



Assessment of Adequacy of Public Services Report 3930 and 3960 Riverside Drive

CITY OF OTTAWA

Development Application File No. D07-02-23-0004 / D07-16-23-0001

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1 Introduction

1.1 Scope

IBI Group Professional Services (Canada) Inc. (hereinafter referred to as IBI, or Arcadis - IBI Group) has been retained by Taggart Realty Management (TRM) on behalf of St. Mary's Lands Corporation to prepare an Assessment of Adequacy of Public Services Report (APSR) in support of Zoning By-Law Amendment and Subdivision Draft Plan applications for the subject lands in accordance with the policies set out by the Planning and Development Branch of the City of Ottawa.

The purpose of this report is to investigate and confirm the adequacy of public services for the proposed site. More precisely, it will review major municipal infrastructure including water supply, wastewater collection and management of stormwater as a function of the proposed development. It will also include a Sedimentation and Erosion Control Plan.

Hence, this APSR will provide the stakeholders with a conceptual level servicing scheme demonstrating the subject lands can be developed as proposed.

1.2 Subject Site

The lands are known municipally as 3930 and 3960 Riverside Drive in the City of Ottawa. The development is bounded by Hunt Club Road to the south, Riverside Drive to the east, City of Ottawa Uplands-Riverside park to the north and undeveloped environmental lands, adjacent to the Rideau River, to the west, as shown on Figure 1- Location Plan.

This site is approximately 8.15 hectares in size and is currently zone "General Mixed-Use, Subzone1, Exception 1719, subject to Schedule 251, Maximum height of 137 above sea level (GM1[1719]S251 H(137 A.S.L.)) in the City's comprehensive Zoning By-Law..

1.3 Proposed Development

TRM is proposing to change the current zoning of the northern portion of the lands to "Residential Third density, Subzone Z (R3Z), to remove the Schedule 251, add a new height schedule for the apartment blocks and to amend the provisions to the GM1 subzone. Please refer to Planning Rational prepared by Fotenn dated December 22, 2022.

The proponent is also proposing a plan of subdivision that will create blocks and lots in support of the proposed development. Please refer to Figure 2 – Draft plan.

The current development concept plan identifies 24 single family lots, 53 townhouse units and 4 apartment buildings proposing a total of 580 rental units. The plan also proposes the creation of a 0.38ha public park. Please refer to Figure 3 for the Concept Plan.

1.4 Previous Studies

Design of this project has been undertaken in accordance with the following reports:

- Riverside Drive Land Sanitary Sewer Servicing Study Update prepared by IBI Group, April 2022
- Riverside Drive Area Brief in Support of Development of Lands Within the Riverside Drive Planning Area prepared by Cumming Cockburn & Associates Limited, May 1986

DECEMBER 13, 2023



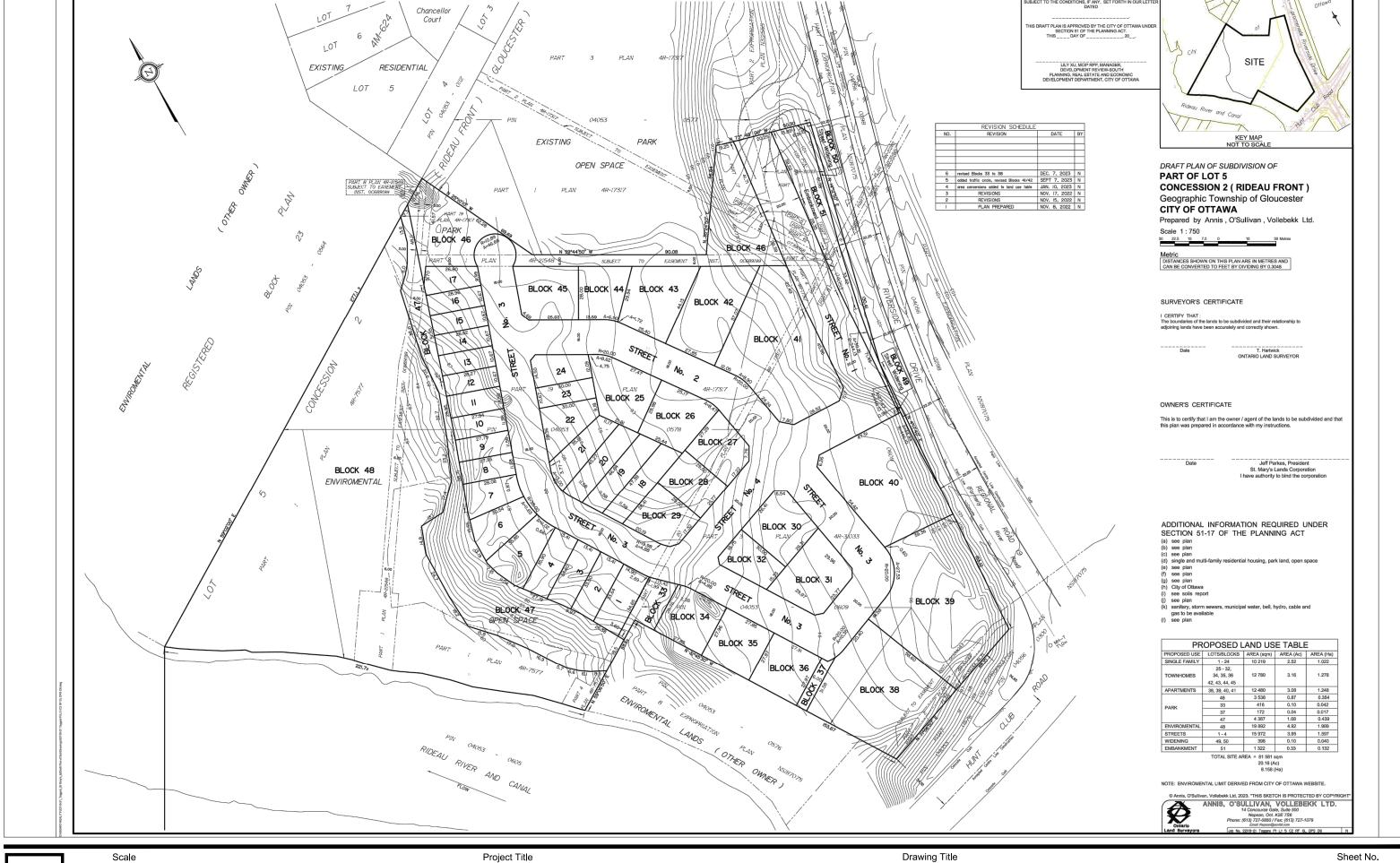
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Scale

Project Title

Drawing Title

Sheet No.



ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES REPORT

3930 AND 3960 RIVERSIDE DRIVE

Drawing Title

Sheet No.

DRAFT PLAN



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Sheet No.

CONCEPT PLAN

- Stormwater Management for Riverside Drive Lands prepared by Cumming Cockburn & Associates Limited, April 1987
- Riverwalk Park Stormwater Management Facility Update Stormwater Design Plan prepared by Novatech Engineering, June 1996

1.5 Geotechnical Considerations

The following is the most recent geotechnical investigation report prepared by WSP-Golder Associates:

 Geotechnical Assessment – Proposed Residential Development – 3930 and 3960 Riverside Drive, Ottawa, Ontario; Report No. 21482114-3000, dated September 29, 2023.

The site slopes generally from Riverside Drive down towards the Rideau River in a rough South-East to North-West direction. The site transitions from an elevation of approximately 104m at the Riverside Drive and Hunt Club Road intersection down to approximately 86m-88m along the western boundary of the proposed development.

The site was previously used as a granular extraction site and has subsequently been filled to reclaim land for development purposes. Generally, there is between 3m to 15m of fill across the site. Consequently, it is our understanding that a ground improvement program will be required to allow the development of the subject lands.

In regard to the site grading, although the placement of additional fill materials could add further load and increase the magnitude of potential long-term settlements, it is expected that this effect could be mitigated by the ground improvement program. From that perspective, there is not considered to be a restrictive limit on the permissible grade raise for this site.

It should also be noted that in designing the ground improvement program, the proposed grade raise will need to be considered. The geotechnical engineer will have to review the proposed grade raise for this project as part of the detail design to confirm that the geotechnical guidelines and recommendations have been adequately interpreted.

The proposed thickness of pavements elements noted in the report are the following:

Material	Thickness of Pavement Elements (mm)		
		Light Duty	Heavy Duty
Asphaltic Concrete	Superpave 12.5	40	50
OPSS.MUNI 1151	Superpave 19.0	50	70
Granular Material	Granular A Base	150	150
OPSS.MUNI 1010 or City of Ottawa specification F3147	Granular B, Type II Subbase	600	750

Among other items, the report comments on the following:

- Site grading
- Infrastructure construction
- Grade raise considerations
- Slope stability

- Design for earthquakes
- Foundation Design
- Sewer and watermain Construction
- Environmental considerations

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1.6 Pre-consultation

An engineering pre-consultation with the city was held September 1, 2021 regarding the proposed development. Notes from this meeting may be found in **Appendix F**.

It should be noted that pre-consultation with the Ministry of the Environment, Conservation and Parks (MECP) will be arranged prior to detail design.

2 Water Supply

2.1 Existing Conditions

As previously noted, the eight-hectare Riverside Park site is located west of Riverside Drive and north of Hunt Club Road. An existing 406mm diameter watermain is located on Riverside Drive, in pressure district **Zone 2C** which will provide the water supply to the site.

2.2 Design Criteria

2.2.1 Water Demands

Water demands have been calculated for the full development. Per unit population density and consumption rates are taken from Tables 4.1 and 4.2 at the 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	280 l/cap/day
•	Residential Peak Daily Demand	700 l/cap/day
•	Residential Peak Hour Demand	1,540 l/cap/day
•	ICI Average Day Demand	28,000 l/gross ha/day
•	ICI Peak Daily Demand	42,000 l/gross ha/day
•	ICI Peak Hour Demand	75,600 l/gross ha/day

A watermain demand calculation sheet is included in **Appendix A** and the total water demands are summarized as follows:

•	Average Day	4.17 l/s
•	Maximum Day	10.43 l/s
•	Peak Hour	22.94 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.

Water Age A total travel time of 5 days or less during basic day demand is

reasonable. A residence time of 8 days should not be exceeded.

2.2.3 Fire Flow Rates

A Fire Underwriting Survey (FUS) calculation has been conducted for the apartment buildings. In the calculation the building is considered fire restive and in accordance with the FUS methodology the area of the 2 largest adjoining floors along with the 50% of the area of eight floors above are considered. Apartment T1 the largest and T3 with the most exposure were calculated resulting in a 6000 l/min for T1 and 9,000 l/min for T3. All the apartments will be evaluated with a 9,000 l/min (133.3 l/s) fire flow.

The majority of the single family lots and townhouse blocks meet the requirements of Item 4.1 and 4.2 at Technical Bulletin IDSTB-2014-02 revision to Ottawa Design Guidelines — Water in which the fire flow requirement is capped at 10,000 l/min (166.7 l/s). There are three locations where the rear of a unit is within 10 meters of the side of an adjacent unit which requires separate FUS calculations. Townhouse units 33 to 35 and units 39 to 41 back onto flanking units with less than 10 metres separation. As the townhouse blocks are separated by more than 3 meters, separate FUS calculations are done for wood frame construction, results give a required fire flow of 9,000 l/min for units 39 to 41 and 10,000 l/min for units 39 to 41. The other location is lot 23 backing onto the side of unit 25, as lots 22 to 24 are separated by less than 3 meters, the three buildings are considered a single fire unit in the FUS calculation which results in a required fire flow of 10,000 l/min. A copy of the FUS calculations are included in **Appendix A**.

2.2.4 Boundary Conditions

The City of Ottawa has provided a hydraulic boundary condition at Riverside Drive where the connection to the site will occur. A copy of the boundary conditions is included in **Appendix A** and summarized as follows:

Table 2. 1 Hydraulic Boundary Conditions at Riverside Drive

	RIVERSIDE DRIVE.
Max HGL (Basic Day)	133.1 m
Min HGL (Peak Hour)	124.1 m
Max Day + Fire Flow (183 l/s Fire Flow)	127.1 m

2.2.5 Hydraulic Model

A computer model for the subject development has been developed using the Infowater program produced by Innovyze. The model includes the existing watermain and boundary condition on Riverside Drive.

2.3 Proposed Water Plan

2.3.1 Watermain Layout

There are two connections proposed to the existing 406mm watermain Riverside Drive with an isolation valve added between the connections. One connection is located at the vehicle entrance to the site with the other connection located further south on Riverside Drive. The two watermains connect to the looped system servicing the residential units. All watermains are 200 mm diameter except for a short section of 50 mm diameter located at the dead end at the northeast corner of the site.

2.3.2 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 included in **Appendix A** and summarized as follows:

Scenario

Basic Day (Max HGL) Pressure Range 287.1 to 422.3 kPa Peak Hour (Min HGL) Pressure Range 198.9 to 332.3 kPa Max Day + 183 l/s Fire Flow Range 185.1 l/s 275.6 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, therefore pressure

reducing control is not required for this development.

Minimum Pressure Based on the boundary condition provided by the City for minimum

pressure, the peak hour pressure at Riverside Drive is less than 276 kPa. As the elevation of the site is lower than Riverside Drive, the required

pressure is met for the residential units.

Fire Flow All nodes have design fire flows above the 133.3 l/s required for the

apartment buildings and 166.7 l/s for singles and townhouses.

Water Age There are no unlooped watermains except for a small dead end at lots

15 to 17 which is serviced with a 50 mm watermain in accordance with City detail W37.2. The water age analysis conducted under the basic

day scenario shows the longest age of 9.28 hours at the dead end.

3 WASTEWATER DISPOSAL

3.1 Existing Conditions

In 1987 the J. Perez Corporation development, known as Riverwalk Park, included a 525 mm diameter sanitary sewer extension to the southern limits of its development and was designed to service the urban area between Riverside Drive and the Rideau River north and south of Hunt Club Road. This sewer currently terminates at the north limit of the existing City of Ottawa Uplands-Riverside Park. At its current terminus, the existing 525Ø sewer was sized for an external area of 39.42 hectares with a predicted peak flow 108.6 l/s based on now outdated City of Ottawa design guidelines. The existing trunk sewer has a capacity of 200 L/s.

Subsequent to the 1987 Riverwalk Park development, the City of Ottawa commissioned a report, completed by IBI Group in December 2007, to review the sanitary sewer requirements in the Riverside Drive corridor which was since updated by IBI Group in March 2022.

For reference, the original Riverwalk Park sanitary sewer design sheet and Drainage Area Plan #3675-501A are included in the 2022 Study report located in **Appendix B**.

That updated study identified a total of 26.45 ha of developable property south of Chancellor Court and west of Riverside Drive. The developable properties and flow estimates from the 2022 report were:

Table 3.1 Riverside Drive Lands - Ownership and Areas

	ARE	A (HA)	FLOW (L/S)	
PROPERTY	GROSS (HA)	DEVELOPABLE (HA)	FLOW (L/S)	
- St. Mary's Riverside - Transport Canada - Dymon Management Ltd. - City of Ottawa/Airport Authority	8.58 3.65 8.69 34.96	6.35 0.00 6.29 13.81	13.70 0.00 5.90 12.95	
TOTAL	55.88	26.45	32.55	

As result, the total sanitary flow from tributary areas south of St. Mary's Riverside is now only estimated at **32.55 L/s** which is significantly less than the available capacity of **108.6 l/s**. The March 2022 Updated report also reconfirms that, theoretically, additional external lands (+/- 65 Ha) upstream of the City of Ottawa/Airport Authority property could also develop as commercial/employment uses and outlet to the existing trunk sanitary sewer downstream of the St. Mary's Riverside development.

3.2 Design Criteria

The sanitary sewers for the subject site will ultimately be based on the following key City of Ottawa design criteria:

Industrial flow 35,000 l/ha/d
 Residential per capital 280 l/person/d

Harmon – correction factor K=0.8

Peaking factor
 1.5 if ICI in contributing area >20%

1.0 if ICI in contributing area <20%

Infiltration allowance 0.33 l/s/ha

Velocities
 0.60 m/s min. to 3.0 m/s max.

Populations:

o 3.4 population per single family units

o 2.7 population per townhouse units

1.8 population per apartment unit

3.3 Recommended Wastewater Plan

Sanitary service for the subject site will be provided via the extension of the existing trunk sanitary sewer from the City of Ottawa Uplands-Riverside Park to the southern property boundary, where it can ultimately be extended by others to an south of the Hunt Club Bridge.

At this current stage, it is anticipated that a 450mm diameter trunk sewer will be extended across the subject site. The site will also be serviced via 200mm diameter local sewers. In areas where the depth of the trunk sanitary sewer is more than 5.0m, the local sewer may be a "High Level" and be place above the trunk in the same horizontal alignment. The exact locations of the High Level local sanitary sewers will be further discussed with City representatives during detail design.

The 2022 City of Ottawa report estimated that the peaked flow from the St. Mary's Riverside site would be approximately 13.70 l/s. The conceptual Sanitary Sewer Design Sheet, found in **Appendix B** i based on the current site concept shown in Figure 3, estimates a total peaked total flow of 14.82 l/s, calculated using criteria identified in section 3.2.

Given that there is significant residual capacity at the proposed sanitary connection location, as demonstrated in the 2022 report and identified in section 3.1, the extra 1.12 L/s (14.82l/s – 13.70l/s) can be deemed negligible.

3.4 Hunt Club Road Watermain Crossing

It should be noted that at detail design, the extension of the trunk sanitary sewer under the Hunt Club bridge to service the lands to the south of the subject will need to be considered.

More precisely, the future trunk sanitary sewer will have to cross a City of Ottawa 610mm high-pressure watermain. Based on City of Ottawa mapping, the watermain, which crosses the Rideau River, runs more on less parallel with Hunt Club Road.

IBI Group obtained the City of Ottawa design drawing of the existing 600mm diameter watermain to ensure the watermain can be crossed with the sanitary sewer. In the general vicinity of the possible crossing, the watermain appears to be climbing at a slope of +/-24%. It can be said that

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in a distance of 10m the watermain will change elevations by approximately 2.4m which will certainly allow a crossing to be made.

Hence, prior to detailed design of the trunk sanitary sewer extension southward the designer should obtain a survey of the of the watermain at the anticipated crossing location in order to ensure the proposed trunk can cross the existing watermain as per the City standards and that the trunk sewer is not constructed excessively deep within the St. Mary's Riverside site.

4 SITE STORMWATER MANAGEMENT

4.1 Background

The St. Mary's Riverside site falls within the drainage limits of the existing Riverwalk stormwater facility (henceforth referred to as the City of Ottawa Kimberwick Stormwater Management Facility). The design of that pond was outlined within the report "Stormwater Management for Riverside Drive Lands" completed by CCL in April of 1987. The drainage area plan (Drawing No. 3625-501) as well as the storm sewer design sheet prepared for the Riverwalk Park development in 1987 is included in **Appendix C**. The subject site is included south of the Riverwalk Park development in the area identified as St. Mary's Cement with a drainage area of 7.00 ha at a runoff coefficient of 0.70.

The facility was designed to meet criteria established by the MOEE, including fecal coliform and TSS reduction. An MOEE application for the facility was forwarded and on August 25, 1987, the MOEE provided the Certificate of Approval (certificate #3-0842-87-006) for the pond. However, before the pond was constructed, the City of Ottawa requested that the facility be slightly relocated. Accordingly, the C of A was amended by the Ministry of Environment on December 28, 1988 and the facility was eventually constructed in 1990.

Following the construction of the facility, the stormwater pond was updated as part of the development of adjacent lands by Claridge Homes in 1996. The report "Riverwalk Park Stormwater Management Facility Updated Stormwater Design Plan" was completed by Novatech Engineering (June 1996). That report outlined the strategy to rehabilitate the facility which had fallen into disrepair, operate, maintain and monitor performance up to the point of full assumption of the facility by the City of Ottawa in 1998. That report indicated that discussions with MOEE and the City of Ottawa confirmed that the developers will only be required to remediate and operate the pond as intended under the original Certificate of Approval. The original Certificate of Approval requires that the pond be operated efficiently to detain and treat both TSS and Fecal Coliforms. The optimization of the ponds performance would result in a substantial reduction in both concentrations but may not meet current criteria at all times. It should be noted that the MOEE has also stated that the owner of the facility would not be required to meet any other criteria in the future.

4.2 Proposed Stormwater Management Plan

The stormwater management system for the site incorporates standard urban drainage design and stormwater management features that can be summarized as follows:

- a dual drainage concept with surface storage,
- an oil and grit separator (OGS); and,
- an end-of-pipe SWM facility (Kimberwick SWM Facility).

4.2.1 Dual Drainage Concept

The site will be designed with dual drainage features, accommodating minor and major system flow. The minor system is tributary to the existing City of Ottawa Kimberwick SWM Facility. In order to provide the subject site with an outlet to the existing pond, a new storm sewer is proposed. Storm runoff from the Uplands-Riverside Park site was included in the design of the existing downstream sewers. It should be noted that the ground surface of the inlet works to the Stormwater Management Facility is at or near the 80 meter contour while the lowest part of the upstream development site is close to the 89 meter contour.

The minor system restriction for the proposed apartment blocks will be limited to 2 year capture. These blocks will be provided with storage to contain the 100 year storm event. However, at

detailed design the option of conveying major flow from the proposed apartment blocks towards the adjacent Rideau River and/or roadway network will be assessed. Ultimately, the development of each block will require a Site Plan Applications which will include full stormwater management designs and plans.

For the purposes of conceptual lumped modeling of the site, the capture rate for the remainder of the site the has been adjusted to be above the 2 year (up to the 100 year) to eliminate cascading major flow from the site to respect the limited available major system outlet to the Rideau River. The significant grade differential across the site limits the major system storage opportunities. The roads through the site will generally be on continuous grade, but will provide with a low point to allow for limited ponding. It is anticipated that continuous road sections will be provided with double catchbasins where feasible. Also, it is anticipated that some major system ponding will be possible and the capture at these locations would be optimized as required. At the detailed design stage, the storm sewers would be sized to the 2 year storm event and upsized as required to respect the hydraulic grade line freeboard requirements for the development as well as cascading major system flow. The dual drainage system has been evaluated using the SWMHYMO hydrological model. Further details of the modelling completed for the site are provided in the below sections.

4.2.2 Oil and Grit Separator (OGS)

The subject site will be provided with an oil and grit separator (OGS) to provide water quality control for the proposed development area. The unit will be sized to provide Enhanced water quality control, or 80% removal of TSS. The OGS unit would be located along the storm trunk sewer at the downstream limit of the development. Treated water from the OGS would then be conveyed via the proposed storm sewer to the existing storm manhole located upstream of the Kimberwick SWM facility. Please refer to Figure 8 for approximate location of the proposed OGS unit.

4.2.3 Existing Kimberwick Stormwater Management Facility

The existing Kimberwick SWM Facility was designed to service the drainage area of the subject site. As outlined within the above Section 4.1, the design of that pond was outlined within the report "Stormwater Management for Riverside Drive Lands" completed by CCL in April of 1987. The facility was designed to meet criteria established by the MOEE, including fecal coliform and TSS reduction.

The drainage area and runoff coefficient allocation for the St. Mary's site were confirmed by the drainage area plan (Drawing No. 3625-501) and rational method spreadsheet. The pond design included the subject site with a drainage area of 7.0 ha at a runoff coefficient of 0.70. The current design for the subject site is approximately 8.1ha at C of 0.5, which is less than the allocated capacity.

Following the construction of the facility, the stormwater pond was updated as part of the development of adjacent lands by Claridge Homes in 1996. The report "Riverwalk Park Stormwater Management Facility Updated Stormwater Design Plan" was completed by Novatech Engineering (June 1996). That report outlined the strategy to rehabilitate the facility which had fallen into disrepair, operate, maintain and monitor performance up to the point of full assumption of the facility by the City of Ottawa in 1998.

4.3 Minor Storm Sewer Design Criteria

The storm sewers in the Uplands-Riverside Park site are sized based on Standards of the City of Ottawa and the MOE. Rational Method Sewer Design Sheet and Drainage Area Plan are provided within **Appendix C.** Some of the key criteria include the following:

Intensity
 2 year (Apartment Blocks)
 100 year (residential Area)

Initial Time of Concentration
 10 min

• Approximate Average Runoff Coefficients used for this assessment:

Average Singles 0.70 Average Townhomes 0.75 Blocks 0.90

Velocities
 Manning roughness coefficient
 Minimal allowable slopes
 0.80 m/s to 6.0 m/s
 0.013 (smooth wall pipes)
 Refer to below table

Table 4-1 Minimal allowable slopes

DIAMETER (MM)	SLOPE (%)
250	0.432
300	0.340
375	0.250
450	0.195
525	0.160

- Minimum depth of cover of 2.0 m
- 100-year Hydraulic Grade Line (HGL) separation to be greater than 0.30 m from the underside of footing

4.4 Hydrological Analysis

Hydrological analysis of the proposed dual drainage system of the subject site was conducted using SWMHYMO. This technique offers a single storm event flow generation and routing. Land use, selected modeling routines, and input parameters are discussed in the following sections. A drainage area plan is presented in Figure 9 and model files are included in **Appendix C**. The main hydrological parameters used in the rational method spreadsheet and model are summarized in the following sections.

4.4.1 Design Storms

A detail design the site will be evaluated using the following storms:

- 2 year 3 hour Chicago storm event with a 10 minute time step (for dual drainage evaluation, specifically the minor system);
- 100 year 3 hour Chicago storm event with a 10 minute time step (for dual drainage evaluation, specifically major flow conveyance); and
- 100 year 3 hour Chicago storm event + 20% increase in intensity with a 10 minute time step (for a stress test on major flow conveyance as per the City of Ottawa Sewer Design Guidelines).

4.4.2 Drainage Area and Parameters

The catchment areas and imperviousness values are based on the rational method spreadsheet. The total and directly connected imperviousness rations will be based upon the previous and impervious areas for the front yard and rear yard catchment areas, to be calculated at detailed design.

- Area and imperviousness Catchment areas and imperviousness values are based on the areas and runoff coefficients applied in the rational method spreadsheet.
- Infiltration Infiltration losses were selected to be consistent with the OSDG. The Horton values are as follows: f₀ = 76.2 mm/h, f₀ = 13.2 mm/h, k = 0.00115 s⁻¹.
- Length Parameter The length parameter (LGI) for the site are based on measured lengths.
- <u>Slope</u> The ground slope was based upon the average slope for both impervious and pervious area. Generally, the slope is approximately 2% (0.02 m/m). This assumes a slope of approximately 1% for impervious or road surfaces and 3% for pervious surfaces (lot grading).
- <u>Initial Abstraction (Detention Storage)</u> Detention storage depths of 1.57 mm and 4.67 mm were used for impervious and pervious areas, respectively.
- Manning's Roughness Manning's roughness coefficients of 0.013 and 0.25 were used for impervious and pervious areas, respectively.

The main hydrological parameters used in the SWMHYMO model are summarized in **Table 4.2**. The corresponding drainage area plan (**Figure 9**) is provided in **Appendix C**, along with model files.

