3.0 Phase 1: Evaluation of Alternatives To the Undertaking

3.1 Project Justification and Rationale

The existing St. Marys landfill reached its approved capacity in January 2016. To maintain operations during preparation of this EA, the Town applied for and received ECA Notices (amendments) allowing continued use. The ECA has been amended to allow operation through September 30, 2022. As required by the ECA, the Town will apply to the MECP for further operation by July 31, 2022.

The MECP is not expected to extend the site's ECA indefinitely without a long-term plan to manage the Town's waste. The Town is responsible for the management of solid waste generated by the Town, its residents and local industry, businesses and institutions. Wastes generated from other communities or entities are not managed by the Town and there is no intent to accept waste from other communities in the future, as noted in a Town letter, dated December 18, 2019 provided in Volume IV, Appendix A. Therefore, the Town is responsible for developing a long-term waste management plan and is doing so through the Environmental Assessment Act planning process.

To understand the landfilling needs of the Town for the 40-year planning period commencing in 2017, investigations were undertaken to understand the Town's projected growth and predicted waste generation volumes. The following section documents the process used to determine the volume of waste requiring disposal over the next 40 years.

3.1.1 Town Demographics

The Town of St. Marys is a compact 12.48 km^2 urban centre with a 2016 Census population of 7,265 people. Located in southern Perth County and surrounded by the Township of Perth South, St. Marys is approximately 16 km southwest of Stratford and 25 km northeast of London. Founded in 1841, the Town is a traditional support and service centre for surrounding agricultural areas and has a full range of residential, commercial, industrial, and institutional areas, facilities, and services.

Table 3-1 provides the Town's population for the 25-year period from 1991 to 2016 according to Statistics Canada Census data.

Table 3-1: Census Data and Growth Rates for St. Marys

Census Year	Population Town of St. Marys	Growth Rate†	
		Period	Annual
1991	5,496	8.30%	1.61%
1996	5,952	5.73%	1.12%
2001	6,293	5.20%	1.02%
2006	6,620	0.68%	0.14%
2011	6,665	9.00%	1.74%
2016	7,265		
1991 to 2016		32.19%	1.12%

† Growth Rate is calculated between Census years, for example, 1991 to 1996 growth is 8.3% overall (for the period) and 1.61% annually.

Overall, the population growth in the Town has been 32.19% over that 25-year period, or an average of 1.12% per year.

3.1.2 St. Marys Landfill

Historically the Town has provided waste disposal services for Town residents, businesses, and industries within the Town's boundaries. There are at least two closed landfill sites dating back to the early to mid-1900's.

The St. Marys Landfill is in the extreme southwest corner of the Town and was originally opened in 1984 on a 16.2 ha parcel of land leased from the adjacent St. Marys Cement Co. (SMC), a major industrial operation and employer in the Town. Prior to its use as a landfill site, SMC mined clays from the site for their cement making process. The Town acquired the 16.2 ha property from SMC in 2009. At that time, additional adjacent lands were also acquired, bringing the total size of the landfill property to 37 ha. The purpose of the acquisition was to allow the Town to continue with the disposal operations and associated waste management activities at the site. To date, 8 ha of the property area approved for waste disposal.

3.1.2.1 Current Waste Diversion

The St. Marys Landfill serves as the sole waste disposal facility for the Town and, in the past decade, it has been modified to introduce waste diversion facilities, including:

- An area for the composting of leaf and yard waste;
- A municipal hazardous and special waste (MHSW) facility; and
- A waste transfer station for acceptance of electronic waste (e-waste), cardboard, scrap metal and blue box recycling materials.

The Town of St. Marys is also a member of the Bluewater Recycling Association (BRA), a non-profit organization based in southwestern Ontario with 20 municipal members. BRA is contracted by the Town to provide curbside collection of household waste and recyclable materials. The Town contracts with another contractor for yard waste pickups.

The Town has a Waste Management By-law No. 101-2019, dated November 26, 2019 (and former By-law No. 2012-71) governing the establishment and maintenance of a system for the collection of garbage, yard waste, recyclable materials and the disposal of waste at the St. Marys Landfill. As a member of BRA, the Town of St. Marys operates a comprehensive waste diversion program for Town residents consisting of several key components, including:

- An automated, user-pay, curbside collection system.
- Residential blue box and blue “wheelie” recycling bins.
- Every other week there is collection of paper (e.g., newspapers, magazines, pizza boxes, cereal boxes, flyers, egg cartons, paper towel rolls and telephone books); glass (e.g., clear and coloured glass food and beverage containers with lids and/or labels); plastic (e.g., wide mouth tubs and rigid screw-top containers, grocery and retail bags); and metal (e.g., aluminum and steel beverage and food cans, empty aerosol containers and empty paint cans, all metal lids).
- Curbside yard waste collection was expanded in 2017. Previously, yard waste was collected for five weeks in the spring and fall (10 weeks total). Collection on an alternating week basis from mid-May to mid-November began in 2017.
- The public is also encouraged to drop-off yard waste at the St. Marys Landfill composting area or at the Municipal Operations Centre located at 408 James Street South. Drop-off at these facilities is available year-round.
- The MHSW depot at the St. Marys Landfill was available until March 18, 2020 for drop-off of hazardous wastes (e.g., automobile batteries, waste oils, compressed gas cylinders, herbicides, aerosols and e-waste).
- Backyard composting, with periodic discounts to Town residents on purchase of back yard composters.

- In 2005, the Town initiated an e-waste collection program for landfill diversion, thereby prohibiting the disposal of e-waste in the St. Marys Landfill.

The Town is currently investigating textile and mattress diversion programs as well.

Table 3-2 provides a list of all the waste (by tonne) diverted from the St. Marys Landfill as per recent Annual Monitoring Reports.

Table 3-2: Summary of Waste Diversion from St. Marys Landfill

Material	Quantity (tonnes)				Receiver
	2015	2016	2017	2018	
Curbside and Convenience Location Collection – Blue Box Recycling	1,070	1,049	1,063	1,050	BRA
Brush Material	196	370.9	69.94	106.77	Town of St. Marys
Leaf & Yard Waste	444	390.1	400.55	496.84	Town of St. Marys
e-waste	38.5†	5.2	21.65	13	Greentech
Wood Waste	85	188.6	114.51	100.1	Town of St. Marys
Scrap Metal	4.3	4.5	1.95	10.93	Robson Scrap Metal
MHSW	6.1	9.2	3.71	4.73	Photech Environmental
Aerosols	0.7		N/A	N/A	
Batteries	N/A		N/A	N/A	Aevitas
Total	**1,844.6**	**2,017.5**	**1,675.31**	1,782.37	

† 7.88 tonnes collected at the landfill; 30.66 tonnes collected at the Pyramid Recreation Centre.

The Town is committed to maintaining and expanding its waste diversion program to the extent possible. The benefits of that ongoing commitment include the reduction of the amount of post-diversion waste requiring disposal at the St. Marys Landfill (with the resulting extension in the life of the site) and the reduction of undesirable materials, such as MHSW, going into the landfill for disposal.

The maintenance and expansion of the Town's waste diversion programs are efforts intended to proceed along with, but separate from, this EA process. However, the Town will also review and may implement additional waste diversion efforts as a normal course of future activities, beyond this EA. The ability to separate, process and market additional recyclable materials – or otherwise divert material from landfill disposal is expected to change over the 40-year planning period of this proposed *Undertaking*. Hence, the Town will review and implement diversion activities as technologies and opportunities become available.

3.1.2.2 Interim ECAs

When the Town began the EA process (2011), the Site operated under ECA No. A150203, dated June 24, 2010. According to Condition 13.5 of the 2010 approval, Phase II/III of the Site had a maximum volume of 276,000 m3, while Phase I – which was completed in 1993 – provided 104,000 m3. This combines to an approved capacity of 380,000 m3 for the Site.

As work on the EA progressed, the Town became concerned that the approved capacity would be consumed before all required approvals (EA, EPA, OWRA, etc.) could be obtained. The Town requested Interim ECA's from the MECP to allow continued operation of their landfill while completing the required approvals. Table 3-3 summarizes the ECA amendments received to date and their updated landfill volume allowances. These ECA amendments have been completed annually, recognizing the progress made by the Town toward completion of the EA. It is anticipated that additional interim capacity approvals may be required while the EA process is completed and all required approvals for the Site's expansion are obtained.

Table 3-3: ECA No. A150203 Amendments and Approved Capacity

ECA Approval & Notices		Resultant Site Capacity (m^3)	Cumulative Additional Volume (m^3)	Comments
	June 24, 2010	380,000		Original ECA (before beginning EA)
1	Dec. 11, 2013	no change		For MHSW Depot (not Interim Capacity)
2	Nov. 16, 2015	395,850	15,850	
3	Sep. 6, 2016	411,950	31,950	
4	Sep. 5, 2017	no change	31,950	
5	Sep. 20, 2018	428,140	48,140	
6	Oct. 4, 2019	434,050	54,050	
	Nov. 16, 2020	440,050	60,050	Issued Complete ECA
	Jan. 10, 2022	453,050	73,050	Issued Complete ECA

Historically, as was the case through Notice 6, the MECP's process for amending an ECA had been to identify only the modification to the ECA. Recently (2020), the MECP changed their policy; they now issue a complete ECA document, containing all conditions and revoking previous versions (including Notices). As a result, the St. Marys Landfill Site currently operates under a new Amended ECA (same number – A150203) dated January 10, 2022. The additional cumulative volume approved through ECAs of 73,050 m3 is accounted for within the required waste capacity sought through this EA.

3.1.2.3 Historic Waste Disposal Rates

As a part of the St. Marys Landfill ECA requirements, annual surveys are conducted to determine the rate of fill of the site for the preceding period. In 2012, the Town installed a scale

system at the St. Marys Landfill, which significantly improved the Town's ability to accurately quantify waste entering the site. Since the Town installed a scale system the efficiency of its operations as measured by mass/volumetric tracking has improved. This may also be attributed to continued staff training and experience operating the site. The following table (Table 3-4) provides the available annual data for the site.

Table 3-4: St. Marys Landfill Historic Waste Disposal Rates

Year	Tonnes Received (t)	Rate of Fill (m^3/y)	In-Situ Density (t/m^3)
2010	no data	13,400	
2011	no data	13,690	
2012	4,154	17,315	0.240
2013	6,285	18,439	0.341
2014	5,687	13,662	0.417
2015	4,587	11,076	0.415
2016	5,943	11,457	0.519
2017	4,508	13,161	0.343
2018	5,050	9,246	0.547
2019	5,850	9,359 (note 4)	0.626
2020	5,921	7,137 (note 4)	0.830

Notes:
1. A tonne (t) is 1,000 kilograms (kg) or about 2,205 pounds (lb).
2. Scale was installed in 2012; no data prior to this date.
3. In-Situ Density is the mass of waste divided by the volume of waste and cover material (cover material mass is not included).
4. Annual Monitoring Reports for 2019 and 2020 only provide estimates for the volumetric rate-of-fill. The resulting In-Situ Density exceeds the 2012-2018 average by more than 55%. The Annual Monitoring Reports do not provide insight for waste stream changes or potential operational variations that explain the drastic improvement of in-situ density.

