

APPENDIX C: Servicing and Stormwater Report (TMIG)

RICHMOND HILL REGIONAL CENTRE SECONDARY PLAN

SERVICING NEEDS ASSESSMENT

FINAL ▪ OCTOBER 2021

REPORT PREPARED FOR



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TMIG PROJECT NUMBER 19132



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1 INTRODUCTION

The Richmond Hill Regional Centre has been identified in Ontario's Places to Grow, the Region's Official Plan, Richmond Hill's Official Plan, and Markham's Official Plan as an area of intensification. In addition to this growth, the Richmond Hill Official Plan has also designated the Yonge Street corridor as an Urban Corridor that will accommodate some of the City's provincially mandated intensification.

The Municipal Infrastructure Group Ltd. (TMIG) has been retained by Urban Strategies to conduct a servicing analysis to assess the existing sanitary sewer, storm sewer and watermain systems in the study area and the capacity for the potential redevelopment of the Richmond Hill Regional Centre.

This report is based on the Servicing Background Report submitted July 2019 and further summarises the servicing opportunities and constrains based on the updated land statistics in the planned intensification of the area.

2 WATER

Water is supplied to the City of Richmond Hill from York Region. The Region is responsible for bulk supply, treatment, and storage of water to its nine local municipalities – including the City of Richmond Hill.

In general, water is treated and pumped by the Region, and transferred to the local municipalities through a series of large-diameter transmission mains. The City then distributes the water through smaller-diameter mains to the local customers.

2.1 Existing Water Distribution System

The Richmond Hill Regional Centre is located within the southern limit of York Pressure District 6 (PD6). PD6 water supply is provided via three PD6 booster pumping stations within York Region plus PD6 feeds from Peel Region and water from PD5 which originates in the City of Toronto.

A map of the existing watermain network with the proposed streets and blocks is provided as an appendix to this report.

2.2 Design Criteria

The City of Richmond Hill *Standards and Specification Manual* (last updated February 2019) was used to outline the design criteria to be utilized in any proposed infrastructure.

Table 2-1 outlines the design criteria to be used for watermains within the City of Richmond Hill.

Table 2-1 Watermain Design Criteria

Consumption Rates:	
Average Daily Demand	365 Lpcd
Peak Daily Demand	545 Lpcd
Peak Hourly Demand	910 Lpcd
Pressures:	
Minimum Pressure during Maximum Day and Peak Hourly Demand	275 kPa (40 psi)
Maximum Pressure during Minimum Hour Demand	690 kPa (100 psi)

Minimum Fire Flow Pressure under Fire Flow plus Maximum Daily Demand	140 kPa (20 psi)
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2.3 Water Demands from the RHC Intensification

Based on the currently-contemplated densities – which will be finalised through the Secondary Plan Process – the build-out water demands for the RHRC are as outlined in Table 2-2.

Table 2-2 Projected Water Demands

Component	Design Basis	Value
Residential Units		13,083
Residential Population	2.2 persons/unit	28,128
Residential Average Day Demand	365 Lpcd	119 L/s
Residential Maximum Day Demand	1.5 Max Day Factor	177 L/s
Residential Peak Hour Demand	2.5 Peak Hour Factor	296 L/s
Employment Floor Area		367,900 m ²
Employment Average Day Demand	Retail: 37m ² /job; Office: 21m ² /job	17 L/s
Employment Maximum Day Demand	1.4 Max Day Factor	24 L/s
Employment Peak Hour Demand	2.4 Peak Hour Factor	24 L/s

2.4 Servicing Recommendations from Recent Studies

2.4.1 York Region – Yonge Street / Highway 7 Regional Centre Water and Wastewater Servicing Class EA

The Class EA (TMIG, 2015) considered required improvements to the Region’s water facilities to supply the projected population projections within Richmond Hill Centre and Langstaff Gateway (Markham) area. The RHRC population and employment projections considered at the time were 15,800 residents and 15,700 jobs, as identified in the Region’s June 23, 2011 Planning and Economic Development Committee Council Report.

