Prepared By:

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Town Of Saugeen Shores

Residual Waste Projection Analysis: 40-Year Planning Horizon

GEI Project No.: 2401298

March 2025 (V2)

Saugeen Shores

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ATTACHMENT A Economic Analysis: Justification for a 40-year Planning Period (October 2024 – R1)
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Document Revision Tracking

Version	Date	Description
V1	September 2024	Residual Waste Projection Analysis: 40-year Planning Horizon
V2	March 2025	Minor updates for consistency across Proposed ToR project documentation

LIST OF ACRONYMS

Acronym	Abbreviation Meaning
AMO	Association of Municipalities of Ontario
EBR	Environmental Bill of Rights
ECA	Environmental Compliance Approval
EA	Environmental Assessment
EA Act	Environmental Assessment Act
EPA	Environmental Protection Act
GEI	GEI Consultants Inc.
IC&I	Industrial, Commercial, and Institutional
IPR	Individual Producer Responsibility
MECP	Ministry of the Environment, Conservation and Parks
O.Reg.	Ontario Regulation
RRCEA	Resource Recovery and Circular Economy Act
RPRA	Resource Productivity and Recovery Authority
R.S.O.	Revised Statutes of Ontario
SSO	Source Separated Organics
ToR	Terms of Reference
Town	Town of Saugeen Shores
WDTA	Waste Diversion Transition Act
WFO	Waste-Free Ontario

RESIDUAL WASTE PROJECTION ANALYSIS:
40-YEAR PLANNING HORIZON

TOWN OF SAUGEEN SHORES

MARCH 2025 (V2)

GEI PROJECT NO.: 2401298

1. INTRODUCTION

1.1 Background

The Town of Saugeen Shores completed a Long-Term Waste Management Plan in 2020 (the Plan). One of the goals of the Plan was to identify and evaluate long-term waste management strategies (or alternatives). Based on the preliminary review, landfill optimization (i.e., the continued use of the existing Southampton Landfill Site) was identified as a viable long-term alternative for the management of the Town's residual waste. This alternative was carried forward as a *Preliminary Preferred 'Alternative To'* to address the problem of diminishing disposal capacity at the existing landfill site and its ability to serve the Town's growing population.

Since the Plan was completed in 2020, the Town has embarked on the process of an Environmental Assessment to pursue the long-term solution for residual waste. As per the Environmental Assessment Act, the first Stage of the Environmental Assessment for this waste management project involves the preparation of a Proposed Terms of Reference (ToR) to provide the framework for the preparation and completion of the Environmental Assessment. As part of the development of the ToR, the purpose, description, and rationale for the proposed undertaking are to be described.

As described in the ToR, it is proposed that the Environmental Assessment be undertaken to address the Town's future waste management needs for residual waste for a 40-year planning period. This Residual Waste Projection Analysis forms part of the supporting documentation for the Terms of Reference and provides estimates for the projected future waste quantity generation and associated waste disposal needs for the Town for the period between 2030 and 2070.

It is recognized that the final purpose, description, and rationale of the proposed undertaking will evolve during the preparation of the Environmental Assessment. Therefore, the final description of the proposed undertaking and the rationale for it may be refined as the Environmental Assessment progresses.

1.2 Purpose and Objectives of the Residual Waste Projection Analysis

This document is intended to provide a general understanding of the types and quantity of waste to be managed. It includes an overview of the relevant waste management regulations and policies, including associated provincial waste diversion targets, and a review of the Town's existing waste management system. Using this information, residual waste quantity projections for the Town are developed through the proposed 40-year planning horizon. The volume of landfill airspace capacity required to accommodate the Town's residual waste during this period is also estimated. The rationale and assumptions used in the development of the projected waste quantity and landfill capacity needs are also described.

The planning horizon typically contemplated by the Ministry in the Environmental Assessment for Waste Management Projects is 25-years. Based on discussions with the MECP, a longer planning horizon may be considered.

During initial consultations with the Ministry on April 8, 2024, it was recommended that, in recognition of the identification of Landfill Optimization as a preliminary preferred alternative, an economic analysis be advanced to provide the rationale for the 40-year planning horizon. As such, a review of financial considerations and an economic analysis was prepared and provided to the MECP in correspondence dated April 12, 2024. A copy of the *'Economic Analysis: Justification for a 40-year Planning Period'*, updated to reflect estimates developed as part of this assessment, is provided in **Attachment A**.

During a meeting with the MECP on July 16, 2024, it was suggested that the details for the waste quantity and landfill capacity projections (over the 40-year planning period) may need to be further developed, refined, and supported. The analysis provided herein has been prepared in response to the Ministry's recommendations.

2. WASTE MANAGEMENT POLICIES AND REGULATIONS

While waste and waste diversion may be impacted by regulations from all three levels of government (federal, provincial, and municipal), waste management in Canada is primarily regulated at the provincial level. The Ministry of the Environment, Conservation and Parks (MECP) and its Waste Management Policy Branch is responsible for the development of policies, regulations, and legislation related to waste management in Ontario. Waste management regulations are generally applied to two main waste generation categories, specifically the residential sector and the Industrial, Commercial, and Institutional (IC&I) sector. Saugeen Shores collects and manages waste from both sectors which are subject to the regulations/guidelines described below.

2.1 Ontario Regulation 347 General – Waste Management (under EPA R.S.O. 1990, c.E.19)

Residential waste management and recycling services mandated by the provincial government are primarily carried out by the municipalities. Municipalities are responsible for developing their own waste management programs and to ensure that their waste management strategy meets the requirements of the Waste Management Regulation O.Reg.347 under the Environmental Protection Act (R.S.O. 1990, C.E.19). This regulation focuses on waste management practices that ensure public health and safety is maintained. It categorizes and sets standards for the management of different types of waste and provides specific exemptions for approval requirements. Regulations included in this regulation pertain to the waste generator, waste carrier, and waste receiver requirements, including waste disposal sites and waste management systems.

2.1.1 Ontario Regulation 101/94 Recycling and Composting Municipal Waste

O.Reg.101/94 outlines provisions relating to recycling and composting of municipal waste. Part II specifies the municipal requirements for (i) Blue Box waste management systems and (ii) leaf and yard waste systems. It requires municipalities with 5,000 or more people to implement and operate curbside recycling programs and to implement programs for home composters. Municipalities with 50,000 or more people must operate a program that collects or accepts leaf and yard waste for diversion.

2.1.2 Ontario Regulation 103/94 IC&I Source Separation Programs

Members of the IC&I sector are themselves responsible for complying with waste related regulations. The province has two regulations under the EPA related to waste reduction and diversion by IC&I waste generators, including the following:

i. Waste Audit Regulation (O.Reg.102/94) which requires designated establishments that meet or exceed specified size thresholds and/or other criteria to take an inventory of their waste and make a plan to reduce waste.

ii. Source Separation Regulation (O.Reg.103/94) which requires designated establishments and multi-unit residential buildings to source separate materials to be recycled or reused.

O.Reg.103/94 targets source separation for waste coming from the IC&I sector because this sector produces a significant proportion of the waste, estimated to be approximately 60% of the total waste generated in Ontario [*Made in Ontario Environment Plan: Reducing Litter and Waste in Our Communities: Discussion Paper,* April 2019]. This regulation outlines the requirements for the implementation of source separation programs specific to wastes generated by the IC&I sector.

O.Reg.103/94 requires owners or operators of designated establishments that meet or exceed specified size thresholds and/or other criteria and of multi-unit residential buildings with six or more units to facilitate source separation programs for specified wastes and to make a reasonable effort to ensure that these wastes are reused or recycled. A summary of the designated establishments and associated source separation program requirements is provided in **Table 2-1**.

TABLE 2-1: Summary of IC&I Designated Establishments and Source Separation Program Requirements

Designated Establishment	Blue Box	Cardboard (Corrugated)	Clean Wood	Brick & Concrete	Drywall (Unpainted)	Steel	Polystyrene& Polyethylene
Retail Shopping Establishments & Complexes	X	X					
Large Construction Projects		X	X	X	X	X	
Large Demolition Products			X	X		X	
Office Buildings	X	X					
Multi-Unit Residential Buildings	X						
Restaurants	X	X					
Hotels and Motels	X	X					
Hospitals	X	X					
Educational Institutions	X	X					
Large Manufacturing Establishments	X	X	X			X	X

Note: 'Blue Box' refers to materials that are generally associated with this waste diversion stream, such as glass, aluminum, fine paper, newsprint, plastics bottles, and steel food or beverage cans.

2.2 Waste-Free Ontario Act

In 2016 the Waste-Free Ontario Act was proclaimed, and with this new waste diversion legislation aimed at managing waste from both the residential and IC&I sector, the former Waste Diversion Act was repealed. The Waste-Free Ontario Act is comprised of the following:

i. Resource Recovery and Circular Economy Act (RRCEA)
ii. Waste Diversion Transition Act (WDTA)

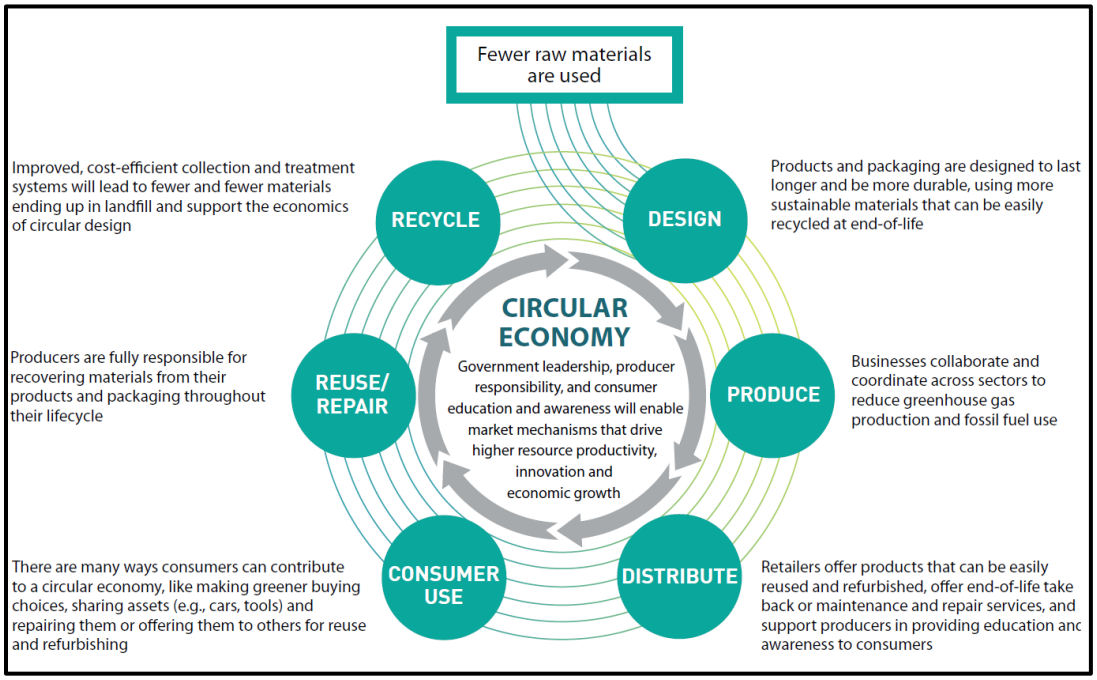
The legislation is accompanied the *'Strategy for a Waste Free Ontario: Building a Circular Economy'*, which lays out Ontario's vision for a circular economy and includes goals for a zero-waste Ontario with zero greenhouse gas emissions from the waste sector and the *'Food and Organic Waste Policy Statement'* (RRCEA, Section 11).

2.2.1 Legislation: RRCEA and WDTA

The legislation is intended to address the problem of waste generation by putting materials destined for the landfill back into the economy (i.e., increasing resource recovery via recycling/reuse) and moving toward a circular economy. A key component of the circular economy is that producers are responsible for the end-of-life management of their products and packaging, including collection, management, and costs associated with the environmental impact of their products.

The goal is to decrease the need for waste disposal through various methods of waste reduction including, but not limited to, recycling programs, increased resource recovery, and decreased packaging. As outlined by the Resource Productivity and Recovery Authority (RPRA), with the Waste-Free Ontario Act *'Ontario is shifting from a linear economy to a circular economy. In a linear economy, natural resources are extracted, manufactured into products, consumed, and then thrown away. In a circular economy, products and packaging are designed to minimize waste and then be recovered, reused, recycled, and reintegrated back into production'*. A schematic of the Circular Economy is provided in **Figure 2-1**.

FIGURE 2-1: Resource Recovery and Circular Economy Schematic
(Source: https://www.ontario.ca/page/strategy-waste-free-ontario-building-circular-economy)



The legislation aims to target waste production at its source, making companies responsible their products and packaging. This responsibility extends throughout the product's lifecycle, including its design, manufacturing, packaging, transportation, product use, and diversion or disposal. This is known as Individual Producer Responsibility (IPR).

