MEMO

To:	Cam Elsby, P.Eng. (City of Ottawa)	From:	GEI Consultants Canada Ltd.
GEI Project:	2501074 – City of Ottawa Urban Expansion Area Hydraulic Assessments	Date:	May 27, 2025

O'Keefe Urban Expansion Area Assessment

1 Introduction

The City of Ottawa (the "City") has recently completed the new Official Plan (OP) and Infrastructure Master Plan (IMP). GEI Consultants Canada Limited (GEI, formerly GM BluePlan Engineering Limited) was previously retained to complete the Wastewater Master Plan (WWMP) as part of the IMP.

The Ministry of Municipal Affairs and Housing (MMAH) provided a set of urban expansion lands that were reviewed as part of the IMP. The IMP recommended system-level water and wastewater infrastructure to support these lands and to be ultimately incorporated into the urban boundary as part of the Province's final approval of the City's Official Plan. However, these expansion areas were subsequently removed from the Official Plan (and therefore from the IMP), with individual developers now eligible to apply to expand the urban area on an ad-hoc basis. Adding these expansion areas will have a system-level impact and the need for additional off-site system-level projects must be assessed on an applicant-basis.

The City has retained GEI to complete the "Sanitary Infrastructure Needs Assessments for Boundary Area Expansion Applications". To streamline the process, the OPA has been divided into Step 1 and Step 2, as described below:

Step 1 aims to establish the baseline capacity of the system as well as identify deficiencies in supporting the planned growth outlined in the boundary area expansion applications. The key output of Step 1 is a hydraulic model capacity assessment of existing infrastructure.

Step 2 will assess how to address potential capacity constraints in the study area through identifying servicing solutions and developing subsequent conceptual designs to determine feasibility and Class D cost estimates. The key outputs of Step 2 are the development of conceptual design information to inform the feasibility, and Class D cost estimates for required infrastructure.

It should be noted that Step 2 is only completed where the Step 1 review finds that there are capacity deficiencies within the existing downstream infrastructure, and improvements are required for development to proceed. If the Step 1 review finds that there is sufficient capacity within the existing downstream infrastructure, then the assessment does not proceed to Step 2.

2 Background

2.1 Study Area

The proposed lands from the O'Keefe development are likely to be serviced by the South Nepean Collector, with a portion of the lands to be pumped on-site. This is due to the topography of the study area causing gravity conveyance to be infeasible for a portion of O'Keefe. The affected infrastructure downstream of the O'Keefe OPA boundary expansion area will be reviewed based on a hydraulic assessment to determine the need for off-site works to support the additional growth.

The O'Keefe area, shown in Figure 1, is currently within the bounds of the Municipality of Nepean, with the study area comprised of residential, mixed use, and employment-only spaces. The site address is listed as 4497 O'Keefe Court, with an estimated build-out population of 3,524 people in 1,493 units allocated to this development alone. An estimated 81 employees are expected to be employed in this development.

The total gross area of the O'Keefe lands development (shown bounded by red polygons in Figure 1) is approximately 78.6 ha; however, a significant portion of this area is comprised of park land, conservation area, and stormwater management facilities. The effective developable area within the O'Keefe lands development was estimated to be 48.3 ha based on the residential and employment properties and was subsequently used in the calculation of future inflow & infiltration.

The following table, Table 1, summarizes the population, unit counts and known phasing information.

Table 1: Summary of proposed development in study area

Development Type	Population	Area (ha)
Single Detached	1,112	8.9
Townhomes	497	3.8
Rear Lane Towns	319	1.1
Back-to-back Towns	124	1.3
Mixed Use Blocks	418	8.6
Condo Blocks	700	15.3
Medium Density Blocks	355	2.6
Total Employees	81	6.7
Residential Total	**3,524**	**41.7**
Employment Total	**81**	**6.7**
Expansion Area Total	**-**	**48.3**