3.1.3 Required Disposal Capacity

The TOR established that 708,000 m^3 of capacity was needed to meet the 40-year planning period for the Town's waste disposal needs. This was based on the rate of fill experienced at the St. Marys Landfill in 2009, 2010, 2011 and 2012.

As outlined in the TOR, a reassessment of the fill rate has been conducted as a part of this EA process to confirm that the requested capacity represents the Town's requirements. The following sections describe the results of the fill rate reassessment.

3.1.3.1 Population Projections

It is generally accepted that there is a strong correlation between population and waste disposal. As a result, the waste requiring disposal can be assumed to correlate with population growth rates.

The population growth rate for the Town of St. Marys was 32.19% overall or 1.12% per year, based on Census of Population data for 1991 to 2016. Most recently, between 2011 and 2016, St. Marys grew 9.0% (equal to a 1.74% compounding annual growth rate). The Statistics Canada census data and related calculations of growth – both between surveys and annualized – are provided in Table 3-1.

Projections for the growth of the Town of St. Marys population have been discussed in the following studies and reports:

- In 2010, the firm of Miller Dickinson Blais found that the Town of St. Marys had historically grown at a much higher rate than Perth County.
- BMA Management Consulting Inc.'s *Municipal Study 2012*, projected 25-year growth rates for Southwestern Ontario at an average of 13.9% (0.52% per year) with select counties seeing growth rates as high as 32.6% (1.15% per year). The *Municipal Study 2012* indicated that Perth County growth might be on the lower end of the projection. This generally reflected the Town's census data (Table 3-1) between 2006 and 2011 (0.14% per year), corresponding to the period when BMA's report was created. It does not reflect the more recent 2011 to 2016 census period, where the Town's growth was 1.74% per year – significantly ahead of the BMA projection.
- In 2014, B.M. Ross and Associates Limited (B. M. Ross) presented population growth estimates as part of the *Town of St. Marys Municipal Infrastructure Projects Public Information Meeting*. In that study B. M. Ross projected growth rates between 0.50% and 1.15% annually for the Town based on historic population growth.
- In January 2017, the Town of St. Marys issued their *St. Marys Strategic Plan Revision & Update*. In it, the Town has targeted a growth rate of 1.5% per year through 2027 for its infrastructure development.

Related to population projections (and waste generation), St. Marys has a disproportionately large industrial base for a community of its size. This impacts employment and residency within the Town. The various studies noted above will have considered the industrial base, including impacts of plant closures and proposed new developments.

The St. Marys population growth rate used for this EA has been revised from the TOR to reflect current literature. The long-term historic growth rate (Table 3-1) has also been considered. In selecting growth rates, it was felt that it is more important to select conservative rates given the resulting impact on the infrastructure needs. However, we did not want to select rates that were excessively large. Thus, we have selected two growth rates that reflect the available information for the EA planning period. These are:

- 1.50% per year growth through (and including) 2027; per the *St. Marys Strategic Plan Revision & Update*. We note this is significantly below the 1.74% annual growth between previous Census periods.

- 1.15% per year growth beginning in 2028 through the end of the EA Planning Period (end-of 2057); per the B. M. Ross estimate. This is in keeping with the Town's historic growth rate predicted by the Census data (Table 3-5).

By using two population growth rates in projections for the Town's population from recent studies, there is a greater level of precision for future planning. As noted above, the annual growth rate through and including year 2027 is 1.50%. The growth rate then decreases to 1.15% annually from 2028 to the end of the EA Planning Period of 2057. Growing the 2016 census population in this way results in the following population projections:

Table 3-5: Resulting Population Projections

Year	Town Population	Growth Rate (% per year)	Notes
2016	7,265	-	Census value.
2017	7,374	1.5%	• Start of Planning Period. • Growth per *St. Marys Strategic Plan Revision & Update.*
2022	7,944	1.5%	
2027	8,558	1.5%	End of growth per *St. Marys Strategic Plan Revision & Update*.
2032	9,062	1.15%	Growth from 2027 per the B. M. Ross estimate.
2037	9,595	1.15%	
2042	10,160	1.15%	
2047	10,758	1.15%	
2052	11,392	1.15%	
2056	11,926	1.15%	Planning Period ends December 31, 2056.

3.1.3.2 Climate Change Effects on Landfill Disposal Needs

Climate Change is usually associated with any significant change in long-term weather patterns. Weather patterns can change the composition of the atmosphere, which results in processes that alter global temperature and precipitation. These processes can ultimately lead to increased occurrence of extreme weather events such as floods, droughts, ice storms and heat waves. To mitigate climate change and the effect it can have on the environment, government agencies have created strategies and guidelines to reduce Greenhouse Gas (GHG) emissions into the atmosphere, including carbon dioxide and methane, two primary constituents of landfill gas. According to Environment and Climate Change Canada [8], emissions from Canadian landfills account for 20% of national methane emissions.

[8] http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=6f92e701-1, accessed March 28, 2017.

The Government of Ontario has committed to reducing GHG emissions to 80% below 1990 levels by 2050 and has established two mid-term targets of 15% below 1990 levels by 2020 and 37% below 1990 levels by 2030 (MOECC, 2015).

The MECP has developed a Climate Change Strategy (MOECC, 2015), which outlines the five areas that Ontario will focus on to achieve the GHG reduction targets, including:

- A prosperous low-carbon economy with world-leading innovation, science and technology;
- Government collaboration and leadership;
- A resource-efficient, high-productivity society;
- Reducing GHG emissions across sectors; and
- Adapting and thriving in a changing climate.

Severe weather events influenced by Climate Change can have a direct impact on landfill utilization. These events can result in increased property damages from excessive wind and precipitation, which can subsequently result in an increase in the amount of materials being received at landfills in the form of damaged goods.

For example, the Town of Goderich was struck by a tornado in 2011. In the year following the event, waste acceptance rates at the municipal landfill were approximately 300% of the previous year [9], indicating the single storm event resulted in the creation of the equivalent of an additional two years of waste. A tornado strike in St. Marys, made more likely due to Climate Change, could cause similar damage and require similar disposal needs.

More recently, the 2016 wildfires in Fort McMurray, Alberta, resulted in the loss of 2,400 homes and buildings. Subsequent news reports [10] indicated that these fire damaged homes each generate between 97 and 175 tonnes of waste. A fire in the downtown core of St. Marys or at a manufacturing plant, potentially worsened by dry conditions related to Climate Change, could therefore create significant quantities of waste requiring disposal.

Locally, high water levels have occurred historically along the Thames River. The most recent event was in February 2018. While this event did not result in any major property damage, the Upper Thames River Conservation Authority (UTRCA) issued a flood warning for St. Marys. Since portions of the Town lie within the UTRCA Flood Plain, high water levels resulting from severe weather events could result in increased property damage and a resultant increase in waste for disposal.

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[9] *Personal communications between James Hollingsworth (Burnside) and Steve Janes (consultant for Huron County Waste Management Planning), June 2014.*

[10] http://www.660news.com/2016/07/10/fort-mcmurrays-genial-landfill-manager-surfs-tsunami-of-wildfire-waste/, accessed July 12, 2016.

Snow and ice storms are also a concern. Several such events have caused widespread damage to trees, power lines and buildings. The most recent event occurred in Winnipeg, Manitoba, on October 14, 2019.

Severe occurrences such as those mentioned above are unlikely to impact the Town directly during the planning period. However, incremental impacts of storm events and Climate Change related impacts are expected to increase in frequency and severity during the planning period.

In order to assess the potential for waste generation from the Town of St. Marys as a result of Climate Change related severe weather events, the Study Team incorporated the U.S. Army Corps of Engineers debris model for a single Category 1 hurricane. This is intended to represent the cumulative effect of more severe storms and resulting damages (disposal needs) that may occur due to Climate Change. Based on the model, approximately five months or 1% of additional capacity could be utilized in dealing with the storm debris. This has been incorporated into the re-evaluation of the disposal capacity required for the Town of St. Marys.

3.1.3.3 Increased Waste Diversion

Ongoing efforts by businesses and residents impact the rate of waste production and disposal through diversion efforts. This can change the quantity, and qualities of the wastes being disposed of by the Town over the planning period.

As noted previously, the Town of St. Marys is a member of the Bluewater Recycling Association (BRA). The Resource Productivity & Recovery Authority (RPRA) [11] does not break-out diversion information for the Town and instead reports it for all members of BRA as a single result. While it is recognized that urban areas such as the Town of St. Marys typically enjoy higher diversion rates than rural area, because the services provided by BRA are equivalent across its service area, it has been assumed that the reported diversion rate for the Association is representative of the diversion rate for the Town. It may be, however, that the Town's diversion rate is higher than the overall (averaged) rate reported for BRA.

The most recent data (2018) [12] indicated that the total diversion rate is 33.8% for BRA (and the Town), while the municipal group, Rural Regional, average is 44.1% and the provincial diversion rate is 49.7%. BRA ranked 13 out of the 15 municipal programs within their municipal group, and the group ranked third of nine categories behind Large Urban Regional, and Urban Regional programs (which combined account for 76% and 80% of disposal and diversion by mass, respectively). It is noted that the Town of St. Marys is directly responsible for diversion of brush material, leaf and yard waste, e-waste, wood waste, scrap metal and MHSW. They also recycle concrete and asphalt in the Town's ongoing construction projects. This diversion information is not provided by the Town to BRA and is therefore not considered in the RPRA (and former Waste Diversion Ontario (WDO)) Datacall results.

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[11] In November 2016, the RPRA replaced Waste Diversion Ontario.

[12] https://rpra.ca/wp-content/uploads/2017-Residential-Waste-Diversion.xlsx, accessed November 1, 2019.

Based on the differences between the Ontario average diversion rate (49.7%) and the Large Urban systems (52.8%) versus the rate obtained by BRA (lower by 12.1% and 15.2%, respectively), there is a clear opportunity for the Town (and the Province) to obtain higher diversion. However, we note that larger communities are capable of more rapidly adapting to emerging trends, and hence obtain better diversion rates sooner. It is reasonable that as additional technologies are developed and because of continuing education, the diversion rate for St. Marys will increase toward rates experienced elsewhere.

As explained in *The Evolving Tonne of Recyclables* [13], several waste management companies and municipalities have also detected changes in the waste stream in the last few years. In September 2020 (based on a 2019 report) the Continuous Improvement Fund (CIF) noted [14] the tremendous global growth in the use of flexible packaging [15] as industry attempts to light-weight their products.

Industry has been working to light-weight their packaging for many years now. In particular, packaging has been redesigned to provide the same level of product protection while containing less material – such as through more rigid, thinner walled plastic protective shells, and, to a lesser extent, by optimizing the products themselves. This reduces production and transportation costs for the products. However, these materials typically have the similar volumes as the predecessors. As a result, receiving facilities (for both waste disposal and recyclables) have noticed a decrease in the mass (weight) being handled without a corresponding decrease in handled volumes. Unilever, a multinational consumer goods company, notes [16] "Since 2010 we've reduced the weight of our packaging by 20% through light-weighting and design improvements." This trend may continue as implementation of the *Waste Free Ontario Act* and the *Resource Recovery and Circular Economy Act* proceeds.