Table 4.2 SWMHYMO Hydrological Parameters

		IMP (%)				MINOR
Area ID	Area (ha)	TIMP	XIMP	LGI (m)	CONCEPTUAL STORAGE (cu-m)	SYSTEM CAPTURE (I/s)
T234	0.97	99	99	60	155	187
T1	0.38	99	99	50	65	76
UNITS	3.44	71	71	151	10	1186
PARK	3.34	7	7	150	n/a	82

Notes: conceptual storage to be confirmed at detailed design stage

4.4.3 Results of the Hydrological Model

The results of the hydraulic model evaluation are summarized in the following sections. Output files are provided within **Appendix C** for reference.

Table 4.3 SWMHYMO Model Results: 2 Year Chicago

AREA ID	RUNOFF (L/S)	MINOR SYSTEM CAPTURE (L/S)	STORAGE UTILIZED (M3)	MAJOR SYSTEM CASCADING OVERFLOW (L/S)
T234	187	175	3	0
T1	76	70	2	0
UNITS	407	407	0	0
PARK	82	81	2	0

AREA ID	RUNOFF (L/S)	MINOR SYSTEM CAPTURE (L/S)	STORAGE UTILIZED (M3)	MAJOR SYSTEM CASCADING OVERFLOW (L/S)
Total Minor Flow		713		

Table 4.4 SWMHYMO Model Results: 100 Year Chicago

AREA ID	RUNOFF (L/S)	MINOR SYSTEM CAPTURE (L/S)	STORAGE UTILIZED (M3)	MAJOR SYSTEM CASCADING OVERFLOW (L/S)
T234	465	187	154	0
T1	185	76	61	0
UNITS	1186	1180	2	0
PARK	715	82	2	633
Total Minor Flow		1523		

5 GRADING AND ROAD

The existing grades within portions of the proposed development lands vary significantly due to the existing topography of the site. The final grading plan will require the balancing of various requirements including but not limited to geotechnical and environmental constraints, connectivity to a proposed multi-use path network, access road and adjacent park, minimum/maximum slopes, overland routing of stormwater, all to ensure the site is graded in accordance with municipal standards.

The significant slope across the existing topography will most likely result in roadway slopes up to 5% and residential units with "Walk-Out" basements to reduce the need for retaining walls while minimizing the impact on the bordering lands. It is also anticipated that the structural elements of the apartment buildings will be designed and constructed to retain the abutting lands where applicable.

Due mostly in part to the extensive grade differential across the property, slope modifications along the western property boundary is proposed.

A conceptual macro grading plan has been prepared to identify the possible grading of the proposed development. A copy of the figure can be found in **Appendix D**.

6 SEDIMENT AND EROSION CONTROL PLAN

6.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to possibly introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These may include:

- Until the local storm sewer, groundwater in trenches will be pumped into a filter mechanism prior to release to the environment. bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches (where applicable);
- sediment capture filter socks will remain on open surface structures such as maintenance holes and catchbasins until these structures are commissioned and put into use; and
- silt fence on the site perimeter will be installed.

6.2 Trench Dewatering

Any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed, including sediment removal and disposal and material replacement as needed. It should be noted that that the contractor will be responsible for the design and management of the trap(s).

6.3 Bulkhead Barriers

Although the storm sewers eventually outlet into a sediment forebay, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewers to reduce sediment loadings during construction. These bulkheads will trap any sediment laden flows, thus preventing any construction-related contamination into existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

6.4 Seepage Barriers

In order to further reduce sediment loading to the stormwater management facility, seepage barriers will be installed on any surface water courses at appropriate locations that may become evident during construction. These barriers will be Light Duty Straw Bale Barriers per OPSD 219.100 and Heavy Duty Silt Fence Barriers per OPSD 219.130. They are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

6.5 Surface Structure Filters

All catchbasins, and to a lesser degree, manholes, convey surface water to sewers. Until streets are asphalted and curbed, all catchbasins and manholes will be constructed with sediment capture inserts or equivalent located between the structure frame and cover. These will stay in place and be maintained during construction and build until it is appropriate to remove same.

7 CONCLUSION

This report outlined a conceptual servicing scheme to support both the Zoning Bylaw amendment and the Plan of Subdivision applications and has illustrated that the proposed residential development at 3930 and 3960 Riverside Drive can be serviced by extending municipal services in an effective manner and in accordance with the City of Ottawa's current level of service requirements.

The water network will be extended to provide necessary service. All sanitary and storm sewer designs for this development will be completed in conformance with City of Ottawa standards while acknowledging downstream constraints.

Adherence to the Sediment and Erosion Control Plan during construction will minimize harmful impacts on surface water.

Detail design of the infrastructure would be completed upon issuance of draft plan approval and would be subject to various governmental approvals prior to construction, including but not limited to the following:

- MECP Certificate of Authorization (C of A) for sewers and SWM;
- Rideau Valley Conservation Authority;
- Commence Work Order: City of Ottawa.

Based on the information provided within this report, the plans prepared for the subject development can be serviced to meet City of Ottawa requirements.

T. R. BRULE EN ON INCE OF ON IRE

Terry Brule, P. Eng. Associate Director

Peter Deir, P. Eng. Stormwater Management - Associate

https://arcadiso365.sharepoint.com/sites/Projects3/140873/Internal Documents/6.0_Technical/6.04_Civil/03_Reports/Assessment of Public Services Report - November 2022/3rd submission - December 2023/CTR-APSR-2023-12-13.docx/2023-12-13

APPENDIX A

Lance Erion

From: Harrold, Eric <eric.harrold@ottawa.ca>
Sent: Thursday, December 1, 2022 12:36 PM

To: Terry Brule

Cc: Terry Brule; Lance Erion

Subject: RE: Request for Watermain Boundary Conditions - Taggart Realty St-Mary's development - 3930

Riverside Drive

Attachments: 3930 Riverside Drive November 2022.pdf

*** Exercise caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. ***

Hi Terry, I appreciate your patience.

The following are boundary conditions, HGL, for hydraulic analysis at 3930 Riverside Drive (zone 2W2C) assumed to be a dual connection to the 406 mm on Riverside Drive (see attached PDF for location):

Minimum HGL: 124.1 m Maximum HGL: 133.1 m

Max Day + FF (183 L/s): 127.1 m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Please let me know if you require anything further.

Best regards,

Eric

Eric Harrold, P.Eng

Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West, Ottawa, ON

613.580.2424 ext. 21447, eric.harrold@ottawa.ca

From: Terry Brule <tbrule@IBIGroup.com>

Sent: December 01, 2022 8:26 AM

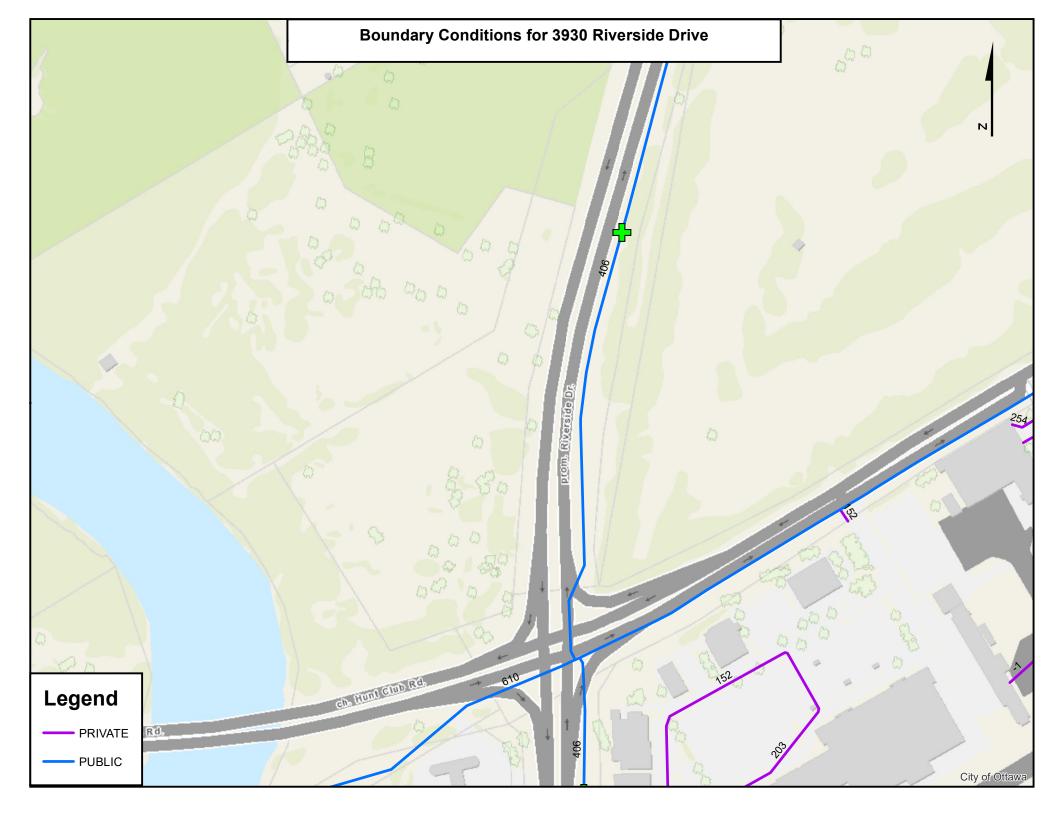
To: Harrold, Eric <eric.harrold@ottawa.ca>

Cc: Terry Brule <tbrule@ibigroup.com>; Lance Erion <lerion@ibigroup.com>

Subject: RE: Request for Watermain Boundary Conditions - Taggart Realty St-Mary's development - 3930 Riverside Drive

Importance: High

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.





TOTALS

24

53

590

1,287

IBI GROUP 333 PRESTON STREET OTTAWA, ON K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

4.17

PROJECT: Riverside and Huntclub

LOCATION : City of Ottawa

DEVELOPER: Taggart Realty Management PAGE:

10.43

FILE:

DESIGN:

22.94

DATE PRINTED:

140873

08-Dec-22

LE

1 OF 1

		RESIDI	ENTIAL			I-RESIDEN			VERAGE D			XIMUM DA			IMUM HOU		FIRE
NODE	1	UNITS			INDTRL	COMM.	INST.		DEMAND	(l/s)	D	EMAND (I	/s)	D	EMAND (I	/s)	DEMAND
	SF	SD & TH	APT	POP'N	(ha.)	(ha.)	(ha.)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	(l/min)
	}																
J4		7		19				0.06	0.00	0.06	0.15	0.00	0.15	0.34	0.00	0.34	9,000
J5			159	286				0.93	0.00	0.93	2.32	0.00	2.32	5.10	0.00	5.10	9,000
J6		2	137	252				0.82	0.00	0.82	2.04	0.00	2.04	4.49	0.00	4.49	9,000
J7		6	111	216				0.70	0.00	0.70	1.75	0.00	1.75	3.85	0.00	3.85	9,000
J8	2	15		47				0.15	0.00	0.15	0.38	0.00	0.38	0.84	0.00	0.84	10,000
J9	9			31				0.10	0.00	0.10	0.25	0.00	0.25	0.55	0.00	0.55	10,000
J10	9	4		41				0.13	0.00	0.13	0.34	0.00	0.34	0.74	0.00	0.74	10,000
J11	2			7				0.02	0.00	0.02	0.06	0.00	0.06	0.12	0.00	0.12	10,000
J12	2			7				0.02	0.00	0.02	0.06	0.00	0.06	0.12	0.00	0.12	
J13		11		30				0.10	0.00	0.10	0.24	0.00	0.24	0.53	0.00	0.53	10,000
J14		8	183	351				1.14	0.00	1.14	2.84	0.00	2.84	6.26	0.00	6.26	9,000

ASSUMPTIONS					
RESIDENTIAL DENSITIES		AVG. DAILY DEMAND		MAX. HOURLY DEMAND	
- Single Family (SF)	<u>3.4</u> p/p/u	- Residential	280 I / cap / day	- Residential	<u>1,540</u> I / cap / day
		- ICI	28,000 I / ha / day	- ICI	<u>75,600</u> I / ha / day
- Semi Detached (SD) & Townhouse (TH)	<u>2.7</u> p/p/u				
				FIRE FLOW	
- Apartment (APT)	<u>1.8</u> p/p/u	MAX. DAILY DEMAND		- SF, SD, TH & ST	10,000 I / min
		- Residential	<u>700</u> I / cap / day	- APT	9,000 I / min
		- ICI	<u>42,000</u> I / ha / day		

Hunt Club at Riverside

Building Floor Area T1 17 Storey Apartment Fire Resitive

2 largest adjoining floors	2,522	m^2
50% of eight floors above	3,637	_
Total Area	6,159	m^2

F = 220C√A

Use

C 0.6 C = 1.5 wood frame
A 6,159 m^2 1.0 ordinary
0.8 non-combustile
F 10,359 l/min 0.6 fire-resistive
use 10,000 l/min

Occupancy Adjustment -25% non-combustile

-15%

-15% limited combustile 0% combustile

+15% free burning
Adjustment -1500 l/min +25% rapid burning

Fire flow 8,500 l/min

Sprinkler Adjustment

Use -30%

Adjustment -2550 l/min

Building	Separation	Adjac	Exposure		
Face	(m)	Length	Stories	L*H Factor	Charge *
north	> 45				
east	> 45				
south	> 45				
west	31.0	38.0	5	190	0%
Total					0%
Adjustment			-	l/min	
_					
Total adjust	ments		(2,550)	l/min	
Fire flow			5,950	l/min	
Use			6,000	l/min	
			100.0	l/s	

^{*} Exposure charges from Table 6 of the FUS 2020 Guideline

Hunt Club at Riverside

Building Floor Area T3 11 Storey Apartment Fire Resitive

2 largest adjoining floors	2,642	m ²
50% of eight floors above	3,952	
Total Area	6,594	m^2

F = 220C√A

C 0.6 C = 1.5 wood frame
A 6,594 m^2 1.0 ordinary
0.8 non-combustile
F 10,719 I/min 0.6 fire-resistive
use 11,000 I/min

Occupancy Adjustment -25% non-combustile

Use -15% limited combustile

-15% 0% combustile

+15% free burning

Adjustment -1650 l/min +25% rapid burning
Fire flow 9,350 l/min

Sprinkler Adjustment

Use -30%

Adjustment -2805 I/min

Building	Separation	Adjac	Exposure		
Face	(m)	Length	Stories	L*H Factor	Charge *
north	16.0	24.0	5	120	8%
east	> 45				
south	10.5	24.0	5	120	8%
west	> 45				
Total					16%
Adjustment			1,496	l/min	
Total adjust	ments		(1,309)	l/min	
Fire flow			8,041	l/min	
Use			8,000	l/min	
			133.3	l/s	

^{*} Exposure charges from Table 6 of the FUS 2020 Guideline

Hunt Club at Riverside

Building Floor Area	Units 33-35
width	15.5
length	18
stories	2
Area	558 m ²

F = 220C√A

С 1.5 C = 1.5 wood frame 558 m² Α 1.0 ordinary 0.8 non-combustile F 7,795 l/min 0.6 fire-resistive 8,000 l/min use

Occupancy Adjustment

-25% non-combustile -15% limited combustile Use -15% 0% combustile +15% free burning

-1,200 l/min +25% rapid burning Adjustment Fire flow 6,800 l/min

Sprinkler Adjustment

0% Use

Adjustment 0 l/min

-					
Building	Separation	Adjace	nt Expose	ed Wall	Exposure
Face	(m)	Length	Stories	L*H Factor	Charge *
north	9.0	17.5	2	35	16%
east	30.0	23.0	4	92	8%
south	3.1	15.5	2	31	16%
west	30.5	18.0	2	36	0%
Total					40%

Adjustment	2,720 l/min
Total adjustments	2,720 l/min
Fire flow	9,520 l/min
Use	10,000 l/min
	166.7 I/s

^{*} Exposure charges from Techinical Bulletin ISTB 2018-02 Appendix H (ISO Method)

Hunt Club at Riverside

Building Floor Area	a Units 39-41
-	-

width 15.5 length 18 stories 2 Area 558 m²

F = 220C√A

C 1.5 C = 1.5 wood frame A 558 m^2 1.0 ordinary

F 7,795 I/min 0.6 fire-resistive use 8,000 I/min

Occupancy Adjustment

-25% non-combustile-15% limited combustile0% combustile

Use -15%

+15% free burning +25% rapid burning

Adjustment -1,200 l/min

Fire flow 6,800 I/min

Sprinkler Adjustment

Use 0%

Adjustment 0 I/min

Building	Separation	Adjacent Exposed Wall			Exposure
Face	(m)	Length	Stories	L*H Factor	Charge *
north	9.0	17.5	2	35	16%
east	3.1	15.5	2	31	16%
south	25.0	9.0	2	18	0%
west	30.5	12.5	2	25	0%
Total					32%

Adjustment	2,176 I/min
Total adjustments	2,176 l/min
Fire flow	8,976 l/min
Use	9,000 l/min
	150.0 l/s

^{*} Exposure charges from Techinical Bulletin ISTB 2018-02 Appendix H (ISO Method)

Hunt Club at Riverside

Building Floor Area	Lot22	Lot23	Lot 24	
width	9	8	9	
length	18	19	18	
stories	2	2	2	
Area	324	304	324	952 m²

F = 220C√A

C 1.5 C = 1.5 wood frame
A 952 m^2 1.0 ordinary
0.8 non-combustile
F 10,182 I/min 0.6 fire-resistive
use 10,000 I/min

Occupancy Adjustment -25% non-combustile -15% limited combustile

Use -15% 0% combustile +15% free burning

Adjustment -1,500 l/min +25% rapid burning Fire flow 8,500 l/min

Sprinkler Adjustment

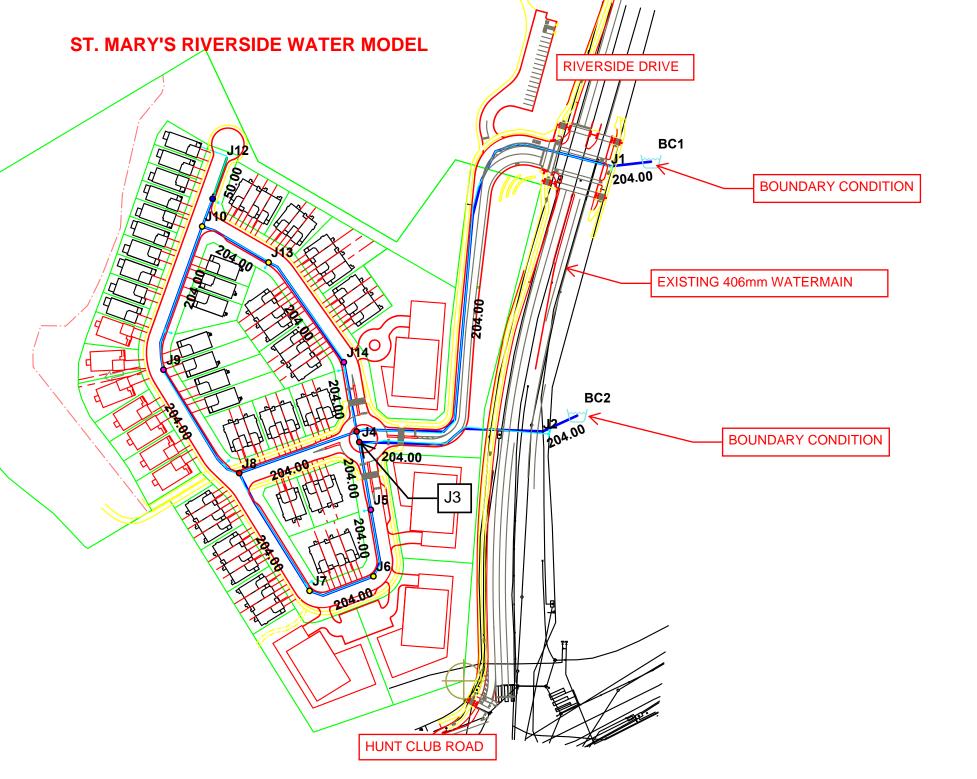
Use 0%

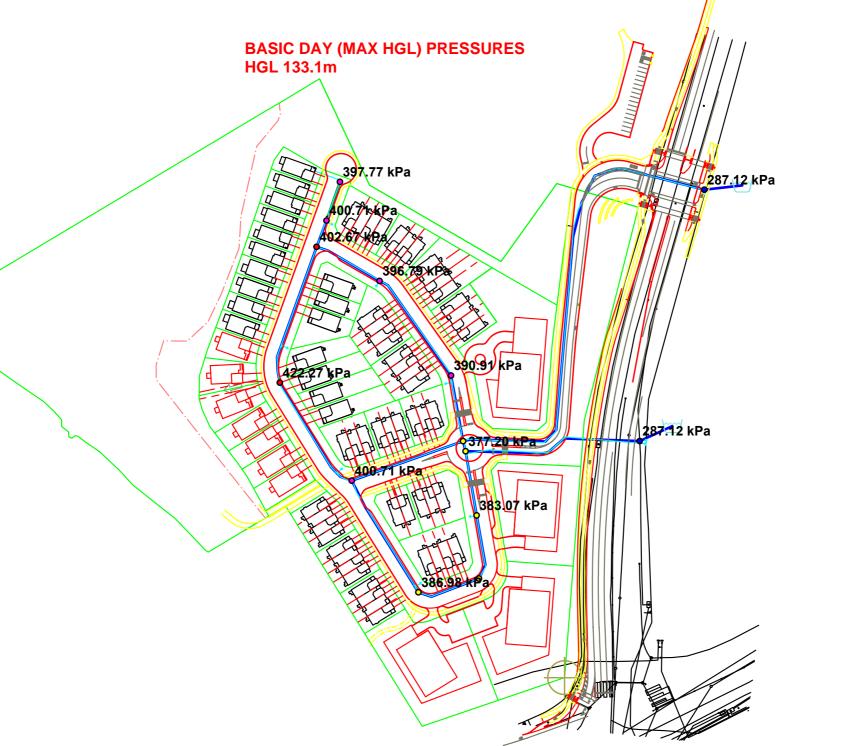
Adjustment 0 l/min

Building	Separatior	Adjacent Exposed Wall			Exposure
Face	(m)	Length	Stories	L*H Factor	Charge *
	07.0	04.5	0	40	00/
north	27.0	24.5	2	49	2%
east	25.0	15.5	2	31	2%
south	27.0	8.0	2	16	0%
west	11.0	18.0	2	36	16%
Total					20%

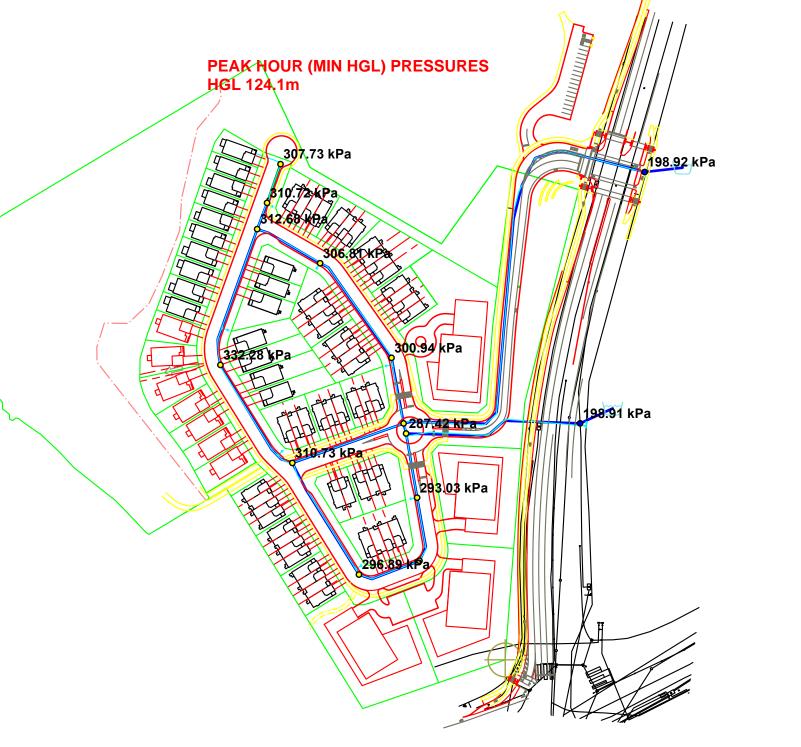
Adjustment	1,700 l/min
Total adjustments	1,700 I/min
Fire flow	10,200 l/min
Use	10,000 l/min
	166.7 l/s

^{*} Exposure charges from Techinical Bulletin ISTB 2018-02 Appendix H (ISO Method)





	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
1	J1	0.00	103.80	133.10	287.12	0.00
2	J10	0.13	92.00	133.09	402.67	0.00
3	J11	0.02	92.20	133.09	400.71	0.00
4	J12	0.02	92.50	133.09	397.77	0.00
5	J13	0.10	92.60	133.09	396.79	0.00
6	J14	1.14	93.20	133.09	390.91	0.00
7	J2	0.00	103.80	133.10	287.12	0.00
8	J3	0.00	94.60	133.09	377.20	0.00
9	J4	0.06	94.60	133.09	377.20	0.00
10	J5	0.93	94.00	133.09	383.07	0.00
11	J6	0.82	94.30	133.09	380.13	0.00
12	J7	0.70	93.60	133.09	386.98	0.00
13	J8	0.15	92.20	133.09	400.71	0.00
14	J9	0.10	90.00	133.09	422.27	0.00