To accompany the RRCEA, the Waste Diversion Transition Act was released to provide guidance for the transition from the established waste diversion programs to the producer responsibility framework. To date, the IPR framework has been applied to existing mandated recycling programs such as tires, hazardous and special waste, and electronics. Due to the complexity of the transition for the blue box program, which is (or was previously) municipally managed and co-funded by industry and municipalities, the blue box program in Ontario is being progressively transitioned between 2023 and 2025, with a comprehensive start date of January 1, 2026. The Town of Saugeen Shores is scheduled to start under the new program on January 1, 2026. Other diversion materials may be considered in the future.

2.2.2 Strategy for a Waste-Free Ontario: Building a Circular Economy

In February 2017, the Province approved a plan for resource recovery and waste reduction known as the *Strategy for a Waste-Free Ontario: Building the Circular Economy*. The strategy outlines the plan to reduce landfilled materials that could otherwise be re-used, recycled, composted and reintegrated back into the economy.

The vision behind a Waste-Free Ontario is *'one where waste is seen as a resource that can be recovered, reused and reintegrated to achieve a circular economy'*. The Strategy provides the guiding principles needed to work toward the elimination of waste and establishes various diversion goals and milestones. The strategy includes several actions to help achieve its goals, including the following:

- Individual Producer Responsibility (IPR): Transition existing waste diversion programs to new producer responsibility framework. Requires producers to take full responsibility for the environmental and financial management of their products and packaging. This transition is planned to be completed by 2026.
- Reduction of Food and Organic Waste: Implementing a framework to reduce the volume of food and organic waste going to the landfill. Ontario's Food and Organic Waste Policy Statement was issued under Section 11 of RRCEA in February 2018. This is presented in **Section 2.2.3** of this report.
- Increase resource recovery across all sectors by requiring industrial, commercial and institutional sectors to divert more of the waste they produce from landfills.

The Waste-Free Ontario legislation includes an implementation plan (or strategy) to work towards systematically avoiding and eliminating the volume of waste, while maximizing the conservation and recovery of resources. The ultimate goals are to achieve a zero waste Ontario and zero greenhouse gas emissions from the waste sector. The province intends to continue to mark its progress towards the interim targets of 30% diversion by 2020, which provincially has been achieved, 50% by 2030, and 80% diversion by 2050.

2.2.3 Food and Organic Waste Policy Statement (April 2018 – RRCEA S.11)

A second key proposed action towards a Waste-Free Ontario is the development of Ontario's Food and Organic Waste Policy Statement aimed at reducing the volume of food and organic waste going to the landfill. This was issued under Section 11 of RRCEA in February 2018 and provides direction to the various levels of government, the IC&I sector, and the waste management sector to increase waste reduction and resource recovery of food and organic waste.

Food and organic wastes reportedly make up an estimated one-third of Ontario's waste stream. These organic wastes include residential organic waste (i.e., food waste and leaf and yard waste) and food produced by the IC&I sector, such as food processors, wholesalers, grocery stores, and restaurants. Relevant policies specific to the residential and IC&I sectors are summarized below.

Residential Sector

Policy Section 4.2: Increasing Residential Resource Recovery in Southern Ontario
According to the Food and Organic Waste Policy, municipalities in Southern Ontario that, as of the effective date, do not provide curbside collection of source separated food and organic waste are to provide:

i) *Curbside collection of food and organic waste to single-family dwellings in an urban settlement area within a local municipality if the population of the local municipality is greater than 50,000 and the population density of the local municipality is greater than or equal to 300 persons per square kilometre.*

ii) *Collection of food and organic waste to single-family dwellings in an urban settlement area within a local municipality if:*
   a. *The population of the local municipality is greater than 50,000 and the population density of the local municipality is less than 300 persons per square kilometre; or*
   b. *The population of the local municipality is greater than 20,000 but equal to or less than 50,000 and the population density of the local municipality is greater than or equal to 100 persons per square kilometre.*

Policy Section 4.5: Collection Preference and Alternatives for Residential Resource Recovery

For municipalities subject to policies 4.2(ii):

i. *Curbside collection of source separated food and organic waste is the preferred method of servicing single-family dwellings.*

ii. *Alternatives to curbside collection or source separation of food and organic waste may be used if it is demonstrated that provincial waste reduction and resource recovery targets can be achieved efficiently and effectively.*

Provided that the population of the Town will be approaching 20,000 persons at about the same time as the landfill will be reaching capacity (i.e., circa 2030-2032), and the population density of the Town will be greater than 100 persons per square kilometer, the Town will be required to have a source separated organics (SSO) program in place in about the next 5 to 7 years (population projections are presented in **Section 4** of this report). At that time, the Town of Saugeen Shores will be subject to Policy 4.2(ii) and Policy 4.5 of the Food and Organic Waste Policy. The primary difference between Policy 4.2(i) and 4.2(ii) is the requirement for curbside collection. Under the current policy statement, the Town would not be required to provide curbside SSO collection when the population reaches the 20,000-person threshold.

As per the Food and Organic Waste Policy, the waste reduction and diversion target for municipalities in Southern Ontario subject to Policy 4.2(ii) is 50% waste reduction and resource recovery of food and organic waste generated by single family dwellings in urban settlement areas.

The IC&I Sector

The Food and Organic Waste Policy requires that multi-residential buildings and IC&I establishments, that meet the threshold in the policy to reduce and divert food and organic waste by either 50% or 70% (depending on their size and subsector), achieve diversion via the implementation of separate collection. Diversion targets for various establishments are summarized in **Table 2-2**.

TABLE 2-2: Summary of IC&I Designated Establishments and Food & Organic Waste Diversion Targets

Designated Establishment	Food & Organic Waste Diversion Target
Multi-Residential Buildings (6 or more units): Applies to municipalities with populations ≥5000	50%
Commercial buildings subject to O.Reg.103/94 that generate >300 kg/week	70%
Commercial buildings not subject to O.Reg.103/94 that generate >300 kg/week	50%
Commercial buildings subject to O.Reg.103/94 that generate <300 kg/week	50%
Educational Institutions and Hospitals subject to O.Reg.103/94 that generate >150kg/week	70%

3. PROVINCIAL WASTE DIVERSION TARGETS AND PERFORMANCE

3.1 Waste Diversion Targets

The Waste Diversion Act came into effect in 2002. At that time the provincial government set a goal to divert 60% of Ontario's waste from all sectors by the end of 2008 (Ontario's 60% Waste Diversion Goal – A Discussion Paper, MOE – June 10, 2004, PIBS 4651e). However, according to the information available, the province was achieving an overall waste diversion rate of approximately 24% in 2008. Currently, the overall diversion rate has stalled at about 30% since about 2015.

Diversion goals, to be applied to all sectors combined, were set as part of the Strategy for a Waste-Free Ontario (2017). The Waste-Free Ontario legislation includes an implementation plan to work towards systematically avoiding and eliminating the volume of waste, while maximizing the conservation and recovery of resources. The ultimate goals are to achieve a zero waste Ontario and zero greenhouse gas emissions from the waste sector. The province intends to continue to mark its progress towards the interim targets of 30% diversion by 2020, which has provincially been achieved, 50% by 2030 and 80% diversion by 2050.

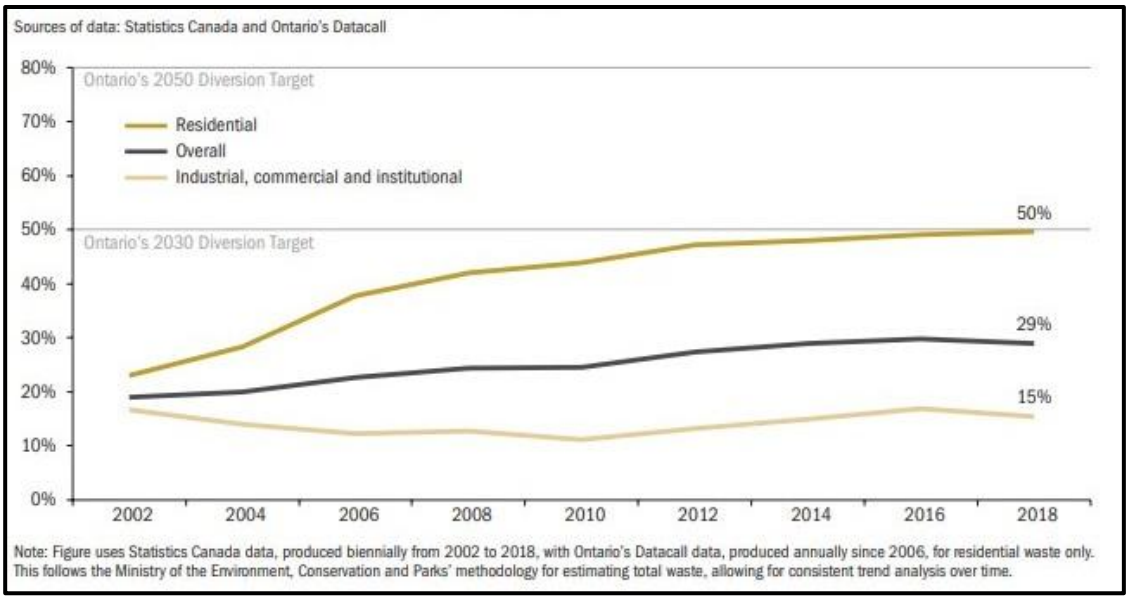
3.2 Sector Overview: Residential and IC&I

According to the Ontario Baseline Waste & Recycling Report (AMO, 2023), in 2022 Ontario generated between 12.7 million tonnes and 15.5 million tonnes of non-hazardous waste. This was equivalent to between 925 and 1,127 tonnes per person. It is generally estimated that approximately 40% of Ontario's waste represents waste from the residential section, with the remaining 60% of waste generated being from the IC&I Sector.

The range in waste generation rates presented above represents the disparity between survey work completed by two different surveys (i.e., Statistics Canada and Waste to Resource Ontario). It is noted that the Ontario government typically uses what is referred to as the 'low generation rate' in their reporting, however, the range presented shows that the tonnages typically reported by the province may underestimate the amount of waste generated and waste disposed. For the purpose of this analysis, and consistent with the Ontario governments approach, references to provincial performance made herein will be in relation to the province's low generation rate.

According to the Baseline Waste and Recycling Report (AMO 2023), in 2022 approximately 30% of all waste generated in Ontario was diverted, with residential waste diversion accounting for approximately two thirds of all material diverted, despite being representative of an estimated 40% of all waste generated. As shown in **Figure 3-1**, this is consistent with historical trends in which the IC&I sector has been shown to divert much less of its waste, despite generating more waste than the residential sector. With the residential sector currently diverting approximately half of its waste, it is evident that the residential diversion initiatives have driven the increase in Ontario's overall diversion rate between 2002 and present.

FIGURE 3-1: Ontario's Waste Diversion Rates (%), 2002-2018
[Source: Value-for-Money Audit: Non-Hazardous Waste Reduction and Diversion in the Industrial, Commercial and Institutional Sector. Office of the Auditor General of Ontario. November 2021.]



Findings of the Value-for-Money Audit (November 2021)

The Food and Organic Waste Policy established diversion targets of 50% to 70% of food and organic waste for multi-residential buildings and designated IC&I establishments. However, it is noted that while these targets are set for the IC&I sector, according to the Value-for-Money Audit (November 2021), *'more than 98% of the IC&I establishments in Ontario are not regulated, limiting the potential of existing regulations to drive better overall IC&I waste practices'*. In other words, the Ministry's IC&I waste regulations including the Waste Audit Regulation (i.e., O.Reg.102/94) and Source Separation Regulation (i.e., O.Reg.103/94) apply to less than 2% of Ontario's businesses and institutions, with the remainder having no obligations under the regulation to reduce or divert their waste. As a result, the Food and Organic Waste Policy appears to have had a limited influence on the overall diversion of waste being achieved by the IC&I sector, with current diversion rates for the IC&I sector estimated to remain in the range of 15% to 17%.

The Audit found that improving waste management in the IC&I sector, which generates and disposes the majority of Ontario's waste, would be a significant step in meeting the province's waste goals and diversion targets. The audit concluded that the Ministry does not currently have effective systems and processes in place to improve IC&I waste reduction and diversion rates to enable Ontario to meet its provincial goals. Based on the findings of the audit, this includes a lack of policies and programs to reduce the amount of IC&I waste generated and disposed. In response to the Auditor Generals Report, the Province has recognized the need to expand the amount of waste diverted by the IC&I sector and is committed to creating more opportunities to reduce and recycle all waste. It is expected that upon implementation of a waste diversion strategy for the IC&I sector by the Ministry, waste diversion rates for the IC&I sector will progressively improve. However, the timing of this is unknown.

