REPORT
PROJECT: 120446-5.2.2

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
CLARIDGE HOMES PHASE 3 LANDS
- 4623 SPRATT ROAD
CLARIDGE HOMES (SPRATT ROAD) INC.
RIVERSIDE SOUTH COMMUNITY

Prepared for CLARIDGE HOMES (SPRATT ROAD) INC.
by IBI GROUP

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1 INTRODUCTION

1.1 Purpose

The purpose of this report is to investigate and confirm the adequacy of public services for the proposed site. This report will review major municipal infrastructure including water supply, wastewater collection and disposal and management of stormwater. This report will also include a Sedimentation and Erosion Control Plan. A review of traffic components will be the subject of a separate report.

This report is being prepared as a technical document in support of the proposed subdivision submission, and was prepared in accordance with the November 2009 “Servicing Study Guidelines for Development Applications” in the City of Ottawa. **Appendix A** contains a customized copy of those guidelines which can be used as a quick reference for the location of each of the guideline items within the study report.

1.2 Background

The Riverside South Community, formerly known as South Urban Community (SUC), is a part of the former City of Gloucester. The Council of the City of Gloucester adopted the first Official Plan for the community in September 1990. The original concept plan for the community served as the basis for both a Gloucester and a Regional OPA. A Master Drainage Plan (MDP) for the community was formulated in June 1992 based on the preliminary land use plan prepared by J. Bousfields and Associates Ltd. in December 1991.

The South Urban Community became a part of the City of Ottawa through amalgamation in 2001 and the new Official Plan of the City of Ottawa designated the areas as “General Urban Area” and “Employment Area” with some adjustments to the urban boundaries. In 2003, the City of Ottawa initiated a Community Design Plan (CDP) for the Riverside South area. The basis of the CDP is the land use plan for the community, which has evolved over the time and has changed significantly since the original plan prepared in early 1990’s.

The South Urban Community River Ridge Master Infrastructure Plan (SUC RR MIP) prepared by Ainley Graham and Associates in 1994 presented a preferred servicing strategy for potable water, sanitary and storm infrastructure in the Riverside South community. The Riverside South Infrastructure Servicing Study Update (ISSU) was issued in 2008 as an update to the SUC RR MIP, to account for modifications to the MDP and CDP since 1994.

1.3 Previous Studies

The following report has been referenced prior to completing this assessment:

1. **Riverside South Development Corporation (RSDC) Phase 13 Site Servicing and Stormwater Management Report (Stantec, 2018)** This report provides details on the proposed water supply and major and minor storm systems with proposed connections for the subject lands. All servicing for the subject lands are to route through this site.

1.4 Subject Property

The current draft plan of subdivision for the subject property is shown on **Figure 1.2** which is included in **Appendix A**. The property covers about 1.8 ha. It is located to the north of the future BRT corridor and east of Spratt Road and south and west of the RSDC Phase 13 community.

The proposed development will include mid-density and 65 townhouse residential units.

1.5 Existing Infrastructure

Figure 1.3 shows the location of existing major municipal infrastructure in the vicinity of the 4623 Spratt development. As stated above, during construction of the adjacent development, RSDS's Phase 13, servicing stubs for storm, sanitary and water services were left at the property line of the subject lands along Libra Street in order to service the subject site.

The report for Phase 13 does not identify any downstream infrastructure missing, as such, all municipal infrastructure to service the subject lands is in place.

1.6 Pre-Consultation

There was a pre-consultation meeting with the City of Ottawa on August 30, 2018. The meeting notes can be found in **Appendix A**. The following are some of the topics reviewed and discussed:

- Zoning information
- Official plan
- Infrastructure
- Noise Study needed
- Traffic Study needed
- RMA needed
- Geotechnical conditions
- Assessment of Adequacy of Public Services Report needed

It should be noted that consultation with the Rideau Valley Conservation Authority and the Ontario Ministry of Environment, Conservation and Parks are to be scheduled forthwith.

1.7 Existing Topography

The property generally slopes from south to north towards Libra Street. Contours for the site are approximately at the 92 m elevation. **Figure 1.4,** which is included in **Appendix A**, shows the general topography of the subject property.

Most surface drainage from the property currently flows towards Libra Street where it is captured via a temporary ditch inlet catch basin (DICB).

Once developed, the intent will be to maintain existing drainage patterns. For reference, a copy of Drawing GCP-1, Macro Grading Plan from the 2017 report is included in **Appendix A**. Additionally, the grading plan from RSDC's Phase 13 is also included in **Appendix A**.

Figure 1.5, located in **Appendix A**, shows the proposed macro-grading plan for the subject lands.

1.8 Geotechnical Considerations

The following geotechnical investigation report has been prepared by Paterson Group

- Report No. PG4730-1 dated December 10th 2018 for the subject property;

Among other items, the reports comments on the following:

- Site grading
- Foundation design
- Pavement design
- Sub-surface conditions
- Groundwater control
- Seismic design
- Corrosion potential
- Trees
- Site servicing

In general, the subsurface profile encountered topsoil, underlain by silty clay and sandy silt.

One of the recommendations from that study included grade raise restrictions for the Development. A copy of Figure 2.0, Site Plan from the Report is included in **Appendix A**. That figure shows a grade raise restriction of 1.5 m across the site.

1.9 Watercourses and Setbacks

There are no identified Municipal Drains in the 2017 ISSU report.

The Stantec 2017 report in support of RSDC's Phase 13 development notes that some surface drainage from the subject lands are currently directed to the Phase 13 lands via overland flow. It is expected that development of the subject lands will eliminate said flows; however, overland flow will be accommodated on an interim basis.

2 WATER SUPPLY

2.1 Existing Conditions

As noted in Section 1.5 there is an existing 200 mm diameter watermain stub on Libra Street at Taurus Place to service the site. **Figure 1.3** in **Appendix A** shows the location of the existing watermains.

2.2 Design Criteria

2.2.1 Water Demands

Water demands have been calculated for the site based on per unit population density and consumption rates taken from Tables 4.1 and 4.2 of the City of Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Single Family 3.4 person per unit
- Townhouse and Semi-Detached 2.7 person per unit
- Average Apartment 1.8 person per unit
- Residential Average Day Demand 350 l/cap/day
- Residential Peak Daily Demand 875 l/cap/day
- Residential Peak Hour Demand 1,925 l/cap/day
- ICI Average Day Demand 50,000 l/gross ha/day
- ICI peak Daily Demand 75,000 l/gross ha/day
- ICI Peak Hour Demand 135,000 l/gross ha/day

Residential units in the subject site consists of street townhouses and back to back townhouses. A watermain demand calculation sheet is included in **Appendix B** for the internal units. The units fronting Libra Street are not included in the analysis as they are serviced by an existing watermain. The total water demands are summarized as follows:

- Average Day 0.57 l/s
- Maximum Day 1.42 l/s
- Peak Hour 3.12 l/s

2.2.2 System Pressure

The Ottawa Design Guidelines – Water Distribution (WDG001), July 2010, City of Ottawa, Clause 4.2.2 states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in Clause 4.2.2 of the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.

Maximum Pressure	Maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls will be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rates

In the recent Technical Bulletin 'ISDTB-2014-02, Revisions to Ottawa Design Guidelines – Water', the fire flow requirements for single detached dwellings and traditional town and row houses can be capped at 10,000 l/min provided that there is a minimum separation of 10 meters between the backs of adjacent units and that the town and row house blocks are limited to 600 square meters of building areas and seven dwelling units. The street townhouses in this development meet the requirements of ISDTB-2014-02, the fire flow rate of 10,000 l/min (166.7 l/s) is used in the fire flow analysis. There are no locations where the rear of a townhouse block is within 10 meters of the side of an adjacent unit.

As the back to back townhouse units do not meet the requirements of ISDTB-2014-02, a Fire Underwriters Survey (FUS) calculation has been carried out for a 6 unit block. Results of the calculation show a fire demand of 11,000 l/min (183.3 l/s), as the back to back townhouses are prominent in this site the 11,000 l/min fire flow demand is used in the fire flow analysis. A copy of the FUS calculation is included in **Appendix B**.

2.2.4 Boundary Conditions

The City of Ottawa has provided five boundary conditions in the Riverside South area for various projects. A boundary condition (Connection 5) has been provided at the Cambie Road and Taurus Place intersection which is used in the hydraulic analysis. There are pre and post configuration values provided with the pre-configuration values considerably lower than the post at Connection 5. As the re-configuration of the pressure area, scheduled for the end of 2019, is expected to occur before this site is developed, the post configuration value are used in the hydraulic analysis. A copy of the boundary conditions is included in **Appendix B** and summarized as follows for Connection 5.

	CONNECTION 5 CAMBIE AT TAURUS
Max HGL (Basic Day)	147.8 m
Peak Hour	144.6 m
Max Day + Fire 10,000 l/min Fire Flow 12,000 l/min Fire Flow	 137.7 m 134.5 m

2.2.5 Hydraulic Model

A computer model for the subject site has been developed using the InfoWater program by Innovyze. The model includes the boundary condition at Cambie Road and the existing watermain on Taurus Place from Cambie Road to the site.

2.3 Proposed Water Plan

2.3.1 Modeling Results

The hydraulic model was run under basic day, maximum day with fire flows and under peak hour conditions. Results of the hydraulic model are include in **Appendix B** and summarized as follows:

Scenario	
Basic Day (Max HGL) Pressure Range	539.2 to 549.5 kPa
Peak Hour (Min HGL) Pressure Range	507.7 to 520.6 kPa
Max Day + 11,000 l/min Fire Flow	178.0 l/s to 243.7 l/s

A comparison of the results and design criteria is summarized as follows:

Maximum Pressure	All nodes have basic day pressures under 552 kPa under post-configuration, therefore pressure reducing control is not required for this development.
Minimum Pressure	All nodes in the model exceed the minimum value of 276 kPa (40 psi).
Fire Flow	All nodes are close to the back to back townhouse requirement of 11,000 l/min (183.3 l/s) for fire flow under the post configuration boundary condition for a 12,000 l/min fire flow.

2.3.2 Watermain Layout

Figure 2.1 shows the proposed Water Plan for the proposed development.

A 200 mm diameter watermain is extended through the site with a 50 mm copper watermain in the cul-de-sac at the southeast corner of the site in accordance with City detail W37. The number of units that are serviced by the internal watermain is 52 which exceeds the 49 unit limit in the guidelines for unlooped watermains. While the hydraulic objectives are met with the single connection, a second watermain connection to the existing main on Libra Street at Taurus Place can be made, the potential second connection is shown on **Figure 2**. The necessity of the second connection will be confirmed at the detailed design stage.

3 SANITARY SEWERS

3.1 Existing Conditions

As noted earlier in Section 1.5, sanitary flows from the subject site will be routed to through RSDC's Phase 13 lands with a sanitary connection to manhole SAN 3 located at the intersection of Libra Street and Torus place. **Figure 1.3,** in **Appendix A**, shows the current extent of this sewer, which is to be terminated at the property line of the subject site.

3.2 RSDC's Phase 13 Design (Stantec, 2018)

Drainage area plan SA-1 and the sanitary sewer design sheet for the above noted project have been included in **Appendix C** as they demonstrate that the whole of the subject lands have been included in the design calculations for the sanitary sewers within RSDC's Phase 13 which serve as the sanitary outlet for the subject lands. The subject lands are identified as drainage area R3AA.

It should be noted that the drainage area identified above contains additional lands east of the subject property which are not part of this report and are owned by others. The detailed design application will note the capacity remaining for these undeveloped lands.

3.3 Design Criteria

The estimated wastewater flows from the subject site are based on the revised City of Ottawa design criteria. Among other items, these include:

- Average residential flow = 280 l/c/d
- Peak residential flow factor = (Harmon Formula) x 0.80
- Average commercial flow = 28,000 l/s/ha
- Average institutional flow = 28,000 l/s/ha
- Peak ICI flow factor = 1.5 if ICI area is ≤ 20% total area
  1.0 if ICI area is > 20% total area
- Inflow and Infiltration Rate = 0.33 l/s/ha
- Minimum Full Flow Velocity = 0.60 m/s
- Maximum Full Flow Velocity = 3.0 m/s
- Minimum Pipe Size = 200 mm diameter

In accordance with the City of Ottawa Sewer Design Guidelines table 4.2, the following density rates are estimated for the subject site:

- Single units = 3.4
- Semi units = 2.7
- Townhouse and back to back units = 2.7
- Apartment units = 1.8

3.4 Recommended Sanitary Plan

A preliminary sanitary plan is included in **Figure 3.1** in **Appendix C**. No external sanitary flows are anticipated to cross the subject lands. As such, all sanitary sewers are proposed to be at normal depth and size.

A reconfiguration of the sewer connection at Libra Street will be coordinated at the detailed design stage.

4 STORMWATER MANAGEMENT

4.1 Existing Conditions

Stormwater flows will be routed through the adjacent development to the existing trunk sewers located within Spratt Road onwards to the ultimate storm outlet which is the existing Riverside South Pond 1.

There are no existing municipal drains, watercourses or recognized drainage features located on the subject lands aside from a temporary ditch constructed as part of the RSDC Phase 13 application to direct upstream overland flow to a prosed DICB on the subject lands.

4.2 RSDC's Phase 13 Design (Stantec, 2018)

Drainage area plan SD-1 and the storm sewer design sheet for this project have been included in **Appendix D** as they demonstrate that the whole of the subject lands have been included in the design calculations for the storm sewers within RSDC's Phase 13 which serve as the storm outlets for the subject lands.

It should be noted that the subject lands have been separated into two drainage areas, namely L105AA and L102AA. Each drainage area has been provided with a separate stub connecting to the Libra Street sewers in separate locations.

The easternmost stub, for drainage area L105AA has been left in a location that will require relocation, as such, at the time of detailed design a Municipal Consent circulation will take place to extend this sewer approximately 30m westward within the Libra Street ROW to provide a connection with the subject lands through the proposed servicing block.

It should be noted that the drainage area 102AA identified above contains additional lands east of the subject property which are not part of this report and are owned by others. The detailed design application will note the capacity remaining for these undeveloped lands.

4.3 Minor Storm Sewer Design Criteria

The minor system storm sewers for the subject site are proposed to be sized based on the rational method, applying standards of both the City of Ottawa and MECP. Some of the key criteria for this site include the following:

- Sewer Sizing: Rational Method
- Design Return Period: 1:2 year (local streets)
  1:5 year (collector streets)
  1:10 year (arterial roads)
- Initial Time of Concentration 10 minutes
- Manning's: 0.013
- Minimum Velocity: 0.80 m/s
- Maximum Velocity: 3.00 m/s

PIPE DIAMETER (MM)	SLOPE (%)
250	0.43
300	0.34
375	0.25
450	0.20
525	0.16
600	0.13
675	0.11
750 and larger	0.1

- Runoff Coefficients (per ISSU Update, to be confirmed at detailed design stage):

LAND USE		RUNOFF COEFFICIENT
Residential	Low Density	0.65
	Medium Density	0.70
	High Density	0.80
Commercial		0.75
Green Space		0.30
Institutional		0.75
Park		0.20

4.4 Recommended Minor Storm Plan

A preliminary storm plan is included in **Figure 4.1** in **Appendix D**. No permanent external storm flows are anticipated to cross the subject lands. As such, all storm sewers are proposed to be at normal depth and size.

As with sanitary, a reconfiguration of the sewer connection at Libra Street will be coordinated at the detailed design stage along with a portion of storm sewer to be installed along Libra Street as noted in section 4.2

An interim DICB will be located along the southern limit of the lands to capture any temporary overland flow until the lands to the south are developed. This inlet will be sized and located during detailed design.

4.5 Dual Drainage

Development of the subject site will include a stormwater strategy using the dual drainage system. The system features a combination of on-site detention (surface ponding) with inlet control devices (ICDs) and direct conveyance with no ponding. It accommodates both minor and major stormwater runoff. During frequent storms the effective runoff collected by catchment areas is directly released via catch basin inlets into the network of storm sewers, called the minor system. During less frequent storms, the balance of the flow (in excess of the minor flow) is accommodated by a system of rear yard swales and street segments (or other forms of underground storage or surface storage such as dry ponds). The main advantage of this arrangement is its ability to adjust the rate of total inflow into the minor system to satisfy the required level of service. The required total inflow is typically maintained by the restriction of the capacity and the density of the inlets directly connected into this system. As noted, during less frequent storms, the balance of the flow is accommodated by the major system. Typically, this accommodation is achieved by the attenuation on catchment surfaces called on-site detention and/or direct conveyance of the flow to a recipient.

5 EROSION AND SEDIMENTATION CONTROL PLAN

During construction, existing conveyance systems and water courses can be exposed to sediment loading. Development of a subdivision such as this project can potentially create deleterious material which can enter the natural environment and gain access to fish and amphibian habitat. In order to prevent site generated sediments from entering the environment, an Erosion and Sedimentation Control Plan (ESCD) will be implemented prior to development. Although a generic ESCP can be developed as part of this report and subsequent Design Briefs, the final plan will be developed and implemented by the Owner's general contractor.

The erosion and sedimentation control strategy for the subject site could include erection of silt fences, straw bale barriers and rock check dams. These measures will ensure protection of both adjacent developments and the natural environment adjacent to and downstream of the site.

A copy of a potential Erosion and Sedimentation Control Plan (ESCP) is shown on **Figure 5.1**, which is included in **Appendix E**.

Other elements of an ESCP could also include installation of bulkhead barriers at the nearest existing downstream manholes to ensure deleterious material does not gain access to those sewers and potentially the downstream pump station(s) and/or Pond 1.

6 APPROVALS AND PERMIT REQUIREMENTS

6.1 City of Ottawa

The City of Ottawa will review all development documents including final working drawings and related reports. Upon completion, the City will approve the local watermains, under Permit No. 008-202; submit the sewer extension MECP application to the province and eventually issue a Commence Work Notification.

6.2 Province of Ontario

The Ministry of Environment, Conservation and Parks (MECP) will approve the local sewers under Section 53 of the Ontario Water Resources Act and issue an Environmental Compliance Approval. A Permit To Take Water may also need to be issued by the MECP.

6.3 Conservation Authority

At this time it is understood that there are no required permits, authorizations or approvals needed expressly for this development from the Conservation Authority; however, this will be confirmed through a subsequent pre-consultation with the RVCA.

6.4 Federal Government

There are no required permits, authorizations or approvals needed expressly for this development from the federal government.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusion

All infrastructure which is needed to service the subject site already exists or is proposed to be completed imminently. The development plan will include connections to the infrastructure to adequately service the site with water supply, wastewater collection and disposal and management of stormwater runoff. The extension of the existing watermains through the subject site will provide a reliable source of both drinking water and fire flows. The ultimate wastewater outlets are already in place. A stormwater management facility, Pond 1, will provide the necessary treatment for runoff from the subject site. Development of the subject property will include the recommended storm sewer plan. Therefore, there are suitable public services in place to service the subject site.

7.2 Recommendation

From an assessment of major municipal infrastructure perspective, it is recommended that the development application for the Claridge property at 4623 Spratt Road be accepted and that the development of the property move forward.

Lance Erion, P. Eng.
Associate

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APPENDIX A

Development Servicing Study Checklist

The following table is a customized copy of the current City of Ottawa's Development Servicing Study Checklist. It is meant to be a quick reference for location of each of the items included on the list. The list contains the various item description and the study section in which the topic is contained.

