

## **879 River Road – Functional Servicing Report**

Project #160401394



Prepared for:  
Richcraft Group of Companies

Prepared by:  
Stantec Consulting Ltd.

April 5, 2018

## Sign-off Sheet

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## 879 RIVER ROAD – FUNCTIONAL SERVICING REPORT

Introduction  
April 5, 2018

### 1.0 INTRODUCTION

Richcraft Group of Companies have commissioned Stantec Consulting Ltd. to prepare the following Functional Servicing Report for 879 River Road. The subject property is located northeast of the intersection of River Road and Nicolls Island Road within the Riverside South Community (RSC). The property is currently zoned Development Reserve (DR) and is bordered by River Road to the west, and proposed residential developments in all other directions. The property is indicated in **Figure 1**. The proposed residential development comprises approximately 3.2ha of land, and contains a mixture of townhomes and back to back units.

**Figure 1: Approximate Location of 879 River Road Draft Plan Area**



## **879 RIVER ROAD – FUNCTIONAL SERVICING REPORT**

Introduction  
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### **1.1 OBJECTIVE**

The intent of this report is to build on the servicing principles outlined in the Riverside South Community Infrastructure Servicing Study Update (2017 ISSU) to create a servicing strategy specific to the subject property. The report will establish criteria for future detailed design of the subdivision, in accordance with the associated background studies, City of Ottawa Guidelines, and all other relevant regulations.

## 879 RIVER ROAD – FUNCTIONAL SERVICING REPORT

Background  
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### 2.0 BACKGROUND

The following documents were referenced in the preparation of this report:

- Riverside South Community Infrastructure Servicing Study Update (ISSU)- Rideau River Area, Stantec Consulting Ltd., June 21, 2017.
- Assessment of Adequacy of Public Services - RSDC Phase 15 Lands – 750 River Road and 4650 Spratt Road ( Urbandale Corporation), IBI Group, August 2017.
- Assessment of Adequacy of Public Services – Claridge Homes Phase 2 Lands – 807 River Road and 4720 Spratt Road, IBI Group, August 2017.
- Geotechnical Investigation – Proposed Residential Development – 879 River Road, Paterson Group, March 2, 2018.
- City of Ottawa Sewer Design Guidelines, 2<sup>nd</sup> Ed., City of Ottawa, October 2012
- City of Ottawa Water Distribution Design Guidelines, 1<sup>st</sup> ED., City of Ottawa, July 2010
- City of Ottawa Technical Bulletin ISBT-2018-01 Revision to Ottawa Sewer Design Guidelines, March 2018
- City of Ottawa Technical Bulletin ISBT-2018-02 Revision to Ottawa Water Design Guidelines, March 2018

### 3.0 POTABLE WATER ANALYSIS

#### 3.1 BACKGROUND

The proposed development is currently located within Zone 2W in the City of Ottawa's water distribution system. Zone reconfiguration is expected to be complete in 2018 which will convert the proposed site to operate at Zone SUC pressure. A 610mm diameter watermain is proposed along River Road immediately west of the 879 River Road Development area, as well as a 400mm and 300mm diameter mains along the north and south boundary of the development as outlined in the ISSU update.

#### 3.2 PROPOSED WATERMAIN SIZING AND LAYOUT

The proposed watermain alignment and sizing for this development is shown on **Drawing WTR-1** with 203mm diameter piping. It should be noted that the pipe layout and sizing for the development is preliminary and is to be verified upon detailed hydraulic analysis for the development area.

##### 3.2.1 Ground Elevations

The proposed ground elevations of the development range from approximately 90.0m to 91.5m. Preliminary grading and elevations have been determined for the site and included on **Drawing GP-1**.

##### 3.2.2 Water Demand

The current draft plan for the 879 River Road Development calls for a total of 75 townhome units, 41 back to back units, and an estimated population of 299 persons.