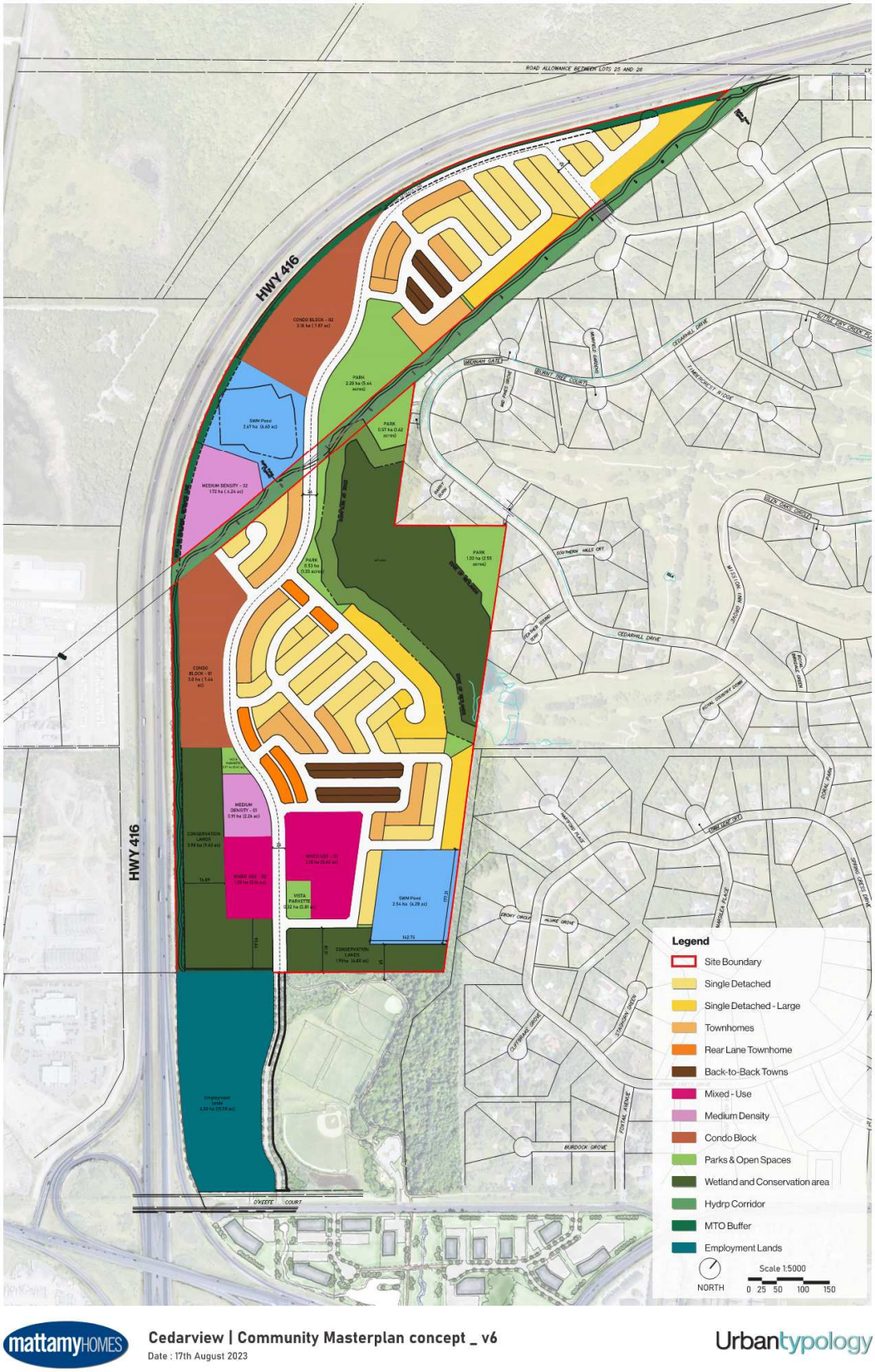

Figure 1: O'Keefe Urban Expansion Area Community Masterplan Concept

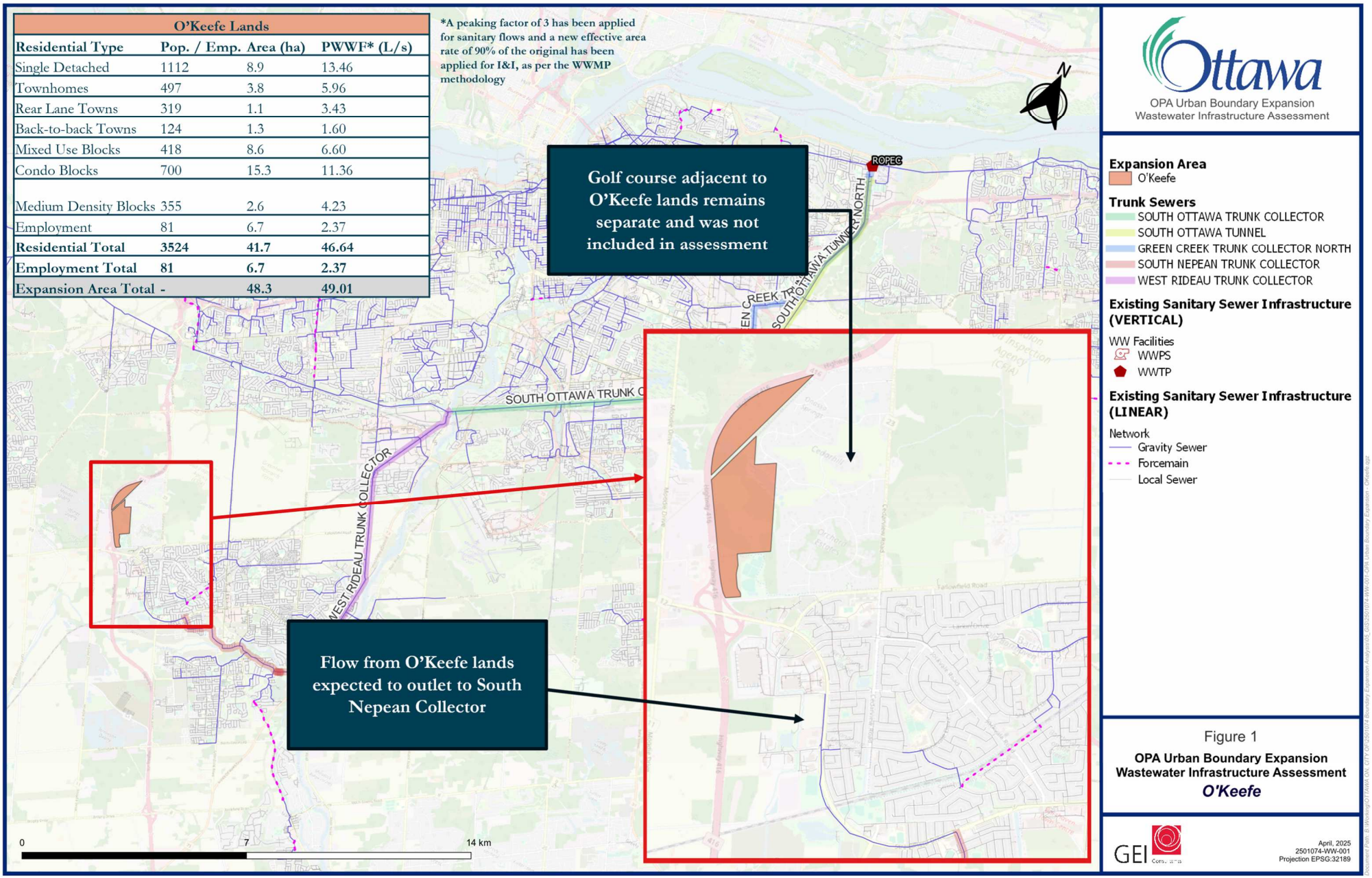

Figure 2: Study Area and System Overview

2.2 Background Information

To better understand the constraints of the study area, previous studies were reviewed. This includes the following studies:

- City of Ottawa 2024 Infrastructure Master Plan (IMP) (2024)
- O'Keefe Court Preliminary Servicing Analysis (2024)
- Assessment of Adequacy of Public Services Report for 4497 O'Keefe Court (2024)
- Barrhaven Vision Destination Transit Planning (2020)

Infrastructure Master Plan (IMP)

As part of the WWMP assessment, 2046 population growth projections were used to develop a future hydraulic model scenario, with the aim of assessing future collection system performance and identifying necessary infrastructure improvements to accommodate increased demands from population growth.

The 1-in-25-year and 1-in-100-year June 2014 events were the primary triggers to identify a future system capacity constraint. The hydraulic model results were reviewed to identify sewers within the same general location which showed capacity issues and served as the basis for comparison between existing system capacity issues and system capacity issues caused as a result of future growth.

The O'Keefe area was not considered in the 2024 IMP assessment. The closest area assessed for the IMP is the South West area, serviced by the Lynwood Collector. The South West area consists of the South Urban Community west of the Rideau River, which includes Manotick, Barrhaven, Riverside South and areas in Nepean that drain to the Lynwood Collector. Under existing conditions, surcharging was seen in various local groupings of maintenance holes with an HGL depth less than 2.4m from ground. No major surcharging issues were noted for the trunks in the area.

Similarly, under future conditions, results were consistent with what was seen in existing conditions: areas that were surcharging under existing conditions continued to surcharge under future conditions without mitigations in place in the South West area.

There were various projects noted in the both the 2013 and 2024 IMPs; however, the main project that impacts the O'Keefe area is the South Nepean Collector Phase 2, Phase 3 extension upgrade. This project has been completed as of the 2024 IMP; as such, it was added to the existing conditions model.

Tartan Pumping Station was originally constructed to provide interim servicing for growth around Strandherd Drive, until the South Nepean Collector was built as part of the Strandherd Road Widening Project. This complex project was originally expected for completion in 2008; however,

due to several delays, the project was ultimately completed in 2020. When construction of the South Nepean Collector was completed, the temporary sewers which collected flows from the Strandherd Drive areas (installed 2005-2010) were decommissioned and the flows diverted to the South Nepean Collector.

O'Keefe Court Preliminary Servicing Analysis / Assessment of Adequacy of Public Services Report for 4497 O'Keefe Court

Mattamy Homes retained DSEL to conduct a preliminary servicing analysis for the O'Keefe area, detailed in the memorandum to the City of Ottawa in February 2024. As part of the analysis, the focus of the document is to investigate servicing opportunities to support the O'Keefe lands for both water and wastewater. It should be noted that the development is split into two phases: Phase 1 has already been constructed and is serviced by municipal watermains but is on septic system for wastewater requirements. Phase 2, the lands west of Phase 1, is the focus of GEI's assessment.

The O'Keefe lands has been proposed to be serviced by a gravity sewer connection to the South Nepean Collector, which is an existing 525mm connection. In addition to the wastewater flow generated from the O'Keefe lands, the analysis also considers the addition of the Barrhaven Conservancy development. With the O'Keefe development alone, the SNC is in free flow with a residual free-flowing capacity of 121.21 L/s. With both developments considered, the SNC is still in free flow despite the critical SNC sewer segment's residual free-flowing capacity reduced to 32.85 L/s. It should be noted that the Barrhaven Conservancy development is not part of the O'Keefe lands development currently being assessed by the City and GEI.

The memo also stated that Mattamy Homes was looking into the acquisition and development of a vacant parcel south of the original study area; this parcel is now included in the current assessment as the large (6.30 ha) employment land to the southwest of the O'Keefe lands development.

Similar conclusions remained in place in "Assessment of Adequacy of Public Services Report for 4497 O'Keefe Court", dated in October 2024.

Barrhaven Vision Destination Transit Planning

A transit study was conducted for the future development of Barrhaven. The document details future planned developments, included the O'Keefe area, to be serviced by planned transit such as light rail transit and bus transit. No major discussion on wastewater servicing was noted in the document.

2.3 Discussions with Stakeholders

To keep stakeholders informed of the recommendations being made for the area, the Technical Advisory Committee (TAC) was consulted.

Discussions with the project team at City as well as the TAC included a summary of the current study area conditions, current plans of additional growth added to the area, and potential concerns with maintaining level of service while enabling development in the O'Keefe area to proceed. There were no major concerns from the TAC regarding wastewater servicing capacity in the downstream off-site trunk infrastructure.

2.4 Level of Service and Design Criteria

As part of the hydraulic analysis, level of service (LOS) was assessed based on a set of design criteria. For the purposes of this assessment, level of service is defined as the expected hydraulic performance that serviced residents and businessowners should expect to receive from the City's wastewater infrastructure. Methods to maintain the target level of service can include: infrastructure upgrades to resolve existing issues and support additional growth, basement and surface flooding prevention measures, inflow and infiltration reduction, etc. The criteria used in this assessment originated from the WWMP to ensure consistency when reviewing and comparing results.

Three main hydraulic models were reviewed as part of this assessment:

- Existing Conditions
- Future Conditions All-Projects (without the addition of O'Keefe)
- Future Conditions All-Projects (with the addition of O'Keefe)

The hydraulic models were simulated under various design storms to compare hydraulic performance. As part of the LOS Review, the following storms will be used:

- 1-in-5-year June 2014 rainfall event (free flow)
- 1-in-25-year June 2014 rainfall event (projects flagged if 2.1 m HGL is triggered)
- 1-in-100-year June 2014 rainfall event (climate scenario for assessing resiliency)

It should be noted that the discussion of results is specific to the 1-in-25-year June 2014 event. Results for the 1-in-5-year and 1-in-100-year Event can be found in Appendix A.