Overall – through the 40-year planning period – it is predicted that the mass of waste produced on an annual per capita basis will decrease through continuing diversion efforts. This will occur as programs in rural and small urban areas are established mimicking those of larger urban areas. In addition, we anticipate manufacturers will continue and enhance their efforts to reduce materials used in production and packaging. However, with the current trend towards rigid, lightweight materials, the reduction in per capita disposal requirements on a volume basis will lag mass reductions. This trend may continue as the Province proceeds with implementation of the *Waste Free Ontario Act* and the *Resource Recovery and Circular Economy Act*. In fact, it may continue due to similar pressures external to Ontario.

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[13] http://www.solidwastemag.com/downloads/165/download/SWR_D15J16_LR.pdf, accessed December 9, 2016.

[14] https://thecif.ca/understanding-flexible-packaging-for-recycling/, accessed November 23, 2020.

[15] From the CIF report, flexible packaging is used for "a wide array of products such as coffee, laundry detergent, baby food, cat litter, single-serve juices, motor oil, toothpaste and even more. Packages can be made with a single layer, a mono-material laminate (i.e. multiple layers from the same polymer) or the more complicated, multi-material laminate (made from multiple layers from different polymers). Flexible packaging can also include papers and metals as key components, closures using zips, spouts or reseal adhesives, and various additives."

[16] https://www.unilever.com/sustainable-living/reducing-environmental-impact/waste-and-packaging/, accessed November 23, 2020.

MECP's (Nov. 2018) Preserving and Protecting our Environment for Future Generations – A Made-In Ontario Environment Plan identifies the need for action to be taken to reduce waste being generated and to increase diversion. Reduction of waste can occur at all levels, from the end-users to the producers. As Ontario begins to move towards a Producer Responsibility model to replace the Blue Bin program, it is expected that innovations will be made to reduce single-use plastics and create markets for diverting additional waste streams. The Plan identifies the Province's commitment to work with producers and municipalities to educate residents on the importance of reducing the amount of waste generated, increase waste diversion, and managing food/organic waste (composting). Unfortunately, it is unknown how or when Plan implementation by the Province, waste generators and members of the public will impact the local disposal needs of the Town.

Future diversion rates have not been projected due to the transition of the Blue Box program to Expanded Producer Responsibility (EPR) under the *Resource Recovery and Circular Economy Act*. The regulations for EPR have not been developed and the role of the municipality in the program remains uncertain at this time.

3.1.3.4 Disposal of Industrial, Commercial, and Industrial Waste

The Town has approximately 777 ha of total developed land, of which approximately 410 ha, about 53%, is Industrial, Commercial and Institutional (IC&I). The Town is not responsible for waste collection or disposal from IC&I users however, many of these IC&I users have their waste delivered to the St. Marys Landfill for disposal. To ensure that disposal needs of IC&I users are factored into the overall required capacity, the waste disposal rate calculated for the St. Marys population includes waste disposed by IC&I users, which is subject to annual population growth. As a percentage of the total waste disposed at the St Marys Landfill over the past six years (2015 to 2020, inclusively), an average of 60% originates from the IC&I sector. When comparing the amount of waste disposed by residential and IC&I users verses the land area used for each, there is a clear correlation. It is expected that as the Town experiences growth in population, the IC&I sector will similarly experience growth – this has been accommodated within the required disposal capacity.

3.1.3.5 Waste Reduction and Diversion Assessment (2018)

The *Waste Reduction and Diversion Assessment* (2018) created by St. Marys states that IC&I waste may be largely reduced within the community by following the *Strategy for a Waste Free Ontario: Building a Circular Economy* document. The Town has interest in following guidelines set forth in the *Strategy for a Waste Free Ontario* document, being a long-term initiative toward waste diversion. Also stated in the *Waste Reduction and Diversion Assessment* (2018), there are eight waste diversion and reduction programs operating within the Town, which have successfully diverted approximately 5,500 tonnes of waste from the landfill site over the period of 2015 to 2017 (inclusive). Including 2018 data, shown in Table 3-6, the Town has diverted a total of 7,320 tonnes. These programs include the following:

- Automated Curbside Collection
- Municipal Hazardous and Special Waste Depot
- Leaf and Yard Waste Collection
- Scrap Metal Recycling
- Blue Box Recycling
- Electronic Waste
- Concrete and Asphalt Recycling
- Wood and Brush Grinding

Additional details regarding the programs can be found within the Assessment document, included as Appendix A.

Eight additional waste reduction or diversion programs have been identified for Town future consideration, including the following:

Table 3-6: St. Marys Proposed Potential Diversion Programs

Program	Description
Food and Organics Collection	In line with 'Ontario's Food and Organic Waste Framework Action Plan', which strives to reduce food waste, recover resources from food and organic waste, promote beneficial uses and support resource recovery infrastructure.
Cigarette Waste Recycling Program	St. Marys is evaluating implementing a Cigarette Waste Recycling Program using TerraCycle, which cannisters' accept all portions of the cigarette. The cigarette waste is then shipped for recycling, which are then remodeled to create industrial products.
Asphalt Shingles Recycling Program	Currently being considered by the municipality to increase diversion from the landfill site. The Town has consulted with industry leaders in shingles recycling and other municipalities who currently operate an asphalt shingle recycling program, to understand how it would be incorporated within the Town's waste management system.
Mattress and Box Spring Program	Mattresses and Box Springs are a bulky waste stream currently accepted at the landfill, presenting another avenue to increase waste diversion. Compaction of these wastes can cause issues due to the metal springs becoming entangled within equipment, increasing maintenance requirements. Neighbouring municipalities redirect this stream to third party processors.
Landfill Optimization	The in-situ density of waste is less than what is anticipated with the use of compaction equipment. Further improvement to operations at the landfill will increase density values. St. Marys has been in discussion with local industry regarding diverting waste specific streams from the landfill. Additionally, the Town is investigating additional earth moving equipment at the landfill, which is currently done utilizing compaction equipment.
Backyard Composting Initiatives	Having success in the past, backyard composting is a cost-effective means to increase diversion of food wastes. St. Marys is evaluating The Green Cone, a backyard composting

Program	Description
	system, which digests all types of food wastes and does not attract animals due to its enclosed design.
Textile Recycling	St. Marys offers multiple location where residents can dispose of their clothing around the Town. The Town is looking at potentially implementing systems for textile material not in a condition to be donated, to increase diversion of this stream.
IC&I Diversion	Based on the Provincial goal of creating a circular economy, the IC&I sector will be required to focus on the following: • Using fewer raw materials to reduce waste; • Design products and packaging to be more durable and recyclable; • Businesses should coordinate with differing sectors to reduce greenhouse gas production; and • Companies should implement programs for the reuse, repair or recycle their products at the end of their life-cycle.

Initiatives have been developed to fit near-term and long-term goals, including additional incentive programs for backyard composters and consideration of implementing a food and organics collection program, respectively. These programs, in addition to the implementation and timeline of the Provincial government's frameworks, goals and programs, may play a role in the long-term reduction of divertible items entering the landfill. The proposed expansion volume is conservative, in order to account for uncertainties regarding the overall timeline of future provincial/Town diversion programs.

As reported within the Assessment document, in 2017 the implemented diversion programs accounted for approximately 44% of wastes being diverted from the landfill. This rate is consistent with the reported diversion rates as calculated in the report from 2010 to 2017, which have an average rate of 47%, not trending in an increased fashion. However, it is difficult to project the future effects on the Town's diversion rate, due to the uncertainty of the timeline and impact of Provincial programs on the Town's waste management practices. The significant impacts of IC&I waste will likely be reduced, due to the government's circular economy approach.

It is reasonable to assume gradual implementation of the Town's and Provincial government initiatives will show improvement over the planning period – reducing the mass of waste requiring disposal. However, the extent that these improvements will reduce the *volume* of waste entering the landfill is unknown. The unquantifiable nature of waste reduction is discussed further below (particularly Section 3.1.3.7, which discounts anticipated disposal requirements by 2.4%).

3.1.3.6 Effect of Provincial Policies

The *Waste-Free Ontario Act* (2016), enacts the *Resource Recovery* and *Circular Economy Act* (2016) (RRCEA). For the Town of St. Marys, the primary impact of the RRCEA will be the

transition of responsibilities for the (current) Blue Box recycling program. Producers, as defined in the RRCEA, are to assume responsibility for recycling from the Town. The mechanism for this has not yet been developed, but implementation is currently expected to occur between 2023 and 2025, as stated in the *Strategy for a Waste-Free Ontario: Building a Circular Economy* (2017) and the Minister's August 15, 2019 direction letters to Stewardship Ontario (SO) and the Resource Productivity & Recovery Authority (RPRA).

It is believed that the shift to producer responsibility will increase Ontario's overall recycling rates. Simultaneously, it will promote innovation by producers; they will seek less costly, more eco-friendly packaging materials/methods. Disposal tonnages may also drop in future years due to stricter packaging regulations, limiting manufacturers from incorporating a greater amount of plastic or non-recyclable material within their packaging (see also the discussion on *The Evolving Tonne of Recyclables* in Section 3.1.3.3).

There may also be additional benefits to the Town if product stewardship programs are extended to more materials/products than currently covered by existing diversion programs. However, there are two initial concerns relative to the Town of St. Marys and disposal requirements:

- Will the producers achieve the collection (diversion from disposal) targets that will be set by the province? A producer may decide to pay penalties instead of putting forth the effort to achieve the diversion target.
- Will producers concentrate their collection (diversion from disposal) efforts in large-population centres? Such centres offer efficiency-of-scale benefits to the producers.

Should either (or both) occur, the Town may need to dispose of more material than has historically been landfilled.

As a landfill operator, the Town is also concerned about the relationship between disposal mass (tonnage) and landfill volume (cubic metres). As described in *The Evolving Tonne of Recyclables* in Section 3.1.3.3, lighter material may arrive for disposal. Lighter material might not be packed into an equally smaller volume then the space required in the landfill will not decrease. Annually reported disposal densities (tonnes per cubic metre) at the St. Marys landfill have varied drastically in the last several years. This may be a symptom of producers moving to light-weight packaging material.

Ontario's Food and Organic Waste Policy Statement [17], issued under Section 11 of the *Resource Recovery and Circular Economy Act, 2016*, provides direction to provincial ministries, municipalities, industrial, commercial and institutional establishments, and the waste management sector to increase waste reduction and resource recovery of food and organic waste. In the policy statement's section entitled "Increasing Residential Resource Recovery in Southern Ontario", it indicates that municipalities that do not already provide curbside collection of source separated food and organic waste will only be required to start a collection program if

[17] https://www.ontario.ca/page/food-and-organic-waste-policy-statement (accessed October 2019).

their population exceeds 20,000 (there are other criteria, but this is a simplified explanation; full details can be found in the policy statement). The Town of St. Marys population was 7,265 according to the 2016 Census. Food and organic waste collection is therefore not required by the Province's policy.