GENERAL CONTENT

	ITEM DESCRIPTION	LOCATION
	Executive Summary (for larger reports only)	N/A
√	Date and revision number of the report	Front Cover
√	Location Map and plan showing municipal address, boundary, and layout of proposed development.	Figure 1.1
√	Plan showing the site and location of all existing services.	Figure 1.3
√	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.	Section 2.2, 3.2, 3.3, 4.3 Figure 1.1
√	Summary of Pre-consultation Meeting with City and other approval agencies.	Section 1.6
√	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Sections 1.3, 2.2, 3.2
√	Statement of objectives and servicing criteria	Section 1.1, 2.2.3, 3.3 & 4.3
√	Identification of existing and proposed infrastructure available in the immediate area.	Figure 1.3
√	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).	Sections 1.9
√	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.	Section 1.8 Detail Design
√	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
	Proposed phasing of the development, if applicable.	N/A
√	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.8

√	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	Noted

DEVELOPMENT SERVICING REPORT: WATER

	ITEM DESCRIPTION	LOCATION
√	Confirm consistency with Master Servicing Study, if available	Section 2.2
√	Availability of public infrastructure to service proposed development	Section 2.1
√	Identification of system constraints – external water needed	Sections 2.2
√	Identify boundary conditions	N/A
√	Confirmation of adequate domestic supply and pressure	Section 2.3 & Appendix B
√	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 2.2
√	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Section 2.2 Appendix B
	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defining phases of the project including the ultimate design.	Section 2.4
	Address reliability requirements such as appropriate location of shut-off valves.	Detail Design
√	Check on the necessity of a pressure zone boundary modification.	N/A
√	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Section 2.2
√	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.	Detail Design
√	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities and timing of implementation.	N/A
√	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 2.3
√	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Detailed Design

DEVELOPMENT SERVICING REPORT: WASTEWATER

	ITEM DESCRIPTION	LOCATION
√	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 3.3
√	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 3.2
√	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 condition of sewers.	Detail Design
√	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 3.2, Appendix C
√	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 3.1, 3.2, 3.4
	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix "C") format.	Section 3.3 & Detail Design
√	Description of proposed sewer network including sewers, pumping stations and forcemains.	Section 3.1, 3.4 & Figure 3.1 in Appendix C
√	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).	Section 1.9
√	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	Section 3.1
√	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
√	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
√	Special considerations such as contamination, corrosive environment etc.	Detail Design

DEVELOPMENT SERVICING REPORT: STORMWATER CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 4.1, 4.4 Appendix D
√	Analysis of available capacity in existing public infrastructure.	Section 4.1, 4.4,
√	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Section 1.7, Figure 1.4 in Appendix A

√	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 4.5
√	Water quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 4.5
√	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 4.3, 4.4, 4.5
√	Set-back from private sewage disposal systems.	N/A
√	Watercourse and hazard lands setbacks.	Section 1.9, 4.8
√	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Section 1.6
√	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Section 4.2
√	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 4.5 Detail Design
√	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Section 1.9, 4.8
	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.	Detail Design
√	Any proposed diversion of drainage catchment areas from one outlet to another.	Section 1.7, 4.4
√	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 4.2, 4.4, Appendix D
	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
√	Identification of potential impacts to receiving watercourses	N/A
√	Identification of municipal drains and related approval requirements.	Section 1.9
√	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 4.5 Detail Design
√ √	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Section 4.5 Detail Design
	Inclusion of hydraulic analysis including hydraulic grade line elevations.	Section 4.6
√	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 5
√	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
√	Identification of fill constraints related to floodplain and geotechnical investigation.	Section 1.8,

APPROVAL AND PERMIT REQUIREMENTS: CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	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.	Section 1.6, 1.9
	Application for Certification of Approval (CofA) under the Ontario Water resources Act.	Section 1.6 Detail Design
√	Changes to Municipal Drains	N/A
√	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Section 6

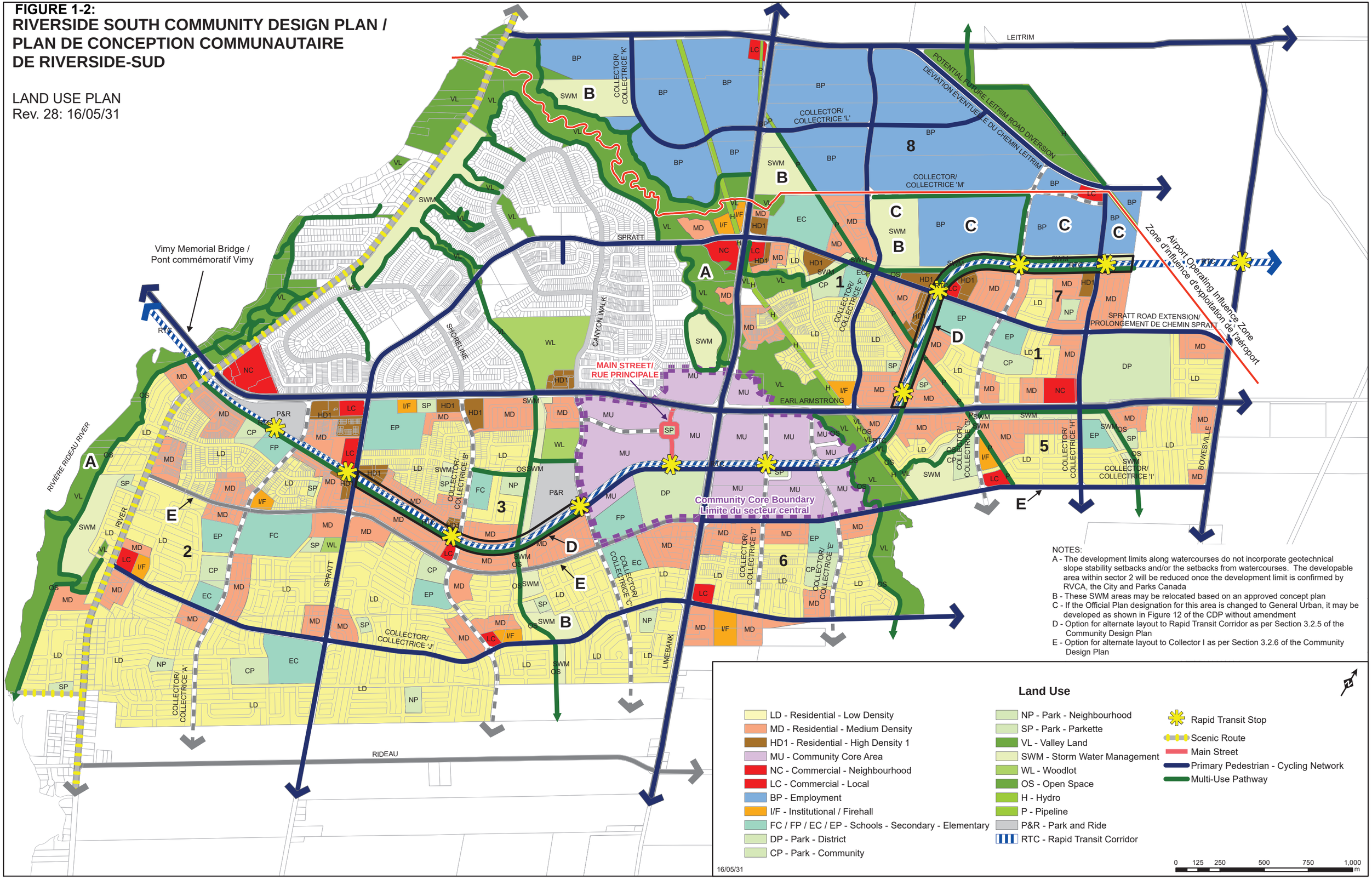
CONCLUSION CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	Clearly stated conclusions and recommendations	Section 7.1 & 7.2
	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.	Detail Design
√	All draft and final reports shall be signed and stamped by professional Engineer registered in Ontario.	Completed

FIGURE 1-2:

RIVERSIDE SOUTH COMMUNITY DESIGN PLAN / PLAN DE CONCEPTION COMMUNAUTAIRE DE RIVERSIDE-SUD

LAND USE PLAN
Rev. 28: 16/05/31



NOTES:
A - The development limits along watercourses do not incorporate geotechnical slope stability setbacks and/or the setbacks from watercourses. The developable area within sector 2 will be reduced once the development limit is confirmed by RVCA, the City and Parks Canada
B - These SWM areas may be relocated based on an approved concept plan
C - If the Official Plan designation for this area is changed to General Urban, it may be developed as shown in Figure 12 of the CDP without amendment
D - Option for alternate layout to Rapid Transit Corridor as per Section 3.2.5 of the Community Design Plan
E - Option for alternate layout to Collector I as per Section 3.2.6 of the Community Design Plan

Land Use

- LD - Residential - Low Density
- MD - Residential - Medium Density
- HD1 - Residential - High Density 1
- MU - Community Core Area
- NC - Commercial - Neighbourhood
- LC - Commercial - Local
- BP - Employment
- I/F - Institutional / Firehall
- FC / FP / EC / EP - Schools - Secondary - Elementary
- DP - Park - District
- CP - Park - Community
- NP - Park - Neighbourhood
- SP - Park - Parkette
- VL - Valley Land
- SWM - Storm Water Management
- WL - Woodlot
- OS - Open Space
- H - Hydro
- P - Pipeline
- P&R - Park and Ride
- RTC - Rapid Transit Corridor
- Rapid Transit Stop
- Scenic Route
- Main Street
- Primary Pedestrian - Cycling Network
- Multi-Use Pathway

16/05/31

0 125 250 500 750 1,000 m

I:\AA_Staff\Sarah\DonMorse\RiversideSouthCDP_Update_2015\RiversideSouthCDP_LandUse2015_enRev28.mxd

N

EARL ARMSTRONG ROAD

BRIAN GOOD AVENUE

CAMBIE ROAD

SUBJECT SITE

SPRATT ROAD

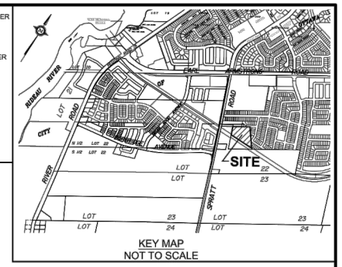
J:\20446_4623Spratt\5.9 Drawings\59civil\current\Assessment\4623-fig-1.1-Location Plan.dwg Layout Name: LOCATION PLAN Plot Scale: 1:5.13 Plotted At: 3/26/2019 Last Saved By: James.Battison Last Saved At: Mar. 26, 19

Scale	Project Title	Drawing Title	Sheet No.
IBI			
1:5000	4623 SPRATT	LOCATION PLAN	FIGURE 1.1

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

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

DON HERWEYER, MCIP RPP, MANAGER
DEVELOPMENT REVIEW-SOUTH
PLANNING, INFRASTRUCTURE AND ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA



DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 22
CONCESSION 1 (RIDEAU FRONT)
Geographic Township of Gloucester
CITY OF OTTAWA
Prepared by Annis, O'Sullivan, Vollebekk Ltd.
March 13, 2019

Scale 1 : 500
20 15 10 5 0 10 20 Metres

Metric
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :
The boundaries of the lands to be subdivided and their relationship to adjoining lands have been accurately and correctly shown.

Date — V. Andrew Shelp, ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE

This is to certify that we are the owners of the lands to be subdivided and that this plan was prepared in accordance with our instructions.

Date — Jim Burghout, Claridge Homes (Spratt Road) Inc. I have the authority to bind the corporation.

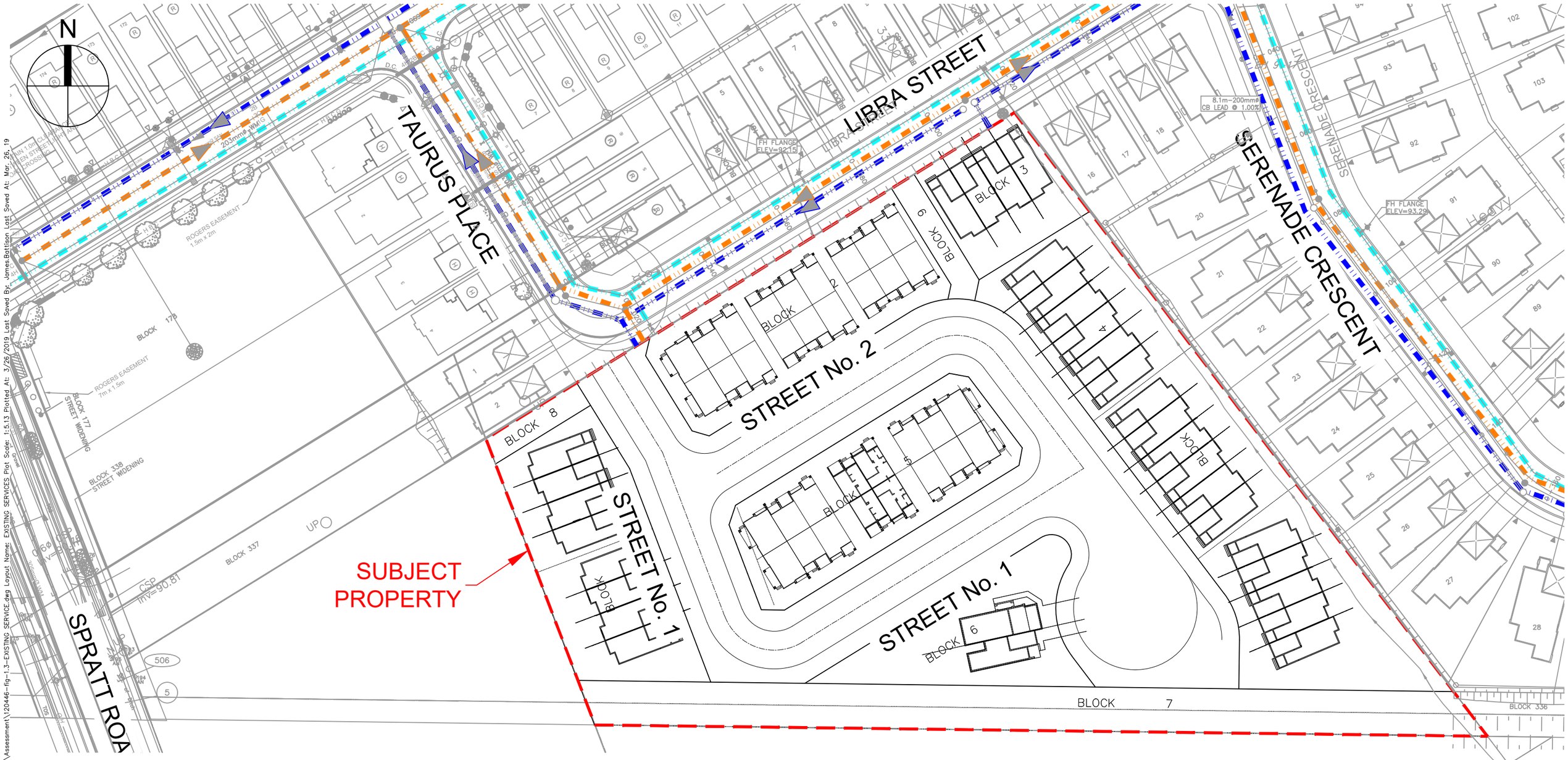
AREA SCHEDULE	
BLOCK	Square Metres
1	1 669.7
2	1 747.3
3	787.6
4	3 694.8
5	1 710.9
6	1 097.7
7	2 001.2
8	148.1
9	184.7
STREETS / RESERVES	5 862.5
TOTAL	18 904.5

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT
(a) see plan
(b) see plan
(c) see plan
(d) multi-family residential housing
(e) see plan
(f) see plan
(g) see plan
(h) City of Ottawa
(i) see soils report
(j) see plan
(k) sanitary, storm sewers, municipal water, bell, hydro, cable and gas to be available
(l) see plan

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 17SIO-19 Claridge Pt Lt 22 Cl RF GL DPS 02 N

Scale	Project Title	Drawing Title	Sheet No.
NTS	4623 SPRATT	DRAFT PLAN	FIGURE 1.2



LEGEND:

- PROPOSED WATERMAIN - SEPARATE APPLICATION(s)
- EXISTING WATERMAIN
- PROPOSED STORM - SEPARATE APPLICATION(s)
- EXISTING STORM
- PROPOSED SANITARY - SEPARATE APPLICATION (s)
- EXISTING SANITARY

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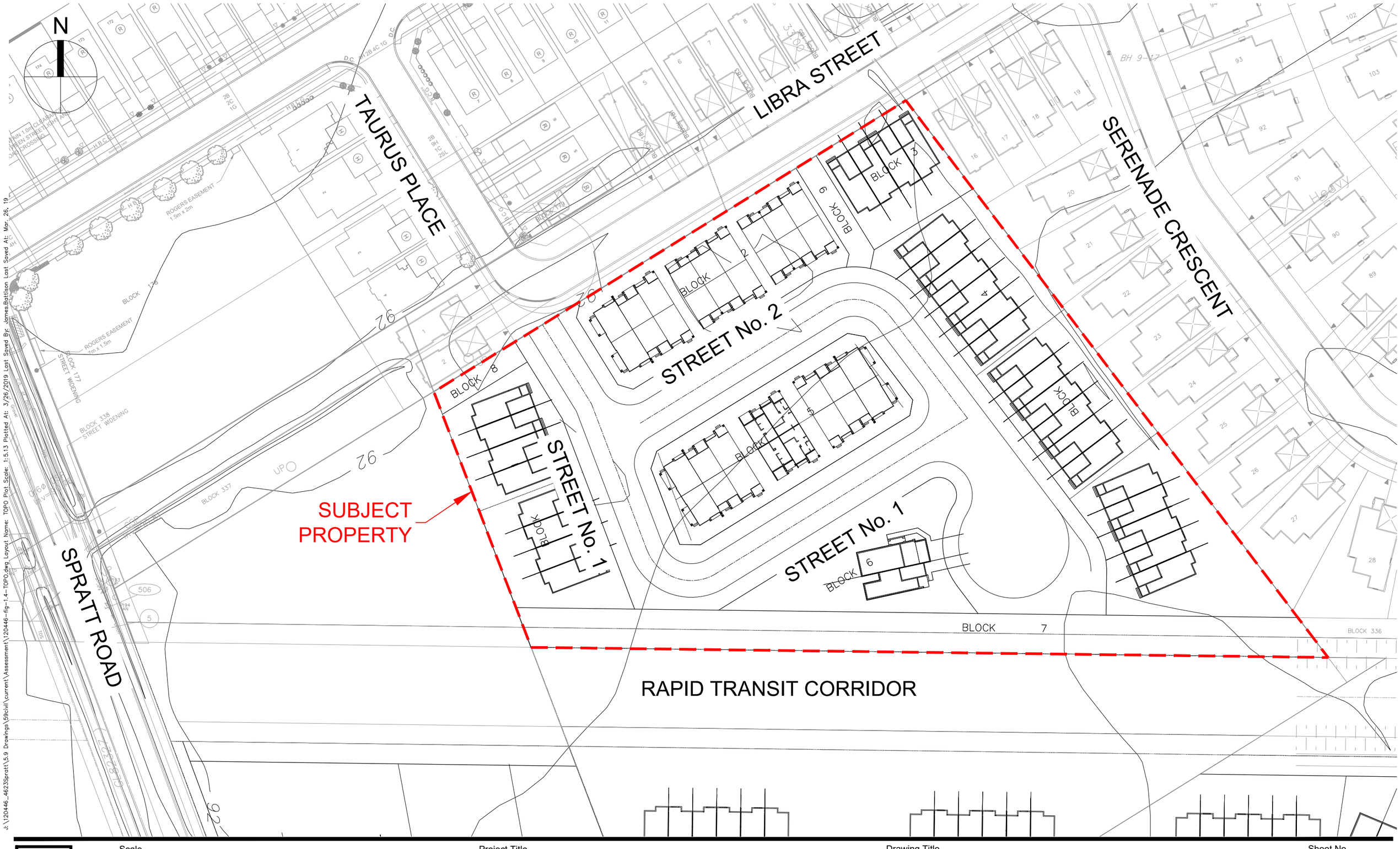
Scale	Project Title	Drawing Title	Sheet No.
NTS	4623 SPRATT	LOCATION OF EXISTING MAJOR MUNICIPAL INFRASTRUCTURE	FIGURE 1.3



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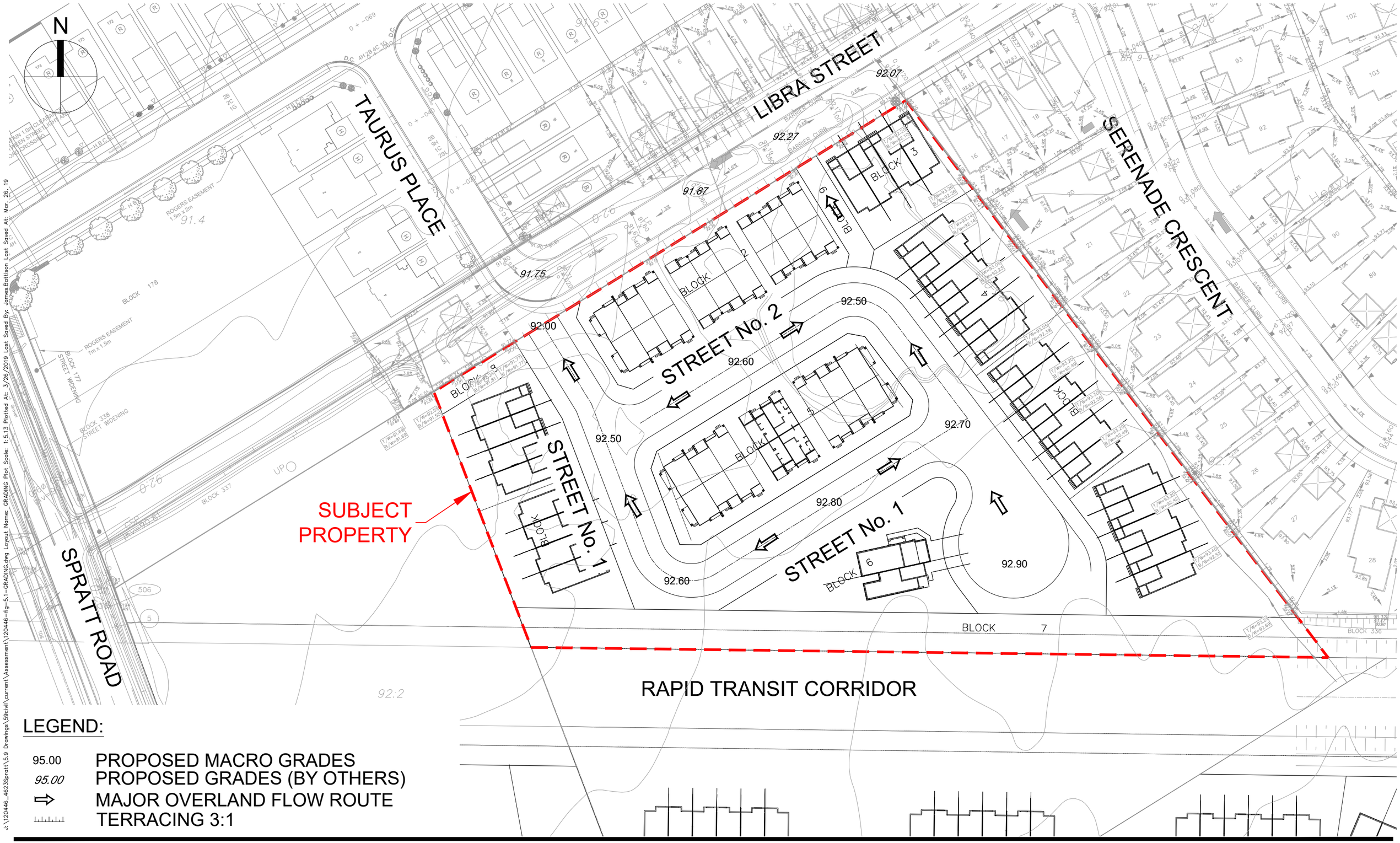
Scale	Project Title	Drawing Title	Sheet No.
NTS	4623 SPRATT	SITE TOPOGRAPGY	FIGURE 1.4



LEGEND:

95.00	PROPOSED MACRO GRADES
95.00	PROPOSED GRADES (BY OTHERS)
⇨	MAJOR OVERLAND FLOW ROUTE
	TERRACING 3:1

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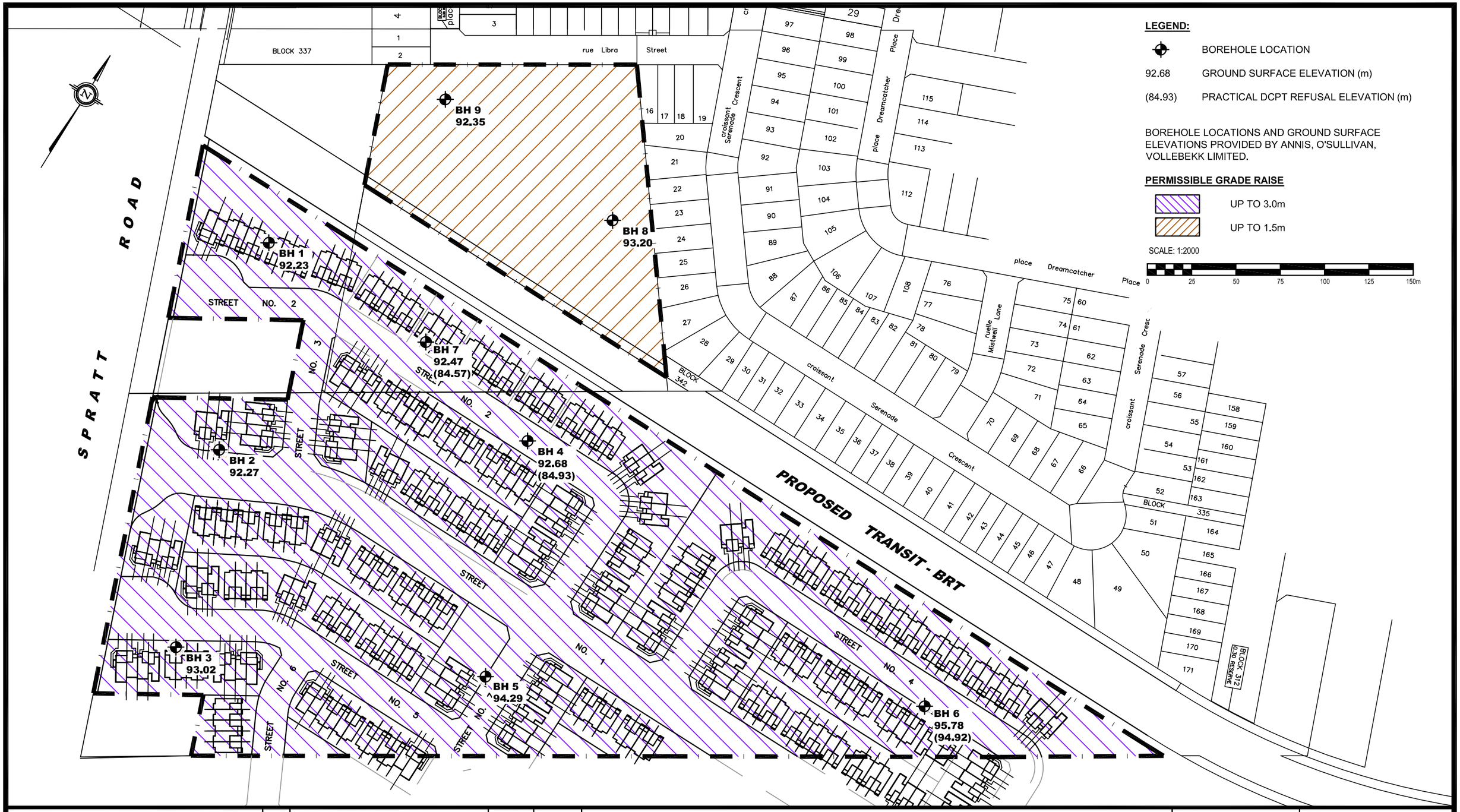
Scale	Project Title	Drawing Title	Sheet No.
NTS	4623 SPRATT	PROPOSED MACRO GRADING PLAN	FIGURE 5.1



LEGEND:

- BOREHOLE LOCATION
- 92.68 GROUND SURFACE ELEVATION (m)
- (84.93) PRACTICAL DCPT REFUSAL ELEVATION (m)

BOREHOLE LOCATIONS AND GROUND SURFACE ELEVATIONS PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LIMITED.

