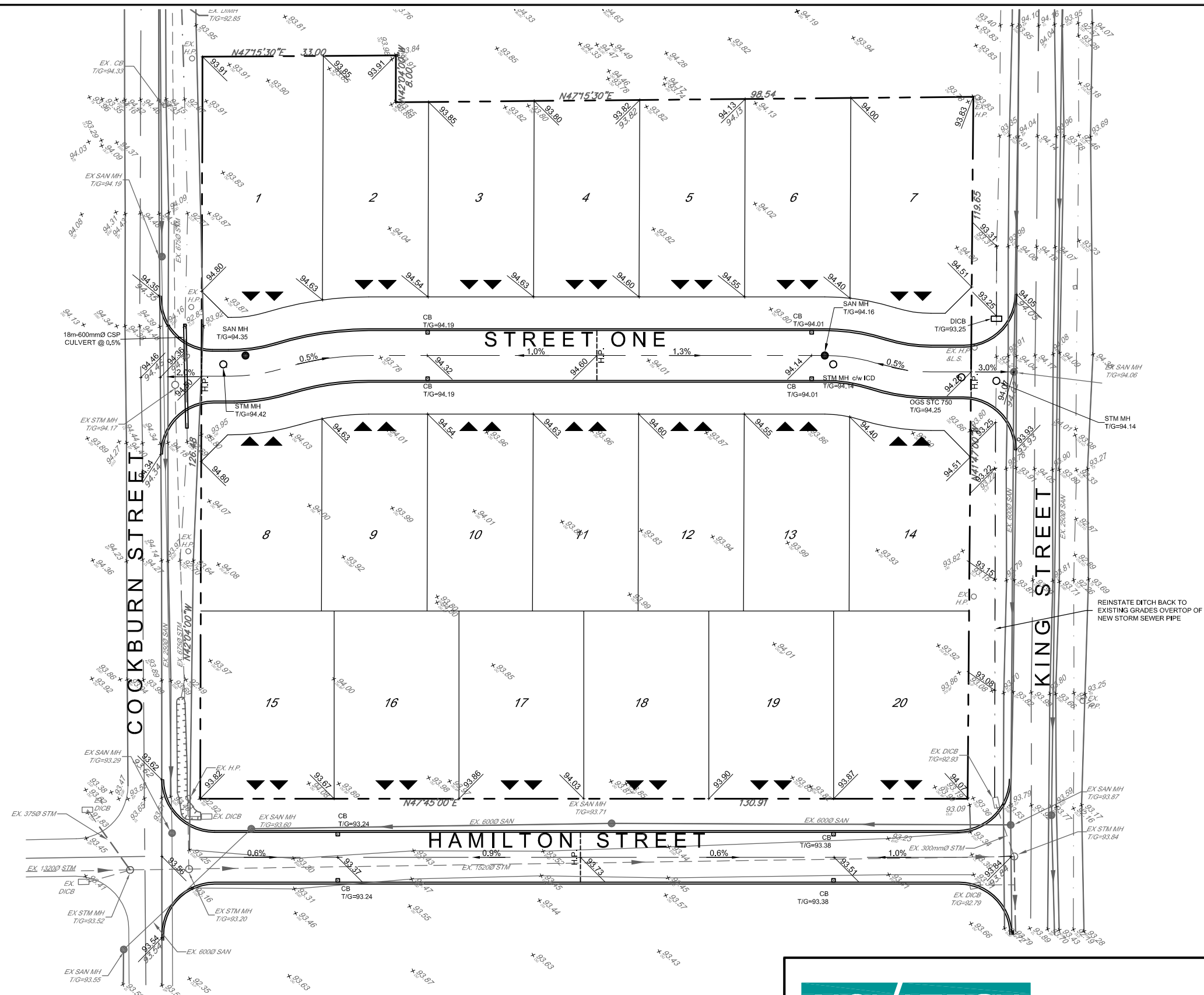
A Preliminary Grading Plan has been prepared and is shown on Figure 5. Storage limits of surface storage and the 1:100 year floodline are also shown on the Preliminary Grading Plan. As previously indicated lot grading will be designed to provide grades at openings to the proposed buildings that are 0.3m above the 1:100 regulatory floodline.

3.5 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter bags will be placed under the grates of nearby catchbasins and manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
 - Mud mats will be installed at the site entrances;
 - The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.

The erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken



M:\2009\109222\CAD\Design\109222-GR.dwg, Grading Concept, Aug 05, 2016 - 2:03pm, minehorlak



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VILLAGE OF RICHMOND

CONCEPTUAL GRADING PLAN

APR 2016 109222 FIGURE 5

4.0 CONCLUSION

The conclusions of this report are as follows:

- Water servicing will be provided by private wells as recommended in the Master Servicing Study.
- Sanitary servicing can be provided from the existing and proposed sanitary sewers within the road right-of-ways which drain to the existing pump station servicing the Village as recommended in the Master Servicing Study.
- Stormwater will drain to the existing and proposed storm sewers which drain to the existing municipal storm sewer system and to the Hamilton Drain.
- Stormwater management is required for the development to best management practices. Quantity control can be provided with the implementation of an inlet control device to attenuate flows and allow for storage of stormwater in storm sewers and on the surface in road sags. However, in spring conditions, storage of stormwater will not be provided due to the elevation of the 1:100 year floodline.
- Quality control of stormwater can be provided with a combination of an oil grit separator unit and Best Management Practices.
- Foundation drainage will be pumped to the storm sewer system via sump pumps.
- The lot grading design should include grading at openings to the proposed buildings that are 0.3m above the 1:100 regulatory floodline.
- An overland flow route will be provided.
- Erosion and sediment control measures will be implemented during construction.

Prepared by:

Reviewed by:

Cara Ruddle, P.Eng.
Project Manager

J. Lee Sheets, CET
Sr. Project Manager

APPENDIX A

Floodplain Information

Ron Cebryk

From: Ron Cebryk [r.cebryk@novatech-eng.com]
Sent: Thursday, September 11, 2008 4:49 PM
To: glen.mcdonald@rvca.ca
Subject: Scollan Subdivision - Richmond
Contacts: Glen McDonald

Glen,

Attached are two drawings for the subject site. This site was previously looked at in the early 1990's and I believe that there is a file on it at RVCA. As discussed with you, our client, Jack Scollan, has asked us to review the floodplain implications further to Don MacIver's letter regarding same. The two drawings show the following:

1. The floodplain from RVCA mapping superimposed on the site.
2. The floodplain plotted on the site using 93.78 as the floodline with topo from previous site survey.

As you can see, there is a significant portion of the site in the floodplain, regardless of which plan is viewed. I suspect that some of the area on the northern half (lots 12 to 16 incl. and probably some of the road) were above the flood plain before stripping took place...this is the big stockpile on lots 6 to 10 and 17 to 19 incl.

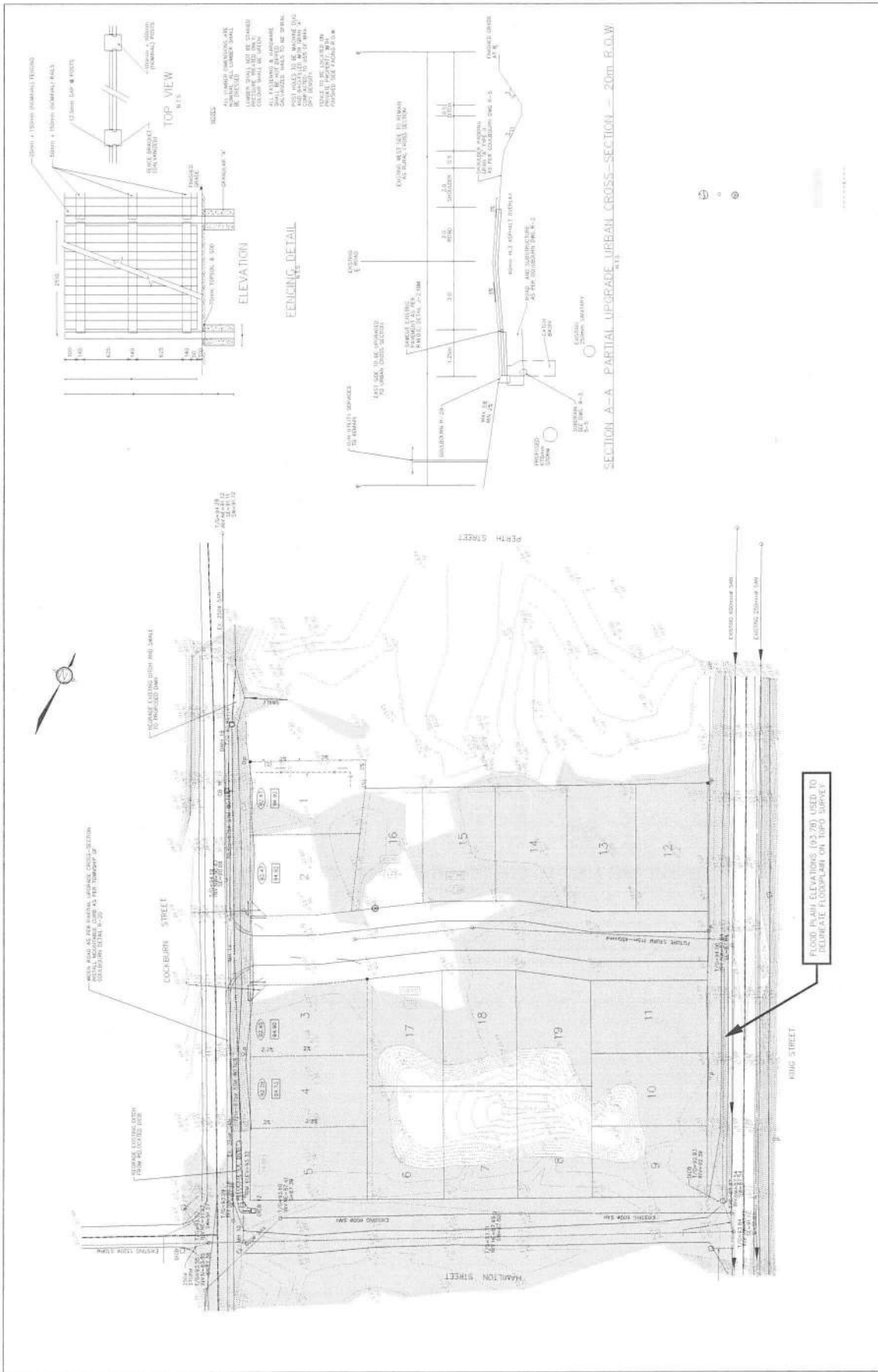
Jack and I would like to meet with you to see what can be done to facilitate the development of the site.