When reviewing the results, the flow conditions for sewers will be assessed as follows:

- A sewer is considered free flowing when depth to diameter ratio (d/D) is less than 0.8 and the peak flow to theoretical pipe capacity ratio (q/Q) is less than 1

- A sewer is considered to be approaching surcharging by depth when the depth to diameter ratio (d/D) is between 0.8 and 1, but the theoretical pipe capacity is not exceeded ($q/Q < 1$)
- A sewer is considered surcharged by depth when the depth to diameter ratio is greater than or equal to 1 ($d/D \geq 1$), but the theoretical pipe capacity is not exceeded ($q/Q < 1$)
- A sewer is considered surcharged by flow when the depth to diameter ratio is greater than or equal to 1 ($d/D \geq 1$), and the theoretical pipe capacity is also exceeded ($q/Q \geq 1$)

In addition to sewer conditions, maintenance holes are also reviewed to identify areas of basement flooding risk.

- When the HGL > 1.8m below ground level, the maintenance hole does not indicate basement flooding risk
- When the HGL ≤ 1.8m below ground level, the maintenance hole is flagged as at potential risk for basement flooding
    - Clusters of nodes where the HGL ≤ 2.4m below ground level were also flagged to identify an area of potential concern
- When the HGL is above ground level, the maintenance hole indicates surface breakout (flooding)

2.5 Wastewater Flow Generation

The O'Keefe OPA boundary expansion area would add over 3,000 additional people and 81 employees to be serviced by the City's sanitary system. An estimate of the peak wet weather flow (PWWF) has been added to Table 2.

Table 2: Summary of proposed development, with PWWF estimate

Development Type	Population	Area (ha)	PWWF[1] (L/s)
Single Detached	1112	8.9	13.46
Townhomes	497	3.8	5.96
Rear Lane Towns	319	1.1	3.43
Back-to-back Towns	124	1.3	1.60
Mixed Use Blocks	418	8.6	6.60
Condo Blocks	700	15.3	11.36
Medium Density Blocks	355	2.6	4.23
Employment	81	6.7	2.37
Residential Total	**3524**	**41.7**	**46.64**
Employment Total	**81**	**6.7**	**2.37**
Expansion Area Total	**-**	**48.3**	**49.01**

[1] A peaking factor of 3 has been applied for sanitary flows and a new effective area rate of 90% of the original has been applied for I&I, as per the WWMP methodology

It is estimated that approximately 49 L/s will be generated from the new development within O'Keefe. It should be noted that this growth is also added alongside the 2046 projected population as represented in the IMP. No 2046 growth was identified directly upstream of the South Nepean Collector; however, 2046 growth along the South Nepean Collector in the IMP included 34,737 residents and 6,768 employees.

3 OPA Step 1 – Assessment of Existing and Planned Infrastructure Capacity

3.1 Capacity Analysis

The wastewater generated from O'Keefe is loaded to the South Nepean Collector, which then flows into the West Rideau Trunk. The capacity reviewed in several model scenarios to ensure the trunk infrastructure can support the additional growth from the development. Table 3 summarizes the hydraulic performance of the South Nepean Collector and West Rideau Trunk based on the sewer segment with the highest depth to diameter ratio.

Table 3: Summary of Downstream Trunk Capacity

	1-in-5-year		1-in-25-year		1-in-100-year	
Condition	**Max. d/D**	**Min. Freeboard (m)**	**Max. d/D**	**Min. Freeboard (m)**	**Max. d/D**	**Min. Freeboard (m)**
Existing (2019)	0.35	2.3	0.38	2.26	0.41	2.23
Future (2046 Growth)	0.70	1.72	0.72	1.70	0.74	1.67
Future (2046 Growth with O'Keefe)	0.71	1.70	0.73	1.68	0.75	1.66

Overall, it was found that the capacity in the downstream trunks was sufficient to handle the additional flow generated from O'Keefe under all conditions, with ample capacity for a 1-in-100-year wet weather event as well. The highest depth to diameter ratio recorded in a 1-in-25-year event under future conditions (with the addition of O'Keefe) was noted to be at 0.73 near Merivale Rd/MacFarlane Rd, with a residual capacity of approximately 1016 L/s within the sewer segment.

The downstream sewer with the lowest available freeboard is located along the West Rideau Trunk sewer, near the intersection of Prince of Wales Drive and Crestway Drive. This is a low topographic area of the system near the inverted siphon which crosses beneath the Rideau River and connects into the West Rideau Trunk sewer. There are no direct property connections to the West Rideau Trunk sewer at this low point, and so the minimum freeboard is not considered to be a concern at this location despite reaching the 1.8m freeboard threshold.

3.2 Hydraulic Assessment

The following section discusses the hydraulic assessment completed under normal operating conditions.

During existing conditions under normal operating conditions, it was found that capacity within the sewer was sufficient within all storm events. When reviewing both the South Nepean Collector and the West Rideau Trunk, the d/D within both trunks never surpasses 0.38. The trunks are considered to be in free flow, with no highest hydraulic constraints noted. The profile of the South Nepean Collector and the West Rideau Trunk can be seen in Figure 3, and the map view of the study area in Figure 6.

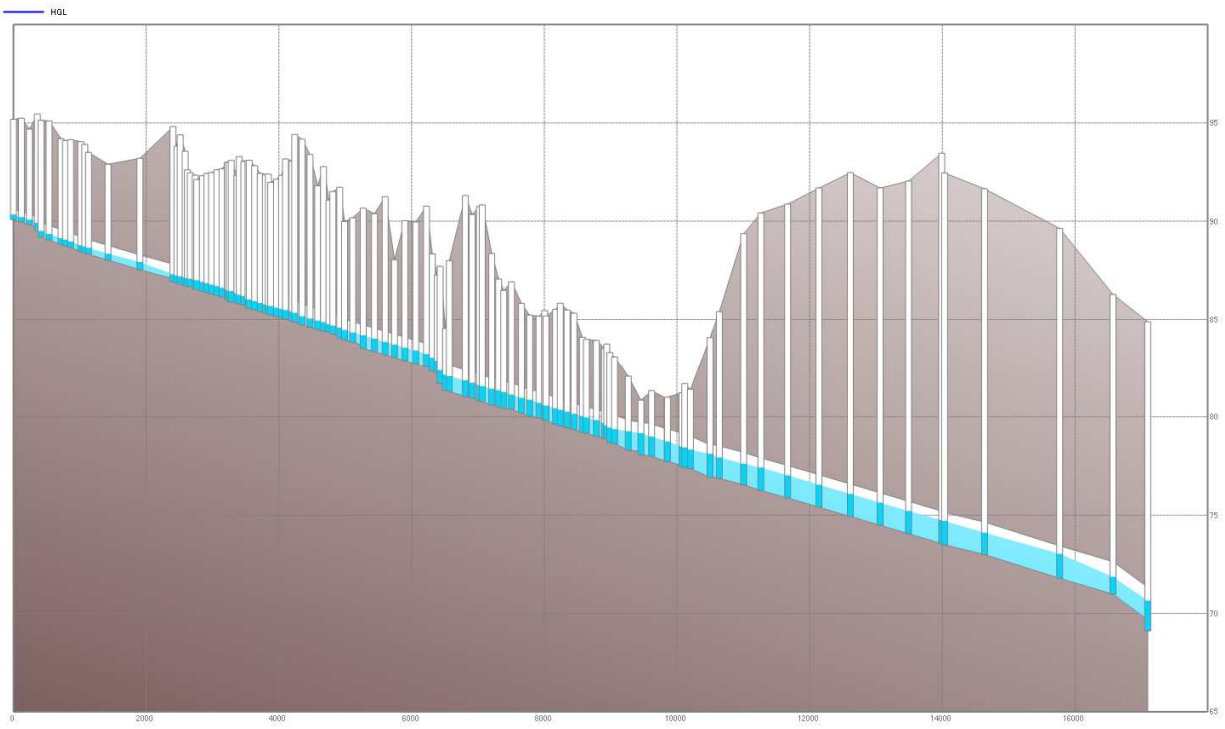

Figure 3: Profile view of South Nepean Collector and West Rideau Trunk under existing conditions

During future 2046 growth conditions, without the addition of O'Keefe, overall sewer performance was found to be similar to existing conditions. While sanitary flows increase in future conditions due to the addition of 2046 growth, the trunks are still free flowing. The average d/D for the trunk was approximately 0.45, with the maximum reaching 0.72. The profile of the trunk during future conditions can be seen in Figure 4, and the map view of the study area in Figure 7.