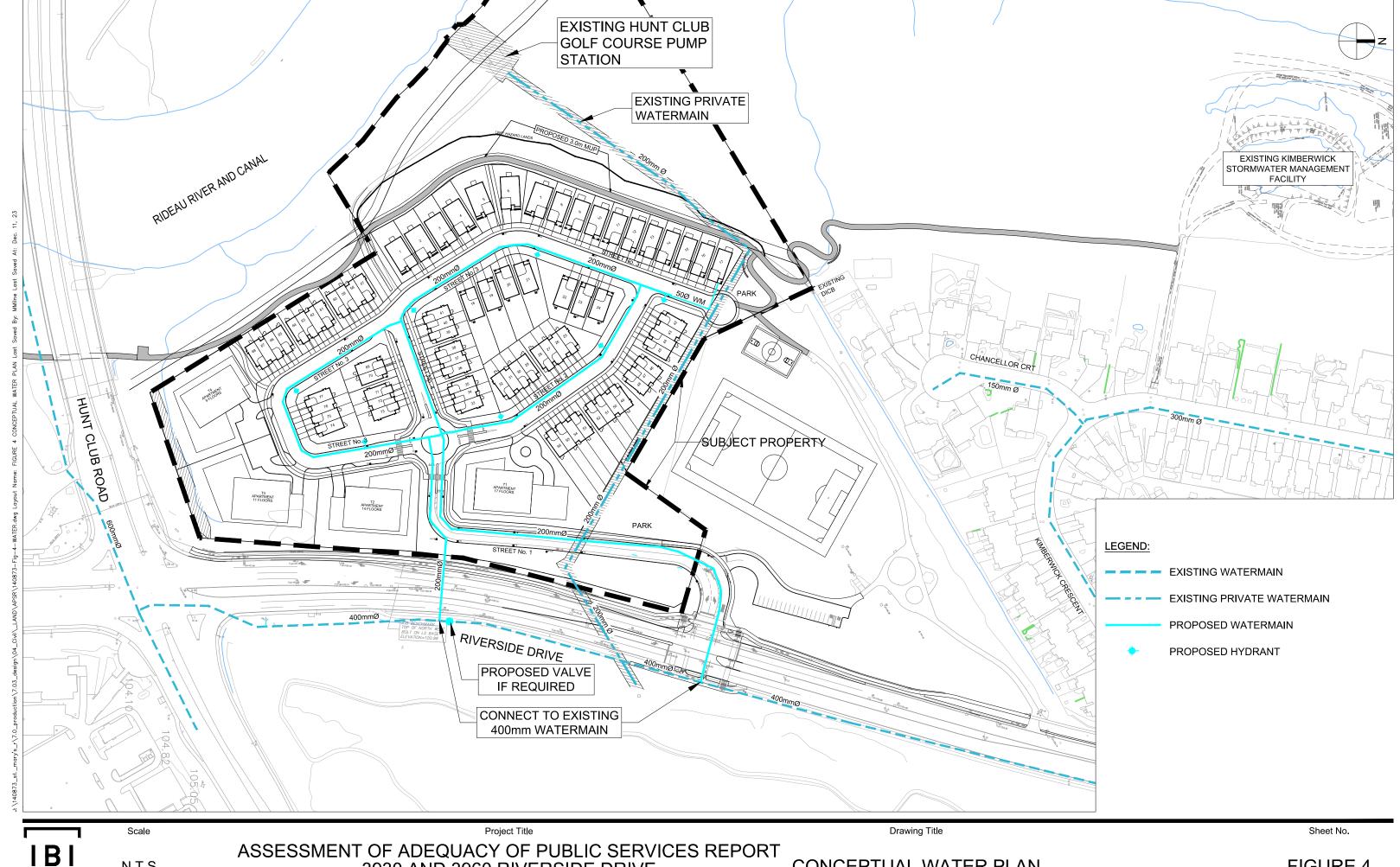


	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
1	J1	0.00	103.80	124.10	198.92	0.00
2	J10	0.74	92.00	123.91	312.68	0.00
3	J11	0.12	92.20	123.91	310.72	0.00
4	J12	0.12	92.50	123.90	307.73	0.00
5	J13	0.53	92.60	123.91	306.81	0.00
6	J14	6.26	93.20	123.91	300.94	0.00
7	J2	0.00	103.80	124.10	198.91	0.00
8	J3	0.00	94.60	123.93	287.41	0.00
9	J4	0.34	94.60	123.93	287.42	0.00
10	J5	5.10	94.00	123.90	293.03	0.00
11	J6	4.49	94.30	123.90	290.03	0.00
12	J7	3.85	93.60	123.90	296.89	0.00
13	J8	0.84	92.20	123.91	310.73	0.00
14	J9	0.55	90.00	123.91	332.28	0.00

	ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count	Water Age (hrs)
1	13	J1	J3	278.87	204.00	110.00	8.59	0.26	0.17	0.61	Open	0	0.00
2	15	J4	J2	106.45	204.00	110.00	-14.35	0.44	0.17	1.57	Open	0	0.00
3	17	J3	J4	6.15	204.00	110.00	-4.71	0.14	0.00	0.20	Open	0	0.00
4	19	J4	J5	38.65	204.00	110.00	9.30	0.28	0.03	0.70	Open	0	0.00
5	21	J5	J6	38.69	204.00	110.00	4.20	0.13	0.01	0.16	Open	0	0.00
6	23	J6	J7	38.27	204.00	110.00	-0.29	0.01	0.00	0.00	Open	0	0.00
7	25	J7	J8	77.12	204.00	110.00	-4.14	0.13	0.01	0.16	Open	0	0.00
8	27	J8	J9	73.67	204.00	110.00	0.75	0.02	0.00	0.01	Open	0	0.00
9	29	BC1	J1	1.00	204.00	110.00	8.59	0.26	0.00	0.60	Open	0	0.00
10	P11	J8	J3	69.92	204.00	110.00	-5.73	0.18	0.02	0.29	Open	0	0.00
11	P13	J9	J10	84.81	204.00	110.00	0.20	0.01	0.00	0.00	Open	0	0.00
12	P15	J10	J11	16.61	204.00	110.00	0.24	0.01	0.00	0.00	Open	0	0.00
13	P17	J11	J12	24.32	50.00	100.00	0.12	0.06	0.01	0.25	Open	0	0.00
14	P19	J10	J13	42.53	204.00	110.00	-0.78	0.02	0.00	0.01	Open	0	0.00
15	P21	J13	J14	70.89	204.00	110.00	-1.31	0.04	0.00	0.02	Open	0	0.00
16	P23	J14	J3	39.58	204.00	110.00	-7.57	0.23	0.02	0.48	Open	0	0.00
17	P27	J2	BC2	1.00	204.00	110.00	-14.35	0.44	0.00	1.57	Open	0	0.00



	ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	J10	167.34	203.27	J11	138.00	106.28	202.18	139.96	141.93
2	J11	167.06	185.09	J11	139.96	106.48	185.09	139.96	139.96
3	J13	167.24	204.76	J13	139.96	106.88	204.76	139.96	139.97
4	J14	136.14	231.57	J14	139.96	107.48	231.57	139.96	139.99
5	J3	133.30	272.31	J3	139.96	108.88	272.31	139.96	139.96
6	J4	133.45	275.59	J4	139.96	108.88	275.59	139.96	139.96
7	J5	135.62	232.73	J5	139.96	108.28	232.73	139.96	139.96
8	J6	135.34	215.10	J6	139.96	108.58	215.10	139.96	139.99
9	J7	135.05	215.49	J7	139.96	107.88	215.49	139.96	139.99
10	J8	167.38	245.16	J8	139.96	106.48	245.16	139.96	139.99
11	J9	167.25	220.97	J9	139.96	104.28	220.97	139.96	139.97



N.T.S.

APPENDIX B



REPORT

RIVERSIDE DRIVE LANDS SANITARY SEWER SERVICING STUDY UPDATE

Project: 126394-7.03.04



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Appen	dix D	Figure 4 – Proposed Sanitary Sewer Plan and Profile	
Appen	dix E	Figure 5 – The City of Ottawa and The Ottawa International Airport Authority Gravity Service Limits	

PREAMBLE

This following report, initially prepared in 2007 has been updated as needed/where needed to bring the design up to current City of Ottawa standards and reflect the current development conditions. The four main areas that have been updated are:

- Sanitary sewer design flows have been updated to reflect the latest design parameters from the City of Ottawa as outlined in Technical Bulletin ISTB-2018-01
- Flows tributary from the Taggart Realty lands have been revised to conform to the current development concept
- Proposed sewer routing through the Taggart Realty lands has been revised to conform to the current development concept
- Construction cost estimates have been updated to reflect current market conditions

1.0 INTRODUCTION

1.1 Purpose

This report was prepared to review the feasibility of providing a sanitary sewer outlet for the study area which is identified in Figure 1 Study Area and Ownership and located in **Appendix A**. The area falls within the Riverside Drive corridor and includes lands both immediately north and south of the Hunt Club Bridge. The area is bounded by Riverside Drive to the west and the Rideau River to the east, the Quinterra/Riverwalk Park development to the north and on the south by the former municipal boundary between the former City of Ottawa and the former City of Gloucester. Pockets of residential uses along the river front south of the Hunt Bridge are excluded from the study area, as well as the City of Ottawa park lands adjacent to the Quinterra/Riverwalk neighbourhood. It is assumed that the property immediately south of the bridge, currently owned by Transport Canada, will remain undeveloped and, additionally, for the purposes of this report, the areas immediately adjacent to the Hunt Club Bridge are assumed to be undevelopable.

The principal land owners in the study area include Taggart Realty, which has land holdings north of Hunt Club Road; Transport Canada, Dymon Management Limited, the City of Ottawa and the Ottawa International Airport Authority, all of which own lands south of Hunt Club Road.

Most of the external major municipal services, including a trunk sanitary sewer, needed to support urbanization of the study area were constructed in the 1970's and 1980's.

1.2 Background

Prior to 1980, the former Regional Municipality of Ottawa Carleton extended a regional trunk sanitary system immediately adjacent to the Rideau River to a location about 700

meters north of the study area. In 1987, the J. Perez Corporation development, known as Riverwalk Park, included a 525 mm dia. extension of the trunk sanitary sewer to the south limits of its development. The existing outlet sewer for the study area currently is terminated at Point A (MH 17A, just south of Riverwalk Park), which is identified on Figure 2 Existing and Proposed Sewers, located in **Appendix A**. The invert elevation of the sewer at that location is 84.63 meters.

Also for reference, an existing 300 mm diameter sewer located in Riverside Drive and Hunt Club Road adjacent to the airport is included on Figure 2. That sewer was installed by the federal government in the mid 1970's to provide a wastewater outlet for federal buildings located on Limebank Road. The sewer outlets at Bowesville Road.

In 2001, the land owners to the south of the Hunt Club Bridge, including the City of Ottawa, the Ottawa International Airport Authority and the Newill Corporation, prepared a planning submission in support of proposed amendments to the Official Plan and zoning-by-law. The Newill Corporation property was subsequently purchased by Dymon Management Limited, which presently owns the property.

The following report sections will review the feasibility of the existing wastewater infrastructure to support development of the study area and present a servicing scheme to provide a development and conservation strategy for the study area.

2.0 WASTEWATER OUTLET

2.1 Existing Conditions

Prior to 1980, the former Regional Municipality of Ottawa-Carleton (RMOC) constructed a trunk sanitary sewer designed to service the study area and other adjacent areas. The 750mm dia. Riverside Drive Collector sewer terminated between the Urbandale Realty and DND properties north of the study area.

In the late 1980's, as part of its Riverwalk Park development, J. Perez Corporation constructed an extension to the regional trunk sewer which extended to the south limits of its property. At that location, the sewer was designed to provide a wastewater outlet for additional lands to the south. For reference, two documents from the Riverwalk Park development including the Riverwalk Park – Sanitary Sewer Design Sheet and Riverwalk Park – Sanitary Drainage Area Plan are both included in Appendix B.

At its termination (MH 17A on the Riverwalk Park design sheet), the sewer was sized for an external area of 39.42 hectares with a predicted peak flow of 108.6 l/s. The existing sewer has a capacity of 200 l/s.

2.2 Potential Development

Lands south of Riverwalk Park can outlet wastewater flows to the existing 525 mm dia. sewer presently terminated at the north limit of the study area. The potential future

developments include those lands within the study area. The gross and net areas for the various land parcels within the study area are indicated on Figure 3 Drainage Area Plan, which is included in **Appendix C**. The following table provides a breakdown of the areas for each land owner. It should be noted that only a portion of the gross study area can be developed.

TABLE 2.1 RIVERSIDE DRIVE LANDS – OWNERSHIP AND AREAS

LAND OWNED	AF	REAS (ha)
LAND OWNER	GROSS	DEVELOPABLE (NET)
Taggart Realty	8.58 ha	6.35 ha
Transport Canada	3.65 ha	0.00 ha
Dymon Management Ltd.	8.69 ha	6.29 ha
City of Ottawa/	34.96 ha	13.81 ha
Airport Authority		
TOTAL	55.88 ha	26.45 ha

The City's Official Plan has identified the areas north of the Hunt Club Bridge as General Urban Area and those south of the bridge as Employment Area. Current City zoning identifies some of the lands as either Employment Centre or Light Industrial. It also identifies those lands adjacent to the Rideau River as Leisure/Open Space. It Is anticipated that Taggart Realty will approach the City of Ottawa requesting that their lands be re-zoned to allow residential uses. As a conservative approach, we have assumed residential flows from these lands in the updated analysis found below. Not all the study area will be urbanized and generate wastewater flows. This report assumes the Open Space areas will contribute no flows to the sanitary sewer extension. Therefore, although the total study area is over 55 hectares, only about 47% (26.45 ha) is considered for urbanization.

For the purposes of this report, with the exception of the Taggart Realty property, all developable lands within the study area will be considered as commercial developments. The wastewater flow estimate for the Taggart Realty property is based on the current concept plan shown in the report figures and unit types and totals provided by the owners which include 30 single units, 48 townhouse units and 490 apartments. The exact unit count will be verified through the Site Plan Application process. Using standard City of Ottawa design guidelines for estimating wastewater flow, it is estimated that the study area will generate a peak flow of 32.55 l/s. The flow estimate is based on the following criteria:

Total developable area

Average Commercial Flow

Commercial Peaking Factor

Residential Flow

Residential Peaking Factor

Infiltration Allowance

26.45 ha

28,000 l/ha/day

1.5

280 l/cap/day

Modified Harmon Formula

0.33 l/s/ha

Based on this analyses, the sewer extension though the study side would require new 250 mm dia to 300 mm dia pipes and the existing sub-trunk would have a spare capacity of over 168 l/s (200.6 - 32.6), which is more than adequate to accommodate development of the study area. In fact, a considerably larger area could develop and route wastewater flows to the existing outlet sewer.

The sanitary sewer design sheet for the proposed sewer extension is included in **Appendix C**. There are two designs included on the design sheet; one for the study area without any consideration for wastewater contributions from lands external to the study area, and another which includes a potential external drainage area of 65.0 ha.

The second design was included to take advantage of the available outlet capacity and provide other stakeholders, such as the Airport Authority, with wastewater options. The expected sanitary flow, including an external area of 65.0 hectares, is 93.49 l/s, which still results in 26.29 l/s theoretical available spare capacity in the proposed outlet sewer.

As expected, the sewers needed to carry the wastewater flows for the two models presented on the sewer spreadsheets are different sizes. A 250 mm and 300 mm diameter sewer system will be adequate for the study area needs and a larger sewer (375 mm and 450 mm diameter) would be needed if external areas to the study area are to be considered.

In keeping with good planning practice, this report assumes that areas external to the study area will eventually take advantage of the existing spare capacity in the outlet sewer. Accordingly, the larger 450 mm and 375 mm diameter sewers have been included in this report.

2.3 Sewer Route

Figure 4, Proposed Sanitary Sewer Plan and Profile, which is located contained in **Appendix D**, provides a potential sewer route for the extension of the outlet sewer needed to service the study area. This route is conceptual and is provided only to indicate the feasibility of providing a wastewater outlet for the study area. The conceptual design will require some refinements to meet the needs of future plans of development.

From its current terminus at Point A, the sewer could be constructed southward towards the Hunt Club Bridge through the existing park and the Taggart Realty property. As the concept development and feasibility analysis of the Taggart property is currently ongoing and Taggart is aware of the requirement for the subject sanitary sewer to cross their lands, it is anticipated that the landowner will propose a route for the sanitary sewer through their lands that is acceptable to both the City and Taggart Realty. The proposed routing of the sewer will be confirmed with the City through the development review application process.

There are two existing infrastructures which cross the Taggart Realty property. A small diameter watermain was constructed by the Hunt Golf and Country Club near the center

of the property and a gas main exists near the southern portion of the property. The exact location of those mains should be accurately determined prior to final designs of the sanitary sewer. Taggart Realty will construct the portion of the subject sanitary sewer downstream of and within their lands at the time of on-site site servicing works needed for the development of their parcel. It is anticipated that a cost sharing agreement, ultimately reimbursing Taggart Realty for all oversize/over depth costs, will be worked out with the City of Ottawa on behalf of the upstream landowners.

There is an opportunity to cross under the Hunt Club Bridge near the eastern abutment onto the lands south of the bridge. The sewer obvert elevation at the bridge should be adjusted near the 88.50 meter range since the crushed stone sheeting at the bridge is close to the 91.0 meter elevation. There will be about 5.5 meters of headroom under the bridge.

South of the bridge, the sewer could be constructed near the toe of an existing embankment on Transport Canada land, and east of the existing stormwater management facility which straddles the federal crown land and the property owned by Dymon Management Limited (DML). Final design of the sanitary sewer will have to take into account the locations of the existing storm sewers on the Transport Canada lands and the Dymon Management lands.

The sanitary sewer will also be designed for the lands owned by the City of Ottawa and the Airport Authority. While the Dymon Management lands are on relatively high terrain (between 102 and 106 meters), some of the more southern lands, owned by the City of Ottawa and the Airport Authority, are at lower elevations. Therefore, the sections of sanitary sewer between Points C and D located on the Dymon Management property should be relatively deep to ensure as much of the study area as possible can drain by gravity to the proposed sewer. It is therefore proposed that the sewer between about MH 12 and Point D be located about 10 meters below existing grade, terminating at point D at an obvert elevation of about 96 meters. As noted earlier in this section, the storm sewer location is conceptual only at this time. At the design stage of the sewer, other route locations, such as within the Riverside Drive public right-of-way, could be further investigated.

Based on that location, Figure 5, The City of Ottawa and the Ottawa International Airport Gravity Service Limits, which is located in **Appendix E** indicates the expected limit of the City of Ottawa property that can drain by gravity to the new sewer. About 7.8 ha of the 13.81 ha of the City's property can be expected to develop with a gravity outlet. The balance will require pumping facilities to connect to the new sewer.

3.0 COST OPINION AND EASEMENTS

3.1 Cost Opinion

The proposed sanitary sewer needed to provide the outlet service to the study area is indicated on Figure 4. That sewer includes about 800 meters of 450 mm dia and 280 meters of 375 mm dia sewer. The estimated cost opinion of that sewer is \$1,608,750 and is summarized in Table 4.1.

TABLE 4.1 SANITARY SEWER COST OPINION

UNIT COST RATES (\$/M) LENGTHS (m)	SEWER SI	EGMENTS AN	D SIZES	COST SUMMARIES
	A-B 450Ø	B-MH11 450Ø	MH11-D 375Ø	
Lengths (m)	490	310	280	
Base Unit Rate (\$/m)	\$ 750	\$ 1,000	\$ 2,000	
Base Construction Cost (\$)	\$367,500	\$310,000	\$560,000	\$1,237,500
Contingency Allowance (15%)	\$ 55,125	\$ 46,500	\$ 84,000	\$ 185,625
Engineering Allowance (15%)	\$ 55,125	\$ 46,500	\$ 84,000	\$ 185,625
Total Cost Opinion (\$)	\$477,750	\$403,000	\$728,000	\$1,608,750

This estimate is based on local knowledge and the City of Ottawa Cost Estimate Classification System. Specifically, the Contingency Engineering allowances are considered Planning Level Estimates Class C based on the functional level of detail as shown on Figure 4, proposed Sanitary Sewer Plan and Profile.

3.2 Easement Requirements

The City of Ottawa, in its 2012 Sewer Design Guidelines, includes a discussion regarding acceptable easement requirements for buried infrastructure such as the proposed sanitary sewer. These guidelines indicate that for a single sanitary sewer pipe, a minimum 6.0 meter wide easement for a shallow pipe is required by the City. For pipes greater than four meters in depth, then a minimum 9.0 meter wide easement is needed pending geotechnical consideration.

After a review of the actual easement requirements for the subject sewer which will be constructed in native sandy sails, a general rule of thumb is that for every meter of buried depth, two meters will be required for surface easements. For instance, for a five meter deep sewer, a ten meter wide easement would be necessary. From MH11 to MH14, as shown on Figure 4, the sewer is proposed to be about 10 meters deep. Therefore, in that situation, a 20 meter wide easement would be necessary to meet the City of Ottawa guidelines. A geotechnical review should be completed to confirm the feasibility of those requirements.

4.0 CONCLUSION

Development of the Riverside Drive Lands over the last 30 years has provided a wastewater outlet for the study area. An existing 525 mm diameter sanitary sewer, terminated at the northern limits of the study area, has about 108 l/s available capacity for future developments both north and south of the Hunt Club Bridge.

The estimated peak wastewater flow which could be generated from the study area, when fully developed, is in the order of 33 l/s. The existing outlet sewer can be readily extended southward through the study site and provide the necessary wastewater outlet to support development of the area. It is also recommended that the sewer extension be sized to provide as much spare capacity as possible to ensure other land owners in the adjacent areas have a wastewater outlet option. Although most of the study area can drain by gravity to the proposed outlet sewer extension, portions of the southern study area will require the use of pumping facilities.

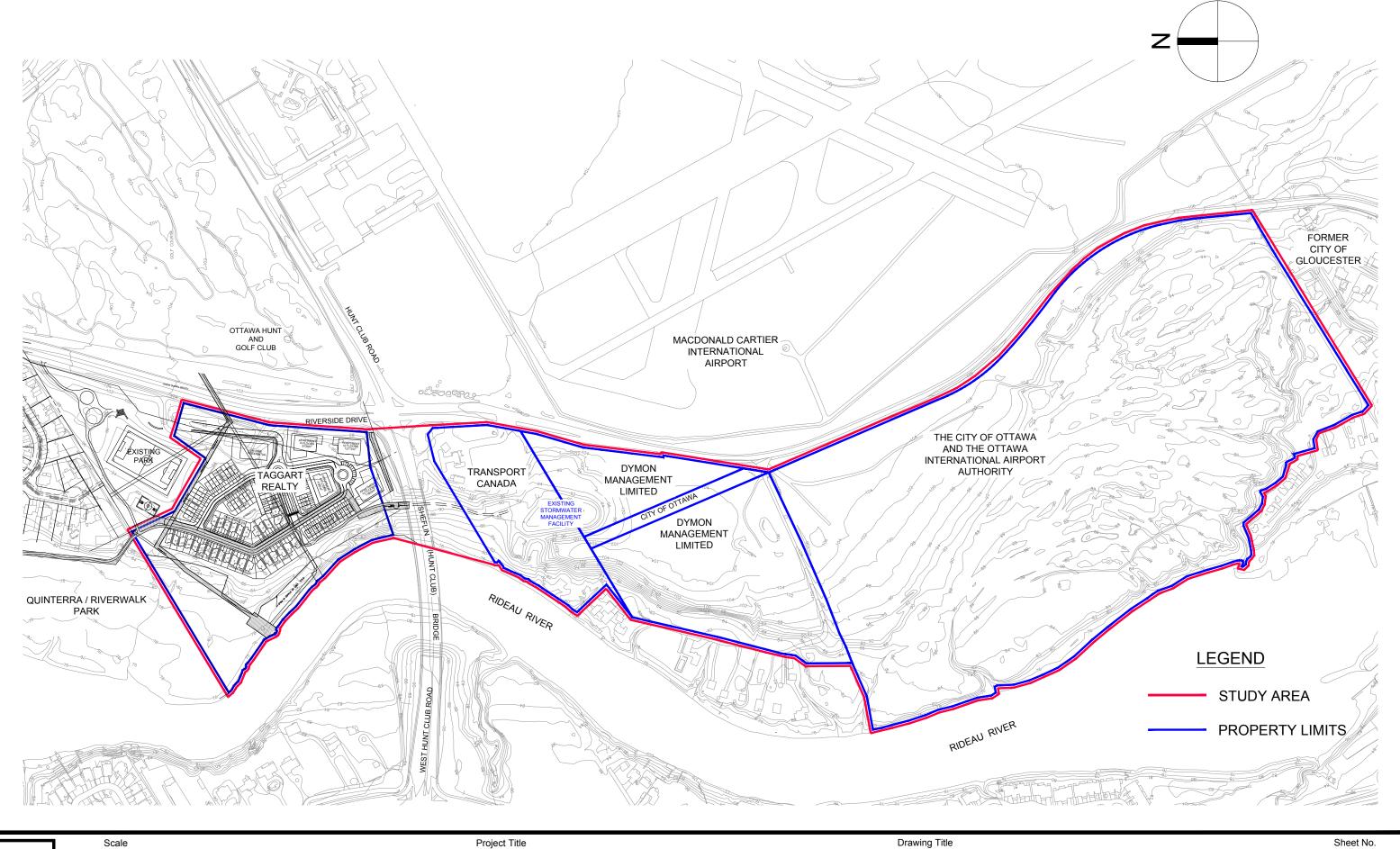
Prepared by:

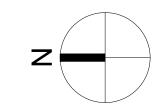


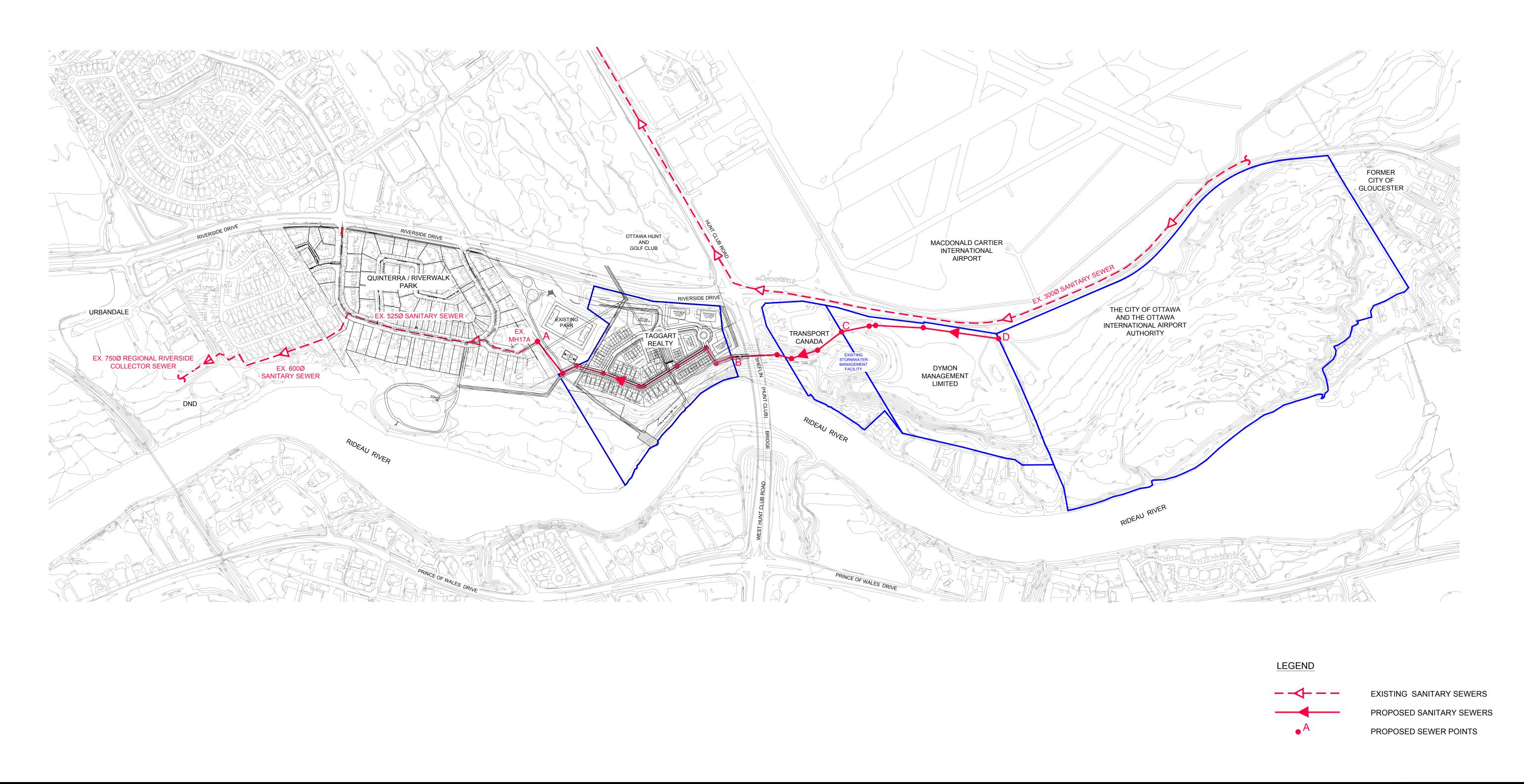
James I. Moffatt, P. Eng. Associate

APPENDIX A

- Figure 1 Study Area and Ownership
- Figure 2 Existing and Proposed Sanitary Sewers