Regards,
Ron

Ron Cebryk
Senior Project Manager

Novatech Engineering Consultants Ltd.
Suite 200, 240 Michael Cowpland Drive
Kanata . Ontario . Canada . K2M 1P6
Tel: (613) 254-9643 x220
Fax: (613) 254-5867
Email: r.cebryk@novatech-eng.com
Web: <http://www.novatech-eng.com>

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FOR ALL ELEVATIONS (3.79) USED TO DETERMINE UPGRADE FOR UREAN IN URS MODEL

| | | | | |
|--|---|---|---|---|
| <p>NOVATECH EPIC ENGINEERING CONSULTANTS OTTAWA, ONTARIO</p> | | <p>SCALE 1 : 500</p> | <p>TOWNSHIP OF COLLINGBURN VILLAGE OF RICHMOND SCOLLAN SEVERANCES</p> | <p>DATE 2010</p> |
| <p>NO. 1 DATE 2010</p> | <p>NO. 2 DATE 2010</p> | <p>NO. 3 DATE 2010</p> | <p>NO. 4 DATE 2010</p> | <p>NO. 5 DATE 2010</p> |
| <p>NO. 6 DATE 2010</p> | <p>NO. 7 DATE 2010</p> | <p>NO. 8 DATE 2010</p> | <p>NO. 9 DATE 2010</p> | <p>NO. 10 DATE 2010</p> |
| <p>NO. 11 DATE 2010</p> | <p>NO. 12 DATE 2010</p> | <p>NO. 13 DATE 2010</p> | <p>NO. 14 DATE 2010</p> | <p>NO. 15 DATE 2010</p> |
| <p>NO. 16 DATE 2010</p> | <p>NO. 17 DATE 2010</p> | <p>NO. 18 DATE 2010</p> | <p>NO. 19 DATE 2010</p> | <p>NO. 20 DATE 2010</p> |

THE POSITION OF ALL UTILITY CONDUITS, MANHOLES, SERVICES AND OTHER INFRASTRUCTURE AND SURROUNDING SHOWN ON THE CONCEPT DRAWINGS AND URS MODEL AND THE STRONGHOLDERS IS NOT GUARANTEED BY URS. URS HAS CONDUCTED VISUAL INSPECTIONS OF THE SITE, INCLUDING THE UTILITY AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Transmittal



| | |
|--|-------------------------------------|
| ATTN: Mr. Don MacIver | DATE: February 17, 2009 |
| AT: Rideau Valley Conservation Authority P.O. Box 599 3889 Rideau Valley Drive Manotick ON, K4M 1A5 | OUR FILE NO: 109027 |
| | YOUR FILE NO: |
| | RE: Cut/Fill Application |
| FROM: Miroslav Savic | Return to Sender: Yes: No: x |

| | | | | | | |
|-------------------|--------------|------------------|---------------------------------|-----------------|--------------|------------------------|
| Shuttle: X | Rush: | Hot Shot: | Out of Town / Overnight: | Pick-up: | Mail: | Hand Deliver: x |
|-------------------|--------------|------------------|---------------------------------|-----------------|--------------|------------------------|

COMMENTS

Mr. MacIver,

Enclosed, please find the following documents:

- Review Fee – Cheque for \$2,000.
- Cut/Fill Application Supplemental Information letter (4 copies)
- Talos Custom Homes Ltd. Agent authorization letter (4 copies)
- Cut/Fill Plan – 109027-CFP (4 copies)
- Cut/Fill Application Form (4 copies)

Please call if you require further information.

NOVATECH ENGINEERING CONSULTANTS LTD.

Miroslav Savic, P. Eng.

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Application Form For Development

Including Placing of Fill, Construction, Interference to Wetlands and Alteration to Shorelines and Watercourses

Rideau Valley Conservation Authority, Ontario Regulation 174/06
3889 Rideau Valley Drive, P.O. Box 599, Manotick, ON K4M 1A5

Section 28 (1) of the CA Act states that, subject to the approval of the Minister, an authority may make regulations applicable in the area under its jurisdiction, (b) prohibiting, regulating or requiring the permission of the authority for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse, or for changing or interfering in any way with a wetland or (c) prohibiting, regulating or requiring the permission of the Authority for development if, in the opinion of the authority, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development. The information on this form is required in order to consider the granting of permission under the Regulation.
Only complete applications can be processed (please see 'complete application' guide).

| | |
|-------------------------------------|--|
| Landowner Name: <u>JACK SCOLLAN</u> | Telephone No. <u>613-913-4970</u> Fax No. _____ |
| Mailing Address: <u>RR #13</u> | Business No. _____ |
| <u>ONTARIO</u> | e-mail _____ |
| Postal Code: <u>K0A 1B0</u> | Agent's Name: <u>TALOS CUSTOM HOMES LTD</u> |
| | Phone: <u>613-747-3993</u> Fax No. <u>613-747-2868</u> |

Application is hereby made to:

- Place or Remove Fill
- Construct New Building
- Add, Alter or Renovate Building
- Install Sewage Disposal System
- Alter a Watercourse

- Interference with wetlands or other adjacent lands (within 120 m)
- Construct retaining wall, erosion control
- Construct Pond, Reservoir
- Road Crossing
- Other (Specify): _____

Purpose of work: (or use covering letter)

RE-GRADING TO ESTABLISH ORIGINAL GRADE

Description of work: (or use covering letter)

EXCAVATION AND GRADING OF FILL STOCKPILED ON SITE

Location at which development or waterway alteration is proposed:

Lot: _____ Reg. Lot No.: PTS 182, 9R5234 Current Municipality: _____
 Concession: _____ Reg. Plan No.: 9R5234 Municipal Address (St./Rd./Ave./Cr. etc.): 10 KING ST
 Former Municipality: _____

Existing Use of Land: (vacant, residential, etc.)

VACANT

Proposed Use of Land:

RESIDENTIAL

Proposed Start Date: 05/01/05
m d y

Proposed Finish Date: 05/05/09
m d y

Signature of Owner/Authorized Agent:

(If agent, provide letter of authorization from owner)



02/13/09
m d y

Letter attached

Entry on Property

S. 28 (20) An officer appointed by the Authority may enter on private property, other than a dwelling or building, if the entry is for the purpose of considering a request related to the property for permission under application.

Attach Required Plans and Fee — including a copy of the property survey and/or deed

Personal information contained on this form is collected under the authority of regulations made under Section 28 of the Conservation Authorities Act of Ontario as amended and may be shared with departments or agencies of local, provincial or the federal government having an interest in the same. Questions about this collection should be directed to the Conservation Authority.

| | | |
|------------------------------|--------------------------|--------------------------|
| Office Use Only | | |
| Date received: _____ | FHA File #: _____ | Fee Paid: _____ |
| <small>m / d / y</small> | | <small>m / d / y</small> |
| Circulation to: _____ | Application#: _____ | Permit Issued: _____ |
| <small>m / d / y</small> | | <small>m / d / y</small> |
| Easement Ag. required: _____ | Hearing: _____ | Decision: _____ |
| | <small>m / d / y</small> | |
| | Appeal: _____ | |

Required Plans Include:

A signed application form permission to construct or reconstruct or modify or add to a building or structure shall include,

- (a) 4 copies of a plan of the property showing the proposed location of the building or structure, its elevation and the proposed final grade plan;
- (b) 4 copies of a complete description of the type of building or structure to be constructed, including drainage details;
- (c) 4 copies of a statement of the dates between which the construction will be carried out; and
- (d) 4 copies of a statement of the proposed use of the building or structure following completion of the construction.

A signed application for permission to undertake site grading or place or dump fill shall include,

- (a) 4 copies of a plan of the property on which the fill is to be placed, showing the proposed location of filling, the depth to which it is proposed to fill and the proposed final grade of the land when filling is completed;
- (b) 4 copies of a complete description of the type of fill proposed to be placed or dumped;
- (c) 4 copies of a statement of the dates between which the placing or dumping will be carried out; and
- (d) 4 copies of a statement of the proposed use of the land following completion of placing or dumping.

A signed application for permission to straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse, shall include,

- (a) 4 copies of a plan on which shall be shown in plan view and cross section the details of such straightening, change, diversion or interference;
- (b) 4 copies of a description of the protective measures to be undertaken;
- (c) 4 copies of a statement of the dates between which the straightening, changing, diverting or interfering will be carried out; and
- (d) 4 copies of a statement of the purpose of the proposed work.
- (e) all drawings shall be to scale.

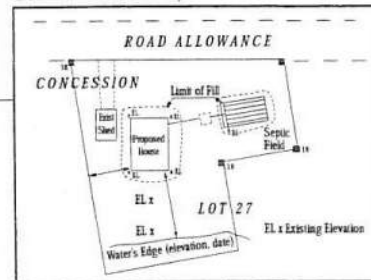
Note: The Authority may, at any time, withdraw any permission given under this Regulation, if, in the opinion of the Authority, the conditions of the permit are not complied with.

The Conservation Authority is also authorized to include in our review consideration for whether any harmful alteration, destruction or disturbance of fish habitat will occur which would contravene the provisions of Section 35 of the *Canada Fisheries Act*. It should be noted that, where impacts can not be mitigated, *only* the Minister of Fisheries and Oceans Canada may authorize such alteration, destruction or disturbance.

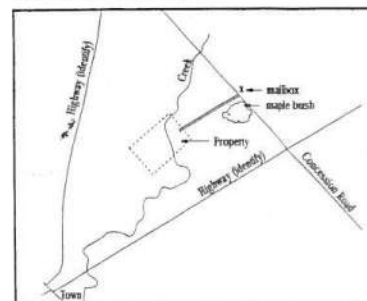
Construction Drawings



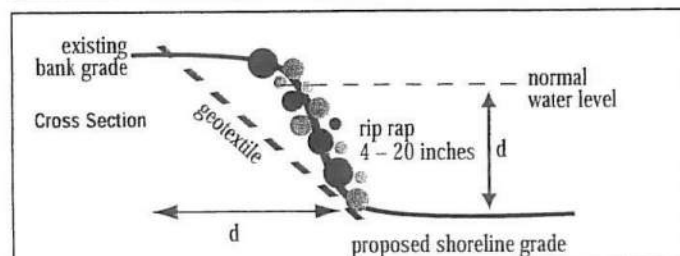
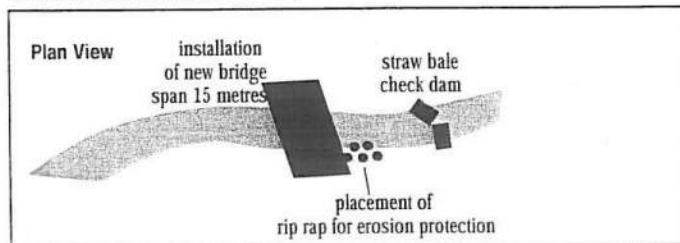
Site Plan (draw to scale or give accurate distance measurements)



Location Plan (draw to scale or give accurate distance measurements)



Channelization, Bank Stabilization, Erosion Control



These drawings are not for design purposes; they are examples to illustrate the minimum level of detail required to enable Conservation Authority staff to process the application. Please ensure that your application is complete (as per *Ontario Regulation 97/04* — copies available) so that there will be no delay in the review process.

It is an offence to contravene any regulation made under Section 28 of the *Conservation Authorities Act* (R.S.O. 1990) and on summary conviction the accused is liable to a fine of not more than \$10,000.00 or to a term of imprisonment of not more than three months (S.28 (16)). An order may also be issued for removal of the offending structure or material (S. 28 (17) (18) (19)). Property owners and contractors can both be held accountable.

February 17, 2009

Rideau Valley Conservation Authority
P.O. Box 599, 3889 Rideau Valley Drive
Manotick ON, K4M 1A5

Attention: Mr. Don MacIver

Dear Sir:

**Re: Cut/Fill Application
Supplemental Information
File No. 109027-0**

1. Background

- Submitted in accordance with requirements agreed to at January 14, 2009 meeting at RVCA with Bruce Reid, Glen McDonald, Ferdous Ahmed.
- Purpose of work is to restore site to elevations existing prior to stripping of site around 1990. The fill would create a site which resembled the conditions existing when the 1980 floodlines were delineated.

2. Type of Fill

- The fill is taken from a stockpile which was created when the site was stripped prior to being used as a staging/work area by the contractor constructing the sanitary sewer along Hamilton and King streets.