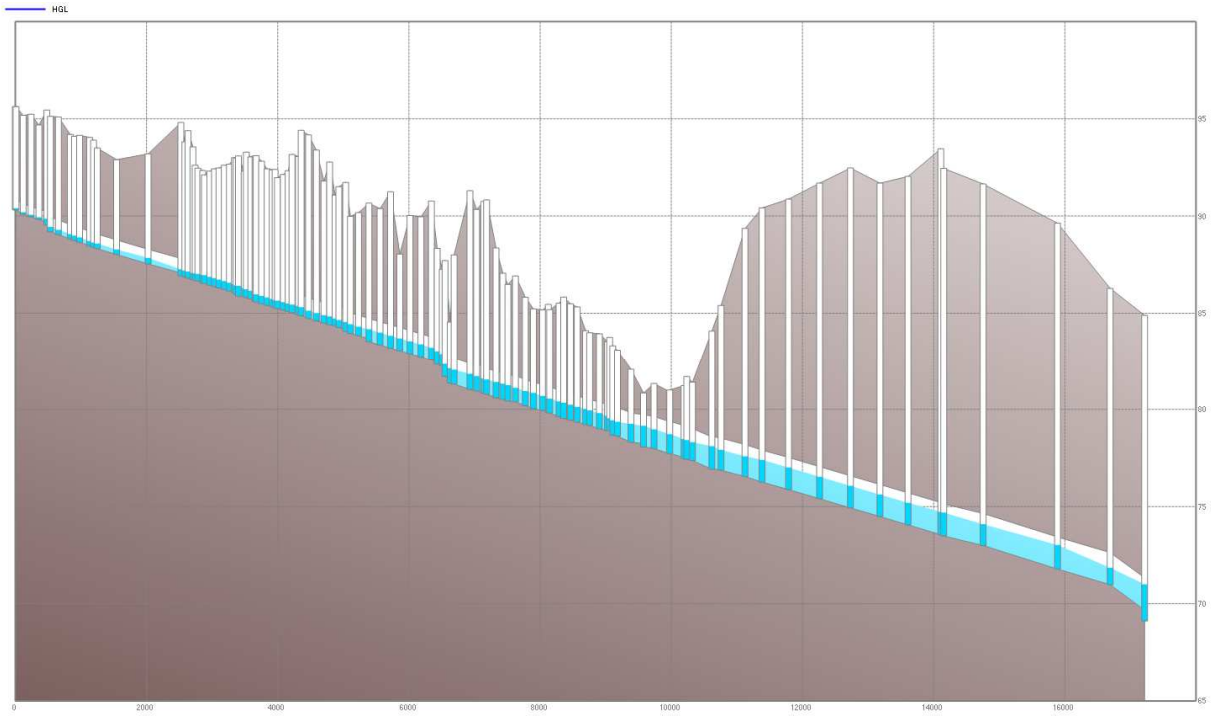

Figure 4: Profile view of South Nepean Collector and West Rideau Trunk under future conditions, no O'Keefe

With the addition of O'Keefe to the future 2046 growth conditions model, the system is still able to sustain the flow generated from the area. The average full by depth ratio for the South Nepean Collector and the West Rideau Trunk is approximately 0.53 and the maximum is 0.73.

Overall, under future 2046 growth conditions with the addition of O'Keefe, the current infrastructure is able to sustain flows. The profile of the South Nepean Collector and West Rideau Trunk during future conditions, with the O'Keefe lands added, can be seen in Figure 5, and the map view of the study area in Figure 8.

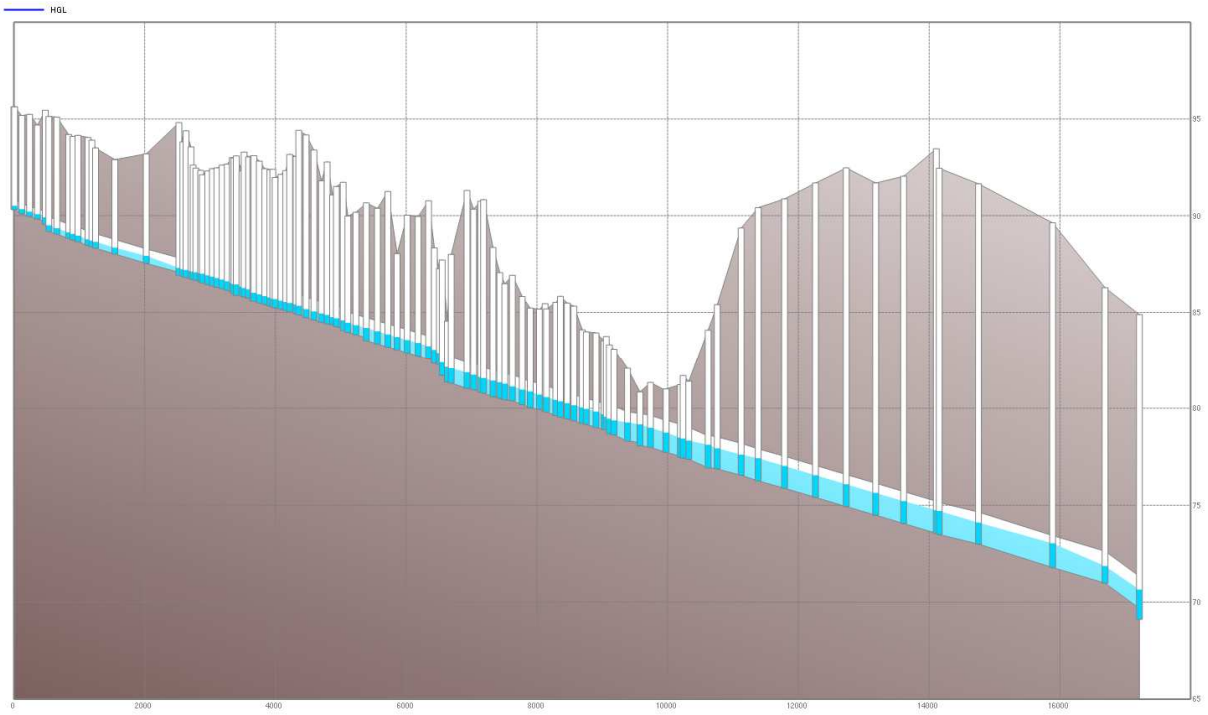

Figure 5: Profile view of South Nepean Collector and West Rideau Trunk under future conditions, with O'Keefe

3.3 Step 1 Conclusions & Recommendations

Overall, under existing and future conditions, pipes are seen to be free flowing and no significant HGL or surcharging issues are seen upstream of the South Nepean Collector. The major 2013 IMP project in the area is the South Nepean Collector extension, which is already constructed as of the completion of this memo. With the addition of this extension, it was found there is sufficient capacity within the area for all three conditions: existing, future without the addition of O'Keefe, and future with the addition of O'Keefe.

Under future conditions, both the current infrastructure and planned infrastructure can sustain the flows during future conditions. With the addition of O'Keefe, the highest d/D noted in the South Nepean Collector and West Rideau Trunk is 0.73 and is still considered free flowing.

Based on the analysis, no new projects have been suggested to support the addition of the O'Keefe lands and no additional infrastructure upgrades have been recommended beyond what has been proposed in the 2013 and 2024 IMPs. Because the Step 1 review found that there is sufficient capacity within the existing downstream infrastructure, then this assessment does not proceed to Step 2.