RIVERSIDE DRIVE LANDS
SANITARY SEWER SERVICING STUDY
CITY OF OTTAWA

Drawing Title

EXISTING AND PROPOSED

SANITARY SEWERS

APPENDIX B

- Riverwalk Park Sanitary Sewer Design Sheet
- Riverwalk Park Sanitary Drainage Area Plan

SHEET DESIGN SEWER SANITARY

1 1 1 1 1 1 1 1 1 1	DESIGN: J.I.M. PROJECT: Riverwalk Park - SHEET NO. CHECKED: W.B. J. Perez Corporation - DATE: Oct. 86 City of Ottawa 3625-3 1 of 2	Rev.: March 87 CUMMING-COCKBURN & ASSOCIATES LIMITED Consulting Municipal Engineers Toronto-Ottawa-Waterloo-London-Brockville	CUMULATIVE INFILTRATION PROFILE	AVG. PEAK FLOW OF AREA TOTAL FLOW DIA. GRADE VEL. CAP. LENGTH L/Sec. FACTOR L/Sec. (ha) AREA L/Sec. L/Sec. L/Sec. L/Sec. Metres	25.18 4.00 100.70 39.42 39.42 7.88 108.60 525 0.20 0.895 200.50 -	25.27 4.88 101.88 0.51 39.93 7.99 109.07 525 0.20 0.896 200.50 49.0	25.32 4.88 181.38 8.37 48.38 8.86 189.48 525 8.28 8.895 288.58 53.8	25.36 4.88 101.49 0.11 40.41 8.08 109.50 525 0.20 0.896 200.50 28.0	1.90 6.80 11.40 1.15 1.36 9.27 11.65 250 0.50 0.863 43.61 59.5	3.82 6.80 18.13 0.73 2.09 0.42 18.54 250 0.50 0.863 43.61 39.5	3.02 6.80 18.13 8.86 2.15 8.43 18.55 258 2.80 1.929 97.70 31.8	28.40 4.00 113.60 0.10 42.66 8.53 122.10 525 0.20 0.896 200.50 38.5	38.14 4.88 128.68 1.88 43.75 8.75 129.38 525 8.28 8.896 208.58 80.8	
			CUMULATIVE	AVG. FLOW PEAK L/Sec. FACTOR	25.18 4.88	25.27 4.00	25.32 4.08	25.36 4.88	1.99 6.00	3.82 6.88	3.82 6.88	28.48 4.88	38.14 4.00	
15A 44 44 44 44 44 44 44 44 44 44 44 44 44	oord ond per hectar	family uses ents	INCREMENT	OTHER AREAS POP. (ha)		18 39.4	16 39.9	7 40.3	8.2	216 1.3	1	4 42.5	334	10 E
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3.5

1 97

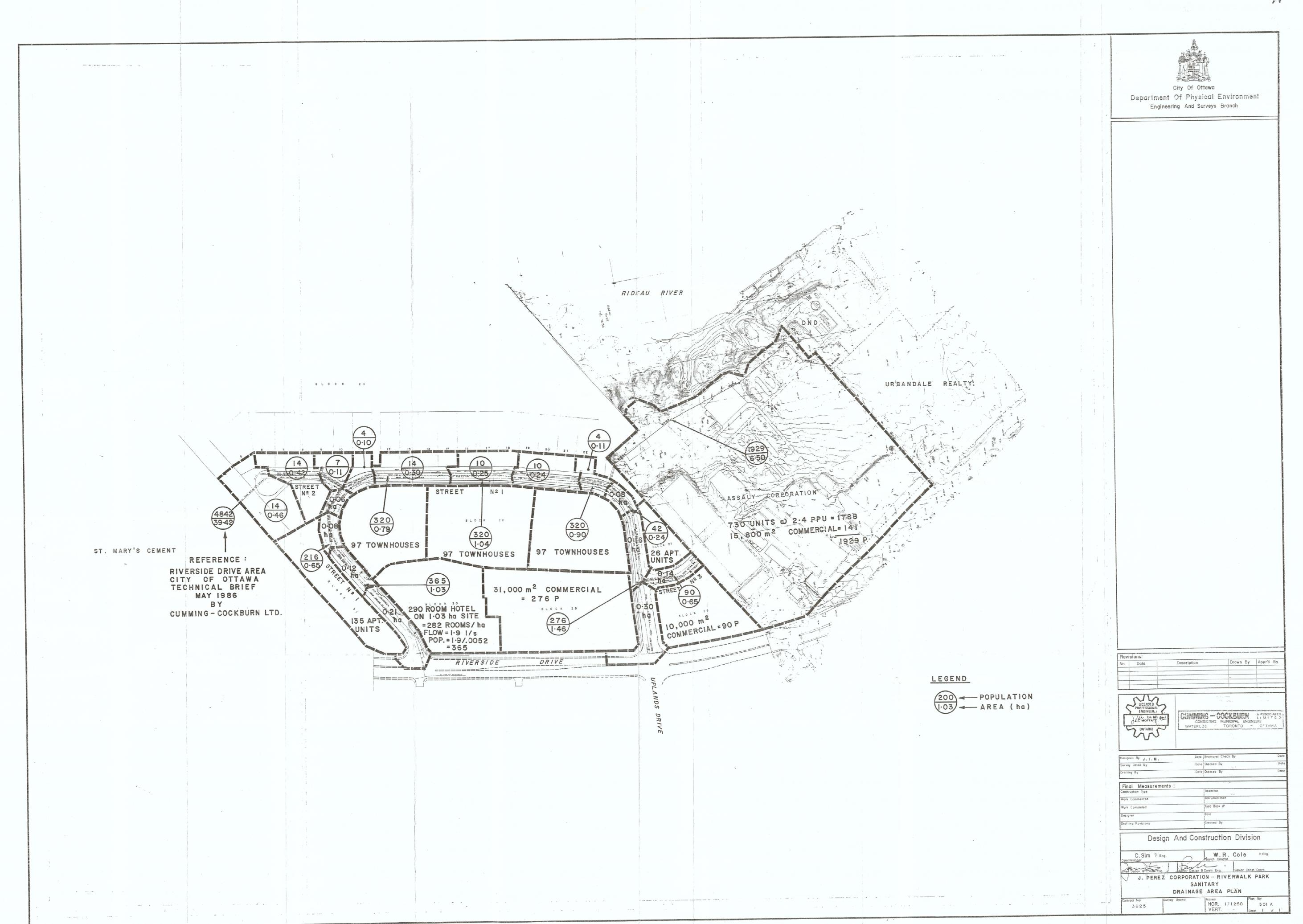
DESIGN SHEET SANITARY SEWER

Flow Per Person: Infiltration:

3.5 ppu single family 3.3 ppu townhouses 1.6 ppu apartments

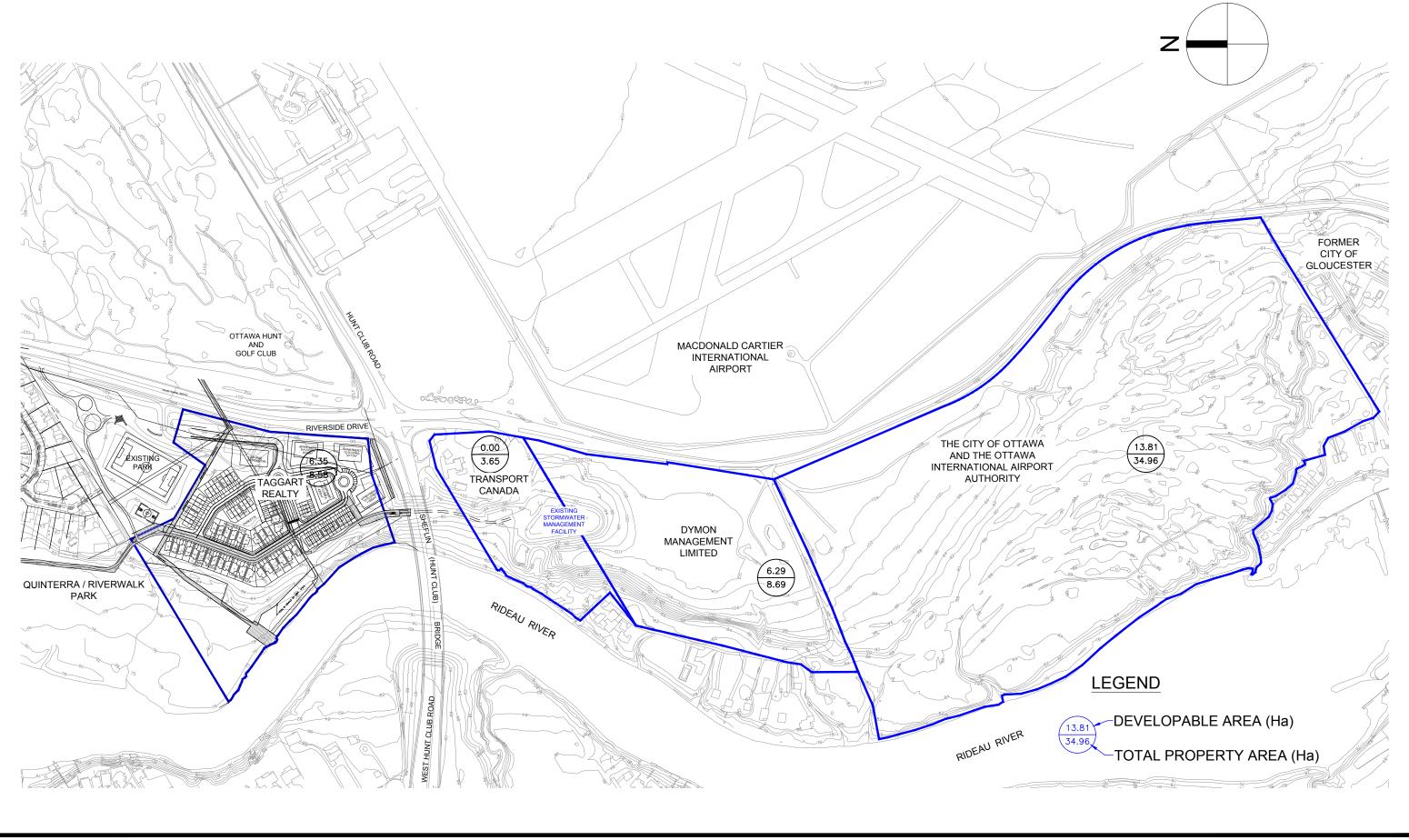
CUMMING-COCKBURN & ASSOCIATES LIMITED
Consulting Municipal Engineers
Toronto-Ottowa-Waterloo-London-Brockville CHECKED: W.B. J. PROJECT: Riverwalk Park - SHEET NO. J. Perez Corporation - DATE: Oct. 86 City of Ottawa 3625-3 2 of 2 Rev.: Jan. 87

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	CAP.	47.86	1.968 105.10	1.966 105.10	0.896 200.50	0.981 286.00							
PROFILE	VEL. CAP.	8.945	1.966	1.966	0.896	0.981							
	GRADE (X)	0.60	2.98	2.90	9.20	8.20							
	PIPE DIA. (mm)	258	258	258	525	668							
	FLOW PIPE DIA.	2.97	11.93	13.32	152.68	11.18 194.18							
	FLOW L/Sec.	9.16	9.51	8.59	9.86	11.18							
INFILTRATION		8.79	2.71	3.03	49.32	55.92							
INFI	INCR. OF AREA TOTAL (hg) AREA	9.79	1.62	0.32	1	6.58							
	PEAK FLOW L/Sec.	2.81	11.42	12.73	142.88	183.88							
TIVE	PEAK	6.00	6.00	6.00	4.99	4.00					,		
CUMULATIVE	AVG. FLOW PEAK L/Sec. FACTOR	0.47	1.98	2.12	35.78	45.78							
	PoP.	96	366	408	6868	8797							
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NI	UNIT POP. DENSITY			1.6	1								
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MANHOLE	FROM	14A	12A	114	104	19A							
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	707	Street No.	Street		Assaly								



APPENDIX C

- Figure 3 Drainage Area Plan
- Sanitary Sewer Design Sheet



IBI

Scale

Project Title

Drawing Title

Sheet No.

FIGURE 3



IBI GROUP 400-333 Preston Street Ottawa, Ontario K1S 5N4 Canada tel 613 225 1311 fax 613 225 9668 ibigroup.com

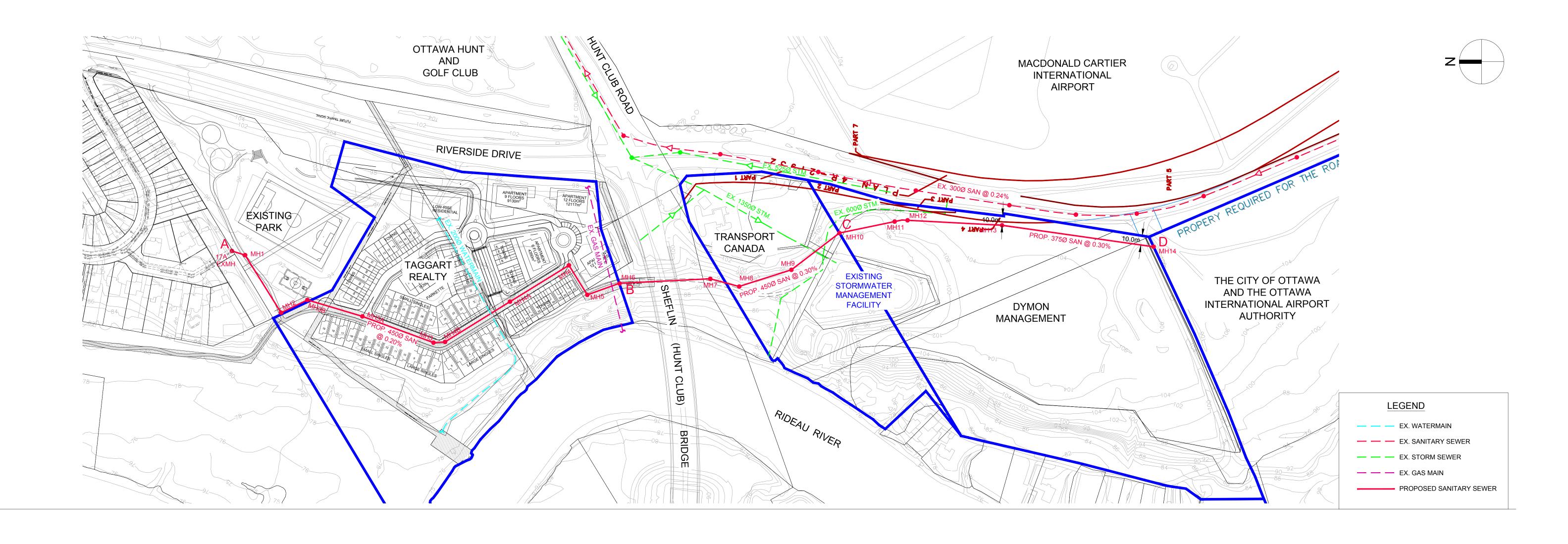
SANITARY SEWER DESIGN SHEET

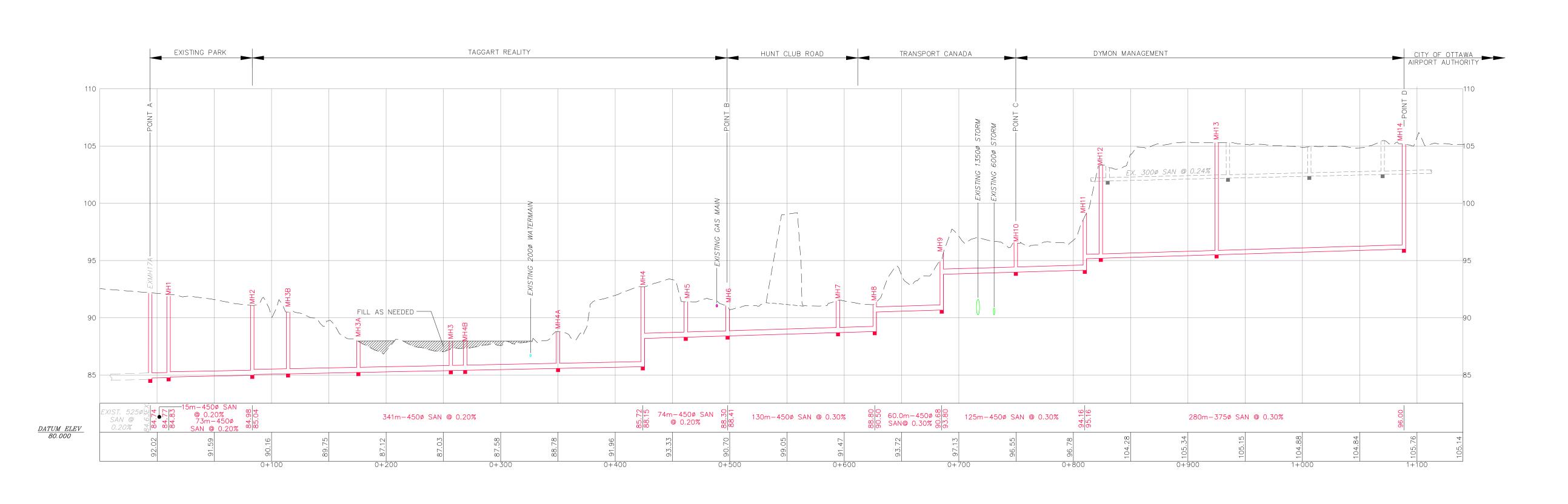
Riverside Drive Lands CITY OF OTTAWA Sanitary Sewer Servicing Study

	LOCATION						RESIDE	NTIAL								ICI A	REAS					RATION ALL		FIXED FL	OW /I /e)	TOTAL			PROPOS	SED SEWER	DESIGN		
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STREET	FROM	TO	w/ Units	SF	SD	TH	APT	w/o Units	IND	CUM	PEAK	FLOW	INSTITU	JTIONAL				STRIAL	PEAK	FLOW	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full)	CAP	ACITY
OTHEET	MH	MH	(Ha)	٠.	- 05		~ .	(Ha)		00	FACTOR	(L/s)	IND	CUM	IND	CUM	IND	CUM	FACTOR	(L/s)		00	(23)		00	(23)	(23)	(,	()	(74)	(m/s)	L/s	(%)
																																	Ь—
No External Drainage Areas		Point D - MH14	1																							1							\vdash
City of Ottawa/Airport Authority	Point D - MH1-	4 MH11							0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	13.81	13.81	1.50	8.39	13.81	13.81	4.56	0.00	0.00	12.95	39.24	280.00	250	0.40	0.774	26.29	67.00%
Dymon Management Limited	MH11	Point B - MH6							0.0	0.0	3.80											20.10		0.00	0.00				250	0.40	0.774		51.97%
Transport Canada/Hunt Club Road																																	
	Point B - MH6								0.0	0.0	3.80	0.00	0.00			0.00	0.00	20.10	1.50		0.00	20.10	6.63	0.00	0.00	18.85	39.24	355.00	250	0.40	0.774	20.39	51.97%
Taggart Realty	MH2	Point A Ex MH17A	6.35	30		48	490		1113.6	1113.6	3.22	11.60	0.00	0.00	0.00	0.00	0.00	20.10	1.50	12.21	6.35	26.45	8.73	0.00	0.00	32.55	55.26		300	0.30	0.757		41.10%
			1																		-					1	200.65	0.00	525	0.20	0.898	200.65	100.00%
External Drainage Areas		Point D - MH14							0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	65.00	65.00	1.50	39.50	65.00	65.00	21.45	0.00	0.00	60.95							
City of Ottawa/Airport Authority	Point D - MH1-	4 MH11							0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	13.81	78.81	1.50	47.89	13.81	78.81	26.01	0.00	0.00	73.90	100.18	280.00	375	0.30	0.879	26.29	26.24%
Dymon Management Limited	MH11	Point B - MH6							0.0	0.0	3.80	0.00	0.00	0.00	0.00	0.00	6.29	85.10	1.50	51.71	6.29	85.10	28.08	0.00	0.00	79.79	162.91	315.00	450	0.30	0.992	83.12	51.02%
Transport Canada/Hunt Club Road																																	
	Point B - MH6								0.0	0.0	3.80		0.00	0.00	0.00	0.00		85.10		51.71	0.00	85.10	28.08	0.00	0.00	79.79	133.02		450	0.20	0.810	53.22	40.01%
Taggart Realty	MH2	Point A Ex MH17A	6.35	30		48	490		1113.6	1113.6	3.22	11.60	0.00	0.00	0.00	0.00	0.00	85.10	1.50	51.71	6.35	91.45	30.18	0.00	0.00	93.49			450	0.20	0.810		29.71%
																											200.65	0.00	525	0.20	0.898	200.65	100.00%
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APPENDIX D

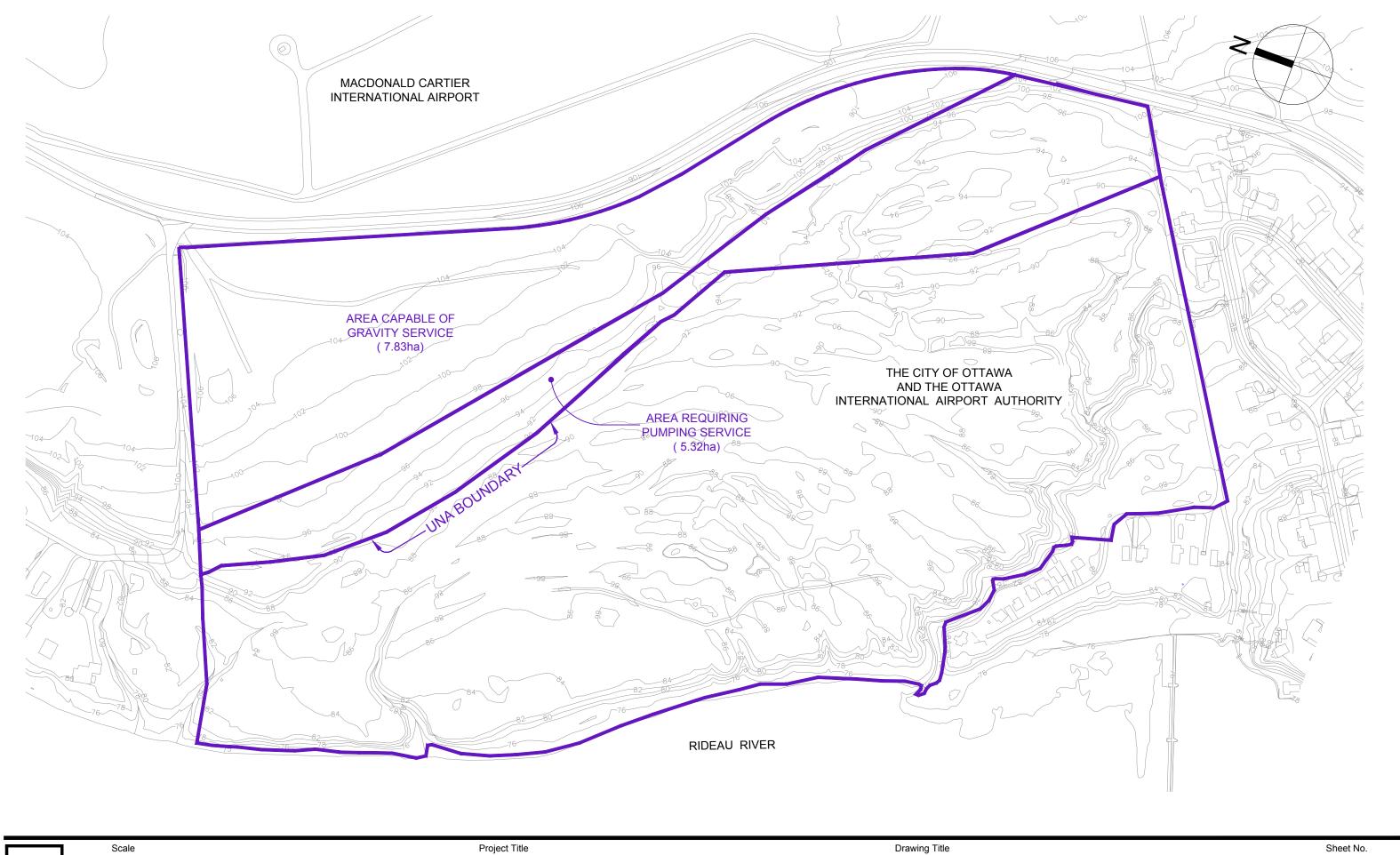
• Figure 4 – Proposed Sanitary Sewer Plan and Profile





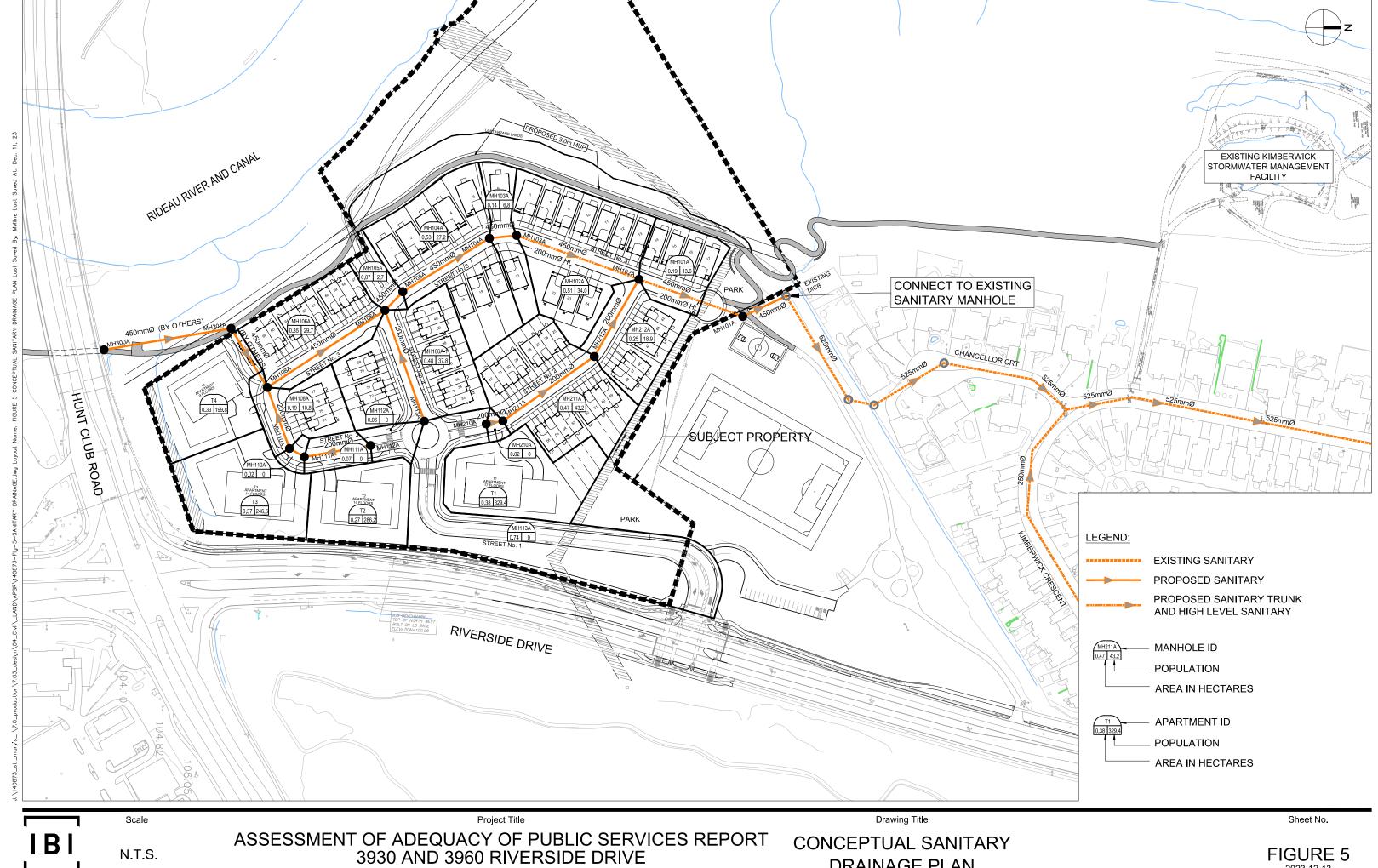
APPENDIX E

 Figure 5 – The City of Ottawa and The Ottawa International Airport Authority Gravity Service Limits