The Ontario government is also placing a large emphasis on reducing food wastes from our landfills, proposing to ban the source altogether. Released in November of 2018, the *Made-in-Ontario Environmental Plan* outlines future actions which will work to divert and reduce organic and food waste from landfills. This plan is expanded upon in the associated document, *Reducing Litter and Waste in Our Communities: Discussion Paper* (2019). The discussion paper outlines the creation of a future proposal for a food waste ban from landfills. It states that municipalities are to implement their own promotion and education programs aimed at preventing food waste. The subject of food rescue is also included in the statement, though is more so directed towards shopping establishments, restaurants and manufacturers. Further, it mentions the shift towards a greater amount of compostable packaging, which may further reduce packaging wastes in landfills. The statement says that all commercial locations (involving restaurants) that generate 300 kg or more of organic waste per week shall be responsible for source separation. This is likely not applicable to commercial locations in St. Marys, due to the small size of the community. These changes to the acceptance of food waste will not be applicable to St. Marys, again due to its small population not meeting the participation threshold. The policy statement mentions that local municipalities with a population of greater than 50,000 residents and a population density of greater or equal to 300 persons per square kilometer are required to participate. St. Marys does not meet the population threshold requiring participation.

Following *Ontario's Food and Organic Waste Framework Action Plan* (2018) may have a significant impact on the town's diversion, as the IC&I sector accounts for roughly 45% of organics waste in Ontario. The community also plans to service additional waste streams by establishing a sustainable diversion program for shingles and textiles, as well as ban mattresses and box springs from the landfill in the future. A pilot program for textile diversion was recently issued [18] but no program is yet in place.

As discussed above, Town of St. Marys is a member of the Bluewater Recycling Association (BRA). BRA collects waste and recyclables for member communities (and some non-member municipalities). BRA does not currently collect food and organic waste. This service may become available in the future, at which time St. Marys may decide to implement food and organic waste collection. Such a program has been envisioned in the Town's August 2018 *Waste Reduction & Diversion Assessment*.

The Town of St. Marys is committed to reviewing their operations and applicable diversion programs every 10 years and implementing diversion targets set out in provincial policy. Through this, we anticipate but cannot quantify future waste reduction and diversion effects.

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[18] Per the St. Mary's Request for Proposals document for a textile diversion program; RFP-PW-16-2019, August 2019.

For planning purposes (that is, to be conservative in our assumptions) the impact of future waste reduction and diversion on the required disposal capacity (volume) is assumed to be minor.

3.1.3.7 Calculated Capacity for the 40-Year Planning Period

During preparation of the TOR, the capacity for the 40-year planning period was calculated based on:

a) The landfill volume consumed between January 1, 2009 and December 31, 2012 [19]. This was averaged, arriving at a value of 13,500 m^3 per year.

b) Population growth, estimated at 1.0% per year, will correspond with the need for disposal capacity.

c) That the new disposal capacity would be required as of January 1, 2017 (i.e., this is the start of the EA planning period, so 40-year planning period would end on December 31, 2056).

Combined, it was calculated that the 40-year planning period would require 708,000 m^3 of waste and operational cover disposal capacity.

The reassessment of capacity requirements undertaken during the EA has updated the method of calculation to consider:

d) The per-capita waste disposal volume: 1.888 m^3/person-year. This is calculated from:

- Total volume used between January 1, 2012 to December 31, 2018 [20]: 94,356 m^3 (approximately 13,500 m^3/year), per volumetric surveys – see Table 3-4.
- Total population that generated the waste volume: 49,964 person-years, calculated from Census data – see Table 3-1.

e) Approximate volumes of waste and operational cover placed in 2017 through 2020 (inclusive) [21]: 38,903 m^3 – see Table 3-4.

f) Projections of Town population for 2021 through 2056 (inclusive): 353,310 person-years, per:

- Census data in Table 3-1.
- Population growth rate estimates in Section 3.1.3.1.

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[19] The 2013 annual rate of fill was unknown at the time of TOR preparation.
[20] The accuracy of disposal volumes for 2019 and 2020 is unknown and therefore not incorporated into the per-capita fill rate calculation (see note on Table 3.4).
[21] Despite inaccurate 2019 and 2020 disposal volumes, they are included in our estimate of volume consumed to date. This does not impact disposal requirements for the planning period.

g) Summing the above and adding 1% to account for potential climate change disposal needs, per Section 3.1.3.2.

All of this results in a total disposal requirement of 713,013 m^3 for the 40-year planning period (2017 through 2056, inclusive).

Diversion of waste through programs offered by the Town are not included in the waste disposal volumes. The volumes used to calculate the total disposal requirement is residual waste; therefore, increases in waste diversion is considered in the overall disposal requirement for the planning period.

Considering the unquantifiable nature of some of the factors discussed in earlier sub-sections, the planning timeframe and ongoing changes to the waste management industry, the Town has decided to continue the EA process using the 708,000 m^3 proposed in the TOR. This is 1% less than the total disposal requirement calculated above (713,013 m^3). Based on the data presented, it is believed that this represents a reasonable, conservative estimate. It allows the Town to meet its current requirements while still planning for the projected growth in a manner that solid waste infrastructure does not become a limiting factor.

3.1.3.8 Interim Fill and Planning Period Capacity

The Town has chosen, and the TOR approved, a planning period of 40-years, starting January 1, 2017, and ending December 31, 2056. The capacity consumed from the approved interim ECA's through EA Approval is removed from the capacity requested by the EA.

Per the previous section, the Town is seeking 708,000 m^3 of total waste and operational cover (disposal) capacity for the *full* 40-year planning period. The various interim ECAs in place since the initial ECA have permitted ongoing disposal of 73,050 $m^3$of waste (see Table 3-3). Therefore, as of September 2022, the capacity requested by this EA is:

708,000 m^3	Planning Period disposal requirements (per Section 3.1.3.7)
minus	
73,050 m^3	Volume consumed from interim ECA's.
634,950 m^3	**Remaining Planning Period Requirements** (through December 31, 2056)

Additional capacity will be consumed as this EA Report is approved and other approvals are sought.. The volume consumed by interim disposal during 2022 (and beyond) is not currently known and will not be reported herein. Further, the base data and evaluations completed for this EA predate the interim operation approvals (ECA's). As a result, this report and it's supporting documents refer to 708,000 m^3 as the planning period required capacity. We recognise the volume consumed during the EA approval process, and subsequent approvals, will be accounted for when determining the design capacity of the landfill.

3.2 Preliminary Problem Statement

The problem which will be addressed through this EA is as follows:

> *The Town of St. Marys must identify a solution that addresses the Town's post*-diversion municipal solid waste disposal needs over a 40-year planning period in a technically and economically feasible manner while minimizing impacts to the environment.

This Problem Statement is reviewed and refined upon completion of the Evaluation of Alternatives to the Undertaking.

For further clarity, the 40-year planning period is defined as ***January 1, 2017*** through ***December 31, 2056.***

3.3 Preliminary Description of the Undertaking

The following describes the proposed Undertaking:

- The Undertaking will include the proposed changes that are made to address the Town's future municipal waste disposal needs.
- The Undertaking will need to address the Problem Statement defined above. The description is purposely broad at this stage to allow for consideration of the range of Alternatives identified in the Terms of Reference. The description of the Undertaking will be refined as the EA progresses.

3.4 Screening of Waste Export Options

3.4.1 Screening Methodology

As noted in Section 2.0, the initial evaluation of *Alternatives to the Undertaking* evaluates the following:

- Do Nothing;
- Alternative 1: Expanding of the St. Marys Landfill; and
- Alternative 2: Exporting Waste to Another Jurisdiction.

Several options exist regarding how, and to where, waste could be exported. During the TOR phase, a list was developed of alternative receiving locations for exported waste from the Town of St. Marys. At the TOR phase, the Study Team was considering two primary jurisdictional areas for waste export, private and municipally operated landfills. The options identified were:

- Waste Export to Local (Municipal) Landfill Sites;

- Green Lane Landfill (Southwold Township, Ontario) [22];
- Mitchell Domestic Landfill (Municipality of West Perth, Ontario);
- Logan Landfill (Municipality of West Perth, Ontario); and
- Blanchard Landfill (Township of Perth South, Ontario).

Waste Export to Private Landfill Sites:

- Twin Creeks Landfill (Warwick Township, Ontario);
- Carleton Farms Landfill (Sumpter Township, Michigan, USA); and
- Proposed Southwestern Landfill [23] (Zorra Township, Ontario).

The TOR noted that other options may be identified during the EA process. During the EA phase, the Study Team identified additional municipal and private landfill options and undertook a screening of these potential options to determine the preferred option for the Town of St. Marys. The additional landfills and screening methodology are presented in the following section.

3.4.1.1 Data Collection

To collect data supporting the evaluation of the *Waste Export Alternatives*, the Study Team developed two surveys, one for municipalities and one for private waste haulers, transfer station and landfill operators.

Municipal Survey

The municipal survey was sent to 14 municipalities that operate landfills within approximately 100 km of St. Marys, including the following:

- County of Wellington;
- Oxford County;
- Regional Municipality of Waterloo;
- Municipality of South Huron;
- Township of Perth South;
- City of Toronto;
- Municipality of West Perth;
- City of Stratford;

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[22] Green Lane was listed in the TOR as a private landfill. However, it was purchased by the City of Toronto in 2007 and is, therefore, a municipally owned landfill.

[23] The Southwestern Landfill proposed by Walker Environmental Group Inc. is undergoing an EA process for approval.

- Municipality of North Perth;
- Township of Perth East;
- County of Brant;
- Municipality of Thames Centre;
- Township of Adelaide Metcalfe; and
- Municipality of Southwest Middlesex.

The survey asked whether the municipality would be interested in accepting St. Marys' waste. A follow-up question asked how the answer had been determined (i.e., had there been a discussion about providing waste capacity to St. Marys amongst council, Committee of the Whole, with the County Warden/Mayor/Chief Administrative Officer etc.). A copy of the survey is provided in Appendix B to this report.

Private Hauler, Transfer Station and Landfill Operator Survey

Three private landfill sites were identified in the TOR. Through the EA process it was determined that additional private options exist, including the following:

- Use St. Marys curbside collection vehicles to deliver waste directly to a private landfill.
- Use St. Marys curbside collection vehicles to deliver waste to a transfer station and then use a private hauler to transfer waste to a private landfill.

In addition to private landfills, disposal at the Emerald Energy from Waste site in Mississauga was considered.

A questionnaire was created to obtain comparative data from private trucking, transfer station and disposal facility operators. The questionnaire included a wide range of questions including tipping rates, maximum length of contracts, rate increases in the last five years, remaining capacity of the landfill and whether they are currently licensed/permitted to receive waste from St. Marys, among other questions. A copy of the questionnaire can be found in Appendix B.

3.4.2 Screening Findings

3.4.2.1 Export to a Municipal Landfill

Of the 14 municipalities who received a survey, 10 responded indicating that they would not be interested in receiving St. Marys' waste. Four did not respond to the survey. Copies of responses are provided in Appendix B. Based on this information it was determined that export to another municipal landfill is not a feasible option. This option was not considered any further in the study.

3.4.2.2 Export for Private Disposal

The Private Waste Service Providers Survey was distributed to:

- Six private landfill and/or transfer station operators:
  - Walker Environmental Group (Niagara Landfill, Smithville, Ontario);
  - Waste Management of Canada Corporation (Twin Creeks Landfill, Watford, Ontario);
  - Republic Services Inc. (Carleton Farms Landfill, Michigan, U.S.A.);
  - BFI Canada Inc.[24] (Ridge Landfill, Blenheim, Ontario);
  - Brooks Road Environmental (Brooks Road Landfill, Cayuga, Ontario); and
  - Emerald Energy from Waste Inc. (Thermal waste disposal site in Mississauga).
- Nine waste haulers:
  - Challenger Motor Freight;
  - Wasteco;
  - GFL Environmental Inc.;
  - Bluewater Recycling;
  - Progressive Waste Solutions;
  - TRY Recycling;
  - Green Valley Recycling;
  - Clean Harbours; and
  - ECL Carriers.