PERMISSIBLE GRADE RAISE

- UP TO 3.0m
- UP TO 1.5m

SCALE: 1:2000

0 25 50 75 100 125 150m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

CLARIDGE HOMES

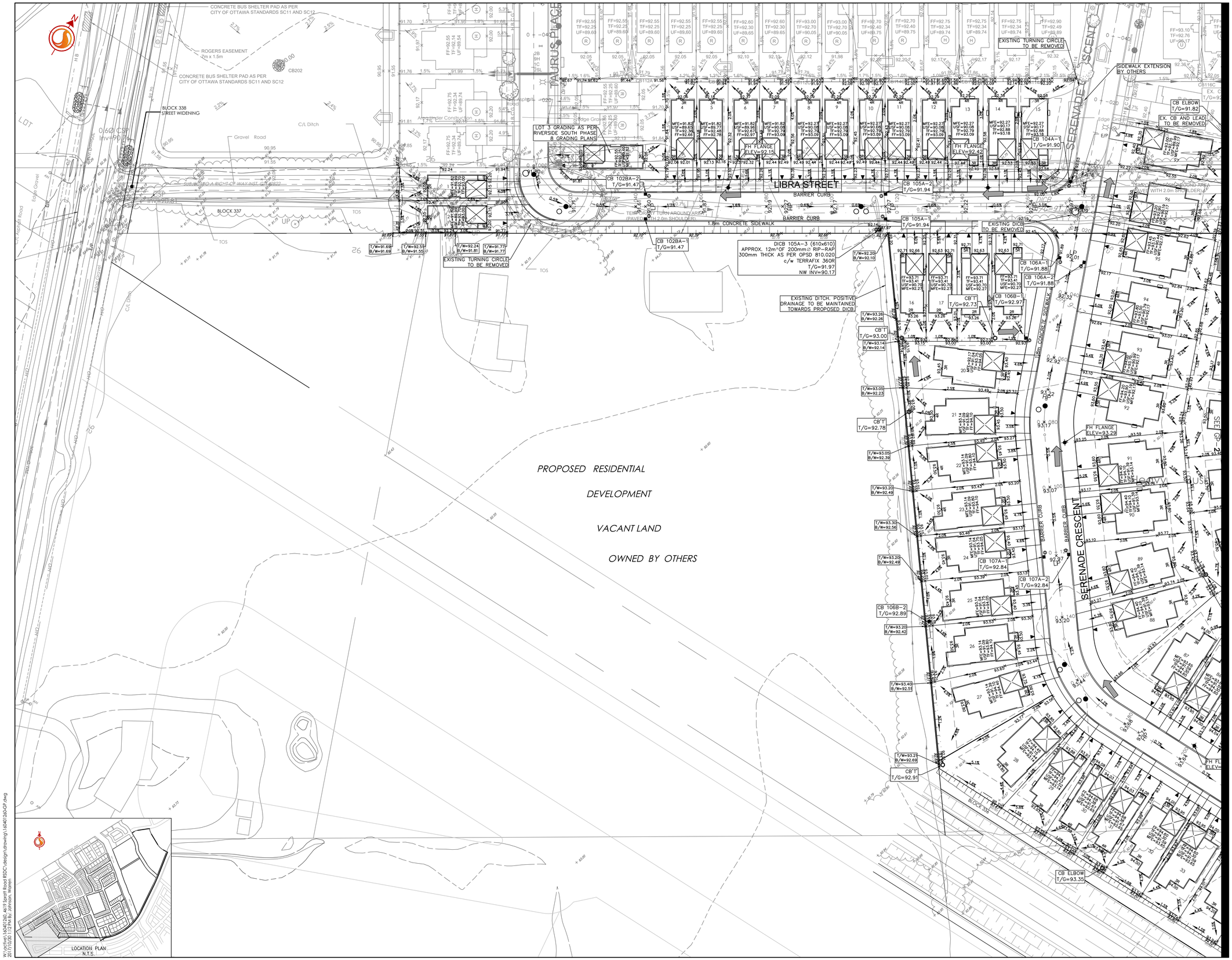
GEOTECHNICAL INVESTIGATION
PROP. RESIDENTIAL DEVELOPMENT - 4623 & 4725 SPRATT ROAD
OTTAWA, ONTARIO

Title:

PERMISSIBLE GRADE RAISE PLAN

Scale: 1:2000	Date: 12/2018
Drawn by: MPG	Report No.: PG4730-1
Checked by: SD	Dwg. No.: PG4730-2
Approved by: DJG	Revision No.: 0

p:\autocad drawings\geotechnical\pg47xx\pg4730-1 thlp.dwg



Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- ORIGINAL GROUND ELEVATION
- PROPOSED ELEVATION
- PROPOSED LOT CORNER ELEVATION / EXISTING ELEVATION AT LOT CORNER
- FLOW DIRECTION AND GRADE
- FF=99.99 FINISHED FIRST FLOOR ELEVATION
- TF=99.84 TOP OF FOUNDATION WALL ELEVATION
- USF=97.14 UNDERSIDE OF FOOTING ELEVATION
- MFE=97.14 MAXIMUM STRESS TEST STORM FLOW ELEVATION
- 3R NUMBER OF RISERS
- B/S BACKSPLIT TYPE UNIT
- W/O WALK-OUT TYPE UNIT
- E.F. ENGINEERED FILL REQUIRED
- 3:1 TERRACING 3:1 SLOPE MAXIMUM (UNLESS OTHERWISE SHOWN)
- PROPOSED SWALE
- DIRECTION OF OVERLAND FLOW
- PROPOSED VALVE BOX
- PROPOSED VALVE CHAMBER
- PROPOSED FIRE HYDRANT
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED STORM SEWER MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN 'T'
- CATCHBASIN TO BE INSTALLED WITH INLET CONTROL DEVICE (SEE DWG NI-1)
- CATCHBASINS TO BE INTERCONNECTED
- PROPOSED DEPRESSED CURB LOCATION
- PROPOSED MOUNTABLE/BARRIER CURB LOCATIONS
- PROPOSED RETAINING WALL AS PER CITY STD L7. FENCE OR RAILING REQUIRED FOR RETAINING WALLS GREATER THAN 0.60m IN HEIGHT.
- PROPOSED NOISE WALL

Notes

GRADING & DRAINAGE APPROVED

SIGNED _____

DATE _____ 2017

9	REVISED GRADING AS PER CITY COMMENTS	WAJ	KS	17.10.30
8	ISSUED FOR CONSTRUCTION	WAJ	KS	17.10.19
7	REVISED GRADING	WAJ	AMP	17.08.30
6	REVISED DRAFT PLAN	WAJ	AMP	17.08.04
5	ISSUED FOR EARLY SERVICING	WAJ	AMP	17.07.28
4	ISSUED FOR MOE APPROVAL	WAJ	AMP	17.07.07
3	ISSUED FOR THIRD SUBMISSION	WAJ	AMP	17.06.02
2	REVISED AS PER CITY COMMENTS	WAJ	AMP	17.04.20
1	ISSUED FOR FIRST SUBMISSION	WAJ	AMP	17.02.21
Revision		By	Appd.	YY.MM.DD
File Name: 160401260-GP		WAJ	SGG	WAJ 16.09.26
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project

RIVERSIDE SOUTH DEVELOPMENT CORPORATION

RIVERSIDE SOUTH PHASE 13

OTTAWA, ON

Title

GRADING PLAN

Project No.	Scale	
160401260	1:500	0 5 15 25m
Drawing No.	Sheet	Revision
GP-1	33 of 60	9

D07-16-13-0034
PLAN # 17379

W:\active\160401260_4619 Sprott Road RSDC\design\drawing\160401260-GP.dwg
2017/10/30 1:12 PM By: Johnson, Marian

ORIGINAL SHEET - ARCH D

4725 Spratt Road – Presonsult, Subdivision

Meeting Summary Notes

Wednesday, August 30, 9:00-9:40; Ottawa City Hall

Attendees:

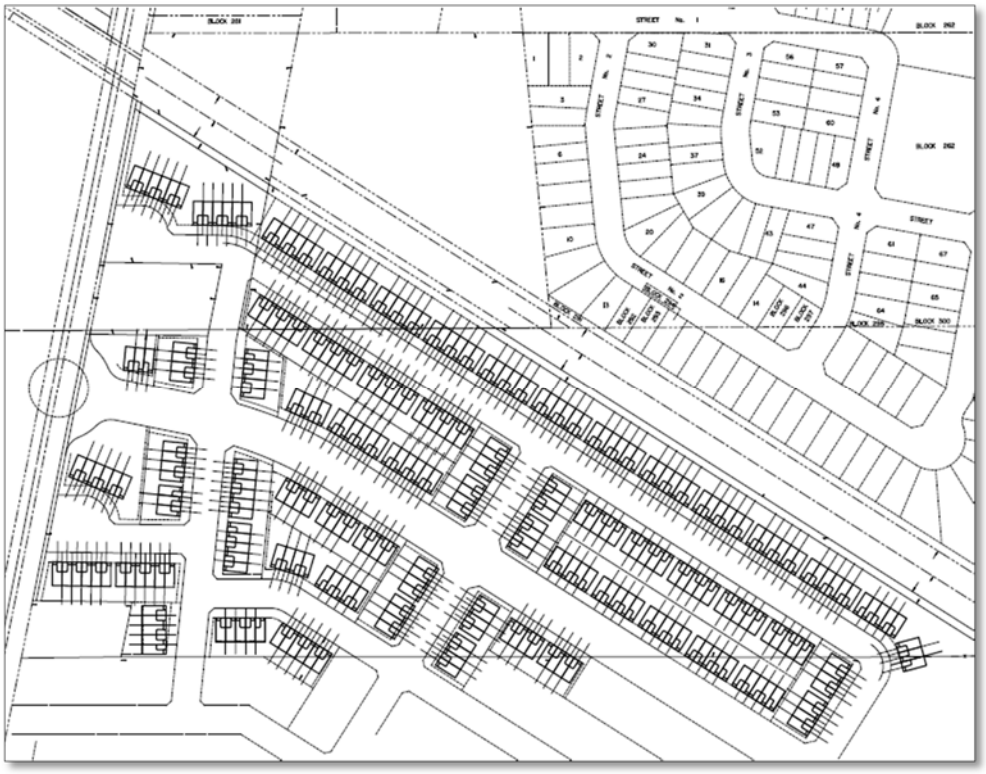
- Vincent Denomme (Claridge)
- Terry Brule (IBI)
- Justin Date (IBI)
- Natasha Baird (Project Manager, City of Ottawa)
- Frank McKinney (Project Manager, Transportation Planning, Env. Assessments)
- Wendy Tse (Planner II, City of Ottawa)
- Tracey Scaramozzino (File Lead, Planner, City of Ottawa)

Unable to Attend:

- Mark Richardson (City Forester, Planning)
- Matthew Hayley (Environmental Planner)
- Asad Yousfani (Transportation Project Manager, City of Ottawa)
- Burl Walker (Parks Planner, City of Ottawa)
- Christopher Moise (Urban Designer, Architect, City of Ottawa)
- Genya Stefanof (OC Transpo)
- Jamie Bachelor (RVCA)
- Emily Davies (Policy Planner, RSS CDP, City of Ottawa)

Issue of Discussion:

- Claridge, Draft Plan of Subdivision
- 95,576 m2 area
- 323 units, all townhouses
- One major collector through the site
- Bus Rapid Transit along the north of the site with station at the south-east corner of Spratt and the BRT Corridor



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1. **Official Plan:** Identify in Planning Rationale and ensure compliance:
   - Designated “General Urban Area”.
   - Riverside South CDP

2. **Zoning Information:**
   - Property is zoned DR – Development Reserve
   - A rezoning application will be required.

3. **Infrastructure/Servicing (Natasha Baird):**

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:

   ⇨ Ottawa Sewer Design Guidelines (October 2012)

- ⇨ Ottawa Design Guidelines – Water Distribution (2010)
- ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
- ⇨ City of Ottawa Park and Pathway Development Manual (2012)
- ⇨ City of Ottawa Accessibility Design Standards (2012)
- ⇨ Ottawa Standard Tender Documents (latest version)
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).
4. The servicing (stormwater, sanitary and water), for the subject lands, is to be based on the Riverside South Community Infrastructure Servicing Study Update – Rideau River Area (June 2017) and the Riverside South Community Master Drainage Plan Update – Rideau River Study Area.
5. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:
    i. Location of service
    ii. Type of development and the amount of fire flow required (as per FUS, 1999).
    iii. Average daily demand: ___ l/s.
    iv. Maximum daily demand: ___l/s.
    v. Maximum hourly daily demand: ___ l/s.
6. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

7. Provide a geotechnical report for the proposed development.

8. Please contact Rideau Valley Conservation Authority to discuss if any requirements are necessary.

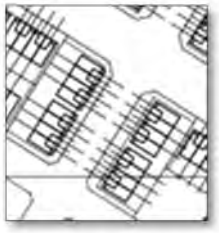
9. I will need the following studies and plans:

    - Assessment of Adequacy of Public Services Brief
    - Watermain Analysis
    - Draft Plan of Subdivision

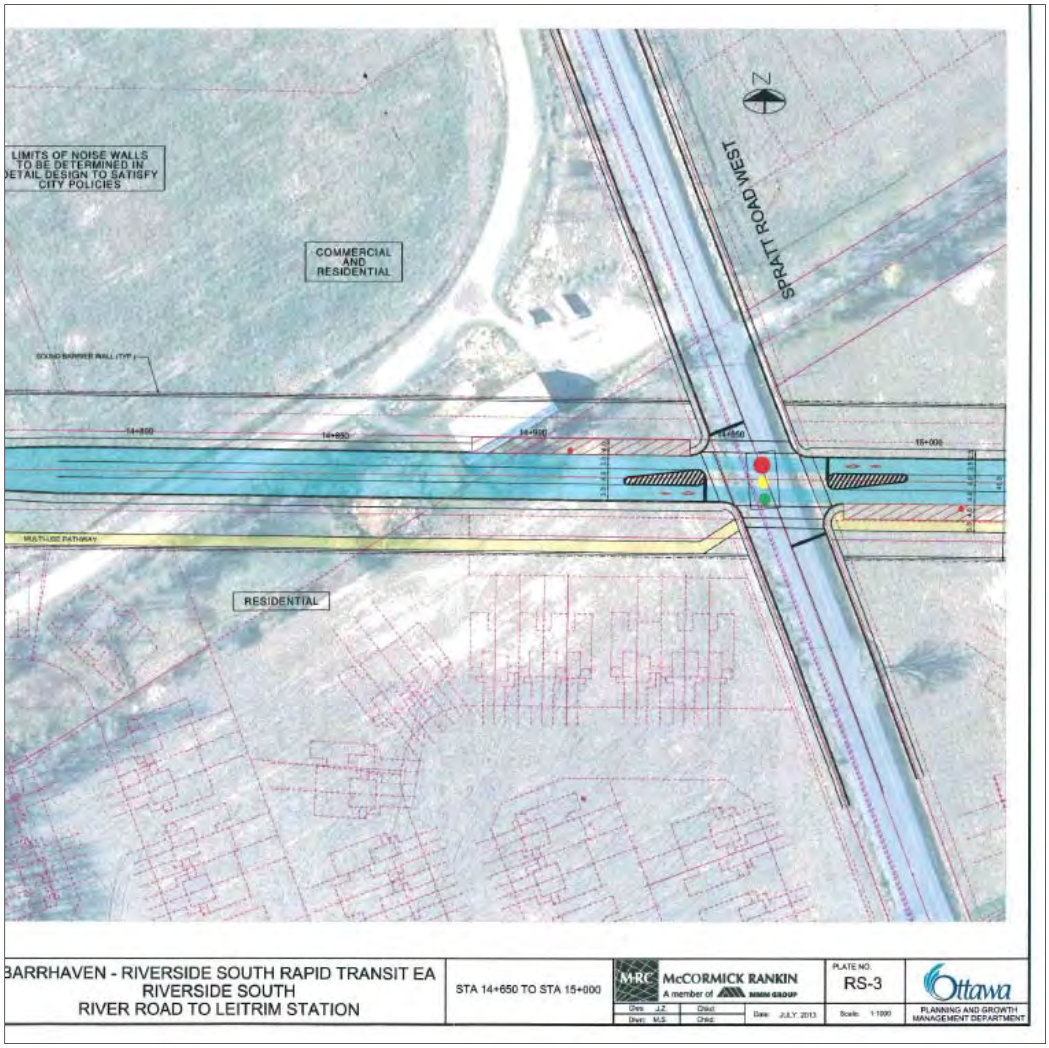
4. Initial Planning/Design Comments (Tracey Scaramozzino, Christopher Moise):

- Site is mostly medium density and a small piece of low density
- Density is to be 38u/ha for medium density. Identify the density that will be achieved through this development.
- As per P. 17 in the CDP "Areas **will have** a mix of unit types – a mix of unit types, primarily on-street and block towns interspersed with singles, semis, townhouse". Revise your plan accordingly.
- Area is within 600m of Transit and is therefore a TOD area – refer to 2.2.1 policies.
- There is 1 'neighbourhood gateway' feature shown in the CDP. Do they intend to provide one?
- Multi-use pathway runs to the north of the site. Land must be provided for this.
- Provide connectivity (a few pathways) from the subdivision to the MUP for easy access to the transit stations.
- Provide connections that will lead to future developments – such as the school to the southeast and the park/woodlot to the southwest
- Sidewalk req'd on both sides of the collector that runs through the development.
- Provide a 'Pedestrian Plan' to show the sidewalk/pathways/MUP connections within and exterior to the site.
- Try to preserve some of the hedgerows – as these are some of the most mature in the area and are specifically mentioned on the CDP section 2.2.4 – p 13.
- The long straight street at the north is not ideal – as it is not pedestrian friendly; break it up with street layout and unit type.
- FYI – ensure that the units will comply with Section 6 "Site and Built Form Guidelines" – which speaks to bldg. design and setbacks
- Ensure the units have paired driveways
- Explain how you are meeting the 'affordable housing' targets – as per S. 8.2
- Explain how the design complies with the Building Better Smarter Suburbs (BBBSS) and the RSS CDP.

- It is appreciated that the townhouse units have been turned to face the side streets.



- As per the Environmental Assessment for the Riverside South BRT – the station will be located on the south-east side of Spratt abutting Claridge lands (see image below). City Staff support a higher density in the immediate vicinity of transit stations to create a hub and will likely request that the current MD (medium density) lands at that intersection be re-designated to HD1 (high density, subzone 1) which permits low-rise, 4-storey apartment buildings.



- The red hatched lines represent the two stations – westbound station is on the west side of Spratt and the eastbound station is on the east side of Spratt.

5. **Transportation (Asad Yousfani)**
   - TIA and Noise Study are required
   - Spratt Road is to be urbanized at a 26m ROW – and is to match the cross-section of Spratt Road north of Cambie Road.
   - The round-a-bout at Spratt Road and the Future Major Collector must line up with Borbridge Avenue on the West side of Spratt Road.
   - Ensure the off-sets on local streets is at least 40 metres; and 60 metres for collectors.

6. **Transportation, Environmental Assessment (Frank McKinney):**
   - Width of BRT corridor from rear lot line to rear lot line is to be 40 metres
   - The roundabout on Spratt is an ideal location for a neighbourhood gateway sign
   - The BRT station will be located at the south-east corner of Spratt Road and the BRT Corridor
   - The BRRT Rapid Transit EA can be provided to your consultant via FTP site, once we receive their contact information.