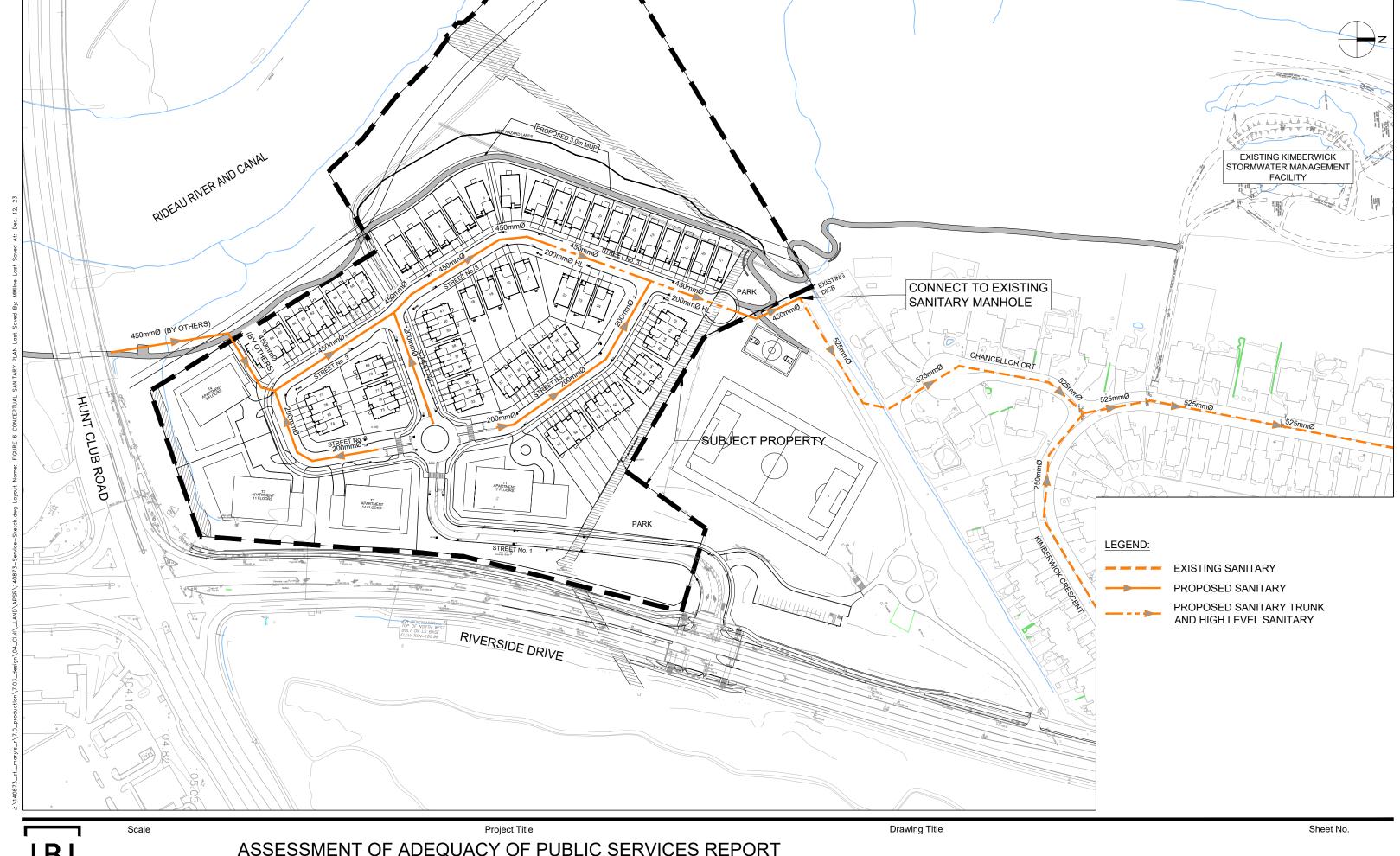
1:5000

THE CITY OF OTTAWA AND THE OTTAWA INTERNATIONAL AIRPORT AUTHORITY **GRAVITY SERVICE LIMITS**

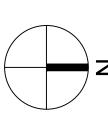


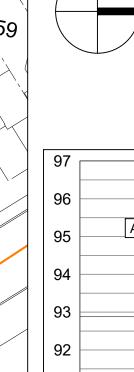
DRAINAGE PLAN

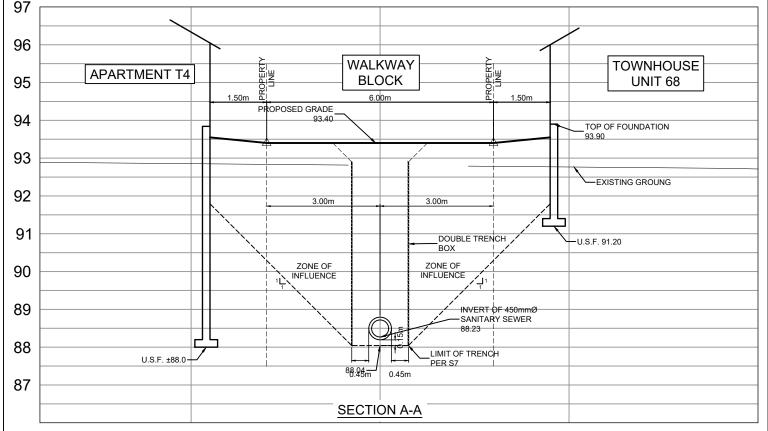
FIGURE 5

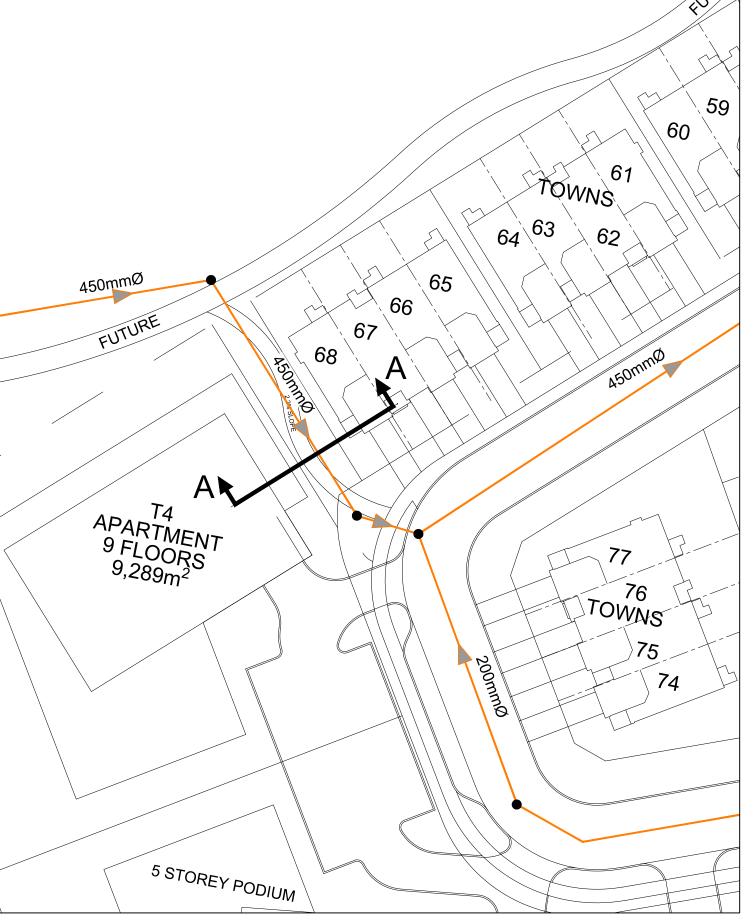


IBI









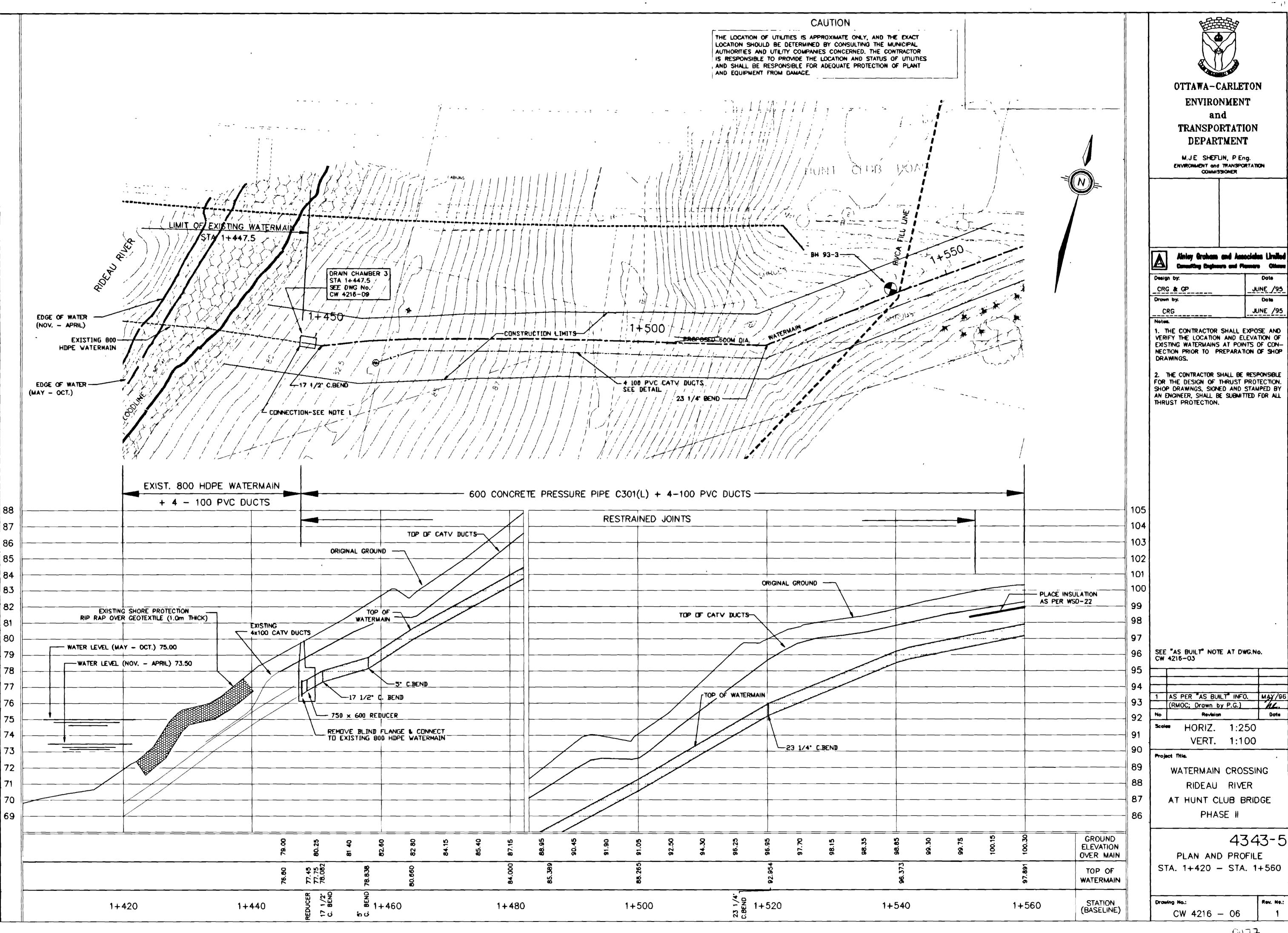
SANITARY SEWER DESIGN SHEET



IBI GROUP
500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Riverside Park City of Ottawa St. Mary's Lands Corporation

								RESIDI	ENTIAL									ICI AREAS					INFILTRA	ATION ALLO	OWANCE			TOTAL			PROPO	SED SEWER	DESIGN		
	LOCATION			AREA		UNIT	TYPES		AREA	POPU	LATION	RES	PEAK			AF	REA (Ha)			IC	I PEA	K	AREA	(Ha)	FLOW	FIXED F	LOW (L/s)	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAII	LABLE
STREET	AREA ID	FROM MH	TO MH	w/ Units (Ha)	SF	TH/SD	Tower UNIT	2 Bed APT	w/o Units (Ha)	IND	СПМ	PEAK FACTOR	FLOW (L/s)	INSTIT	CUM	IND	MERCIAI CU		D CUN	PEA FACT	I		IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	CAP.	ACITY (%)
Street 3		MH112A	MH111A	0.27			159		0.13	286.2	286.2	3.47	3.22	0.00	0.0	0.00						<u> </u>	0.40	0.4	0.13	0.00	0.0	3.35	34.22	39.44	200	1.00	1.055	30.87	90.21%
Street 3		MH111A MH110A	MH110A	0.37		1	137		0.02	246.6	532.8	3.37	5.82	0.00	0.0	0.00							0.39	0.8	0.26	0.00	0.0	6.08	34.22	9.97	200	1.00	1.055	28.14	82.24%
Street 3		IVITTOA	MH108A	0.52		4	111			210.6	743.4	3.30	7.96	0.00	0.0	0.00	0.0	0.0	0.0	1.0	0.0	0	0.52	1.3	0.43	0.00	0.0	8.39	34.22	38.11	200	1.00	1.055	25.83	75.48%
By Others		MH297A	MH298A							0.0	0.0	3.80	0.00	0.00	0.0	0.00	0.0	.0 85.	10 85.1	1.5	0 51.7	71 8	85.10	85.1	28.08	0.00	0.0	79.79	133.02	58.53	450	0.20	0.810	53.22	40.01%
By Others		MH298A	MH299A							0.0	0.0	3.80	0.00	0.00	0.0	0.00	0.0	0.0	0 85.1	1.5	0 51.7	71	0.00	85.1	28.08	0.00	0.0	79.79	133.02	32.04	450	0.20	0.810	53.22	40.01%
By Others		MH299A	MH300A							0.0	0.0	3.80	0.00	0.00	0.0	0.00	0.0	0.0		1.5	0 51.7		0.00	85.1	28.08	0.00	0.0	79.79	133.02	59.64	450	0.20	0.810	53.22	40.01%
By Others										0.0	0.0	3.80	0.00	0.00	0.0	0.00	0.0						0.00	85.1	28.08	0.00	0.0	79.79	133.02	75.61	450	0.20	0.810	53.22	40.01%
By Others		MH301A	MH108A							0.0	0.0	3.80	0.00	0.00	0.0	0.00	0.0	0.0	0 85.1	1.5	0 51.7	<u>′1</u>	0.00	85.1	28.08	0.00	0.0	79.79	133.02	40.62	450	0.20	0.810	53.22	40.01%
Street 3		MH108A	MH106A	0.35		11				29.7	773.1	3.30	8.26	0.00	0.0	0.00	0.0	0.0	0 85.1	1.5	0 51.7	71	0.35	86.8	28.63	0.00	0.0	88.60	133.02	82.57	450	0.20	0.810	44.42	33.39%
Street 4		MH113A	MH106A	0.48		14				37.8	37.8	3.67	0.45	0.00	0.0	0.00	0.0	.0 0.0	0 0.0	1.0	0 0.0	0	0.48	0.5	0.16	0.00	0.0	0.61	34.22	69.04	200	1.00	1.055	33.61	98.22%
Sireel 4		IVITTISA	IVINTUGA	0.40		14				37.0	37.0	3.07	0.45	0.00	0.0	0.00	0.0	0.0	0.0	1.0	0.0	<u> </u>	0.40	0.5	0.10	0.00	0.0	0.01	34.22	09.04	200	1.00	1.055	33.01	90.22%
Street 3		MH106A	MH105A	0.07		1				2.7	813.6	3.28	8.66	0.00	0.0	0.00	0.0	0.0	0 85.1	1.5	0 51.7	71	0.07	87.3	28.81	0.00	0.0	89.18	133.02	15.09	450	0.20	0.810	43.83	32.95%
Street 3		MH105A	MH104A	0.53	8					27.2	840.8	3.28	8.93	0.00	0.0	0.00	0.0	0.0	0 85.1	1.5	0 51.7	71	0.53	87.8	28.99	0.00	0.0	89.63	399.05	59.68	450	1.80	2.431	309.42	77.54%
Street 3			MH103A	0.14	2					6.8	847.6	3.28	9.00	0.00	0.0	0.00				1.5			0.14	88.0	29.03	0.00	0.0	89.74	210.32	16.05	450	0.50	1.281	120.57	57.33%
Street 3 - High Level			MH102A-1	0.51	10					34.0	34.0	3.68	0.41	0.00	0.0	0.00	_						0.51	0.5	0.17	0.00	0.0	0.57	24.19	76.21	200	0.50	0.746	23.62	97.63%
Street 3		MH103A	MH102A							0.0	847.6	3.28	9.00	0.00	0.0	0.00	0.0	0.0	0 85.1	1.5	0 51.7	71	0.00	88.0	29.03	0.00	0.0	89.74	210.32	76.21	450	0.50	1.281	120.57	57.33%
Street 2		MH210A	MH211A	0.38			183		0.02	329.4	329.4	3.45	3.68	0.00	0.0	0.00	0.0	0.0	0.0	1.0	0.0	0	0.40	0.4	0.13	0.00	0.0	3.81	34.22	9.96	200	1.00	1.055	30.40	88.85%
Street 2		MH211A	MH212A	0.47		16				43.2	372.6	3.43	4.14	0.00	0.0	0.00	0.0	0.0	0.0	1.0	0.0	0	0.47	0.9	0.29	0.00	0.0	4.43	34.22	65.56	200	1.00	1.055	29.79	87.06%
Street 2		MH212A	MH102A	0.25		7				18.9	391.5	3.42	4.34	0.00	0.0	0.00	0.0	0.0	0.0	1.0	0.0	0	0.25	1.1	0.37	0.00	0.0	4.71	34.22	52.38	200	1.00	1.055	29.51	86.23%
Sani Outlet -High Level		MH102A-1	MH101A	0.19	4					13.6	13.6	3.72	0.16	0.00	0.0	0.00	0.0	0.0	0.0	1.0	0 0.0	0	0.19	0.2	0.06	0.00	0.0	0.23	24.19	64.68	200	0.50	0.746	23.97	99.06%
Sani Outlet		MH102A	MH101A							0.0									0 85.1				0.00	89.6	29.57		0.0	94.42	133.02	64.68	450	0.20	0.810	38.60	29.02%
Sani Outlet		MH101A	EX. MH100/	A						0.0									0 85.1			71	0.00	89.8	29.63	0.00	0.0	94.61	133.02	28.13	450	0.20	0.810	38.41	28.87%
Existing		EX. MH100A	EX MH3							0.0	1286.7	3.18	13.27	0.00	0.0	0.00	0.0	.0 0.0	0 85.1	1.5	0 51.7	71	0.00	89.8	29.63	0.00	0.0	94.61	200.65	70.89	525	0.20	0.898	106.04	52.85%
Existing		EX MH3	EX MH2						1	0.0	1286.7		13.27	0.00	0.0	0.00							0.00	89.8	29.63	0.00	0.0	94.61	200.65	15.43	525	0.20	0.898	106.04	52.85%
Existing		EX MH2	EX MH1							0.0	1286.7		13.27	0.00		0.00	_						0.00	89.8	29.63	0.00	0.0	94.61	200.65	47.87	525	0.20	0.898	106.04	52.85%
										 			1	_													1				525				
		_								+		_		+						_							1								
Design Parameters:				Notes:						1	<u> </u>	Designed	<u> </u> :	AB			No	0.						R	Revision								Date		
- J					gs coefficient	t (n) =		0.013						_			1.			Report	Name (Mast	er Servicii	ing Study.	- '	of Public Servi	ices, Servicin	g Brief, ect) -	Submission	No. 1				2022-12-06		
Residential		ICI Areas			d (per capita)	` '	280	0 L/day	200) L/day							2	2		· · ·			<u> </u>		2nd Submissio		<u> </u>						2023-09-26		
SF 3.4 p/p/u					on allowance	•		3 L/s/Ha		-		Checked:		TB			3	3						APSR 3	3rd Submissio	n							2023-12-13		
TH/SD 2.7 p/p/u	SD 2.7 p/p/u INST 28,000 L/Ha/day 4. Residential Peaking Factor:																							_					_						
T UNIT 1.8 p/p/u		00 L/Ha/day	1405.0					000)^0.5))0.8	}					1100=0	00																				
2 Bed 2.1 p/p/u		00 L/Ha/day	MOE Chart			= 0.8 Correct		a a a a a a a a a a a a a a a a a a a				Dwg. Refe	erence:	140873-4	00			Ella D. C								Data							Okast N		
Other 60 p/p/Ha	1/00	00 L/Ha/day			rcial and Insti			sea on total	area,									File Ref								Date:	2						Sheet No:		
				1.5 If (greater than 2	20%, otnerwi	ise 1.0											140873-	5.04.04							2022-12-06	0						1 of 1		



APPENDIX C

SHEET N O I S ш Ω œ w * S M STORM

 $Q=2.78~\mathrm{AIC}$ WHERE $Q=\mathrm{Ped}\,\mathrm{K}\,\mathrm{Flow}$ in Litres Per Second (L/S)

A = Area in Hectares (ha)
I = Rainfail Intensity in Millimetres Per Hour (MM/HR)
C = Runoff Coefficient

Rev.: .013 DESIGN n =

March 87 Sept. 87

CUMMING-COCKBURN & ASSOCIATES LIMITED Consulting Municipal Engineers

DESIGN: J.I.M.
CHECKED: W.B.
DATE: Oct. 86

LOCATION			INC	INCR. AREA	ď		CONCEN	CONCENTRATION TIME	TIME			10101	10-011	SEW	SEWER DATA	loronto-Uttowa-Waterloo-London-Brockville SEWER DATA	
STREET	FROM M.H.	T0 M.H.	HECTARE	1 U	2.78 Ac	ACCUM. 2.78 Ac	INLET	IN	TOTAL	RAINFALL INTENSITY I (MM/HR)	PEAK FLOW Q (L/S)	TYPE OF PIPE	PIPE	SLOPE	LENGTH (M)	SLOPE LENGTH CAPACITY VELOCITY % (M) (L/S) (M/S)	VELOCITY (M/S)
Street No. 1	-	7	9.12	0.89	9.27												
			8.28	0.70	0.39	9.66	15.00	0.26	15.26	86.68	52.80	Conc.	300	5.88	47.5	225.7	3.10
	2	3	1,34	0.70	2.61	3.27	15.26	0.43	15.69	79.50	260.00	Conc.	450	1.60	59.5	376.7	2.29
	٤	4	6.43	0.70	0.84	4.11	15.69	0.29	15.98	78.60	320.60	Conc.	450	1.60	40.5	376.7	2.29
	4	5	9.96	0.70	9.12	4.23	15.98	9.18	16.16	77.88	325.70	Conc.	450	3.88	33.5	515.4	3.14
Street No. 2	17	15	88.6	0.45	1.10	1.19	15.88	9.95	15.95	80.08	88.00	Conc.	366	1.80	79.8	161.1	1.38
	15		9.11	9.45	9.14	1.24	15.95	8.31	16.26	78.80	96.72	Conc.	366	1.88	26.8	101.1	1.38
Street No. 1	တ	ð	8.18	9.45	9.13	5.60	16.26	0.21	16.47	77.00	431.20	Conc.	458	3.00	39.8	515.4	3.14
Assaly Property (Street No. 3)	l	4+	3.41	9.62	5.87						1.C. = 19.	19.87 min.					-
Street No. 3	14	12	6.79	0.70	1.54	7.41	19.87	0.46	28.33	67.50	500.20	Conc.	758	0.25	35.0	580.6	1.27
Street No. 1	13	12	9.14	08.80	0.31												
			9.16	8.78	8.31	9.62	12.68	0.37	12.37	92.00	57.04	Conc.	398	4.00	62.0	201.9	2.77
	12	1.1	1.62	8.79	3.15	11.18	20.33	6.46	0.46 20.79	66.70	745.70	Conc.	750	1.28	77.5	1272.0	2.79

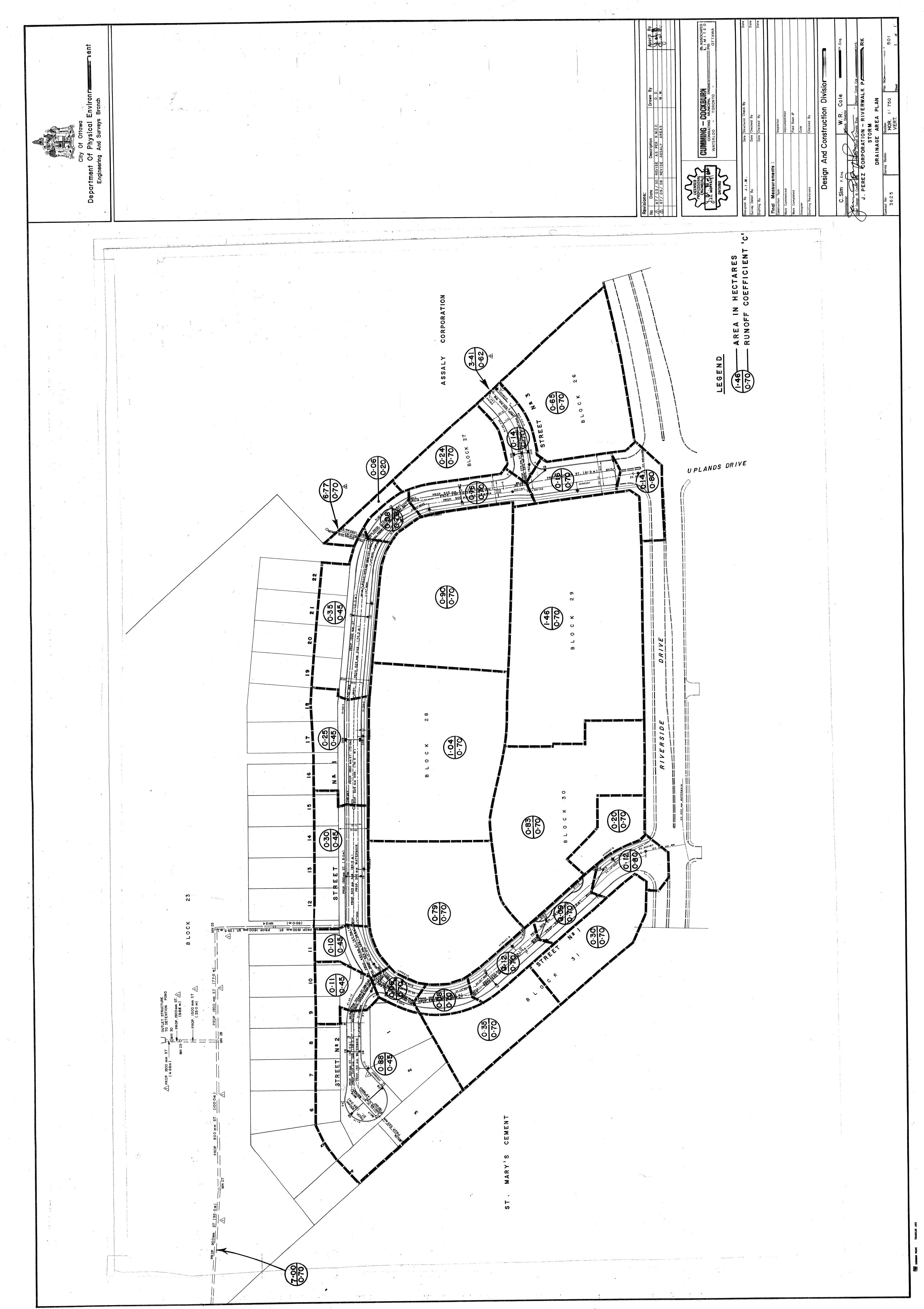
SHEET DESIGN SEWER STORM

Q = 2.78 AIC
WHERE Q = Peak Flow in Litres Per Second (L/S)
A = Area in Hectares (ha)
I = Rainfall Intensity in Willimetres Per Hour (MM/HR)
C = Runoff Coefficient