The Class EA Process identified a new connection to the Regional 1050 mm watermain near Highway 7 and Yonge Street. The other proposed improvements from the Class EA study were related with the realignment of the watermain on

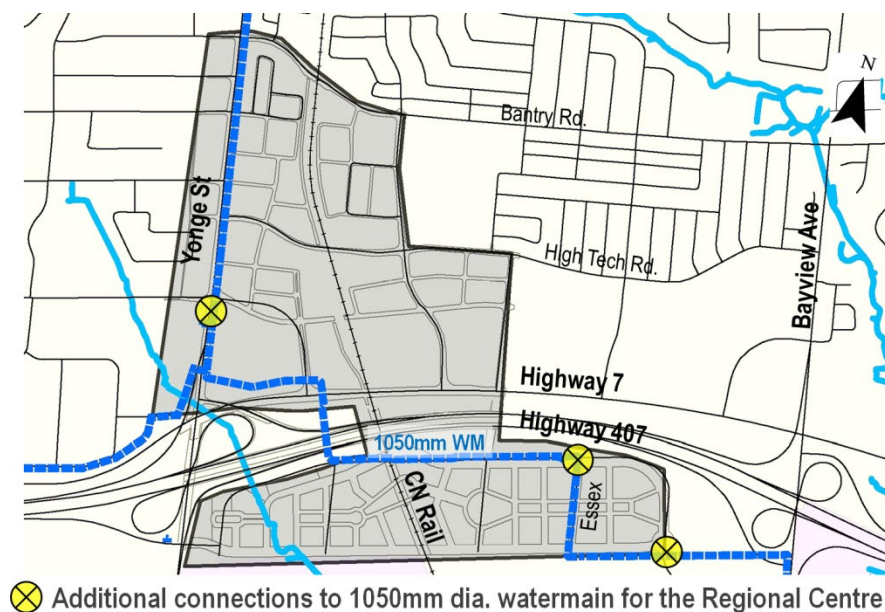
Langstaff Road and two connections within the Langstaff Gateway lands (both within the City of Markham). The following is an excerpt from the Region’s Class EA Report:

“The Preferred Regional Centre improvements identified as Alternative 4 in the Class EA include the following improvements that are shown in [Figure below]:

- Upgrade the existing connection to a 1050 x 400 connection at the intersection of the existing watermain easement and Langstaff Road within the City of Markham;
- New 1050 x 400 connection at the southern end of Essex Avenue within the City of Markham; and,
- New 1050 x 400 connection within the Town of Richmond Hill.

Although 300mm branch connections would be adequate, we are proposing to oversize the connections to provide flexibility in the future to provide the required water servicing requirements for the Regional Centre as per the short term and long term residential/employment demand criteria established by City of Markham/Town of Richmond Hill and Regional fire flow requirements identified in the Class EA study. It is expected that the branching watermains from these three connections will be smaller than 400mm, and reducers will be required outside the chambers. The proposed chambers will be operated by York Region, however the watermain outside the chambers will be operated by the local municipality.”

Figure 2-1 Regional Water Servicing Plan (from Class EA)



While the design of these facilities has not yet commenced, it is our understanding that these recommendations are still current.

2.4.2 Urban Master Environmental Servicing Plan Update

The Urban MESP study completed in 2014 is currently being updated based on updated growth forecasts. This updated study is currently in progress, and will be updated based on the population and employment projections from the Secondary Plan process.

2.5 Water Servicing Recommendations

The RHRC lands are presently serviced from Your Region Pressure District 6 (PD-6), and the existing proposed elevations of the lands are suitable for servicing from this pressure district.

While the formal review of the watermain capacities has not yet been completed, the lands are presently serviced. It is anticipated that some new watermains will need to be replaced as they are in locations that do not suit the proposed streets and blocks layout. New watermains are anticipated within new rights-of-way.

The existing fire servicing to the large-format employment areas is anticipated to be in the order of what will be required for the proposed built form. Fire flows in the order of 300-350 L/s are anticipated. These are generally available through a network of 300 mm watermains.

It is anticipated that all new development will need to have an adjacent 300 mm watermain to achieve the required residual pressures under peak hour demands (275 kPa) and under maximum day plus fire flow scenario (140 kPa). Buildings greater than 85 in height (typically approximately 85 storeys) will require two fire service connections, to watermains on adjacent streets which can be isolated through line valves in the network. The ultimate water distribution network will ensure that tall buildings are appropriately protected.

The proposed Water Servicing Plan is provided at the end of this report.

3 WASTEWATER

Wastewater is collected through sewer system within local roads and directed to trunk sewers. The trunk sewers are maintained by York Region and conveys sewage to a variety of sewage treatment plants and pumping stations. The Region is responsible for collection, and treatment of wastewater in its nine local municipalities – including the City of Richmond Hill.