Water demands for the development were estimated using the City of Ottawa's Water Distribution Design Guidelines. For residential developments, the average day (AVDY) per capita water demand is 350 L/cap/d. For maximum day (MXDY) demand, AVDY was multiplied by a factor of 2.5 and for peak hour (PKHR) demand, MXDY was multiplied by a factor of 2.2. The calculated residential water consumption is represented in **Table 1** for the 879 River Road development:

**Table 1: Residential Water Demands**

Unit Type	Units	Person/Unit	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Townhomes	75	2.7	202	0.82	2.05	4.51
Back to Back	42	2.3	97	0.39	0.98	2.15
		Total	299	1.2	3.0	6.7

### 3.2.3 Connection to Existing Infrastructure

Potable water supply will be connected to the proposed watermain located north and east boundary of the development. **Drawing WTR-1** shows the location of the connection points to the proposed watermain.

## 3.3 HYDRAULIC ASSESSMENT

A hydraulic model was built by Stantec and updated as part of the ISSU based on the revised projections in the Riverside South Community Design Plan (CDP).

### 3.3.1 Allowable Pressures and Fire Flows

The City of Ottawa Water Distribution Design Guidelines state that the desired range of system pressures under normal demand conditions (i.e. basic day, maximum day, and peak hour) should be in the range of 350 to 552 kPa (50 to 80 psi) and no less than 275kPa (40 psi) at the ground elevation in the streets (i.e. at hydrant level). The maximum pressure at any point in the distribution system is to be no higher than 552kPa (80 psi). As per the Ontario Building Code & Guide for Plumbing, if pressures greater than 552kPa (80 psi) are anticipated, pressure relief measures are required. Under emergency fire flow conditions, the minimum pressure in the distribution system is allowed to drop to 138kPa (20 psi).

Stantec assessed the anticipated pressures within the Rideau River study area under full buildout at the year 2031 to meet minimum servicing requirements (basic day and peak hour demands). The results showed that areas along River Road during the basic day conditions exceed pressures of 552kPa (80 psi) and will require pressure reducing valve.

A fire flow analysis was also performed under maximum day conditions as part of the ISSU using recommendations presented in the 2013 Water Master Plan (WMP) for system level analysis in the core area. The analysis confirms the proposed system is capable of providing more than 13,000 L/min fire flow while maintaining a residual pressure of 138 kPa (20psi) at each node.

It should be noted that as per the City's technical bulletin in regards to fire flow (ISDTB-2014-02) for traditional side-by-side towns constructed in accordance with the OBC, the fire flow requirement shall be capped at 10,000 L/min. Back to back units are constructed with firewalls at a minimum two-hour fire resistance rating up to a maximum building area of 600m<sup>2</sup>. As such, nodes that are able to meet the 13,000 L/min fire flow are expected to perform adequately for the proposed development.

Fire flow assessment will be required at the subdivision approval phase in which local watermain are checked for their ability to provide the objective FUS fire flows, which in turn will be

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Potable Water Analysis  
April 5, 2018

determined based on final unit layouts. Smaller, local internal watermains will need to be assessed and verified as development planning proceeds.

### 3.4 POTABLE WATER SUMMARY

The proposed piping alignment and sizing is capable of achieving the required level of service in the Richcraft subdivision. Based on the hydraulic analysis created at the Master Servicing level, the following conclusions were made:

- The proposed water distribution system is recommended to include 203mm diameter pipes;
- During peak hour conditions, the proposed system is capable of operating above the minimum pressure objective of 276kPa (40psi);
- During fire conditions, the proposed system is capable of providing sufficient fire flows (13,000L/min and above) while maintaining a residual pressure of 138kPa (20 psi) in the 879 River Road development. Sizing of internal mains on local streets will be coordinated to ensure a minimum fire flow of 10,000 L/min may be achieved.
- Pressures within the development during basic day conditions may exceed 552kPa (80 psi) and necessitate the use of pressure reducing valves.