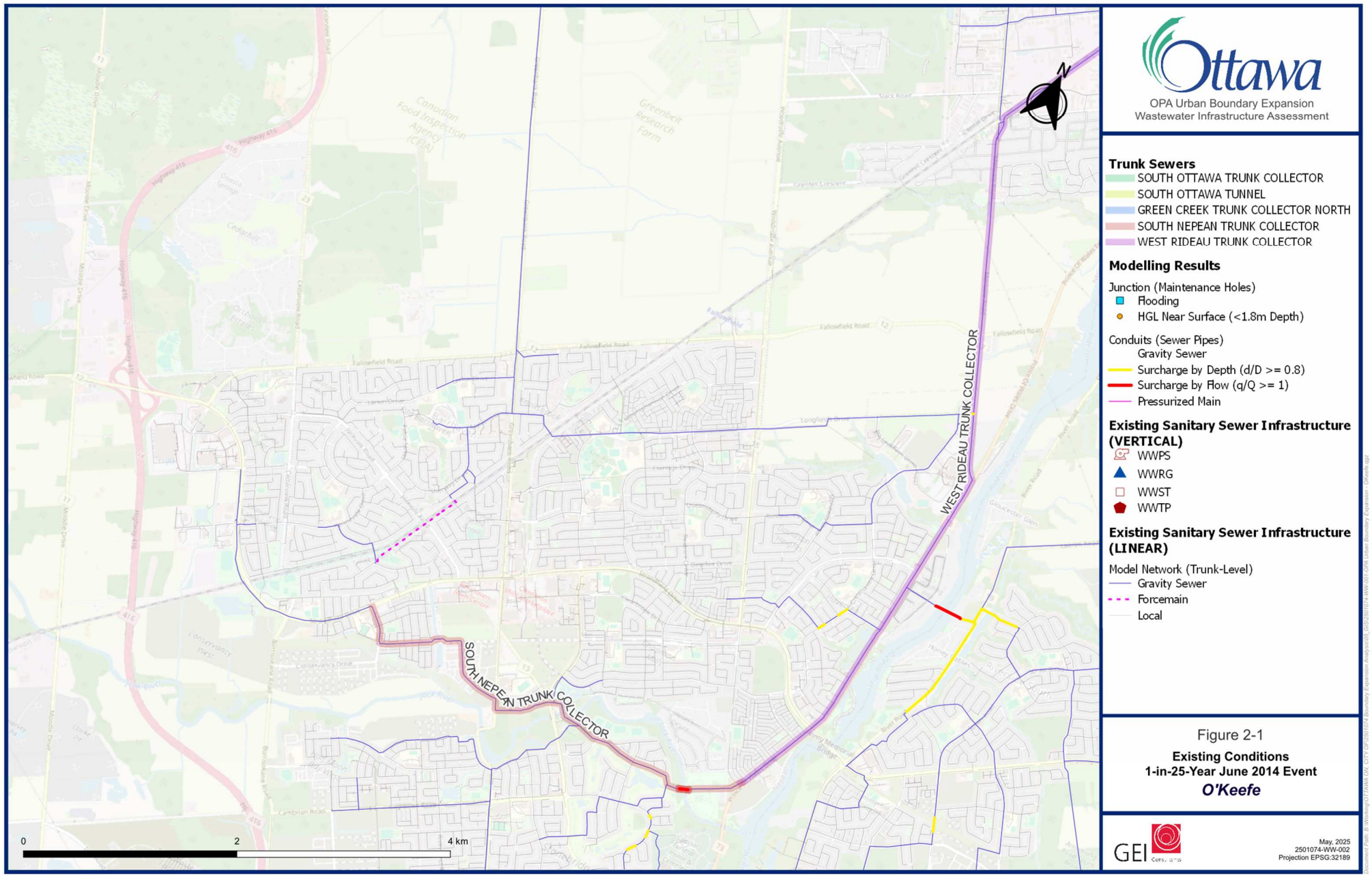

Figure 6: Map view of existing conditions

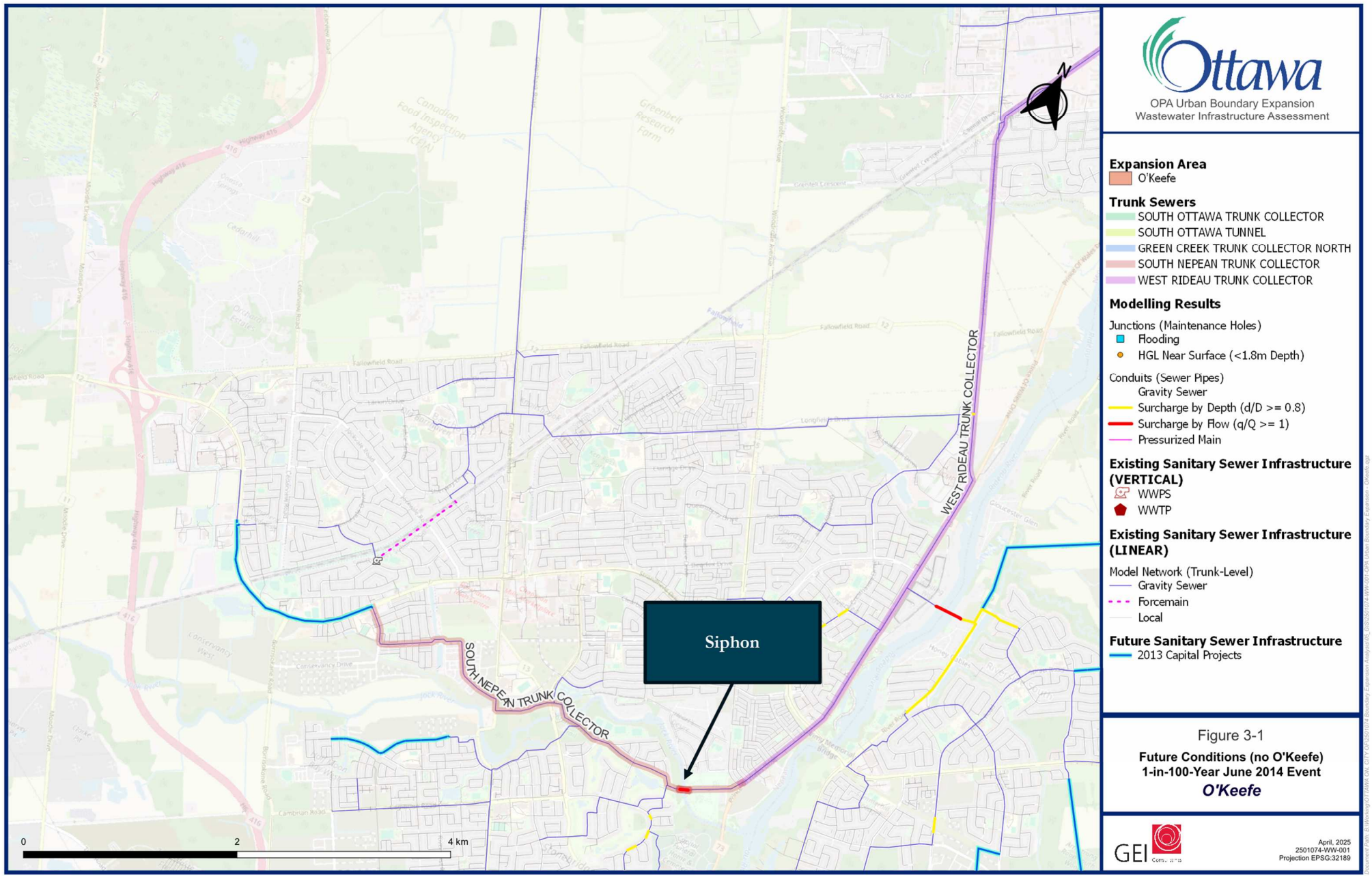

Figure 7: Map view of future conditions, no O'Keefe

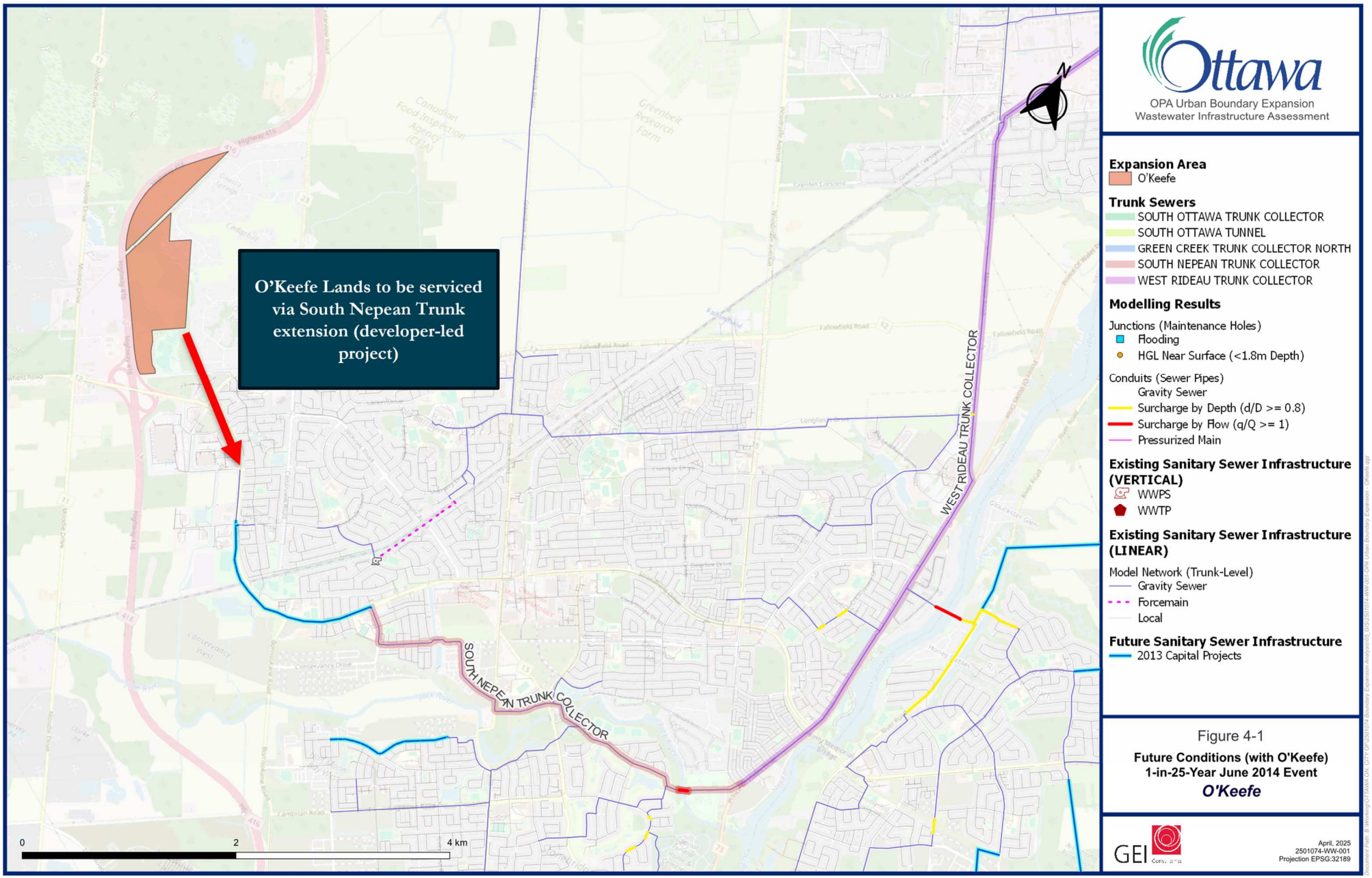

Figure 8: Map view of future conditions, with O'Keefe

Appendix A

Modelling Results

OPA Urban Boundary Expansion
Wastewater Infrastructure Assessment

Trunk Sewers
- SOUTH OTTAWA TRUNK COLLECTOR
- SOUTH OTTAWA TUNNEL
- GREEN CREEK TRUNK COLLECTOR NORTH
- SOUTH NEPEAN TRUNK COLLECTOR
- WEST RIDEAU TRUNK COLLECTOR

Modelling Results

Junction (Maintenance Holes)
- Flooding
- HGL Near Surface (<1.8m Depth)

Conduits (Sewer Pipes)
- Gravity Sewer
- Surcharge by Depth (d/D >= 0.8)
- Surcharge by Flow (q/Q >= 1)
- Pressurized Main

Existing Sanitary Sewer Infrastructure (VERTICAL)
- WWPS
- WWRG
- WWST
- WWTP

Existing Sanitary Sewer Infrastructure (LINEAR)

Model Network (Trunk-Level)
- Gravity Sewer
- Forcemain
- Local

SOUTH NEPEAN TRUNK COLLECTOR

WEST RIDEAU TRUNK COLLECTOR

0 2 4 km

Figure 2-1

Existing Conditions
1-in-25-Year June 2014 Event

O'Keefe

May, 2025
2501074-WW-002
Projection EPSG:32189

OPA Urban Boundary Expansion
Wastewater Infrastructure Assessment

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- Local

SOUTH NEPEAN TRUNK COLLECTOR

WEST RIDEAU TRUNK COLLECTOR

0 2 4 km

Figure 2-2

Existing Conditions