3. Work Schedule

- May 1 to May 15, 2009

4. Proposed Land Use

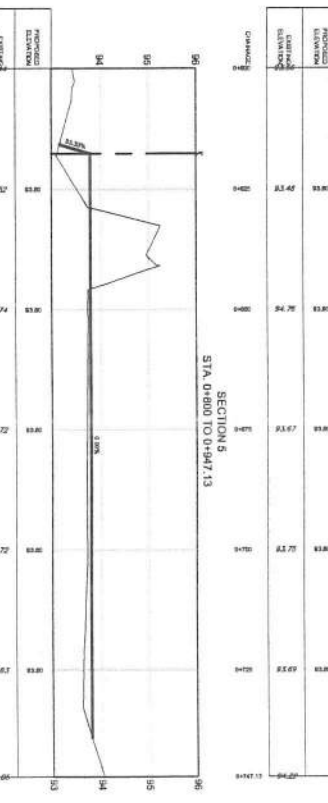
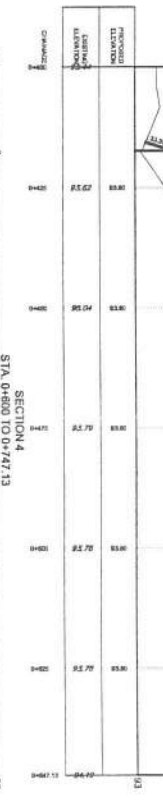
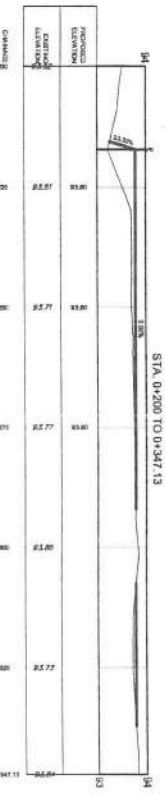
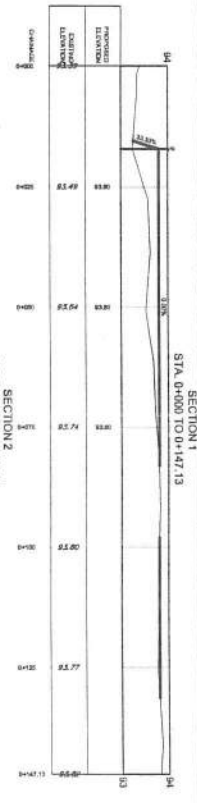
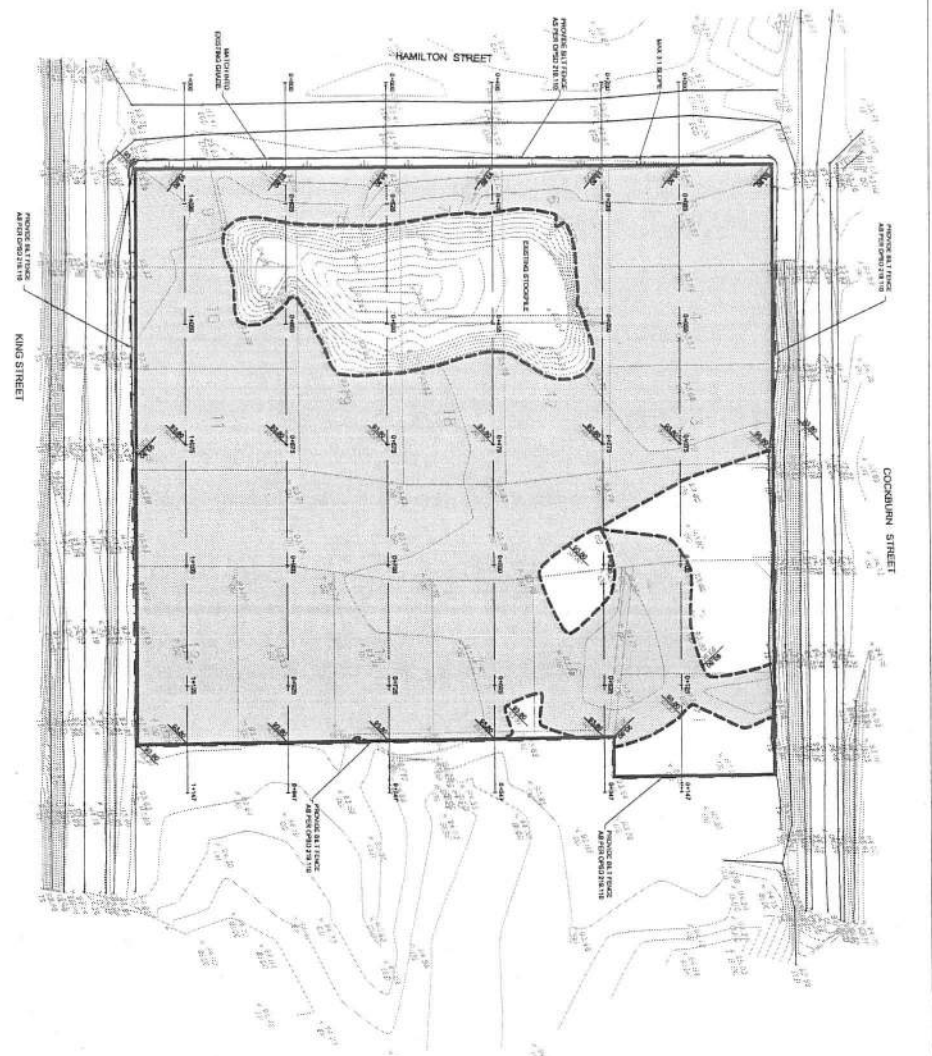
- Residential: Zoning is Village Residential (V3A and V1C) and a draft plan of subdivision will be prepared upon approval of completed work by RVCA.

NOVATECH ENGINEERING CONSULTANTS LTD.



R.S. Cebryk, P.Eng.
Senior Project Manager

20090204/CUTFILL_AP.DOC



LEGEND

- PROPOSED ELEVATION
- EXISTING ELEVATION
- PROPOSED BY 1' VERTICAL
- EXISTING BY 1' VERTICAL
- AS SHOWN ON THIS PLAN

SCALE

HORIZONTAL: 1" = 100'

VERTICAL: 1" = 10'

FOR REVIEW ONLY

NOVATECH ENGINEERING CONSULTANTS LTD.

19027 C/P

NOTE:

THE POSITION OF ALL POLE LINES, CONCRETE, AND STRUCTURES IS NOT NECESSARILY SHOWN ON THIS PLAN. THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. LOCATION OF ALL SERVICE LINES AND THE EXACT STRUCTURES AND ASSUME ALL LIABILITY FOR SAME TO THEM.

MS

Date: April 6, 2009
File: RV5-04/09
Contact: John Garrah

Mr. W. Scanlon
Talos Custom Homes Ltd.
5509 Canotek Road
Unit 1
Ottawa, Ontario
K1J 9J8

Mr. J. Scollan
RR 3
Ashton, Ontario
K0A 1B0

Subject: **Application pursuant to Ontario Regulation 174/06 under Section 28 of the Conservation Authorities Act to undertake development (fill placement from on-site sources) in the regulated area pertaining to Reg. Lot Pts 182, 4R5234, Except Pts 284, 4R11108, Reg. Plan No. 4R-5234, now in the City of Ottawa, being a property with the municipal identification of 10 King Street, Village of Richmond Planning Area**

Dear Sirs:

The proposed development relates to portions of lands within the block bounded by Perth, King, Hamilton and Cockburn Streets in the Village of Richmond community. The information received in the application was reviewed under Ontario Regulation 174/06 ("Development, Interference with Wetlands & Alteration to Shorelines & Watercourses") which the Conservation Authority administers and the approved "Policies Regarding the Construction of Buildings and Structures, Placing of Fill and Alterations to Waterways" (Adopted and Revised by the Board of Directors February 21, 2002 and with transition provisions April, 2006). Specifically, the area reviewed was the property with the legal description referenced above.

This project includes:

The restoration of elevations that existed prior to the stripping of the site that occurred approximately 1990. The fill will create a site with elevations that will resemble the conditions by which the 1980 floodlines were delineated. The proposed works are described on Drawing No. 109027-CFP, Rev. No. 1 February 05/09, Novotech Engineering Consultants Ltd.

The re-grading is situated in the 1:100 year floodplain limits of the Jock River as identified in the most recent (2005) floodplain mapping study. As such, the Conservation Authority's regulatory jurisdiction and mandate apply. Mr. Miroslav Savic, P. Eng. of Novotech Engineering Consultants

Ltd. has provided a supplemental information letter (File No. 109027-0) dated, February 17, 2009, on the Cut/Fill application submitted in accordance with requirements agreed to at a January 14, 2009 meeting at RVCA with Bruce Reid, Glen McDonald, Ferdous Ahmed.

The proposed work is the re-grading of a fill stockpile that was created when the site was stripped prior to being used as a staging/work area by the contractor constructing the sanitary sewer along Hamilton and King Streets. The stripping of this material had the effect of lowering the site elevations below the 1:100 flood level, whereas previously the site was marginally above flood level.

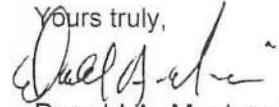
The Cut/Fill Plan-109027-CFP for Project No. 109027 received by the RVCA February 18, 2009 was reviewed by RVCA Water Resources engineering staff and is consistent with the discussions that was had on January 14th 2009 with RVCA staff. **It was noted that there will be no importing of any material on to the site and the scope of work is limited to spreading/re-grading the material in the existing stockpile only.**

By this letter the Rideau Valley Conservation Authority hereby grants you approval to undertake this project as outlined in your permit application but subject to the following conditions:

1. The work is to be restricted to the work only as described in the application, drawings 109027-CFP dated February 5, 2009, as prepared by Miroslav Savic, P. Eng. Novatech Engineering Consultants Ltd.
2. **Sediment and erosion control measures shall be in place before any excavation or construction works commence.** All approved sediment/erosion control measures are to be monitored regularly and maintained as necessary, to ensure good working order and remain in place until landscaping has been established. In the event that the erosion and sedimentation control measures are deemed not to be performing adequately, the contractor shall undertake additional measures as appropriate to the situation to the satisfaction of the Conservation Authority.
3. The entire area is to be reseeded and/or stabilized upon completion of the works to ensure that there is no conveyance of sediment off site into the local ditches and stormsewer system or to the Jock River.
4. Any changes in the proposed construction works, including proposed changes by the contractor or project manager, must be reviewed and approved by the Rideau Valley Conservation Authority prior to implementation.
5. **The owner is ultimately responsible (contractor responsible as well) for failure to comply with any and/or all of these conditions and must take all precautions to ensure no sediment runoff from the work site into the surface waters or stormsewers during and after the construction period. Failure to comply with the approval and/or conditions of this letter may result in the approval being revoked and in the initiation of legal action to remedy the matter to the Conservation Authority's satisfaction.**
6. This permit letter is valid until April 30, 2011, noting the proposed start of work is April, 2009.
6. **A fill deposit of \$3000.00 is to be submitted to the Conservation Authority when the signed copy of this permission is returned to our office. The deposit will be returned (less 10% administration fee) upon review of the finished grading plan**

(referenced to geodetic datum) showing that the fill placement/regrading has been implemented in accordance with the approved plans and confirming that all proposed grades within the site have been achieved and not exceeded or changed.