In general, wastewater is collected and conveyed southbound towards treatment plants and discharge locations through large trunk sewers. The City is responsible for maintaining local sewers that discharge to the trunk sewers.

3.1 Existing Wastewater Collection System

A map of the existing collection system with the proposed streets and blocks is provided as an Appendix to this report.

3.1.1 Local City System

The Study Area is generally divided into three sewersheds:

1. Lands West of Yonge Street, which are serviced via a 450 mm sanitary sewer along the watercourse;
2. Lands Between Yonge Street and the Railway, which are directed to an existing 600 mm sanitary sewer on Yonge Street; and,
3. Lands East of the Railway, which are directed south to the 600 mm sanitary sewer crossing the railway.

All wastewater from the Study Area is currently conveyed to the Central Collector which begins near Yonge Street and Highway 7.

3.1.2 Regional Facilities

The Regional Centre is currently within the existing Central Collector (also known as the Pomona Creek Collector) drainage area. The Central Collector connects to the Bayview Collector, which eventually discharges to the Leslie St SPS. The Central Collector cannot accommodate the proposed Richmond Hill Centre/Langstaff Gateway Urban Growth Centre buildout flows.

The Region studied alternatives for servicing the long-term intensification of the Centre through their Yonge Street / Highway 7 Regional Centre Water and Wastewater Servicing Class EA, completed in 2015 by TMIG.

3.2 Design Criteria

The City of Richmond Hill *Standards and Specification Manual* (last updated February 2019) was used to outline the design criteria to be utilized in any proposed infrastructure.

Table 3-1 outlines the design criteria to be used for sanitary sewers within the City of Richmond Hill.

Table 3-1 Wastewater Design Criteria

Average Flow	365 L/person/day (though the City is considering the use of alternative design standards for high density applications)
Peaking Factor	Harmon
Commercial Average Flow	180,000 L/floor hectare/day (including I/I and peaking)
Industrial Average Flow	180,000 L/floor hectare/day (including I/I and peaking)
Cover (to obvert)	2.5m (residential and industrial areas)

3.3 Wastewater Design Flows from the RHC Intensification

Based on the currently-contemplated densities – which will be finalised through the Secondary Plan Process – the build-out water demands for the RHRC are as outlined in Table 3-2.

Table 3-2 Projected Wastewater Design Flows

Component	Design Basis	West of CNR	East of CNR	Total
Residential Units		8,487	4,595	13,083
Residential Population	2.2 persons/unit	18,248	9,880	28,128
Residential Average Flow	365 Lpcd	77 L/s	42 L/s	119 L/s
Residential Peak Flow	Harmon Peaking Factor	234 L/s	146 L/s	380 L/s
Residential Design Flow	Adds 0.26 L/ha/s Extraneous Flow	238 L/s	148 L/s	386 L/s
Employment Floor Area		243,400 m ²	124,500 m ²	367,900 m ²
Employment Design Flow	Retail: 37m ² /job;			

3.4 Servicing Recommendations from Recent Studies

3.4.1 York Region – Yonge Street / Highway 7 Regional Centre Water and Wastewater Servicing Class EA

The Class EA Study (TMIG, 2015) preferred wastewater solution includes the existing Central Collector remaining in place and a new wastewater sewer that connects to the Richmond Hill Collector. The preferred wastewater solution is shown in Figure 3-1.

The existing Central Collector is required to remain in operation. From the Class EA Study, there is remaining capacity within the Central Collector. To optimize the remaining capacity of the Central Collector, the wastewater drainage areas will need to be revised and the CN Rail Tracks serves as a drainage divide, with the west portion remaining within Central Collector and the east side will be diverted from the Central Collector to the Richmond Hill Collector.

Figure 3-1 Regional Wastewater Servicing Plan (from Class EA)



The connection point between the proposed Highway 7 sewer and the existing Richmond Hill sewer on Red Maple Road allows for the diversion of the east side flows to the Richmond Hill Collector. Additional sewer re-alignments would be required south of the connection point to ensure all flows are diverted to the new Highway 7 sewer.

The Region’s Class EA was based on a previous Development Plan concept which would have added 31,500 people plus jobs to the RHRC Area, with approximately 15,900 people and jobs contributing flows to the Central Collector (see Table 3-3. The current planning considerations identify a total 44,500 people and jobs within the RHRC area, with approximately 29,100 identified on the west side of the CNR. As such, we anticipate that wastewater from a combined 13,200 people plus jobs (at a minimum) would need to be directed from the west side of the tracks to the east, in order to limit the flows to the Central Collector to approximately what was planned through the Region’s Class EA.