3.3 Residential Waste Diversion

Since about 2002, residential diversion rates for the province have increased from about 25% to ±50% (refer to **Figure 3-1**). The Ontario Baseline Waste & Recycling Report (AMO, 2023) presents an overview of the findings and trends for materials diverted in Ontario. Key findings from the AMO Report include the following:

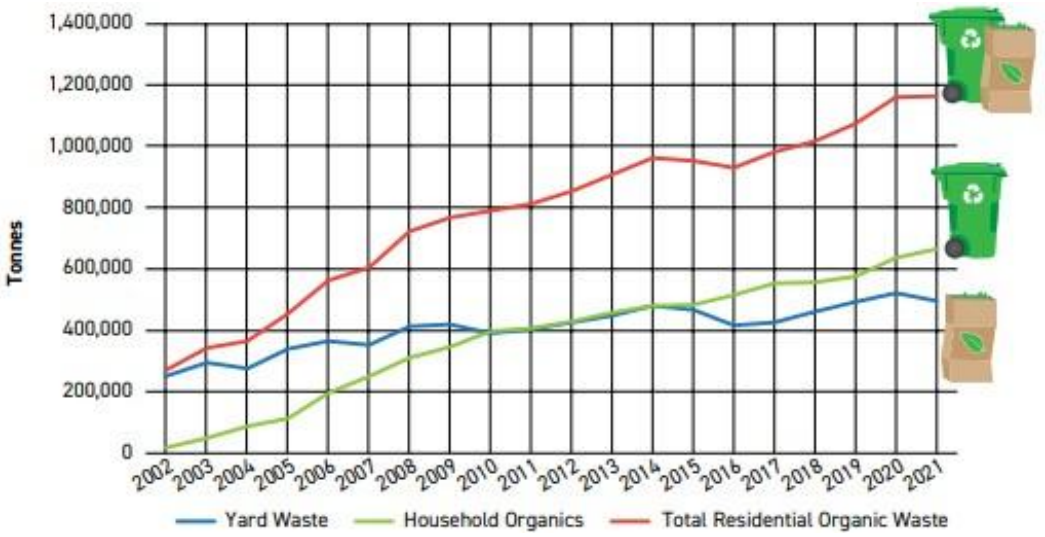
1. **Recyclable Materials (i.e., waste diversion, excluding organics):**

   The amount of other residential materials recycled by weight has decreased by 19%. The decrease is partially explained by the changes in the composition of the packaging materials residents consume with a shift from heavier materials such as paper, glass, and metal to lightweight plastics.

2. **Organic Waste:**

   The increase in Ontario's diversion rate has mainly been driven by the municipal government initiatives in organic waste diversion programs. Diversion of organic material has been accomplished through the operation of residential organic waste collection programs, including food waste and leaf and yard waste. Overall, between 2002 and 2022, organic waste diversion programs tripled the amount of residential organic waste diverted. As shown in **Figure 3-2,** the increase in the capture rate is primarily due to the implementation of green bin programs that collect household organics (e.g., green waste).

FIGURE 3-2: Total Residential Organic Waste Diverted in Ontario
[Source: Ontario Baseline Waste & Recycling Report 2023. Association of Municipalities Ontario.]

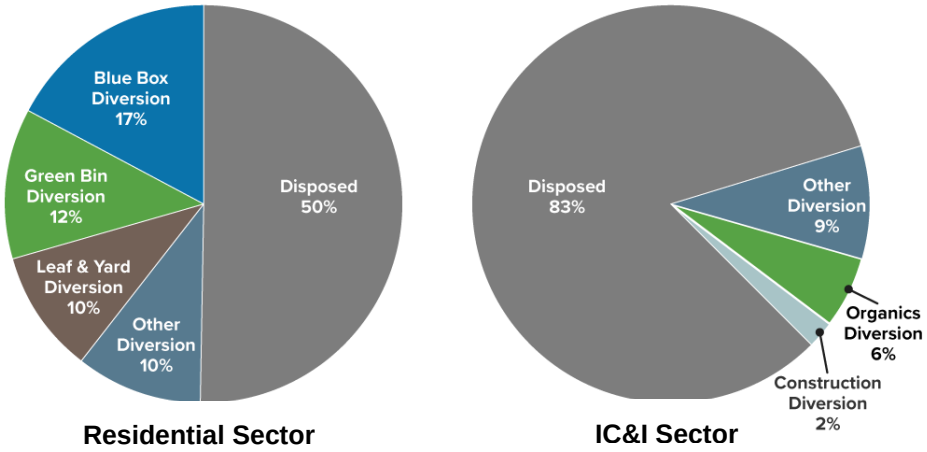


3. **Overview of Waste Breakdown (by Sector and Diversion Stream):**

   As outlined in the MECP 'Made in Ontario Environment Plan: Reducing Litter and Waste in Our Communities: Discussion Paper' (April 2019), Ontario generates nearly one tonne of waste per person each year and the overall diversion rate has stalled at about 30%. Consistent with the findings of the AMO Report (2023), the residential sector was found to divert nearly 50% of residential waste generated, while the IC&I sector diverted about 17% its waste (based on 2017 and 2018 data sources).

   Of particular interest is the materials breakdown of waste generated by the residential sector and IC&I sector. As shown in **Figure 3-3**, and consistent with the findings of the AMO Report (2023), organic waste represents the largest stream of waste (by weight) diverted by municipal governments, accounting for almost half of the residential waste diverted. However, not all municipalities have organic waste diversion programs in place.

FIGURE 3-3: Ontario's Residential and IC&I Waste Management
[Source: Reducing Litter and Waste in Our Communities: Discussion Paper (MECP ERO# 013-4689: April 2019)]



3.4 Key Considerations for the Projection of the Town's Residual Waste Disposal Needs

Data from the Province indicates that the current diversion rate is approximately 50% for residential waste. However, when the lower waste diversion rates being achieved by the IC&I sector are considered, the overall diversion rate for the province is about 30%. While the provincial targets have been successful in increasing diversion, particularly from the residential sector, the previous targets set have generally not been met. Based on the review of the historical diversion targets set by the province, the overall diversion rates achieved, and the diversion trends for various diversion streams, when developing waste capacity needs projections for the Town of Saugeen Shores, it is proposed that the following considerations be made:

Considering that past provincial diversion targets have generally not been met, it is recommended that the residual waste quantity projections take into consideration the provincial diversion goals but also provide an allowance for additional residual waste should interim goals not be met.

Largest gains for increased diversion are likely to be made via the implementation of SSO programs by the Town and via improved IC&I diversion.

1. Gains made to Ontario's diversion rate have mainly been driven by municipal government initiatives in organic waste diversion programs, primarily via the implementation of green bin programs that collect source separated organics (SSO). It is recognized that the implementation of a residential SSO program would be beneficial. This would likely need to be a Town-directed initiative. The Town is pursuing a source separated organics program feasibility study in 2025 that will review options for green waste diversion.
   - *It is recommended that the potential waste diversion gains resulting from the implementation of an SSO program be considered in the residual waste quantity projections -*

2. Waste diversion by the IC&I sector, which generates and disposes most of Ontario's waste, offers a significant opportunity to achieve increased diversion. It is recognized that improved waste management strategies in the IC&I sector would be a significant step in meeting the province's waste goals and diversion targets. While improvements in the diversion of IC&I waste can be encouraged and supported by the Town, the creation of opportunities to reduce and recycle all waste generated by this sector would be most successful if supported by the province via the creation of additional policies and programs specific to this sector.
   - *It is recommended that potential waste diversion gains resulting from additional provincial policies and programs specific to the IC&I sector be considered in the residual waste quantity projections. It is thought that the gains will be realized progressively. Therefore, it is recommended that a progressive increase in waste diversion achieved by this sector be assumed in the residual waste projections -*

4. TOWN DEMOGRAPHICS AND POPULATION PROJECTIONS

4.1 Town Demographics and Community Profile

The Town of Saugeen Shores is characterized by an estimated 18 kilometers of shoreline along Lake Huron to the west along which the communities of Southampton and Port Elgin have been developed. Based on the 2021 census data, the Town has a reported population of 15,908 persons, not including the relatively high number of seasonal residents and the influx of tourists during the summer months. Consistent with the Town's tourism industry, the dwelling counts reported by Statistics Canada indicate that a significant proportion of the dwellings within the Town of Saugeen Shores are seasonal. According to the 2021 Census data, of the 8,548 private dwelling units, approximately 20% (or 1,643 units) are occupied by seasonal residents.

The Town is rather unique when compared to the surrounding municipalities/territories in that an estimated 85% of its population is situated within urban communities, with 15% residing in the outlying rural areas. The population density within the Town is approaching 100 persons per square kilometer.

According to Statistics Canada Census data, the Town's average annual growth rate increased from 1.7% reported for the period between 2011 and 2016, to 3.2% reported for the period between 2016 and 2021. This unprecedented growth rate is expected to continue, or increase, with the anticipated large infrastructure projects at Bruce Power (i.e., the Town's largest employer) requiring contractors, consultants and additional full-time employees to move to Saugeen Shores. These projects include the Bruce Power Life-Extension Program, such as the Major Component Replacement (MCR) Projects (to sustain operations until 2064) and the potential of the Bruce C project, which aims to secure additional nuclear capacity at the Bruce Power site to support the province's growing energy needs.

4.2 Population Projections

Population projections for the Town were recently updated to the year 2042 as part of a *'Development Charges Background Study to Amend By-Law'* (April 2023, Final Report) prepared by DFA Infrastructure International Inc. As part of the Study, the population and employment growth were projected based on the Statistics Canada census data, a Development Charges Background Study completed in 2021, the Town's subdivision plan applications, and a memo on growth prepared by Hemson Consulting Limited in 2018. Overall, it is anticipated that the Town of Saugeen Shores will experience a continually increasing population.

Table 4-1 provides a summary of the Town's reported population and the population projections presented in the Development Charges Background Study (2023) for the period between 2016 and 2042. The projected population and growth are presented for the census population excluding and including the undercount. Population undercounts refer to the census error of excluding someone who should have been enumerated. For the purposes of the DFA Study, undercounts were assumed to be 3%.

Based on the population projections presented in the Development Charges Background Study, the following is noted:

- It is estimated that the population of Saugeen Shores will grow by approximately 44% during the period between 2024 and 2042. This is equivalent to an annual growth rate of 2.46%.
- Based on the reported 2021 census population and the population forecast of 25,384 persons (including the undercount) for the year 2042, the compound growth rate is estimated to be 2.1%.

Using the compound growth rate of 2.1% and the 2042 population forecast presented in the DFA Study, the population for the Town of Saugeen Shores was projected to the year 2070 to facilitate further estimations for the landfill capacity needs over the 40-year period between 2030 and 2070. Based on this assumption, it is estimated that the Town's population will increase to about 45,500 persons in 2070. A summary of the population projections, using the undercounts as a basis, is provided in **Table 4-1**.

Using the compound growth rate of 2.1% and the 2042 population forecast presented in the DFA Study, the population for the Town of Saugeen Shores was forecast to the year 2070 to facilitate further estimations for the landfill capacity needs over the 40-year period between 2030 and 2070. Population forecasts to the year 2070 are presented in **Table 4-1**.

TABLE 4-1: Population Projections (2016 to 2070)

YEAR	POPULATION	
	Excluding Undercount	Including Undercount
Based on the Development Charges Background Study (DFA, 2023)		
2016	*13,715*	*14,126*
2017	*14,176*	*14,601*
2018	*14,775*	*15,218*
2019	*15,150*	*15,604*
2020	*15,535*	*16,001*
2021	*15,908*	*16,385*
2022	*16,293*	*16,782*
2023	*16,688*	*17,189*
2024	17,083	17,596
2025	17,478	18,003
2026	17,873	18,410
2027	18,268	18,816
2028	18,663	19,223
2029	19,059	19,603
2030	19,454	20,037
2031	19,886	20,483
2032	20,319	20,928
2033	20,751	21,374
2034	21,184	21,820
2025	21,617	22,265
2036	22,049	22,711
2037	22,482	23,156
2038	22,914	23,602
2039	23,347	24,047
2040	23,780	24,493
2041	24,212	24,939
2042	24,645	25,384
Assumes a compound growth rate of 2.1%		
2045	----	27,019
2050	----	29,987
2055	----	33,280
2060	----	36,936
2065	----	40,992
2070	----	45,494

Populations presented in blue shading are based on those provided in Appendix A of the Town of Saugeen Shores Development Charges Background Study to Amend By-Law 56-2021 and Proposed Amending By-Law Final Report (DFA Infrastructure International Inc., May 9, 2023). Population projections beyond 2042 assume a compound growth rate of 2.1%.

5. EXISTING WASTE MANAGEMENT SYSTEM

5.1 Southampton Landfill Site

As a result of the amalgamation that occurred in 1999, the Town owns two landfill sites including the Southampton Landfill and the Port Elgin Landfill. The Town continued the use of both landfills until July 2007, at which time the Port Elgin landfill site was filled to capacity and subsequently closed. Since that time the Town has consolidated its landfill operations to the Southampton Landfill Site, with the site now forming a key component of the Town's Waste Management infrastructure. It is noted that the Environmental Compliance Approval (ECA No. A273101) for the Southampton Landfill Site limits the acceptance of waste to that generated within the Town of Saugeen Shores. It is estimated that the Southampton Landfill will reach its approved capacity sometime between 2030 and 2032. This will ultimately depend upon the rate of development and population growth within the Town, and the success of the Town's waste diversion initiatives.

The Town currently provides various recycling programs and diversion opportunities to its residents and is actively investigating, and continues to be prepared to consider, additional reduction and reuse opportunities. Diversion is achieved via the curbside collection of blue box materials, at the Town's Transfer Station located at the Southampton Landfill Site, and at several waste diversion depots available for select waste streams.