By this letter the Rideau Valley Conservation Authority assumes no responsibility or liability for any flood, erosion, or slope failure damage which may occur either to your property or the structures on it or if any activity undertaken by you adversely affects the property or interests of adjacent landowners. **This letter does not relieve you of the necessity or responsibility for obtaining any other federal, provincial approvals or municipal zoning approvals and permits.** This permit is not transferable to subsequent property owners. Should you have any questions regarding this letter please contact John Garrah at our Manotick office.

Yours truly,

Donald A. Maciver MCIP, RPP
Director of Planning

cc: Miroslav Savic, P. Eng. Novatech Engineering

City of Ottawa – Infrastructure Services and Community Sustainability
Att'n: D. Herweyer

NOTE: The applicant agrees that Authority staff may visit the site before, during and after construction for the purpose of determining compliance with any conditions as set out in this letter of permission. This letter of permission does not come into full force and effect until the attached copy of this letter is returned to the Authority offices in Manotick signed and dated which return shall be taken as indicating acceptance of the conditions of the Authority's approval and acknowledgement that the details of the proposal as described in this letter are a fair and accurate representation of the proposed undertaking. The fill deposit must also be received.

Pursuant to the provisions of S. 28(12) of the Conservation Authorities Act (R.S.O. 1990, as amended) any or all of the conditions set out above may be appealed to the Executive Committee of the Conservation Authority in the event that they are not satisfactory or can not be complied with.

Forty-eight hours written notice to the Conservation Authority General Manager is required regarding the commencement of work.

It is acknowledged that it is the sole responsibility of the proponent's project management team and the contractor to implement the sediment and erosion control plan and monitoring of same during construction.

Print Name: _____ Date: _____

Signed: _____ Date: _____

Ron Cebryk

From: John Garrah [john.garrah@rvca.ca]
Sent: Thursday, October 22, 2009 2:29 PM
To: r.cebryk@novatech-eng.com
Cc: Bruce Reid
Subject: 10 King Street-RVCA Application RV5-04/09

Ron,

Sorry for the delay on this matter.

The finished grading plan has been reviewed by RVCA staff which is satisfied that it meets the approved plan submitted by Novatech engineering Drawing No. 109027-CFP bearing the stamp of M.Savic P. Eng.

If you have any further questions please contact me.

Regards,

John Garrah

Part 8 OBC Inspector/ Development Review Officer

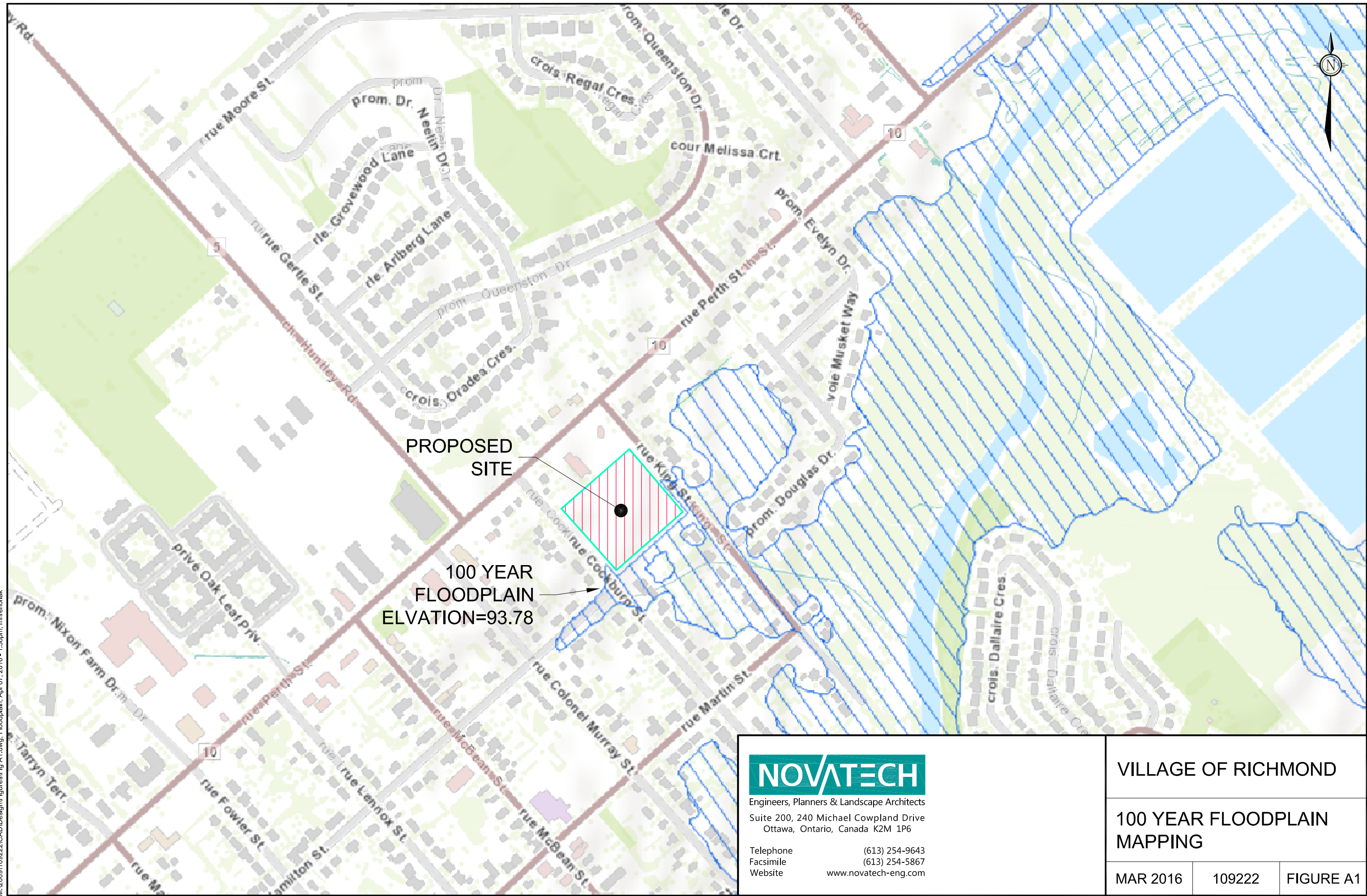
RideauValley Conservation Authority

3889 RideauValley Dr. Box 599

Manotick, Ontario K4M 1A5

613-692-3571 or 1-800-267-3504 extension 1115

john.garrah@rvca.ca



M:\2009\109222\CAD\Design\Figures\Fig A1.dwg, Floodplain, Apr 07, 2016 - 1:38pm, mhrehortak



Engineers, Planners & Landscape Architects
 Suite 200, 240 Michael Cowpland Drive
 Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
 Facsimile (613) 254-5867
 Website www.novatech-eng.com

VILLAGE OF RICHMOND

100 YEAR FLOODPLAIN
 MAPPING

| | | |
|----------|--------|-----------|
| MAR 2016 | 109222 | FIGURE A1 |
|----------|--------|-----------|

APPENDIX B

**City of Ottawa Correspondence
Pre-Consultation Meeting**

Ron Cebryk

From: McWilliams, Cheryl [Cheryl.McWilliams@ottawa.ca]
Sent: Tuesday, December 29, 2009 12:55 PM
To: a.thompson@novatech-eng.com
Cc: Hall, Kevin; Kearney, Michel
Subject: RE: Richmond Square Subdivision (10 Cockburn Street, Richmond)

Adam:

Zoning By-law Amendment Submission Requirements

We have had a look at your comments on the requirement for a Hydrogeological Investigation in support of the Zoning By-law Amendment and note we will require the study. There is still a slight increase in density proposed from the current zoning and we need to ensure that there is adequate water available to this development and that will not impact others, before we can support an amendment.

The balance of the listed submission requirements is accurate.

Subdivision Submission Requirements

I have pulled the old subdivision file and apparently there is a development agreement registered against four lots on Cockburn Street, but the subdivision itself never received draft approval. The agreement will have to be removed prior to registering the subdivision agreement. Nothing has happened on the old subdivision file since April 1991 when it was put in storage. I only have the old RMOC file and cannot find the Goulbourn file which might be more enlightening.

There are no reports filed with existing application, and we will need to discuss - internally - whether the old file should be closed or if we can continue under that file. Unfortunately this week I am the only one in the office. I will get back to you next week and let you know the status of the old file and any requirements for new application or submission required under the old file. There is probably not a need to set up another meeting at this point.

Thanks,

Cheryl McWilliams, MCIP, RPP
Planner
Development Review - Rural
Planning and Growth Management
City of Ottawa
110 Laurier Ave W
580-2424 ext 30234
fax 580-2576

-----Original Message-----

From: Adam Thompson [mailto:a.thompson@novatech-eng.com]
Sent: December 21, 2009 1:52 PM
To: McWilliams, Cheryl
Cc: Ron Cebryk; Murray Chown; Kearney, Michel; Hall, Kevin
Subject: Richmond Square Subdivision (10 Cockburn Street, Richmond)

Cheryl,

Thank you for our pre-consultation meeting on Wednesday, December 16, 2009 regarding a proposed subdivision for the lands at 10 Cockburn Street in Richmond. Further to this meeting and our subsequent conversation, it is our understanding that the supporting documentation required for a Zoning By-law Amendment application includes the following:

- Planning Rationale
- Phase 1 and 2 Environmental Site Assessment
- Concept Plan showing the proposed lotting, units and streets
- Conceptual Servicing Study that reviews stormwater, sanitary and water services

We also understand that the City is requesting a Hydrogeological Investigation in support of the Zoning By-law Amendment application. In our meeting, we explained that, in our opinion, a Hydrogeological Investigation should not be required in support of the Zoning By-law Amendment, but rather as support for the subsequent Draft Plan of Subdivision application.

We continue to be of the opinion that a Hydrogeological Investigation should not be required for the Zoning By-law Amendment. The current zoning on the subject property would permit the development of up to 22 townhouse units and 13 single family dwellings for a total of 35 units. The proposed zoning would allow semi-detached dwellings with the potential for up to 40 units. The difference between the existing permitted unit count and the proposed is minimal and is not significant enough in terms of water usage to justify a delay in processing the Zoning application.

It is understood that a Hydrogeological Investigation is required in support of the Draft Plan of Subdivision. We note that the Subdivision application is expected to be filed within two months of filing the Zoning By-law Amendment application. Should the City still be concerned with the number of units and how it relates to the zoning amendment, there will be sufficient time to review the results of the Hydrogeological Investigation in advance to bringing a Staff Report to ARAC on the Zoning application.

A Draft Plan of Subdivision application will follow shortly after submission of the Zoning By-law Amendment. It is our understanding that the following supporting documentation will be required for the Subdivision application:

- Proposed Draft Plan of Subdivision
- Record of Site Condition
- Hydrogeological Investigation
- Conceptual Servicing Study
- Conceptual Stormwater Management Plan

We note that a Tree Preservation Report was not going to be required, however one is available and would be provided with the application.

As discussed in our meeting, and upon further review of the City of Ottawa Transportation Report Guidelines, a Traffic Impact Study will not be required for this subdivision. The proposed 40 unit subdivision is less than the 75 units that would trigger the need for a Traffic Brief. We also understand that the City will consider whether or not a Noise Assessment will need to be completed with respect to noise generated from Perth Street.

You suggested that another meeting would be required to finalize the draft plan submission requirements. We suggest that this occur early in the new year. Please advise if you feel there is anything we have missed with respect to the requirements of these applications.

Thank you,

Adam Thompson MCIP RPP
Planner

Novatech Engineering Consultants Ltd.