### 4.0 WASTEWATER SERVICING

#### 4.1 BACKGROUND

As indicated in the ISSU, wastewater servicing for the Riverside South Community was designed to collect and discharge to the West Rideau Collector. Currently, sanitary flows are being conveyed to the temporary Riverside South Pumping Station facility that can hold a maximum capacity 140 L/s. The flows are expected to be redirected at the end of 2018 to three siphons under the Rideau River. Infrastructure south of Earl Armstrong Road have four potential connection points to existing sanitary sewers: River Road and Earl Armstrong, Spratt Road and Earl Armstrong, Shoreline Drive and Earl Armstrong, and Canyon Walk and Earl Armstrong. Based on the sanitary catchments illustrated in the ISSU, flows from 879 River Road fall within drainage areas 2a and 2c. Development under drainage area 2a are anticipated to be conveyed to the 450mm diameter pipe along River Road, while drainage allocated to area 2c is conveyed to the 450mm diameter pipe along Spratt Road. The sanitary drainage plan for the ISSU is included in **Appendix B**.

The development of 879 River Road is in accordance with the recommendations in the Technical Memo for 801 River Road. The Assessment of Adequacy of Public Services – Claridge Homes Phase 2 Lands report for 807 River Road and 4720 Spratt Road (IBI Group, August 2017) identifies an approved revision to the drainage areas between River Road and Spratt Road sewers. It was proposed to allocate 33ha from drainage area 2c and 8ha from drainage area 2d away from discharging to the proposed sewer along Spratt Road and into drainage area 2a which is tributary to the River Road sewer. The revision to increase drainage area allocated to sanitary catchment 2a was supported by all impacted landowners including the RSDC and was considered a minor change to the Master Servicing Study (MSS). The memorandum sent by IBI Group can be found in **Appendix B**.

#### 4.2 DESIGN CRITERIA

As outlined in the most recent City of Ottawa Technical Memo for Sewer Design Guidelines, the following design parameters were used to calculate estimated wastewater flow rates and to preliminarily size on-site sanitary sewers:

- Minimum Full Flow Velocity – 0.6 m/s
- Maximum Full Flow Velocity – 3.0 m/s
- Manning's roughness coefficient for all smooth walled pipes – 0.013
- Back to Back Persons per unit – 2.3
- Townhouse Persons per unit – 2.7
- Extraneous Flow Allowance – 0.33 L/s/ha
- Residential Average Flows – 280 L/cap/day
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m
- Residential peaking factor – Harmon Formula

### 4.3 PROPOSED SERVICING

Per the Riverside South Community Design Plan (RSCDP), the contributions from the proposed site were assumed to have medium and low residential densities. Population densities were calculated for medium residential units at 91 pers./ha and low density units at 70 pers./ha. The proposed 3.2ha development consist of 75 townhomes and 42 back to back units. The most recent draft plan calculates a contributing population of 299. The anticipated wastewater peak flow generated from the existing and proposed development is summarized in the table below:

**Table 2 : Estimated Wastewater Peak Flow**

# of Units	Population	Peak Factor	Peak Flows (L/s)	Infiltration Flows (L/s)	Total Estimated Wastewater Peak Flow (L/s):
117	299	4.00	3.88	1.06	4.93

1. Average residential flow based on 280 L/p/day
2. Peak factor for residential units calculated using Harmon's equation
3. Average townhome population assumed to be 2.7 persons/unit
4. Average back to back population assumed to be 2.3 persons/unit
5. Infiltration flow based on 0.33 L/s/ha

A sanitary sewer design sheet for the proposed site is included in **Appendix B**. Full port backwater valves are to be installed on all sanitary services within the site to prevent any surcharge from the downstream sanitary sewer from impacting the proposed property.

## 5.0 STORMWATER MANAGEMENT

### 5.1 EXISTING CONDITIONS

The proposed development site measures approximately 3.2 ha in area and is currently undeveloped. The topography across the site is relatively flat and has a gradual downward slope to the west. The site is bound by the future residential lands to the north and east, existing residential development to the south, and River Road to the west. Existing grades are provided on the conceptual grading plan (**Drawing GP-1**). An existing ditch along the southern boundary of the proposed site captures runoff from the site in addition to flows from 807 River Road and directs the outflow towards road side ditches on River Road. The runoff from the east side ditches on River Road is conveyed across through two culvert crossings located north and south of the proposed Pond 5 block. Proposed storm and sanitary infrastructure conflicts with the north and south culverts. As such, they will be replaced with smaller culverts. The ISSU report noted that the south ravine will be lost due to development. It is proposed to redirect the flows from the culvert crossing by regrading the River Road ditches to flow to the south ravine culvert if River road maintains its rural cross-section.

