

Chapter 2

Confirmation and Description of Components

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The Regional Municipality of Durham

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Contents

2.	Confirmation and Description of Components	1
2.1	Overview	1
2.2	Infrastructure Located in East Gwillimbury	2
2.3	Infrastructure Located in Newmarket/Aurora	12
2.4	Leslie Street Trunk Sewer	22
2.5	Markham Collector Twinning	27
2.6	Primary Trunk Twinning	29
2.7	Duffin Creek WPCP Expansion	31
2.8	Duffin Creek WPCP New Outfall	33

Table index

Table 2.1	York Region Sewage Works Project List	1
Table 2.2	2nd Concession SPS Upgrade (Y6) Project Information	3
Table 2.3	Queensville West SPS Upgrade (Y7) Project Information	4
Table 2.4	Holland Landing SPS Upgrade (Y8) Project Information	5
Table 2.5	Newmarket East SPS (Y9-A) Project Information	6
Table 2.6	Newmarket East SPS Force mains (Y9-B) Project Information	7
Table 2.7	Queensville East SPS (Y11-A) Project Information	8
Table 2.8	Queensville East SPS Force mains (Y11-B) Project Information	9
Table 2.9	2nd Concession North Gravity Sewer (Y12-A) Project Information	10
Table 2.10	2nd Concession South Gravity Sewer (Y12-B) Project Information	11
Table 2.11	Aurora East SPS Gravity Interconnection (Y3-A) Project Information	13
Table 2.12	Aurora East SPS (Y3-B) Project Information	14
Table 2.13	Aurora East SPS Force mains (Y3-C) Project Information	15
Table 2.14	Newmarket SPS Upgrade (Y4) Project Information	16
Table 2.15	Bogart SPS Upgrade (Y5) Project Information	17
Table 2.16	Aurora SPS Gravity Sewer Twinning (Y10) Project Information	18
Table 2.17	Leslie Street Trunk Sewer Phase 3 (Y13-A) Project Information	19
Table 2.18	Mulock SPS (Y13-B) Project Information	20
Table 2.19	Mulock SPS Force mains (Y13-C) Project Information	21
Table 2.20	Leslie Street Trunk Sewer Phase 1 (Y1-A1) Project Information	23
Table 2.21	Leslie Street Trunk Sewer Phase 2 (Y1-A2) Project Information	24
Table 2.22	Yonge Street Sewer Rehabilitation (Y1-B) Project Information	25
Table 2.23	Bloomington Interceptor Sewer (Y-14) Project Information	26
Table 2.24	Markham Collector Twinning (Y2) Project Information	27
Table 2.25	Primary Trunk Sewer Twinning (P3) Project Information	29
Table 2.26	Duffin Creek WPCP Upgrades and Stage 4 Expansion (P1) Project Information	31

Figure index

Figure 2.1	Map of Study Area for 2nd Concession SPS (Y6) Upgrade Project	3
Figure 2.2	Map of Study Area for Queensville West SPS Upgrade (Y7) Project	4
Figure 2.3	Map of Study Area for Holland Landing SPS Upgrade (Y8) Project	5
Figure 2.4	Map of Study Area for Newmarket East SPS (Y9-A) Project	6
Figure 2.5	Map of Study Area for Newmarket East SPS Forcemains (Y9-B) Project	7
Figure 2.6	Map of Study Area for Queensville East SPS (Y11-A) Project	8
Figure 2.7	Map of Study Area for Queensville East SPS Forcemains (Y11-B) Project	9
Figure 2.8	Map of Study Area for 2nd Concession North Gravity Sewer (Y12-A) Project	10
Figure 2.9	Map of Study Area for 2nd Concession South Gravity Sewer (Y12-B) Project	11
Figure 2.10	Map of Study Area for Aurora East SPS Gravity Interconnection (Y3-A) Project	13
Figure 2.11	Map of Study Area for Aurora East SPS (Y3-B) Project	14
Figure 2.12	Map of Study Area for Aurora East SPS Forcemains (Y3-C) Project	15
Figure 2.13	Map of Study Area for Newmarket SPS Upgrade (Y4) Project	16
Figure 2.14	Map of Study Area for Bogart SPS Upgrade (Y5) Project	17
Figure 2.15	Map of Study Area for Aurora SPS Gravity Sewer Twinning (Y10) Project	18
Figure 2.16	Map of Study Area for Leslie Street Trunk Sewer Phase 3 (Y13-A) Project	19
Figure 2.17	Map of Study Area for Mulock SPS (Y13-B) Project	20
Figure 2.18	Map of Study Area for Mulock SPS Forcemains (Y13-C) Project	21
Figure 2.19	Map of Study Area for Leslie Street Trunk Sewer Phase 1 (Y1-A1) Project	23
Figure 2.20	Map of Study Area for Leslie Street Trunk Sewer Phase 2 (Y1-A2) Project	24
Figure 2.21	Map of Study Area for Yonge Street Sewer Rehabilitation (Y1-B) Project	25
Figure 2.22	Map of Study Area for Bloomington Interceptor Sewer (Y-14) Project	26
Figure 2.23	Map of Study Area for Markham Collector Twinning (Y2) Project	28
Figure 2.24	Map of Study Area for Primary Trunk Sewer Twinning (P3) Project	30
Figure 2.25	Map of Study Area for Duffin Creek WPCP Upgrades and Stage 4 Expansion (P1) Project	32
Figure 2.26	Map of Study Area for Duffin Creek WPCP New Outfall (P2) Project	34

2. Confirmation and Description of Components

2.1 Overview

This chapter describes the projects in each study area of the York Region Sewage Works Project. The tables in this section highlight important details on each project that will be explained further in subsequent chapters, including a Class 5 capital cost estimate, in-service date required, existing infrastructure, address and length and diameter for linear components, where applicable. The projects within the York Region Sewage Works system have been assigned unique identifications, which are denoted with “Y”, “P”, or “D” in the tables below. Table 2.1 displays the project identifications along with their corresponding names.

Table 2.1 York Region Sewage Works Project List

Project identification	Project name
North YDSS Expansion	
Y1-A1	Leslie Street Trunk Sewer Phase 1
Y1-A2	Leslie Street Trunk Sewer Phase 2
Y1-B	Yonge Street Sewer Rehabilitation
Y3-A	Aurora East SPS Gravity Interconnection
Y3-B	Aurora East SPS
Y3-C	Aurora East SPS Forcemain
Y4	Newmarket SPS Upgrade
Y5	Bogart SPS Upgrade
Y6	2nd Concession SPS Upgrade
Y7	Queensville West SPS Upgrade
Y8	Holland Landing SPS Upgrade
Y9-A	Newmarket East SPS
Y9-B	Newmarket East SPS Forcemain
Y10	Aurora SPS Gravity Sewer Twinning
Y11-A	Queensville East SPS
Y11-B	Queensville East SPS Forcemains
Y12-A	2nd Concession North Gravity Sewer
Y12-B	2nd Concession South Gravity Sewer
Y13-A	Leslie Street Trunk Sewer Phase 3
Y13-B	Mulock SPS
Y13-C	Mulock SPS Forcemains
Y14	Bloomington Interceptor Sewer

Project identification	Project name
South YDSS Expansion	
Y2	Markham Collector Twinning
YDSS Primary System Expansion	
P1	Duffin Creek WPCP Upgrades and Stage 4 Expansion
P2	Duffin Creek WPCP New Outfall
P3	Primary Trunk Sewer Twinning, inclusive of D1 - Pickering Parkway SPS and D2 - Squires Beach SPS

Table notes:

1. YDSS = York Durham Sewage System
2. SPS = Sewage Pumping Station
3. WPCP = Water Pollution Control Plant

2.2 Infrastructure Located in East Gwillimbury

To accommodate the projected growth, East Gwillimbury must use the downstream York Durham Sewage System (YDSS) conveyance infrastructure. However, the current downstream infrastructure, which relies on the existing Yonge Street Trunk Sewer, requires rehabilitation and twinning to meet the growth objectives.

The improvement plan for East Gwillimbury includes upgrading the existing local sewage pumping stations (SPSs) to increase capacity to meet forecasted demands, constructing a new local SPS for conveyance from the eastern area and improving the gravity conveyance along 2nd Concession Road. Additionally, a gravity trunk sewer will be constructed to carry the increased flow south toward the Newmarket area. Existing infrastructure and construction of a major Newmarket East Sewage Pumping Station (SPS) and Newmarket East SPS Forcemains servicing East Gwillimbury will divert the flow to the new gravity trunk sewer along the Leslie Street corridor, relieving the pressure on the existing Newmarket and Aurora SPSs.

Table 2.2 to Table 2.10 summarize information on each project. The red line denotes the 200-metre (m) study area. Details of the development and evaluation of the new East Gwillimbury projects can be found in Chapter 4.