Suite 200, 240 Michael Cowpland Drive

Kanata . Ontario . Canada . K2M 1P6

Tel: (613) 254-9643 x270

Fax: (613) 254-5867

Email: a.thompson@novatech-eng.com

Web: <http://www.novatech-eng.com>

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Matthew Hrehoriak

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Sent: August-12-16 1:33 PM
To: Cara Ruddle; Hall, Kevin
Cc: Adam Thompson
Subject: RE: Talos Richmond.

Hello Cara, the inclusion of the OGS unit to provide quality control for the stormwater for the protection of surface water quality and aquatic habitat in the receiver is acceptable to the RVCA.

Jocelyn Chandler M.Pl. MCIP, RPP
Planner, RVCA
t) 613-692-3571 x1137
f) 613-692-0831
jocelyn.chandler@rvca.ca

www.rvca.ca

mail: Box 599 3889 Rideau Valley Dr., Manotick, ON K4M 1A5

courier: 3889 Rideau Valley Dr., Nepean, ON K2C 3H1

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From: Cara Ruddle [mailto:c.ruddle@novatech-eng.com]
Sent: Wednesday, August 10, 2016 10:28 AM
To: Hall, Kevin <Kevin.Hall@ottawa.ca>
Cc: Jocelyn Chandler <jocelyn.chandler@rvca.ca>; Adam Thompson <a.thompson@novatech-eng.com>
Subject: RE: Talos Richmond.

Kevin:

Further to your comments below, please find attached a revised stormwater management plan for the above noted site. We have revised the drainage areas as discussed in your email below and show possible connections for rear yard catchbasins. Please confirm which connections the City would prefer and we will update the report accordingly. We have reviewed various storm servicing options and the attached sketch shows a revised proposal. We feel that a roadside ditch and subdrain system will not work along Street 1 as there are too many driveways and the intended purpose of infiltration would not be achieved. Also the proposed storm sewer along Street 1 has been oversized to provide some quantity control of stormwater.

We are proposing to provide quality control of stormwater with an OGS unit with the invert above the 2 year flood level in the Jock River system. The storm sewer from Street 1 would outlet to a proposed storm sewer below the existing road side ditch along the south or west side of King Street and is shown in the attached sketch. Please confirm if this design concept is acceptable and we can revise and resubmit the report.

Please call or email if you have any questions. Thanks.

Cara Ruddle, P.Eng.
Project Manager

NOVATECH Engineers, Planners & Landscape Architects

From: Hall, Kevin [<mailto:Kevin.Hall@ottawa.ca>]
Sent: Thursday, July 07, 2016 11:46 AM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Subject: Talos Richmond.

Cara

I have reviewed the Talos Homes Richmond Square Subdivision Conceptual Servicing Study Revised April 18, 2016 and have the following comments.

1. The City can accept the proposal of the use of sump pumps. The design details need to be finalized eg: outlet and basement goose neck.
2. The front of Lots 15-20 most likely will be draining to the road and should be taken out of the design of the sewer. Also the rear yard CB could be connected to Hamilton street instead of connecting to Street One. By removing these two drainage areas might make the storm water design of street one easier.
3. Road crossing culverts need to be minimum 600mm diameter and 2.8mm thickness.
4. Due to the comments from the CA the City is willing to look at an alternative road design to having a road with curbs and explore the opportunity of using ditches and or an infiltration system to achieve the quality requirements.

Please revise the report and re-submit.

Kevin Hall, C.E.T.

Project Manager, Infrastructure Approvals
Development Review - Rural Services
Gestionnaire de projet, Approbation des demandes d'infrastructure
Examen des demandes d'aménagement (Services ruraux)



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APPENDIX C

Master Servicing Study Information

4.6 PREFERRED WATER SERVICING SOLUTION

The preferred solution for providing potable water to Richmond includes the following:

- Existing, infill and “rounding out” areas to be serviced by private wells until connection to communal system is warranted (“rounding out” is not specifically defined, although the intent is that this represents relatively minor development areas located throughout the village)
- Larger scale future growth areas to be serviced by communal system(s) with at-grade storage as required to meet balancing, fire and emergency needs
- Communal system(s) are to be designed to allow for expansion/integration to service all existing and future development areas within the Village of Richmond with the intent of ultimately creating a single communal well system (one primary storage/pumping facility with several individual well sites) for the entire Village.

This solution allows for existing residences, as well as institutional, commercial and industrial establishments to remain connected to private wells and allows for limited infill development and “rounding out” development to be serviced by new private wells in the short to medium terms. To provide potable water and fire protection for new large scale developments, a new communal well system will be constructed west of the Jock River within the Western Development Lands. This new system will be designed to current City of Ottawa standards and will consist of multiple deep wells, disinfection (and further treatment if required), at-grade storage, a high lift pumping station and a network of distribution watermains. This communal system will be designed for future expansion to service existing and other growth within the Village of Richmond. As well, an expansion and/or extension of the City of Ottawa’s existing King’s Park Communal Well System will be considered for servicing new development and/or existing areas east of the Jock River. A piped connection between these communal well systems is recommended when feasible to improve reliability for all serviced areas within the Village.

8.3 FUNCTIONAL DESIGN OF THE RECOMMENDED WASTEWATER DESIGN CONCEPT

The preferred wastewater design concept for the Village of Richmond is to upgrade the gravity collection system, repair the existing forcemain, construct a new 600mm diameter forcemain and expand the existing Richmond pump station to service all existing and planned development within the Village boundary. As it is anticipated that the growth projections will continue to evolve over time as more detailed development information becomes available, prior to the undertaking the detailed design of the recommended design concept, it recommended that the population projections, wastewater flows and functional design be revisited.

8.3.1 Sanitary Flows

As discussed in **section 8.1** the inflow and infiltration rates in the Village’s wastewater collection exceed the City’s sewer design guidelines, with a monitored I/I rate of 0.70L/s/ha being measured during the September 9, 2004 event. As the City will be implementing I/I reduction strategies in the Village as part of a long term objective to reduce the extraneous flows to something more line with the City guideline of 0.28L/s/ha, the City directed the design team to assume that the existing pump station, with a capacity of 160L/s, is adequate to service all existing and infill development within the Village in conjunction with the continued use of the lagoons for storage during snowmelt and extreme wet weather events and to upgrade the station to convey the peak wet weather flow of 200L/s from the future growth areas. Therefore, the pump station will be designed to convey a maximum of 360L/s to the Glen Cairn Collector, but must be capable of pumping the total peak wet weather flow of 460L/s to the lagoon under emergency conditions. Regardless of the pump station operation/design, the gravity collection system will be sized to handle the total peak WWF of 460L/s.

Table 8-7 and **Table 8-8** summarize the range of sanitary flows expected to enter the Richmond Pump Station.

| Table 8-7: High Growth Scenario Wastewater Flows – Operational and Design Parameters (L/s) | | | |
|---|--------------------------|-----------------------|-----------------------|
| | Average DWF ^A | Peak DWF ^A | Peak WWF ^B |
| Existing, Infill & Future Growth | 97 | 213 | 456 |

Notes:

- A. Flows include GWI and 6L/s from Munster Pump Station.
- B. Peak WWF do not include flows from Munster. During extreme wet weather events the Munster flows are stored on-site and pumped after the event has passed.

| Table 8-8: Flows from the Richmond Pump Station | | | | |
|--|---|---|-----------------------------------|--|
| | Normal and Extreme WWF Operation ^A | | | Emergency Operation |
| Scenario | Peak WWF Flow into the Richmond PS (L/s) | Peak Flow into the Glen Cairn Collector (L/s) | Peak WWF into Lagoon Cell C (L/s) | Peak WWF Flow into Lagoon Cell C (L/s) |
| Existing, Infill & Future Growth | 456 | 360 | 96 | 456 |

Notes:

A. *Peak WWFs do not include flows from Munster Pump Station. During extreme wet weather events the Munster flows are stored on-site and pumped after the event has passed.*

8.3.2 Gravity Sewer Design

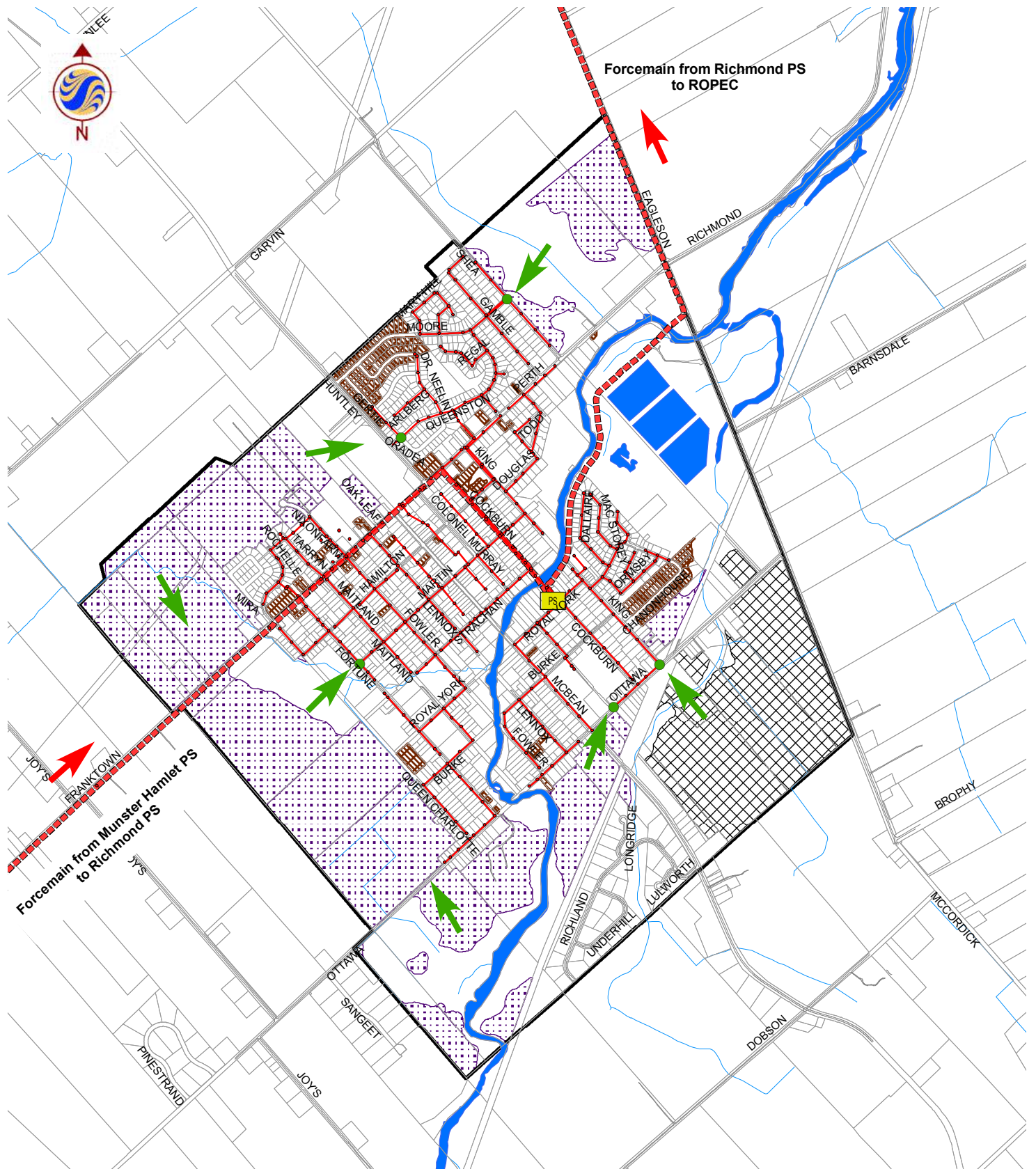
The gravity collection system was designed to convey a peak WWF of 460L/s from all existing development, as well as the planned infill and future growth areas within the Village boundary. In general, the existing collection system has sufficient capacity to convey the future peak wet weather flows except along sections of Martin Street, Cockburn, King and Royal York which are under capacity. The collection system upgrades described below, are illustrated in **Figure 8-6** and **Figure 8-7** with the supporting design calculations provided in **Appendix J**. The existing connection elevation of the gravity sewer into the wet well is unchanged at 86.0m, with revisions being made to the sizes and slopes of the upstream sewers to ensure gravity servicing for all, but a small pocket, of the future development area.