### 5.2 STORMWATER MANAGEMENT DESIGN

#### 5.2.1 Proposed Conditions

The proposed residential development contains a mixture of townhome and back to back units. Presently there are no storm sewers along River Road south of Summerhill Street. The ISSU stormwater management report states Pond 5 is currently under design and is located offsite to the northwest of the property on the west side of River Road. Site sewers and overland flow for the entirety of the site are to ultimately outlet to Pond 5. Inlet control devices and road sag storage points will be used to restrict inflow rates to the sewer and to provide attenuating surface storage as described in the overall ISSU/MDP (Master Drainage Plan) stormwater management design for the Pond 5 tributary area.

#### 5.2.2 Design Methodology

The design methodology for the SWM component of the development is as follows:

##### General

- Use of the dual drainage principle (City of Ottawa).
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff (City of Ottawa).
- Assess impact of 2-year storm (using SCS design event), 5-year storm, and the worst case 100-year storm events in addition to the 100-year events outlined in the City of Ottawa Sewer Design Guidelines, and climate change scenarios with a 20% increase of rainfall intensity, on the major & minor drainage system (City of Ottawa).



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Stormwater Management  
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### Storm Sewer & Inlet Controls

- Size storm sewers to convey 2-year storm event under free-flow conditions using 2012 City of Ottawa I-D-F parameters. Storm sewers servicing collector streets to convey the 5-year storm event. (City of Ottawa.)
- Restrict inflows to the sewer to the 2-year rate (5-year for collector streets) or as required.
- Analysis to be conducted using the 100-year 12hour SCS distribution and 3-hour Chicago events (City of Ottawa).
- 100-year Storm HGL to be a minimum of 0.30 m below building foundation footing (City of Ottawa).
- Maximum 'climate change' HGL to be lower than proposed basement elevations (City of Ottawa Sewer Design Guidelines (2012)).

### Surface Storage & Overland Flow

- No rear-yard ponding volumes to be accounted for in SWM model preparation (City of Ottawa).
- The product of depth times velocity on streets not to be greater than 0.6 during the 100-year storm (City of Ottawa).
- Building openings to be above the 100-year water level (City of Ottawa).
- Total maximum depth of flow under static and dynamic conditions shall be less than 0.35m (City of Ottawa).
- Major and minor flow to be conveyed to SWM pond 5 for quality (80% TSS Removal) and quantity control (EUC MSS).
- Provide adequate emergency overflow conveyance off-site (City of Ottawa).

The site is to be designed using the “dual drainage” principle, whereby the minor (pipe) system is designed to convey the peak rate of runoff from the 2-year design storm and runoff from larger events is conveyed by both minor (pipe) and major (overland) channels, such as roadways and walkways, safely off site without impacting proposed or existing downstream properties.

In keeping with the 2-year inlet restriction criterion (5-year for collector streets), inlet control devices (ICDs) or orifice plates will be specified during the detailed design stage for all street and rear yard catchbasins to limit the inflow to the minor system. Restricted inlet rates to the sewer are necessary to prevent the hydraulic grade line from surcharging storm sewers into basements during major storms.

**Drawing STM-1** outlines the proposed storm sewer alignment and drainage divides. The major system flows generated from larger events will be safely conveyed to River Road and ultimately SWM Pond 5 by engineered (overland) channels such as roadways and walkways. Details of major system overland flow routes to SWM pond 5 are labelled in the **Drawing MAJ-1** in **Appendix C**.