It is noted that the TOR indicated that the Southwestern Landfill proposed by Walker Environmental Group Inc. in Zorra Township would be considered. As this proposed landfill was not approved at the time of the survey, it was determined that it should not be included in the screening. However, as noted, a variety of alternative private landfills were assessed.

Of the six private landfill and transfer station operators contacted, five completed the survey. Of the nine waste haulers contacted, five provided responses. The full survey and responses can be found in Appendix B.

A summary of the private landfill and thermal treatment sites costs and ability to receive waste from St. Marys is presented in Table 3-7. The four final disposal and treatment sites which provided responses to the survey questions include:

- Walker Environmental (Niagara Landfill);
- Waste Management of Canada Corporation (Twin Creeks Landfill);
- Republic Services Inc. (Carleton Farms Landfill); and
- Emerald Energy from Waste Inc. (an incinerator in Peel Region).

[24] Now known as *Waste Connections of Canada*.

Table 3-7: Responses to Private Landfill/Thermal Treatment Fee and Capacity Questions

Questions	Walker Environmental (Niagara Landfill)	Waste Management of Canada Corporation (Twin Creeks Landfill)	Republic Services Inc. (Carleton Farms Landfill)	Emerald Energy from Waste Inc.
Is your site licensed/permitted to receive waste from St. Marys? (Y/N)	Y	Y	Y	Y
Do you have capacity to receive 2000 to 5000 tonnes/year from St. Marys? (Y/N)	Y	Y	Y	Y
What is the estimated remaining capacity at your site (in m^3 and years)?	Volume: 14.5 Mm^3 Life: 13 years	Volume: 20 Mm^3 Life: 25 years‡	Volume: 60 Mm^3 Life: 75 years	N/A
What is the current gate tipping rate?	$45 to 55/tonne	$45 to 50/tonne	$18/tonne	$90/tonne
What is the maximum contract duration you are willing to negotiate?	10	25	10	20
How have tipping rates changed in last 5 years?	± 5% continual decline with par dollar and cheap fuel, stabilizing now with lower Canadian dollar	Rates have decreased to compete with Michigan landfill rates.	Have not increased in last 5 years.	No response provided.
Distance from St. Marys†	157 km	80 km	250 km	144 km
Preferred Private Landfill/Thermal Treatment Site	Not preferred: high tipping fees, short lifespan remaining and short contract duration.	Preferred for proximity and contract duration.	Not preferred: distance and border crossing required.	Not preferred: high tipping fees and distance to the site.

Notes:

† One-way travel distance, from St. Marys to the disposal site.

‡ Rate-of-Fill revised in 2017, resulting in an estimated 15 years of remaining capacity.

No response received for the Ridge Landfill (Blenheim, Ontario) or the Brooks Road Landfill (Cayuga, Ontario).

BFI Canada Inc. provided a survey response that indicate their transfer station would send waste to the Ridge Landfill. They did not answer the landfill related questions featured in Table 3-7. As such, only four of the five respondents have been included.

Based on the information provided, the Twin Creeks Landfill in Watford and Carleton Farms Landfill in Michigan are the highest rated opportunities.

The Twin Creeks Landfill has the following advantages:

- At least 25 years of capacity remaining at the site.
- Willingness to negotiate a 25-year contract.
- Relatively close distance from St. Marys.

The advantages of taking the Town's waste to Carleton Farms Landfill in Michigan include:

- 75 years of capacity remaining at the site (this is the only landfill with sufficient capacity to fully address the 40-year needs of St. Marys).
- A low tipping fee (cost).

Although the option to deliver waste to Michigan offers some advantages, in August 2006 [25] Ontario's Environment Minister and US Senators for Michigan, Debbie Stabenow and Carl Levin, agreed to stop cross-border shipments of municipally-managed waste, from Ontario into Michigan by 2011. The agreement does not cover waste under private contract that the Ontario government and its municipalities do not control. The agreement was focussed on the larger Ontario municipalities that were, at the time, shipping their waste to Michigan landfills, namely the City of Toronto and the Regions of Durham, Peel and York. Today some Ontario municipalities are utilizing private waste collection, transfer stations, and/or haulage to send their waste to Michigan landfills. As such, for this option to be feasible, the Town would need to use a private hauler or deliver waste to a private transfer station with the necessary permissions/approval to transport waste across the border into Michigan. Through the survey, Waste Management of Canada Corporation noted the following:

> *St. Marys waste volume is small. Therefore, roll-off and curbside collection vehicles should haul direct to a disposal site. A depot should be set up for local volume service in front-load bins.*

[25] https://www.theglobeandmail.com/news/national/agreement-to-phase-out-shipments-of-ontario-garbage-to-michigan/article1102634/, accessed September 30, 2019.

As such, it was determined that using a private hauler would be required to make use of the landfill in Michigan, while it is preferable to use curbside collection vehicles to deliver waste directly to the Twin Creeks Landfill.

3.4.2.3 Conclusion

Based on the discussion and comparative analysis provided above, delivery to the Twin Creeks Landfill was determined to be the Preferred Alternative for waste export. This *Alternative* will be carried as *Alternative 2* in the evaluation of the *Alternatives to the Undertaking*.

3.5 Alternatives to the Undertaking

The TOR indicated that the Alternatives to the Undertaking would include a "Do Nothing" option, expansion of the St. Marys Landfill and an option to export waste to another jurisdiction. Based on the screening presented in Section 3.4, the Alternatives to the Undertaking are as follows:

Do Nothing

As a requirement of the *EA Act*, the 'Do Nothing' must be considered. Doing Nothing represents the result of no action being taken to address the Problem Statement and serves as a baseline against which other Alternatives can be compared. Do Nothing has thus been carried forward for comparison to the Proposed Undertaking and Alternative 1 during the EA. The Do Nothing Alternative assumes that waste collection and disposal will continue using current practices as specified under the current ECA and then will cease in September 2022 when the ECA expires.

Alternative 1: Expanding the St. Marys Landfill

This Alternative involves the continued operation of the St. Marys Landfill by the Town following the design, approval and construction of expanded waste disposal areas within the existing 37 ha property. The Town plans to continue to contract BRA to undertake the curbside collection program.

For the purposes of this portion of the EA, this Alternative is assumed to have the following characteristics:

- The expansion would be located entirely within the Town-owned property at 1221 Water Street South (the existing landfill property);
- The landfill expansion area would be designed to have a leachate collection system and stormwater management system, in accordance with typical Environmental Compliance Approval (ECA) requirements;
- Setbacks from property lines will be included; and

- Typical nuisance control measures will be in place, including:
  - Applying daily cover to control odour and reduce blowing litter;
  - Providing visual barriers, such as berms or tree plantings to block sightlines;
  - Applying dust control measures, as required;
  - Conducting regular inspections by landfill staff to observe and record any operational issues and implementing corrective actions; and
  - Continuing the existing program to record and respond to public complaints and take corrective actions.

Alternative 2: Exporting Waste to the Twin Creeks Landfill

For the purposes of this EA, *Alternative 2* would involve the closure of the St. Marys Landfill for waste disposal. The Bluewater Recycling Association (BRA) would continue to collect municipal waste through their current curbside waste collection program; however, the waste would be transported to another waste disposal site outside the jurisdiction of the Town of St. Marys. For the purposes of this assessment, it was assumed that waste would be taken directly, without using a transfer station, to the Twin Creeks Landfill in Watford, Ontario using existing BRA curbside collection vehicles.

While the Town is not responsible for Industrial, Commercial and Institutional (IC&I) collection or disposal, IC&I users have their waste delivered to the St. Marys Landfill. If it were to close, then all IC&I users would need to have their collection contractors take their wastes to another disposal facility. This could be the Twin Creeks Landfill or another facility.

The Twin Creeks landfill is 301 ha in size with a permitted landfill footprint of 101.8 ha. This site is operated under Environmental Compliance Approval (ECA) No. A032203. The site's name and address were updated by ECA Notice 24, dated May 24, 2019 to:

> Twin Creeks Environmental Centre
> 5768 Nauvoo Road (Watford)
> Warwick Township, County of Lambton

As noted through the initial screening survey described in Section 3.4, there is substantial available capacity at the landfill. The Twin Creeks Landfill is approved to accept waste from St. Marys. Therefore, it is assumed that no additional permitting or approvals are required by Waste Management of Canada, the owner and operator of Twin Creeks, should this Alternative be selected.

It is assumed that the St. Marys landfill site would continue to operate as a public waste drop-off and composting site for St. Marys residents.

3.6 Study Area

During preparation of the TOR a specific landfill to be used for exporting waste was not identified. As such, the Study Area for this portion of the EA was not defined.

A reasonable Study Area has been defined by the spatial extent of the proposed Alternatives and the surrounding lands within 120 m of the footprint of each of the Alternatives. This includes the existing St. Marys landfill, the lands around the St. Marys landfill where the expansion could take place, the Twin Creeks Landfill and the travel route between St. Marys and the Twin Creeks Landfill, as shown on Figure 3-1.

Lands immediately adjacent to these features are also included in the Study Area.