Table 3-3 West-to-East Transfer Calculations

Population (Residents+Jobs)	Yonge Street / Hwy 7 Class EA	RHRC Secondary Plan	Change
Residential	15,800	28,128	+12,328
Employment	15,700	16,132	+621
East-West Split	Population + Employment	West (to Central Collector)	East (to New Hwy 7 Trunk)
Yonge Street/Hwy 7 Class EA (York)	31,500	15,900	15,600
RHRC Secondary Plan	44,500	29,100	15,400
Required Transfer		-13,200	+13,200
Net Serviced Population		15,900	28,600

While a population of 15,900 was contemplated to be conveyed from the RHRC lands to the Central Collector at the time of the Region’s Class EA, the Region may need to consider an alternative strategy to address intensification within Richmond Hill outside of the RHRC area, as well as intensification within the Langstaff Gateway (Markham) portion of the overall Regional Centre. As such, the Region may need to re-assess contributions to the Central Collector.

3.5 Wastewater Servicing Recommendations

While the formal review of the existing sewer capacities has not yet been finalised, the lands are presently serviced. It is anticipated that some new sewers will need to be replaced as they are in locations that do not suit the proposed streets and blocks layout. New sewers are anticipated within new rights-of-way.

In order to facilitate establishing a new west-east drainage boundary to ensure that enough wastewater generated within the RHRC is directed east to the new Regional Trunk Sewer, a new sewer along the north-south roadway immediately east of Yonge Street is proposed. This new sewer would convey the wastewater south towards the stormwater pond block, which represents the lowest elevation within the Study Area. From this location, there are two alternatives to conveying the flows to the proposed Regional trunk sewer on the east side of the CNR:

1. The preferred option would be a gravity sewer under the railway to the western limit of the proposed trunk sewer on Red Maple Road;
2. A secondary option would be to pump the wastewater under the railway, from a new sewage pumping station which could potentially be located in the southeast corner of the park block which has been identified to the north of the SWM pond block.

While a preliminary review of the sewer grades for the new Regional Trunk Sewer indicate that a gravity solution may be feasible, there are still many unknowns associated with the TTC Subway extension into the Station Block. A new west-to-east gravity sewer would need to avoid the proposed TTC extension, as well as be deep enough to get under the CNR (to be coordinated through CN). Without details of the TTC extension and potential underground interferences, it is impossible to confirm whether a gravity solution would be viable. The advantage of the secondary “pumped” solution is that a forcemain across the TTC/rail corridor would be of smaller diameter, and also able to be installed deep enough to avoid underground interferences but also then be raised to meet the discharge location at the Region’s proposed trunk sewer.