1-in-5-Year June 2014 Event

O'Keefe

GEI Consultants

May, 2025
2501074-WW-002
Projection EPSG:32189

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OPA Urban Boundary Expansion
Wastewater Infrastructure Assessment

Trunk Sewers
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Existing Sanitary Sewer Infrastructure (VERTICAL)
- WWPS
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- WWTP

Existing Sanitary Sewer Infrastructure (LINEAR)

Model Network (Trunk-Level)
- Gravity Sewer
- Forcemain
- Local

SOUTH NEPEAN TRUNK COLLECTOR

WEST RIDEAU TRUNK COLLECTOR

0 2 4 km

Figure 2-3

Existing Conditions
1-in-100-Year June 2014 Event

O'Keefe

GEI Consultants

May, 2025
2501074-WW-002
Projection EPSG:32189

OPA Urban Boundary Expansion
Wastewater Infrastructure Assessment

Expansion Area
- O'Keefe

Trunk Sewers
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- WWPS
- WWTP

Existing Sanitary Sewer Infrastructure (LINEAR)

Model Network (Trunk-Level)
- Gravity Sewer
- Forcemain
- Local

Future Sanitary Sewer Infrastructure
- 2013 Capital Projects

SOUTH NEPEAN TRUNK COLLECTOR

WEST RIDEAU TRUNK COLLECTOR

0 2 4 km

Figure 3-1

Future Conditions (no O'Keefe)
1-in-25-Year June 2014 Event
O'Keefe

GEI Consultants

May, 2025
2501074-WW-001
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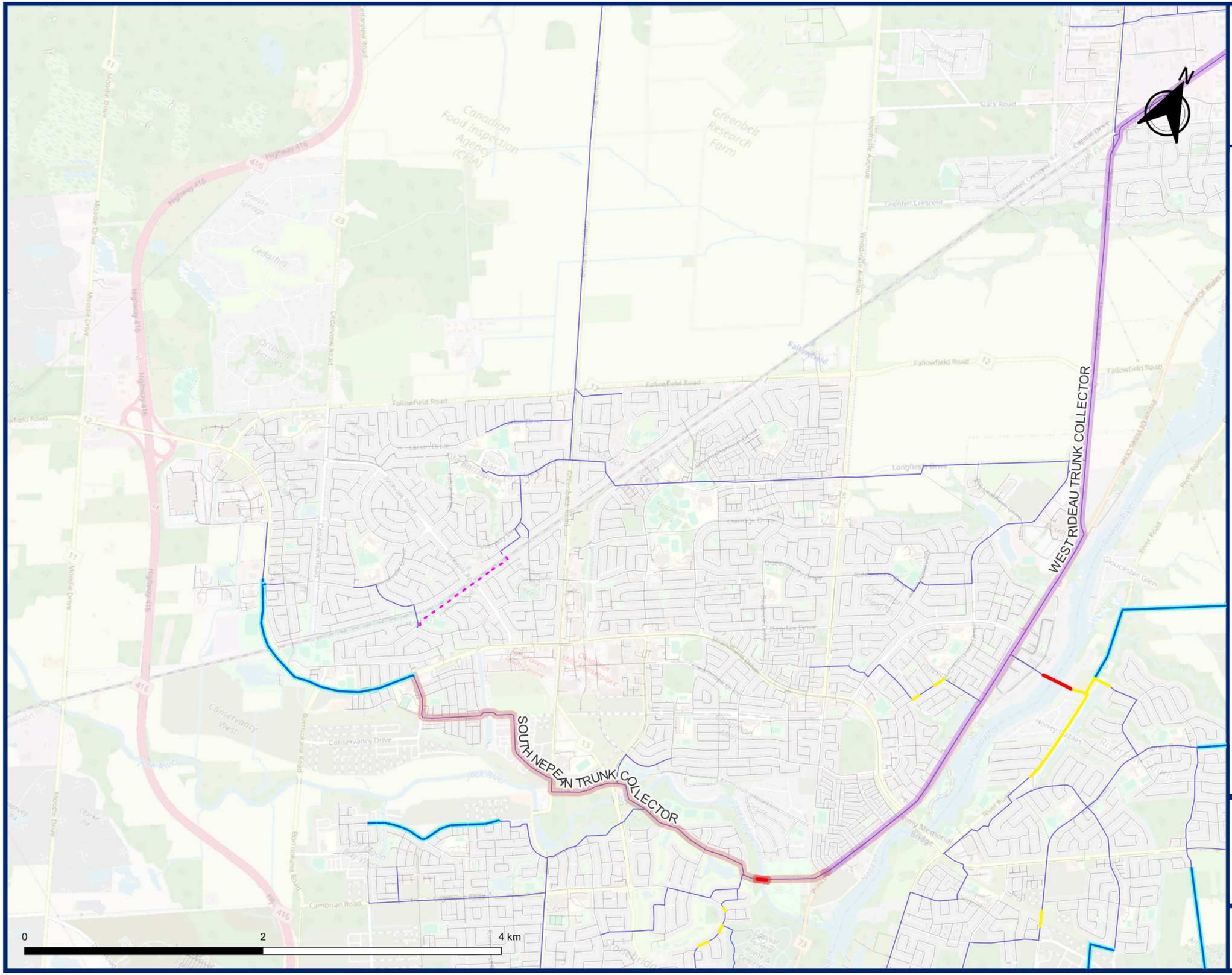