Table 2.2 2nd Concession SPS Upgrade (Y6) Project Information

Project information	
Project name	2 nd Concession Sewage Pumping Station Upgrade
Project identification	Y6
Class 5 capital cost estimate	\$19 million
In-service date required	2028
Existing infrastructure	Sharon Trunk Sewer 2nd Concession connections 2nd Concession Sewage Pumping Station
Location	18676 2nd Concession Road (2nd Concession and East Holland River)

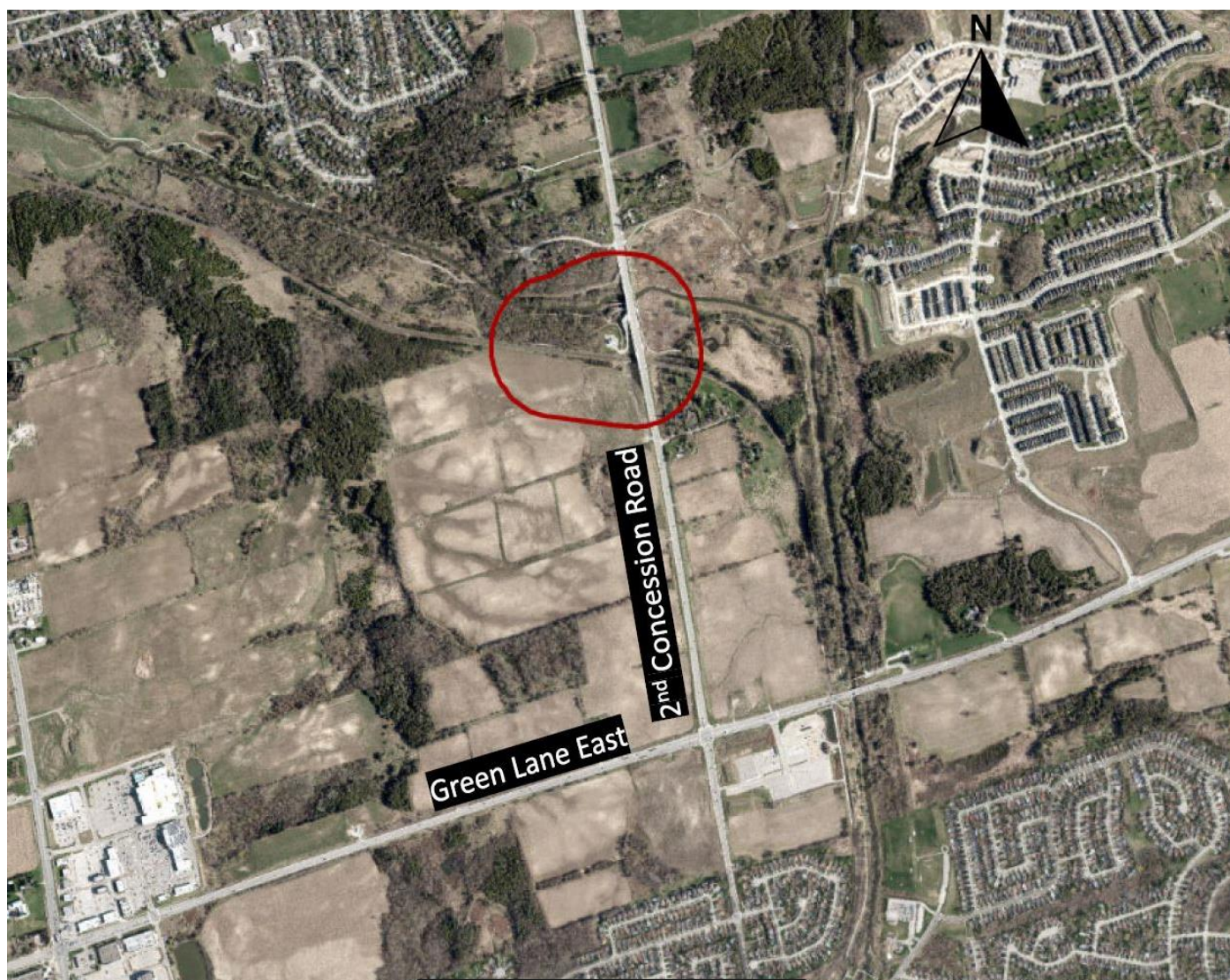


Figure 2.1 Map of Study Area for 2nd Concession SPS (Y6) Upgrade Project

Table 2.3 Queensville West SPS Upgrade (Y7) Project Information

Project information	
Project name	Queensville West Sewage Pumping Station Upgrade
Project identification	Y7
Class 5 capital cost estimate	\$10 million
In-service date required	2036
Existing infrastructure	Queensville West Sewage Pumping Station
Location	20287 2nd Concession Road



Figure 2.2 Map of Study Area for Queensville West SPS Upgrade (Y7) Project

Table 2.4 Holland Landing SPS Upgrade (Y8) Project Information

Project information	
Project name	Holland Landing Sewage Pumping Station Upgrade
Project identification	Y8
Class 5 capital cost estimate	\$7 million
In-service date required	2036
Existing infrastructure	Holland Landing Sewage Pumping Station
Location	44 Bradford Street (Thompson Drive and East Holland River)

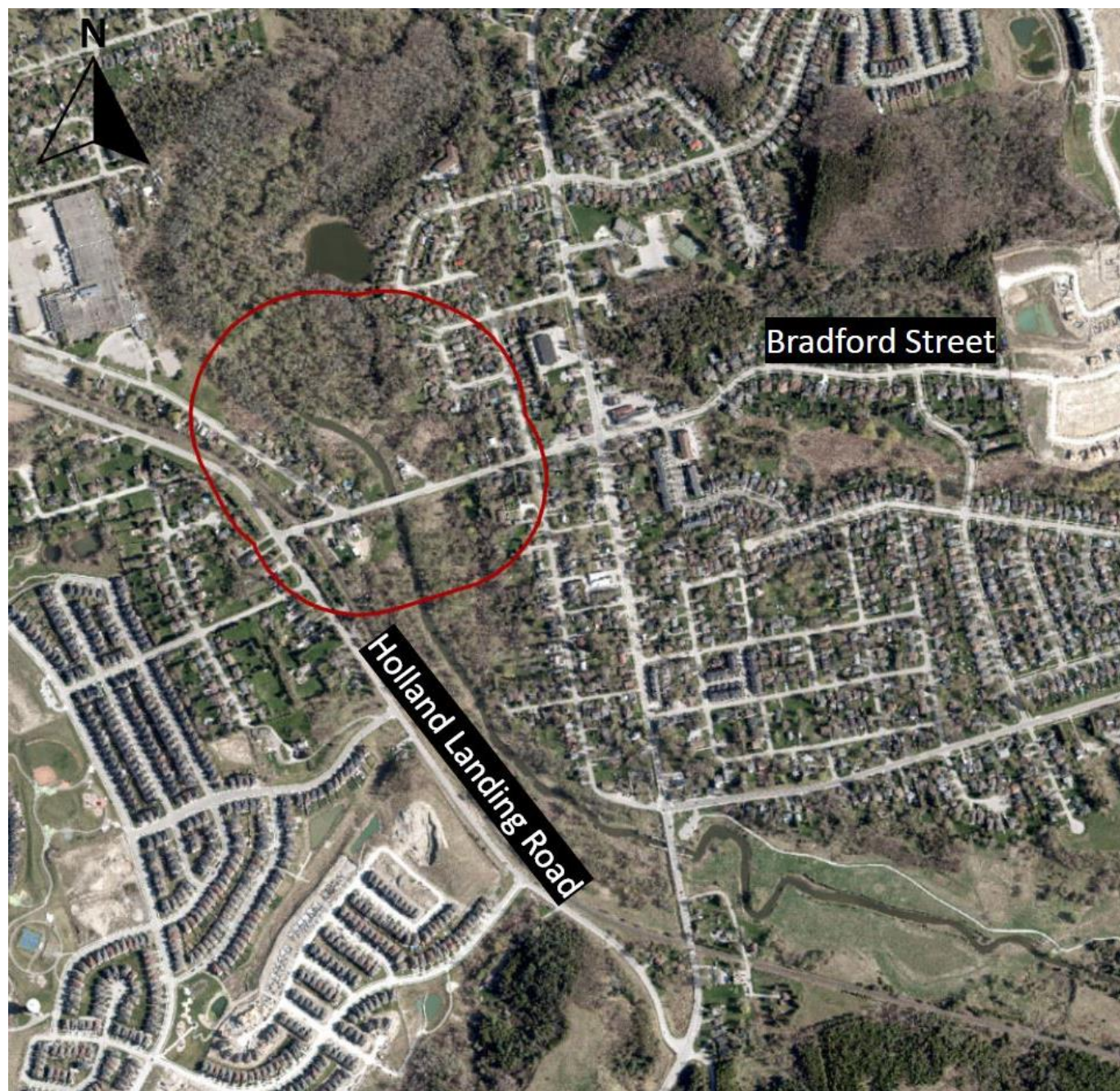


Figure 2.3 Map of Study Area for Holland Landing SPS Upgrade (Y8) Project

Table 2.5 Newmarket East SPS (Y9-A) Project Information

Project information	
Project name	Newmarket East Sewage Pumping Station
Project identification	Y9-A
Class 5 capital cost estimate	\$134 million
In-service date required	2036
Existing infrastructure	None
Location	Bayview Parkway