Figure 8-8 identifies where the future growth areas were assumed to contribute and the servicing assumptions in the individual areas.

North of Jock River










- Martin (Fortune to Fowler) - 287m – 525mm dia @ 0.15%
- Martin (Fowler to McBean) - 326m – 525mm dia @ 0.25%
- Martin (McBean to Cockburn) - 283m – 600mm dia @ 0.15%
- Cockburn (Martin to Richmond PS) – 307m – 675mm dia @ 0.2-0.25%

Note: A more detailed servicing investigation of the low lying area west of Fortune and south of Ottawa, where the ground elevation is less than 96m, is needed to confirm if gravity servicing is or is not feasible.



W:\active\1634_00808_Richmond_Water_Sanitary\planning\drawing\GIS Data\Master Plan Figures\Figure 5.4-richmond_wastewater_servicing_existing&alternatives_20090203.mxd

Legend

- | | | | |
|---|-----------------------------|---|---------------------------------------|
|  | WWPS |  | Village of Richmond Boundary |
|  | Future Dev. Loadings |  | Future Residential Development |
|  | Sanitary MH |  | Future Infill Development |
|  | Sanitary Collector |  | Future Industrial Development |
|  | Sanitary Forcemain | | |



Stantec

Client/Project

CITY OF OTTAWA
VILLAGE OF RICHMOND
MASTER SERVICING STUDY

Figure No.

5.4

Title **Connection Locations
to the Central Collection System**

January 2009

APPENDIX D

Sanitary Servicing Information

Ron Cebryk

From: Ron Cebryk [r.cebryk@novatech-eng.com]
Sent: Thursday, February 18, 2010 5:09 PM
To: 'joseph.zagorski@ottawa.ca'
Subject: 10 Cockburn Street Sanitary Area - Proposed Richmond Square Subdivision

Joe,

Further to our telephone conversation regarding the proposed 40 unit residential development, the following information is provided to assist you in incorporating the development area in the work being done to update the Stantec Study for the Water and Sanitary Master Servicing Study.

1. The site (see attached aerial photo) is zoned for low and medium density development with about 35 units.
2. The site is proposed, through rezoning, to be 40 units of semi-detached residential (see attached draft plan of subdivision).
3. The site was included in Stantec's study with a development area as shown on Figure 5.4 in Stantec's report (copy attached). This development area reflected the floodlines that are shown on the regulatory floodplain mapping.
4. This past spring we proposed to RVCA that the site was in the floodplain as a result of site stripping which occurred between the original floodplain mapping and the latest mapping. The stripping was left in a stockpile on site and is shown by the isolated area in the south of the site on Stantec Figure 5.4. In light of this, we proposed that the site should not be encumbered by the latest floodplain mapping and that the entire site should be considered outside the floodplain as per the original elevations prior to stripping. In order to accomplish this, it was proposed that the stripping, which had been stockpiled on the site, be spread over the site. This was agreed to and the work was done.
5. As-built surveys were completed and submitted to RVCA for approval. This approval was granted and a copy of this is attached.

I trust that the information provided above is sufficient for you to have the entire development incorporated in the report update. As I indicated to you, the impact of going from 35 to 40 units results in a very small increase in design flow of 0.1 L/s.

If you have any questions, please contact me.

Regards,
Ron

Ron Cebryk
Senior Project Manager

Novatech Engineering Consultants Ltd.
Suite 200, 240 Michael Cowpland Drive
Kanata . Ontario . Canada . K2M 1P6
Tel: (613) 254-9643 x220
Fax: (613) 254-5867
Email: r.cebryk@novatech-eng.com
Web: <http://www.novatech-eng.com>

'The information contained in this email message is confidential and is for exclusive use of the addressee.'



SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED _____ 20____.

THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT, THIS _____ DAY OF _____ 20____.

MICHAEL WIDOMAK, MANAGER
 DEVELOPMENT REVIEW, RURAL SERVICES BRANCH
 PLANNING AND GROWTH MANAGEMENT DEPARTMENT
 INFRASTRUCTURE SERVICES AND COMMUNITY SUSTAINABILITY
 CITY OF OTTAWA



1-5509 CANOTEK ROAD, OTTAWA, ON K1J 9J8
 TEL: 747-3993 FAX: 747-2868

DRAFT
 PLAN OF SUBDIVISION OF
 UNIT 59 AND PART OF UNIT 56
 INDEX PLAN D-13
 Geographic Township of Goulbourn
 CITY OF OTTAWA
 STANTEC GEOMATICS LTD.
 2009



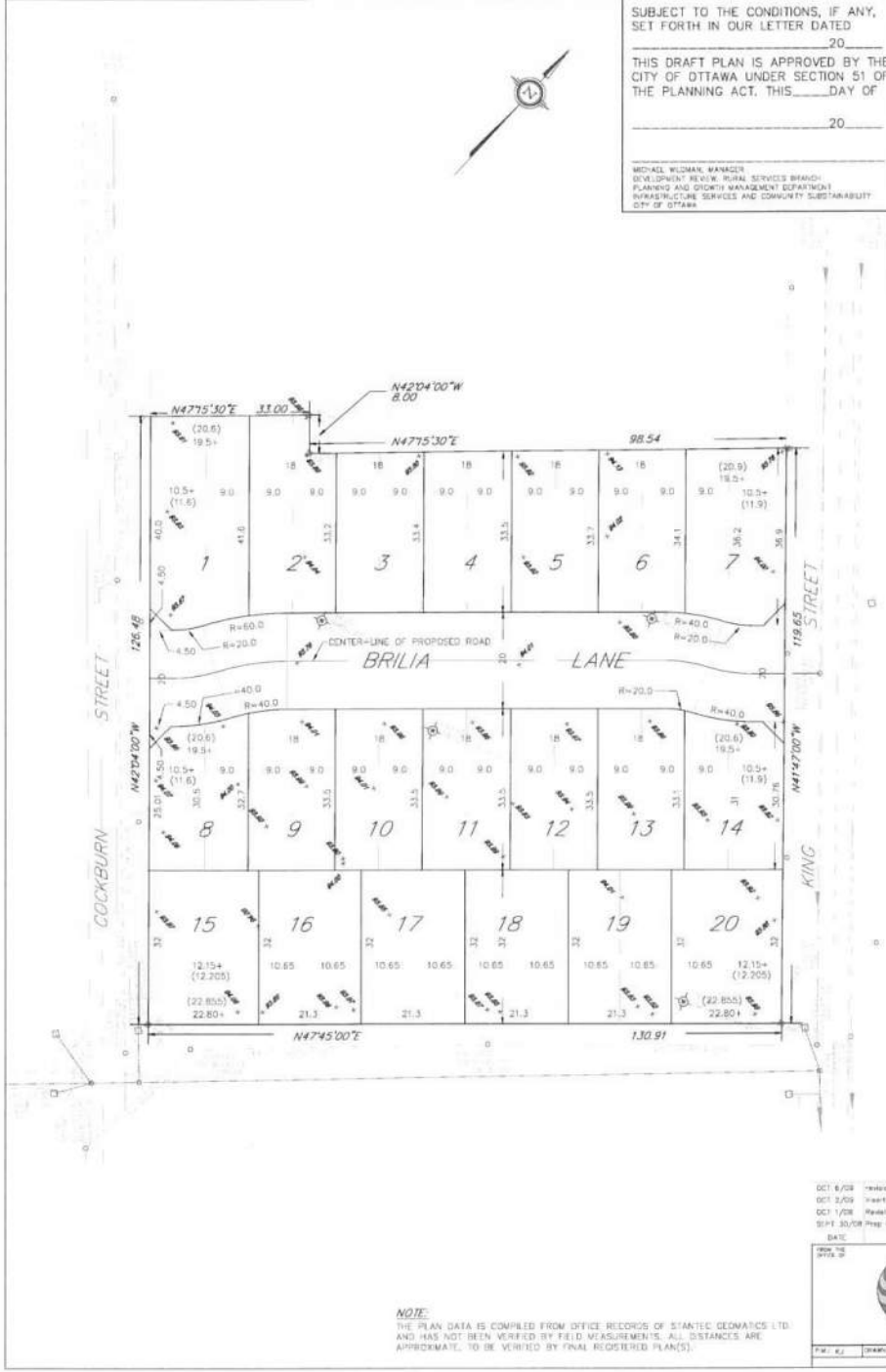
SURVEYOR'S CERTIFICATE:
 I HEREBY CERTIFY THAT THE BOUNDARIES OF THE SUBJECT LANDS AND THEIR RELATIONSHIP TO ADJOINING LANDS HAVE BEEN ACCURATELY AND CORRECTLY SHOWN.

DATE: _____
 BRIAN J. WEBSTER
 ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE:
 I HEREBY AUTHORIZE THIS DRAFT PLAN OF SUBDIVISION TO BE SUBMITTED ON MY BEHALF.

DATE: _____

- ADDITIONAL INFORMATION:**
- 1) PRELIMINARY CITY WATER AVAILABLE
 - 2) SET SOI REPORT
 - 3) SEE TOPOGRAPHICAL INFORMATION
 - 4) ALL CITY SERVICES AVAILABLE
 - 5) NONE KNOWN



NOTE:
 THE PLAN DATA IS COMPILED FROM OFFICE RECORDS OF STANTEC GEOMATICS LTD AND HAS NOT BEEN VERIFIED BY FIELD MEASUREMENTS. ALL DISTANCES ARE APPROXIMATE, TO BE VERIFIED BY FINAL REGISTERED PLANS.

| | | | |
|------------|--|----------|----|
| OCT 6/09 | Revisions to center-line, re-lot 7 and 14, get to MGS for review | Rev2.dwg | CS |
| OCT 2/09 | Insert (see built system/prop) from rev'd Moncton.dwg files, get to MGS for review | Rev3.dwg | CS |
| OCT 1/08 | Revisions per MGS meeting, add Concept Oct 11-08 to MGS for preliminary review | Rev2.dwg | CS |
| SEPT 30/08 | Prep Concept Sept 30-08-A per DT/MGS for rev'd Sept 29-08 | Rev1.dwg | CS |