Per the requirements noted in the PCSWMM model prepared as part of the Stormwater Management and Servicing Report for the Riverside South Community, it is intended to manage the runoff from the 100-year event within the subcatchment area. The major system was designed to have a maximum ponding depth of 0.35m in a 100-year storm event. The model



## 879 RIVER ROAD – FUNCTIONAL SERVICING REPORT

Stormwater Management  
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assumes a design capture rate of 100 m<sup>3</sup>/ha of on-site detention and no outflow to adjacent lands.

The minor system for the entirety of the Rideau River Study Area is conveyed by four proposed trunk sewers and intended to discharge into Pond 5 by two inlets (see **Drawing STM-1**). The trunk sewers were assigned a maximum limit of 3,000mm diameter based on calculated drainage areas and orientation of sewers. Pond 5 has been designed and sized to permit servicing of the proposed development area per Stantec's latest ISSU report which refined sizing and configurations outlined in the 2016 MDP. Per the report, Pond 5 infrastructure is sufficient to service the development. Future development to the south was expected to be serviced through the proposed development to the 3,000mm diameter storm sewer on River Road.

### 5.3 DEVIATIONS FROM PREVIOUS STUDIES

The 2016 MDP demonstrates storm sewer outlets to Pond 5 directly north and south of the proposed pond. The revised design in the 2017 ISSU report maintains the outlet at the north, however, the south outlet is relocated to the center of Pond 5.

The minor system inflow from Claridge lands to the south and the subjected site is proposed to connect to River Road at the western boundary of the proposed site. Due to the outlet relocating further north than originally designed, the minor system discharge for the proposed site can be directed to the northern boundary by connecting to the proposed 2700mm diameter trunk before entering the 3000mm diameter storm sewer along Rideau Road.

Peak minor system flow rates to SWM Pond 5 are expected to be unaffected as no significant reductions or increases occurred as a result of altering the storm sewer route.

Grading  
April 5, 2018

### 6.0 GRADING

The lands on 879 River Road currently drain predominantly from east to west. A macro grading plan was prepared as part of the ISSU to ensure the site grades and infrastructure tie into neighboring development and can be found in **Appendix E**. A conceptual grading plan has been prepared, which satisfies the stormwater management requirements for the site. Grading has been established to provide an overland flow route required for stormwater management directed in its majority towards the northern boundary of the site. Grades along the property lines of the site have been set to tie smoothly into the existing grades.

The subject site maintains emergency overland flow routes for flows deriving from storm events in excess of the maximum design event to the existing River Road ROW as depicted in **Drawing GP-1**.

Utilities  
April 5, 2018

### 7.0 UTILITIES

As the subject site lies within a new residential development area, Hydro, Bell, Gas and Cable servicing for the proposed development are not readily available. Exact size, location and routing of utilities, along with determination of any off-site works required for redevelopment, will be finalized after design circulation.

Detailed design of the required utility services will be completed by the respective utility companies.

### 8.0 APPROVALS

Ontario Ministry of Environment (MOE) Environmental Compliance Approvals (ECAs, formerly Certificates of Approval (CofA)) under the Ontario Water Resources Act will be required for proposed storm and sanitary sewers, and inlet control devices (Transfer of review) for the proposed development.

The Rideau Valley Conservation Authority will need to be consulted in order to obtain municipal approval for the development and for approval for filling of ditches on the south boundary of the development.

A MOE Permit to Take Water (PTTW) may be required for the site as some of the proposed works may be below the groundwater elevation shown in the geotechnical report. The geotechnical consultant shall determine whether a PTTW is required at the detailed design stage / prior to construction.

Erosion Control  
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### 9.0 EROSION CONTROL

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit extent of exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with plastic or synthetic mulches.
6. Provide sediment traps and basins during dewatering.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Plan construction at proper time to avoid flooding.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

9. Verification that water is not flowing under silt barriers.
10. Clean and change silt traps at catch basins.

Refer to Erosion and Sediment Control Plans as shown in **Drawing-EC-1** for the proposed location of silt fences, cutoff swales, temporary sediment basins and other erosion control structures.