OPA Urban Boundary Expansion
Wastewater Infrastructure Assessment

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- WWPS
- WWTP

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Model Network (Trunk-Level)
- Gravity Sewer
- Forcemain
- Local

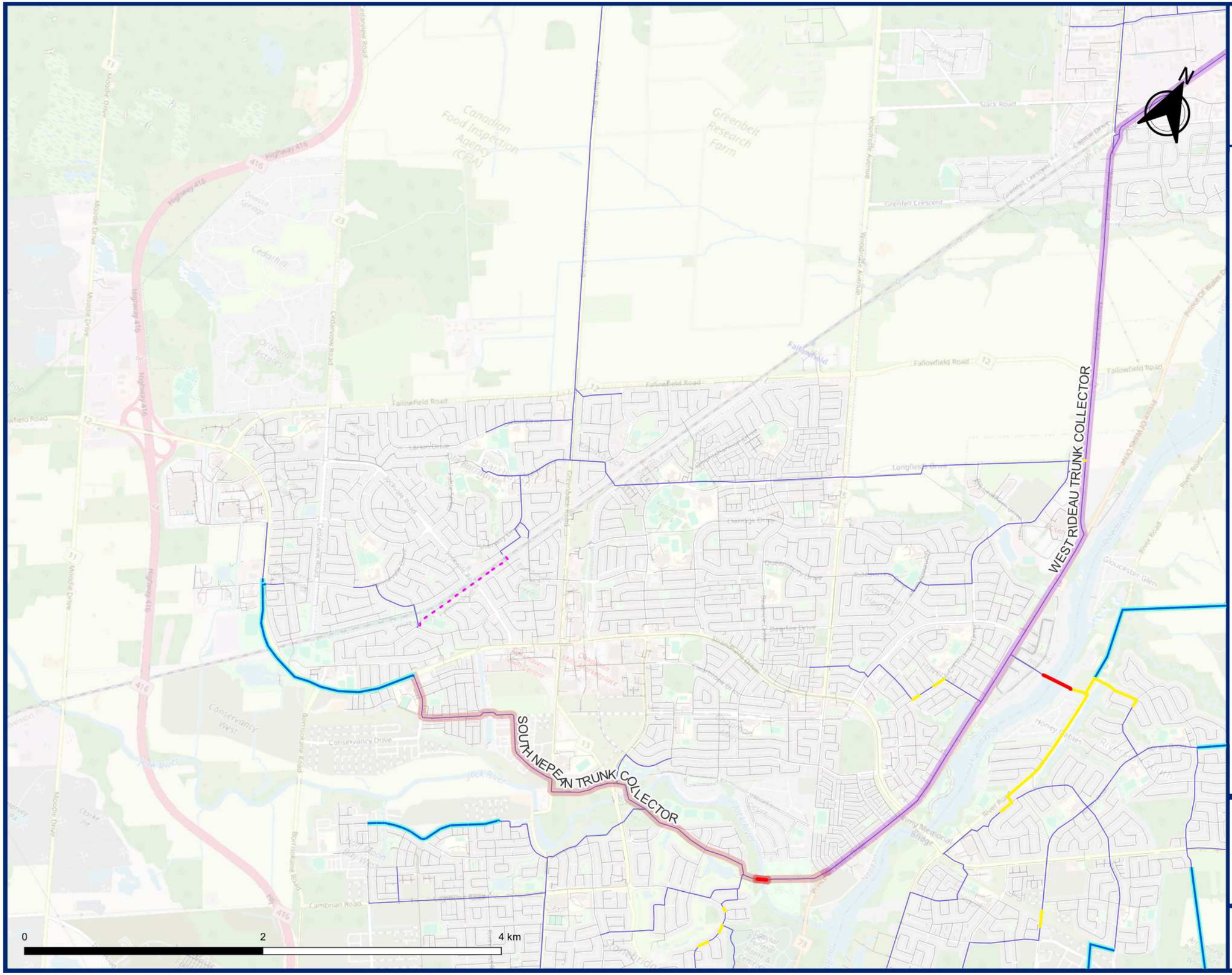
Future Sanitary Sewer Infrastructure
- 2013 Capital Projects

Figure 3-2

Future Conditions (no O'Keefe)
1-in-5-Year June 2014 Event
O'Keefe

GEI Consultants

May, 2025
2501074-WW-001
Projection EPSG:32189



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Wastewater Infrastructure Assessment

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Conduits (Sewer Pipes)
- Gravity Sewer
- Surcharge by Depth (d/D >= 0.8)
- Surcharge by Flow (q/Q >= 1)
- Pressurized Main

Existing Sanitary Sewer Infrastructure (VERTICAL)
- WWPS
- WWTP

Existing Sanitary Sewer Infrastructure (LINEAR)

Model Network (Trunk-Level)
- Gravity Sewer
- Forcemain
- Local

Future Sanitary Sewer Infrastructure
- 2013 Capital Projects

Figure 3-3

Future Conditions (no O'Keefe)
1-in-100-Year June 2014 Event
O'Keefe

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May, 2025
2501074-WW-001
Projection EPSG:32189

OPA Urban Boundary Expansion
Wastewater Infrastructure Assessment

Expansion Area
- O'Keefe

Trunk Sewers
- SOUTH OTTAWA TRUNK COLLECTOR
- SOUTH OTTAWA TUNNEL
- GREEN CREEK TRUNK COLLECTOR NORTH
- SOUTH NEPEAN TRUNK COLLECTOR
- WEST RIDEAU TRUNK COLLECTOR

Modelling Results

Junctions (Maintenance Holes)
- Flooding
- HGL Near Surface (<1.8m Depth)

Conduits (Sewer Pipes)
- Gravity Sewer
- Surcharge by Depth (d/D >= 0.8)
- Surcharge by Flow (q/Q >= 1)
- Pressurized Main

Existing Sanitary Sewer Infrastructure (VERTICAL)
- WWPS
- WWTP

Existing Sanitary Sewer Infrastructure (LINEAR)