Figure 2.4 Map of Study Area for Newmarket East SPS (Y9-A) Project

Table 2.6 Newmarket East SPS Force mains (Y9-B) Project Information

Project information	
Project name	Newmarket East Sewage Pumping Station Force mains
Project identification	Y9-B
Class 5 capital cost estimate	\$164 million
In service date required	2041
Length	2.5 kilometres
Diameter	1050 millimeters
Number of force mains	2
Existing infrastructure	None
Location	Bayview Parkway, Green Lane East and Leslie Street



Figure 2.5 Map of Study Area for Newmarket East SPS Force mains (Y9-B) Project

Table 2.7 Queensville East SPS (Y11-A) Project Information

Project information	
Project name	Queensville East Sewage Pumping Station
Project identification	Y11-A
Class 5 capital cost estimate	\$19 million
In service date required	2031
Existing infrastructure	None
Location	Queensville Sideroad



Figure 2.6 Map of Study Area for Queensville East SPS (Y11-A) Project

Table 2.8 Queensville East SPS Forcemains (Y11-B) Project Information

Project information	
Project name	Queensville East Sewage Pumping Station Forcemains
Project identification	Y11-B
Class 5 capital cost estimate	\$16 million
In service date required	2031
Length	3 kilometres
Diameter	250 millimetres
Number of forcemains	2
Existing infrastructure	None
Location	Queensville Sideroad/Leslie Street (Sewage Pumping Station to east end of Sharon Trunk Sewer)



Figure 2.7 Map of Study Area for Queensville East SPS Forcemains (Y11-B) Project

Table 2.9 2nd Concession North Gravity Sewer (Y12-A) Project Information

Project information	
Project name	2nd Concession North Gravity Sewer
Project identification	Y12-A
Class 5 capital cost estimate	\$31 million
In service date required	2028
Length	3 kilometres
Diameter	750 millimetres
Existing infrastructure	2nd Concession Force mains
Location	2nd Concession (Doane Road to 2nd Concession Sewage Pumping Station)

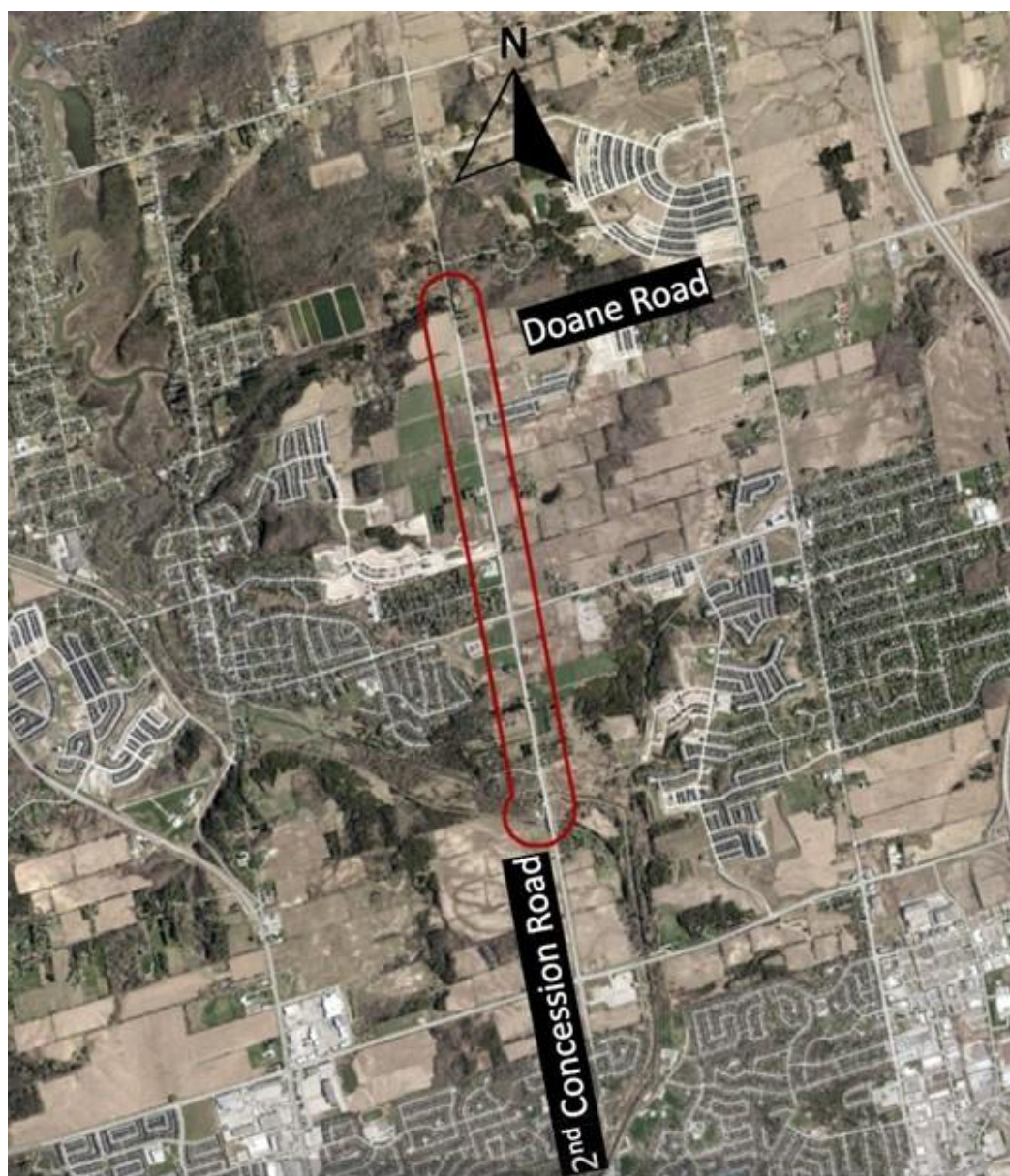


Figure 2.8 Map of Study Area for 2nd Concession North Gravity Sewer (Y12-A) Project

Table 2.10 2nd Concession South Gravity Sewer (Y12-B) Project Information

Project information	
Project name	2nd Concession South Gravity Sewer
Project identification	Y12-B
Class 5 capital cost estimate	\$137 million
In service date required	2028
Length	2 kilometres
Diameter	1800 millimetres
Existing infrastructure	None
Location	2nd Concession (2nd Concession Sewage Pumping Station to Newmarket Sewage Pumping Station)



Figure 2.9 Map of Study Area for 2nd Concession South Gravity Sewer (Y12-B) Project

2.3 Infrastructure Located in Newmarket/Aurora

Newmarket and Aurora contain the existing spine of the YDSS conveyance system. To reliably convey increased sewage flows, nine upgrades or new infrastructure projects are required. The improvements to the existing system involve upgrades to the existing Newmarket and Bogart SPSs and twinning of the Aurora SPS Gravity Sewer.

Construction of a new SPS (Aurora East), along with an associated interconnection gravity sewer and discharge forcemains, will allow flows to be conveyed to the new Leslie Street Trunk Sewer.

Construction of a new Leslie Street Trunk Sewer, Mulock SPS and Mulock SPS Forcemains will allow sewage generated within East Gwillimbury and pumped by the Newmarket East SPS to be diverted. This will utilize the Leslie Street Trunk Sewer, which offloads sewage flows from the existing Yonge Street Trunk Sewer that will allow for additional flow from the north-west area of Richmond Hill and King City.

Table 2.11 to Table 2.19 summarizes each project. The red line denotes the 200 m study area. Details of the development and evaluation of the new Newmarket and Aurora projects can be found in Chapter 5.