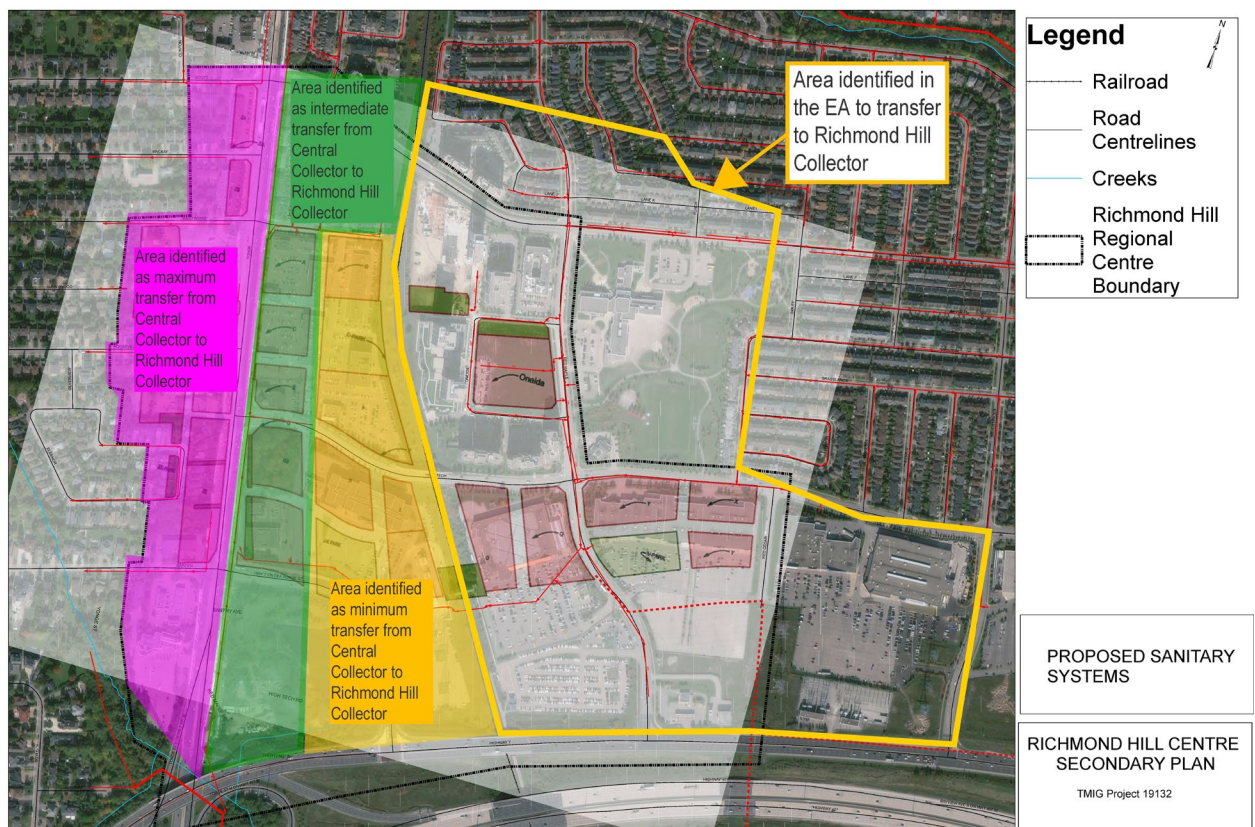
And while wastewater from only 13,200 residents plus jobs would need to be transferred from the Central Collector to the New Highway 7 trunk sewer to meet the servicing objectives of the Region’s Class EA, there may be a need for the Region to consider an even greater west-to-east transfer. The following options are available:

1. Minimum Transfer: This would divert the area west of the railway and east of Yonge Street (*except the parcels fronting onto Yonge Street*) to the new Highway 7 Trunk sewer. This would transfer approximately 14,000 people plus jobs away from the Central Collector, achieving the calculated transfer from Table 3-3;
2. Intermediate Transfer: This would add to the Minimum Transfer Area the parcels on the east side of Yonge Street. As those blocks are redeveloped, the sanitary services for those parcels could be transferred from the existing Yonge Street sewer to a new sewer along the proposed north-south street to the east of Yonge. It is likely not feasible to connect the properties on the west side of Yonge Street across to the east due to the existing underground infrastructure along Yonge.
3. Maximum Transfer: Divert Richmond Hill’s Yonge Street sewer east at Garden Avenue and under the railway to the proposed trunk along Red Maple Road. This would effectively divert the entire RHRC area – plus a portion of the Yonge Street corridor to the north of the Centre – to the east.

These options are presented in Figure 3-2.

In order to achieve the Intermediate and Maximum Transfers above (diverting the wastewater flows from the entire RHRC away from the Central Collector), a new Regional Sewage Pumping Station may be required. Given the area and the volume of flows being transferred, and present uncertainties as to the subsurface configuration of the railway/subway corridor, it is advantageous to consider that an SPS will likely be required. There may be gravity solutions available, but – without more detailed Subway construction plans – it is impossible to confirm whether these are feasible at this time. It is proposed that this new facility be Region-owned as it will be diverting flows between two Regional trunk sewers, and it will provide additional benefit to the Markham component of the overall Regional Centre.

Figure 3-2 Revised Sanitary Drainage Areas



The proposed Wastewater Servicing Plan is provided at the end of this report.

4 STORMWATER

4.1 Existing Stormwater System

The study area is within the Don River watershed. An existing SWM pond is located at the northeast corner of Yonge Street and Highway 7. The approximate tributary area to the facility is 120 ha which includes the portion of the Study Area east of Yonge Street. The storm pipe that conveys the flows from Yonge Street is 1500mm diameter pipe and the storm pipe that conveys the flows from the study area to the pond is two 2400mmx3000mm box pipes. This SWM pond discharges into a crossing under Highway 7 and Highway 407. This SWM pond is currently within TRCA's regulated limit. However, TRCA staff has indicated that an updated floodplain model shows that this pond is outside of the floodplain and the pond will be removed from the regulation limit.