DESIGN n =

		DESIGN:	. ¥. I . ك	DESIGN: J.I.M. PROJECT: Riverwalk Park - SHEET NO.	
		CHECKED	.a. æ.	CHECKED: W.B. J. Perez Corporation —	
		DATE:	Oct. 86	DATE: Oct. 86 City of Ottawa 3625-3 2 of 2	
				Control Contro	1
ŧ.	Же.:	Rev.: March 87		CUMMING-COCKBURN & ASSOCIATES LIMITED	
		March 31/87	87	Consulting Municipal Engineers	
		Sept. 87		Toronto-Ottawa-Waterioo-London-Brockviile	•

	γ														
	/ELOCITY (M/S)	2.79		1.43		1.57		1.57	1.57	1.81		1.58	2.83		
	CAPACITY VELOCITY (L/S)	1272.0		1274.0		2857.0		2857.0	2857.0	3296.0		1034.0	3687.0		
SEWER DATA	LENGTH C	37.5		24.0		110.0		72.0	82.5	165.5		197.5	34.8		
SEWER	SLOPE LE	1.29		6.29		6.15 1		0.15	6.15	6.20 1		0.30	9.25		
	PIPE S	750		1050		1500		1500	1588	1500		998	1500	`	
	TYPE OF P	Conc.	.13 min.	Conc.		Conc.		Conc.	Conc.	Conc.		Conc.	Conc.		
	PEAK FLOW T Q T (L/S)	775.30	T.C. = 23,1	814.40		1894.66		1995.60	1986.00	2416.00	18.33 min.	967.98	3450.00		
	RAINFALL PE INTENSITY I (MM/HR)	65.70	<u> </u>	81.78		78.89		68.88	67.40	66.88	.50m/sec.	71.88	68.70		
	TOTAL I	20.01		23.41		24.58		25.34	26.22	27.74	388m/1.	20.41	28.03		
CONCENTRATION TIME	IN PIPE	9.22 2		0.28		1.17		9.76	88.9	1.52	5.88 +	2.98	9.29		
ONCENT	ļ	20.79		23.13		23.41		24.58	25.34	26.22	T.C. = 1	18.33	27.74		
-	ACCUM. 2.78 Ac INLET	11.86		13.20		26.75		29.68	29.46	36.69	Ţ- <u>;</u>	13.62	50.22		
	.78 Ac	8.62	13.17	6.63	9.44	1.75	9.31	2.82	9.38	1.54		13.62	1		
INCR. AREA	*°°	9.79	9.78	0.20	9.45	0.70	9.45	9.70	0.45	9.70		9.78	1		
INC	HECTARE	6.32	6.77	98.8	9.35	8.98	0.25	1.04	6.38	8.79		7.08	1		
	10 H		10		8	 		1.	9	28		28	outlet		
	FROM	=	North	Bulkhead 	10		8		7			26	28		
LOCATION	TERRITO		Assolv Property		Street No. 1						** Mary's Cement			100000000000000000000000000000000000000	- Andrew - A
	$oldsymbol{oldsymbol{oldsymbol{oldsymbol{eta}}}$,		A S S S		+ 0				3)	t	;			





Ministry of the Environment

Ministère FEB 137

AMÉNDMENT TO CERTIFICATE OF APPROVAL MUNICIPAL AND PRIVATE SEWAGE WORKS NUMBER 3-0842-87-006 Notice No. 1

Claridge Homes (Briar Ridge) Inc. 210 Gladstone Avenue, No. 201 Ottawa, Ontario K4B 1H9

Site Location: Riverwalk Park Subdivision

Kimberwick Crescent

Ottawa City,

You are hereby notified that I have amended Certificate of Approval No. 3-0842-87-006 issued on December 28, 1988 for construction of stormwater management facilities consisting of a primary settling pond and secondary marsh treatment pond, as follows:

modification to raise the height of the overflow weir to an elevation of approximately 76.75 metres;

all in accordance with the application for approval dated December 12, 2001, and supporting information and documentation prepared by Novatech Engineering Ltd., Consulting Engineers and Planners.

This Notice shall constitute part of the approval issued under Certificate of Approval No. 3-0842-87-006 dated December 28, 1988

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

- 1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
- 2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;
- 8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, Ontario Water Resources
Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 7th day of February, 2002

THIS NOTICE WAS MAILED

ON Ell 11, 2002

Oc (Signed)

Miles A Platte R Fa

Mohamed Dhalla, P.Eng.

Director

Section 53, Ontario Water Resources Act

AM/

: District Manager, MOE Ottawa

Greg MacDonald, Novatech Engineering Consultants Ltd.

NOTES: GENERAL

1. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS AND OPS DRAWINGS AND SPECIFICATIONS, UNLESS OTHERWISE NOTED.

2. CONTRACTOR IS TO PROCURE COPIES OF THE STANDARDS AND KEEP ON SITE.

3. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.

4. THE ORIGINAL TOPOGRAPHY AND GROUND ELEVATIONS, SERVICING AND SURVEY INFORMATION SHOWN ON THIS PLAN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACCURACY OF ALL INFORMATION OBTAINED FROM THIS PLAN.

5. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.

6. BEFORE COMMENCING CONSTRUCTION, PROVIDE PROOF OF COMPREHENSIVE ALL RISK AND OPERATIONAL LIABILITY INSURANCE INCLUDING BLASTING. INSURANCE POLICY TO NAME THE OWNER, ENGINEER, MUNICIPALITY AND THE COUNTY AS CO-INSURED. AMOUNT OF INSURANCE TO BE SPECIFIED BY OWNER'S AGENT.

7, PRIOR TO ANY ROCK EXCAVATION, CONTRACTOR IS REQUIRED TO COMPLETE A PRE-CONSTRUCTION SURVEY.

8. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION, PROTECT AND ASSUME ALL RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON

9. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CIT OF OTTAWA BEFORE COMMENCING CONSTRUCTION.

10. RESTORE ALL SURFACE FEATURES TO EXISTING CONDITIONS OR BETTER AND TO THE SATISFACTION OF THE CITY OF

11. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.

12. SIDE SLOPES FOR ALL EXCAVATIONS ARE TO BE IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFTY ACT (ONTARIO REGULATION 213/91).

13. THE OWNER AGREES TO PREARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS AND DURING ALL PHASES OF THE SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MH & CBS TO PREVENT SEDIMENT FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.

NOTES: GRADING

1. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER.

2. GRADE AND/OR FILL WHERE REQUIRED.

3. MATCH EXISTING ELEVATIONS UNLESS OTHERWISE NOTED.

4. ENBURE POSITIVE DRAINAGE FROM SHORELINE AND BERM INTO STORMWATER PONDWHETHER INDICATED OR NOT.

5. MINIMUM OF 0.5% AND MAXIMUM OF 8% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.

6. MAXIMUM TERRACING GRADE IS 3:1.

NOTES: SOIL ANALYSIS

1. SOIL MATRIX INVESTIGATION - RIVERWALK STORM WATER FACILITY KIMBERWICK CRESCENT. OTTAWA, ONTARIO

-ACCUTEST: REP.# 2709961. MAY, 2007.

SITE BENCHMARK:

EXISTING FIRE HYDRANT - TOP OF FLANGE. EAST SIDE OF MALHOTRA CRESCENT, SIX HOUSES NORTH OF CUL-DU-SAC.

DERIVED FROM:

NOVATECH ENGINEERING AS-BUILTS PLAN 95023 P2. RIVERWOOD LANDINGS (STA 1+400 TO 1+503.93)

& BREECH AND DIRECTION OF FLOW GENERAL POND FLOW DIRECTION EXISTING CONCRETE HEADWALL

MANHOLE EXISTING SANITARY SIDESLOPES

GABIONS SURVEY - MAY.2007 BERM ELEVATION EXISTING POND WATER LINE

EXISTING CENTRE LINE OF BREECH EXISTING CENTRE LINE OF CONCRETE EXISTING TOP OF SEDIMENT STOCK PILE

OF SEDIMENT STOCK PILE EXISTING WATER HEAD WALL SURVEY CONTROL POINT

SURVEY - NOVEMBER, 2007 (POST POND CLEAN-OUT)

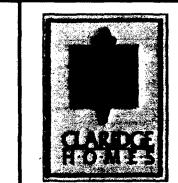
EXISTING TOP OF SLOPE/BERM EXISTING ORIGINAL GROUND EXISTING BOTTOM OF EXISTING WATER EXISTING BOTTOM OF EXISTING TOP OF

EXISTING CONCRETE EXISTING OBVERT OF CONCRETE CULVERT EXISTING POND TOP OF SLOPE

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK,

DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL

LIABILITY FOR DAMAGE TO THEM.





COUTLET STRUCTURE

WITH ROCK AND

(Aprox. Lac. Only)

STOPLOGS

LWOODEN PEDESTRIAN

BOARD WALK (Aprox. Loc. Only)

DRAINAGE POND 09

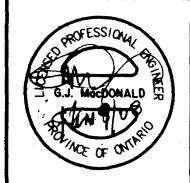
	·		
	,		
2	ISSUED FOR FINAL APPROVAL AND TAKE OVER BY	JAN, 08	GMacD
- 1	ISSUED FOR SWF TAKE OVER BY CITY	JUN , 07	GMacD
No.	REVISION	DATE	BY

APROX LOCATION
OF TOP OF BANK

PEDESTRIAN FOOT PATH____/

MIXED BRUSH

GRASS AND TREES



MIXED BRUSH GRASS AND



T D. T R S Drive CHECKED APPROVED		
T D. CR S Drive CHECKED 643 867 APPROVED		CHECKED
CHECKED 643 APPROVED		DRAWN
CHECKED CHECKED APPROVED APPROVED		DIA.
643 APPROVED	RS	
867 APPROVED	Drive	CHECKED
867 APPROVED	643	•
am		APPROVED
O.I.	om	

GMacD	SCALE	CITY OF OTTAWA
GMacD	1: 300	RIVER WALK STORM WATER FACILITY (Kimberwick Cre
MWC	1. 300	FACILITY (KIMDERWICK Cre
GMacD		GRADING AND SERVICING P
GM acD		CLEAN OUT AND BERM REPAIRS, 2007

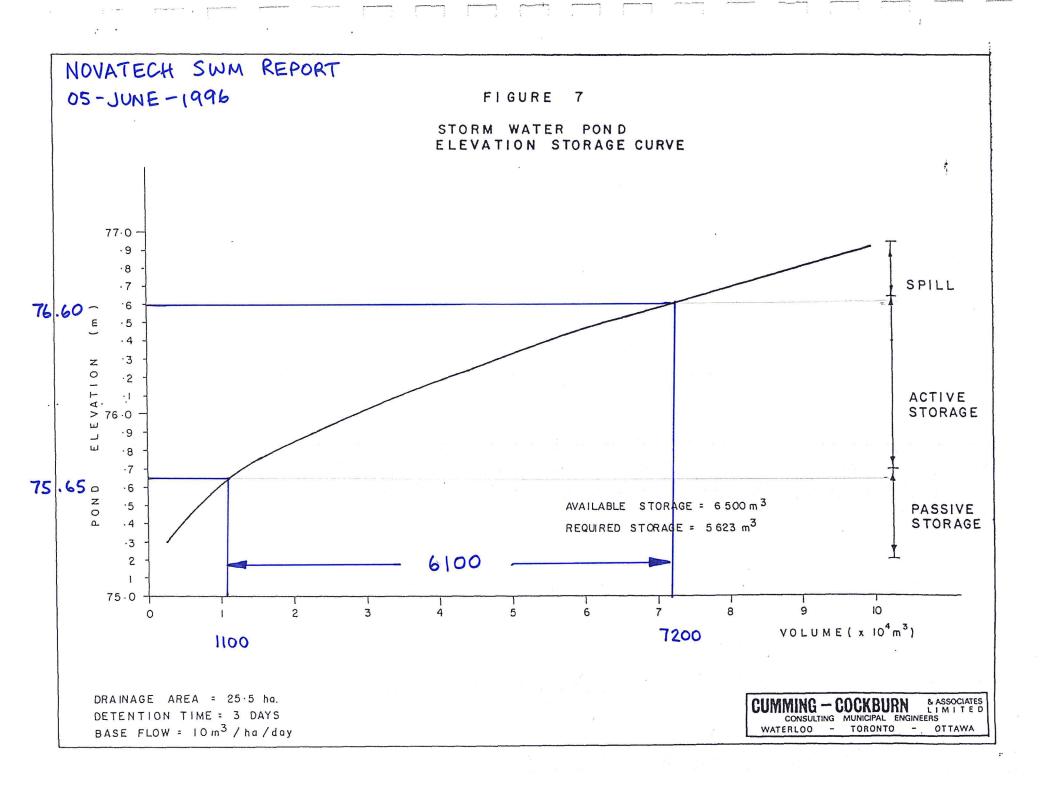
KEY PLAN:

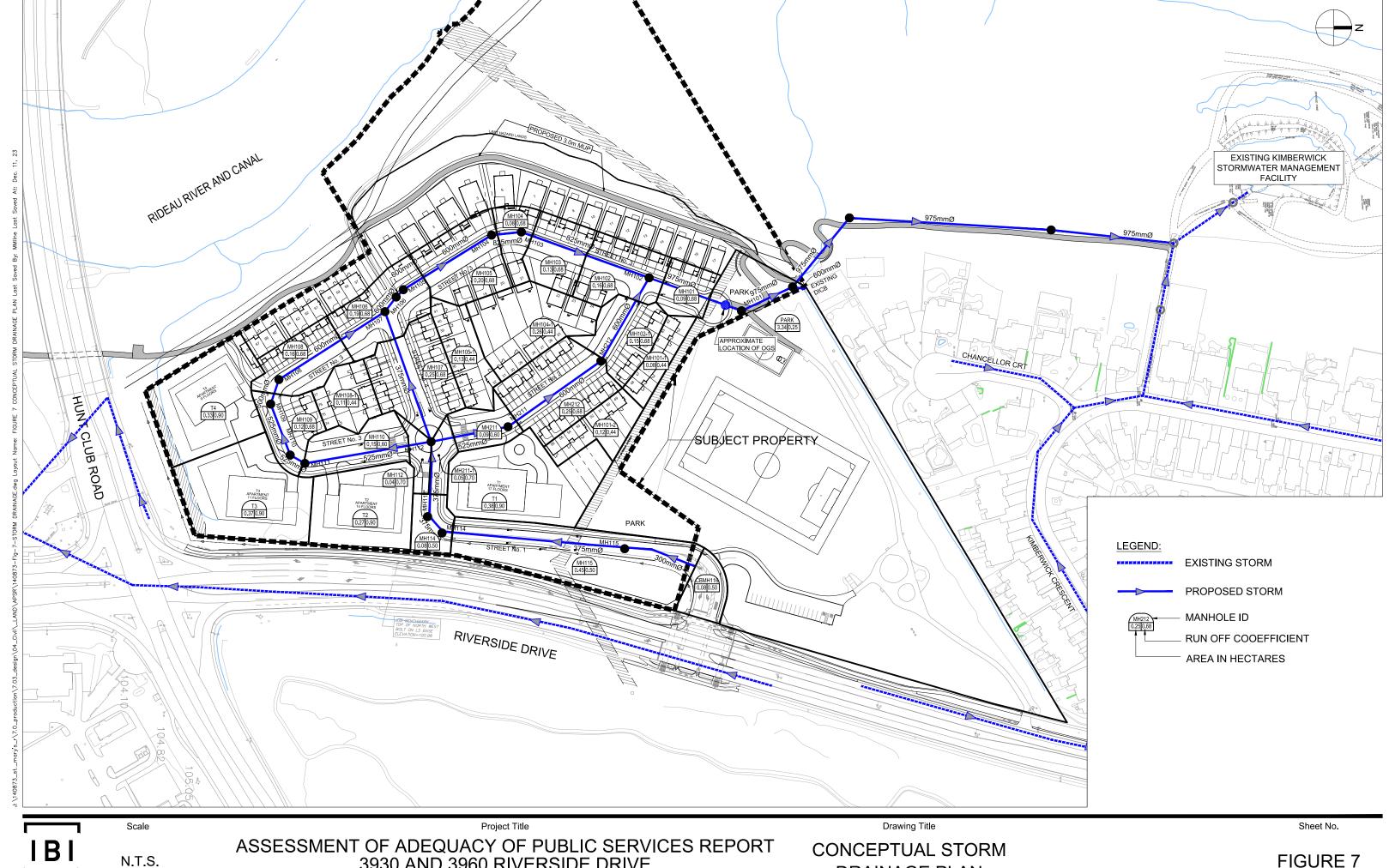
95023SWF

MAY, 2007

95023SWF-GS

T/G=88,12/

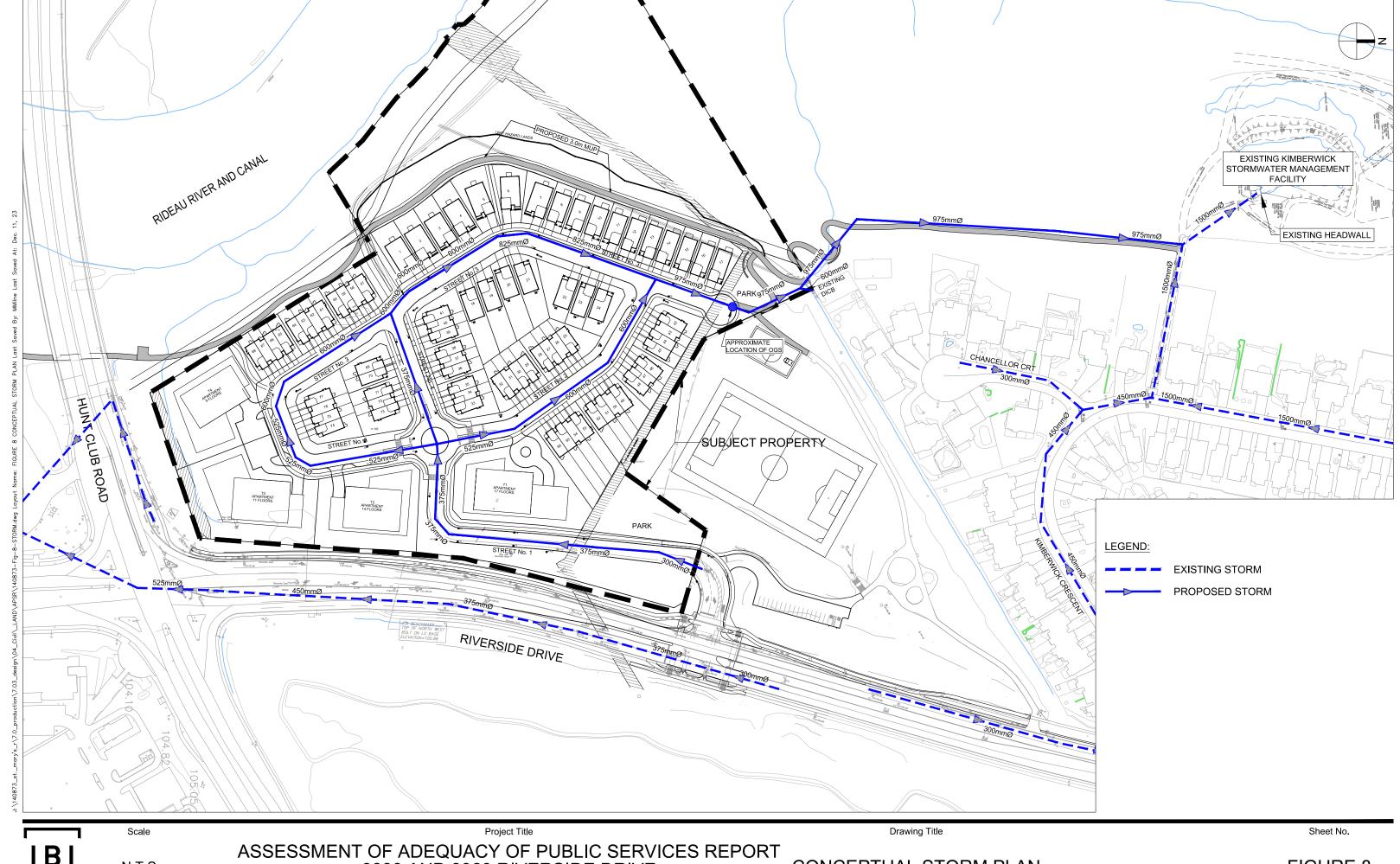




ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES REPORT 3930 AND 3960 RIVERSIDE DRIVE

DRAINAGE PLAN

FIGURE 7



IBI N.T.S. ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES REPORT 3930 AND 3960 RIVERSIDE DRIVE

CONCEPTUAL STORM PLAN

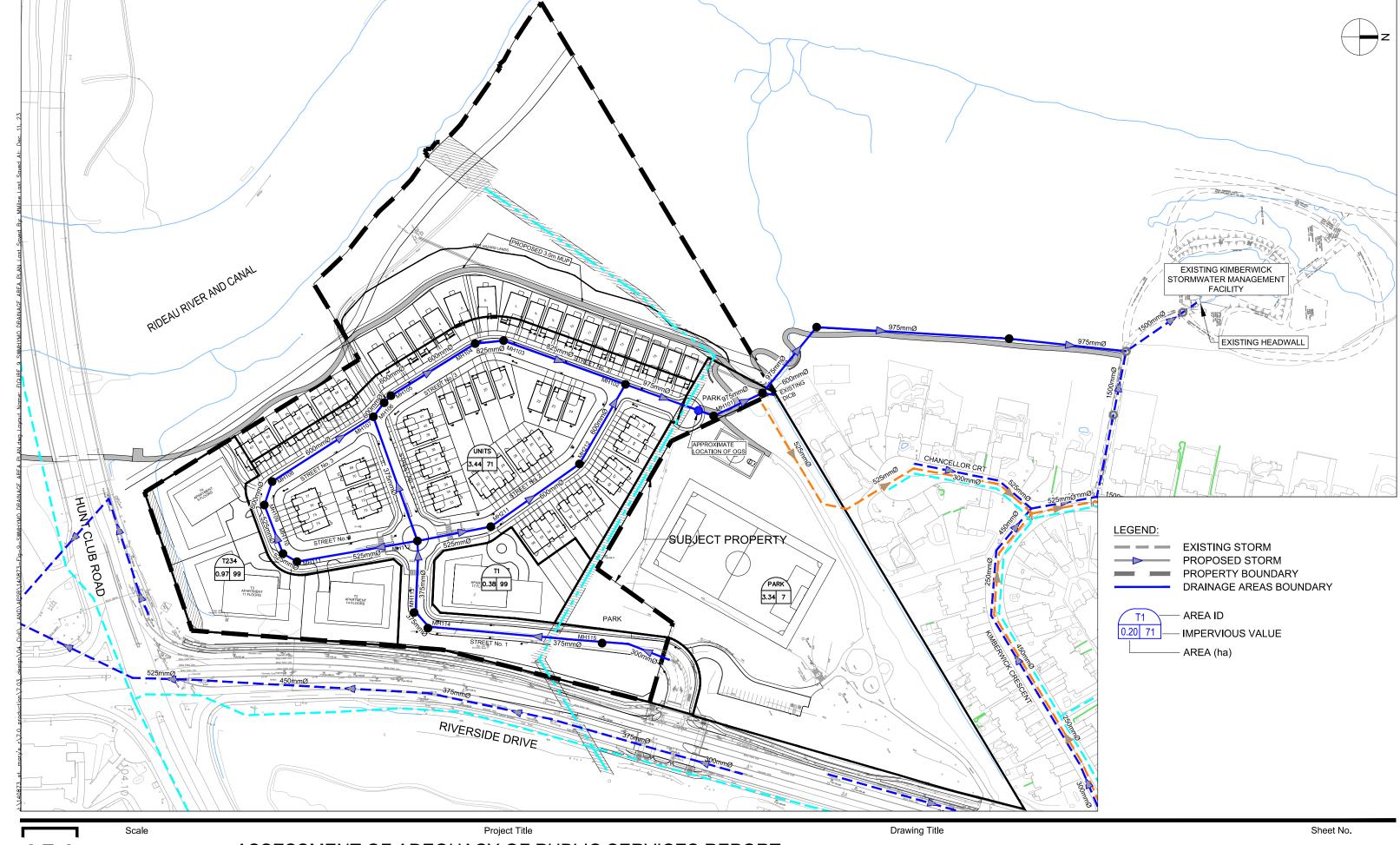
IBI

IBI GROUP 500-333 Preston Street Ottawa, Ontario K1S 5N4 Canada tel 613 225 1311 fax 613 225 9868