Table 2.11 Aurora East SPS Gravity Interconnection (Y3-A) Project Information

Project information	
Project name	Aurora East Sewage Pumping Station Gravity Interconnection
Project identification	Y3-A
Class 5 capital cost estimate	\$17 million
In service date required	2031
Length	250 metres
Diameter	1500 millimetres
Existing infrastructure	None
Location	St. John's Sideroad

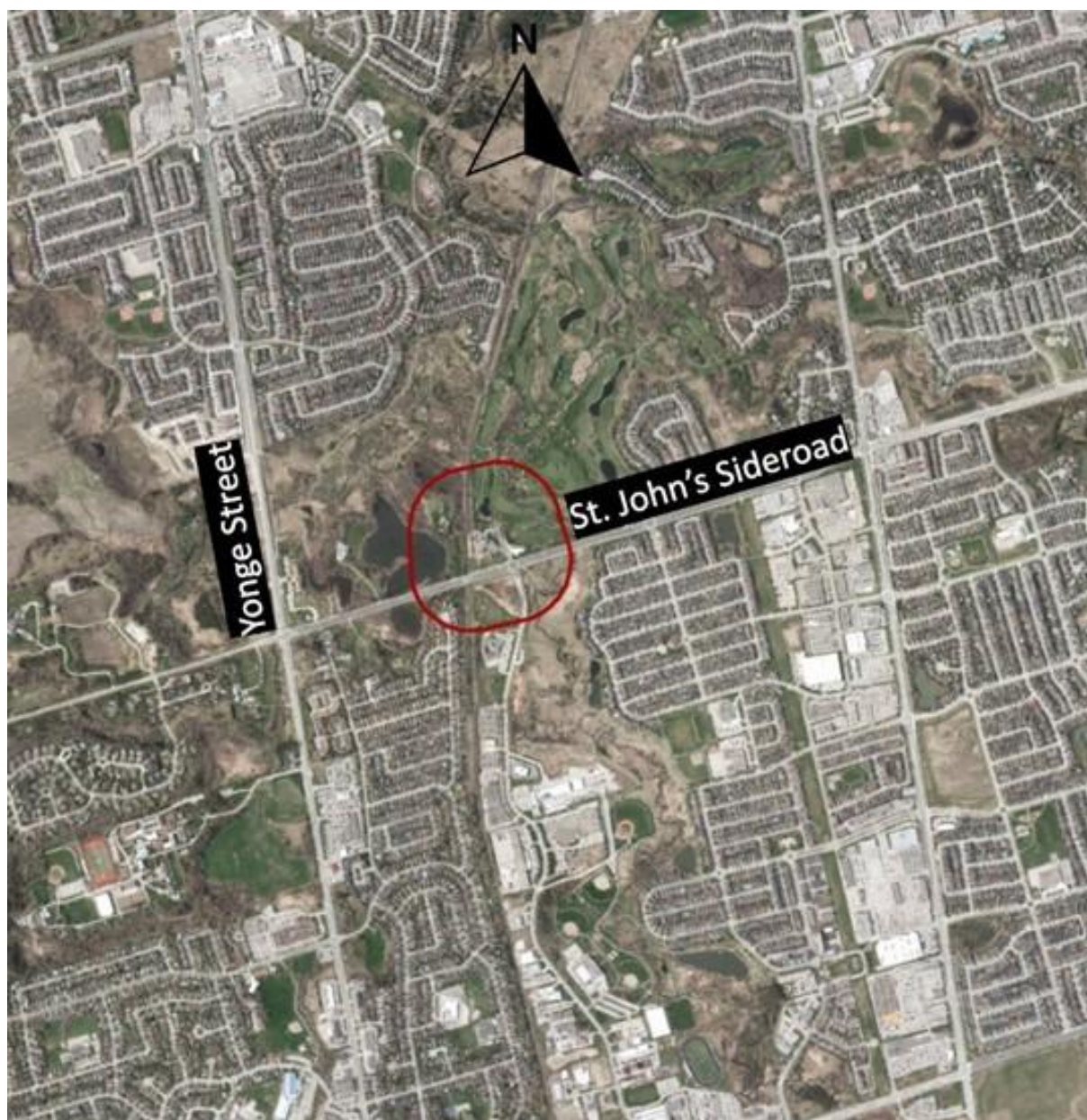


Figure 2.10 Map of Study Area for Aurora East SPS Gravity Interconnection (Y3-A) Project

Table 2.12 Aurora East SPS (Y3-B) Project Information

Project information	
Project name	Aurora East Sewage Pumping Station
Project identification	Y3-B
Class 5 capital cost estimate	\$134 million
In service date required	2031
Existing infrastructure	None
Location	St. John's Sideroad

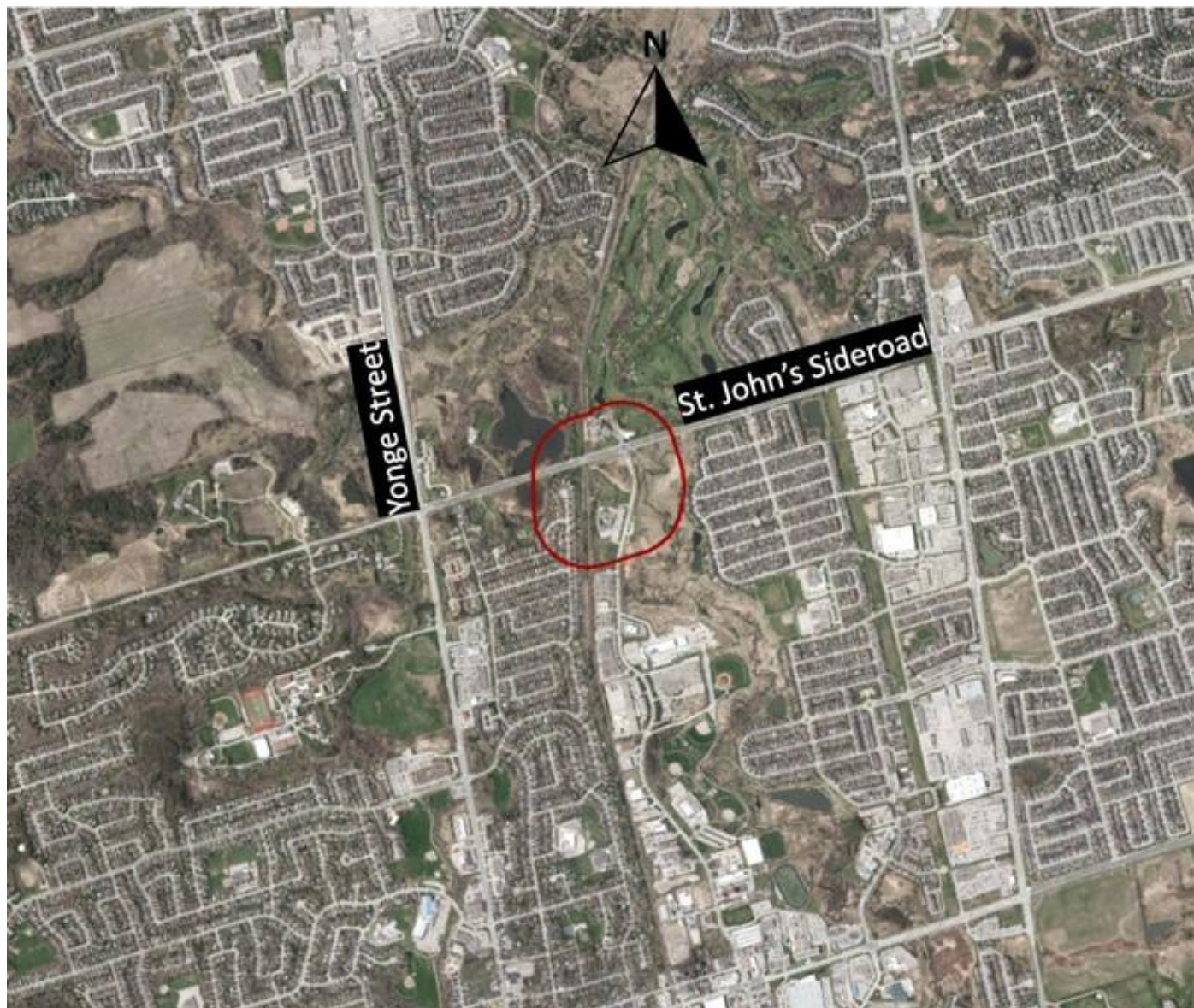


Figure 2.11 Map of Study Area for Aurora East SPS (Y3-B) Project

Table 2.13 Aurora East SPS Force mains (Y3-C) Project Information

Project information	
Project name	Aurora East Sewage Pumping Station Force mains
Project identification	Y3-C
Class 5 capital cost estimate	\$238 million
In service date required	2031
Length	2.5 kilometres
Diameter	1050 millimetres
Number of force mains	2
Existing Infrastructure	None
Location	St John's Sideroad from Aurora Sewage Pumping Station to Leslie Street



Figure 2.12 Map of Study Area for Aurora East SPS Force mains (Y3-C) Project

Table 2.14 Newmarket SPS Upgrade (Y4) Project Information

Project information	
Project name	Newmarket Sewage Pumping Station Upgrade
Project identification	Y4
Class 5 capital cost estimate	\$15 million
In service date required	2028
Existing infrastructure	Newmarket Sewage Pumping Station
Location	360 Bayview Parkway



Figure 2.13 Map of Study Area for Newmarket SPS Upgrade (Y4) Project

Table 2.15 Bogart SPS Upgrade (Y5) Project Information

Project information	
Project name	Bogart Sewage Pumping Station Upgrade
Project identification	Y5
Class 5 Capital Cost Estimate	\$8 million
In service date required	2036
Existing infrastructure	Bogart Sewage Pumping Station
Location	319 Hamilton Street