Based on the Langstaff Centre Community Design Brief Stormwater Management Pond Western Drainage Area dated April 1994 prepared by Marshall Macklin Monaghan, this pond has a tributary area of approximately 120ha with an imperviousness of 75% and provides the following water quality and water quantity treatment levels:

- Water quality
 - retention of runoff from 25mm storm for 24hours and storage for 25mm storm event
 - 75% TSS removal
- Water quantity
 - control post to pre-development flows for the 2 through 100 year storm events

The pond storage volumes are documented in Table 4-1.

Table 4-1 Existing Stormwater Pond Storage Volumes

	Elevation (m)	Volume Required (m³)	Volume Provided (m³)
Permanent Pool	186.0-188.0	8,000	9,500
Water Quality Active Storage	188.0-189.85	21,880	22,600
Water Quantity	189.85 - 192.0	51,350	56,700
Additional Regional Freeboard	192.0 – 192.75	69,740	70,700

A 375mm diameter orifice was designed to control the runoff from the 25mm storm and retain it for 24hours. A weir 1.8m wide set at an elevation of 189.85m was designed to control the 2 through 100 year storm events. The outfall is a 3.0m x 1.5m culvert that connects to the crossing under Highway 7 and Highway 407.

The outflows from the design report are provided in Table 4-2.

Table 4-2 Stormwater Pond Design Outflows

Storm Frequency	Outflow (m³/s)
2yr	0.65
5yr	1.89
25yr	4.40
100yr	6.68

A map of the existing storm sewer network is provided as an attachment to this report.

4.2 Stormwater Design Criteria

Future developments are to be designed according to the policies set out by the City, Toronto and Region Conservation Authority (TRCA), and Ministry of Environment, Conservation and Parks (MECP) using the following documents:

- The City of Richmond Hill *Standards and Specification Manual* (last updated February 2019)
- MECP, *Stormwater Management Planning and Design Manual*, dated March 2003

- TRCA, *Stormwater Management Criteria*, dated August 2012

The general criteria for stormwater management is as follows:

- Volume / Erosion Control: Minimum volume control criterion is on-site retention of the first 5 mm of precipitation. If the site requires a pond, then the retention of the 25 mm storm for 48 hours is required.
- Water Balance: City sustainability metrics require on-site retention of the first 5 mm of precipitation, for all new Site Plan development.
- Water Quantity Control: Minimum water quantity criterion is to control post-development peak flows to pre-development levels for all storms up to and including the 100-year storm. If the site is 5 ha. or more and drains to the Don River watershed, the quantity requirement is unit flow relationships as shown in Table 4-3.
- Water Quality Control: Minimum Level 1 (enhanced) water quality control required.

Table 4-3 Don River Watershed Sub-Basin Unit Peak Flows (from TRCA)

Sub-Basin Number	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
22	0.0046	0.0092	0.0132	0.0172	0.0209	0.0252
26	0.0038	0.0074	0.0107	0.0137	0.0166	0.02
29	0.0035	0.0069	0.0102	0.0133	0.0161	0.0196
30	0.0033	0.0053	0.0076	0.0097	0.0117	0.0143

Generally, the design criteria, as set out in The City of Richmond Hill Standards and Specification Manual (last updated February 2019), the storm sewers are to be designed to convey the 5 year frequency storm event using the IDF curves provided in the City’s Manual (Table 4-4) unless otherwise directed by the City.

Table 4-4 IDF for 2 to 100 year events (source: City Design Manual)