ibigroup.com

Riverside Park City of Ottawa St. Mary's Lands Corporation

																									100 YR								ary o Editoo	•
	LOCATION					AREA	A (Ha)					_	_	_			RATIO	ONAL DESIG	N FLOW				_				_	_		EWER DATA				
STREET	AREA ID	FROM TO		C=	_					C= INI			TIME	TOTAL	i (2)	i (5)	i (10)		2yr PEAK	•	10yr PEAK	_		FLOW	DESIGN		LENGTH		IPE SIZE (mn	n) S		VELOCITY		
JIII.	711127112	11.0	0.	20 0.25 0.44	4 0.50	0 0.60	0.68 0.70	0 0.76	0.80	0.90 2.78	AC 2.78AC	(min)	IN PIPE	(min)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	FLOW (L/s)	FLOW (L/s)	FLOW (L/s)	FLOW (L/s)	IND	CUM	FLOW (L/s)	(L/s)	(m)	DIA	W	Н	(%)	(m/s)	(L/s)	(%)
Street 1		CBMH116 MH1	15		0.08	0				0.1	1 0.11	10.00	0.49	10.40	76.81	104.19	122.14	178.56	8.54	11 50	13.58	19.86	0.00	0.00	10.96	100.88	41.03	300			1.00	1 202	04.02	80.32%
Street 1		MH115 MH1			0.00					0.6		10.49	1.49	10.49	74.96	104.19	119.15	174.16	55.22	74.80	87.78	128.30	0.00	0.00	19.86 128.30	182.91	106.63	375	+		1.00	1.383 1.604	81.03 54.61	29.85%
Street 1		MH114 MH1			0.08					0.0		11.60	0.13	11.73	71.16	96.43	113.00	165.13	60.33	81.76	95.81	140.01	0.00	0.00	140.01	182.91	12.71	375			1.00	1.604	42.90	23.45%
Street 1		MH113 MH1			0.00	0	0.04	4		0.0		11.00	0.13	12.19	70.73	95.85	112.31	164.12	65.48	88.73	103.97	151 93	0.00	0.00	151.93	182.91	43.67	375			1.00	1.604	30.98	16.94%
Ottoot 1		10111110 101111	-				0.0	1		0.0	0.30	11.70	0.40	12.10	70.70	30.00	112.01	104.12	00.40	00.70	100.07	101.50	0.00	0.00	101.50	102.01	40.07	070			1.00	1.004	00.00	10.547
Street 3		MH112 MH1	11			0.15				0.27 0.9	3 0.93	10.00	0.62	10.62	76.81	104.19	122.14	178.56	71.10	96.46	113.07	165.30	0.00	0.00	165.30	448.66	74.49	525			1.00	2.008	283.36	63.16%
Street 3		MH111 MH1								0.0		10.62	0.08	10.70	74.51	101.04	118.42	173.10	68.98	93.53	109.63	160.24	0.00	0.00	160.24	448.66	9.83	525			1.00	2.008	288.41	64.28%
Street 3		MH110 MH1					0.12		(0.37 1.1		10.70	0.26	10.96	74.22	100.64	117.95	172.40	154.25	209.15	245.14	358.31	0.00	0.00	358.31	448.66	31.78	525			1.00	2.008	90.35	20.14%
Street 3		MH109 MH1	08							0.33 0.8		10.96	0.11	11.08	73.29	99.36	116.45	170.20	212.84	288.55	338.18	494.27	0.00	0.00	494.27	640.56	15.04	600			1.00	2.195	146.29	22.84%
Street 3		MH108 MH1	07	0.11	1		0.16			0.4	4 3.34	11.08	0.45	11.53	72.90	98.82	115.82	169.27	243.56	330.17	386.95	565.54	0.00	0.00	565.54	784.52	73.27	600			1.50	2.688		27.91%
Street 4		MH112 MH1	07				0.25			0.4	7 0.47	10.00	0.83	10.83	76.81	104.19	122.14	178.56	36.30	49.24	57.72	84.39	0.00	0.00	84.39	182.91	80.31	375			1.00	1.604	98.52	53.86%
Street 3		MH107 MH1	06				0.19			0.3	6 4.17	11.53	0.06	11.59	71.38	96.74	113.37	165.67	297.87	403.68	473.05	691.30	0.00	0.00	691.30	859.40	10.74	600			1.80	2.945	168.10	19.56%
Street 3		MH106 MH1	05	0.13	3					0.1	6 4.33	11.59	0.03	11.63	71.19	96.47	113.05	165.20	308.36	417.89	489.69	715.61	0.00	0.00	715.61	859.40	5.97	600			1.80	2.945	143.79	16.73%
Street 3		MH105 MH1	04				0.20			0.3	8 4.71	11.63	0.34	11.97	71.08	96.32	112.87	164.94	334.76	453.65	531.60	776.85	0.00	0.00	776.85	859.40	60.37	600			1.80	2.945	82.55	9.61%
Street 3		MH104 MH1	03	0.26	3		0.08			0.4	7 5.18	11.97	0.15	12.12	69.99	94.83	111.12	162.37	362.50	491.14	575.49	840.91	0.00	0.00	840.91	1,058.89	17.42	825			0.50	1.919	217.98	20.59%
Street 3		MH103 MH1	02				0.29			0.5	5. 73	12.12	0.69	12.81	69.52	94.19	110.36	161.25	398.18	539.44	632.07	923.56	0.00	0.00	923.56	1,058.89	78.97	825			0.50	1.919	135.33	12.78%
Street 2		MH112 MH2				0.09	0.0	5	(0.38 1.2	0 2.12	10.00	0.38	10.38	76.81	104.19	122.14		163.13	221.30	259.42	379.25	0.00	0.00	379.25	448.66	45.57	525			1.00	2.008	69.41	15.47%
Street 2		MH211 MH2		0.12			0.25			0.6		10.38	0.50	10.88	75.38	102.24	119.84	175.17	206.80	280.47	328.75	480.55	0.00	0.00	480.55	640.56	66.22	600			1.00	2.195	160.01	24.98%
Street 2		MH212 MH1	02	0.08	3		0.15			0.3	8 3.12	10.88	0.43	11.31	73.58	99.76	116.92	170.89	229.92	311.72	365.34	533.97	0.00	0.00	533.97	640.56	56.04	600			1.00	2.195	106.59	16.64%
																													1					
Storm Outlet		MH102 MH1					0.09			0.1			0.44	13.25	67.48		107.07		608.85	824.53	965.97	1,411.24	0.00	0.00	1,411.24	1,653.18		975			0.50	2.145	241.94	14.63%
Storm Outlet		MH101 MH1	00							0.0	0 9.02	13.25	0.26	13.50	66.23	89.68	105.05	153.46	597.57	809.07	947.77	1,384.53	0.00	0.00	1,384.53	1,653.18	32.85	975	1		0.50	2.145	268.65	16.25%
												15.00		4.5.00				11000	112.22	122.22		221 -2			221 = 2				+			2.42=		10.000/
Ex. Park		D INLET MH1	00	3.34						2.3	2.32	15.00	0.06	15.06	61.77	83.56	97.85	142.89	143.38	193.96	227.14	331.70	0.00	0.00	331.70	640.56	7.38	600	+		1.00	2.195	308.86	48.22%
Otamas Outlan		NALIA OO NALIA	20							0.0	0 44 04	45.00	0.40	45.40	04.04	00.00	07.04	1 10 50	000.40	0.45.70	4 407 57	4.047.00	0.00	0.00	4.047.00	4.050.40	50.00	075	1		0.50	0.445	05.70	0.470/
Storm Outlet		MH100 MH								0.0		15.06	0.40	15.46			97.64			945.78		1,617.39		0.00			52.00	975	1		0.50	2.145	35.79	2.17%
Storm Outlet		MH99 MH9								0.0		15.46	0.91	16.37	60.70		96.14	140.38	688.58	900.30	·	1,592.39		0.00	1,592.39		117.57		+		0.50	2.145	60.79	3.68%
Storm Outlet		IVITI98 EXIV	ПЗ							0.0	0 11.34	16.37	0.39	16.77	58.70	79.37	92.92	135.00	665.92	900.30	1,054.09	1,538.91	0.00	0.00	1,538.91	2,337.95	71.78	975	+		1.00	3.034	799.04	34.18%
FLOW FROM SWM MOD)EI (1):															+	+	+	+						1,523.00	+			+	+				
FLOW FROM SWIM MOD	JEL (1).																								1,525.00	1								
Ex. Kimberwock Cresc.(2))	EXMH2 EXM	H3							0.0	0 36.60	+						+							2,416.00	3 2 1 4 4 7	39.60	1500			0.19	1.762	798 47	24.84%
Ex. rameerweek erese.(2)	-/	EXIVITIE EXIVI	710							0.0	00.00														2,410.00	0,214.41	00.00	7000			0.70	1.702	700.47	24.0470
Outlet to Existing Pond	1	EXMH3 EXM	H4				 			0.0	0 47.94														3,939.00	4,300.04	41.88	1500			0.34	2.357	361.04	8.40%
											11101	+													3,000100	1,000101	11100	1500						011070
																												1000						
			0.	.00 3.34 0.70	0.6	1 0.24	1.78 0.09	9 0.00	0.00	1.35 11. 3	34						1								1	1								
																	1								1	1			\Box					
																									1	1	1							
Definitions:			No	tes:	•	-	•	•	<u> </u>	<u>-</u>		Designed	:	AB	-	-	-	No.						Rev	ision							Date		
Q = 2.78CiA, where:			1.	Mannings coefficie	ent (n) =	= 0.013	3											1.		Report Na	ame (Master S	Servicing Stud	dy, Adequad	y of Public S	Services, Servi	cing Brief, e	ct) - Submis	sion No. 1			2	2022-12-06		
Q = Peak Flow in Litres p	per Second (L/s)																	2					APS	SR Submissi	ion 2						2	2023-09-26		
A = Area in Hectares (Ha	,											Checked:		TB				3					APS	SR Submissi	ion 3						2	2023-12-13		
i = Rainfall intensity in m																																		
[i = 732.951 / (TC+6.19	_	2 YEAR																																
[i = 998.071 / (TC+6.05	-	5 YEAR										Dwg. Refe	erence:	140873-5	00																			
[i = 1174.184 / (TC+6.0	-	10 YEAR																		ference:					Date							Sheet No:		
[i = 1735.688 / (TC+6.0	.014)^0.8201	100 YEAR										1							140873	3-6.04.04					2022-1	2-06						1 of 1		



PLAN

00001> =================================	00136> 00137> (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES: 001389 Fo (mm/hr)= 76.20 K (1/hr)= 4.14 001399 Fc (mm/hr)= 13.20 Cum.Inf. (mm)= .00 001400 (i) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL 001412 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 001424> 001443-
00012x SMMHYMO Ver/4.05	001466 ***=================================
00022> 00023 +	00157> 00158 ROUTING RESULTS AREA QPEAK TPEAK R.V. 00159
000285 +++++++ FROGRAM ARRAY DIMENSIONS +++++ 000305	00163> 00164> TOTAL NUMBER OF SIMULATED OVERFLOWS = 0 00165> CUMULATIVE TIME OF OVERFLOWS (hours) = .00 00166> PERCENTAGE OF TIME OVERFLOWING (%) = .00 00167> 00168> PEAK FLOW REDUCTION (OOUt/Oin)(%) = 93.448 00169> PEAK FLOW REDUCTION (OOUT/OIN)(%) PEAK FLOW REDUCTION (OOU
00035>	00170> TIME SHIFT OF PEAK FLOW (min)= 2.00 00171> MAXIMUM STORAGE USED (ha.m.)=.2869E-03 00172> 00173>
00040 * Input filename: C:\IBI\SWMHYMO\projects\140873\140873-H.dat	001755 * 001765 *# DRAINAGE AREA T1 - RESIDENTIAL 001785 *# 0.38 HA
00047> ************************************	00182>
00052> *# Project Name: [st.Mary's] Project Number: [140873] 00053> *# Date : 00054> *# Modeller : [MG] 00055> *# Company : Cumming Cockburn Limited 00056> *# License # : 3699242 00057> ************************************	00187> Surface Area (ha)= .38 .00 00188> Dep. Storage (mm)= .80 1.50 00189> Average Slope (%)= .15 2.00 00190> Length (m)= 50.00 40.00 00191> Mannings n = .013 .250 00192>
00058 *# 00059 *# POST-DEVELOPMENT CONDITIONS 00060 *#====================================	00193> Max.eff.Inten.(mm/hr) = 76.80 16.03 00194> over (min) 3.00 18.00 00195> Storage Coeff. (min) = 3.31 (ii) 17.99 (ii) 00196> Unit Hyd. Tpeak (min) = 3.00 18.00 00197> Unit Hyd. peak (cms) = .35 .06 **TOTALS*
00064> 00065> 000660 00067> 00068>	00198-
00070>	002055
00078>	00213> 040:0006
00084> *# Company : Cumming Cockburn Limited 00085> *# License # : 3699242 00086> ##***********************************	00219 IN>05:(T1) 00220 0UT<02:(T1MIN) =======
00091>	002266 ROUTING RESULTS AREA OPEAK TPEAK R.V. 002277
00097	00232> TOTAL NUMBER OF SIMULATED OVERFLOWS = 0
00104> 00105> 00106> 040:0003 00107> *	00240> 002410- 002412 040:0007
00109> *# DRAINNGE AREA T2T3T4 - RESIDENTIAL 00110> *# 0.97 HA 00111> *# 2 Year Minor System Capture 00112> *# up to 100 year on-site storage 00113> *#====================================	00244 *# DRAINAGE AREA UNITS - RESIDENTIAL 00245 *# 3.44 HA 00246 *# 100 Year Minor System Capture 00247 *# No on-site storage 00248 *#====================================
00115> CALIE STANDHYD Area (ha)= .97 00116> 01:7234 DT=1.00 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00 00117>	002500 CALIB STANDHYD Area (ha) = 3.44 002511 04:UNITS DT=1.00 Total Imp(%) = 71.00 Dir. Conn.(%) = 71.00 00252>
00121> Average Slope (%) = 1.5 2.00 00122> Length (m) = 60.00 40.00 00123> Mannings n = .013 .250 00124> 00125> Max.eff.Inten.(mm/hr) = 76.80 15.18 00126> over (min) 4.00 19.00	002565
00127> Storage Coeff. (min)= 3.69 (ii) 18.69 (ii) 00128> Unit Hyd. Tpeak (min)= 4.00 19.00 (0129> Unit Hyd. peak (cms)= .30 .06 **TOTALS** 00130> PEAK FLOW (cms)= .19 .00 .187 (iii) 00132> TIME TO PEAK (hrs)= 1.00 1.25 1.000	00263> Unit Hyd. Tpeak (min) = 6.00 22.00 00264> Unit Hyd. peak (cms) = .18 .05 00266> PEAK FLOW (cms) = .40 .02 .407 (iii) 00266> PEAK FLOW (cms) = .40 .02 .407 (iii) 00267> TIME TO DEAK (hrs) = .103 .130 .1033
00132> RUNOFF VOLUME (mm) = 31.06 4.81 30.797 00134> TOTAL RAINFALL (mm) = 31.86 31.86 31.86 00135> RUNOFF COEFFICIENT = .97 .15 .967	002675 TIME TO PEAK (hrs) = 1.03 1.30 1.033 002685 RINOFF VOLUME (mm) = 31.06 4.81 23.447 002695 TOTAL RAINFALL (mm) = 31.86 31.86 31.86 002705 RUNOFF COEFFICIENT = .97 .15 .736

```
(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
FO (mm/hr)= 76.20 K (1/hr)= 4.14
FC (mm/hr)= 13.20 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAR FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
                                                                                                                                                                                                       00407>
00409040:0013-----
00409> ** END OF RUN : 44
00410>
00410>
               Requested routing time step = 1.0 min.
                                                                 ------OUTLFOW STORAGE TABLE ------OUTFLOW STORAGE | OUTFLOW STORA
                                                                                                              | OUTFLOW STORAGE | (cms) (ha.m.) | 1.186 .1000E-02 | .000 .0000E+00
                                                                       OUTFLOW STORAGE
(cms) (ha.m.)
.000 .0000E+00
1.180 .1000E-03
00294>
00295>
00296>
00297>
                         ROUTING RESULTS
                                                                           AREA QPEAK
                                                                             (ha)
3.44
3.44
.00
                                                                                                   (cms)
.407
.407
                                                                                                                            (hrs)
1.033
1.033
.000
                       INFLOW >04: (UNITS )
OUTFLOW<07: (UNITSM)
OVERFLOW<09: (UNITSM)
 00299>
00300>
00301>
00302>
00303>
                                                       TOTAL NUMBER OF SIMULATED OVERFLOWS = CUMULATIVE TIME OF OVERFLOWS (hours) = PERCENTAGE OF TIME OVERFLOWING (%) =
                                                                                                                                                                                                       00304>
                                                        PEAK | FLOW | REDUCTION | [Qout/Qin] (%) = 99.974 | TIME SHIFT OF PEAK | FLOW | (min) = .00 | MAXIMUM | STORAGE | USED | (ha.m.) = .3482E-04
                                                                                                                                                                                                       00440> ------
00441> | READ STORM |
00442> | Ptotal= 71.66 mm|
00443> ----
                                                                                                                                                                                                                                                                   Filename: 100 YEAR 3 HOUR CHICAGO - 10 MIN TIME ST
Comments: 100 YEAR 3 HOUR CHICAGO - 10 MIN TIME ST
                                                                                                                                                                                                                                                   TIME RAIN | TIME RAIN |
hrs mm/hr | hrs mm/hr |
1.7 6.046 | 1.00 178.559 |
3.3 7.542 | 1.17 54.049 |
5.0 10.159 | 1.33 27.319 |
6.7 15.969 | 1.50 18.240 |
8.3 40.655 | 1.67 13.737 |
                                                                                                                                                                                                                                                                                                                             TIME
                                                                                                                                                                                                                                                                                                                                              RAIN |
                                                                                                                                                                                                                                                                                                                           TIME RAIN |
hrs mm/hr |
1.83 11.059 |
2.00 9.285 |
2.17 8.024 |
2.33 7.080 |
2.50 6.347 |
 00310> 040:0009------
00311> * 00312> *# Adding T1 and T234 and UNITS major flow to Rideau River 00313> ------
.000
                                                            SUM 10: 100 .00 .000 .00 .00
                                                                                                                                                                         .000
Surface Area (ha) = .23
Dep. Storage (mm) = .80
Average Slope (%) = .15
Length (m) = .150.00
Mannings n = .013
                                                                                                        PERVIOUS (i)
3.11
1.50
2.00
40.00
.250
                                                                                                                                                                                                                                                                                          178.56 147.80
3.00 9.00
2.63 (ii) 8.67 (ii)
3.00 9.00
.41 .13
                                                                                                                                                                                                                               Max.eff.Inten.(mm/hr) = over (min)
Storage Coeff. (min) = Unit Hyd. Tpeak (min) = Unit Hyd. peak (cms) =
                                                                                                                                                                                                      00472>
00473>
00473>
00474>
00475>
00476>
00477>
004779>
00481>
00482>
00483>
00484>
00485>
00486>
00487>
00486>
 00338>
00339>
00340>
00341>
00342>
00343>
00344>
00345>
00346>
00348>
                        Max.eff.Inten.(mm/hr) = over (min)
Storage Coeff. (min) =
Unit Hyd. Tpeak (min) =
Unit Hyd. peak (cms) =
                                                                             76.80 13.11
6.00 22.00
6.40 (ii) 22.30 (ii)
6.00 22.00
.18 .05
                                                                                                                                                                                                                                                                                                                                                     *TOTALS*
.465 (iii)
1.000
70.475
71.665
.983
                                                                                                                                                                                                                                PEAK FLOW (cms) =
TIME TO PEAK (hrs) =
RUNOFF VOLUME (mm) =
TOTAL RAINFALL (mm) =
RUNOFF COEFFICIENT =
                                                                                                                                                                                                                                                                                            .46
1.00
70.86
71.66
.99
                                                                                                                                             *TOTALS*
.082 (iii)
1.267
                        PEAK FLOW (cms) = .04 .07
TIME TO PEAK (hrs) = 1.03 1.30
RUNOFF VOLUME (mm) = 31.06 4.81
TOTAL RAINFALL (mm) = 31.86 31.86
RUNOFF COEFFICIENT = .97 .15
*** WARNING: For areas with impervious ratios below 20%, this routine may not be applicable.
                                                                                                                                                                                                                              (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
FO (mm/hr)= 76.20 K (1/hr)= 4.14
FC (mm/hr)= 13.20 Cum.Inf. (mm)= .00
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) FRAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00349>
00350>
00351>
00352>
00353>
00354>
00355>
00356>
00357>
00358>
                                                                                                                                                                                                       00489>
00490>
                            (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:
                                                                                                                                                                                                      FO (mm/hr)=76.20 Cum.Inf. (1/hr)= 4.14

FO (mm/hr)=13.20 Cum.Inf. (mm)= .00

(ii) TIME STEF (DT SOUDLE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.

(iii) FEAR FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00366>
00367>
00368>
               | ROUTE RESERVOIR | Requested routing time step = 1.0 min. | IN>08: [PARK ) |
               | IN>08: (PARK )
| OUT<06: (PARKMI)
                                                                                                                                                                                                                          ====== OUTLFOW STORAGE TABLE =====
                                                                                                                                                                                                                                                                                    AREA QPEAK TPEAK
                                                                                                                                                                                                                                                                                                                                                        R.V.
                                                                  OUTFLOW STORAGE OUTFLOW STORAGE (Cms) (ha.m.) (cms) (ha.m.) (.000.0000E+00 .002.2000G-00.000E+00 .000.0000E+00 .000.0000E+00 .0000E+00 .
00371>
00372>
00373>
00374>
00375>
                                                                                                                                                                                                       00506>
00507>
00508>
00509>
00510>
                                                                                                                                                                                                                                                                                  (ha) (cms)
.97 .465
.97 .187
.00 .000
                                                                                                                                                                                                                                                                                                                                  (hrs)
1.000
1.117
                                                                                                                                                                                                                                                              TOTAL NUMBER OF SIMULATED OVERFLOWS = CUMULATIVE TIME OF OVERFLOWS (hours) = PERCENTAGE OF TIME OVERFLOWING (%) =
 00376>
00377>
00378>
00379>
                                                                                AREA
                                                                                                       QPEAK
                                                                                                                             TPEAK
                                                                                                                                                 R.V.
                         ROUTING RESULTS
                       INFLOW >08: (PARK )
OUTFLOW<06: (PARKMI)
OVERFLOW<09: (PARKMA)
                                                                               (ha)
3.34
3.34
.00
                                                                                                                             (hrs)
1.267
1.300
                                                                                                                                                                                                                                                              PEAK FLOW REDUCTION [Qout/Qin](%)= 40.231 TIME SHIFT OF PEAK FLOW (min)= 7.00 MAXIMUM STORAGE USED (ha.m.)=.1540E-01
 00381>
                                                        TOTAL NUMBER OF SIMULATED OVERFLOWS = CUMULATIVE TIME OF OVERFLOWS (hours) = PERCENTAGE OF TIME OVERFLOWING (%) =
                                                                                                                                                                                                      00386>
                                                        PEAK FLOW REDUCTION [Qout/Qin](%)= 98.321
TIME SHIFT OF PEAK FLOW (min)= 2.00
MAXIMUM STORAGE USED (ha.m.)=.1807E-03
| ADD HYD ( 100) | ID: NHYD AREA
                                                                                                                                             TPEAK R.V.
(hrs) (mm)
1.03 30.80
1.02 30.80
1.03 23.45
1.30 6.65
                                                                                                                                                                               (cms)
.000
.000
.000
                                                                                                                                                                                                                               ID1 03:T234MIN
                                                           +ID2 02:173MIN .38
+ID2 02:171MIN .38
+ID3 07:UNITSMIN 3.44
+ID4 06:PARKMIN 3.34
SUM 01: 100 8.13
                                                                                                                                                1.05 17.77
                                                                                                                                                                                 .000
               NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
                                                                                                                                                                                                                                 Max.eff.Inten.(mm/hr) = 178.56
```