3.7 Description of the Existing Environment

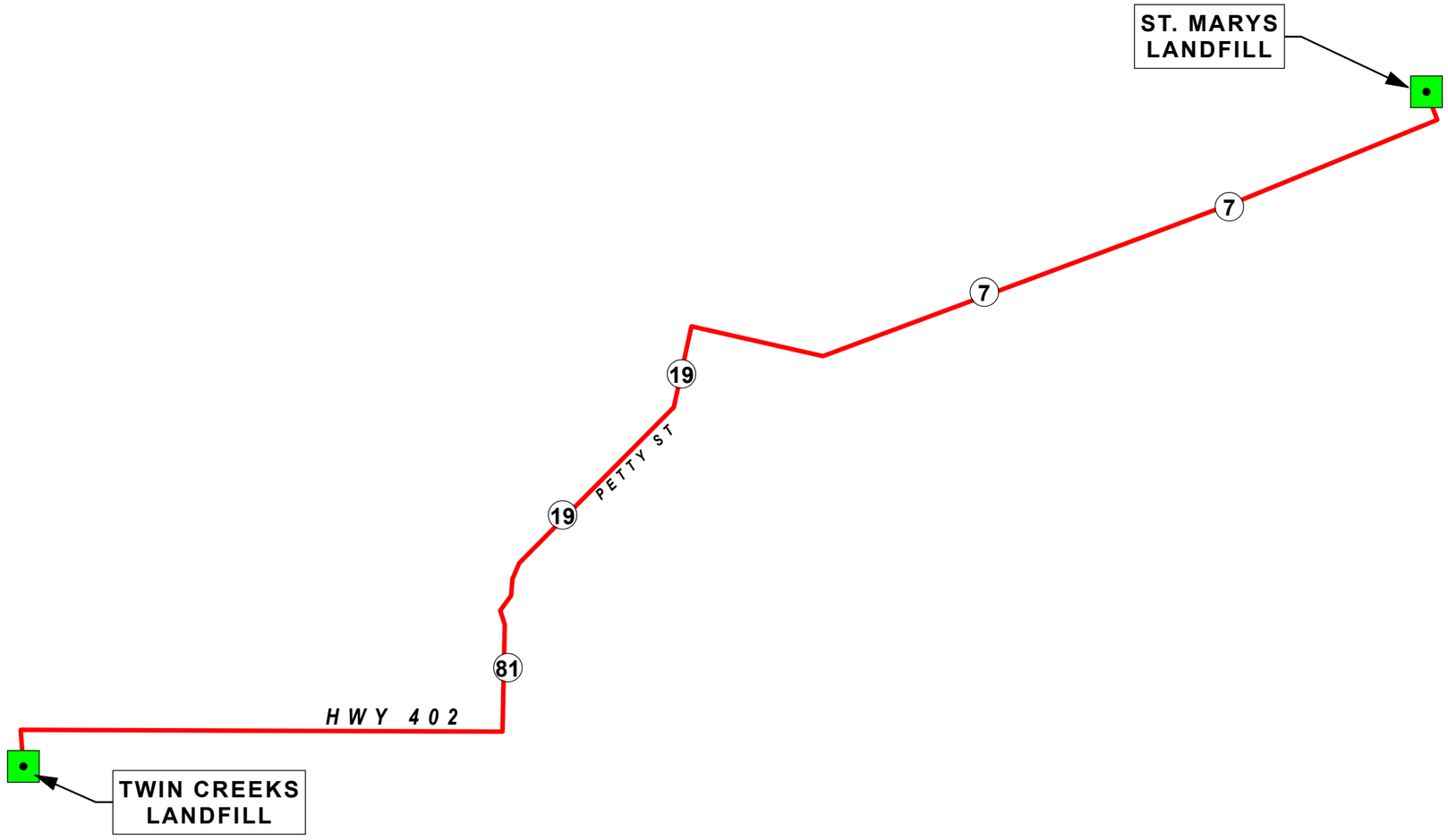
The TOR indicated that the evaluation of Alternatives To the Undertaking would be qualitative, based on information from existing data sources or from information to be gathered through the landfill operators' survey. As such, the description of the environment for this phase of the EA is based on publicly available data sources and the survey, described in Section 3.4.1. The TOR indicated that, with respect to Alternative 1, Expansion of the Existing Landfill, data sources will include, but will not be limited to:

- Official Plan documents;
- Background air, surface and groundwater quality reports, studies and previous monitoring results;
- Various operational and technical reports documenting existing landfill operations;
- Complaints history;
- Employment records;
- Statistics Canada data sets; and
- Other sources as identified during the assessment process.

With respect to Alternative 2, Export Waste to Another Jurisdiction, data will primarily be derived from a survey to be administered to the operators of a number of potential waste disposal facilities, expected to be mainly landfills, which may be able to accept the Town's waste.

The TOR also indicated that during the EA, additional field investigations would be undertaken to characterize the environment in greater detail. This more detailed description of the environment is provided in Section 6.6.

According to the EA Act, and EA must include, among other items, “a description of… the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly.” Section 6.1(1).



Landfill Location

Proposed Route between Landfills

Sources:

1. Ministry of Natural Resources and Forestry, © Queen's Printer for Ontario.
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

Disclaimer:

R.J. Burnside & Associates Limited and the above mentioned sources and agencies are not responsible for the accuracy of the spatial, temporal, or other aspects of the data represented on this map. It is recommended that users confirm the accuracy of the information represented.

This map is the product of a Geographic Information System (GIS). As such, the data represented on this map may be subject to updates and future reproductions may not be identical.

Datum: North American 1983	
Coord. System: NAD 1983 UTM Zone 17N	
Projection: Transverse Mercator	
Central Meridian: 81°0'0.00"W	
False Easting: 500,000m	False Northing: 0m
Page Orientation: 0°	Scale Factor: 0.99960

N

Grid North

0 2.5 5 7.5 10 12.5

Kilometers

BURNSIDE

Client

TOWN OF ST. MARYS

Figure Title

FUTURE SOLID WASTE DISPOSAL EA

STUDY AREA

Drawn	Checked	Date	Figure No.
SK	TR	JUNE 2022	**3-1**
Scale		Project No.	
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File Path: C:\Project\300\032339 (St. Marys)\2022 Solid Waste Disposal EA\032339 Figure 3-1 Study Area.mxd Print Date: 2022/06/05 Time: 05:28 PM

In Section 1(1) of the EA Act, the “environment” is defined as:

i) Air, land or water,

j) Plant and animal life, including human life,

k) The social, economic and cultural conditions that influence the life of humans or a community,

l) Any building, structure, machine or other device or thing made by humans,

m) Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or

n) Any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

As such, this phase of the EA characterizes the “environment” in accordance with this definition.

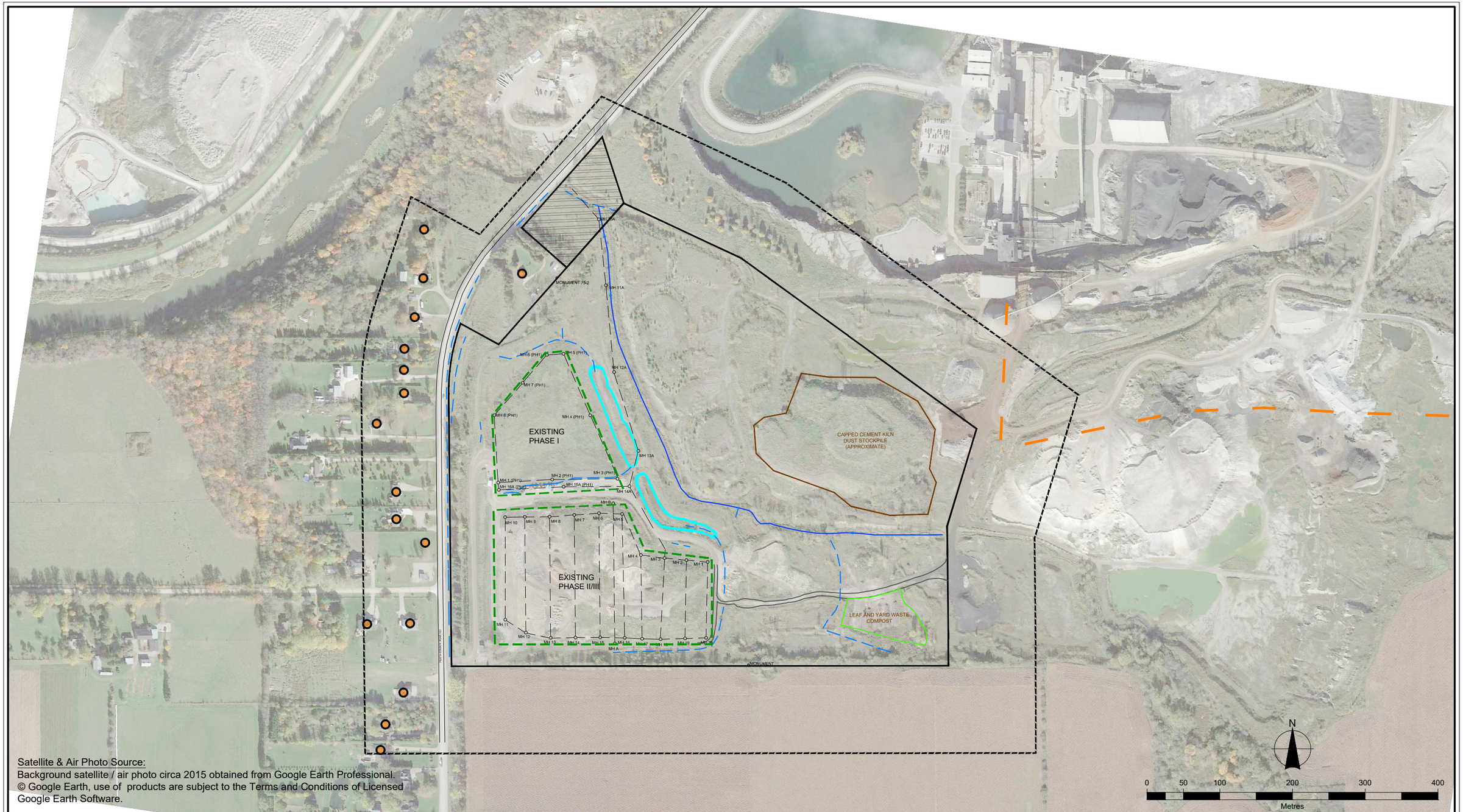
Accordingly, the following sections document the existing environment in the Study Area. The components of the environment, listed above, are organized into the following headings:

- **Built Environment:** including, any building, structure, machine or other device or thing made by humans, any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities.
- **Natural Environment:** including air, land or water, plant and animal life, including human life.
- **Social and Cultural Environment:** including the social, economic and cultural conditions that influence the life of humans or a community.

The following sections describe the existing environment, under these headings, within the Study Area, including the lands associated with the existing St. Marys Landfill property, the Twin Creeks Landfill property and the haul route between St. Marys and Twin Creeks.

3.7.1 Existing St. Marys Landfill

Existing conditions at the St. Marys landfill are shown on Figure 3-2.



Satellite & Air Photo Source:
Background satellite / air photo circa 2015 obtained from Google Earth Professional.
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LEGEND

- PROPERTY BOUNDARY
- 120M BUFFER
- EXISTING WASTE FOOTPRINT
- WATERCOURSE
- DRAINAGE SWALE
- LEACHATE COLLECTION SYSTEM
- STORM WATER MANAGEMENT BASIN
- LEACHATE COLLECTION SYSTEM MANHOLE
- COMPOST AREA
- ELECTRICAL DISTRIBUTION LINES
- RESIDENCE WITHIN 120M OF LANDFILL PROPERTY
- CAPPED CEMENT KILN DUST STOCKPILE (APPROXIMATE)
- RIGHT-OF-WAY AND SEWER EASEMENT

BURNSIDE

Client: **TOWN OF ST. MARYS**

Figure Title

FUTURE SOLID WASTE DISPOSAL EA

EXISTING LANDFILL AND ADJACENT FEATURES

Drawn	Checked	Date	Figure No.
SK	TR	JUNE 2022	3-2
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File: C:\Project\300\032339 (St. Marys)\2022 Solid Waste Disposal EA\032339 FIG 3-2 EXISTING ENVIRONMENT.dwg Date Plotted: June 5, 2022 - 6:07 PM

3.7.1.1 Built Environment

Past Uses and Disturbances

The St. Marys landfill is in the southwestern portion of the Town. The site was originally owned by St. Marys Cement Co. (SMC) now a wholly-owned subsidiary of Votorantim Cimentos based in Sao Paulo, Brazil. Founded in 1912, SMC offices and the cement plant are still located north of the landfill in an area that was formerly a quarry.

Prior to the development of the landfill, the property was licenced by the Ministry of Natural Resources as part of the SMC quarry. Historical aerial photographs show that soil was stripped from the north end of the Site and possibly some rock quarried. The surficial clay was also mined on portions of the Site for use in the cement production. More recently, the north end of the Site was used to stockpile soils and materials associated with cement production.

In 1979, the Town began investigating the feasibility of using a portion of a former clay pit owned by SMC as a municipal landfill site (CRA, 1982). The 16.2 ha property was smaller than the current Site. The property was leased from SMC. At the time, the long-term end use planned for the Site was to become part of a greenbelt buffer zone surrounding the SMC plant (CRA, 2011).