7. **Forestry, Private (Mark Richardson):**
   - TCR is required
   - Tree Permit will be required to remove any trees
   - Contact Mark for further details and/or on-site visit

8. **Natural Environment (Matthew Hayley):**
   - TCR is required
   - Tree permit is needed to remove trees over 10 cm dbh
   - There are two existing residential properties adjacent to this development. Please pay close attention to the trees along these property lines and in

particular the boundary trees and trees on the residential property with critical root zones that extend onto the development site, boundary trees are co-owned and the neighbours permission will be required to remove or harm those trees.

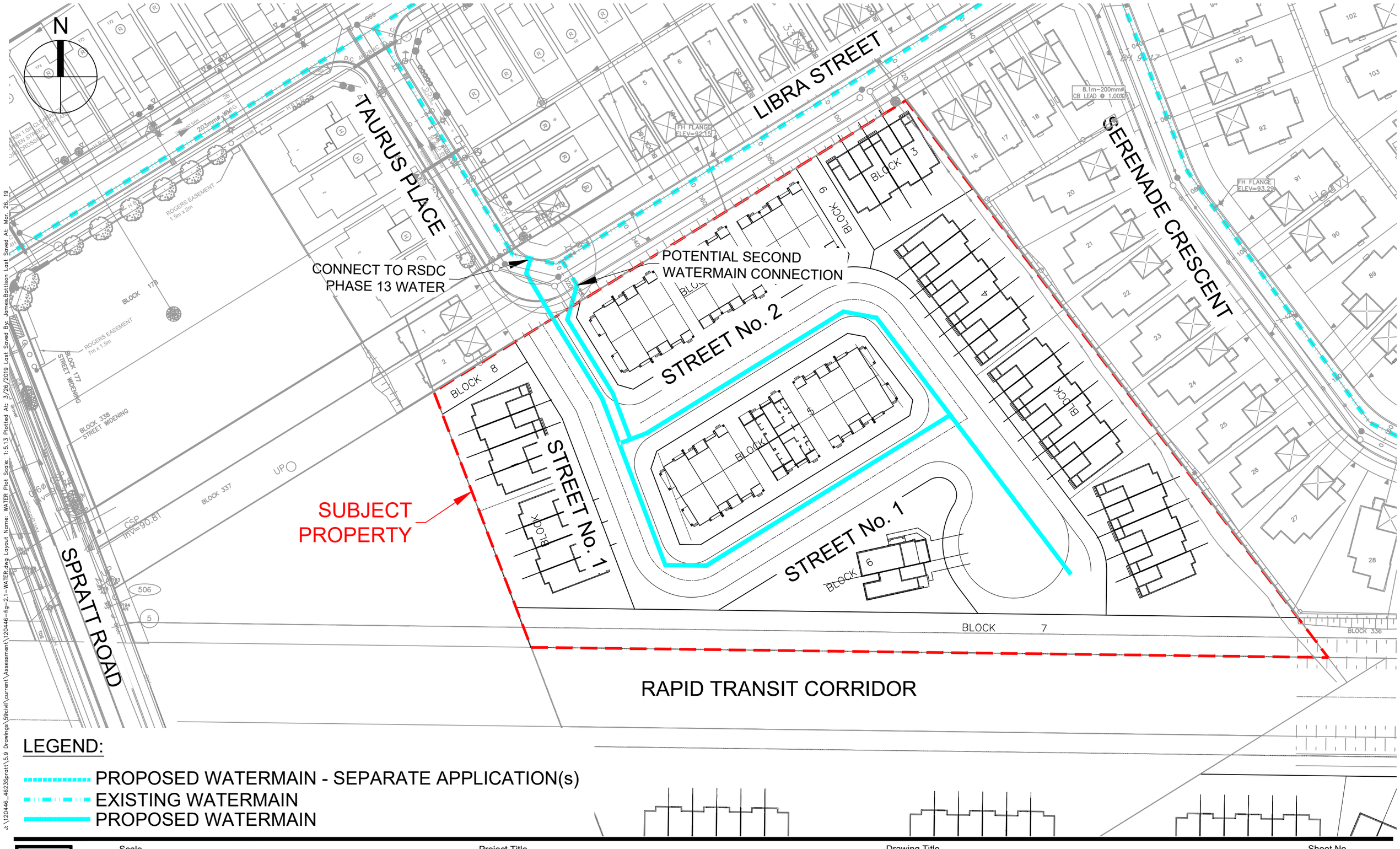
- The property may contain habitat for endangered and threatened species and as such an Environmental Impact Statement (EIS) is required. The EIS will need consultation with the local Kemptville District Office to identify species of concern. The EIS can be combined with the TCR.
- Integrated Environmental Review is to be provided as part of the Planning Rational, more guidance is available in the Official Plan Section 4.7.1.

9. Parks and Facilities (Burl Walker):

- A minimum 10 metre wide corridor is to be conveyed to the City for the MUP on the south side of the BRT. The MUP width is to be consistent with the blocks that have already been conveyed to the City to the west (Blocks 153 and 174 on 4M-1470 and Block 56 on 4M-1480).
- City records show that the Riverside South landowners' park cost sharing agreement will include the subject lands. We will be requesting a draft plan condition to address the cost sharing agreement, such as the following:

  The Owner acknowledges and agrees that the full amount of the parkland dedication requirement is to be provided through the conveyance of parkland within another subdivision or subdivisions in the Riverside South Community Design Plan area. The Owner agrees to enter into a cost sharing agreement with other landowners within the Riverside South Community Design Plan area to distribute the parkland dedication costs and the park development costs proportionately amongst the benefitting landowners in accordance with the intent of Official Plan Amendment 159, to the satisfaction of the General Manager, Recreation, Cultural and Facility Services. The Owner further acknowledges and agrees that the parkland dedication requirement shall be in the form of conveyance of parkland rather than the payment of cash-in-lieu of parkland dedication.

APPENDIX B



LEGEND:

PROPOSED WATERMAIN - SEPARATE APPLICATION(s)
EXISTING WATERMAIN
PROPOSED WATERMAIN

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Scale	Project Title	Drawing Title	Sheet No.
NTS	4623 SPRATT	CONCEPTUAL WATER PLAN	FIGURE 2.1

BOUNDARY CONDITIONS

Boundary Conditions For: Riverside South Phase 15-2 & 760 River Road &4725 Spratt Rd & 4623 Spratt Rd

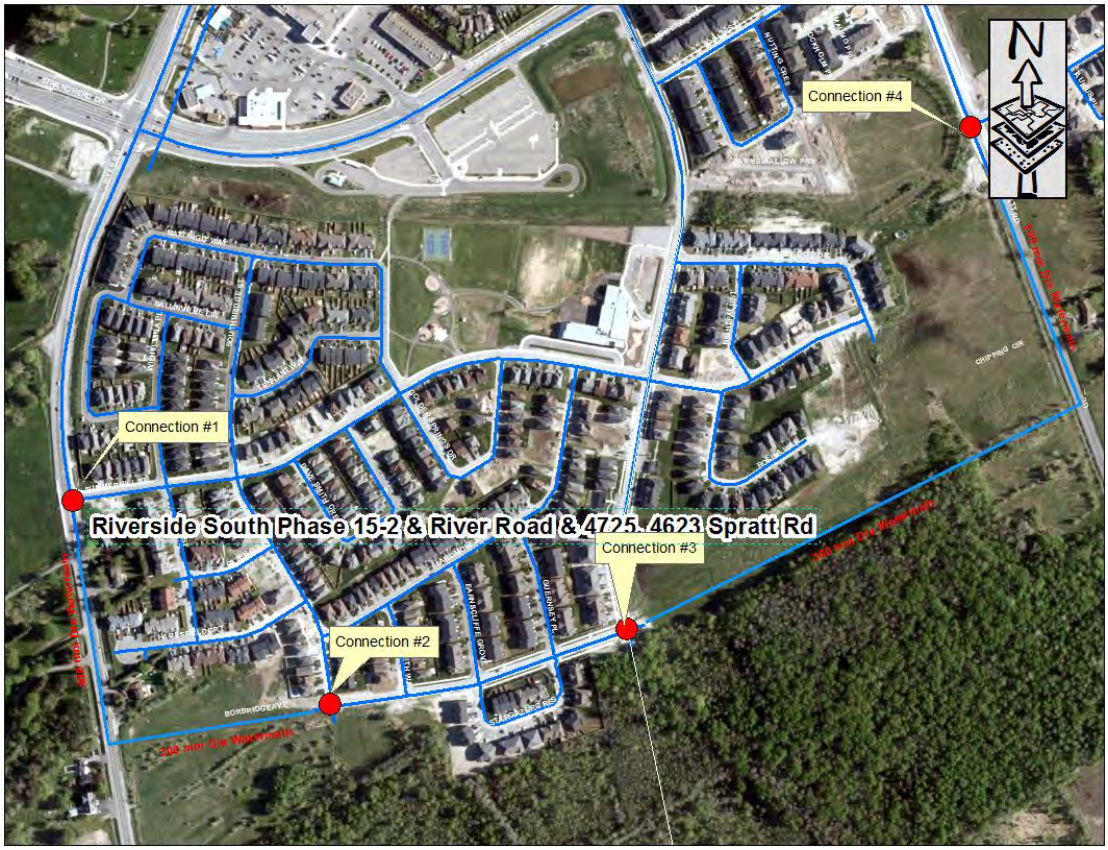
Date of Boundary Conditions: 2018-Dec-06

Provided Information:

Scenario	Demand	
	L/min	L/s
Average Daily Demand	991.8	16.53
Maximum Daily Demand	2137.2	35.62
Peak Hour	4498.8	75.0
Fire Flow #1 Demand	10,000	166.7
Fire Flow #2 Demand	12,000	200.0
Fire Flow #3 Demand	15,000	250.0

Number Of Connections: 5

Location:



BOUNDARY CONDITIONS

Location 4263 Spratt Road – Connection 5

BOUNDARY CONDITIONS

Results:

Pre_Configuration

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.8	61.3
Peak Hour	123.9	48.7
Max Day Plus Fire (10,000) L/min	119.9	42.9
Max Day Plus Fire (12,000) L/min	117.9	40.0
Max Day Plus Fire (15,000) L/min	117.3	38.8

[1]Elevation: **89.71 m**

Connection #: 2

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.8	60.8
Peak Hour	123.9	48.3
Max Day Plus Fire (10,000) L/min	121.3	44.4
Max Day Plus Fire (12,000) L/min	119.8	42.3
Max Day Plus Fire (15,000) L/min	117.3	38.8

[1]Elevation: **90.00 m**

BOUNDARY CONDITIONS

Connection #: 3

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.8	59.4
Peak Hour	124.0	46.9
Max Day Plus Fire (10,000) L/min	121.7	43.7
Max Day Plus Fire (12,000) L/min	120.4	41.9
Max Day Plus Fire (15,000) L/min	118.2	38.7

[1]Elevation: **99.99 m**

Connection #: 4

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.9	58.3
Peak Hour	124.0	45.9
Max Day Plus Fire (10,000) L/min	121.3	41.9
Max Day Plus Fire (12,000) L/min	119.8	39.8
Max Day Plus Fire (15,000) L/min	117.2	36.1

[1]Elevation: **91.79 m**

Connection #: 5

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.8	57.8
Peak Hour	123.7	45.0
Max Day Plus Fire (10,000) L/min	112.8	29.4
Max Day Plus Fire (12,000) L/min	107.9	22.5

[1]Elevation: **92.06 m**

BOUNDARY CONDITIONS

Post_Configuration

Connection #: 1

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	82.6
Peak Hour	144.6	78.0
Max Day Plus Fire (10,000) L/min	142.6	75.2
Max Day Plus Fire (12,000) L/min	141.3	73.3
Max Day Plus Fire (15,000) L/min	139.0	70.1

[1]Elevation: **89.71 m**

Connection #: 2

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	82.2
Peak Hour	144.6	77.6
Max Day Plus Fire (10,000) L/min	142.9	75.2
Max Day Plus Fire (12,000) L/min	141.7	73.5
Max Day Plus Fire (15,000) L/min	139.6	70.6

[1]Elevation: **90.00 m**

BOUNDARY CONDITIONS

Connection #: 3

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	80.7
Peak Hour	144.6	76.2
Max Day Plus Fire (10,000) L/min	143.4	74.5
Max Day Plus Fire (12,000) L/min	142.3	73.0
Max Day Plus Fire (15,000) L/min	140.6	70.5

[1]Elevation: **99.99 m**

Connection #: 4

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	79.7
Peak Hour	144.6	75.2
Max Day Plus Fire (10,000) L/min	143.2	73.1
Max Day Plus Fire (12,000) L/min	142.0	71.5
Max Day Plus Fire (15,000) L/min	140.0	68.7

[1]Elevation: **91.79 m**

Connection #: 5

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.8	79.3
Peak Hour	144.6	74.8
Max Day Plus Fire (10,000) L/min	137.7	65.1
Max Day Plus Fire (12,000) L/min	134.5	60.5

[1]Elevation: **92.06 m**

BOUNDARY CONDITIONS

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:

a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

2) Watermains extending from Connection #1 to Connection #2 and watermains extending from Connection #4 to Connection #3 as per connection location figure in this boundary condition must be as per Riverside South Community Infrastructure Servicing Study dated June 21 2017 update.

3) 4623 Spratt Road proposed development will require an additional connection if the number of homes exceed 50 units.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

FILE: 118404.5.7
DATE PRINTED: 14-Mar-19
DESIGN: LE
PAGE : 1 OF 1

PROJECT : 4623 Spratt
LOCATION : CITY OF OTTAWA
DEVELOPER : RIVERSIDE SOUTH DEVELOPMENT CORPORATION

NODE	RESIDENTIAL				NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND
	UNITS			POP'N	INDTRL	COMM.	INST.										
	SF	SD & TH	APT		(ha.)	(ha.)	(ha.)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	(l/min)
4623 Spratt Road																	
J1		8		22				0.09	0.00	0.09	0.22	0.00	0.22	0.48	0.00	0.48	11,000
J2		3		8				0.03	0.00	0.03	0.08	0.00	0.08	0.18	0.00	0.18	11,000
J3		5		14				0.05	0.00	0.05	0.14	0.00	0.14	0.30	0.00	0.30	11,000
J4		6		16				0.07	0.00	0.07	0.16	0.00	0.16	0.36	0.00	0.36	11,000
J5		9		24				0.10	0.00	0.10	0.25	0.00	0.25	0.54	0.00	0.54	11,000
J6		2		5				0.02	0.00	0.02	0.05	0.00	0.05	0.12	0.00	0.12	11,000
J7		9		24				0.10	0.00	0.10	0.25	0.00	0.25	0.54	0.00	0.54	11,000
J8		10		27				0.11	0.00	0.11	0.27	0.00	0.27	0.60	0.00	0.60	11,000
Total		52		140						0.57			1.42			3.12	

ASSUMPTIONS

RESIDENTIAL DENSITIES

- Single Family (SF) 3.4 p / p / u
- Semi Detached (SD) & Townhouse (TH 2.7 p / p / u
- Apartment (APT) 1.8 p / p / u
- -Other 66 u / p / ha

AVG. DAILY DEMAND

- Residential 350 l / cap / day
- ICI 50,000 l / ha / day

MAX. DAILY DEMAND

- Residential 875 l / cap / day
- ICI 75,000 l / ha / day

MAX. HOURLY DEMAND

- Residential 1,925 l / cap / day
- ICI 135,000 l / ha / day

FIRE FLOW

- SF, SD, TH & ST 10,000 l / min
- Back to Back TH 11,000 l / min
- ICI 15,000 l / min

Fire Flow Requirement from Fire Underwriters Survey

4623 Spratt Road - 6 unit back to back townhouse block

Building Floor Area	width	18.0	
	depth	18.0	
	stories	2	
		648.0	

$F = 220C\sqrt{A}$

C	1.5		C =	1.5	wood frame
A	648	m^2		1.0	ordinary
				0.8	non-combustible
F	8,400	l/min		0.6	fire-resistive
use	8,000	l/min			

Occupancy Adjustment

		-25%	non-combustible	
		-15%	limited combustible	
Use	-15%	0%	combustible	
		+15%	free burning	
Adjustment	-1200 l/min	+25%	rapid burning	
Fire flow	6,800 l/min			

Sprinkler Adjustment

Use	0%
Adjustment	0 l/min

Exposure Adjustment

Building Face	Separation	Charge
north	27.0	10%
east	4.5	20%
west	4.5	20%
south	23.0	10%
Total		60%

Separation	Charge
0 to 3m	+25%
3.1 to 10m	+20%
10.1 to 20m	+15%
20.1 to 30m	+10%
30.1 to 45m	+5%

Adjustment	4,080	l/min
Total adjustment	4,080	
Fire flow	10,880	l/min
Use	**11,000**	**l/min**
	183.3	**l/s**


CAMBRIDGE ROAD
CONN-5
BOUNDARY CONDITION CONNECTION
TAURUS RIDGE
LIBRA STREET
C2
J1
J2
J3
J4
J5
J6
J7
J8
LOT 23
STREET NO. 2

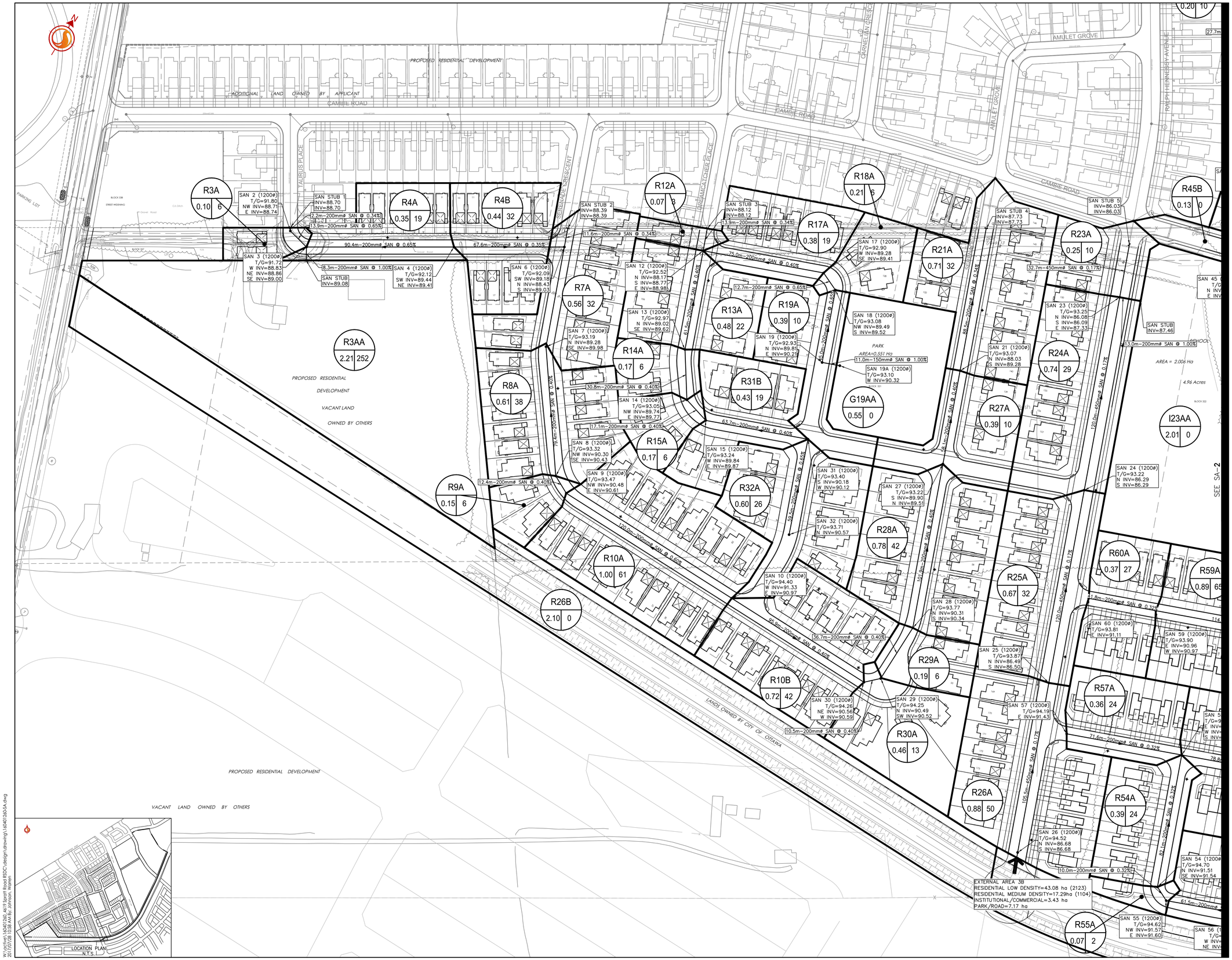
WATER MODEL

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)
1	☐	C1	0.00	91.50	147.80	56.30
2	☐	C2	0.00	91.50	147.80	56.30
3	☐	J1	0.10	91.75	147.80	56.05
4	☐	J2	0.03	92.00	147.80	55.80
5	☐	J3	0.05	92.25	147.80	55.55
6	☐	J4	0.07	92.50	147.80	55.30
7	☐	J5	0.10	92.75	147.80	55.05
8	☐	J6	0.02	92.80	147.80	55.00
9	☐	J7	0.10	92.00	147.80	55.80
10	☐	J8	0.11	91.75	147.80	56.05

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)
1	☐	C1	0.00	91.50	144.60	53.10
2	☐	C2	0.00	91.50	144.59	53.09
3	☐	J1	0.54	91.75	144.59	52.84
4	☐	J2	0.18	92.00	144.59	52.59
5	☐	J3	0.30	92.25	144.59	52.34
6	☐	J4	0.36	92.50	144.59	52.09
7	☐	J5	0.54	92.75	144.59	51.84
8	☐	J6	0.12	92.80	144.58	51.78
9	☐	J7	0.54	92.00	144.59	52.59
10	☐	J8	0.60	91.75	144.59	52.84

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (m)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (m)	Design Fire Node Pressure (m)
1	☐	C2	183.30	243.71	J4	14.28	105.78	243.71	14.28	14.28
2	☐	J1	183.55	200.19	J4	14.28	105.78	200.19	14.28	14.31
3	☐	J2	183.38	185.11	J2	14.28	105.78	185.11	14.28	14.29
4	☐	J3	183.44	179.30	J3	14.28	105.78	179.30	14.28	14.28
5	☐	J4	183.46	178.01	J4	14.28	105.78	178.01	14.28	14.27
6	☐	J7	183.55	180.20	J7	14.28	105.78	180.20	14.28	14.28
7	☐	J8	183.57	185.75	J8	14.28	105.78	185.75	14.28	14.29

APPENDIX C



W:\active\160401260_4619 Strandherd Road RSDC\design\drawings\160401260SA.dwg
2017/07/28 10:34 AM By: Johnson Warren