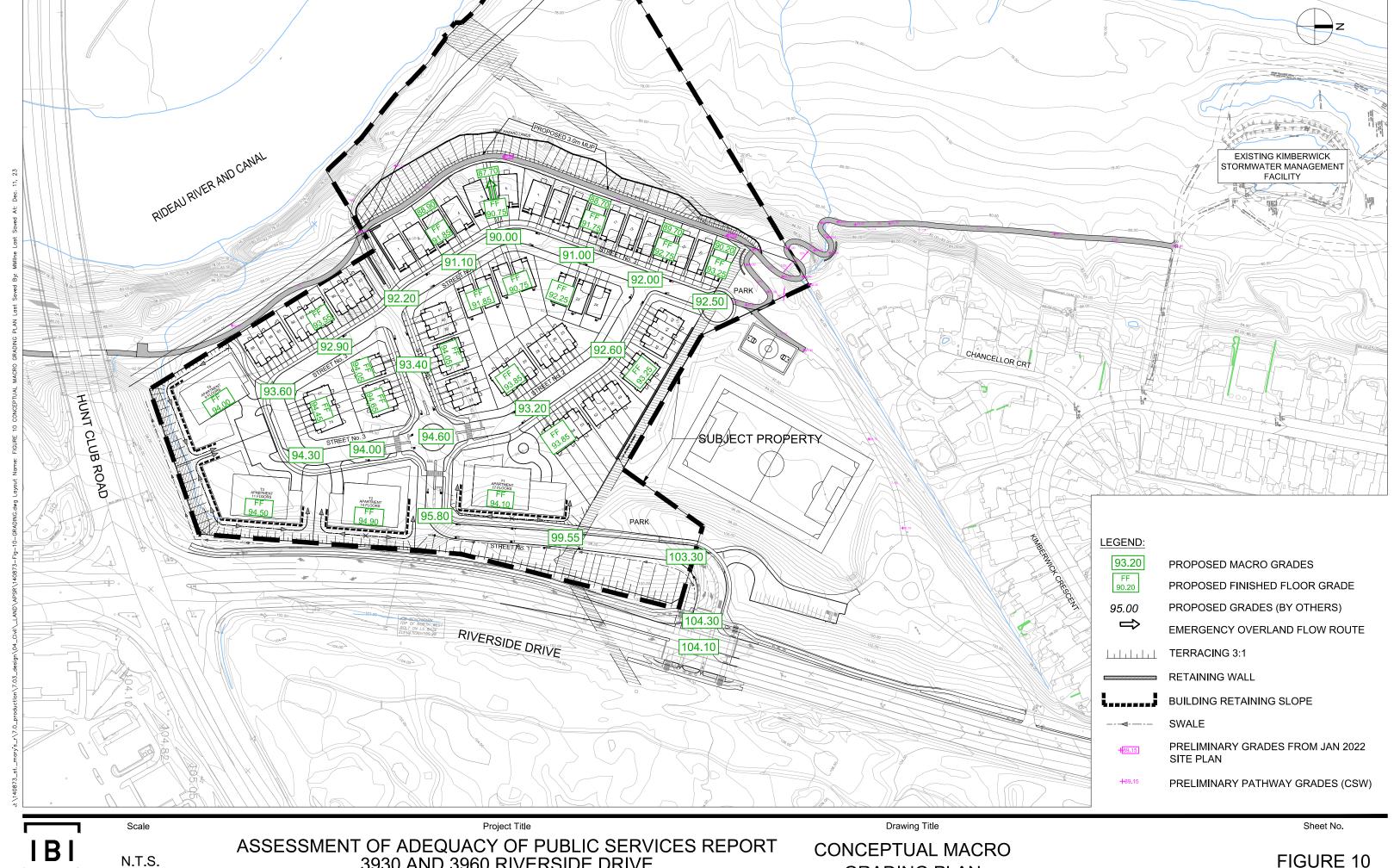
00541>			*#
00542> 00543> 00544>	Unit Hyd. Tpeak (min) = 2.00 8.00 Unit Hyd. peak (cms) = .50 .14	00678> 00679>	CALIB STANDHYD
00545> 00546>	*TOTALS*	00680> 00681>	IMPERVIOUS PERVIOUS (i)
00547> 00548> 00549>	RUNOFF VOLUME (mm) = 70.86 31.87 70.475	00682> 00683> 00684>	B 25 () 00 1 50
00550>		00685>	Length (m) = 150.00 40.00 Mannings n = .013 .250
00552> 00553> 00554>	Fo (mm/hr) = 76.20 K (1/hr) = 4.14	00687> 00688> 00689>	Max.eff.Inten.(mm/hr) = 178.56 136.35
00555> 00556>	(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.	00690> 00691>	Unit Hyd. Tpeak (min)= 5.00 11.00
00557> 00558> 00559>	· · · · · · · · · · · · · · · · · · ·	00692> 00693> 00694>	onit nyd. peak (cms)24 .10 ***********************************
00560> 00561>	. 045:0006	00695> 00696>	TIME TO PEAK (hrs)= 1.02 1.12 1.117 RUNOFF VOLUME (mm)= 70.86 31.87 34.599
00563>	*#=====================================	00697> 00698> 00699>	TOTAL RAINFALL (mm)= 71.66 71.66 71.665 RUNOFF COEFFICIENT = .99 .44 .483 *** WARNING: For areas with impervious ratios below
00565> 00566>	ROUTE RESERVOIR Requested routing time step = 1.0 min.	00700> 00701>	20%, this routine may not be applicable.
00567> 00568> 00569>	OUT-(02: (TIMIN) ========= OUT-LOW STORAGE TABLE ====================================	00702> 00703> 00704>	Fo (mm/hr) = 76.20 K (1/hr) = 4.14
00570> 00571>	.000 .0000E+00 .076 .6500E-02 .070 .1000E-03 .000 .0000E+00	00705> 00706>	(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
00572> 00573> 00574>	ROUTING RESULTS AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm)	00707> 00708> 00709>	
00575> 00576>	INFLOW >05: (T1) .38 .185 1.000 70.475 OUTFLOW<02: (T1MIN) .38 .076 1.083 70.475	00710> 00711>	045:0011
00577> 00578> 00579>	TOTAL NUMBER OF STRUCK APPROURDED ONS - 0	00713>	*# No on-site storage - Minor system Capture flow 2 year CHI *#
00580> 00581>	CUMULATIVE TIME OF OVERFLOWS (hours)= .00 PERCENTAGE OF TIME OVERFLOWING (%)= .00	00715> 00716>	ROUTE RESERVOIR Requested routing time step = 1.0 min. INNO8:(PARK)
00582> 00583> 00584>	PEAK FLOW REDUCTION [Oout/Oin](%)= 40.941	00717> 00718> 00719>	OUTLOG: (PARKMI) ======== OUTLFOW STORAGE TABLE =========== OUTLFLOW STORAGE OUTFLOW STORAGE (cms) (ha.m.) (cms) (ha.m.)
00585> 00586>	PEAK FLOW REDUCTION [Qout/Qin](%)= 40.941 TIME SHIFT OF PEAK FLOW (min)= 5.00 MAXIMUM STORAGE USED (ha.m.)=.6072E-02	00720> 00721>	.000 .0000E+00 .082 .2000E-03 .077 .1000E-03 .000 .0000E+00
00587> 00588> 00589>		00722> 00723> 00724>	ROUTING RESULTS AREA GERAL TERRY K.V.
00591>	* * DRAINAGE AREA UNITS - RESIDENTIAL	00725> 00726>	INFLOW >08: (PARK) 3.34 .715 1.117 34.599 OUTFLOW<06: (PARKMI) .97 .082 .900 34.599
00593>	* # 100 Year Minor System Capture	00727> 00728> 00729>	
00596>		00730> 00731>	PERCENTAGE OF TIME OVERFLOWING (%)= 14.15
00598>	04:UNITS DT= 1.00 Total Imp(%)= 71.00 Dir. Conn.(%)= 71.00	00732> 00733> 00734>	
00600> 00601>	TMPERVIOUS PERVIOUS (i)	00735> 00736>	MAXIMUM STORAGE USED (ha.m.)=.1823E-03
00602> 00603> 00604>	Average Slope (%)= .15 2.00	00737> 00738> 00739>	
00605>			*# Adding T1 and T234 UNITS and Park minor flow
00607> 00608> 00609>	Max.eff.Inten.(mm/hr)= 178.56 136.35 - over (min) 5.00 11.00 - Storage Coeff. (min)= 4.58 (ii) 10.82 (ii)	00743>	ADD HYD (100) ID: NHYD
00610>	Unit Hyd. Tpeak (min)= 5.00 11.00 Unit Hyd. peak (cms)= .24 .10	00746>	ID1 03:T234MIN
00612> 00613> 00614>	*TOTALS* - PEAK FLOW (cms)= 1.04 .21 1.186 (iii) - TIME TO PEAK (hrs)= 1.02 1.12 1.033	00747> 00748> 00749>	+ID4 06:PARKMIN .97 .082 .90 34.60 .000
00615> 00616> 00617>	RUNOFF VOLUME (mm) = 70.86 31.87 59.556 TOTAL RAINFALL (mm) = 71.66 71.66 71.665	00750>	
00618> 00619>	(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:	00753>	
00620> 00621> 00622>	Fc (mm/hr) = 13.20 Cum.Inf. (mm) = .00	00756>	045:0013
00623> 00624>	THAN THE STORAGE COEFFICIENT.	00758>	** END OF RUN : 89
		00760> 00761> 00762>	***************************************
00628> 00629>	· *·	00763> 00764>	
00631>	*#	00765> 00766> 00767>	START Project dir.: C:\TRI\SWMHYMO\projects\140873\
00633> 00634>	· ROUTE RESERVOIR Requested routing time step = 1.0 min.	00768> 00769>	START Project dir.: C:\IBI\SWMHYMO\projects\140873\
00636>	OUTFLOW STORAGE OUTFLOW STORAGE	00771>	NRUN = 090 NSTORM= 1
00638> 00639> 00640>	.000 .0000E+00 1.186 .1000E-02 1.180 .1000E-03 .000 .0000E+00	00773> 00774>	000.0002
00641>	ROUTING RESULTS AREA QPEAK TPEAK R.V.	00776>	*#************************************
00643> 00644> 00645>	INFLOW >04: (UNITS) 3.44 1.186 1.033 59.556	00778>	*# Date : *# Modeller : [MG]
00646>	TOTAL NUMBER OF SIMULATED OVERFLOWS = 0	00782>	*# Company : Cumming Cockburn Limited *# License # : 3699242
00648> 00649> 00650>	PERCENTAGE OF TIME OVERFLOWING (%)= .00		*# POST-DEVELOPMENT CONDITIONS *#=
00651> 00652>	PEAK FLOW REDUCTION [Oout/Oin](%)= 99.503	00786>	*
00653> 00654> 00655>	TIME SHIFT OF PEAR FLOW (min)= .00 MAXIMUM STORAGE USED (ha.m.)=.1654E-03	00789>	090:0002
00656> 00657>	045:0009	00791> 00792>	Ptotal= 86.00 mm Comments: CHICAGO 3 HOUR 10 MIN 100 YEAR STORM - I
00658> 00659> 00660>	* * # Adding T1 and T234 and UNITS major flow to Rideau River	00793> 00794> 00795>	hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr .17 7.255 1.00 214.271 1.83 13.271 2.67 6.912
00662>	ADD HYD (100) ID: NHYD AREA QPEAK TPEAK R.V. DWF	00796>	.33 9.050 1.17 64.859 2.00 11.142 2.83 6.336 .50 12.191 1.33 32.783 2.17 9.628 3.00 5.855
00663> 00664> 00665>	ID1 08:T234MAJ	00798> 00799> 00800>	.83 48.786 1.67 16.484 2.50 7.616
00666>	SUM 10: 100 .00 .000 .00 .00 .00	00801>	090:0003
00669> 00670>	. v.	00804>	*#* *# DRAINAGE AREA T2T3T4 - RESIDENTIAL
00671>	*#=========	00806>	*# 0.97 HA *# 2 Year Minor System Capture
00674>	* *# 2 Year Minor System Capture	00809>	*# up to 100 year on-site storage *#
	*		

00813> 00814> 00815> 00816> 00817> 00819> 00820> 00821> 00822> 00825> 00825> 00827> 00828> 00829 00830> 00829 00830> 00830> 00830> 00830> 00830> 00830> 00830> 00830>	IMPERVIOUS PERVIOUS (i) OU	
00843>	*# Up to 100 year on-site storage - Minor system Capture flow 2 year CHI)977> *)978> **∯===================================
000465	ROUTE RESERVOIR Requested routing time step = 1.0 min. 00 IN-D01: (T234) 00 00 00 OUTCO3: (T234MI) ======== OUTLFOW STORAGE TABLE ======== 00 (cms) (ha.m.) (cms) (ha.m.) 00 (cms) (ha.m.) 00 0000E+00 0000E+00 (cms) (ha.m.) 00 0000E+00 0000E+00 (cms) (ha.m.) 00 0000E+00 0000E+00 0000E+00 (cms) (ha.m.) (ha.m.) (ha.m.) 000E+00 000E+00 000E+00 000E+00 000E+00 000E+00 000E+00 000E+00 000E+00 000E+000 000E+0	1980 **
00859> 00860> 00861>	TOTAL NUMBER OF SIMULATED OVERFLOWS = 3 00	994> OVERFLOW<09: (UNITSM) .12 .307 1.017 72.986 995>
00862> 00863> 00864>	PERCENTAGE OF TIME OVERFLOWING (%)= 2.86 00)997> CUMULATIVE TIME OF OVERFLOWS (hours)= .10)998> PERCENTAGE OF TIME OVERFLOWING (%)= 1.98)999>
00865> 00866> 00867> 00868>	FEAK FLOW REDUCTION [Qout/Qin](%) = 33.122 01 TIME SHIFT OF PEAK FLOW (nin) = .00 01 MAXIMUM STORAGE USED (ha.m.) = .1547E-01 01 01 0	DOON DEAK FLOW REDUCTION [Qout/Qin](%) = 78.810
00871>	* 01	1005>
00873>	*# DRAINAGE AREA T1 - RESIDENTIAL 01	1007> * 1008> *# Adding T1 and T234 and UNITS major flow to Rideau River 1009>
00875>	*# 2 Year Minor System Capture *# up to 100 year on-site storage 01	1009>
00878>		L013> +ID2 06:T1MAJ .02 .135 1.02 84.78 .000 L014> +ID3 09:UNITSMAJ .12 .307 1.02 72.99 .000
00881> 00882>	01	0017>
00883> 00884> 00885>	Surface Area (ha) = .38 .00 01	1018> NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. 1019>
00886> 00887> 00888>	Mannings n = .013 .250 01	1021> 090:0010
00889> 00890> 00891> 00892> 00893>	over (min) 2.00 8.00 01 Storage Coeff. (min)= 2.20 (ii) 7.70 (ii) 01 Unit Hyd. Tpeak (min)= 2.00 8.00 01	1024> *# DRAINAGE AREA Upland Riverside Park - Park 1
00894> 00895> 00896> 00897> 00898> 00899>	PEAK FLOW (cms)= .22 .00 .223 (iii) 01 TIME TO FEAK (hrs)= 1.00 1.07 1.000 01 RUNDEF VOLUME (mm)= 85.20 43.09 84.777 01 TOTAL RAINFALL (mm)= 86.00 86.00 85.998 01	1029>
00900> 00901> 00902> 00903> 00904>	(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES: FO (mm/hr)= 76.20 K (1/hr)= 4.14 01 FC (mm/hr)= 13.20 Cum.Inf. (mm)= .00 01 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL 01	1035> Dep. Storage (mm)= .80 1.50 1036> Average Slope (%)= .15 2.00 1037> Length (m)= 150.00 40.00 1038> Mannings n = .013 .250
00909>	(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 01 01 01 01 01 01 01 01 01 01 01 01 01	1040
00911> 00912>	*# Up to 100 year on-site storage - Minor system Capture flow 2 year CHI	1045> **TOTALS** 1046> PEAK FLOW (cms)= .12 .89 .969 (iii) 1047> TIME TO PEAK (hrs)= 1.00 1.10 1.083
00913> 00914> 00915> 00916> 00917> 00918>	ROUTE RESERVOIR Requested routing time step = 1.0 min. 01 IN-05:(TI) 01 01 01 01 01 01 01	1048> RUNOFF VOLUME (mm) = 85.20 43.09 46.037
00919> 00920> 00921>	.000 .0000E+00 .076 .6500E-02 01	1054> (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES: 1055> Fo (mm/hr)= 76.20 K (1/hr)= 4.14 1056> Fc (mm/hr)= 13.20 Cum.Inf. (mm)= .00
00922> 00923> 00924> 00925> 00926>		1057> (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL 1058> THAN THE STORAGE COEFFICIENT. 1059> (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. 1060> (1061> (1061)
00927>	01	.062> 090:0011
00928> 00929> 00930> 00931>	CUMULATIVE TIME OF OVERFLOWS (hours) = .10	1065> *# 1066>
00929> 00930> 00931> 00932> 00933> 00934> 00935> 00936>	CUMULATIVE TIME OF OVERFLOWS (hours) = .10 PERCENTAGE OF TIME OVERFLOWING (%) = 2.54 01 01 PEAK FLOW REDUCTION [Qout/Qin](%) = 34.152 01 TIME SHIFT OF PEAK FLOW (min) = 1.00 MAXIMUM STORAGE USED (ha.m.) = .6500E-02 01	1065> *
00929> 00930> 00931> 00932> 00933> 00934> 00935> 00936> 00937> 00938>	CUMULATIVE TIME OF OVERFLOWS (hours) = .10 PERCENTAGE OF TIME OVERFLOWING (%) = 2.54 01 01 PEAK FLOW REDUCTION [Qout/Qin](%) = 34.152 01 TIME SHIFT OF PEAK FLOW (min) = 1.00 01 MAXIMUM STORAGE USED (ha.m.) = .6500E-02 01 090:0007	1065> *
00929> 00930> 00931> 00932> 00933> 00934> 00935> 00936> 00937> 00938> 00939> 00940> 00941>	CUMULATIVE TIME OF OVERFLOWS (hours) = .10 PERCENTAGE OF TIME OVERFLOWING (%) = 2.54 01 PEAK FLOW REDUCTION [Qout/Qin](%) = 34.152 01 TIME SHIFT OF PEAK FLOW (min) = 1.00 01 MAXIMUM STORAGE USED (ha.m.) = .6500E-02 01 090:0007	1065> *
00929> 00930> 00931> 00932> 00934> 00935> 00936> 00937> 00938> 00939> 00940> 00941> 00942> 00944>	CUMULATIVE TIME OF OVERFLOWS (hours)= .10 PERCENTAGE OF TIME OVERFLOWING (%) = 2.54 01 PEAK FLOW REDUCTION [Qout/Qin](%) = 34.152 01 TIME SHIFT OF PEAK FLOW (min) = 1.00 01 MAXIMUM STORAGE USED (ha.m.) = .6500E-02 01 090:0007	0655

$C: \IBI\SWMHYMO\Projects\140873\140873-H.out$

01081> 01082> 01083> 01084>	TOTAL NUMBER OF SIMULATED OVERFLOWS = 2 CUMULATIVE TIME OF OVERFLOWS (hours)= .85 PERCENTAGE OF TIME OVERFLOWING (%)= 16.24
01085> 01086> 01087> 01088> 01089>	PEAK FLOW REDUCTION [Qout/Qin](%)= 8.465 TIME SHIFT OF PEAK FLOW (min)= -12.00 MAXIMUM STORAGE USED (ha.m.)=.1930E-03
01090>	090:0012
	* *# Adding T1 and T234 UNITS and Park minor flow
01095>	ADD HYD (100) ID: NHYD AREA QPEAK TPEAK R.V. DMF
01102> 01103> 01104>	SUM 01: 100 5.36 1.531 1.02 71.79 .000
01107>	090:0013
01109>	990:0002
01111>	090:0002
01112> 01113>	FINISH
01115> 01116>	WARNINGS / ERRORS / NOTES
01117> 01118> 01119> 01120>	040:0010 CALIB STANDHYD *** WARNING: For areas with impervious ratios below
01121> 01122> 01123>	*** WARNING: For areas with impervious ratios below 20%, this routine may not be applicable.
01124> 01125>	
01126> 01127>	

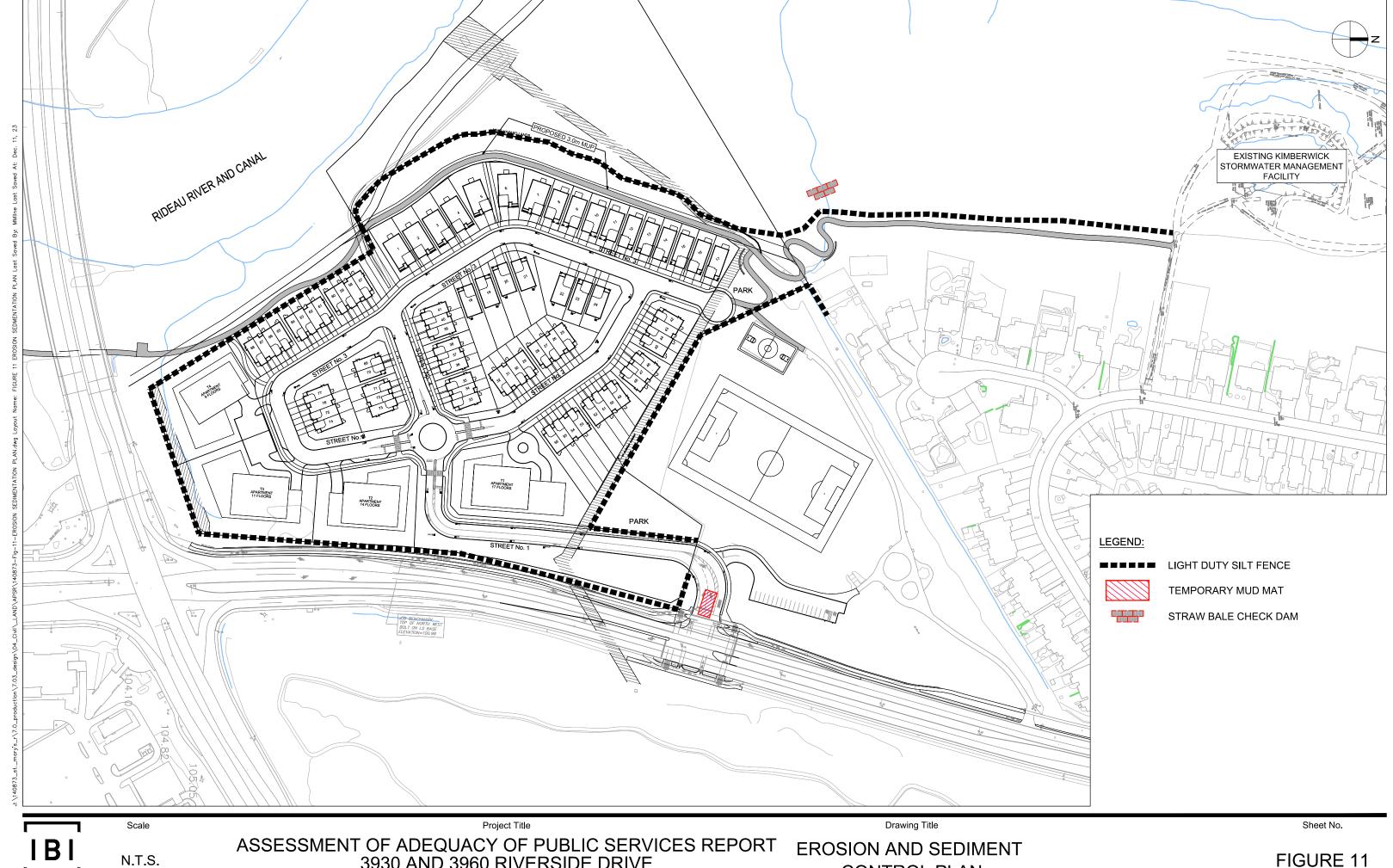
APPENDIX D



ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES REPORT 3930 AND 3960 RIVERSIDE DRIVE

GRADING PLAN

APPENDIX E



IBI

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES REPORT 3930 AND 3960 RIVERSIDE DRIVE

EROSION AND SEDIMENT CONTROL PLAN

APPENDIX F



MEMO

Date: September 2nd, 2021

To / Destinataire	Kelby Lodoen Unseth, Planner	
From / Expéditeur	Eric Harrold, Project Manager, Infrast	ructure Approvals
Subject / Objet	Pre-Application Consultation 3930 Riverside Drive, Ward 16 Plan of Subdivision	File No. PC2021-0282

The following are the engineering comments pertaining to the Pre-Consultation meeting for 3930 & 3960 Riverside Drive (Major and Minor Re-Zoning and Plan of Subdivision) which was held on September 2nd.

List of Reports and Plans (Plan of Subdivision and Re-zoning):

- 1. Conceptual Grading and Servicing Plan
- 2. Storm Drainage / Ponding Plan
- 3. Stormwater Management and Site Servicing Feasibility Study
- 4. Geotechnical Investigation and Slope Stability Assessment Report (including delineation of limit of hazard lands)
- 5. Geomorphological Study for the adjacent section of the Rideau River

The feasibility study must look at the assessment of adequacy of public services, as well as how the internal subdivision will function. The report should include, at a minimum, the following:

- Conceptual Level Master Grading Plan to confirm feasibility of proposed stormwater management and drainage
- Conceptual Level Master Servicing Plan that is supported by a high-level analysis for the storm sewers, sanitary sewers and watermain design.
- Stormwater management modeling for both the existing pond and the future development
- Road cross section with draft submission

The aforementioned reports, studies and plans are required to support the proposed Re-zoning and Plan of Subdivision applications. If the applicant elects to apply for the re-zoning in advance of the Plan of Subdivision process, additional / alternative submissions may be required.

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

 The Servicing Study Guidelines for Development Applications are available at the following address:



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https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans

- 2. Servicing and site works shall be in accordance with the following documents:
 - Ottawa Sewer Design Guidelines (October 2012) and all the Technical Bulletins including, Technical Bulletin PIEDTB-2016-01 and ISTB-2018-01
 - Ottawa Design Guidelines Water Distribution (2010) and Technical Bulletins ISD-2010-2, ISDTB-2014-02 and ISTB-2018-02
 - 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 available for purchase from the City's Information Centre by email at lnformationCentre@ottawa.ca or by phone at (613) 580-2424 x 44455
- 4. The Stormwater Management Criteria, for the subject site, is to be based on the following:
 - Design of this project must be undertaken in accordance with the following reports:
 - Riverside Drive Land Sanitary Sewer Servicing Study prepared by IBI Group, May 2021
 - Riverside Drive Area Brief in Support of Development of Lands Within the Riverside Drive Planning Area prepared by Cumming Cockburn & Associates Limited, May 1986
 - Stormwater Management for Riverside Drive Lands prepared by Cumming Cockburn
 & Associates Limited, April 1987
 - Riverwalk Park Stormwater Management Facility Update Stormwater Design Plan prepared by Novatech Engineering, June 1996
 - There may be area specific SWM Criteria within SWM and/or Sub-watershed studies that may apply, please check.
 - Quality control requirements to be provided by Rideau Valley Conservation Authority (RVCA).
 - The applicant has indicated that they intend to connect to the existing River Walk Stormwater Management Pond, located to the north of the site. The Stormwater Management Report must discuss the capacity and design of the existing pond and confirm that the additional flows will not adversely affect the function of the pond. The minor system capture must be limited to the allocated capacity of the existing SWM facility. The original design report for the pond indicates that only approximately 50% of the subject site is included within the drainage area for the pond. The Consultant must review whether the pond drainage area still meets the design intent to assess whether the pond can accept the proposed drainage area.



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5. Deep Services:

i. A plan view of the approximate services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of available future services is:

a. Connections:

- i. Existing 900 mm dia. STM (Conc.) (to be extended to the property line)
- ii. Existing 406 mm dia. Watermain (PVC)
- iii. Existing 525 mm dia. SAN (Conc.) (may need to be extended beneath City park to be confirmed by the civil consultant)
- ii. The designer should be aware there may be limited capacity in the downstream sanitary sewer system. The sanitary demand needs to be coordinated with the City Planning Dept. to determine if the existing sanitary sewer system has sufficient capacity to support a rezoning. Please provide sanitary demands to the City project manager for coordination. The proposed flows should not exceed those accounted for in the 2021 update of the Riverside Drive Lands Sanitary Sewer Servicing Study Update by IBI.
- iii. As identified in the Sanitary Sewer Servicing Study by IBI (2021), the proposed sanitary sewer will be extended to the south, beneath the Hunt Club Bridge, to service properties along Riverside Drive. The location, depth and size of the sewer must be in accordance with the servicing study. The sewer may qualify as a Development Charge project however that won't be determined until mid-2022 and the DC by-law update is scheduled for +/-2024. Per Infrastructure Planning, a cost sharing agreement between the City and all benefitting parties would be preferred. Development Review would be managing this and would need support from CREO and Legal. CREO has indicated that they have been in talks with Taggart and Dymon, and are prepared to enter into some form of agreement for the sanitary sewer extension.
- 6. Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission. 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 connection(s)
ii.	Type of development and the amount of fire flow required, as per FUS (1999), including calculations.
iii.	Average daily demand: l/s.
iv.	Maximum daily demand:l/s.
٧.	Maximum hourly daily demand: l/s.
vi.	Hydrant location and spacing to meet City's Water Design guidelines.



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- vii. Water supply redundancy will be required for more than 50 m3/day water demand. Provide watermain looped connection or with isolation valve to meet this requirement.
- 7. If required, Phase 1 Environmental Site Assessment (ESA) 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. The ESA may provide recommendations where site contamination may be present. The recommendations from the ESA need to be coordinated with the servicing report to ensure compliance with the Sewer Use By-Law.
- 8. MECP ECA Requirements All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);
 - a. The consultants determine if an approval for sewage works under Section 53 of OWRA is required and determines what type of application. The City's project manager may help confirm and coordinate with the MECP as required.
 - b. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
 - Pre-consultation is not required if applying for standard or additional works (Schedule A
 of the Agreement) under Transfer Review.
 - d. Pre-consultation with local District office of MECP is recommended for direct submission.
 - e. Consultant completes an MECP request form for a pre-consultation. Send request to moeccottawasewage@ontario.ca
 - f. ECA applications are required to be submitted online through the MECP portal. A business account required to submit ECA application. For more information visit https://www.ontario.ca/page/environmental-compliance-approval

NOTE: Site Plan Approval, or Draft Approval, is required before an application is sent to the MECP.

- 9. There are significant geotechnical considerations for this site due to the proximity to the Rideau River. The geotechnical report must thoroughly consider the slope stability of the site and establish the limits of hazard lands, per the Ministry and City's guidelines.
- 10. General Engineering Submission requirements:
 - a. As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
 - b. All required plans are to be submitted on standard A1 size sheets (594mm x 841mm) sheets, utilizing a reasonable and appropriate metric scale as per City of Ottawa Servicing and Grading Plan Requirements: title blocks are to be placed on the right of the sheets and not along the bottom. Engineering plans may be combined, but the Site Plans must be provided separately. Plans shall include the survey monument used to confirm datum. Information shall be provided to enable a non-surveyor to locate the survey monument presented by the consultant.
 - c. All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, ext. 21447 or by email at eric.harrold@ottawa.ca.