5.2 Existing Waste Types, Quantities and General Composition

As part of the Town's undertaking to plan the future management of waste generated within the community, the types, composition, and quantity of the waste the Town currently manages needs to be understood and is presented below.

5.2.1 Data Sources and Waste Types

For the purposes of this report, data on the Town's waste generated for the period between 2019 and 2023 have been reviewed to assess the current waste disposal practices and to determine estimates of the Town's waste generation and diversion rates. Average rates of waste received over a period of several years is considered more accurate relative to the measured tonnages for each individual year. By applying the average rate, years where a greater quantity of waste is received in relation to a potential large-scale project (i.e., infrastructure projects, accelerated development activity, etc.) can be accounted for. A summary of the waste generation and diversion quantities (by weight) is provided in **Table 5-1**.

The main data sources for waste generation and diversion estimates are the Town records and the RPRA Municipal Datacall. The screening and tracking of incoming waste to the Town's transfer station is thought to provide accurate records in terms of residual waste to be landfilled and divertible materials. The RPRA datacall provides information specific to the residential portion of the waste stream. Neither of these records specifically provides accurate estimates of the relative contributions of waste from the residential sector and the IC&I sector.

The IC&I sector includes hospitals, office buildings, educational institutions, industrial firms, and businesses, including the services associated with tourism (i.e., camping, cottages, hotels and restaurants), which is considered a major industry for the Town. Based on estimates developed to support the Town's Long-Term Waste Management Plan (2020), the quantity of residual waste generated by the IC&I sector in association with the tourism industry and other related entities including, but not limited to, the hospital, seniors home(s), and industrial firms, accounts for an estimated 40% of the total residual waste in the community. Therefore, for the purposes of establishing baseline data, it is assumed that 40% of the residual waste received at the landfill (or approximately 32% of the total waste generated once an additional amount of 17% is accounted for IC&I diversion) represents waste from the IC&I sector. This proportion is less than the provincial average, which estimates that 60% of total waste generated is from the IC&I sector. It is noted that, at this time, the local schools and a majority of the campgrounds have their waste managed by private contractors.

TABLE 5-1: Waste Generation Summary - Type, Quantity, and Composition (Tonnes and kg/capita)

	YEAR										Average	
	2019		2020		2021		2022		2023			
	Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	Tonnes	(%)
OVERALL DIVERSION RATES (Residential and IC&I Sectors, Combined)												Compared to (%)
Total Waste Generated	**9,438**	**----**	**9,876**	**----**	**10,074**	**----**	**9,893**	**----**	**9,021**	**----**	**9,660**	**Total Waste Generated**
Residual Waste	6,337	67.1%	6,329	64.1%	6,604	65.6%	6,495	65.7%	5,768	63.9%	**6,307**	**65.3%**
Organics Diversion*	*1,536*	*16.3%*	*1,769*	*17.9%*	*1,897*	*18.8%*	*1,654*	*16.7%*	*1,525*	*16.9%*	*1,676*	*17.4%*
Other Diversion	*1,565*	*16.6%*	*1,777*	*18.0%*	*1,573*	*15.6%*	*1,743*	*17.6%*	*1,728*	*19.2%*	*1,677*	*17.4%*
Overall Diversion	3,101	32.9%	3,546	35.9%	3,470	34.4%	3,398	34.3%	3,253	36.1%	**3,354**	**34.7%**
Residual Waste Contibutions (Assumes that 40% of the residual waste generated originates from the IC&I sector)												Compared to (%)
Total Residual Waste	**6,337**	**%Residual**	**6,329**	**%Residual**	**6,604**	**%Residual**	**6,495**	**%Residual**	**5,768**	**%Residual**	**6,307**	**65.3%**
												Total Residual / **Sector Total**
Residential Sector	3,802	60%	3,798	60%	3,962	60%	3,897	60%	3,461	60%	3,784	60% / 57.2%
IC&I Sector	2,535	**40%**	2,532	**40%**	2,642	**40%**	2,598	**40%**	2,307	**40%**	2,523	**40%** / 83.0%
Waste Diverted (Assumes that the IC&I sector diverts the equivalent of 17% of the total waste it generates)												Compared to (%)
Overall Diversion	**3,101**	**32.9%**	**3,546**	**35.9%**	**3,470**	**34.4%**	**3,398**	**34.3%**	**3,253**	**36.1%**	**3,354**	**34.7%**
												Total Diverted / **Sector Total**
Residential Sector	2,582	40.4%	3,028	44.4%	2,929	42.5%	2,865	42.4%	2,781	44.6%	2,837	84.6% / 42.8%
IC&I Sector	519	**17.0%**	519	**17.0%**	541	**17.0%**	532	**17.0%**	473	**17.0%**	517	15.4% / **17.0%**
OVERALL WASTE CONTRIBUTIONS BY SECTOR (Residual and Diverted Waste, Combined)												Compared to (%)
												Total Waste Generated
Residential Sector	6,384	67.6%	6,825	69.1%	6,891	68.4%	6,763	68.4%	6,241	69.2%	6,621	68.5%
IC&I Sector	3,054	32.4%	3,050	30.9%	3,183	31.6%	3,130	31.6%	2,780	30.8%	3,039	31.5%

	YEAR					Average
	2019	2020	2021	2022	2023	
Population (DFA, 2023)	***15,604***	***16,001***	***16,385***	***16,782***	***17,189***	**----**
PER CAPITA WASTE GENERATION AND DIVERSION RATES (kg/person)						
Total Waste Generated (Tonnes)	9,438	9,876	10,074	9,893	9,021	9,660
Total Waste Generated (per Capita)	**605**	**617**	**615**	**589**	**525**	**590**
Residual Waste (per Capita)	406	396	403	387	336	385
Overall Diversion (per Capita)	199	222	212	202	189	205
Residential Sector						
Waste Generated (Tonnes)	6,384	6,825	6,891	6,763	6,241	6,621
Waste Generated (per Capita)	**409**	**427**	**421**	**403**	**363**	**404**
Residual Waste (per Capita)	244	237	242	232	201	231
Overall Diversion (per Capita)	165	189	179	171	162	173
IC&I Sector						
Waste Generated (Tonnes)	3,054	3,050	3,183	3,130	2,780	3,039
Waste Generated (per Capita)	**196**	**191**	**194**	**187**	**162**	**186**
Residual Waste (per Capita)	162	158	161	155	134	154
Overall Diversion (per Capita)	33	32	33	32	27	32

NOTES:

1. It is assumed that 40% of the total residual waste received at the Southampton Landfill Site is from the IC&I sector. Overall, it is estimated that the IC&I sector diverts ±17% of the estimated 3,039 tonnes of waste generated (i.e., the IC&I residual waste generated is equal to about 2,523 tonnes [83%] and IC&I waste diverted is 517 tonnes [17%]).
2. Populations presented are based on those provided in Appendix A of the Town of Saugeen Shores Development Charges Background Study to Amend By-Law 56-2021 and Proposed Amending By-Law Final Report (DFA Infrastructure International Inc., May 9, 2023).
3. The total per capita residential waste generation rate (residual and diverted, combined) is consistent with the average annual waste generation rate presented for the residential sector in the Ontario Baseline Waste & Recycling Report (AMO, 2023) of approximately 400 kg/capita.
4. * Organics diversion estimates are based on the weight of wood, stumps and brush received at the site. Additional organics diversion is being achieved via the diversion of leaf and yard waste at the Yard Waste Site.

5.2.2 Waste Quantity and Composition

The waste diversion rate is defined as the total amount of divertible content (including recycling, reuse, and organics) divided by the total quantity of waste generated (i.e., waste diverted + residual waste), which is expressed as a percent. The total tonnage of residual waste disposed at the Southampton Landfill Site and of waste diverted for the 5-year period between 2019 and 2023 is summarized in **Table 5-1**.

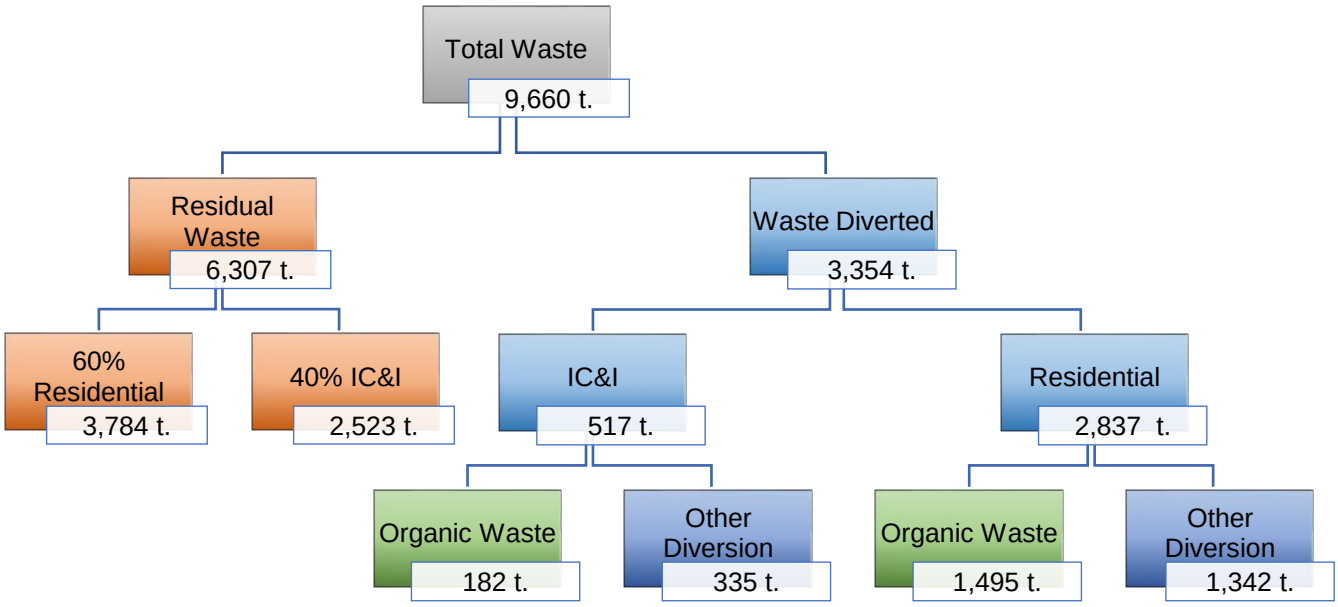
The waste managed by the Town is divided into two main contributors, the residential and the IC&I sectors. The residential diversion rates presented in **Table 5-1** assume that the IC&I sector contributes 40% of the total residual waste and, in addition to the residual waste that can be attributed to the IC&I sector, the IC&I sector diverts an estimated 17% of the total waste it generates. As a result, Town-specific diversion related to the IC&I sector was estimated assuming that in addition to the IC&I residual waste (i.e. 40% of the total residual waste or 2,523 tonnes), the total IC&I waste generated includes for the equivalent of 17% waste diversion (or an additional 517 tonnes). Therefore, of the total estimated IC&I waste generated, 83% is disposed and 17% is diverted.

Table 5-1 also determines estimates for waste generation and diversion on a kilogram's per capita basis using the populations presented in **Section 4**. Based on the information available, the Town generates an estimated 590 kg/capita of waste. It is noted that the per capita residential waste generation rate (residual and diverted, combined) of 404 kg/capita is consistent with the provincial average annual waste generation rate presented for the residential sector in the Ontario Baseline Waste & Recycling Report (AMO, 2023).

Based on the information available, and using the assumptions outlined herein, the average diversion rate for all waste handled by the Town is about 35%. Taking the provincial average of 17% diversion in the IC&I sector and applying it to the Town's overall diversion, the resulting residential diversion rate is calculated to be 43%. It is noted that the residential diversion rates presented in **Table 5-1** exclude the leaf and yard waste diversion, as this is dropped off at the Town's Yard Waste Site and does not pass over the weigh scale. Therefore, the Town's overall waste diversion rate (and residential diversion rate) underestimates the actual diversion being achieved. However, as it is anticipated that leaf and yard waste will continue to be accounted for separately. Therefore, the 'baseline' diversion rate for the Town developed for the purpose of projecting future residual waste generation estimates will remain.

Figure 5-1 shows a summary of the average quantity and type of waste generated within the Town over the last 5-years. Residual waste, which represents approximately 65% of the total waste generated, is assumed to be 60% residential and 40% IC&I waste. A summary of the Town's average annual residual waste and diversion rates, by sector, is provided in **Figure 5-1**.

FIGURE 5-1: Residual Waste Generation and Diversion – Town of Saugeen Shores (2019 to 2023)



6. RESIDUAL WASTE PROJECTION ANALYSIS

Based on the review of the historical diversion targets set by the province, the overall diversion rates achieved, and the diversion trends for various diversion streams, it was recognized that the largest gains for increased diversion are likely to be made via the implementation of an SSO program by the Town and improved IC&I diversion. Three (3) different residual waste quantity projections were developed as part of this analysis to take into consideration the provincial diversion goals but also consider an allowance for additional residual waste should interim goals not be met. These projection models are important to analyze to ensure that there remains sufficient capacity to accommodate growth in the event that the diversion targets are not fully realized. A 40-year planning horizon helps with this situation as well, providing for time (and space) to accommodate the real time residual waste while pursuing additional capacity through the planning processes.