ORIGINAL SHEET - ARCH D

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

SA24A / 0.38 | 34 — SANITARY DRAINAGE AREA ID# / POPULATION / SANITARY DRAINAGE AREA ha.
SANITARY DRAINAGE AREA
PROPOSED SANITARY SEWER
EXISTING SANITARY SEWER
FUTURE STUB

Notes

REVIEWED BY DEVELOPMENT REVIEW BRANCH
SIGNED
DATE 2017
PLAN NUMBER

5	ISSUED FOR EARLY SERVICING	WAJ	AMP	17.07.28
4	ISSUED FOR MOE APPROVAL	WAJ	AMP	17.07.07
3	ISSUED FOR THIRD SUBMISSION	WAJ	AMP	17.06.02
2	REVISED AS PER CITY COMMENTS	WAJ	AMP	17.04.20
1	ISSUED FOR FIRST SUBMISSION	WAJ	AMP	17.02.21
Revision		By	Appd.	YY.MM.DD
File Name: 160401260-SA		WAJ	SGG	WAJ 16.09.26
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
RIVERSIDE SOUTH DEVELOPMENT CORPORATION

RIVERSIDE SOUTH PHASE 13

OTTAWA, ON

Title
SANITARY DRAINAGE PLAN

Project No.	Scale	Revision
160401260	1:1000 (0 10 30 50m)	
Drawing No.	Sheet	
SA-1	58 of 60	5

D07-16-13-0034

PLAN # 17379

Stantec

SUBDIVISION:

Riverside South Development Corporation - Phase 13

DATE: April 6, 2017
REVISION: 1
DESIGNED BY: WAJ
CHECKED BY: AMP

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 1604-01260

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	350 L/p/day	MINIMUM VELOCITY	0.60 m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	50,000 L/ha/day	MAXIMUM VELOCITY	3.00 m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 L/ha/day	MANNINGS n	0.013
PEAKING FACTOR (COMM., INST.):	1.5	INDUSTRIAL (LIGHT)	35,000 L/ha/day	BEDDING CLASS	B
PERSONS / SINGLE UNIT	3.2	INSTITUTIONAL	50,000 L/ha/day	MINIMUM COVER	2.50 m
PERSONS / TOWNHOME	2.4	INFILTRATION	0.28 L/s/ha		
PERSONS / APARTMENT	1.9				

External Areas

Low Density	22 unit/ha*
Medium Density	38 unit/ha*
High Density	60 unit/ha

* As per the RSCISSU, populations for low and medium density residential are based on 70% of the total area

LOCATION			RESIDENTIAL AREA AND POPULATION									COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE							
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	SINGLE	UNITS TOWN	APT.	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (L/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (L/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (L/s)	FLOW (L/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Phase 8 Stub 7 (Portico Way)																																	
External 3D, 3E, 4A, R80B (External), R80A	80	79	107.75	1169	373	1062	6652	107.75	6652	3.13	84.3	0.00	0.00	0.00	0.00	0.00	0.00	11.72	11.72	39.97	39.97	10.2	159.44	159.44	44.6	139.1	63.4	525	PVC	SDR 35	0.19	196.7	**70.71%**	0.88	0.84
R79A	79	78	0.11	0	0	0	0	107.86	6652	3.13	84.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72	0.00	39.97	10.2	0.11	159.55	44.7	139.1	41.1	525	PVC	SDR 35	0.19	195.1	**71.33%**	0.87	0.83
R78A	78	77	0.11	0	0	0	0	107.97	6652	3.13	84.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72	0.00	39.97	10.2	0.11	159.66	44.7	139.2	41.1	525	PVC	SDR 35	0.19	200.1	**69.53%**	0.90	0.84
R77AA	77A	77	7.75	0	0	0	0	7.75	0	4.00	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	7.75	7.75	2.2	2.2	13.0	200	PVC	SDR 35	1.00	33.4	**6.49%**	1.05	0.49
R77B, R77A	77	76	0.48	0	0	0	0	116.20	6652	3.13	84.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72	0.00	39.97	10.2	0.48	167.89	47.0	141.5	110.6	525	PVC	SDR 35	0.19	195.7	**72.30%**	0.88	0.84
R76A	76	75	0.07	0	0	0	0	116.27	6652	3.13	84.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72	0.00	39.97	10.2	0.07	167.96	47.0	141.5	26.4	525	PVC	SDR 35	0.19	197.2	**71.77%**	0.88	0.84
R75A	75	74	0.19	0	0	0	0	116.46	6652	3.13	84.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72	0.00	39.97	10.2	0.19	168.15	47.1	141.5	71.3	525	PVC	SDR 35	0.19	195.1	**72.56%**	0.87	0.83
R74A	74	73	0.08	0	0	0	0	116.54	6652	3.13	84.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72	0.00	39.97	10.2	0.08	168.23	47.1	141.6	32.3	525	PVC	SDR 35	0.19	195.4	**72.47%**	0.87	0.84
R73AA	73A	73	6.00	0	0	0	684	6.00	684	3.90	10.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	6.00	6.00	1.7	12.5	13.0	200	PVC	SDR 35	1.00	33.4	**37.34%**	1.05	0.83
R73A	73	60E	0.20	0	0	0	0	122.74	7336	3.09	91.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72	0.00	39.97	10.2	0.20	174.43	48.8	150.7	78.2	525	PVC	SDR 35	0.19	195.9	**76.95%**	0.88	0.85
																												525							
Phase 8 Stub 6 (Pathfinder Way)																																	
R41A	41	40	0.45	4	0	0	13	0.45	13	4.00	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.45	0.45	0.1	0.3	77.1	200	PVC	SDR 35	0.65	27.1	**1.23%**	0.85	0.24
R40A	40	39	0.34	4	0	0	13	0.78	26	4.00	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.34	0.78	0.2	0.6	76.4	200	PVC	SDR 35	0.32	18.9	**3.36%**	0.60	0.23
R39A	39	38	0.13	1	0	0	3	0.91	29	4.00	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.13	0.91	0.3	0.7	11.4	200	PVC	SDR 35	0.32	18.9	**3.82%**	0.60	0.24
R38A	38	37	0.52	9	0	0	29	1.44	58	4.00	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.52	1.44	0.4	1.3	77.0	200	PVC	SDR 35	0.32	18.9	**7.06%**	0.60	0.29
R37A	37	36	0.93	17	0	0	54	2.37	112	4.00	1.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.93	2.37	0.7	2.5	120.0	200	PVC	SDR 35	0.32	18.9	**13.10%**	0.60	0.34
R36A	36	35	0.05	0	0	0	0	2.42	112	4.00	1.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.05	2.42	0.7	2.5	33.8	200	PVC	SDR 35	0.32	18.9	**13.18%**	0.60	0.34
G72A, R72A	72	47	0.46	6	0	0	19	0.46	19	4.00	0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.71	1.71	0.0	2.18	2.18	0.6	0.9	100.1	200	PVC	SDR 35	0.65	27.0	**3.42%**	0.85	0.34
R58A	58	51	0.36	0	9	0	22	0.36	22	4.00	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.36	0.36	0.1	0.5	68.2	200	PVC	SDR 35	0.65	26.9	**1.68%**	0.85	0.26
R57A	57	53	0.36	0	10	0	24	0.36	24	4.00	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.36	0.36	0.1	0.5	71.6	200	PVC	SDR 35	0.32	18.9	**2.59%**	0.60	0.22
R67A	67	66	0.34	0	9	0	22	0.34	22	4.00	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.34	0.34	0.1	0.4	61.4	200	PVC	SDR 35	0.65	27.0	**1.65%**	0.85	0.26
R66B (External), R66A	66	56	0.22	0	5	0	12	0.56	34	4.00	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	1.30	0.0	1.52	1.86	0.5	1.1	49.3	200	PVC	SDR 35	0.32	18.9	**5.63%**	0.60	0.27
R56A	56	55	0.32	0	8	0	19	0.88	53	4.00	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.32	2.18	0.6	1.5	61.5	200	PVC	SDR 35	0.32	18.9	**7.75%**	0.60	0.30
R55A	55	54	0.07	0	1	0	2	0.95	55	4.00	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.07	2.25	0.6	1.5	10.0	200	PVC	SDR 35	0.32	18.9	**8.06%**	0.60	0.30
R54A	54	53	0.39	0	10	0	24	1.34	79	4.00	1.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.39	2.64	0.7	2.0	82.1	200	PVC	SDR 35	0.32	18.9	**10.69%**	0.60	0.33
R53A	53	52	0.66	0	21	0	50	2.37	154	4.00	2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.66	3.67	1.0	3.5	78.8	200	PVC	SDR 35	0.32	18.9	**18.58%**	0.60	0.38
R52A	52	51	0.12	0	4	0	10	2.48	163	4.00	2.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.12	3.78	1.1	3.7	18.0	200	PVC	SDR 35	0.32	18.9	**19.58%**	0.60	0.39
R51A	51	50	0.45	0	11	0	26	3.29	211	4.00	3.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.45	4.59	1.3	4.7	81.9	200	PVC	SDR 35	0.32	18.9	**24.89%**	0.60	0.41
R60A	60	59	0.37	4	6	0	27	0.37	27	4.00	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.37	0.37	0.1	0.5	41.8	200	PVC	SDR 35	0.32	18.9	**2.88%**	0.60	0.22
R59A	59	50	0.89	9	15	0	65	1.27	92	4.00	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.89	1.27	0.4	1.8	114.6	200	PVC	SDR 35	0.32	18.9	**9.76%**	0.60	0.31
R50A	50	49	0.07	0	0	0	0	4.63	303	4.00	4.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.07	5.93	1.7	6.6	49.0	200	PVC	SDR 35	0.32	18.9	**34.75%**	0.60	0.46
R65A	65	64	0.50	0	11	0	26	0.50	26	4.00	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.50	0.50	0.1	0.6	77.2	200	PVC	SDR 35	0.32	18.9	**3.00%**	0.60	0.23
R64A	64	63	0.58	0	16	0	38	1.08	65	4.00	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.58	1.08	0.3	1.4	58.5	200	PVC	SDR 35	0.32	18.9	**7.15%**	0.60	0.29
R63A	63	62	0.56	5	3	0	23	1.64	88	4.00	1.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.56	1.64	0.5	1.9	68.9	200	PVC	SDR 35	0.32	18.9	**9.97%**	0.60	0.32
R62A	62	61	0.29	2	0	0	6	1.93	94	4.00	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.29	1.93	0.5	2.1	9.0	200	PVC	SDR 35	0.32	18.9	**10.95%**	0.60	0.33
R61A	61	49	0.70	11	0	0	35	2.64	130	4.00	2.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.70	2.64	0.7	2.8	94.3	200	PVC	SDR 35	0.32	18.9	**15.00%**	0.60	0.35
R49A	49	48	0.26	4	0	0	13	7.53	446	4.00	7.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.26	8.83	2.5	9.7	53.8	200	PVC	SDR 35	0.32	18.9	**51.24%**	0.60	0.51
R48A	48	47	0.59	8	0	0	26	8.12	471	3.99	7.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.0	0.59	9.42	2.6	10.2	120.0	200	PVC	SDR 35	0.32	18.9	**54.19%**	0.60	0.52
R71A	71	70	0.88	13	0	0	42	0.88	42	4.00	0.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.88	0.88	0.2	0.9	100.1	200	PVC	SDR 35	0.32	18.9	**4.87%**	0.60	0.25

Stantec

SUBDIVISION:

Riverside South Development Corporation - Phase 13

DATE: April 6, 2017
REVISION: 1
DESIGNED BY: WAJ
CHECKED BY: AMP

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 1604-01260

DESIGN PARAMETERS

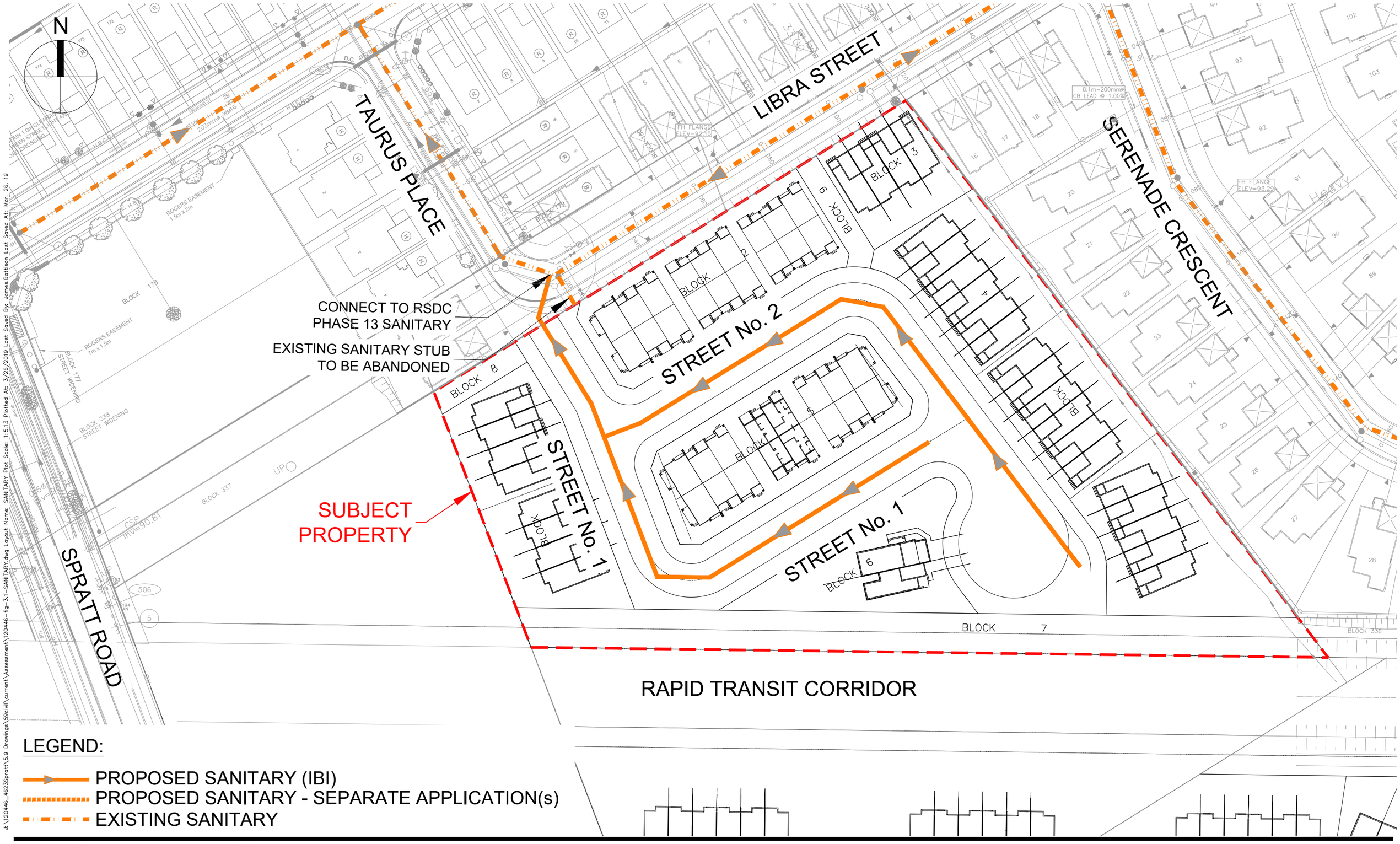
MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	350	L/p/day	MINIMUM VELOCITY	0.60	m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	50,000	L/ha/day	MAXIMUM VELOCITY	3.00	m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000	L/ha/day	MANNINGS n	0.013	
PEAKING FACTOR (COMM., INST.):	1.5	INDUSTRIAL (LIGHT)	35,000	L/ha/day	BEDDING CLASS	B	
PERSONS / SINGLE UNIT	3.2	INSTITUTIONAL	50,000	L/ha/day	MINIMUM COVER	2.50	m
PERSONS / TOWNHOME	2.4	INFILTRATION	0.28	L/s/ha			
PERSONS / APARTMENT	1.9						

External Areas

Low Density	22 unit/ha*
Medium Density	38 unit/ha*
High Density	60 unit/ha

* As per the RSCISSU, populations for low and medium density residential are based on 70% of the total area

LOCATION			RESIDENTIAL AREA AND POPULATION									COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE							
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	SINGLE	UNITS TOWN	APT.	POP.	CUMULATIVE AREA	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
			(ha)					(ha)			(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(m)	(mm)			(%)	(l/s)	(%)	(m/s)	(m/s)
R70A	70	69	0.20	2	0	0	6	1.08	48	4.00	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.20	1.08	0.3	1.1	8.6	200	PVC	SDR 35	0.32	18.9	**5.72%**	0.60	0.27
R69A	69	68	0.24	3	0	0	10	1.32	58	4.00	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.24	1.32	0.4	1.3	43.7	200	PVC	SDR 35	0.32	18.9	**6.89%**	0.60	0.29
R68A	68	47	0.17	2	0	0	6	1.49	64	4.00	1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.17	1.49	0.4	1.5	36.8	200	PVC	SDR 35	0.32	18.9	**7.68%**	0.60	0.30
R47A	47	46	0.04	0	0	0	0	10.12	554	3.95	8.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.0	0.04	13.13	3.7	12.5	23.4	200	PVC	SDR 35	0.32	19.0	**66.21%**	0.60	0.55
R46A	46	45	0.10	0	0	0	0	10.22	554	3.95	8.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.0	0.10	13.23	3.7	12.6	62.1	200	PVC	SDR 35	0.32	18.9	**66.44%**	0.60	0.55
R45B, R45A	45	44	0.37	4	0	0	13	10.59	567	3.95	9.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.0	0.37	13.60	3.8	12.9	36.5	200	PVC	SDR 35	0.40	21.1	**60.90%**	0.67	0.60
R44A	44	43	0.23	4	0	0	13	10.81	580	3.94	9.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.0	0.23	13.83	3.9	13.1	23.4	250	PVC	SDR 35	0.25	30.2	**43.52%**	0.61	0.50
R43A	43	42	0.63	12	0	0	38	11.44	618	3.92	9.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.0	0.63	14.45	4.0	13.9	78.1	250	PVC	SDR 35	0.25	30.3	**45.78%**	0.61	0.51
R42A	42	35	0.20	3	0	0	10	11.64	628	3.92	10.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.0	0.20	14.65	4.1	14.1	27.7	250	PVC	SDR 35	0.25	30.3	**46.44%**	0.61	0.51
R35A	35	34	0.21	3	0	0	10	14.27	750	3.88	11.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.0	0.21	17.28	4.8	16.6	24.6	250	PVC	SDR 35	0.25	30.3	**54.79%**	0.61	0.54
R34A	34	33	0.36	8	0	0	26	14.63	775	3.87	12.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.01	0.0	0.36	17.64	4.9	17.1	40.6	250 250	PVC	SDR 35	0.26	30.7	**55.65%**	0.62	0.55
Phase 8 Stub 1 (Taurus Place)																																			
R4A	4	3	0.35	6	0	0	19	0.35	19	4.00	0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.35	0.35	0.1	0.4	90.4	200	PVC	SDR 35	0.65	27.0	**1.51%**	0.85	0.26
R3AA	3A	3	2.21	0	0	0	252	2.21	252	4.00	4.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	2.21	2.21	0.6	4.7	8.3	200	PVC	SDR 35	1.00	33.5	**14.05%**	1.05	0.61
R3A	3	2	0.10	2	0	0	6	2.65	278	4.00	4.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.10	2.65	0.7	5.2	13.9	200	PVC	SDR 35	0.65	27.0	**19.44%**	0.85	0.54
	2	1	0.00	0	0	0	0	2.65	278	4.00	4.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	2.65	0.7	5.2	2.2	200 200	PVC	SDR 35	0.34	19.4	**26.99%**	0.61	0.43
Phase 8 Stub 2 (Serenade Crescent)																																			
R4B	4	6	0.44	10	0	0	32	0.44	32	4.00	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.44	0.44	0.1	0.6	67.6	200	PVC	SDR 35	0.35	19.7	**3.26%**	0.62	0.23
R10A	10	9	1.00	19	0	0	61	1.00	61	4.00	1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	1.00	1.00	0.3	1.3	120.0	200	PVC	SDR 35	0.60	25.9	**4.89%**	0.81	0.35
R9A	9	8	0.15	2	0	0	6	1.15	67	4.00	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.15	1.15	0.3	1.4	12.4	200	PVC	SDR 35	0.40	21.1	**6.67%**	0.67	0.31
R8A	8	7	0.61	12	0	0	38	1.76	106	4.00	1.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.61	1.76	0.5	2.2	79.4	200	PVC	SDR 35	0.40	21.1	**10.42%**	0.67	0.36
R7A	7	6	0.56	10	0	0	32	2.32	138	4.00	2.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.56	2.32	0.6	2.9	62.0	200	PVC	SDR 35	0.40	21.1	**13.61%**	0.67	0.39
	6	5	0.00	0	0	0	0	2.76	170	4.00	2.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	2.76	0.8	3.5	11.6	200 200	PVC	SDR 35	0.34	19.4	**18.13%**	0.61	0.38
Phase 8 Stub 3 (Dreamcatcher Place)																																			
R32A	32	31	0.60	8	0	0	26	0.60	26	4.00	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.60	0.60	0.2	0.6	59.5	200	PVC	SDR 35	0.65	27.0	**2.16%**	0.85	0.29
R31B	31	15	0.43	6	0	0	19	1.02	45	4.00	0.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.43	1.02	0.3	1.0	63.7	200	PVC	SDR 35	0.40	21.1	**4.79%**	0.67	0.28
R15A	15	14	0.17	2	0	0	6	1.19	51	4.00	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.17	1.19	0.3	1.2	17.1	200	PVC	SDR 35	0.40	21.2	**5.48%**	0.67	0.29
R14A	14	13	0.17	2	0	0	6	1.36	58	4.00	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.17	1.36	0.4	1.3	30.8	200	PVC	SDR 35	0.40	21.1	**6.21%**	0.67	0.31
R13A	13	12	0.48	7	0	0	22	1.83	80	4.00	1.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.48	1.83	0.5	1.8	61.5	200	PVC	SDR 35	0.40	21.1	**8.57%**	0.66	0.34
G19AA	19A	19	0.00	0	0	0	0	0.00	0	4.00	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.55	0.0	0.55	0.55	0.2	0.2	11.0	150	PVC	DR 28	1.00	15.3	**1.01%**	0.86	0.23
R19A	19	18	0.39	3	0	0	10	0.39	10	4.00	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.0	0.39	0.94	0.3	0.4	45.0	200	PVC	SDR 35	0.65	27.0	**1.56%**	0.85	0.26
R18A	18	17	0.21	2	0	0	6	0.61	16	4.00	0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.0	0.21	1.16	0.3	0.6	12.7	200	PVC	SDR 35	0.65	27.0	**2.16%**	0.85	0.29
R17A	17	12	0.38	6	0	0	19	0.99	35	4.00	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.0	0.38	1.54	0.4	1.0	75.0	200	PVC	SDR 35	0.40	21.1	**4.73%**	0.67	0.28
R12A	12	11	0.07	1	0	0	3	2.89	118	4.00	1.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.0	0.07	3.44	1.0	2.9	13.9	200 200	PVC	SDR 35	0.34	19.5	**14.80%**	0.61	0.36
Phase 8 Stub 4 (Serenade Crescent)																																			
R10B	10	30	0.72	13	0	0	42	0.72	42	4.00	0.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.72	0.72	0.2	0.9	95.9	200	PVC	SDR 35	0.40	21.1	**4.15%**	0.66	0.27
R30A	30	29	0.46	4	0	0	13	1.17	54	4.00	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.46	1.17	0.3	1.2	10.5	200	PVC	SDR 35	0.40	21.1	**5.72%**	0.67	0.30
R29A	29	28	0.19	2	0	0	6	1.36	61	4.00	1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.19	1.36	0.4	1.4	36.7	200	PVC	SDR 35	0.40	21.1	**6.46%**	0.67	0.31
R28A	28	27	0.78	13	0	0	42	2.14	102	4.00	1.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.78	2.14	0.6	2.3	101.9	200	PVC	SDR 35	0.40	21.2	**10.65%**	0.67	0.36
R27A	27	21	0.39	3	0	0	10	2.53	112	4.00	1.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.39	2.53	0.7	2.5	58.1	200	PVC	SDR 35	0.40	21.1	**11.93%**	0.67	0.37
R21A	21	20	0.71	10	0	0	32	3.24	144	4.00	2.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.71	3.24	0.9	3.2	88.5	200 200	PVC	SDR 35	0.34	19.5	**16.64%**	0.61	0.38
Phase 8 Stub 5 (Ralph Hennessy Avenue)																																			
R26B (External), EXT3B	26A	26	60.37	663	460	0	3227	60.37	3227	3.42	44.6	3.43	3.43	0.00	0.00	0.00	0.00	0.00	0.00	9.27	9.27	3.0	73.07	73.07	20.5	68.1	3.4	450	PVC	SDR 35	0.17	124.1	**54.84%**	0.76	0.66
R26A	26	25	0.88	8	10	0	50	61.25	3276	3.41	45.3	0.00	3.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.27	3.0	0.88	73.95	20.7	68.9	105.5	450	PVC	SDR 35	0.17	124.1	**55.53%**	0.76	0.67
R25A	25	24	0.67	10	0	0	32	61.92	3308	3.41	45.6	0.00	3.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.27	3.0	0.67	74.62	20.9	69.5	120.0	450	PVC	SDR 35	0.17	122.7	**56.65%**	0.75	0.66
R24A	24	23	0.74	9	0	0	29	62.66	3337	3.40	46.0	0.00	3.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.27	3.0	0.74	75.36	21.1	70.1	120.0	450	PVC	SDR 35	0.17	122.7	**57.10%**	0.75	0.66
I23AA	23A	23	0.00	0	0	0	0	0.00	0	4.00	0.0	0.00	0.00	0.00	0.00	0.00	0.00	2.01	2.01	0.00	0.00	1.7	2.01	2.01	0.6	2.3	13.0	200	PVC	SDR 35	1.00	33.4	**6.89%**	1.05	0.51
R23A	23	22	0.25	3	0	0	10	62.91	3347	3.40	46.1	0.00	3.43	0.00	0.00	0.00	0.00	0.00	2.01	0.00	9.27	4.7	0.25	77.62	21.7	72.6	32.7	450	PVC	SDR 35	0.17	123.2	**58.89%**	0.75	0.68