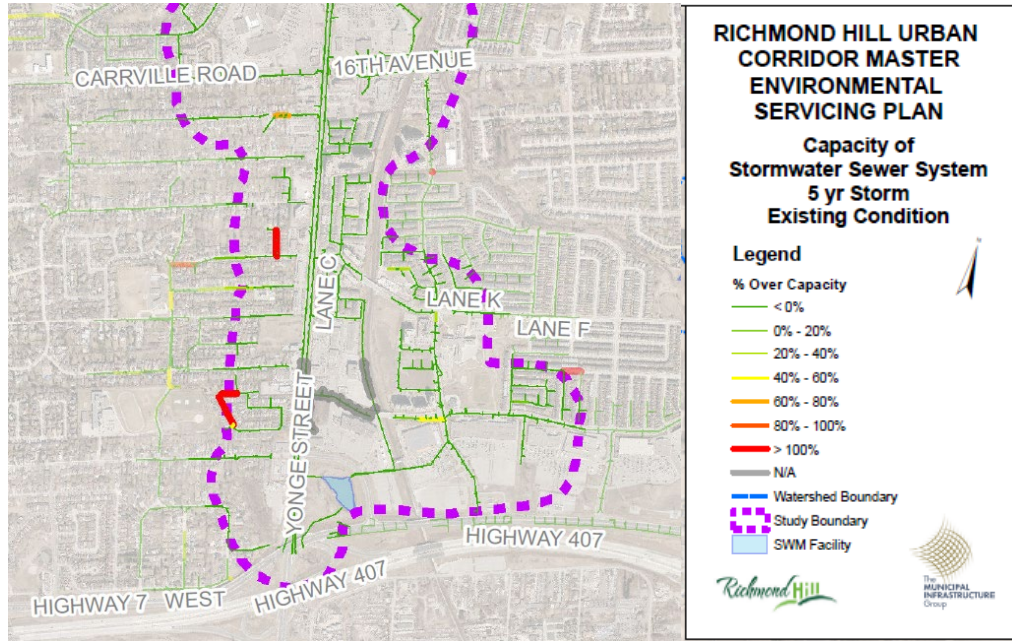
Return Frequency	Intensity
2 year	$i = 641(T+4)^{-0.7821}$
5 year	$i = 991(T+4)^{-0.8080}$
10 year	$i = 1129(T+4)^{-0.8191}$
25 year	$i = 1530(T+4)^{-0.8287}$
50 year	$i = 1752(T+4)^{-0.8337}$
100 year	$i = 1977(T+4)^{-0.8382}$

4.3 Servicing Recommendations from Recent Studies

4.3.1 2014 Urban Master Environmental Servicing Plan

The Richmond Hill Urban Master Environment Servicing Plan (MESP) was completed in May 2014. A new updated MESP is currently underway but is not available at this time. Based on the MESP completed in 2014, the study area has no capacity issues as shown on Figure 4-1. The study involved using InfoSewer to replicate the existing storm drainage network. The study concluded that current stormwater management requirements (water quality, volume and peak flow control) continue to be appropriate within the context of the urban structure framework defined by the Official Plan, and in fact will constitute a net improvement over existing conditions with respect to the quality, rate and volume of runoff delivered to the municipal drainage systems and ultimately receiving watercourses.

Figure 4-1 Existing Conditions in the Storm Sewer System



Based on the Richmond Hill MESP completed in May 2014, some potential storm sewer capacity issues are anticipated upon full buildout of the RHRC. Potential constraints were identified along Eleanor Circle, Mackay Drive, High Tech Road, and Red Maple Road. All local sewers will be reviewed for adequate storm sewer capacity as part of this Study.

The following ‘Secondary Plan Scale’ and ‘Development Scale’ recommendations were identified in the MESP, and are repeated here for reference and consideration – as appropriate – in the Secondary Plan Study:

- Secondary Plan Scale: [...] The Richmond Hill Centre Secondary Plan area includes an existing SWM facility at northeast corner of Yonge Street and Highway 7. This Secondary Plan should include provisions to maintain this land use and the function of this existing SWM facility which provides treatment for a portion of the Richmond Hill Centre.

All of the Secondary Plans should have policies to require the submission of a Functional Servicing Report (FSR) with development applications to demonstrate conformity to the Urban MESP and more specifically a minor and major drainage system assessment to confirm adequate outlets and capacity are available and to demonstrate conformity to the MESP stormwater management plan. The FSR should provide details of the proposed on-site measures for quality and quantity control, and volume control through the use of feasible LID measures. The Secondary Plans

should require that the FSR storm drainage and SWM analysis be completed in accordance with Town and TRCA standards.

All of the Secondary Plans should include policies to encourage or support the use of LID measures and more specifically the use of enhanced on-site volume control in accordance with the Urban MESP and the Town's Sustainable Design Criteria (Section 7.4.3).

- **Development Scale:** Development applications within the study area should be required to submit a Functional Servicing Report (FSR) to demonstrate conformity to the Urban MESP and more specifically a minor and major drainage system assessment to confirm adequate outlets and capacity are available and to demonstrate conformity to the MESP stormwater management plan. The FSR should provide details of the proposed on-site measures for quality and quantity control, and volume control through the use of feasible LID measures. The FSR storm drainage and SWM analysis should be completed in accordance with Town and TRCA standards. Minor system drainage design sheets in accordance with Town standards shall be submitted at the detailed site plan design stage to verify system capacity.