Model Network (Trunk-Level)
- Gravity Sewer
- Forcemain
- Local

Future Sanitary Sewer Infrastructure
- 2013 Capital Projects

SOUTH NEPEAN TRUNK COLLECTOR

WEST RIDEAU TRUNK COLLECTOR

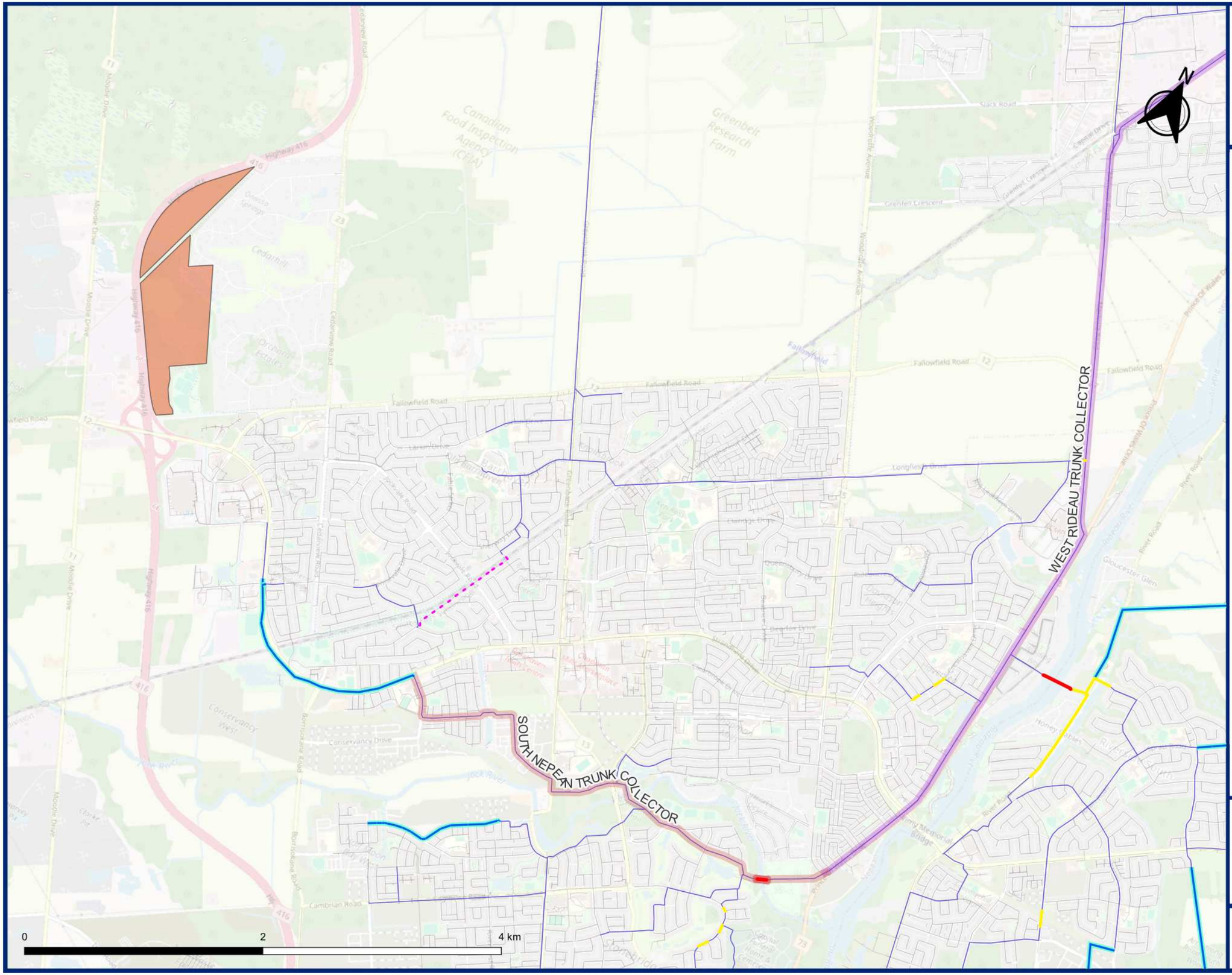
0 2 4 km

Figure 4-1

Future Conditions (with O'Keefe)
1-in-25-Year June 2014 Event
O'Keefe

GEI Consultants

May, 2025
2501074-WW-001
Projection EPSG:32189



Ottawa

OPA Urban Boundary Expansion
Wastewater Infrastructure Assessment

Expansion Area
- O'Keefe

Trunk Sewers
- SOUTH OTTAWA TRUNK COLLECTOR
- SOUTH OTTAWA TUNNEL
- GREEN CREEK TRUNK COLLECTOR NORTH
- SOUTH NEPEAN TRUNK COLLECTOR
- WEST RIDEAU TRUNK COLLECTOR

Modelling Results

Junctions (Maintenance Holes)
- Flooding
- HGL Near Surface (<1.8m Depth)

Conduits (Sewer Pipes)
- Gravity Sewer
- Surcharge by Depth (d/D >= 0.8)
- Surcharge by Flow (q/Q >= 1)
- Pressurized Main

Existing Sanitary Sewer Infrastructure (VERTICAL)
- WWPS
- WWTP

Existing Sanitary Sewer Infrastructure (LINEAR)

Model Network (Trunk-Level)
- Gravity Sewer
- Forcemain
- Local

Future Sanitary Sewer Infrastructure
- 2013 Capital Projects

Figure 4-2

Future Conditions (with O'Keefe)
1-in-5-Year June 2014 Event
O'Keefe

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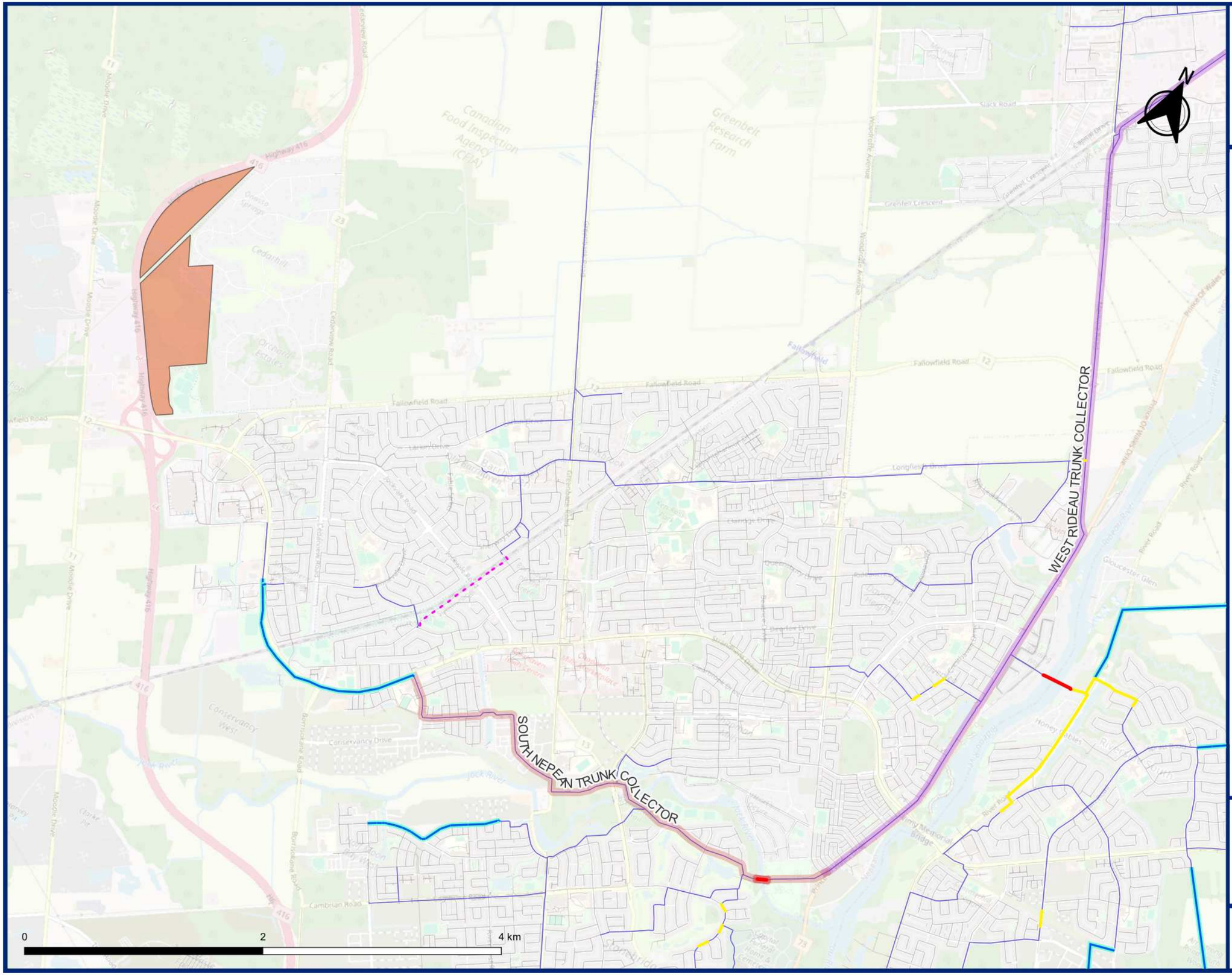
Projection EPSG:32189



Ottawa

OPA Urban Boundary Expansion
Wastewater Infrastructure Assessment

Expansion Area
- O'Keefe

Trunk Sewers
- SOUTH OTTAWA TRUNK COLLECTOR
- SOUTH OTTAWA TUNNEL
- GREEN CREEK TRUNK COLLECTOR NORTH
- SOUTH NEPEAN TRUNK COLLECTOR
- WEST RIDEAU TRUNK COLLECTOR

Modelling Results

Junctions (Maintenance Holes)
- Flooding
- HGL Near Surface (<1.8m Depth)

Conduits (Sewer Pipes)
- Gravity Sewer
- Surcharge by Depth (d/D >= 0.8)
- Surcharge by Flow (q/Q >= 1)
- Pressurized Main

Existing Sanitary Sewer Infrastructure (VERTICAL)
- WWPS
- WWTP

Existing Sanitary Sewer Infrastructure (LINEAR)

Model Network (Trunk-Level)
- Gravity Sewer
- Forcemain
- Local

Future Sanitary Sewer Infrastructure
- 2013 Capital Projects

Figure 4-3

Future Conditions (with O'Keefe)
1-in-100-Year June 2014 Event
O'Keefe

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May, 2025
2501074-WW-001
Projection EPSG:32189