DATE: _____

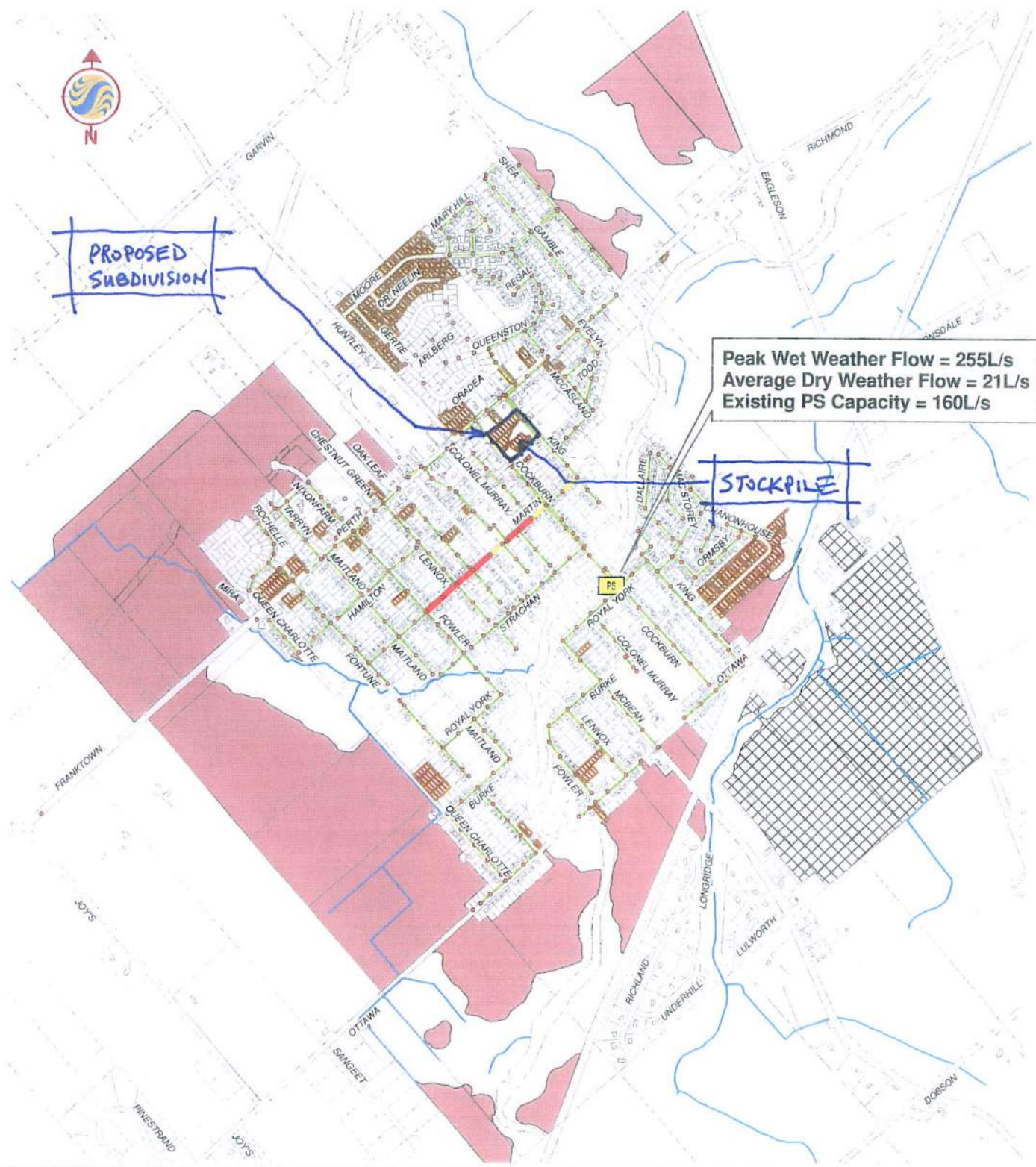
S T A N T E C



STANTEC GEOMATICS LTD.







Ontario Land Surveyors
 201446 - 201460
 (613) 722-4425 FAX (613) 722-0188
 "C" REG. URBAN SURVEYORS
 Website: www.stantec.com

| | | | | | |
|---|----------|-------|----------|---------|--------------|
| DWG. NO. | DRAWN BY | FILED | PROJECTS | JOB NO. | 18011809-130 |
| app-1-10-00011809-130_Stage Homes Richmond-Rev 2 - 14_M_0 | | | | | |



W:\active\1634_00806_Richmond_Water_Sanitary\planning\drawing\GIS Data\Master Plan\Figures\Figure 5-4-r1\mond_wastewater_SS_Results_fmlr_Only_pstrat_0420090130.mxd

Legend

| | | |
|---|---|--------------------|
| Flow / Pipe Capacity |  | Future Development |
|  |  | Future Infill |
|  |  | Future Industrial |
|  | | |

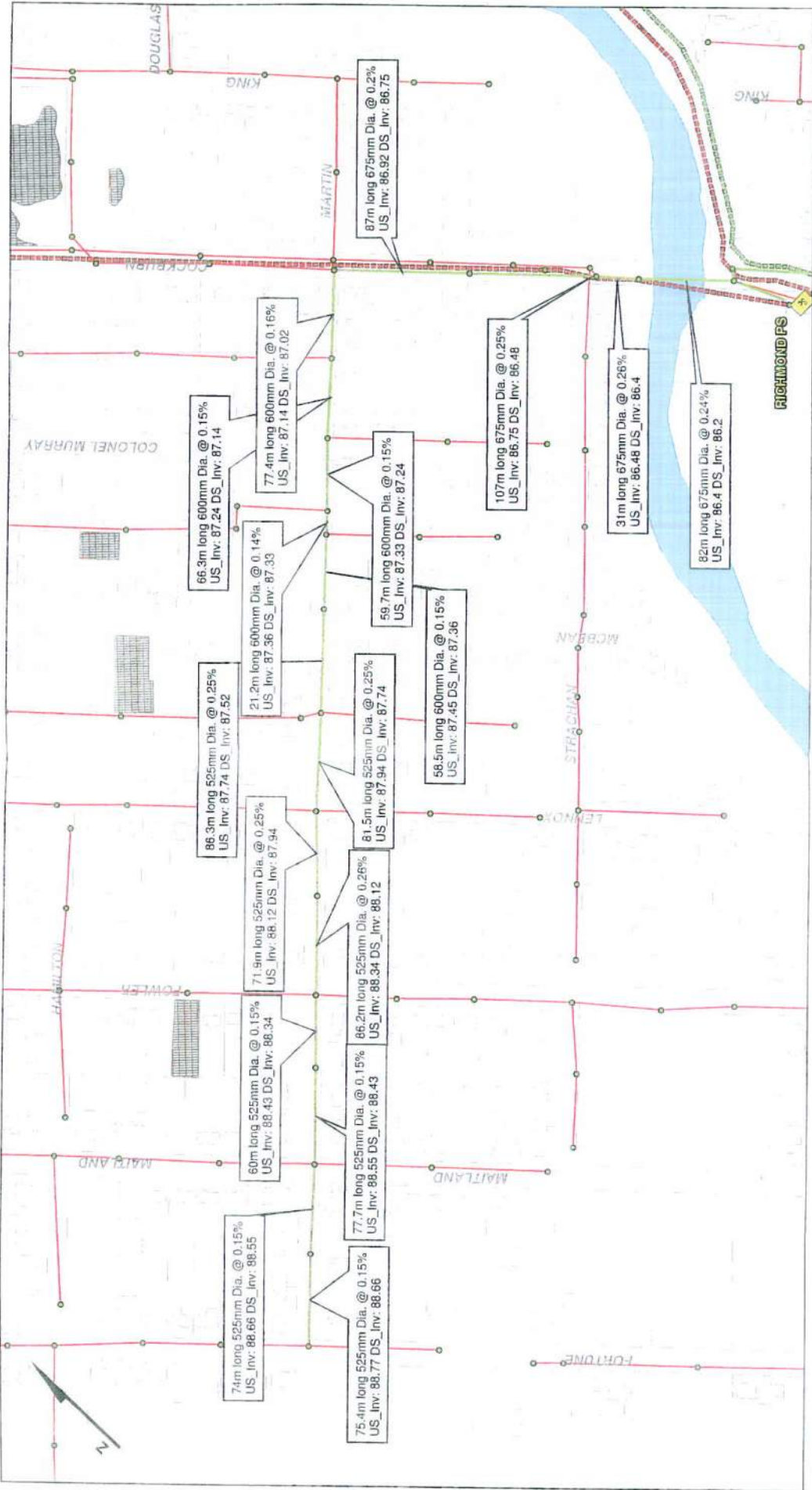
0.00-0.90
0.90-1.10
+1.10



Client/Project
CITY OF OTTAWA
VILLAGE OF RICHMOND
SANITARY MASTER SERVICING STUDY

Figure No. **5.4**

Title **Existing and Infill Area Gravity Collection System Bottlenecks** March 2009 1634-00808



Legend

- Sanitary Sewer Options A, B, C
- Sanitary Foremain Upgrades
- Existing Sanitary Sewer
- Existing Sanitary Foremain
- Future Infill
- Future Development
- Sanitary Manhole

0 25 50 100 150 200 Meters

1:3,000

Ron Cebryk

From: John Garrah [john.garrah@rvca.ca]
Sent: Thursday, October 22, 2009 2:29 PM
To: r.cebryk@novatech-eng.com
Cc: Bruce Reid
Subject: 10 King Street-RVCA Application RV5-04/09

Ron,

Sorry for the delay on this matter.

The finished grading plan has been reviewed by RVCA staff which is satisfied that it meets the approved plan submitted by Novatech engineering Drawing No. 109027-CFP bearing the stamp of M.Savic P. Eng.

If you have any further questions please contact me.

Regards,

John Garrah

Part 8 OBC Inspector/ Development Review Officer

RideauValley Conservation Authority

3889 RideauValley Dr. Box 599

Manotick, Ontario K4M 1A5

613-692-3571 or 1-800-267-3504 extension 1115

john.garrah@rvca.ca



SANITARY SEWER DESIGN SHEET

PROJECT #:109222
 DESIGNED BY : RSC
 CHECKED BY : RSC

PROJECT: **Richmond Square Subdivision**
 DEVELOPER: **Talos Homes**

DATE: 01-Feb-10
 REV.:

| LOCATION | | | INDIVIDUAL | | | CUMULATIVE | | PEAK FACTOR M | POPULATION FLOW | PEAK EXTRAN. | PEAK DESIGN | PROPOSED SEWER | | | | | |
|-------------------------|---------|-------|------------|------------------------|------------|------------------------|------------|---------------|-----------------|-----------------|------------------|----------------|----------------|--------------|---------|----------------|--------------------------|
| STREET | FROM MH | TO MH | Units | Population (in 1000's) | AREA (ha.) | Population (in 1000's) | AREA (ha.) | | Q (p) (L/s) | FLOW Q(i) (L/s) | FLOW Q (d) (L/s) | LENGTH (m) | PIPE SIZE (mm) | TYPE OF PIPE | GRADE % | CAPACITY (L/s) | FULL FLOW VELOCITY (m/s) |
| Exist Zoning - 35 Units | | | 35 | 0.104 | 1.59 | 0.104 | 1.590 | 4.2 | 1.78 | 0.45 | 2.22 | N/A | N/A | N/A | N/A | N/A | |
| Rezoning - 40 Units | | | 40 | 0.108 | 1.59 | 0.108 | 1.590 | 4.2 | 1.85 | 0.45 | 2.30 | N/A | N/A | N/A | N/A | N/A | |
| | | | 75 | 0.212 | 3.180 | | | | | | | 0.0 | | | | | |