6.1 Diversion of Source Separated Organics

As identified in **Section 3.4**, organic waste diversion programs, often referred to as source separated organics (SSO) or Green Bin programs, provide the Town the greatest opportunity for increased diversion.

Gains made to Ontario's diversion rate have mainly been driven by municipal government initiatives in organic waste diversion programs, primarily via the implementation of green bin programs that collect source separated organics.

- It is recommended that the potential waste diversion gains resulting from the implementation of an SSO program be considered in the residual waste quantity projections -

Organic waste diversion programs are a key consideration identified for the projection of the Town's future residual waste disposal needs. Preventing food waste from entering the residual waste stream will provide a significant opportunity to the Town to work towards meeting the waste diversion targets set out in the Waste-Free Ontario legislation.

Increased diversion of organics can be achieved under an extended 'Source Separated Organics Collection' (SSO) scenario. Depending on the processing method, SSO waste can include dairy products, plants and

flowers, food scraps, vegetables, fruits, grain products, meat, and paper that is not recyclable. Hygiene products (e.g. diapers) and pet waste can also be considered SSO, however are only accepted at a limited number of facilities. Generally, these wastes are processed at a central processing facility via windrows, aerated static piles and in-vessel composting, or anaerobic digestion.

It is projected that the Town's population will be approaching 20,000 persons at about the same time as the Southampton landfill will be reaching capacity (i.e., circa 2030-2032). As per the Food and Organic Waste Policy Statement, the Town will be required to collect food and organic waste from single-family dwellings (i.e., residential properties with five or less units) in urban settlement areas with a target of reducing food and organic waste by 50% from the residential sector. The policy has led to many communities across Ontario adopting a curbside green bin program. Provincially, it is estimated that household food and organic waste makes up approximately one-third of municipal solid waste.

An effective and extended source separated organics program has the potential to reduce waste disposal in landfills. The Town is pursuing a source separated organics program feasibility study in 2025 that will review options for green waste diversion. It is recommended that the waste diversion gains resulting from the implementation of an SSO program within the Town be considered in the residual waste quantity projections. It is estimated that, depending on the method and technology selected to manage the Town's organics, an organics management program (i.e., green bin program) could take between two and five years to implement.

Based on information from other municipalities that have implemented such programs, an additional waste diversion in the range of 10% to 20% has been achieved with this diversion strategy. Therefore, it is proposed that estimates assume that an additional 15% to 20% of waste diversion (applied to the residential diverted waste) can be achieved upon implementation of an SSO program by the Town. Based on the estimated annual average residential diverted waste of approximately 2,850 tonnes, upon implementation of the SSO program the Town could achieve the diversion of an additional 425 tonnes to 565 tonnes of waste from the landfill. This would increase the Town's residential diversion rate to approximately 50%. With 30% of municipal solid waste comprised of food and organic waste (or the equivalent of about 1,135 tonnes), it is estimated that upon implementation of an SSO program, the Town would initially achieve in the range of 37% to 50% diversion of the food and organic waste contributions to its residual waste stream from the residential sector, thereby reaching the provincial target.

6.2 Waste Diversion Gains from the IC&I Sector

As discussed in **Section 3**, minimal waste diversion gains have been achieved by the IC&I sector in Ontario. The waste diversion from waste generated by this sector continues to sit in the range of 15% to 17%. As identified in **Section 3.4**, improved IC&I diversion provides the Town with a significant opportunity for increased diversion.

Improved waste management strategies in the IC&I sector would offer a significant step towards meeting the province's waste goals and diversion targets. While improvements in the diversion of IC&I waste can be encouraged and supported by the Town, the creation of opportunities to reduce and recycle waste generated by this sector would be most successful if supported by the province via the creation of additional policies and programs specific to this sector.

As previously recommended, in selecting an IC&I diversion rate for planning purposes (i.e., residual waste generation projections), it is recommended that the potential waste diversion gains resulting from the implementation of additional provincial policies and programs specific to the IC&I sector be considered in the residual waste quantity projections. However, it is thought that the gains will likely be realized progressively.

6.3 Future Waste Disposal Needs

Residual waste disposal projections were developed to estimate of the future quantity of residual waste (by weight) that may be generated by the Town over a period of 40-years. The total waste managed by the Town is divided into two main types of waste including Residential and IC&I. Current and projected diversion and disposal rates were developed for each waste type. Estimates of the Town's future waste disposal needs, projected to the year 2070, were developed using an annual per capita rate of residual waste generation and diversion (based on various assumptions applied over the 40-year planning horizon) and the Town's projected population (DFA, 2023).

As the overall waste generation rate per capita has remained relatively consistent over the years, with the residential residual waste generation rate being similar to the provincial average, estimated waste quantities herein are based on the assumption that the overall waste generation rate of 590 kg/capita will not decrease. Therefore, waste projections will assume that there is no change in the per capita waste generation rate in the future. Further, the estimated proportional contributions of 404 kg/capita from the residential sector and 186 kg/capita from the IC&I sector will remain the same. In essence, reductions in the overall residual waste generation rates will be a direct result of gains from diversion. It is further noted that, although not measured or accounted for, additional waste diversion will continue to be achieved through the collection of leaf and yard waste at an alternate location.

Three waste diversion scenarios were developed using the population undercounts as a basis. Scenarios range from conservative, with no increase in the existing diversion rates beyond additional diversion gains from the implementation of an SSO program, to meeting the interim waste diversion goals established in the Strategy for a Waste-Free Ontario of 30% by 2020, 50% by 2030 and 80% by 2050. The waste diversion goals are applicable to the combination of all sectors including residential and IC&I. It is noted that the Town is considered to have already exceeded the interim target of 30% diversion through the existing diversion programs (see **Table 5-1**). Summaries of the data analysis are provided in this section and the detailed summaries of the data analysis are included in **Attachment B.**

6.3.1 Scenario 1: Conservative

By implementing an SSO program within the Town, it is predicted that there will be a gain in diversion equal to a 15% to 20% increase in the residential diverted waste. Therefore, this approach considers a conservative scenario where no further increase in waste diversion is achieved beyond the 50% residential waste diversion rate estimated to account for the anticipated implementation of an SSO program as described in **Section 6.1**. In addition, this scenario assumes that diversion from the IC&I sector will remain the same over the 40-year period (i.e., 17% of IC&I waste generated). Compared to the provinces diversion targets, this scenario represents the expected increase in the diversion rate to within 80% of the provincial target of 50% by 2030 (with SSO implementation) and, in consideration of no further diversion gains after 2030, a diversion rate equivalent to about half (i.e., 39.6% overall diversion) of the provincial target of 80% by 2050.

This approach accounts for population growth but does not consider further gains that may be achieved by continuing to work towards the province's long-term waste diversion targets. The intention is to provide the most conservative estimate (i.e., upper limit) of the long-term waste disposal needs. This approach would ensure that the Town has sufficient landfill capacity available over the 40-year planning horizon. As shown in **Table 6-1**, it is estimated that the Town would generate approximately 445,000 tonnes of post-diversion waste over the 40-year period between 2030 and 2070.

TABLE 6-1: Scenario 1 (Conservative) - Diversion Assumptions & Residual Waste Generation Rates

	2020	2025	2030	2040	2050	2060	2070	Total Residual Waste (2030 - 2070)
Provincial Waste Diversion Target								
(Goal applied Residential and IC&I)	**30%**		**50%**		**80%**			
Conservative Scenario								
Residential Diversion (%)		42.8%	50.0%	50.0%	50.0%	50.0%	50.0%	445,000 tonnes
Residential Diversion (kg/capita)		173	202	202	202	202	202	
IC&I Diversion (%)		17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	
IC&I Diversion (kg/capita)		32	32	32	32	32	32	
Overall Diversion (%)		**34.7%**	**39.6%**	**39.6%**	**39.6%**	**39.6%**	**39.6%**	
Overall Diversion (kg/capita)		**205**	**234**	**234**	**234**	**234**	**234**	
Residual Waste Generated (kg/capita)		**385**	**356**	**356**	**356**	**356**	**356**	

6.3.2 Scenario 2: Progressive

This approach recognizes the intent of the provincial diversion targets. However, it considers that historically the targets have generally not been met. As such, the progressive scenario for the development of residual waste quantity projections takes into consideration the provincial diversion targets but provides for an allowance for additional residual waste should interim goals not be met within the specified timeframe but are eventually complied with. Note that under this scenario the 80% diversion would be post the 40-year planning period. Further, the estimates presented herein do not account for leaf and yard waste diversion.

This approach assumes that waste diversion gains will progressively be realized as the capture rates from existing waste diversion programs improve and as diversion programs for other materials are implemented. For example, with the anticipated implementation of an SSO program it is estimated that the Town may initially achieve in the range of 37% to 50% diversion of the food and organic waste contributions to its residual waste stream from the residential sector. Accordingly, it is this program may increase the overall residential diversion rate to about 50% by 2030.

Compared to the provinces diversion targets, this scenario represents the expected increase in the diversion rate to within 80% of the provincial target of 50% by 2030 (with SSO implementation) and, in consideration of a progressive increase in diversion, it is assumed that the Town will achieve a waste diversion rate of 63.7% by 2070. This represents an increase in the diversion rate to within about 80% of the provincial target (of 80% diversion) by 2070.

The general approach, assumptions, and rationale for the progressive scenario are presented in **Table 6-2** and a summary of the diversion assumptions and residual waste generation rates is provided in **Table 6-3**. As shown in **Table 6-3**, it is estimated that the Town would generate approximately 332,000 tonnes of residual waste over the 40-year period between 2030 and 2070.

TABLE 6-2: Scenario 2 (Progressive) – Assumptions and Rationale for Residual Waste Projections

General (Same as for other scenarios)
It is assumed that the total waste generation rate of 590 kg/capita will remain the same in future years. This is based on the average waste generation rate for the 5-year period between 2019 and 2023.
Residential waste generation will be equivalent to 404 kg/capita (residual and diverted, combined).
Waste generated by the IC&I sector will be equivalent to 186 kg/capita (residual and diverted, combined).
2030
Residential Sector: The residential diversion rate in 2030 will be assumed to start at 50% (or 202 kg/capita). This represents an increase of about 7% diversion from the current diversion rate and is intended to reflect gains related to the implementation of an SSO program that will likely become a requirement around this time.
IC&I Sector: Based on the minimal impact existing provincial policies and programs seem to be having on diversion from the IC&I sector, with diversion rates remaining in the range of 15% to 17%, significant gains are not expected to occur in the short-term. Therefore, the IC&I diversion rate in 2030 will be assumed to start at 20% (or 37 kg/capita).
Overall Diversion: It is assumed that the Town will achieve a waste diversion rate of 40.6% by 2030. This represents an increase in the diversion rate to within 80% of the provincial target of 50% diversion by 2030.
Progressive increase in waste diversion: The diversion rate is assumed to progressively increase during the 20-year period between 2030 and 2050. Using the diversion assumptions presented for the years 2030 and 2050, a compound growth rate was applied to the diversion rate to estimate the residual waste generated, per capita, for each year.
2050
Residential Sector: It is assumed that the residential diversion rate by 2050 will be 60% (or 243 kg/capita). This represents a 10% increase over the 20-year period. Additional diversion will likely be realized via increased capture rates from the existing diversion programs (i.e., SSO) and the implementation of additional recycling and reuse opportunities for other materials.
IC&I Sector: It is assumed that effective provincial policies and programs will be developed and implemented, resulting in increased diversion from this sector. It is assumed that the IC&I diversion rate by 2050 will be 40% (or 74 kg/capita). This represents a 20% increase over the 20-year period. To date, the Province has focused its efforts on residential diversion. Therefore, when compared to the residential sector, greater diversion gains are anticipated through the years as the Province creates additional programs and policies specific to this sector.
Overall Diversion: It is assumed that the Town will achieve a waste diversion rate of 53.7% by 2050. This represents an increase in the diversion rate to within about 67% of the provincial target of 80% diversion by 2050.
Progressive increase in waste diversion: The diversion rate is assumed to progressively increase during the 20-year period between 2050 and 2070. Using the diversion assumptions presented for the years 2050 and 2070, a compound growth rate was applied to the diversion rate to estimate the residual waste generated, per capita, for each year.
2070
Residential Sector: It is assumed that the residential diversion rate by 2070 will be 70% (or 283 kg/capita). This represents a 10% increase over the 20-year period. Additional diversion will likely continue to be realized via increased capture rates from the existing diversion programs (i.e., the SSO program) and the implementation of additional recycling and reuse opportunities.
IC&I Sector: It is assumed that effective provincial policies and programs will continue to be developed and implemented, resulting further diversion gains from this sector. It is assumed that the IC&I diversion rate by 2070 will be 50% (or 93 kg/capita). This represents a 20% increase over the 20-year period.
Overall Diversion: It is assumed that the Town will achieve a waste diversion rate of 63.7% by 2070. This represents an increase in the diversion rate to within about 80% of the provincial target (of 80% diversion) by 2070.