4.4 Stormwater Servicing Recommendations

Overall, the redevelopment of the RHRC presents an opportunity to reduce the runoff to existing city sewers, as the overall imperviousness of the RHRC lands is anticipated to decrease, through the inclusion of new parks and open spaces. Any new buildings will be designed to the current SWM standards, including the addition on site-controls to limit the release rate of stormwater to the municipal network. Any new streets incorporated into the RHRC will represent “uncontrolled” sources for stormwater runoff, but many of these will be located within existing built areas or parking lots, which are effectively close to 100% impervious in their current conditions.

Because the proposed redevelopment represents a net reduction in the total runoff from the RHRC, it is anticipated that no modifications to the existing storm pond (configuration or volume) are required.

The existing local storm sewer system appears to generally line-up with the proposed road network. There are some instances where existing storm sewers will need to be relocated to accommodate proposed new development blocks.

The Viva Next BRT project on Yonge Street will likely introduce restrictions on the feasibility of Yonge Street service connections for properties along Yonge Street.

Service connections may have to be focussed on local or new City side streets or on easements abutting Yonge Street.

A large 1800mm x 2400mm concrete box storm sewer flowing from north to south on the west side of the railway is recommended to be maintained in its current alignment due to the high cost of realignment. Road network may require slight modifications in this area. As an alternative, it may be possible to relocate a portion of this culvert to the new internal street identified immediately to the west of the rail corridor.

5 COORDINATION WITH OTHER STUDIES

As this present Study progresses, there might be other studies or development plans advanced which might need to inform this Study, or have the potential to be informed by this study.

The Toronto Transit Commission is considering options for the Yonge Subway Extension, and the ultimate station design and construction could conflict with key components of the buried municipal infrastructure. This study will assume that the base function of all existing infrastructure will be restored in all instances where elements of the infrastructure need to be realigned or relocated. This also applies to the function of the existing stormwater management pond, which might ultimately need to be reconfigured (be it to accommodate the Transit Hub, or even reconfigured to accommodate a revised road network).

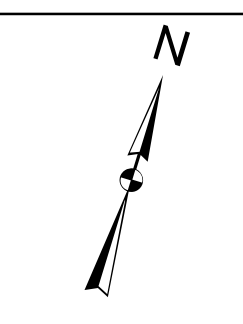
There are also active and potential future development applications within the RHRC. As functional servicing reports are developed for those properties, any new infrastructure or infrastructure improvements should be reviewed in the context of this present study to minimise the potential for infrastructure to be constructed in the short-term which does not align with the ultimate long-term servicing objectives of the RHRC as a whole.

APPENDIX A

PRELIMINARY SERVICING FIGURES



Legend



- Railroad
- Road Centrelines
- Creeks
- Richmond Hill Regional Centre Boundary
- Proposed Water Network
- Regional Watermain
- City Watermain

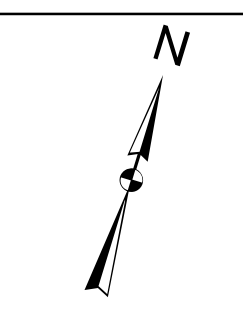
PROPOSED WATER SYSTEMS

RICHMOND HILL CENTRE SECONDARY PLAN

TMIG Project 19132



Legend



- Railroad
- Road
- Centrelines
- Creeks
- Richmond Hill Regional Centre Boundary
- EX Regional Sanitary Sewer
- Ex City Sanitary Sewer
- Future Highway 7 Sanitary Trunk (Region)
- Proposed Sanitary Sewers

PROPOSED SANITARY SYSTEMS

RICHMOND HILL CENTRE SECONDARY PLAN
 TMIG Project 19132

If Gravity not Feasible, then Sewage Pumping Location for West to East Transfer

Existing Sewer Removal

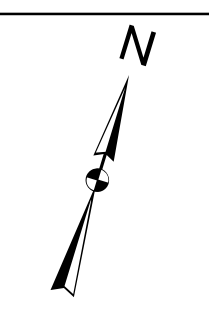
Future Highway 7 trunk to Richmond Hill Collector






Future connection to Trunk

Central Collector



Legend



-  Regional Storm Sewer
-  City Storm Sewer
-  Railroad
-  Road Centrelines
-  Creeks
-  Richmond Hill Centre Boundary

PROPOSED STORM SYSTEMS

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