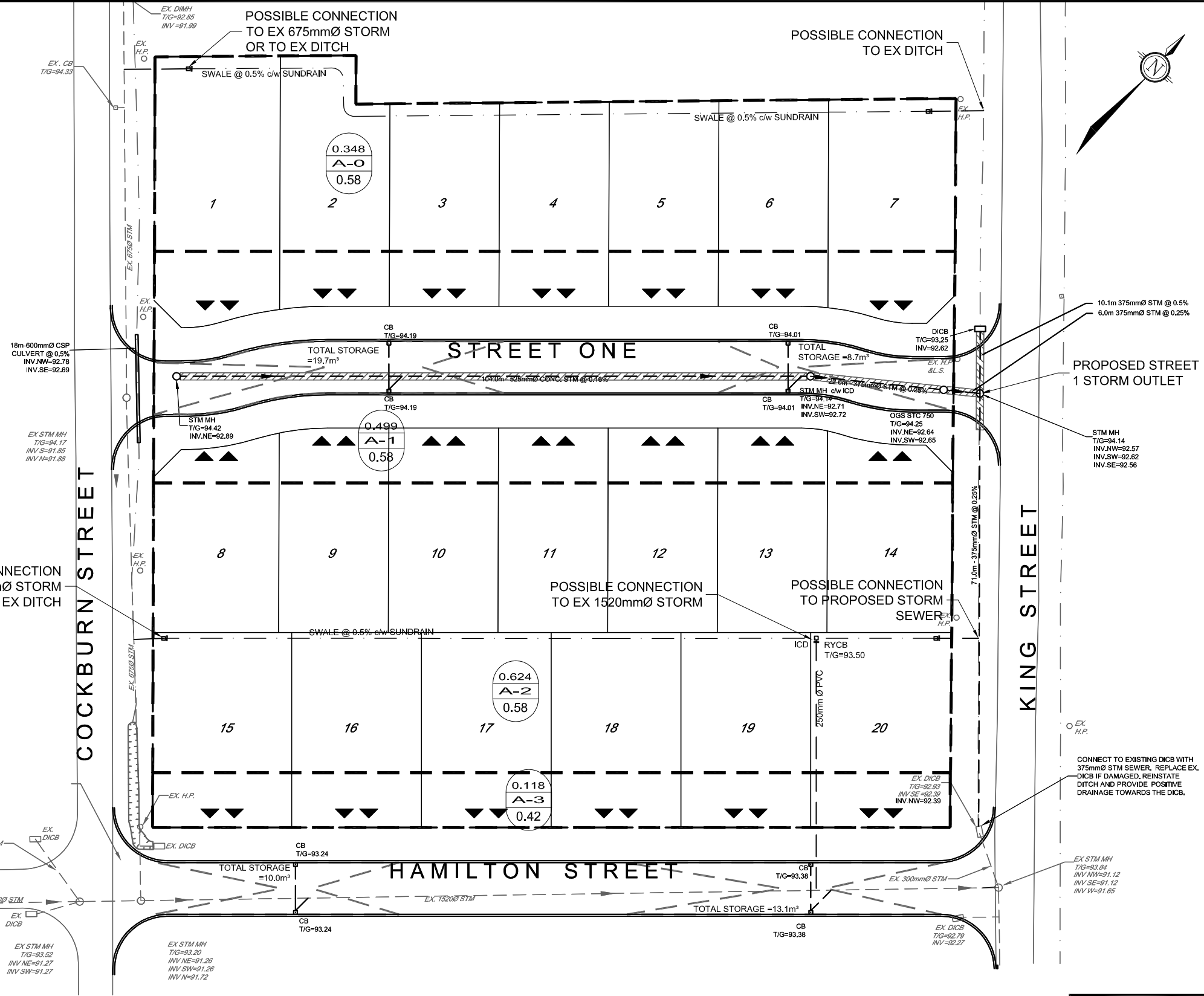
Notes:

- 1. $Q(d) = Q(p) + Q(i)$, where $Q(d)$ = Design Flow (L/sec)
 $Q(p)$ = Population Flow (L/sec)
 $Q(i)$ = Extraneous Flow (L/sec)
- 2. $Q(i) = 0.28$ L/sec/ha
- 3. $Q(p) = (P \times q \times M) / 86,400$, where
 P = Population Exist Zoning = 35 units (13sf & 22 Towns) @ 3.4 persons & 2.7 persons/unit respectively
 P = Population Rezoning = 40 units (semi-detached) @ 2.7 persons/unit
 q = Average per capita flow = 350 L/cap/day
 M = Harmon Formula (maximum of 4.0)
 Min pipe size 200mm @ min. slope 0.4%
 250 min slope 0.28%

APPENDIX E

Stormwater Management Calculations

M:\2009\109222\CAD\Design\109222-SWM.dwg, SWM CONCEPT, Sep 01, 2016 - 1:29pm, mhrehorlak



LEGEND

- PROPOSED STORM SEWER
 - PROPOSED STORM MH
 - PROPOSED CATCHBASIN
 - ▶ PROPOSED SEWER FLOW DIRECTION
 - ◀ EXISTING DITCH INLET CB
 - ▶ EXISTING SEWER FLOW DIRECTION
 - EXISTING STORM MH
 - PROPOSED SURFACE PONDING LIMITS
 - STORM DRAINAGE AREAS
-
- | | |
|-------|--------------------|
| 0.275 | DRAINAGE AREA (ha) |
| A-4 | AREA IDENTIFIER |
| 0.58 | RUNOFF COEFFICIENT |

NOVATECH
 Engineers, Planners & Landscape Architects
 Suite 200, 240 Michael Cowpland Drive
 Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
 Facsimile (613) 254-5867
 Website www.novatech-eng.com

VILLAGE OF RICHMOND

CONCEPTUAL SWM PLAN

SCALE 1 : 750

DATE **SEPT 2016** JOB **109222** FIGURE **A2**

TABLE 1A: Pre-development Runoff Coefficient "C"

| Area | Surface | Ha | "C" | C _{avg} |
|-------|---------|-------|------|------------------|
| Total | Hard | 0.000 | 0.90 | 0.20 |
| 1.590 | Soft | 1.590 | 0.20 | |

Runoff Coefficient Equation

$$C = (A_{\text{hard}} \times 0.9 + A_{\text{soft}} \times 0.2) / A_{\text{Tot}}$$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00

TABLE 1B: Allowable Flows

| Outlet Options | Area (ha) | C _{avg} | Tc (min) | Q _{2 Year} (L/s) |
|----------------|-----------|------------------|----------|---------------------------|
| Jock River | 1.590 | 0.20 | 10 | 67.9 |

Time of Concentration Tc= 10 min
 Intensity (2 Year Event) I₂= 76.81 mm/hr

TABLE 4A: Post-Development Runoff Coefficient "C" - A-1

| Area | C _{avg} | *C ₁₀₀ |
|-------|------------------|-------------------|
| Total | 0.58 | 0.66 |
| 0.499 | | |

TABLE 4B: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-1

0.499 =Area (ha)
 0.58 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s) | Net Flow to be Stored (L/s) | Storage Req'd (m ³) |
|---------------|------------|-------------------|--------------|------------------------|-----------------------------|---------------------------------|
| 5 YEAR | 0 | 230.48 | 185.44 | 61.0 | 124.44 | 0.00 |
| | 5 | 141.18 | 113.59 | 61.0 | 52.59 | 15.78 |
| | 10 | 104.19 | 83.83 | 61.0 | 22.83 | 13.70 |
| | 15 | 83.56 | 67.23 | 61.0 | 6.23 | 5.61 |
| | 20 | 70.25 | 56.52 | 61.0 | -4.48 | -5.37 |

TABLE 4C: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-1

0.499 =Area (ha)
 0.66 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s) | Net Flow to be Stored (L/s) | Storage Req'd (m ³) |
|---------------|------------|-------------------|---------------|------------------------|-----------------------------|---------------------------------|
| 100 YEAR | 0 | 398.62 | 364.96 | 69.4 | 295.56 | 0.00 |
| | 5 | 242.70 | 222.21 | 69.4 | 152.81 | 45.84 |
| | 10 | 178.56 | 163.48 | 69.4 | 94.08 | 56.45 |
| | 15 | 142.89 | 130.83 | 69.4 | 61.43 | 55.29 |
| | 20 | 119.95 | 109.82 | 69.4 | 40.42 | 48.51 |

Equations:

Flow Equation

$$Q = 2.78 \times C \times I \times A$$

Where:

C is the runoff coefficient

I is the rainfall intensity, City of Ottawa IDF

A is the total drainage area

Runoff Coefficient Equation

$$C_s = (A_{hard} \times 0.9 + A_{soft} \times 0.2) / A_{Tot}$$

$$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25) / A_{Tot}$$

TABLE 4D: STORAGE PROVIDED - A-1

| | Surface (Road) | Pipe | Structures | Surface (Swale) | Rear Yard Subdrain | Total Storage |
|----------------------------------|----------------|------|------------|-----------------|--------------------|---------------|
| Storage Volume (m ³) | 28.4 | 23.2 | 4.9 | N/A | N/A | 56.5 |

TABLE 4E: Orifice Sizing information - A-1

| Control Device | | | | | | |
|----------------|------------|----------|----------|------------------|------------------------|-----------|
| Plug ICD | | 160 mm | | | | |
| Design Even | Flow (L/S) | Head (m) | Elev (m) | Outlet dia. (mm) | Area (m ²) | Dia. (mm) |
| 1:5 Year | 61.0 | 1.22 | 94.01 | 375.00 | 0.020 | 160.0 |
| 1:100 Year | 69.4 | 1.58 | 94.37 | 375.00 | 0.020 | 160.0 |

| MAX Ponding Depth (cm) | |
|------------------------|------|
| 1:100 Yr | 0.18 |
| 1:5 Yr | 0 |

APPENDIX F

Development Servicing Study Checklist

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ~~N/A~~ Executive Summary (for larger reports only).
- Date and revision number of the report.
- Location map and plan showing municipal address, boundary, and layout of proposed development. **FIGS. 1 & 2**
- Plan showing the site and location of all existing services. **FIG. 3**
- Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- Summary of Pre-consultation Meetings with City and other approval agencies.
- Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.
- Statement of objectives and servicing criteria.
- Identification of existing and proposed infrastructure available in the immediate area.
- 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).

- 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.
- 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. **HYDROGEO REPORT**
- Proposed phasing of the development, if applicable.
- Reference to geotechnical studies and recommendations concerning servicing.
- 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

4.2 Development Servicing Report: Water

- Confirm consistency with Master Servicing Study, if available
- Availability of public infrastructure to service proposed development
- Identification of system constraints
- Identify boundary conditions
- Confirmation of adequate domestic supply and pressure
- 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.
- 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.
- Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
- Address reliability requirements such as appropriate location of shut-off valves
- Check on the necessity of a pressure zone boundary modification.

- 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
- ~~N/A~~ 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 feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ~~N/A~~ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ~~N/A~~ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

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

- 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).
- 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.
- 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.

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)
- Analysis of available capacity in existing public infrastructure.
- A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern. **REFERENCE MADE TO MCMANUS REPORT**
- 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.
- Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ~~N/A~~ Set-back from private sewage disposal systems.
- ~~N/A~~ Watercourse and hazard lands setbacks.
- Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

- Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- 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. *McManus Report*
- ~~N/A~~ Any proposed diversion of drainage catchment areas from one outlet to another.
- 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.
- Identification of potential impacts to receiving watercourses
- Identification of municipal drains and related approval requirements.
- Descriptions of how the conveyance and storage capacity will be achieved for the development.
- 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.
- Inclusion of hydraulic analysis including hydraulic grade line elevations. *REFER TO McMANUS STUDY*
- Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- 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.
- Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

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

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

4.6 Conclusion Checklist

- Clearly stated conclusions and recommendations
- 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