## 879 RIVER ROAD – FUNCTIONAL SERVICING REPORT

Geotechnical Investigation  
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### 10.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was conducted by Paterson Group on March 2, 2018. The report summarizes the existing soil conditions within the subject area and construction recommendations. For details which are not summarized below, please see the original Paterson report included in **Appendix D**. As stated in the geotechnical investigation, the subsurface profile across the site consists of a layer of topsoil/agricultural soils underlain by silty sand followed by very stiff to stiff silty deposits.

Groundwater levels were measured from six boreholes. Groundwater levels recorded in January 2018 for BH1 to BH5 ranged from 0.4 to 3.0m below the existing ground surface and are subject to seasonal fluctuations.

Practical refusal to excavation was encountered for BH 3 at a depth of 14m. Based on geological mapping for the area, bedrock in the area consists of dolomite in an Oxford formation with an overburden thickness of 10 to 15 m depth.

Permissible grade raise restrictions of 2.0m are recommended for proposed buildings footings to allow them to be placed over a stiff silty clay bearing surface. Existing ditches are to be in-filled with a recommended permissible grade raise of 1.5m above existing grades in adjacent table land.

Pavement structures for driveways and local roadways are provided in **Table 3** and **Table 4** below.

**Table 3: Pavement Structure – Car Only Parking Areas/ Driveways**

Thickness (mm)	Material Description
50	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete
150	Base – OPSS Granular A Crushed Stone
300	Subbase - OPSS Granular B Type II
-	Subgrade – Either in situ soils or OPSS Granular B Type I or II material placed over in situ soil.

**Table 4: Pavement Structure – Local Roadways**

Thickness (mm)	Material Description
40	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete
50	Binder Course – HL-8 or Superpave 19.0 Asphaltic Concrete



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150	Base – OPSS Granular A Crushed Stone
400	Subbase - OPSS Granular B Type II
-	Subgrade – Either in situ soils or OPSS Granular B Type I or II material placed over in situ soil.

# 11.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding information, the following conclusions are summarized below:

## 11.1 POTABLE WATER ANALYSIS

The proposed system is capable of providing sufficient fire flow while maintaining a residual pressure of 138kPa (20 psi) in all areas based on hydraulic analysis done at the ISSU level. A final hydraulic analysis is to be completed at time of detailed design. During peak hour conditions, the proposed system is expected to operate above the minimum pressure objective of 276kPa (40psi). Pressure reducing valves are anticipated to be required based on the modeling results outlined in the ISSU.

## 11.2 WASTEWATER SERVICING

The 879 River Road development will be serviced by a network of gravity sewers which will direct wastewater flows westerly through the River Road sewer, and to the temporary Riverside South Pumping Station. The proposed sanitary sewer design indicates 2 connection points to proposed sewers north and south of the site, with a total estimated peak outflow of 5.74 L/s.

## 11.3 STORMWATER MANAGEMENT

- The proposed stormwater management plan is in compliance with the goals specified in the background reports and the 2012 City of Ottawa Sewer Guidelines
- Inlet control devices will be proposed to limit inflow from the site area into the minor system to the 2-year storm event based on City of Ottawa IDF curves.
- The storm sewer hydraulic grade line will be maintained at least 0.30 m below the underside of footing in the subdivision during design storm events up to the 100-year storm.
- All dynamic surface water depths are to be less than 0.35 m during all storm events up to the 100-year storm.
- Quality treatment of runoff and quantity control for the development will be provided by the proposed downstream SWM pond 5. The proposed site design will maintain an emergency overland flow route to the pond via River Road.

## 11.4 GRADING

A preliminary grading for the proposed development has been established to provide an overland flow route required for stormwater management directed in its majority towards River Road. Detailed grading will adhere to all requirements as outlined in the City of Ottawa guidelines.

## **879 RIVER ROAD – FUNCTIONAL SERVICING REPORT**

Conclusions And Recommendations  
April 5, 2018

### **11.5 UTILITIES**

Utility infrastructure will be extended to the area as development of these and neighboring lands proceed. Exact size, location and routing of utilities will be finalized at the detailed design stage.