TABLE 6-3: Scenario 2 (Progressive) - Diversion Assumptions & Residual Waste Generation Rates

	2020	2025	2030	2040	2050	2060	2070	Total Residual Waste (2030 - 2070)
Provincial Waste Diversion Target								
(Goal applied Residential and IC&I)	**30%**		**50%**		**80%**			
Progressive Scenario (±67% of interim target by 2050, progressing to within ±80% of the diversion target [of 80% diversion] by 2070)								
Residential Diversion (%)		43%	50.0%	*55.4%*	60.0%	*65.5%*	70.0%	332,000 tonnes
Residential Diversion (kg/capita)		173	202	*224*	243	*265*	283	
IC&I Diversion (%)		17%	20.0%	*30.0%*	40.0%	*45.0%*	50.0%	
IC&I Diversion (kg/capita)		32	37	*56*	74	*84*	93	
Overall Diversion (%)		**34.7%**	**40.6%**	***47.4%***	**53.7%**	***59.1%***	**63.7%**	
Overall Diversion (kg/capita)		**205**	**239**	***280***	**317**	***349***	**376**	
Residual Waste Generated (kg/capita)		**385**	**351**	***310***	**273**	***242***	**214**	

6.3.3 Scenario 3: Achieve 100% of the Provincial Waste Diversion Targets

This approach considers a scenario where the Town achieves the provinces ambitious waste diversion goals set in the Strategy for a Waste-Free Ontario, with interim diversion targets of 30% by 2020, 50% by 2030, and the longer-term goal of 80% diversion by 2050. It assumes that 80% diversion will be maintained for the period between 2050 and 2070. It is noted that the Town is considered to have achieved the interim target of 30% diversion by 2020.

The general approach, assumptions, and rationale are presented in **Table 6-4** and a summary of the diversion assumptions and residual waste generations rates is provided in **Table 6-5**. Under this scenario it is estimated that the Town would generate approximately 180,000 tonnes of residual waste over the 40-year period between 2030 and 2070.

TABLE 6-4: Scenario 3 (Target Reached) – Assumptions and Rationale for Residual Waste Projections

General (Same as for other scenarios)
It is assumed that the total waste generation rate of 590 kg/capita will remain the same in future years. This is based on the average waste generation rate for the 5-year period between 2019 and 2023.
Residential waste generation will be equivalent to 404 kg/capita (residual and diverted, combined).
Waste generated by the IC&I sector will be equivalent to 186 kg/capita (residual and diverted, combined).
2030
Residential Sector: The residential diversion rate in 2030 will be assumed to start at 50% (or 202 kg/capita). This represents an increase of about 7% diversion from the current diversion rate and is intended to reflect gains related to the implementation of an SSO program that will likely become a requirement around this time.
IC&I Sector: The IC&I diversion rate in 2030 will be assumed to start at 50% (or 93 kg/capita). This would represent an increase of about 33% from the current diversion rate for the IC&I sector.
Overall Diversion: It is assumed that the diversion rate would meet the provincial interim diversion goal of 50% in 2030.
Progressive increase in waste diversion: The diversion rate is assumed to progressively increase during the 20-year period between 2030 and 2050. Using the diversion assumptions presented for the years 2030 and 2050, a compound growth rate was applied to the diversion rate to estimate the residual waste generated, per capita, for each year.
2050
Residential Sector: It is assumed that the residential diversion rate by 2050 will be equivalent to the provincial target of 80% (or 324 kg/capita). This represents a 30% increase over the 20-year period.
IC&I Sector: It is assumed that IC&I diversion will be equivalent to the provincial target of 80% (or 149 kg/capita). This represents a 30% increase over the 20-year period (or a 63% increase over the 40-year planning horizon).
Overall Diversion: It is assumed that the diversion rate would meet the provincial interim diversion goal of 80% in 2080.
It is assumed that 80% diversion will be maintained for the 20-year period between 2050 and 2070.
2070

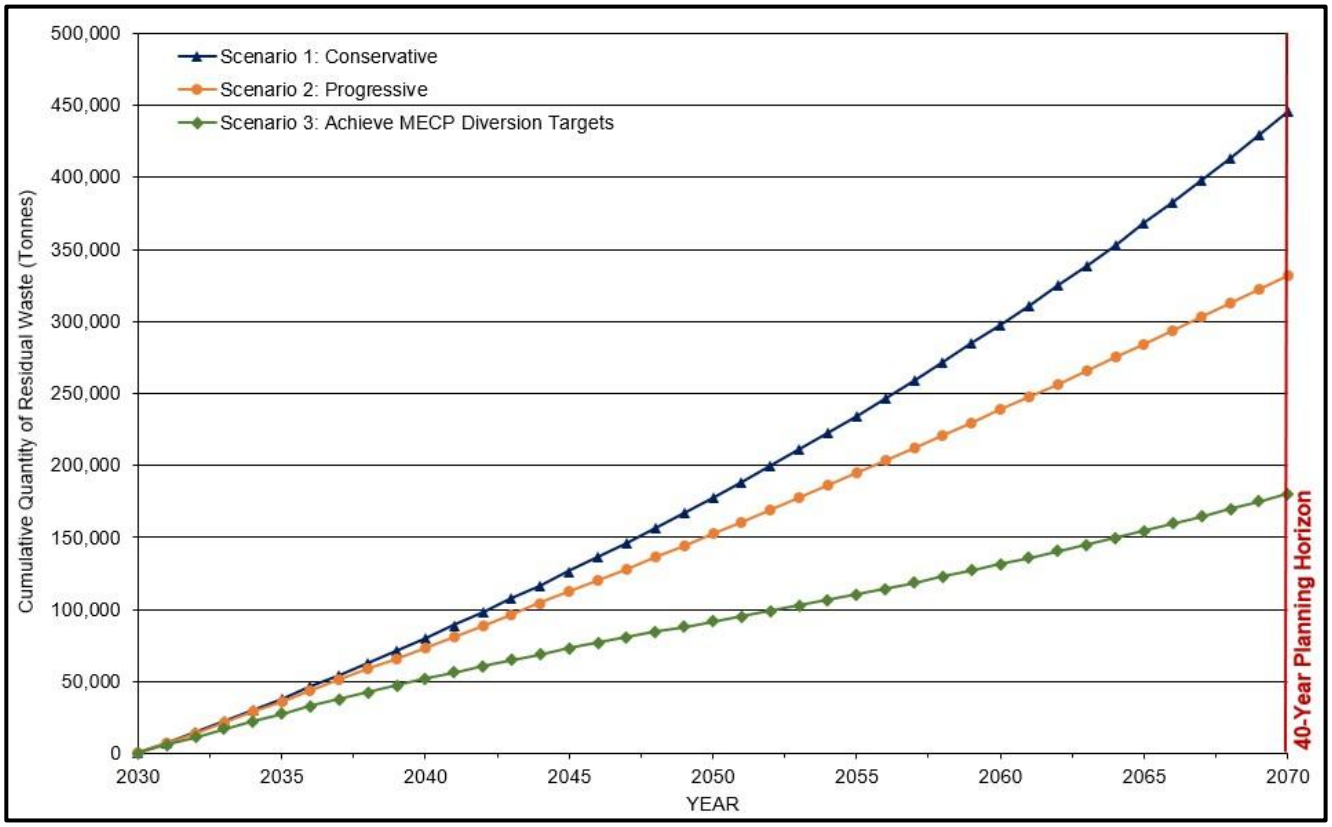
TABLE 6-5: Scenario 3 (Target Reached) - Diversion Assumptions & Residual Waste Generation Rates

	2020	2025	2030	2040	2050	2060	2070	Total Residual Waste (2030 - 2070)
Provincial Waste Diversion Target								
(Goal applied Residential and IC&I)	**30%**		**50%**		**80%**			
Achieve 100% of the provincial waste diversion targets								
Residential Diversion (%)		42.8%	50.0%	*68.3%*	80.0%	80.0%	80.0%	180,000 tonnes
Residential Diversion (kg/capita)		173	202	*276*	324	324	324	
IC&I Diversion (%)		17.0%	50.0%	*68.3%*	80.0%	80.0%	80.0%	
IC&I Diversion (kg/capita)		32	93	*127*	149	149	149	
Overall Diversion (%)		**34.7%**	**50.0%**	***68.3%***	**80.0%**	**80.0%**	**80.0%**	
Overall Diversion (kg/capita)		**205**	**295**	***403***	**472**	**472**	**472**	
Residual Waste Generated (kg/capita)		**385**	**295**	***187***	**118**	**118**	**118**	

6.3.4 Summary and Discussion

The results of the three scenarios, presented in **Figure 6-1**, estimate that the Town will generate in the range of between 180,000 tonnes and 445,000 tonnes of residual waste during the 40-year period between 2030 and 2070. The three scenarios provide projections of the estimated residual waste quantities that would be generated during the proposed 40-year planning horizon. Conservative waste quantities reflect estimates for a conservative scenario where no additional diversion (beyond the 50% residential diversion target for SSO) is achieved to meeting the provincial waste diversion targets.

FIGURE 6-1: Projected Residual Waste Capacity Needs: 40-year Planning Horizon (2030 to 2070)



The province's waste diversion goals set in the Strategy for a Waste-Free Ontario are ambitious. Further, based on previous targets set by the Ministry, these targets are often not met and take many years (or decades) longer to achieve. It is noted that although the province has made recent strides for waste diversion within the residential sector, waste diversion rates for the IC&I sector remain relatively low and stagnant. While improvements in the diversion of IC&I waste can be encouraged and supported by the Town, the creation of opportunities to reduce and recycle waste generated by this sector would be most successful if supported by the Province via the creation of additional policies and programs specific to this sector. It is expected that it will take some time for the province to develop and implement effective diversion policies and programs for this sector. Therefore, it is recommended that the residual waste quantity projections applied to the Town of Saugeen Shores Environmental Assessment for Waste Management consider both the provincial diversion goals but also provide an allowance for additional residual waste should interim goals not be met.

In recognition of the above, it is recommended that the residual waste quantity projections for the Town's waste management project be based on the Progressive Approach (i.e., Scenario 2). This scenario provides a compromise between selecting a waste diversion rate that is too high, resulting in a situation where the Town has insufficient capacity to accommodate its long-term waste management needs and underestimating the waste

diversion that will be achieved, resulting in the Town having oversized landfill infrastructure that could serve the community well beyond the 40-year planning horizon. Based on the Progressive Scenario, it is estimated that the Town will generate approximately 332,000 tonnes of residual waste over the 40-year period.

6.4 Landfill Capacity Needs Projection

The Town's waste management and landfill operations currently occur at the Southampton Landfill Site, which forms a key component of the Town's waste management infrastructure. The site is located at 126 Concession 14, directly east of the community of Southampton.

The weigh scale data (reviewed in **Section 5**) and annual topographic surveys, which determine the volume of landfill capacity used on an annual basis, can be used to forecast the volume of landfill airspace required. Based on the topographic surveys completed at the site between 2019 and 2023, the average annual fill rate at the existing Southampton Landfill Site is 13,750 m^3 (**Table 6-6**).

TABLE 6-6: Landfill Space Consumption Rates

YEAR	Units	2019	2020	2021	2022	2023	Average
Landfill Capacity Used During Year	(m^3)	19,250	11,300	13,700	12,800	11,700	13,750
Capacity Consumed by Residual Waste	(m^3)	15,400	9,040	10,960	10,240	9,360	11,000
Capacity Consumed by Interim Cover	(m^3)	3,850	2,260	2,740	2,560	2,340	2,750
Residual Waste Received	(tonnes)	6,337	6,329	6,604	6,495	5,768	6,307
Waste Compaction Density	(kg/m^3)	412	700	603	634	616	573

The volume of landfill airspace required is directly related to the quantity of residual waste (i.e., tonnage) that can be placed in a given volume of landfill space. The volume of airspace capacity required to accommodate waste is typically calculated by multiplying the tonnes of waste to be disposed by a density factor (or compaction density) which is calculated as follows:

Landfill Compaction Density = Residual Waste Disposed ÷ [0.8 x Airspace Capacity Used]

The compaction density is the amount of waste (in kilograms) that can be accommodated in one cubic meter of airspace within the landfill. The volume does not include the volume required for interim cover (i.e., daily and intermediate cover). Cover material is placed on the active area of waste disposal at the end of each day and over areas that will not actively be used for extended periods of time. In general, it is assumed that interim cover (i.e., soil, woodchips, etc.) consumes 20% of the disposal volume (or a 4:1 waste to cover ratio). Under existing operations, the Town is achieving a waste compaction density of about 573 kg/m^3. This density is considered "good" in the *Guidelines for the Establishment, Operation, Management, Maintenance and Closure of Landfilling Sites in Ontario (MECP)*.

The future landfill airspace capacity needs for residual waste were determined using the waste quantity projections developed under the progressive scenario, where increased waste diversion is progressively achieved, and a compaction density of 573 kg/m^3. An additional volume for interim cover was subsequently applied assuming a 4:1 waste to cover ratio. This combines the projected waste generation and the operational conditions within Saugeen Shores. A summary of the landfill airspace capacity needs projections is provided in **Table 6-7**. Based on this analysis, it is estimated that the Town would require approximately 725,000 cubic meters (m^3) of landfill capacity for the management of its residual solid waste over the 40-year period between 2030 and 2070. This includes interim cover (not final cover). As the waste compaction density was determined using the site-specific information available, it is noted that this approach assumes that the method of placement and compaction will remain similar to existing operational conditions and the compaction density will continue to be achievable through the 40-year planning period.