The Site was approved in 1983, landfilling began in December 1984 in the area known as Phase I. The proposed bottom elevation was 315 masl (CRA, 1982 Plan 2). Phase I was completed and finished with final cover in the summer of 1993 (CRA, 2012).

Phase II/III was divided into eight stages, which corresponded with the development of a leachate collection system from east to west. Stage 7 was constructed in the fall of 2010 and began receiving waste in December 2010. A weigh scale was installed in 2012 to assist in operations and filling control. Stage 8 was constructed in late summer 2013 and began receiving waste in September 2013 (Burnside, 2013). Phases I and II/III are shown on Figure 3-2.

The Town purchased additional property from SMC in 2009. ECA No. A150203 dated January 10, 2022 reflects Site ownership by the Town and incorporated additional land from SMC to bring the Site to its current size. The Site is now a 37 ha waste disposal Site with an 8 ha landfill area.

Cement Kiln Dust (CKD) Stockpile

As described above, the northeast portion of the landfill property was purchased by the Town from SMC in 2009. The land in this area contains a Cement Kiln Dust (CKD) stockpile from historic SMC operations, as shown on Figure 3-2. The CKD stockpile has been in place for approximately 30 years. The CKD stockpile was studied by Golder in 2005. A copy of the report is provided in Appendix C. The study found that the total

volume of CKD is estimated to be approximately 350,000 to 400,000 m^3. Golder compared samples of the material to the 2004 *Soil, Groundwater and Sediment Standards; Table 3: Full Depth Site Conditions in Non-Potable Groundwater, Industrial/Commercial Use*. The results indicated that the material generally did not exceed the Table 3 standards for petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCB) or polycyclic aromatic hydrocarbons (PAH). There was one minor exceedance for cadmium; however, all other metals were below specified limits. Groundwater samples taken from two monitoring wells in the CKD stockpile were tested for inorganics, PCB and PAH. Samples were found to be alkaline with a pH of 10 and high in sulphate, chloride, potassium and sodium. There were no exceedances of Table 3 standards apart from selenium and silver in which the exceedance was due to a detection limit higher than the standard. One groundwater sample was submitted for TCLP analysis with no exceedances.

Approved Waste Collection

The ECA approved the Site for the collection and diversion of recyclable waste including Waste Electrical and Electronic Equipment (WEEE), acceptance and transfer of Municipal Hazardous or Special Waste (MHSW), and the composting of leaf and yard waste.

Leachate Collection

The Phase I leachate collection system is a perimeter system consisting of perforated collector pipes connected between manholes. It was installed as a contingency system to control mounding within the waste.

The Phase II/III collection system incorporates perimeter collectors as well as lateral collectors passing beneath the waste. The system was extended as each new Phase was constructed. Both the perimeter system of Phase I and the underdrain system of Phase II/III restrict the movement of leachate beyond the landfilling footprint and control the leachate mound within the waste.

Initially, leachate from Phase I was collected in a holding tank near maintenance hole number 1 in Phase I (MH1, PH1). Leachate from Phase II/III was collected in a holding tank near MH3. In 1997, a sewer was installed to gravity drain the leachate directly from the leachate collection systems to the Town's sanitary sewer system. The Phase I leachate holding tank was decommissioned in 2008. The Phase II/III leachate holding tank was used to connect the Phase II/III leachate collection system to the gravity sewer. It contains a valve to shut off leachate flow for maintenance of the sewer line. There is no dedicated leachate storage tank on-site; however, the site itself can provide leachate storage as does the collection system. Leachate is directed to the Town's wastewater treatment plan (WWTP). The actual amount of leachate directed to the WWTP is small relative to the capacity of the plant. It is estimated that Phase I and Phase II/III produce

an average of 24.5 m^3/day of leachate. By comparison, the WWTP has a Rated Capacity of 5,560 m^3/day. This means the landfill leachate is approximately 0.4% of the WWTP's rated capacity.

Drainage and Stormwater Features

The topography of the site today is a result of not only the landfill, but historical activities connected to SMC operations. These activities include clay mining over most of the site, overburden stripping and stockpiling east of the watercourse, cement kiln dust stockpiling and rerouting of the watercourse.

The Site has been impacted by industrial activity since the 1960's. It was around that time that the quarry operation to the north began encroaching into what is now the landfill Site. It is likely that there were impacts to the groundwater prior to that time from quarry dewatering. Most of the Site was then disturbed by the SMC borrow pit that mined clay for cement manufacturing. SMC personnel indicate that borrow pit operations at the Site ended in 1977. By this time none of the site was in a natural state.

The highest elevation on the Site today is the CKD stockpile at around 334 m amsl at its highest point. The elevations of the fill areas are approximately 327 m for Phase I and 326 m amsl in Phase II/III. The lowest elevations on the Site occur along the watercourse. This channel enters the east side of the Site at an elevation of approximately 310 m amsl and exits at the northwest end below 309 m amsl. The elevation changes between SP1-10, the surface water station at the east side of the Site and SP3-93, near the north end, is approximately 1.5 m. This is over a distance of about 660 m resulting in a grade of 0.2%.

Water Street S [26] is a topographic ridge on the west side of the Site and acts as a drainage divide. West of the ridge, runoff flows west toward the Thames River. East of the road, runoff is eastward toward the stormwater retention basins and the watercourse.

Surface water from the complete landfill areas is directed through a series of perimeter ditches and swales around the landfills and along the interior roadways. The ditches and swales convey the runoff to two stormwater retention basins. These stormwater basins attenuate the peak flows during storm events and allow sedimentation. The 2012 Annual Report noted that riser pipes were replaced, and sediment was removed from both stormwater basins during the landfill earthworks in October and November 2007. As part of the Site's ongoing monitoring, swales, culverts and outlets are inspected regularly to ensure surface water flow.

[26] Water Street S. runs through the Town of St. Marys and becomes Perth Road 123 roughly 470 m north of the landfill entrance. However, the landfill's address is listed as Water St. S. and the stretch adjacent to the landfill is locally referred to as Water St. S. Therefore, for the purposes of this EA, the stretch of road along the western boundary of the landfill is referred to as Water St. S.

The stormwater basins outlet to the watercourse via control features. The watercourse leaves the Site by a culvert under Water St. S. It eventually discharges into the Thames River, approximately 500 m downstream of the Site.

Upstream of the Site, this watercourse divides into two branches (see Figure 3-2). The north branch skirts the south edge of the SMC quarry and drains industrial properties and agricultural fields east of the Site. The south branch occupies a vegetated channel between the agricultural fields and the excavated/filled areas on the SMC property. It drains industrial and agricultural land further south and east before crossing James Street and Elginfield Road (Highway 7). In total, approximately 370 ha of land drain through the watercourse on the landfill property.

Site reconnaissance in 2015 indicated that site drainage is less defined east of the watercourse. Surface water runoff from the relatively steep slopes of the CKD stockpile flows radially in all directions, including west toward the watercourse and north toward the quarry. There are relatively flat areas between the stockpile and the watercourse with isolated water-filled depressions, some of which contain cattails.

Site Size

Currently, the landfill property is 37 ha in size with 8 ha approved for landfilling. Waste for disposal is accepted from the Town of St. Marys only. The majority of waste collected is from the large IC&I base within the Town as well as from household curbside collection. Private waste companies generally dispose of waste at the St. Marys Landfill with the exception of some specialized waste that is taken to other diversion or disposal locations within the region.

There is current no landfill gas collection system in place.

Traffic Conditions

The haul routes for the site are primarily from the north and south along Water St. S./Perth Road 123

- Adjacent to the landfill and south of the landfill, Water St. S. (also referred to as Perth Road 123) is a two-lane arterial road, which has a posted speed of 80 km/hr in the landfill access area. This road is under the jurisdiction of the County of Perth.
- Roughly 470 m north of the landfill entrance, the road becomes under the jurisdiction of St. Marys. The road has a posted speed of 50 km/hr.

The above haul routes connect to the tar and chip driveway [27] which serves as the St. Marys Landfill access route, located on the east side of Water Street S. The entrance of the access road works to form a T-intersection with Water Street S and is stop-sign controlled.

3.7.1.2 Social and Cultural Environment

Population

The Town of St. Marys has a population of a 7,265 according to the 2016 Census. Census data indicates that from 2001 to 2006, the Town grew from 6,293 to 6,617 residents (Statistics Canada, 2006). Between 2011 and 2016, the Town population changed from 6,655 to 7,265 (Statistics Canada, 2016).

Land Use

The site is surrounded by the SMC plant to the northeast and northwest, agricultural fields to the south, and a number of rural residences and farms to the west.

The landfill property is identified as an Environmental Constraint area, in accordance with the Town's Official Plan. Surrounding land uses within the Town include Extractive Industrial uses to the north, northeast and west that encompass the operations of SMC. One residence is situated on the east side of Water Street S. This residence is surrounded on its north, east and west property limits by the landfill property. This property is identified for Extractive Industrial purposes, according to Schedule A, Land Use Plan of the Official Plan. A small area of floodplain lands lies on either side of the Thames River.

The Township of Perth South lies adjacent to the western and southern boundaries of the landfill. The Township does not have its own Official Plan and, instead, defers to the County of Perth Official Plan. According to Schedule A of the Perth County Official Plan, lands to the immediate south and east are designated as Licensed Quarry Pit/Limestone Resource and Agricultural Lands with a small amount of Natural Resources/Environment adjacent to the Thames River.

In total, there are 16 residences within 120 m of the landfill. These are rural residential properties, as shown on Figure 3-2.

Until recently, SMC maintained an aggregate extraction license for a portion of the lands it had sold to the Town. Per the SMC Surrender of Land document, under Aggregate License 4494 dated September 21, 2016, the surrendered lands were 19.45 ha and

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[27] The driveway was upgraded to tar and chip in 2019. The air modelling for the Site was based on the previous gravel driveway surface conditions. The tar and chip driveway is an improvement compared to the modelled conditions.

4.37 ha in size for the existing and potential landfill areas, respectively. This surrender was approved under Section 16(2) of the *Aggregate Resources Act* by the Ministry of Natural Resources and Forestry on November 8, 2016. The entire St. Marys Landfill property is now unencumbered by the aggregate extraction license.

Economic Conditions

The landfill currently employs one full-time staff position, one part-time staff position and six staff who work occasionally, as follows:

- Site Attendant – a full-time position;
- Compactor Operator – a regular part-time position;
- (Five) Equipment Operators – as occasionally needed;
- Environmental Services Supervisor – a full-time position that provides site operations supervision; and
- Supervisor of Operations – as occasionally needed.

The Town of St. Marys 2016 budget attributed total staff salary for these employees as approximately $106,000. For clarity, the Supervisor of Operations spends only a portion of their time dealing with the existing landfill operations. This is also true for others noted “as occasionally needed”. As a result, only a portion of their salaries are attributed to the landfill operations in the budget. The full amount of the site attendant’s salary is included.

St. Marys is home to a significant industrial sector, which represents a substantial employment and economic driver at the local and regional level. St. Marys is strategically located, being approximately 40 km from London (2011 Census population 366,150) and 20 km from Stratford (2011 Census population 30,886). This means there is a large commuter base in the area. As a result, the Town is an important contributor to the economic and social stability of the surrounding municipalities and Southwestern Ontario.