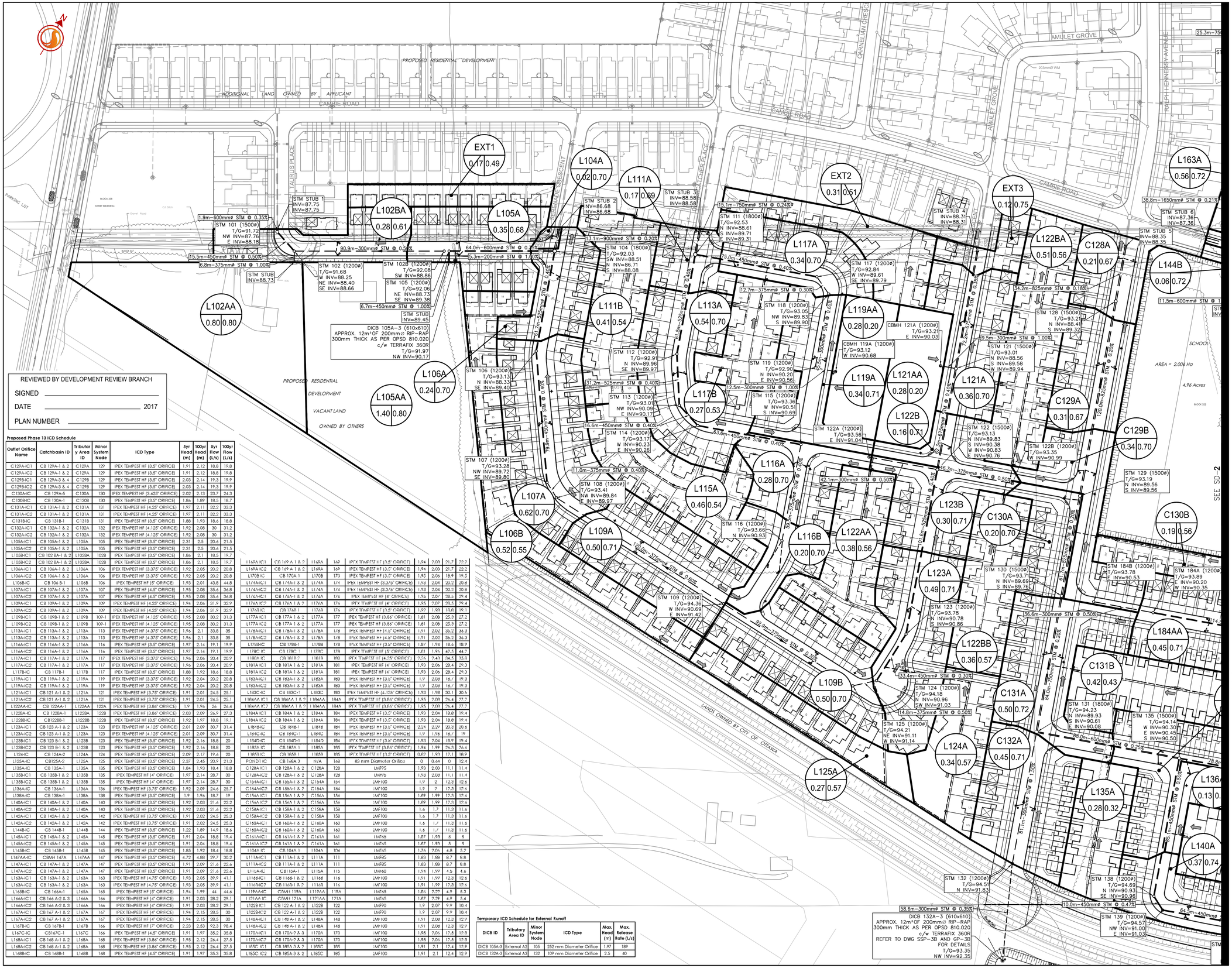
LEGEND:

- PROPOSED SANITARY (IBI)
- PROPOSED SANITARY - SEPARATE APPLICATION(s)
- EXISTING SANITARY

Scale	Project Title	Drawing Title	Sheet No.
NTS	4623 SPRATT	CONCEPTUAL SANITARY PLAN	FIGURE 3.1

IBI

APPENDIX D



Proposed Phase 13 ICD Schedule

Outlet Orifice Name	Catchbasin ID	Tributary Area ID	Minor System Node	ICD Type	5yr Head (m)	100yr Head (m)	5yr Flow (L/s)	100yr Flow (L/s)
C129A-IC1	CB 129A-1 & 2	C129A	129	IPEX TEMPEST HF (3.5" ORIFICE)	1.91	2.12	18.8	19.8
C129A-IC2	CB 129A-1 & 2	C129A	129	IPEX TEMPEST HF (3.5" ORIFICE)	1.91	2.12	18.8	19.8
C129B-IC1	CB 129A-3 & 4	C129B	129	IPEX TEMPEST HF (3.5" ORIFICE)	2.03	2.14	19.3	19.9
C129B-IC2	CB 129A-3 & 4	C129B	129	IPEX TEMPEST HF (3.5" ORIFICE)	2.03	2.14	19.3	19.9
C130A-IC	CB 129A-5	C130A	130	IPEX TEMPEST HF (3.625" ORIFICE)	2.02	2.13	23.7	24.3
C130B-IC	CB 130A-1	C130B	130	IPEX TEMPEST HF (3.5" ORIFICE)	1.86	1.89	18.5	18.7
C131A-IC1	CB 131A-1 & 2	C131A	131	IPEX TEMPEST HF (4.25" ORIFICE)	1.97	2.11	32.2	33.3
C131A-IC2	CB 131A-1 & 2	C131A	131	IPEX TEMPEST HF (4.25" ORIFICE)	1.97	2.11	32.2	33.3
C131B-IC	CB 131B-1	C131B	131	IPEX TEMPEST HF (3.5" ORIFICE)	1.88	1.93	18.6	18.8
C132A-IC1	CB 132A-1 & 2	C132A	132	IPEX TEMPEST HF (4.125" ORIFICE)	1.92	2.08	30	31.2
C132A-IC2	CB 132A-1 & 2	C132A	132	IPEX TEMPEST HF (4.125" ORIFICE)	1.92	2.08	30	31.2
L105A-IC1	CB 105A-1 & 2	L105A	105	IPEX TEMPEST HF (3.5" ORIFICE)	2.31	2.5	20.6	21.5
L105A-IC2	CB 105A-1 & 2	L105A	105	IPEX TEMPEST HF (3.5" ORIFICE)	2.31	2.5	20.6	21.5
L105B-IC1	CB 102 BA-1 & 2	L102BA	102B	IPEX TEMPEST HF (3.5" ORIFICE)	1.86	2.1	18.5	19.7
L105B-IC2	CB 102 BA-1 & 2	L102BA	102B	IPEX TEMPEST HF (3.5" ORIFICE)	1.86	2.1	18.5	19.7
L106A-IC1	CB 106A-1 & 2	L106A	106	IPEX TEMPEST HF (3.375" ORIFICE)	1.92	2.05	20.2	20.8
L106A-IC2	CB 106A-1 & 2	L106A	106	IPEX TEMPEST HF (3.375" ORIFICE)	1.92	2.05	20.2	20.8
L106B-IC	CB 106 B-1	L106B	106	IPEX TEMPEST HF (5" ORIFICE)	1.93	2.01	43.8	44.8
L107A-IC1	CB 107A-1 & 2	L107A	107	IPEX TEMPEST HF (4.5" ORIFICE)	1.95	2.08	35.6	36.8
L107A-IC2	CB 107A-1 & 2	L107A	107	IPEX TEMPEST HF (4.5" ORIFICE)	1.95	2.08	35.6	36.8
L109A-IC1	CB 109A-1 & 2	L109A	109	IPEX TEMPEST HF (4.25" ORIFICE)	1.94	2.06	31.9	32.9
L109A-IC2	CB 109A-1 & 2	L109A	109	IPEX TEMPEST HF (4.25" ORIFICE)	1.94	2.06	31.9	32.9
L109B-IC1	CB 109B-1 & 2	L109B	109-1	IPEX TEMPEST HF (4.125" ORIFICE)	1.95	2.08	30.2	31.3
L109B-IC2	CB 109B-1 & 2	L109B	109-1	IPEX TEMPEST HF (4.125" ORIFICE)	1.95	2.08	30.2	31.3
L113A-IC1	CB 113A-1 & 2	L113A	113	IPEX TEMPEST HF (4.375" ORIFICE)	1.96	2.1	33.8	35
L113A-IC2	CB 113A-1 & 2	L113A	113	IPEX TEMPEST HF (4.375" ORIFICE)	1.96	2.1	33.8	35
L116A-IC1	CB 116A-1 & 2	L116A	116	IPEX TEMPEST HF (3.5" ORIFICE)	1.97	2.14	19.1	19.9
L116A-IC2	CB 116A-1 & 2	L116A	116	IPEX TEMPEST HF (3.5" ORIFICE)	1.97	2.14	19.1	19.9
L117A-IC1	CB 117A-1 & 2	L117A	117	IPEX TEMPEST HF (3.375" ORIFICE)	1.96	2.06	20.4	20.9
L117A-IC2	CB 117A-1 & 2	L117A	117	IPEX TEMPEST HF (3.375" ORIFICE)	1.96	2.06	20.4	20.9
L117B-IC	CB 117B-1	L117B	117	IPEX TEMPEST HF (3.5" ORIFICE)	1.88	1.92	18.6	18.8
L119A-IC1	CB 119A-1 & 2	L119A	119	IPEX TEMPEST HF (3.375" ORIFICE)	1.92	2.04	20.2	20.8
L119A-IC2	CB 119A-1 & 2	L119A	119	IPEX TEMPEST HF (3.375" ORIFICE)	1.92	2.04	20.2	20.8
L121AA-IC1	CB 121 A-1 & 2	L121AA	121	IPEX TEMPEST HF (3.75" ORIFICE)	1.91	2.01	24.5	25.1
L121AA-IC2	CB 121 A-1 & 2	L121AA	121	IPEX TEMPEST HF (3.75" ORIFICE)	1.91	2.01	24.5	25.1
L122AA-IC	CB 122AA-1	L122AA	122A	IPEX TEMPEST HF (3.86" ORIFICE)	1.9	1.96	26	26.4
L122BA-IC	CB 122BA-1	L122BA	122B	IPEX TEMPEST HF (3.86" ORIFICE)	2.03	2.09	26.9	27.3
L122BB-IC	CB122BB-1	L122BB	122B	IPEX TEMPEST HF (3.5" ORIFICE)	1.92	1.97	18.8	19.1
L123A-IC1	CB 123 A-1 & 2	L123A	123	IPEX TEMPEST HF (4.125" ORIFICE)	2.01	2.09	30.7	31.4
L123A-IC2	CB 123 A-1 & 2	L123A	123	IPEX TEMPEST HF (4.125" ORIFICE)	2.01	2.09	30.7	31.4
L123B-IC1	CB 123 B-1 & 2	L123B	123	IPEX TEMPEST HF (3.5" ORIFICE)	1.92	2.16	18.8	20
L123B-IC2	CB 123 B-1 & 2	L123B	123	IPEX TEMPEST HF (3.5" ORIFICE)	1.92	2.16	18.8	20
L124-IC	CB 124A-2	L124A	124	IPEX TEMPEST HF (3.5" ORIFICE)	2.09	2.17	19.6	20
L125A-IC	CB125A-2	L125A	125	IPEX TEMPEST HF (3.5" ORIFICE)	2.37	2.45	20.9	21.3
L135A-IC	CB 135A-1	L135A	135	IPEX TEMPEST HF (3.5" ORIFICE)	1.84	1.93	18.4	18.8
L135B-IC1	CB 135B-1 & 2	L135B	135	IPEX TEMPEST HF (4" ORIFICE)	1.97	2.14	28.7	30
L135B-IC2	CB 135B-1 & 2	L135B	135	IPEX TEMPEST HF (4" ORIFICE)	1.97	2.14	28.7	30
L136A-IC	CB 136A-1	L136A	136	IPEX TEMPEST HF (3.75" ORIFICE)	1.92	2.09	24.6	25.7
L138A-IC	CB 138A-1	L138A	138	IPEX TEMPEST HF (3.5" ORIFICE)	1.9	1.96	18.7	19
L140A-IC1	CB 140A-1 & 2	L140A	140	IPEX TEMPEST HF (3.5" ORIFICE)	1.92	2.03	21.6	22.2
L140A-IC2	CB 140A-1 & 2	L140A	140	IPEX TEMPEST HF (3.5" ORIFICE)	1.92	2.03	21.6	22.2
L142A-IC1	CB 142A-1 & 2	L142A	142	IPEX TEMPEST HF (3.75" ORIFICE)	1.91	2.02	24.5	25.3
L142A-IC2	CB 142A-1 & 2	L142A	142	IPEX TEMPEST HF (3.75" ORIFICE)	1.91	2.02	24.5	25.3
L144B-IC	CB 144B-1	L144B	144	IPEX TEMPEST HF (3.5" ORIFICE)	1.22	1.89	14.9	18.6
L145A-IC1	CB 145A-1 & 2	L145A	145	IPEX TEMPEST HF (3.5" ORIFICE)	1.91	2.04	18.8	19.4
L145A-IC2	CB 145A-1 & 2	L145A	145	IPEX TEMPEST HF (3.5" ORIFICE)	1.91	2.04	18.8	19.4
L145B-IC	CB 145B-1	L145B	145	IPEX TEMPEST HF (3.5" ORIFICE)	1.85	1.92	18.4	18.8
L147AA-IC	CBMH 147A	L147AA	147	IPEX TEMPEST HF (3.5" ORIFICE)	4.72	4.88	29.7	30.2
L147A-IC1	CB 147A-1 & 2	L147A	147	IPEX TEMPEST HF (3.5" ORIFICE)	1.91	2.09	21.6	22.6
L147A-IC2	CB 147A-1 & 2	L147A	147	IPEX TEMPEST HF (3.5" ORIFICE)	1.91	2.09	21.6	22.6
L163A-IC1	CB 163A-1 & 2	L163A	163	IPEX TEMPEST HF (4.75" ORIFICE)	1.93	2.05	39.9	41.1
L163A-IC2	CB 163A-1 & 2	L163A	163	IPEX TEMPEST HF (4.75" ORIFICE)	1.93	2.05	39.9	41.1
L165B-IC	CB 166A-1	L165A	165	IPEX TEMPEST HF (5" ORIFICE)	1.94	1.99	44	44.6
L166A-IC1	CB 166 A-2 & 3	L166A	166	IPEX TEMPEST HF (4" ORIFICE)	1.91	2.03	28.2	29.1
L166A-IC2	CB 166 A-2 & 3	L166A	166	IPEX TEMPEST HF (4" ORIFICE)	1.94	2.03	28.2	29.1
L167A-IC1	CB 167 A-1 & 2	L167A	167	IPEX TEMPEST HF (4" ORIFICE)	1.94	2.15	28.5	30
L167A-IC2	CB 167 A-1 & 2	L167A	167	IPEX TEMPEST HF (4" ORIFICE)	1.94	2.15	28.5	30
L167B-IC	CB 167B-1	L167B	166	IPEX TEMPEST HF (7" ORIFICE)	2.23	2.53	92.3	98.4
L167C-IC	CB167C-1	L167C	166	IPEX TEMPEST HF (4" ORIFICE)	1.91	1.97	35.2	35.8
L168A-IC1	CB 168 A-1 & 2	L168A	168	IPEX TEMPEST HF (3.86" ORIFICE)	1.95	2.12	26.4	27.5
L168A-IC2	CB 168 A-1 & 2	L168A	168	IPEX TEMPEST HF (3.86" ORIFICE)	1.95	2.12	26.4	27.5
L168B-IC	CB 168B-1	L168B	168	IPEX TEMPEST HF (4.5" ORIFICE)	1.91	1.97	35.3	35.8
L169A-IC1	CB 169 A-1 & 2	L169A	169	IPEX TEMPEST HF (3.5" ORIFICE)	1.94	2.03	21.7	22.2
L169A-IC2	CB 169 A-1 & 2	L169A	169	IPEX TEMPEST HF (3.5" ORIFICE)	1.94	2.03	21.7	22.2
L170B IC	CB 170A-1	L170B	170	IPEX TEMPEST HF (3.5" ORIFICE)	1.95	2.06	18.9	19.5
L174A-IC1	CB 174A-1 & 2	L174A	174	IPEX TEMPEST HF (3.375" ORIFICE)	1.93	2.04	20.2	20.8
L174A-IC2	CB 174A-1 & 2	L174A	174	IPEX TEMPEST HF (3.375" ORIFICE)	1.93	2.04	20.2	20.8
L176A-IC1	CB 176A-1 & 2	L176A	176	IPEX TEMPEST HF (4" ORIFICE)	1.95	2.07	28.5	29.4
L176A IC2	CB 176A-1 & 2	L176A	176	IPEX TEMPEST HF (4" ORIFICE)	1.95	2.07	28.5	29.4
L177A IC	CB 177A-1 & 2	L177A	177	IPEX TEMPEST HF (3.86" ORIFICE)	1.81	2.08	25.3	27.2
L177A IC2	CB 177A-1 & 2	L177A	177	IPEX TEMPEST HF (3.86" ORIFICE)	1.81	2.08	25.3	27.2
L178A-IC1	CB 178A-1 & 2	L178A	178	IPEX TEMPEST HF (4.5" ORIFICE)	1.91	2.02	36.2	36.3
L178A-IC2	CB 178A-1 & 2	L178A	178	IPEX TEMPEST HF (4.5" ORIFICE)	1.91	2.02	36.2	36.3
L178B-IC	CB 178B-1	L178B	178	IPEX TEMPEST HF (3.5" ORIFICE)	1.87	1.94	18.6	18.9
L178C IC	CB 178C-1	L178C	178	IPEX TEMPEST HF (3.5" ORIFICE)	1.81	1.96	42.5	44.7
L180A IC	CB 181B-2	L181A	180	IPEX TEMPEST HF (4.75" ORIFICE)	2.76	2.43	34.5	35.8
L181A IC1	CB 181A-1 & 2	L181A	181	IPEX TEMPEST HF (4" ORIFICE)	1.93	2.06	28.4	29.3
L181A IC2	CB 181A-1 & 2	L181A	181	IPEX TEMPEST HF (4" ORIFICE)	1.93	2.06	28.4	29.3
L183A-IC1	CB 183A-1 & 2	L183A	183	IPEX TEMPEST HF (3.5" ORIFICE)	1.9	2.03	18.7	19.3
L183A-IC2	CB 183A-1 & 2	L183A	183	IPEX TEMPEST HF (3.5" ORIFICE)	1.9	2.03	18.7	19.3
L183C-IC	CB 183C-1	L183C	183	IPEX TEMPEST HF (4.125" ORIFICE)	1.93	1.98	30.1	30.5
L184AA IC1	CB 184AA 1 & 2	L184AA	184A	IPEX TEMPEST HF (3.86" ORIFICE)	1.95	2.08	26.4	27.2
L184AA IC2	CB 184AA 1 & 2	L184AA	184A	IPEX TEMPEST HF (3.86" ORIFICE)	1.95	2.08	26.4	27.2
L184A IC1	CB 184A 1 & 2	L184A	184	IPEX TEMPEST HF (3.5" ORIFICE)	1.93	2.04	18.8	19.4
L184A IC2	CB 184A 1 & 2	L184A	184	IPEX TEMPEST HF (3.5" ORIFICE)	1.93	2.04	18.8	19.4
L184B-IC	CB 184B-1	L184B	184	IPEX TEMPEST HF (3.5" ORIFICE)	2.24	2.29	30.2	30.6
L184C-IC	CB 184C-1	L184C	184	IPEX TEMPEST HF (3.5" ORIFICE)	1.9	1.96	18.7	19
L184D-IC	CB 184D-1	L184D	184	IPEX TEMPEST HF (3.5" ORIFICE)	1.93	2.04	18.9	19.4
L185A IC	CB 185A-1	L185A	185	IPEX TEMPEST HF (3.86" ORIFICE)	1.94	1.99	26.3	26.6
L185B IC	CB 185B-1	L185B	185	IPEX TEMPEST HF (3.5" ORIFICE)	0.82	1.93	10.1	18.9
POND1 IC	CB 168A 3	N/A	168	83 mm Diamotor Orifice	0	0.64	0	12.4
C128A IC1	CB 128A 1 & 2	C128A	128	LMP95	1.93	2.03	11.1	11.4
C128A-IC2	CB 128A-1 & 2	C128A	128	LMP95	1.93	2.03	11.1	11.4
C134A-IC1	CB 134A-1 & 2	C134A	134	LMP100	1.9	2	12.2	12.6
C134A-IC2	CB 134A-1 & 2	C134A	134	LMP100	1.9	2	12.2	12.6
C156A IC1	CB 156A 1 & 2	C156A	156	LMP100	1.89	1.99	10.5	17.6
C156A IC2	CB 156A 1 & 2	C156A	156	LMP100	1.89	1.99	10.5	17.6
C158A IC1	CB 158A 1 & 2	C158A	158	LMP100	1.6	1.7	11.3	11.6
C158A-IC2	CB 158A-1 & 2	C158A	158	LMP100	1.6	1.7	11.3	11.6
C160A-IC1	CB 160A-1 & 2	C160A	160	LMP100	1.6	1.7	11.2	11.5
C160A-IC2	CB 160A-1 & 2	C160A	160	LMP100	1.6	1.7	11.2	11.5
C161A-IC1	CB 161A-1 & 2	C161A	161	LMP65	1.87	1.93	5	5
C161A IC2	CB 161A 1 & 2	C161A	161	LMP65	1.87	1.93	5	5
104A IC	CB 104A 1	104A	104	LMP65	1.76	2.06	4.8	5.2
L111A-IC1	CB 111A-1 & 2	L111A	111	LMP85	1.83	1.88	8.7	8.8
L111A-IC2	CB 111A-1 & 2	L111A	111	LMP85	1.83	1.88	8.7	8.8
L115A-IC	CB115A-1	L115A	115	LMP60	1.94	1.99	4.5	4.6
L116B-IC1	CB 116B-1 & 2	L116B	116	LMP100	1.91	1.99	12.3	12.6
L116B-IC2	CB 116B-1 & 2	L116B	116	LMP100	1.91	1.99	12.3	12.6
L119AA-IC	CBMH 119A	L119AA	119A	LMP65	1.86	2.29	4.9	5.3
L121AA IC	CBMH 121A	L121AA	121A	LMP65	1.87	2.29	4.9	5.4
L122B IC1	CB 122 A-1 & 2	L122B	122	LMP90	1.9	2.07	9.9	10.4
L122B-IC2	CB 122 A-1 & 2	L122B	122	LMP90	1.9	2.07	9.9	10.4
L148A-IC1	CB 148 A-1 & 2	L148A	148	LMP100	1.91	2.08	12.3	12.9
L148A-IC2	CB 148 A-1 & 2	L148A	148	LMP100	1.91	2.08	12.3	12.9
L170A-IC1	CB 170A-2 & 3	L170A	170	LMP100	1.95	2.06	12.5	12.8
L170A-IC2	CB 170A-2 & 3	L170A	170	LMP100	1.95	2.06	12.5	12.8
L185C IC1	CB 185A-3 & 5	L185C	185	LMP100	1.91	2.1	12.4	12.9
L185C IC2	CB 185A-3 & 2	L185C	185	LMP90	1.91	2.1	12.4	12.9