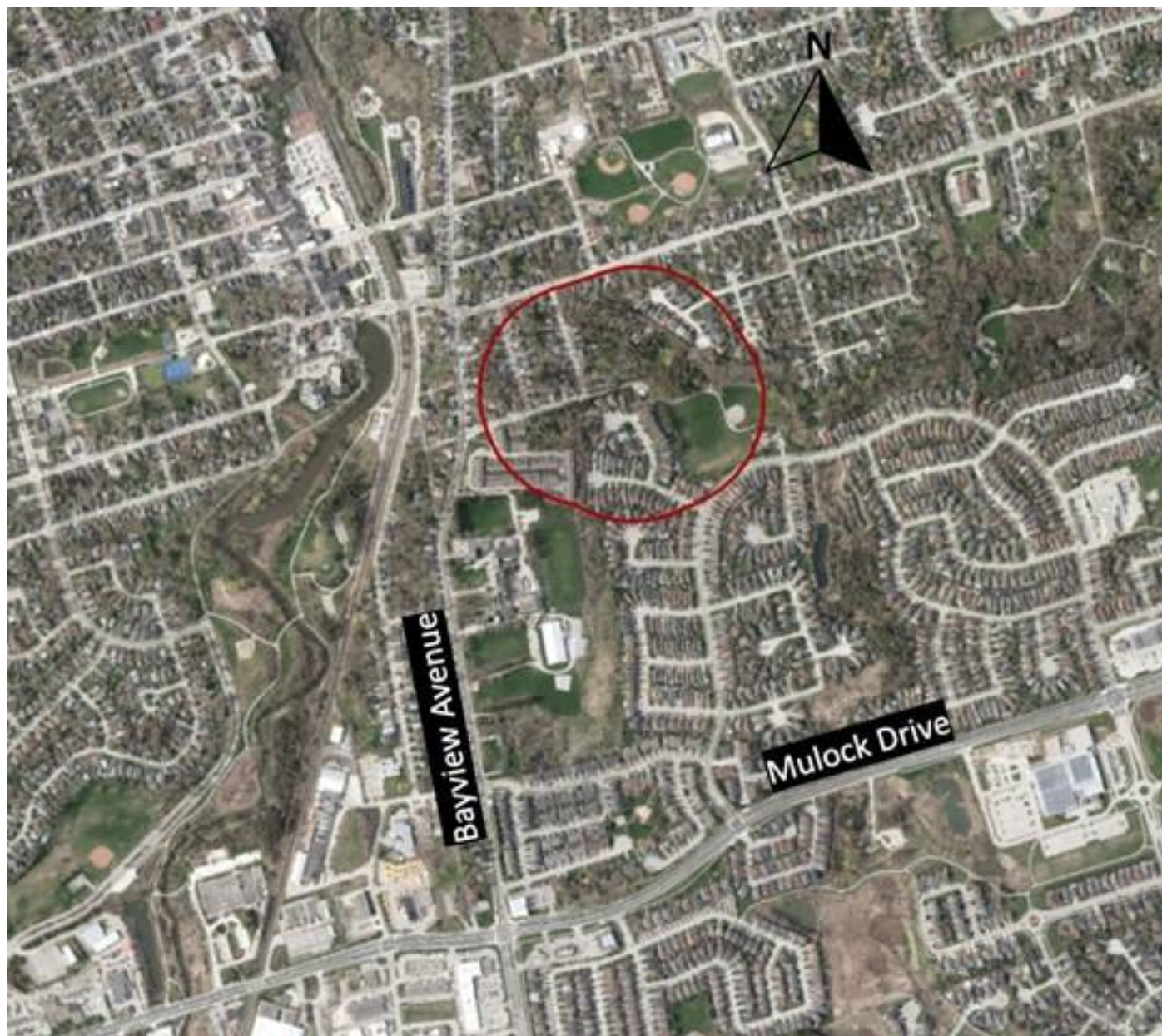


Figure 2.14 Map of Study Area for Bogart SPS Upgrade (Y5) Project

Table 2.16 Aurora SPS Gravity Sewer Twinning (Y10) Project Information

Project information	
Project name	Aurora Sewage Pumping Station Gravity Sewer Twinning
Project identification	Y10
Class 5 capital cost estimate	\$53 million
In service date required	2028
Length	1 kilometre
Diameter	1350 millimeters (mm) and 2400 mm
Existing infrastructure	None
Location	Golf Course (Aurora Sewage Pumping Station to Connection Chamber)

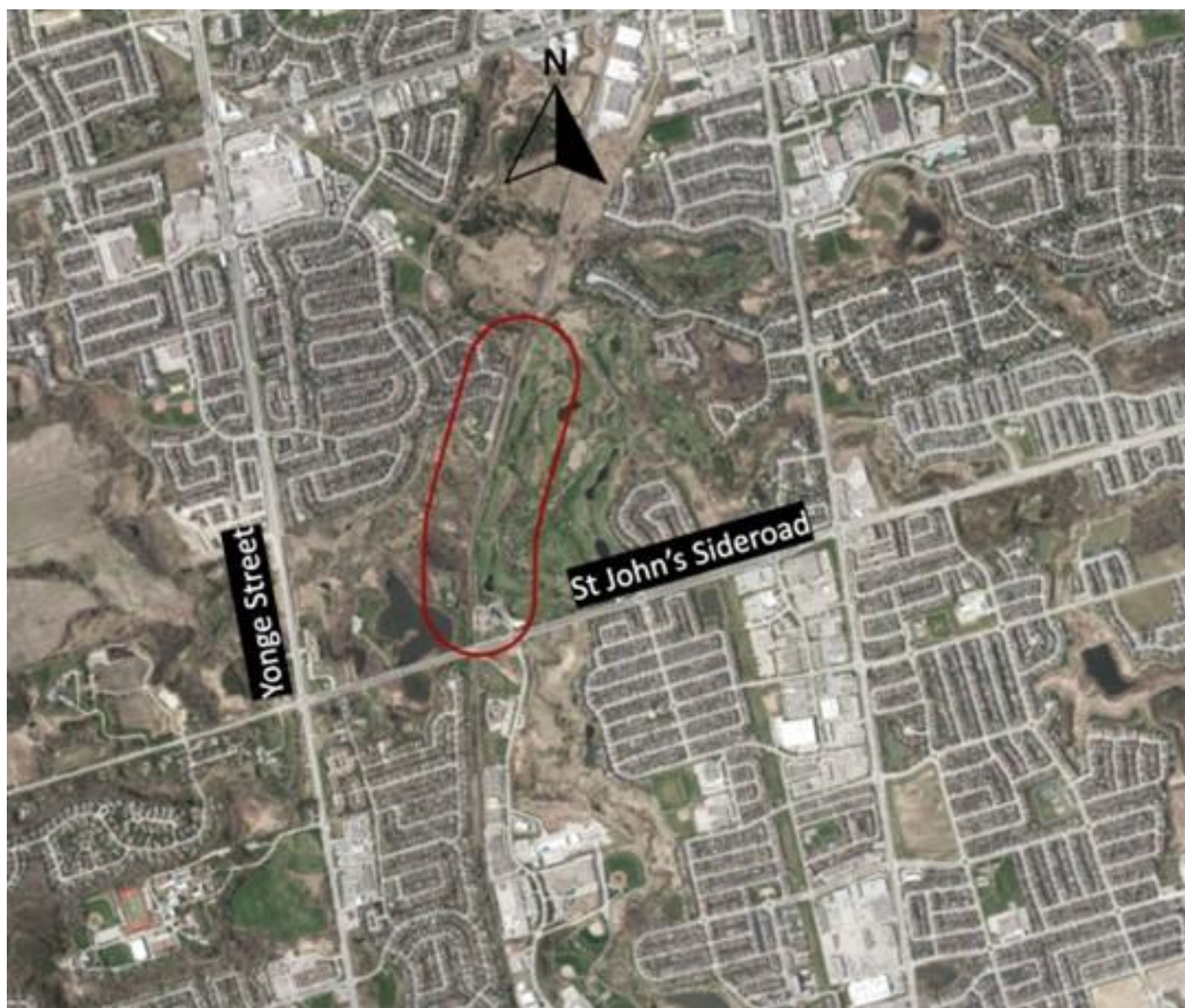


Figure 2.15 Map of Study Area for Aurora SPS Gravity Sewer Twinning (Y10) Project

Table 2.17 Leslie Street Trunk Sewer Phase 3 (Y13-A) Project Information

Project information	
Project name	Leslie Street Trunk Sewer Phase 3
Project identification	Y13-A
Class 5 capital cost estimate	\$191 million
In service date required	2041
Length	4.2 kilometres
Diameter	1800 millimetres
Existing infrastructure	None
Location	Leslie Street (Green Lane East to Mulock Drive)



Figure 2.16 Map of Study Area for Leslie Street Trunk Sewer Phase 3 (Y13-A) Project

Table 2.18 Mulock SPS (Y13-B) Project Information

Project Information	
Project name	Mulock Sewage Pumping Station
Project identification	Y13-B
Class 5 capital cost estimate	\$134 million
In service date required	2041
Existing infrastructure	None
Location	Mulock Drive



Figure 2.17 Map of Study Area for Mulock SPS (Y13-B) Project

Table 2.19 Mulock SPS Forcemains (Y13-C) Project Information

Project information	
Project name	Mulock Sewage Pumping Station Forcemains
Project identification	Y13-C
Class 5 capital cost estimate	\$166 million
In service date required	2041
Length	2.4 kilometres
Diameter	1050 millimetres
Number of forcemains	2
Existing infrastructure	None
Location	Leslie Street (Mulock Sewage Pumping Station to St John's Sideroad)



Figure 2.18 Map of Study Area for Mulock SPS Forcemains (Y13-C) Project

2.4 Leslie Street Trunk Sewer

The existing YDSS central section from Bloomington Road to 19th Avenue relies on the existing Yonge Street Trunk Sewer. This existing sewer requires rehabilitation and twinning to meet the growth objectives. This involves rehabilitation of the existing Yonge Street Trunk Sewer and maintenance holes between Bloomington Road and 19th Avenue. Additionally, a twin trunk sewer will be constructed on Leslie Street to accommodate the anticipated required flow capacity to 2051, including sewage from service areas upstream of St. John's Sideroad. The Bloomington Interceptor Sewer is designed as a gravity sewer to divert the flow from the Aurora East forcemain to ensure efficient conveyance of wastewater within the sewage system.