TABLE 6-7: Projected Landfill Airspace Capacity Needs- Cumulative (Progressive - 2030 to 2070)

	Units	2030	2040	2050	2060	2070
Capacity for Residual Waste Disposal	(m^3)	0	128,291	266,026	415,971	579,503
Interim Cover Requirements	(m^3)	0	32,073	66,506	103,993	144,876
Total Airspace Capacity	**(m^3)**	**0**	**160,364**	**332,532**	**519,964**	**724,379**

7. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Town of Saugeen Shores is experiencing a high level of growth that is expected to continue well into the future, with large infrastructure projects in the community planned to 2064, and beyond. A 40-year planning period captures the local conditions of a small rural community with a high growth rate, stable employment and a strong tourism industry.

Provincial expectations include both the residential and IC&I sectors. The Town has the greatest ability to realize changes and impacts to diversion through the residential sector and relies heavily on the province to mandate change in the IC&I sector. Currently diversion rates achieved by the IC&I sector are stagnant. For the Progressive Scenario analysis, higher levels of residential diversion were assumed and are expected to be achievable.

The Town is expected to achieve the provincial targets for organic and food waste diversion as the population grows, and it is realistic to believe that as additional targets are planned and established, implementation will be achieved although delayed for further diversion streams.

Operations at the Southampton Landfill Site are considered “Good” and can be maintained through the planning period, achieving a waste compaction density of 573kg/m^3, regardless of the change in material type and maintaining the 20% requirement for interim cover.

Waste disposal projections were developed to estimate of the waste quantities (weight) that would be generated during the 40-year period between 2030 and 2070, and it is recommended that the Environmental Assessment utilize the Progressive Scenario (#2) to estimate the volume of residual waste to be managed by the Town. This reflects the Town’s ability to meet the provincial guidelines in a timely manner while recognizing the potential of delayed implementation by either the Province or the Town. Further a progressive approach provides for a balance between inadequate capacity at a disposal site for the waste generated that is greater than estimated and excess capacity for overachieving diversion measures and residual waste reductions.

Based on the residual waste projection analysis for a progressive approach, it is estimated that the Town will generate 332,000 tonnes of residual waste, requiring approximately 725,000 cubic meters (m^3) of landfill airspace capacity (plus final cover) over the 40-year period. Therefore, it is recommended that the Environmental Assessment for the Saugeen Shores Waste Management Project be undertaken to address the Town’s future waste management needs for residual waste within a 40-year planning period, for a capacity of 725,000 cubic metres plus final cover.

8. REFERENCES

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ATTACHMENT A

Economic Analysis: Justification for a 40-year Planning Period (October 2024 – Revision 1)

October 8, 2024
GEI Project No: 2401298

Via Email: Catherine.sutherland@ontario.ca

Catherine Sutherland
135 St Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5

Re: Economic Analysis: Justification for 40-year Planning Period
Town of Saugeen Shores Waste Management Project (EA):
Review of Potential for Landfill Optimization
Revision 1

Dear Catherine,

This letter provides an update to the Economic Analysis dated April 12, 2024. The letter was developed to address MECP consultation comments which suggested that the rationale for the 40-year planning period may need to be further developed and supported. It was recommended that, in recognition of the identification of Landfill Optimization as a preliminary preferred alternative, an economic analysis be advanced to provide the rationale for this planning horizon. The analysis provided was prepared to support the recommended Ministry consultation specific to the planning horizon for the undertaking.

As part of the development of the Terms of Reference, the Town's projected waste capacity needs has been updated and documented in a Residual Waste Projection Analysis: 40-Year Planning Horizon. Since this financial analysis relies on residual waste projections, this economic analysis has been updated to reflect the most recent information. It is noted that although some of the absolute numbers are influenced by these updates, the conclusions and findings presented herein remain.

PURPOSE AND DESCRIPTION OF THE UNDERTAKING

The Town of Saugeen Shores completed a Long-Term Waste Management Plan in 2020. One of the goals of the Plan was to identify and evaluate long-term waste management strategies (or alternatives). Based on the preliminary review, landfill optimization was identified as a viable long-term alternative for the management of the Town's residual waste. This alternative was carried forward into the Environmental Assessment as a *Preliminary Preferred 'Alternative To'* and supports the initiation of a Comprehensive Environmental Assessment (EA) for the waste management project pursuant to the Environmental Assessment Act.

The first Stage of the environmental assessment process involves the preparation of a Proposed Terms of Reference (ToR) which provides the framework for the preparation and completion of the Environmental Assessment. As part of the development of the ToR, the purpose, description, and rationale for the proposed undertaking are to be described.

As described in the ToR, the purpose of the Environmental Assessment is to address the problem of diminishing disposal capacity at the Town of Saugeen Shores' existing Southampton Landfill Site through the assessment and determination of a long-term solid waste management strategy for the Town. It is proposed that the Environmental Assessment be undertaken to address the Town's future waste management needs for residual waste for a 40-year planning period. It is recognized that the final purpose, description, and rationale of the proposed undertaking will evolve during the preparation of the Environmental Assessment. Therefore, the final description of the proposed undertaking and the rationale for it will be refined as the Environmental Assessment progresses.

ECONOMIC 'ENVIRONMENT'

As per the *Code of Practice for Preparing and Reviewing a Terms of Reference for Environmental Assessments in Ontario*, the comparative screening criteria used to provide the rationale for the selection of a preferred 'Alternative To' will encompass five key categories including the social, technical, natural, cultural, and economic 'environments'. The financial analysis provided herein is focussed on the review of the economic 'environment.'

To assess the financial implications, the 'planning horizon' (i.e., landfill site life) is a key descriptive component for the undertaking in that it can alter the outcome of the comparative evaluation and assessment of impacts for the various 'Alternatives To' being considered. In particular, the economic analysis and associated justification for projects (or undertakings) that require a large capital investment will be highly dependent on the number of years the project provides service.

The following review of financial considerations and economic analysis has been completed to support the proposed 40-year planning period with specific reference to the *Preliminary Preferred Landfill Optimization Alternative.* It is expected that the continued use of the existing Southampton Landfill Site and associated additional landfill capacity required to support the Town for the duration of the planning period will incur significant up-front (or capital) costs. It is noted that for the *Alternative to Establish a New Landfill Site within the Town*, capital costs would be significantly greater as additional investment would be required for property acquisition and the development of site facilities and associated supporting infrastructure (i.e., access roads and servicing).

FINANCIAL CONSIDERATIONS

In consideration of the *Landfill Optimization Alternative*, capital costs for project planning and implementation would primarily be associated with the environmental assessment process and the significant capital investment made at the site both to support existing operations and to support continued landfill development at the site. When considering the financial implications, it is important to recognize that once the capital investment is made, the overall capacity (i.e., landfill volume) of the landfill does not influence the base costs significantly; otherwise known as economy of scale. Therefore, the actual financial benefit of the alternative cannot be properly weighed if the service life of the project is not appropriately considered. This particularly applies to large infrastructure projects that are intended to provide service for long periods of time (decades).

The planning horizon typically contemplated by the Ministry in the Environmental Assessment for Waste Management Projects is 25-years. While we understand that this planning horizon has been established as the standard based on the uncertainty of the future waste management landscape, particularly for the management of residual waste, for the majority of other types of infrastructure projects undertaken a planning horizon of 25-years would be considered inappropriate (i.e., bridges, roads, wastewater treatment plants, etc.). A 40-year planning horizon is a reasonable amount of time for contracts for third-party, for capital investment and life-cycle infrastructure.

Further, when project planning and landfill optimization is considered, a planning horizon of 25-years ultimately places the Town in an iterative process that involves general operations and management of the landfill for a proportional period of approximately 60% (i.e., 15-years) and the administratively heavy and costly planning process for waste management projects for a proportional period of 40% (i.e., 10-years). This can be generally broken down as follows:

i. Completion of works associated with project implementation of approximately 2 years.
ii. Landfill operations and management (15 years)
iii. Project Planning: Initiation of background studies and the environmental assessment process to review the 'Alternatives To' and 'Alternative Methods,' a period of approximately 8 to 10 years.

Ultimately, when the planning for an undertaking requires that the project be revisited every 15-years, the suggestion that a long-term plan is being developed could be construed as being misrepresentative of the project goal. This is particularly evident when compared to other types of municipal infrastructure projects which are planned and constructed to support longer term use and development. Undertakings for water, wastewater, and road infrastructure are good examples of projects that provide and establish working frameworks for infrastructure systems. While these systems may require upgrades and/or servicing, their establishment and continued use can often last for many decades, far beyond the 25-year planning horizon typically contemplated by the Ministry for past approvals. With respect to waste management projects, it would likely be considered inappropriate to design an alternative waste management facility, such as an incinerator, to meet the waste management needs of a community limited to a 25-year service life. It would likely be encouraged that, similar to a wastewater treatment plant, the facility be designed to provide service for many decades.

ECONOMIC ANALYSIS: Rationale for a 40-year Planning Horizon

The Southampton Landfill has been in operation for greater than 50 years. GEI (formerly GM BluePlan Engineering) is currently retained by numerous municipalities to provide landfill operations and monitoring support at over 30 municipally owned sites. Most of these landfills were approved in the 1970's and 1980's, with the basis for the approval linked to potential site capacity as opposed to a specified planning horizon. The majority of these landfill sites continue to operate and provide valuable infrastructure to the municipalities while being regulated and overseen by the MECP, with compliance monitoring and reporting to the MECP typically required on an annual basis. The associated operational periods for this infrastructure of greater than 25-years has not been problematic and, in fact, would have saved Ontario taxpayers millions of dollars in waste management planning costs by not requiring that an Environmental Assessment process be completed after their first 25 years in service, and every 25-years thereafter.

In this particular scenario, there are many costs that will be incurred regardless of the site capacity supported by the Environmental Assessment process for this undertaking. The major costs considered herein are:

1. Environmental Assessment process costs incurred by retaining qualified consultants.
2. Administrative costs for the Environmental Assessment process associated with the management of this project by Town Staff.
3. Purchase of the properties for future landfill development and the associated buffer areas.
4. Past investment associated with the existing site facilities and infrastructure (i.e., equipment, transfer station, etc.).
5. Connection to the sanitary sewer (leachate management).
6. Costs associated with site compliance (i.e., monitoring and reporting) and post closure monitoring costs.

Ultimately, in consideration of the *Landfill Optimization Alternative*, capital costs for project planning and implementation would primarily be associated with the environmental assessment process and the significant capital investment made at the site both to support existing operations and to support continued landfill development. These are described below.

A. Project Planning: Environmental Assessment Process and Supporting Documentation

The completion of the planning process, background studies, consultation, and regulatory approvals requires significant investment by the Town and project oversight by both Town staff and the qualified consultant(s) retained to support the undertaking. The costs associated the project planning efforts are estimated in **Table 1**. However, it is noted that although the total planning costs cannot be fully estimated due to the extensive administrative effort of municipal staff which is not regularly documented through the process, rough estimates have been provided to ensure more representative accounting. Therefore, costs associated with project planning generally includes for background studies, consultation efforts, consultant oversight, project management, and project support provided by Town Staff.

It is further noted that the establishment of an appropriate planning period for the project has a direct impact on the security of the disposal option which is associated with the longevity of the residual waste management alternative.

Where the service life for a project is shorter, a larger portion of the project is spent in the planning phases, and less in the general development and operations phase. In the case of landfill sites, it is not uncommon for the planning horizon for landfill optimization or the citing of a new landfill to be in the range of 10 years. As previously stated, with a 25-year planning horizon 40% of the site life for the landfill is in the 'future waste management planning phase' while only 15 years is spent in the development and operations phase. In contrast, where a 40-year planning horizon is selected, 25% of the site life for the landfill is spent in the planning phases.

B. Site Development

It is noted that the costs associated with the site development, described below, and estimated in **Table 1**, are considered in the capital costs.

Leachate Treatment: Connection to the Municipal Sewer

As per the requirements of O.Reg.232/98, leachate collection and treatment will be required. There are several options available for leachate collections systems, including the following:

- Management and treatment of leachate on-site
- Off-site disposal of leachate, hauled (or trucked) to the Town's Wastewater Treatment Plant in Port Elgin or Southampton
- Off-site disposal of leachate via extension of municipal wastewater services to the Site

The ability to manage leachate via the extension of municipal wastewater services to the landfill would be advantageous in terms of the ease of operation and long-term costs. Off-site disposal of leachate via the extension of municipal wastewater services to the existing Southampton Landfill would likely be supported due to the relatively proximal location of the site to servicing. This service connection was identified in the Saugeen Shores Water and Sewage Master Plan and, as such, connection to the existing sanitary sewer system is anticipated.

Based on a preliminary review, connection to the sanitary sewer system through the use of a force main and pumping station would be required to service the landfill. The estimated cost to complete this work is provided in **Table 1**.