Temporary ICD Schedule for External Runoff

DICB ID	Tributary Area ID	Minor System Node	ICD Type	Max. Head (m)	Max. Release Rate (L/s)
DICB 105A-3	External A2	105	252 mm Diameter Orifice	1.97	189
DICB 132A-3	External A3	132	109 mm Diameter Orifice	2.5	40

NOTES:

1. SCHOOL BLOCK TO PROVIDE ON-SITE STORAGE TO STORE 100-YEAR OVER FLOWS AND RESTRICT MINOR SYSTEM PEAK FLOWS TO 195 L/S.
2. PARK AREAS L119AA, L121AA AND L147AA TO STORE 100-YEAR OVERFLOWS AND RESTRICT MINOR SYSTEM PEAK FLOWS AS SHOWN IN THE ICD SCHEDULE.
3. FUTURE HIGH DENSITY RESIDENTIAL BLOCKS L102AA AND L105AA TO PROVIDE ON-SITE STORAGE TO RESTRICT 100-YEAR OVERFLOWS TO 546 L/S AND TO RESTRICT MINOR SYSTEM PEAK FLOWS TO 119 L/S AND 189 L/S RESPECTIVELY.
4. FUTURE HIGH DENSITY RESIDENTIAL AREA L157AA AND FUTURE PARK AND RIDE AREA L151AA TO PROVIDE ON-SITE STORAGE TO CONTAIN 100-YEAR OVERFLOWS AND TO RESTRICT MINOR SYSTEM PEAK FLOWS TO 809 L/S AND 737 L/S RESPECTIVELY.
5. PROPOSED DRY POND DESIGNED TO FULLY CONTAIN 100-YEAR OVERFLOWS AND SLOWLY DISCHARGE INTO THE MINOR SYSTEM AT THE RATE SHOWN IN THE ICD SCHEDULE.

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

PROPOSED STORM SEWER
L101A — AREA ID
0.65 — RUNOFF COEFFICIENT
0.75 — STORM DRAINAGE AREA ha.
STORM DRAINAGE BOUNDARY
OVERLAND FLOW DIRECTION
TYPICAL SERVICE LATERAL LOCATION
CATCHBASIN TO BE INSTALLED WITH INLET CONTROL DEVICE (SEE ICD SCHEDULE)
CATCHBASINS TO BE INTERCONNECTED
PROPOSED CATCHBASIN

5	ISSUED FOR EARLY SERVICING	WAJ	AMP	17.07.28
4	ISSUED FOR MOE APPROVAL	WAJ	AMP	17.07.07
3	ISSUED FOR THIRD SUBMISSION	WAJ	AMP	17.06.02
2	REVISED AS PER CITY COMMENTS	WAJ	AMP	17.04.20
1	ISSUED FOR FIRST SUBMISSION	WAJ	AMP	17.02.21
Revision		By	Appd.	YY.MM.DD
File Name: 160401260-SD		WAJ	SGG	WAJ 16.09.26
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
RIVERSIDE SOUTH DEVELOPMENT CORPORATION
RIVERSIDE SOUTH PHASE 13
OTTAWA, ON

Title
STORM DRAINAGE PLAN

Project No. 160401260
Scale 1:1000 (0 10 30 50m)
Drawing No. SD-1
Sheet 55 of 60
Revision 5

PLAN # 17379
D07-16-13-0034

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2017/07/28 8:17 AM By: Johnson, Warren

ORIGINAL SHEET - ARCH D

Stantec

RIVERSIDE SOUTH PHASE 13

DATE: 2017-06-01
REVISION: 2
DESIGNED BY: WAJ
CHECKED BY: AMP

STORM SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401260

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013 BEDDING CLASS = B
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min

LOCATION			DRAINAGE AREA																						PIPE SELECTION										
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETE (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
Phase 8 Stub 3 (Dreamcatcher Place)																																				
L116A, L116B	116	115	0.48	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.338	0.338	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	72.2	59.5	375	375	CIRCULAR	PVC	-	0.40	104.7	**68.94%**	0.99	0.94	1.06
L115A	115	114	0.46	0.00	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.248	0.587	0.000	0.000	0.000	0.000	0.000	0.000	11.06	72.96	98.91	115.92	169.42	0.0	0.0	118.9	63.6	450	450	CIRCULAR	CONCRETE	-	0.40	187.2	**63.50%**	1.14	1.05	1.01
	114	113	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.587	0.000	0.000	0.000	0.000	0.000	0.000	12.07	69.69	94.41	110.62	161.64	0.0	0.0	113.6	16.6	450	450	CIRCULAR	CONCRETE	-	0.40	187.4	**60.61%**	1.14	1.04	0.27
L113A	113	112	0.54	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.380	0.967	0.000	0.000	0.000	0.000	0.000	0.000	12.33	68.87	93.29	109.31	159.71	0.0	0.0	185.0	31.2	525	525	CIRCULAR	CONCRETE	-	0.40	282.9	**65.40%**	1.27	1.18	0.44
	112	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.967	0.000	0.000	0.000	0.000	0.000	0.000	12.78	67.57	91.51	107.21	156.62	0.0	0.0	181.5	61.5	525	525	CIRCULAR	CONCRETE	-	0.40	283.3	**64.09%**	1.27	1.17	0.88
																				13.65																		
L119AA	119A	119	0.28	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.055	0.055	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	11.8	12.5	300	300	CIRCULAR	PVC	-	1.00	96.1	**12.23%**	1.36	0.76	0.27
L119A	119	118	0.34	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.239	0.294	0.000	0.000	0.000	0.000	0.000	0.000	10.27	75.77	102.77	120.46	176.09	0.0	0.0	61.9	45.5	300	300	CIRCULAR	PVC	-	0.65	77.3	**80.16%**	1.10	1.08	0.70
	118	117	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.294	0.000	0.000	0.000	0.000	0.000	0.000	10.98	73.25	99.31	116.39	170.10	0.0	0.0	59.9	12.7	375	375	CIRCULAR	PVC	-	0.30	90.3	**66.31%**	0.86	0.80	0.27
L117B, L117A	117	111	0.61	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.382	0.676	0.000	0.000	0.000	0.000	0.000	0.000	11.24	72.34	98.06	114.92	167.95	0.0	0.0	135.9	75.0	450	450	CIRCULAR	CONCRETE	-	0.40	188.1	**72.21%**	1.15	1.10	1.14
																				12.38																		
L111A, L111B	111	110	0.58	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.336	1.979	0.000	0.000	0.000	0.000	0.000	0.000	13.65	65.14	88.18	103.29	150.88	0.0	0.0	358.1	15.1	750	750	CIRCULAR	CONCRETE	-	0.24	567.2	**63.13%**	1.24	1.14	0.22
																				14.95									750	750								
			3.29	*0.00*	*0.00*	*0.00*	*0.00*	*0.60*	*N/A*	*N/A*	*N/A*	*1.98*		*0.00*		*0.00*		*0.00*																				
Phase 8 Stub 5 (Ralph Hennessy Avenue)																																				
C132A	132	131	0.00	0.45	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.000	0.000	0.321	0.321	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	92.8	81.1	300	300	CIRCULAR	PVC	-	1.50	117.8	**78.81%**	1.67	1.64	0.82
																				10.82																		
	185	136	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	167.22	230.48	271.61	398.62	0.0	0.0	0.0	17.7	300	300	CIRCULAR	PVC	-	1.00	96.2	**0.00%**	1.37	0.00	0.00
L136A	136	135	0.13	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.095	0.095	0.000	0.000	0.000	0.000	0.000	0.000	0.00	167.22	230.48	271.61	398.62	0.0	0.0	43.9	78.8	450	450	CIRCULAR	CONCRETE	-	1.00	297.4	**14.77%**	1.81	1.07	1.22
																				1.22																		
L142A	142	141	0.40	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.292	0.292	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	62.3	57.0	375	375	CIRCULAR	PVC	-	0.30	90.3	**68.99%**	0.86	0.81	1.18
	141	140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.292	0.000	0.000	0.000	0.000	0.000	0.000	11.18	72.56	98.36	115.27	168.47	0.0	0.0	58.8	49.5	375	375	CIRCULAR	PVC	-	0.30	90.3	**65.18%**	0.86	0.80	1.04
L140A	140	139	0.37	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.270	0.562	0.000	0.000	0.000	0.000	0.000	0.000	12.22	69.23	93.79	109.89	160.56	0.0	0.0	108.1	64.5	450	450	CIRCULAR	CONCRETE	-	0.50	210.3	**51.41%**	1.28	1.11	0.97
	139	138	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.562	0.000	0.000	0.000	0.000	0.000	0.000	13.19	66.40	89.91	105.32	153.86	0.0	0.0	103.7	10.0	450	450	CIRCULAR	CONCRETE	-	0.47	203.4	**50.98%**	1.24	1.07	0.16
L138A	138	135	0.66	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.284	0.846	0.000	0.000	0.000	0.000	0.000	0.000	13.34	65.98	89.32	104.63	152.85	0.0	0.0	155.1	85.1	450	450	CIRCULAR	CONCRETE	-	0.50	210.3	**73.72%**	1.28	1.23	1.15
																				14.49																		
L135A, L135B	135	131	0.72	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.403	1.343	0.000	0.000	0.000	0.000	0.000	0.000	14.49	62.99	85.23	99.81	145.77	0.0	0.0	235.0	88.0	600	600	CIRCULAR	CONCRETE	-	0.25	320.3	**73.39%**	1.10	1.06	1.39
																				15.88																		
C131B, C131A	131	130	*0.00*	*0.91*	*0.00*	*0.00*	*0.00*	*0.00*	*0.59*	*0.00*	*0.00*	*0.000*	1.343	*0.535*	0.856	*0.000*	0.000	*0.000*	0.000	15.88	59.76	80.80	94.61	138.14	0.0	0.0	415.1	84.0	750	750	CIRCULAR	CONCRETE	-	0.20	519.4	**79.92%**	1.14	1.12	1.25
C130A, C130B	130	129	0.00	0.39	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.000	1.343	0.247	1.103	0.000	0.000	0.000	0.000	17.13	57.15	77.25	90.43	132.01	0.0	0.0	450.0	61.7	825	825	CIRCULAR	CONCRETE	-	0.20	674.1	**66.75%**	1.22	1.14	0.90
C129A, C129B	129	128	0.00	0.65	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.000	1.343	0.445	1.548	0.000	0.000	0.000	0.000	18.03	55.43	74.89	87.66	127.95	0.0	0.0	529.0	120.0	825	825	CIRCULAR	CONCRETE	-	0.20	669.7	**78.99%**	1.21	1.19	1.68
C128A	128	127	0.00	0.21	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.000	1.343	0.141	1.690	0.000	0.000	0.000	0.000	19.71	52.50	70.89	82.96	121.05	0.0	0.0	528.6	34.2	825	825	CIRCULAR	CONCRETE	-	0.18	637.6	**82.90%**	1.16	1.15	0.50
																				20.47									825	825								
			2.28	*2.61*	*0.00*	*0.00*	*0.00*	*0.59*	*0.65*	*N/A*	*N/A*	*1.34*		*1.69*		*0.00*		*0.00*																				
Phase 8 Stub 6 (Cambie Road)																																				
L176A, L176B	176	175	0.81	0.00	0.00	0.00	0.00	0.64	0.00	0.00	0.00	0.519	0.519	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	110.8	103.1	450	450	CIRCULAR	PVC	-	0.20	133.0	**83.28%**	0.81	0.81	2.13
	175	174	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.519	0.000	0.000	0.000	0.000	0.000	0.000	12.13	69.49	94.15	110.31	161.19	0.0	0.0	100.2	8.3	450	450	CIRCULAR	PVC	-	0.20	133.0	**75.35%**	0.81	0.78	0.18
L174A	174	173	0.34	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.244	0.763	0.000	0.000	0.000	0.000	0.000	0.000	12.31	68.96	93.41	109.44	159.91	0.0	0.0	146.1	43.5	450	450	CIRCULAR	CONCRETE	-	0.40	188.9	**77.36%**	1.15	1.12	0.65
	173	146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.763	0.000	0.000	0.000	0.000	0.000	0.000	12.95	67.06	90.81	106.39	155.42	0.0	0.0	142.1	36.3	450	450	CIRCULAR	CONCRETE	-	0.40	188.1	**75.55%**	1.15	1.11	0.55
																				13.50																		
	184B	184A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	0.0	36.6	300	300	CIRCULAR	PVC	-	0.50	68.3	**0.00%**	0.97	0.00	0.00
L184AA	184A	184	0.45	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.323	0.323	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	19.7	19.7	88.6	114.5	450	450	CIRCULAR	CONCRETE	-	0.30	162.9	**54.38%**	0.99	0.87	2.19
																				12.19																		
	185A	185	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.000*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	0.0	68.2	300	300	CIRCULAR	PVC	-	0.40	61.1	**0.00%**	0.87	0.00	0.00
L185A, L185B, L185C	185	184	0.57	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.373	0.373	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	79.5	82.2	375	375	CIRCULAR	CONCRETE	-	0.40	104.3	**76.30%**	0.99	0.96	1.42
																				11.42																		
L184A, L184B, L184C, L184D	184	178	1.01	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.567	1.263	0.000	0.000	0.000	0.000	0.000	0.000	12.19	69.31	93.90	110.02	160.75	0.0	19.7	262.8	48.7	525	525	CIRCULAR	CONCRETE	-	0.40	283.8	**92.60%**	1.27	1.31	0.62
																				12.81																		
L183A, L183C	183	182	0.54	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.391	0.391	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	83.4	77.5	450	450	CIRCULAR	CONCRETE	-	0.30	162.1	**51.46%**	0.99	0.85	1.52
	182	181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.391	0.000	0.000	0.000	0.000	0.000	0.000	11.52	71.44	96.82	113.45	165.80	0.0	0.0	77.6	44.8	450	450	CIRCULAR	CONCRETE	-	0.30	164.0	**47.31%**	1.00	0.84	0.89
L181A, L181B	181	180	0.89	0.00	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.528	0.919	0.000	0.000	0.000	0.000	0.000	0.000	12.41	68.66	93.00	108.96	159.20	0.0	0.0	175.3	82.4	525	525	CIRCULAR	CONCRETE	-	0.30	247.2	**70.94%**	1.11	1.05	1.31
	180	179	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.919	0.000	0.000	0.000	0.000	0.000	0.000	13.71	64.98	87.96	103.03	150.49	0.0	0.0	165.9	9.4	525	525	CIRCULAR	CONCRETE	-	0.30	244.4	**67.89%**	1.09	1.02	0.15
	179	178	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.919	0.000	0.000	0.000	0.000	0.000	0.000	13.87	64.58	87.41	102.38	149.54	0.0	0.0	164.9	97.1	525	525	CIRCULAR	CONCRETE	-	0.30	245.3	**67.24%**	1.10	1.03	1.57
																				15.44																		
L178A, L178B, L178C	178	177	0.88	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.545	2.727	0.000	0.000	0.000	0.000	0.000	0.000	15.44	60.74	82.16	96.21	140.48	0.0	19.7	479.9	55.0	750	750	CIRCULAR	CONCRETE	-	0.30	636.3	**75.42%**	1.40	1.35	0.68
L177A	177	146	0.24	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.166	2.893	0.000	0.000	0.000	0.000	0.000	0.000	16.12	59.24	80.11	93.79	136.94	0.0	19.7	495.8	119.7	750	750	CIRCULAR	CONCRETE	-	0.30	635.2	**78.05%**	1.39	1.36	1.46
																				17.58																		