Table 2.20 to Table 2.23 summarizes each project. The red line denotes the 200 m study area. Details of the development and evaluation of the new Yonge Street Sewer Twinning Projects can be found in Chapter 6.

Table 2.20 Leslie Street Trunk Sewer Phase 1 (Y1-A1) Project Information

Project information	
Project name	Leslie Street Trunk Sewer Phase 1
Project identification	Y1-A1
Class 5 capital cost estimate	\$571 million
In service date required	2028
Length	6.3 kilometres
Diameter	2400 millimetres
Existing infrastructure	None
Location	Leslie Street from 19th Avenue to Bloomington Road



Figure 2.19 Map of Study Area for Leslie Street Trunk Sewer Phase 1 (Y1-A1) Project

Table 2.21 Leslie Street Trunk Sewer Phase 2 (Y1-A2) Project Information

Project information	
Project name	Leslie Street Trunk Sewer Phase 2
Project identification	Y1-A2
Class 5 capital cost estimate	\$519 million
In service date required	2031
Length	6.3 kilometres
Diameter	2400 millimetres
Existing infrastructure	None
Location	Leslie Street from Bloomington Road to St. John's Sideroad



Figure 2.20 Map of Study Area for Leslie Street Trunk Sewer Phase 2 (Y1-A2) Project

Table 2.22 Yonge Street Sewer Rehabilitation (Y1-B) Project Information

Project information	
Project name	Yonge Street Sewer Rehabilitation
Project identification	Y1-B
Class 5 capital cost estimate	\$108 million
In service date required	2041
Length	6 kilometres
Diameter	1050 to 1650 millimeters
Existing infrastructure	Rehabilitation of the existing Yonge Street Sewer
Location	Yonge Street from Bloomington Road to 19th Avenue

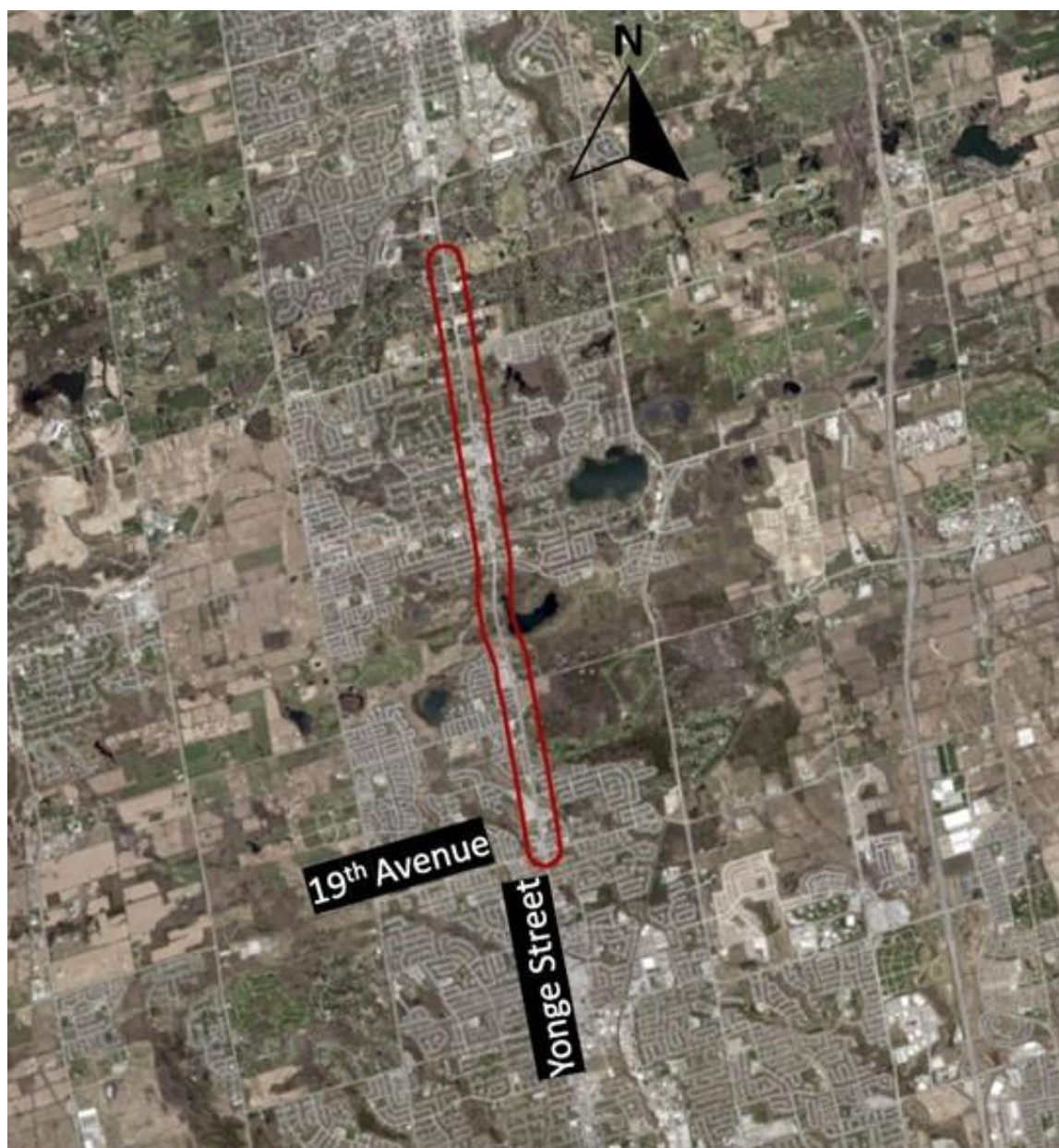


Figure 2.21 Map of Study Area for Yonge Street Sewer Rehabilitation (Y1-B) Project

Table 2.23 **Bloomington Interceptor Sewer (Y-14) Project Information**

Project information	
Project name	Bloomington Interceptor Sewer
Project identification	Y-14
Class 5 capital cost estimate	\$73 million
In service date required	2028
Length	2 kilometres
Diameter	1500 millimetres
Existing infrastructure	None
Location	Bloomington Road from Bayview Avenue to Leslie Street