Property Purchase

To support landfill development and provide for adequate buffer lands, the Town previously purchased the property parcel(s) to the west and northwest of the existing approved landfill area. This area is contemplated as the area that could support continued development of the existing Southampton Landfill Site. The costs associated with property acquisition would be necessitated regardless of the size of the landfill.

C. Cost Analysis

The following cost analysis has been completed to show the impact of the difference between the 25-year and 40-year planning period. For simplicity, all costs are provided in "2024 dollars". It is noted that the cost for the installation of a landfill liner is not included as it is thought that this would generally be proportional to the size of the landfill. In addition, it assumed that the costs would be spread over the life of the landfill without the cost of carrying debts.

TABLE 1: Summary of Estimated Capital Costs for the Landfill Optimization Alternative

Capital Cost - Item	Description	Estimate
Service Extension and Connection to Municipal Sanitary Sewer System	Leachate Collection and Treatment: Construct force main and pumping station to pump leachate to the existing sanitary sewer system and the Town's Wastewater Treatment Plant in Southampton. Generally, includes for the following: ▪ Supply and install approximately 2,200 meters of force main ▪ Road repair and restoration along installation path ▪ Supply and install a pumping chamber ▪ Engineering and construction inspection	$950K to $1.2M
Property Acquisition Costs	Past property purchase required to support additional buffer lands for the existing approved landfill site and anticipated to potentially support future landfill capacity (or development) at the site.	$2.0M
Infrastructure Investment	Continued use of existing infrastructure including roadways and newly constructed receiving and diversion facility.	$2.3M
External Consultants Comprehensive EA Support	Includes the preparation and completion of the following: ▪ Terms of Reference and supporting documentation ▪ Environmental Assessment Report ▪ Background Studies, including the archaeological assessments, the Natural Environment Assessment, the Hydrogeological Investigations, etc. Also includes for extensive pubic, agency and indigenous community consultation. The 25-year planning period would incur additional costs associated with the initiation of another EA.	$1.0M to $1.3M
Town Administration and Staffing Costs Comprehensive EA Support	Includes project management required to support the Environmental Assessment including project oversight and consultation (website development, project communications etc.).	$150K to $200K
	Total Expenditures (Capital Costs)	**$6.4M to 7.0M**

With the cost analysis shown above, the unit cost per cubic meter (m^3) of landfill capacity (waste and interim cover) presented in **Table 2** can be evaluated for a 25-year and a 40-year planning period. The estimated landfill capacity requirements presented below are based on the waste disposal projections developed in the ToR to estimate the volume of residual waste that may be generated by the Town during a specified period. The residual waste generation included for implementation of Source Separated Organics and increased diversion over the planning horizon under a "progressive" diversion scenario.

TABLE 2: Unit Cost Based on Planning Period and Landfill Capacity Estimates

Planning Period	Estimated Capacity Required Residual Waste and Interim Cover (m^3)	Capital Cost / m^3
25-year	425,000 m^3	$16 to $18
40-year	725,000 m^3	$8.75 to $9.75

Another way of interpreting the cost comparison is simply by dividing the capital cost by the number of years associated with the planning period for the undertaking. Under the 25-year planning horizon the capital costs are estimated to be approximately $285,000 annually compared to approximately $165,000 for the 40-year planning period. While we understand that cost of the landfill may not be placed on the rate payers through general taxation and may be implemented through user fees, the following cost comparison is completed to show the overall difference to the residents of Saugeen Shores. On per household basis using the 2021 census data of 8,548 households, this equates to approximately $33/household/year versus $19/household/year, or a difference of about $14/household/year over the service life of the landfill. Again, this is considered to be "low" estimate as it doesn't account for any interest/debt management or economy of scale.

D. Site Compliance Monitoring and Reporting

Additional costs are associated with site compliance (i.e., monitoring and reporting) and post closure monitoring and maintenance costs. These are not identified in the capital costs as compliance monitoring and reporting at the Southampton Landfill Site is required to support existing operations and would continue regardless of whether the site remains operational.

After closure of the landfill, it is standard to account for a 25-year monitoring program. However, based on our experience, it is common that landfill monitoring programs extend beyond the 25-year period and that landfill properties are often owned in perpetuity by the Municipality. It is typical that the monitoring program costs while the site is operational and following site closure are similar. That is, a closed landfill that may have a very similar monitoring program with respect to the number of locations that require annual monitoring and similar reporting costs.

While the number years of monitoring during the active life of the landfill will be longer for the landfill with a 40-year capacity versus that of a 25-year capacity, the post closure costs for monitoring and maintenance are expected to be similar. Thus, additional savings will be provided to taxpayer in this regard as the Town will continue to benefit from managing its residual waste locally. The scale of these savings is difficult to predict with any certainty but are considered to be significant enough to provide further support for the development of a landfill with a longer planning period.

SUMMARY

Based on the long-term planning needs and the significant investment associated with an infrastructure project of this scale, including the on-going monitoring and reporting requirements, it is recommended that the proposed Environmental Assessment be undertaken to address the Town's future waste management needs for residual waste for a 40-year planning period, rather than the historic 25-year period typically contemplated by the Ministry. The 40-year period allows for a volume of waste that enables a more objective comparison of the alternatives (i.e., upfront costs associated with landfill optimization are balanced when compared to privatization or 3rd party services), particularly for a small landfill.

The intention of the 40-year planning period is to ensure that the undertaking resolves a long-term waste management strategy for the Town. While it is recognized that this would provide the Town with a greater approved volumetric landfill capacity, based on the feasibility assessment completed at the Southampton Landfill Site, it has been determined that the site could support a much greater capacity than that estimated for the 40-year planning period.

When considering the financial implications for this undertaking, it is important to recognize that once the capital investment is made, the overall capacity (i.e., landfill volume) of the landfill does not influence the base costs significantly; otherwise known as economy of scale. The longer planning horizon accounts for the significant amount of time needed to complete the planning process to support waste management undertakings, typically in the range of 10-years, and the resulting soft costs and base capital-costs that are unrelated to landfill capacity.

The 40-year period also allows for a volume of waste that enables a more objective comparison of the alternatives (i.e., upfront costs associated with landfill optimization are balanced when compared to privatization or 3rd party services), particularly for a small landfill. In other words, the actual financial benefit of the landfill optimization alternative cannot be properly weighed if the service life of the project is not appropriately considered. This particularly applies to large infrastructure projects that are intended to provide service for long periods of time and applying the upfront or sunken costs to the longer service life, reduces the overall lifecycle costs. In this particular case, the 40-year planning period would support an estimated 580,000 m^3 of airspace capacity for residual waste, or approximately 725,000 m^3 of airspace for waste and interim cover. Comparing this volume as being exported or landfilled is proposed as a fair volume to investigate as appropriate to assess the impacts of both solutions fairly.

Yours truly,
Per:



Andrea Nelson, Project Manager

cc. (Original Economic Analysis was issued on April 12, 2024, to)
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ATTACHMENT B

Scenarios 1 to 3: Detailed Summaries of Waste Quantity & Landfill Capacity Projections

Detailed Summaries of Waste Quantity and Landfill Capacity Projections

		Scenario 1: Conservative			Scenario 2: Progressive					Scenario 3: Achieve Provincial Diversion Targets		
YEAR	Population Projection (1)	Residual Waste (kg/capita)	Residual Waste Generated (tonnes/year)	Cumulative Waste (Tonnes)	Residual Waste (kg/capita)	Residual Waste Generated (tonnes/year)	Cumulative Waste (Tonnes)	Cumulative Waste Capacity (573 kg/m3)	Cumulative Capacity with Interim Cover	Residual Waste (kg/capita)	Residual Waste Generated (tonnes/year)	Cumulative Waste (Tonnes)
2021	16,385	385			385					385		
2022	16,782	385			385					385		
2023	17,189	385			385					385		
2024	17,596	385	6,783		385	6,783				385	6,783	
2025	18,003	385	6,940		385	6,940				385	6,940	
2026	18,410	385	7,096		385	7,096				385	7,096	
2027	18,816	385	7,253		385	7,253				385	7,253	
2028	19,223	385	7,410		385	7,410				385	7,410	
2029	19,603	385	7,556		385	7,556				385	7,556	
2030	20,037	356	7,142	0	351	7,030	0	Landfill Capacity Estimates (m3)		295	5,913	0
2031	20,483	356	7,301	7,301	346	7,097	7,097	12,379	15,473	282	5,775	5,775
2032	20,928	356	7,459	14,760	342	7,161	14,259	24,869	31,087	269	5,638	11,413
2033	21,374	356	7,618	22,378	338	7,223	21,482	37,468	46,835	257	5,501	16,914
2034	21,820	356	7,777	30,155	334	7,282	28,764	50,169	62,711	246	5,365	22,279
2035	22,265	356	7,936	38,091	330	7,338	36,102	62,969	78,711	235	5,230	27,509
2036	22,711	356	8,095	46,186	326	7,392	43,495	75,862	94,828	224	5,097	32,607
2037	23,156	356	8,253	54,439	321	7,444	50,938	88,845	111,057	214	4,965	37,572
2038	23,602	356	8,412	62,851	317	7,493	58,431	101,914	127,393	205	4,835	42,407
2039	24,047	356	8,571	71,422	314	7,539	65,971	115,064	143,830	196	4,707	47,114
2040	24,493	356	8,730	80,152	310	7,584	73,554	128,291	160,364	187	4,580	51,694
2041	24,939	356	8,889	89,041	306	7,626	81,180	141,592	176,990	179	4,455	56,149
2042	25,384	356	9,047	98,088	302	7,666	88,846	154,962	193,703	171	4,333	60,482
2043	25,916	356	9,237	107,326	298	7,729	96,575	168,443	210,554	163	4,226	64,708
2044	26,462	356	9,432	116,757	295	7,794	104,369	182,037	227,546	156	4,123	68,831
2045	27,019	356	9,630	126,388	291	7,859	112,228	195,745	244,681	149	4,022	72,852
2046	27,588	356	9,833	136,221	287	7,925	120,153	209,567	261,959	142	3,923	76,776
2047	28,170	356	10,040	146,261	284	7,991	128,144	223,506	279,382	136	3,827	80,603
2048	28,763	356	10,252	156,513	280	8,058	136,203	237,561	296,951	130	3,734	84,336
2049	29,369	356	10,468	166,980	277	8,126	144,329	251,734	314,667	124	3,642	87,978
2050	29,987	356	10,688	177,669	273	8,194	152,522	266,026	332,532	118	3,553	91,531
2051	30,619	356	10,913	188,582	270	8,265	160,788	280,442	350,552	118	3,614	95,146
2052	31,263	356	11,143	199,725	267	8,337	169,125	294,983	368,729	118	3,691	98,836
2053	31,922	356	11,378	211,102	263	8,410	177,535	309,652	387,065	118	3,768	102,605
2054	32,594	356	11,617	222,720	260	8,483	186,018	324,448	405,560	118	3,848	106,452
2055	33,280	356	11,862	234,581	257	8,557	194,575	339,373	424,216	118	3,929	110,381
2056	33,981	356	12,112	246,693	254	8,632	203,207	354,428	443,035	118	4,011	114,393
2057	34,697	356	12,367	259,060	251	8,707	211,914	369,614	462,018	118	4,096	118,488
2058	35,428	356	12,627	271,687	248	8,783	220,697	384,933	481,166	118	4,182	122,671
2059	36,174	356	12,893	284,581	245	8,859	229,556	400,385	500,481	118	4,270	126,941
2060	36,936	356	13,165	297,745	242	8,936	238,492	415,971	519,964	118	4,360	131,301
2061	37,714	356	13,442	311,187	239	9,014	247,506	431,694	539,617	118	4,452	135,753
2062	38,508	356	13,725	324,912	236	9,093	256,599	447,553	559,441	118	4,546	140,299
2063	39,319	356	14,014	338,926	233	9,172	265,771	463,550	579,438	118	4,642	144,940
2064	40,147	356	14,309	353,236	230	9,252	275,023	479,687	599,609	118	4,739	149,680
2065	40,992	356	14,611	367,846	228	9,332	284,355	495,965	619,956	118	4,839	154,519
2066	41,856	356	14,918	382,764	225	9,414	293,769	512,384	640,480	118	4,941	159,460
2067	42,737	356	15,232	397,997	222	9,496	303,265	528,946	661,183	118	5,045	164,505
2068	43,637	356	15,553	413,550	220	9,578	312,843	545,652	682,066	118	5,151	169,656
2069	44,556	356	15,881	429,431	217	9,662	322,505	562,505	703,131	118	5,260	174,916
2070	45,494	356	16,215	445,646	214	9,746	332,251	579,503	724,379	118	5,371	180,286
Total Landfill Capacity (m3) Including Interim Cover		**971,605**			**724,379**					**393,063**		

(1) Populations presented are based on those provided in Appendix A of the Town of Saugeen Shores Development Charges Background Study to Amend By-Law 56-2021 and Proposed Amending By-Law Final Report (DFA Infrastructure International Inc., May 9, 2023). Population projections beyond 2042 assume a compound growth rate of 2.1%.