Stantec

RIVERSIDE SOUTH PHASE 13

DATE: 2017-06-01
REVISION: 2
DESIGNED BY: WAJ
CHECKED BY: AMP

STORM SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: **160401260**

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min
BEDDING CLASS = B

LOCATION			DRAINAGE AREA																						PIPE SELECTION										
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETE (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
L157AA	157A	157	*6.01*	*0.00*	*0.00*	*0.00*	*0.00*	*0.80*	*0.00*	*0.00*	*0.00*	*4.808*	4.808	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	1025.8	10.7	1050	1050	CIRCULAR	CONCRETE	-	0.18	1208.6	**84.87%**	1.35	1.35	0.13
	157	156	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	4.808	0.000	0.000	0.000	0.000	0.000	0.000	10.13	76.30	103.50	121.33	177.37	0.0	0.0	1019.1	32.9	1050	1050	CIRCULAR	CONCRETE	-	0.18	1208.6	**84.32%**	1.35	1.35	0.40
C156A	156	155	0.00	0.22	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.000	4.808	0.148	0.148	0.000	0.000	0.000	0.000	10.54	74.81	101.44	118.90	173.80	0.0	0.0	1040.7	70.7	1050	1050	CIRCULAR	CONCRETE	-	0.18	1208.6	**86.11%**	1.35	1.36	0.87
	155	154	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	4.808	0.000	0.148	0.000	0.000	0.000	0.000	11.40	71.81	97.33	114.06	166.69	0.0	0.0	999.1	26.2	1050	1050	CIRCULAR	CONCRETE	-	0.18	1208.6	**82.66%**	1.35	1.35	0.32
C154A	154	153	0.00	0.24	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.000	4.808	0.161	0.309	0.000	0.000	0.000	0.000	11.73	70.76	95.89	112.36	164.19	0.0	0.0	1027.3	30.6	1050	1050	CIRCULAR	CONCRETE	-	0.18	1208.6	**84.99%**	1.35	1.35	0.38
																				12.10																			
C161A	161	160	0.00	0.09	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.000	0.000	0.060	0.060	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	17.5	28.4	300	300	CIRCULAR	PVC	-	0.34	56.1	**31.13%**	0.80	0.59	0.80
C160A	160	159	0.00	0.22	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.000	0.000	0.148	0.209	0.000	0.000	0.000	0.000	10.80	73.85	100.14	117.36	171.54	0.0	0.0	58.1	40.9	375	375	CIRCULAR	PVC	-	0.25	82.4	**70.45%**	0.78	0.74	0.92
	159	158	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.209	0.000	0.000	0.000	0.000	11.72	70.78	95.91	112.38	164.23	0.0	0.0	55.6	41.0	375	375	CIRCULAR	PVC	-	0.25	82.4	**67.47%**	0.78	0.73	0.93
C158A	158	153	0.00	0.22	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.000	0.000	0.147	0.356	0.000	0.000	0.000	0.000	12.65	67.92	91.99	107.78	157.46	0.0	0.0	91.0	80.0	450	450	CIRCULAR	CONCRETE	-	0.20	133.0	**68.40%**	0.81	0.76	1.75
																				14.40																			
	153	152	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	4.808	0.000	0.665	0.000	0.000	0.000	0.000	14.40	63.22	85.55	100.19	146.33	0.0	0.0	1002.3	35.5	1050	1050	CIRCULAR	CONCRETE	-	0.18	1208.6	**82.93%**	1.35	1.35	0.44
	152	151	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	4.808	0.000	0.665	0.000	0.000	0.000	0.000	14.84	62.15	84.08	98.47	143.80	0.0	0.0	985.3	120.0	1050	1050	CIRCULAR	CONCRETE	-	0.18	1208.6	**81.52%**	1.35	1.34	1.49
																				16.33																			
L151AA	151A	151	7.75	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00	6.977	6.977	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	1488.6	5.0	975	975	CIRCULAR	CONCRETE	-	0.60	1811.1	**82.19%**	2.35	2.33	0.04
																				10.04																			
	151	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	11.785	0.000	0.665	0.000	0.000	0.000	0.000	16.33	58.79	79.49	93.06	135.87	0.0	0.0	2071.4	120.0	1500	1500	CIRCULAR	CONCRETE	-	0.15	2856.1	**72.53%**	1.57	1.50	1.34
	150	149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	11.785	0.000	0.665	0.000	0.000	0.000	0.000	17.67	56.11	75.82	88.76	129.55	0.0	0.0	1976.9	55.5	1500	1500	CIRCULAR	CONCRETE	-	0.15	2856.1	**69.21%**	1.57	1.48	0.63
	149	148	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	11.785	0.000	0.665	0.000	0.000	0.000	0.000	18.30	54.94	74.23	86.88	126.80	0.0	0.0	1935.7	6.8	1500	1500	CIRCULAR	CONCRETE	-	0.15	2856.1	**67.77%**	1.57	1.47	0.08
L148A	148	147	0.22	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.157	11.942	0.000	0.665	0.000	0.000	0.000	0.000	18.37	54.80	74.04	86.66	126.47	0.0	0.0	1954.8	39.6	1500	1500	CIRCULAR	CONCRETE	-	0.15	2856.1	**68.44%**	1.57	1.48	0.45
L147A, L147AA	147	146	1.92	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.554	12.496	0.000	0.665	0.000	0.000	0.000	0.000	18.82	54.01	72.95	85.39	124.61	0.0	0.0	2009.5	100.4	1500	1500	CIRCULAR	CONCRETE	-	0.15	2856.1	**70.36%**	1.57	1.49	1.13
																				19.95																			
	146	145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	16.152	0.000	0.665	0.000	0.000	0.000	0.000	19.95	52.12	70.37	82.35	120.16	0.0	19.7	2488.0	20.1	1500	1500	CIRCULAR	CONCRETE	-	0.15	2856.1	**87.11%**	1.57	1.58	0.21
L145B, L145A	145	144	0.45	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.296	16.448	0.000	0.665	0.000	0.000	0.000	0.000	20.16	51.78	69.91	81.81	119.36	0.0	19.7	2514.5	65.2	1500	1500	CIRCULAR	CONCRETE	-	0.15	2856.1	**88.04%**	1.57	1.58	0.69
																				20.84																			
	172	171	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	0.0	36.2	300	300	CIRCULAR	PVC	-	0.40	60.8	**0.00%**	0.86	0.00	0.00
	171	165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	0.0	27.0	300	300	CIRCULAR	PVC	-	0.40	60.8	**0.00%**	0.86	0.00	0.00
																				10.00																			
L170A, L170B	170	169	0.36	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.259	0.259	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	55.2	85.2	375	375	CIRCULAR	PVC	-	0.25	82.4	**66.97%**	0.78	0.73	1.94
L169A	169	168	0.31	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.223	0.482	0.000	0.000	0.000	0.000	0.000	0.000	11.94	70.08	94.95	111.25	162.57	0.0	0.0	93.8	11.0	450	450	CIRCULAR	CONCRETE	-	0.20	133.0	**70.52%**	0.81	0.77	0.24
L168A, L168B	168	167	1.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.607	1.089	0.000	0.000	0.000	0.000	0.000	0.000	12.18	69.34	93.94	110.07	160.82	0.0	0.0	209.7	77.0	600	600	CIRCULAR	CONCRETE	-	0.20	287.0	**73.07%**	0.98	0.95	1.36
L167A, L167B, L167C	167	166	1.54	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.859	1.947	0.000	0.000	0.000	0.000	0.000	0.000	13.54	65.45	88.60	103.79	151.61	0.0	0.0	354.1	120.0	675	675	CIRCULAR	CONCRETE	-	0.25	438.5	**80.75%**	1.19	1.17	1.71
L166A	166	165	0.37	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.269	2.216	0.000	0.000	0.000	0.000	0.000	0.000	15.25	61.19	82.77	96.92	141.53	0.0	0.0	376.7	34.4	675	675	CIRCULAR	CONCRETE	-	0.25	438.5	**85.91%**	1.19	1.19	0.48
																				15.73																			
L165A	165	164	0.34	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.244	2.460	0.000	0.000	0.000	0.000	0.000	0.000	15.73	60.10	81.28	95.18	138.97	0.0	0.0	410.7	25.3	750	750	CIRCULAR	CONCRETE	-	0.20	519.4	**79.06%**	1.14	1.12	0.38
	164	163	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	2.460	0.000	0.000	0.000	0.000	0.000	0.000	16.10	59.28	80.15	93.85	137.02	0.0	0.0	405.0	78.1	750	750	CIRCULAR	CONCRETE	-	0.20	519.4	**77.98%**	1.14	1.12	1.17
L163A	163	162	0.56	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.405	2.865	0.000	0.000	0.000	0.000	0.000	0.000	17.27	56.88	76.87	89.99	131.36	0.0	0.0	452.7	25.9	750	750	CIRCULAR	CONCRETE	-	0.20	519.4	**87.15%**	1.14	1.15	0.37
	162	144	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	2.865	0.000	0.000	0.000	0.000	0.000	0.000	17.65	56.16	75.88	88.83	129.65	0.0	0.0	446.9	32.7	750	750	CIRCULAR	CONCRETE	-	0.20	519.4	**86.04%**	1.14	1.15	0.47
																				18.12																			
C144AA	144A	144	0.00	2.01	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.000	0.000	1.384	1.384	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	400.6	11.5	600	600	CIRCULAR	CONCRETE	-	1.00	640.6	**62.53%**	2.19	2.01	0.10
																				10.10																			
L144B, EXT4	144	143	0.51	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.294	19.607	0.000	2.049	0.000	0.000	0.000	0.000	20.84	50.71	68.45	80.10	116.86	0.0	19.7	3171.3	38.8	1650	1650	CIRCULAR	CONCRETE	-	0.21	4399.3	**72.09%**	1.99	1.90	0.34
																				21.61																			
			27.08	*3.00*	*0.00*	*0.00*	*0.00*	*0.72*	*0.68*	*N/A*	*N/A*	*19.61*		*2.05*		*0.00*		*0.00*													1650	1650								
Phase 8 Stub 4 (Serenade Crescent)																																							
L109B	109	125	0.50	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.350	0.350	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	74.7	92.9	375	375	CIRCULAR	PVC	-	0.30	90.3	**82.71%**	0.86	0.85	1.81
L125A	125	124	0.27	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.154	0.504	0.000	0.000	0.000	0.000	0.000	0.000	11.81	70.48	95.50	111.90	163.51	0.0	0.0	98.6	14.8	375	375	CIRCULAR	PVC	-	0.50	116.6	**84.63%**	1.11	1.11	0.22
L124A	124	123	0.34	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.194	0.698	0.000	0.000	0.000	0.000	0.000	0.000	12.04	69.78	94.54	110.77	161.86	0.0	0.0	135.2	33.4	450	450	CIRCULAR	CONCRETE	-	0.30	162.9	**83.01%**	0.99	0.99	0.56
L123B, L123A	123	122	0.80	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.566	1.263	0.000	0.000	0.000	0.000	0.000	0.000	12.60	68.08	92.21	108.03	157.84	0.0	0.0	238.9	101.6	525	525	CIRCULAR	CONCRETE	-	0.40	283.8	**84.21%**	1.27	1.27	1.33
																				13.93																			
L122BA, L122BB	122B	122	0.87	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.488	0.488	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	104.2	46.3	375	375	CIRCULAR	PVC	-	0.50	116.6	**89.37%**	1.11	1.12	0.69
																				10.69																			
L122AA	122A	122	0.38	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.215	0.215	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	45.8	42.1	300	300	CIRCULAR	PVC	-	0.50	68.0	**67.35%**	0.97	0.90	0.78
																				10.78																			
L122B	122	121	0.16	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.116	2.082	0.000	0.000	0.000	0.000	0.000	0.000	13.93	64.41	87.18	102.11	149.15	0.0	0.0	372.6	62.3	675	675	CIRCULAR	CONCRETE	-	0.40	555.5	**67.07%**	1.50	1.41	0.74
																				14.67																			
L121AA	121A	121	0.28	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.055	0.055	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	11.8	9.5	300	300	CIRCULAR	PVC	-	1.00	96.3	**12.20%**	1.37	0.76	0.21
																				10.21																			
L121A	121	120	0.36	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.255	2.392	0.000	0.000	0.000	0.000	0.000	0.000	14.67	62.56	84.64	99.13	144.77	0.0	0.0	415.7	72.2	675	675	CIRCULAR	CONCRETE	-	0.35	516.1	**80.56%**	1.40	1.38	0.87
																				16.12																			
			3.96	*0.00*	*0.00*	*0.00*	*0.00*	*0.60*	*N/A*	*N/A*	*N/A*	*2.39*		*0.00*		*0.00*		*0.00*													675	675								
Phase 8 Stub 1 (Taurus Place)																																							
L102BA	102B	102	0.28	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.170	0.170	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	36.3	90.9	300	300	CIRCULAR	PVC	-	0.50	68.2	**53.22%**	0.97	0.84	1.79
																				11.79																			
L102AA	102A	102	0.80	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00	0.641	0.641	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	136.8	6.8	375	375	CIRCULAR	PVC	-	1.00	164.7	**83.07%**	1.56	1.56	0.07
																				10.07																			
	102	101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.812	0.000	0.000	0.000	0.000	0.000	0.000	11.79	70.54	95.58	112.00	163.66	0.0	0.0	159.0	14.6	450	450	CIRCULAR	CONCRETE	-	0.50	210.3	**75.61%**	1.28	1.24	0.20
	101	100	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.000*	*0.812*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	0.000	11.99	69.92	94.73	111.00	162.20	0.0	0.0	157.6	3.2	600	600	CIRCULAR	CONCRETE	-	0.35	378.1	**41.69%**	1.30	1.04	0.05
																				13.19																			
			1.08	*0.00*	*0.00*	*0.00*	*0.00*	*0.75*	*N/A*	*N/A*	*N/A*	*0.81*		*0.00*		*0.00*		*0.00*													600	600								

Stantec

RIVERSIDE SOUTH PHASE 13	
DATE:	2017-06-01
REVISION:	2
DESIGNED BY:	WAJ
CHECKED BY:	AMP
FILE NUMBER:	160401260

STORM SEWER DESIGN SHEET
(City of Ottawa)

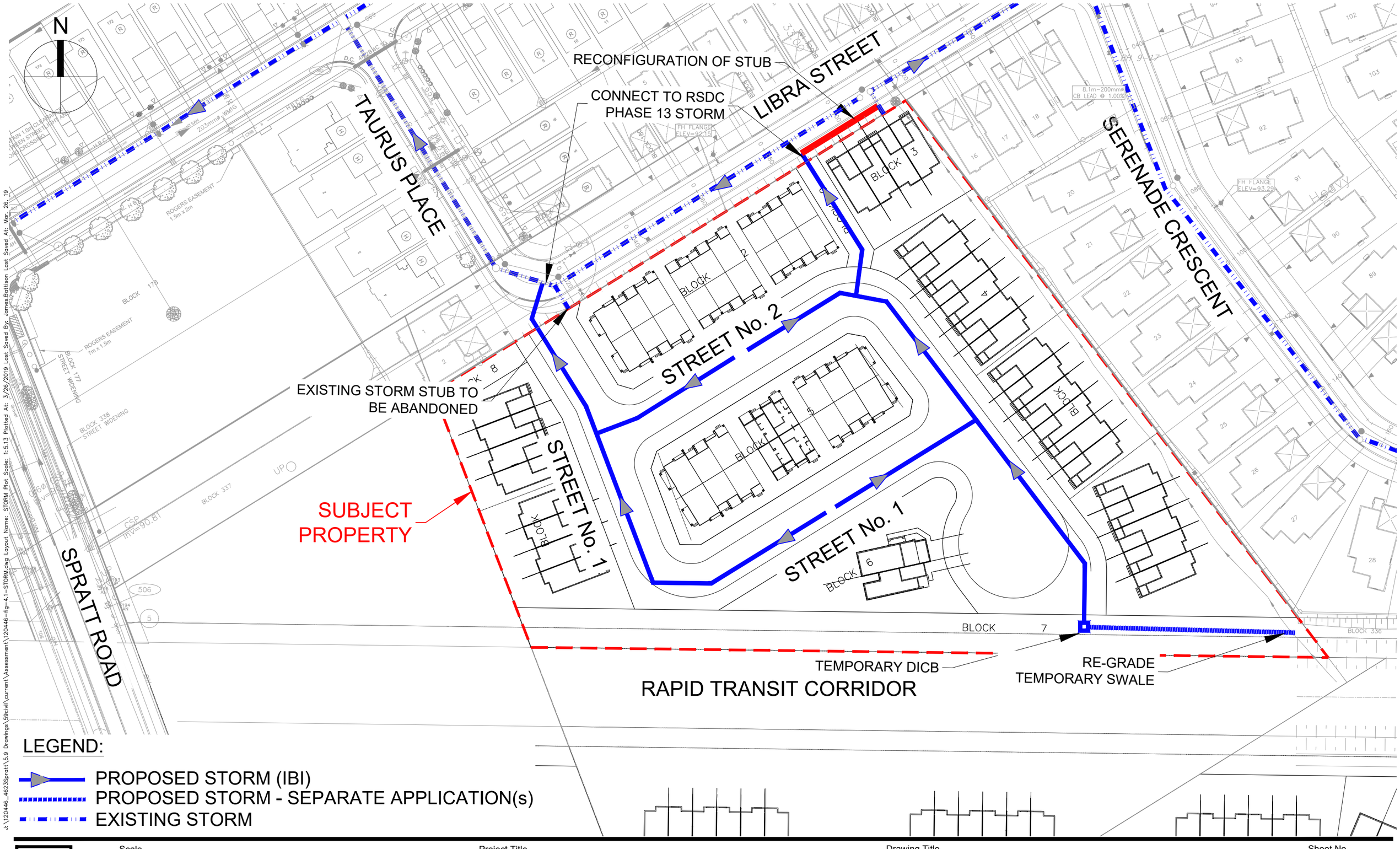
DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013 BEDDING CLASS = B
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min

LOCATION			DRAINAGE AREA																						PIPE SELECTION										
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETE (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
Phase 8 Stub 2 (Serenade Crescent)																																						
L105AA	105A	105	1.40	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00	1.123	1.123	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	239.6	6.7	450	450	CIRCULAR	CONCRETE	-	1.00	297.4	**80.54%**	1.81	1.79	0.06
L105A	105	104	0.35	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.236	1.359	0.000	0.000	0.000	0.000	0.000	0.000	10.06	76.56	103.86	121.75	177.99	0.0	0.0	289.1	64.0	600	600	CIRCULAR	CONCRETE	-	0.35	379.0	**76.29%**	1.30	1.26	0.84
																				10.91																		
L109A	109	108	0.50	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.357	0.357	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	76.2	120.0	375	375	CIRCULAR	PVC	-	0.60	127.7	**59.68%**	1.21	1.09	1.83
	108	107	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.357	0.000	0.000	0.000	0.000	0.000	0.000	11.83	70.42	95.42	111.80	163.38	0.0	0.0	69.9	11.0	375	375	CIRCULAR	PVC	-	0.40	104.3	**67.02%**	0.99	0.93	0.20
L107A	107	106	0.62	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.433	0.790	0.000	0.000	0.000	0.000	0.000	0.000	12.03	69.80	94.56	110.80	161.90	0.0	0.0	153.1	79.9	450	450	CIRCULAR	CONCRETE	-	0.40	188.1	**81.39%**	1.15	1.14	1.17
L106A, L106B	106	104	0.76	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.456	1.246	0.000	0.000	0.000	0.000	0.000	0.000	13.20	66.36	89.85	105.25	153.75	0.0	0.0	229.6	61.7	525	525	CIRCULAR	CONCRETE	-	0.40	283.8	**80.91%**	1.27	1.26	0.82
																				14.02																		
L104A	104	104A	0.02	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.014	2.619	0.000	0.000	0.000	0.000	0.000	0.000	14.02	64.18	86.86	101.74	148.59	0.0	0.0	466.9	13.1	900	900	CIRCULAR	CONCRETE	-	0.20	841.5	**55.48%**	1.28	1.13	0.19
																				15.30									900	900								
			3.65	*0.00*	*0.00*	*0.00*	*0.00*	*0.72*	*N/A*	*N/A*	*N/A*	*2.62*		*0.00*		*0.00*		*0.00*																					



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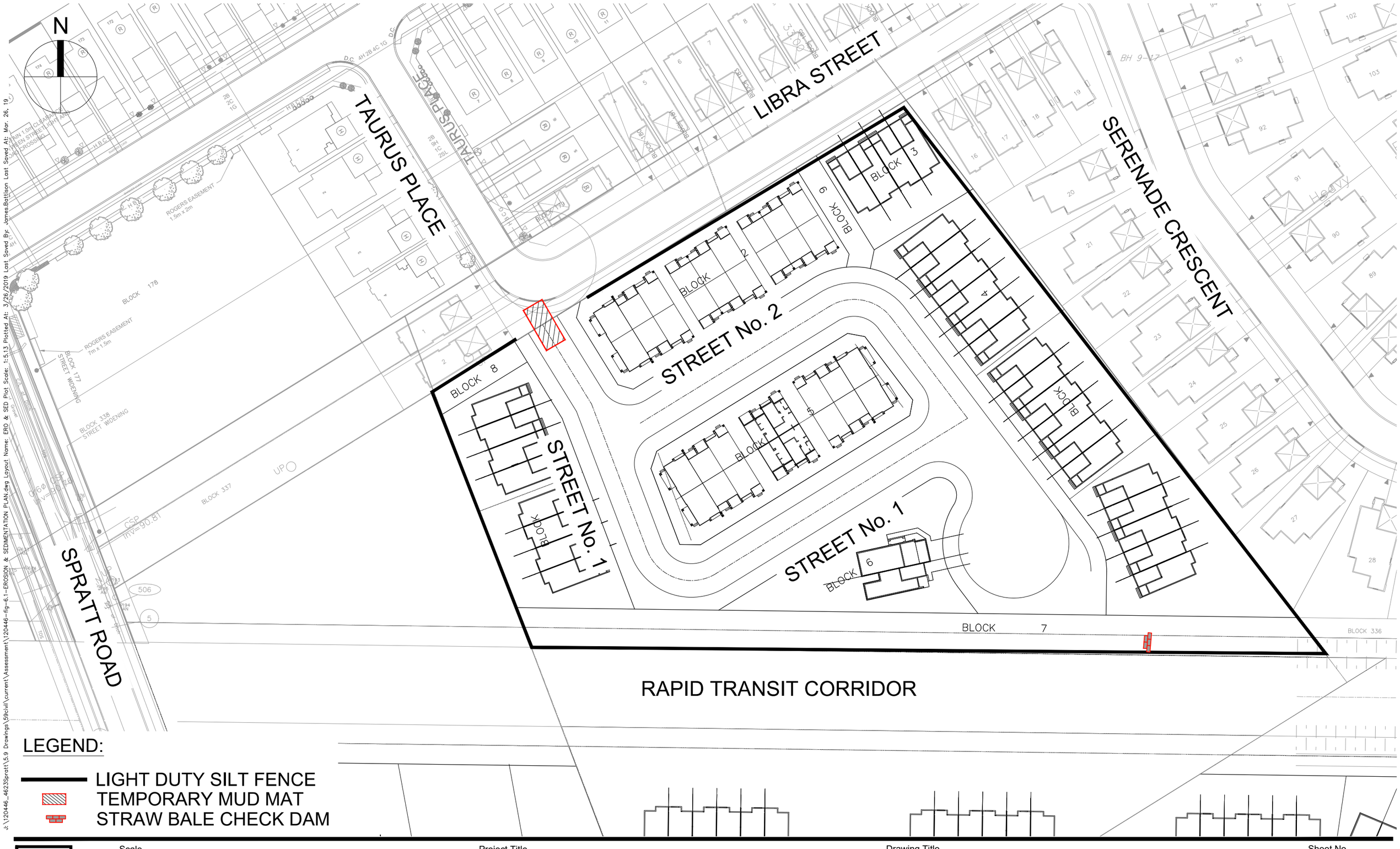
Scale	Project Title	Drawing Title	Sheet No.
NTS	4623 SPRATT	CONCEPTUAL STORM PLAN	FIGURE 4.1

APPENDIX E



LEGEND:

- LIGHT DUTY SILT FENCE
- TEMPORARY MUD MAT
- STRAW BALE CHECK DAM

J:\120446_4623Spratt\5.9 Drawings\59civil\current\Assessment\120446-fig-6.1-EROSION & SEDIMENTATION PLAN.dwg Layout Name: ERO & SED Plot Scale: 1:513 Plotted At: 3/26/2019 Last Saved By: James.Battison Last Saved At: Mar. 26, 19

Scale	Project Title	Drawing Title	Sheet No.
NTS	4623 SPRATT	EROSION & SEDIMENTATION CONTROL PLAN	FIGURE 6.1