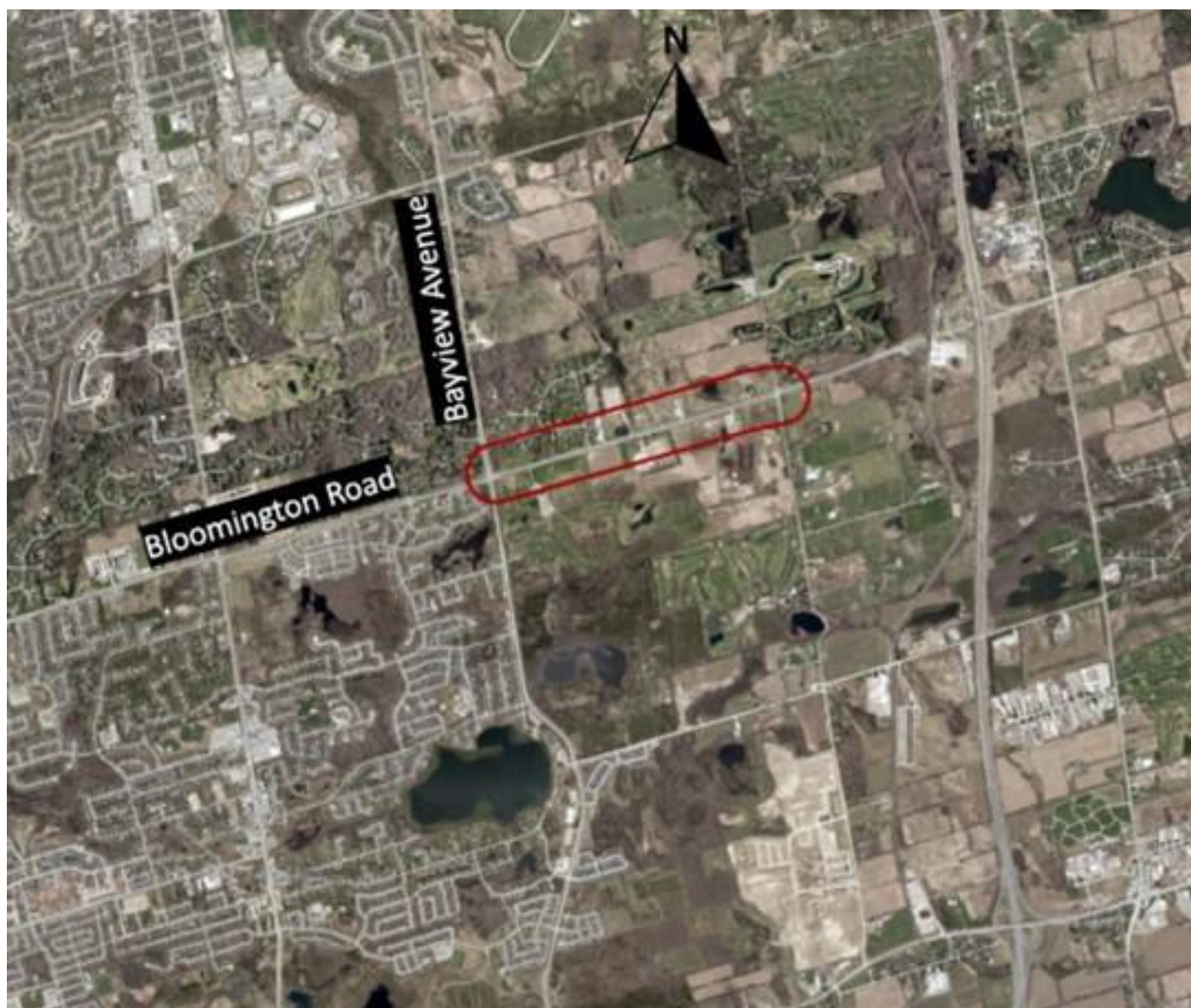


Figure 2.22 **Map of Study Area for Bloomington Interceptor Sewer (Y-14) Project**

2.5 Markham Collector Twinning

The existing Markham Collector is a single 2,400 mm diameter, 15 km trunk sewer built between 1976 and 1978, serving the City of Markham. It originates at Warden Avenue and conveys flows from the Vaughan, Richmond Hill, Aurora and Newmarket collector systems to the YDSS Southeast Collector and into the Primary Trunk, which conveys flows to the Duffin Creek Water Pollution Control Plant (WPCP). The collector crosses the Highway 407 express toll road and runs parallel at the north with two crossings of Highway 7. The collector also has several crossings of the Rouge River and Milne Lake before it crosses Highway 407 east of Markham Road toward the downstream connection adjacent to Ninth Line. Table 2.24 shows the route of the existing Markham Collector Trunk Sewer.

The York Region 2022 Water and Wastewater Master Plan indicates the City of Markham predicted growth of 82 percent (%) in the population and 66% in employment over the next 28 years to 2051. The existing Markham Collector plays a significant role in conveying the sewage flows from the existing network. With no redundancy and limited capacity in the Markham Collector, York Region intends to twin the existing Markham Collector to mitigate the potential for major system failure, to provide system operational flexibility, to provide the capacity necessary to convey projected flows generated from the forecasted growth, and to increase overall system resilience.

The new Markham Collector Twinning will be a single 9.5-km long sewer with a diameter ranging between 2,400 mm and 2,700 mm, as seen in Table 2.24. Details of the development and evaluation of the new Markham Collector Twinning can be found in Chapter 7.

Table 2.24 Markham Collector Twinning (Y2) Project Information

Project information	
Project name	Markham Collector Twinning
Project identification	Y2
Class 5 capital cost estimate	\$600 million
In service date required	2041
Length	9.5 kilometres
Diameter	2400 millimetres (mm) to 2700 mm
Location	From Warden Avenue to Ninth Line

2.6 Primary Trunk Twinning

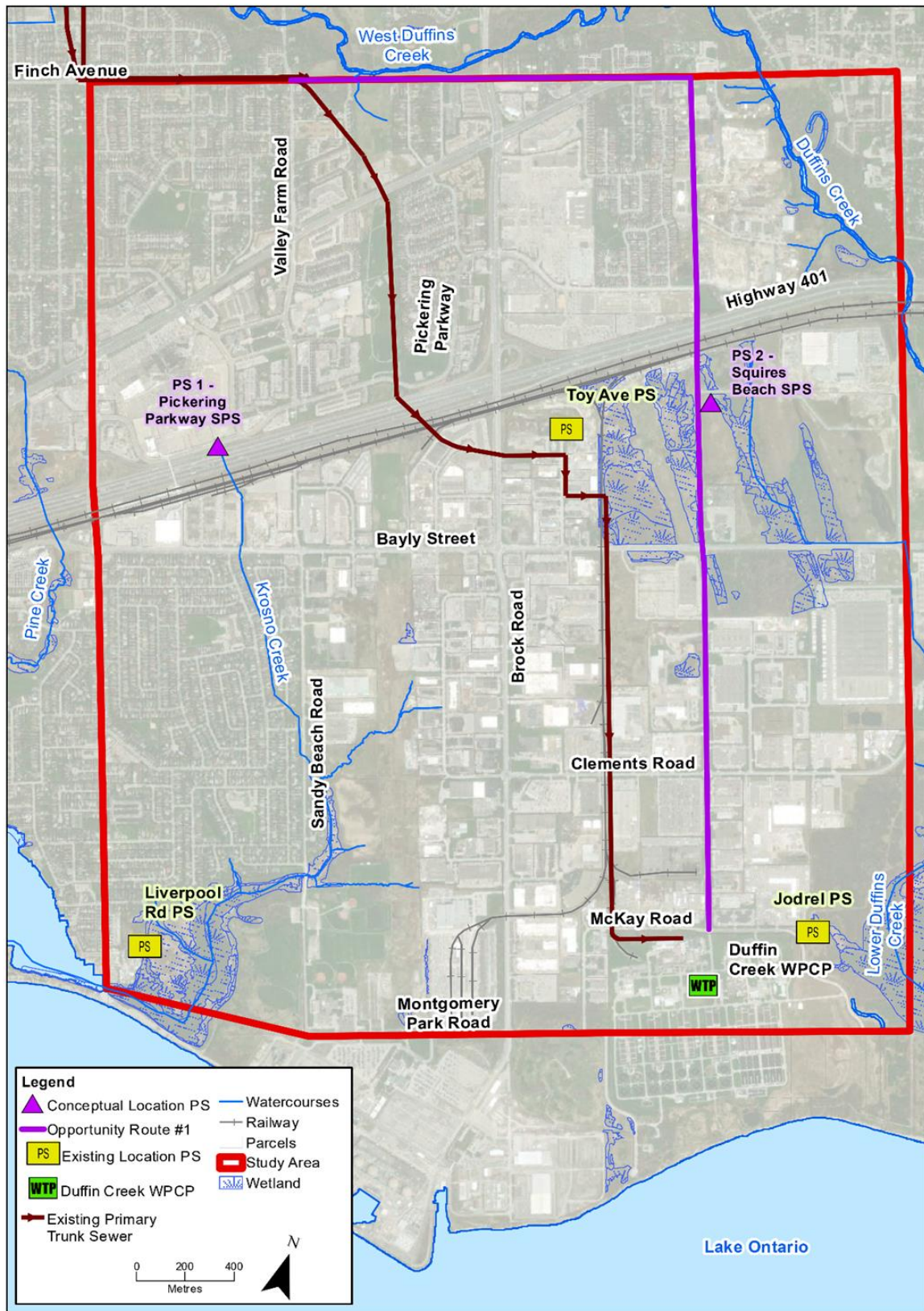
The Primary Trunk, shown in Table 2.25, is a segment of the YDSS that is 42 years old and 5 km long, with diameters between 2,600 mm and 3,000 mm. This single-trunk concrete sewer originates at the end of York Region's Southeast Collector Trunk Sewer (at the intersection of Valley Farm Road and Finch Avenue) and conveys wastewater flows to the Duffin Creek WPCP for treatment. The Primary Trunk collects flows from the Regional Municipality of York (York Region) and the Regional Municipality of Durham (Durham Region) through a network of gravity sewers and SPSs. Durham Region's SPSs that are connected to the Primary Trunk include Toy Avenue SPS, Bayly Street SPS, Jodrel Road SPS and Liverpool SPS. The Bayly SPS provides service for most of the urban area of the Town of Ajax.

The existing trunk sewer has no redundant features permitting maintenance or repair work, and the predicted intensification-related population growth within York Region and Durham Region will exceed the sewer's capacity. To reduce the risk of major system failure, provide the capacity necessary to collect and convey projected wastewater flows generated from the forecasted growth to 2051, increase resilience and provide operational flexibility, York Region and Durham Region intend to construct a new primary trunk twin sewer and two new SPSs, the Pickering Parkway SPS (D1) and Squires Beach Road SPS (D2).

The new Primary Trunk Twinning will be in the City of Pickering and will be 4000 mm in diameter and 5 km long, as seen in Table 2.25. Details of the development and evaluation of the new primary trunk twin and new SPS are in Chapter 8.

Table 2.25 Primary Trunk Sewer Twinning (P3) Project Information

Project information	
Project name	Primary Trunk Sewer Twinning inclusive of Pickering Parkway Sewage Pumping Station (SPS) and Squires Beach SPS
Project identification	P3
Class 5 capital cost estimate	\$551 million
Project identification	D1
Class 5 capital cost estimate	\$211 million
Project identification	D2
Class 5 capital cost estimate	\$125 million
In service date required	2031
Length	5 kilometres
Diameter	4000 millimetres
Location	From Finch Avenue and Valley Farm Road to the Duffin Creek Water Pollution Control Plant



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Figure 2.24 Map of Study Area for Primary Trunk Sewer Twinning (P3) Project

2.7 Duffin Creek WPCP Expansion

The Duffin Creek WPCP is a conventional activated-sludge-based facility in Pickering, Ontario, which treats municipal wastewater from York Region and Durham Region.

The liquid treatment process at the Duffin Creek WPCP is divided into Stages 1 and 2, with a rated average daily flow (ADF) capacity of 320 megalitres per day (ML/d), and Stage 3, with a rated ADF capacity of 310 ML/d. The total rated ADF capacity is 630 ML/d in accordance with the amended Environmental Compliance Approval (ECA) Sewage 5547-C43QV9 permission, issued October 26, 2021.

To accommodate the estimated wastewater flows and loads of the projected sewershed population, additional treatment capacity will be required. A new liquid treatment train (Stage 4), a new fluidized bed incineration system and a new electrical substation and standby power will be needed to increase the capacity and maintain the system's operational flexibility. Planning for a new renewable natural gas purification facility was also included as part of the overall plant upgrades.

The expansion of the Duffin Creek WPCP capacity is limited by the total firm pumping capacity of the existing Stages 1 and 2 and Stages 3 and 4 influent pumping stations (IPSS), which have a total firm pumping capacity of 3,290 ML/d.

The hydraulic capacity that is required to service the sewershed population projection for the 2051 planning period is near the firm capacity that can be accommodated by the existing IPSS.

Therefore, the proposed infrastructure for the plant expansion is based on a hydraulic capacity of 3,290 ML/d and a design peak instantaneous flow (PIF) peak factor of 3.5, providing an expanded ADF capacity of 940 ML/d. Further details of the proposed upgrades are shown in Table 2.26 and discussed in Chapter 9.

Table 2.26 Duffin Creek WPCP Upgrades and Stage 4 Expansion (P1) Project Information

Project information	
Project name	Duffin Creek Water Pollution Control Plant Expansion
Project identification	P1
Class 5 capital cost estimate	\$686 million
In service date required	2036 – 2040
Number of new liquid treatment trains	6
Added peak daily hydraulic capacity	496 ML/d
Added peak hourly hydraulic capacity	775 ML/d
Added peak instantaneous hydraulic capacity	1,085 ML/d
Added solids incineration capacity	105 dried tonnes per day
Natural gas generation	19,710 cubic metres per day
Location	901 McKay Road, Pickering

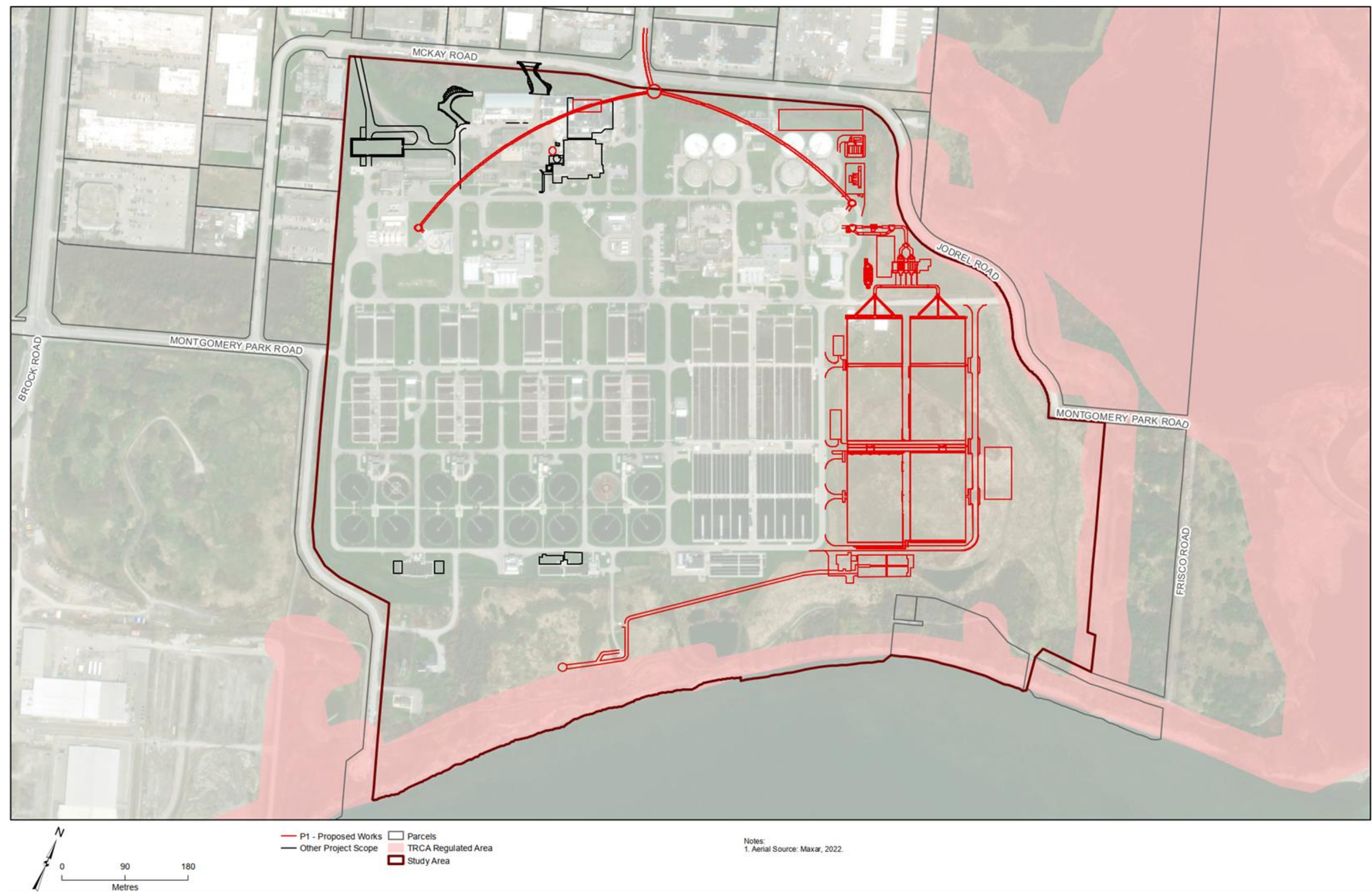


Figure 2.25 Map of Study Area for Duffin Creek WPCP Upgrades and Stage 4 Expansion (P1) Project

2.8 Duffin Creek WPCP New Outfall

The existing outfall consists of a pipe that is 1,100 m long and has an inner diameter of 3,000 mm. This pipe is used to convey clear treated effluent into Lake Ontario through 63 diffuser ports. The outfall was built in 1978. Although shorter than originally planned because of constructability issues, it had an expected useful service life of approximately 75 years based on compliance criteria in effect at that time. In 2021 and 2022, the outfall diffusers were upgraded with duckbill check valves to provide a peak hydraulic capacity of 1,900 ML/d. With the projected wastewater flows, it is expected that a new outfall will be required around the year 2038.

The Duffin Creek WPCP New Outfall project includes construction of an onshore drop shaft and an outfall tunnel approximately 3 km long with an inner diameter of 5500 mm. Considering the capacity of the new Primary Trunk Twin and the peak hydraulic capacity of the existing Stages 1, 2 and 3 IPSs, the new outfall will be designed to provide a hydraulic capacity of 3,290 ML/d. Further details of the proposed structures are shown in Table 2.27 and discussed in Chapter 10.

Table 2.27 Duffin Creek WPCP New Outfall (P2) Project Information

Project information	
Project name	Duffin Creek Water Pollution Control Plant New Outfall
Project identification	P2
Class 5 capital cost estimate	\$318 million
In service date required	2038
Length	2.5 to 3 kilometres
Diameter	Approx. 5.5 metres
Tunnel depth	60 to 70 metres
Number of diffusers/risers	34 to 50
Drop shaft diameter	Approximately 12 metres
Location	901 McKay Road, Pickering and south in Lake Ontario



Figure 2.26 Map of Study Area for Duffin Creek WPCP New Outfall (P2) Project

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