Economic drivers in the Study Area primarily include the SMC operation and agricultural uses to the south and west of the landfill site. SMC is a key industry for the Town. The company was founded in 1912 and is now part of a global consortium. As stated in The Town of St. Marys Economic Prosperity Community Improvement Plan (2015), SMC is an anchor business within the Town and the Region, attracting clients throughout the Great Lakes Region. The Town’s economic stability is strengthened by the presence of this industry as well as a strong agricultural sector. As noted in the Town’s Community Improvement Plan, the Town believes that these are two key areas that can be built upon to retain and attract firms from other diverse sectors. These industries are therefore crucial sectors and all potential impacts to these must be considered when determining future developments.

Archaeological and Cultural Heritage Features

There are no known archaeological sites on, or in the vicinity of, the landfill property, according to Town records. Schedule D of the Town's Official Plan identifies a number of Heritage Conservation Sites. None are near the landfill, as shown in Figure 3-3. Additional cultural heritage features may be present and will be studied further should expansion of the St. Marys Landfill be selected as the preferred alternative.

Treaties and Traditional Territory

Indigenous peoples made use of the lands in the Study Area for thousands of years before European contact. The Thames River was of particular importance as a travel and trade route and source of fish. The landfill property has not been used directly by Indigenous communities in recent times; however, its location in close proximity to the Thames River gives it historical significance. Any specific evidence of past use has been erased by current quarry and landfill alternations to the landscape. It can be assumed that the landfill site could have been used for hunting, gathering and/or access to the Thames River. There are no records or evidence of specific occupation by a permanent or seasonal village.

There are no current uses of the landfill property for traditional purposes or resources. However, The Thames River and its banks continue to be used by Indigenous communities for hunting, gathering of traditional and medicinal plants and for spiritual purposes.

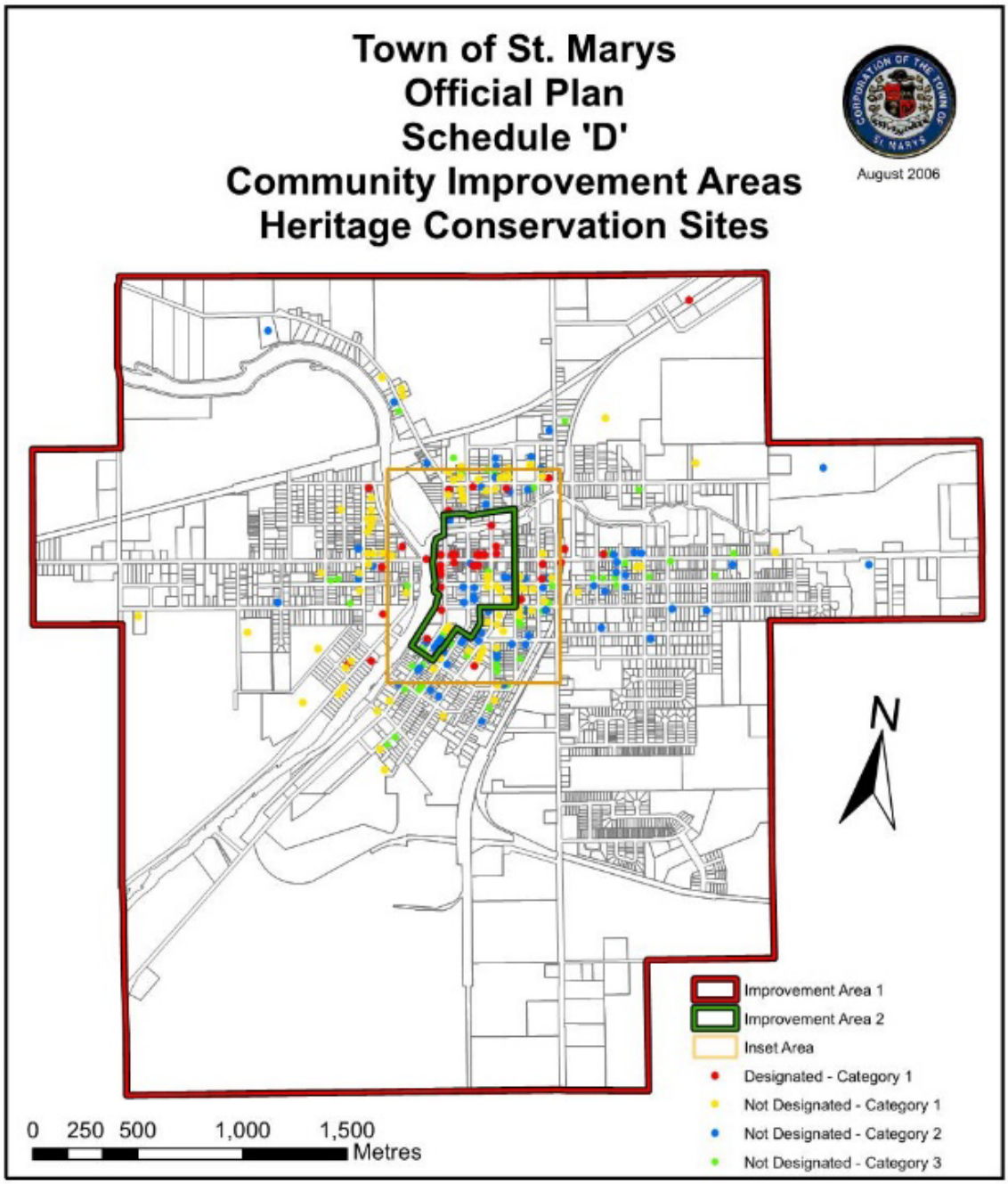
The St. Marys Landfill is within the lands covered by Treaty 29 (1827). The modern signatories to this treaty are:

- Aamjiwnaang First Nation (formerly Chippewas of Sarnia First Nation);
- Caldwell First Nation;
- Chippewas of Kettle & Stoney Point;
- Chippewas of the Thames First Nation; and
- Walpole Island First Nation.

The Haudenosaunee Development Institute (representing the Haudenosaunee Confederacy) and Six Nations of the Grand River also have an interest in the Site due to its location within the area covered by the Nanfan Treaty.

The Indigenous communities listed above are believed to have Indigenous Rights, Treaty Rights, or both, affecting the subject property. However, this list may not be exhaustive.

Figure 3-3: Schedule D of the Town of St. Marys Official Plan



3.7.1.3 Natural Environment

The Thames River is located approximately 250 m to the northwest of the site. An unnamed watercourse runs through the centre of the site and discharges to the Thames River. There is a large, perched culvert along the unnamed watercourse at Water Street, limiting fish migration from the Thames River into the watercourse. The Thames River provides habitat for a Species Concern mussel species, several kilometers downstream of the unnamed watercourse outlet. Farther downstream, additional critical habitat for an Endangered mussel species is also present. The unnamed watercourse provides indirect fish habitat.

As noted, the northeast portion of the landfill property was purchased by the Town from SMC in 2009. The land in this area contains a CK) stockpile from historic SMC operations. The CKD stockpile has been in place for approximately 30 years. The cap and side slopes are well vegetated, and no erosion has been noted. The unnamed watercourse wraps around the south and west sides of the stockpile. Water quality samples from the watercourse since 1985 (as part of the landfill monitoring) have not detected an impact from the landfill or the CKD stockpile. The water quality upstream and downstream is typically similar. Monitoring of benthic invertebrates had been part of the landfill's annual monitoring program until 2008. At that time, it was determined that benthic monitoring would no longer be required because upstream and downstream conditions were similarly impaired and there was no clear value in continuing the program. Details are provided on page 2 of the cover letter to the Town's application to amend the site's Certificate of Approval in 2008. A copy of the letter is provided in Volume IV, Appendix B.

Several small-treed areas and wet depressions are scattered throughout the landfill site. Other natural features on, and around, the site are limited due to the nature of the existing landfill and the historic extraction operations. Some grassland areas are present on inactive and closed landfill cells. These grassland areas may provide habitat for Eastern Meadowlark, a Threatened species. Protection under the ESA applies to grassland habitat for Eastern Meadowlark. Authorization under the ESA (conditional exemptions under O.Reg. 830/21) is required for any impacts to Eastern Meadowlark or its habitat.

Natural woodland areas are present along the Thames River, beyond the Site itself.

Source Water Protection

The St. Marys Landfill is in the Thames-Sydenham & Region Source Protection Area. Mapping supplied by the Upper Thames River Valley Conservation Authority showed that the landfill is not within any Wellhead Protection Areas or Intake Protection Zones for municipal water supplies. There are no Significant Groundwater Recharge Areas mapped on the site. An area in the northeast corner of the landfill site is mapped as

Highly vulnerable Aquifer. This is likely the result of the SMC quarry to the north having removed the protective overburden above the bedrock aquifer during the quarry operation.

The landfill monitoring program includes five residential wells on neighbouring properties. No concerns with drinking water quality have been identified to date by the landfill's monitoring program.

Air Quality

The air quality around the facility is typical of a small landfill. There are 16 residences ("receptors") along the west side of Water Street S. with additional receptors further away to the north and south. To the east, the nearest residential receptors are on James Street South which is more than 1 km from the landfill.

According to landfill records, the residents around the landfill complain about odours infrequently. Road dust is controlled and dust from the working face does not impact the neighbours. All contaminants meet their regulated criteria at the property line, based on annual monitoring report findings.

3.7.2 Twin Creeks Landfill

The existing conditions at the Twin Creeks landfill are shown on Figure 3-4.

This site is operated under Environmental Compliance Approval (ECA) No. A032203. The site's name and address were updated by ECA Notice 24, dated May 24, 2019, to:

Twin Creeks Environmental Centre
5768 Nauvoo Road (Watford)
Warwick Township, County of Lambton

3.7.2.1 Built Environment

The Twin Creek landfill is located outside of the community of Watford. The landfill began operation in 1972. Waste Management of Canada Corporation (WM) has owned and operated the landfill since 1996. In 2008, after a nearly 12-year technical study and public consultation period, the previously named Warwick Landfill was approved for expansion. Construction of the infrastructure for the Expansion Site began in August of 2008 and continued into the fall of 2009. Waste was first deposited into the Expansion Site in November of 2009.

The landfill property is 301 ha with an approved landfilling area of 101.8 ha. The site accepts residential and ICI-related waste from across Ontario. According to the MECP's

Large Landfill Site list [28], The Twin Creeks Landfill was the second largest landfill in Ontario in 2011, with an approved disposal capacity of 26,508,000 m^3.

For comparison, the St. Marys Landfill property is 37 ha (12% of Twin Creeks), the existing waste footprint is 8 ha (8% of Twin Creeks) and the existing approved disposal capacity, including all ECA Notices, is 453,050 m^3 (1.7% of Twin Creeks). The expansion envisioned by this EA would result in a total St. Marys landfill capacity of 1,088,000 m^3 or 4.1% of Twin Creek's capacity.

According to the information provided by Waste Management of Canada Corporation through the private landfill operators survey, described in Section 3.4, the Twin Creeks Landfill includes the following features:

- Full landfill gas collection, including permanent and temporary vertical and horizontal wells. Collection efficiency is estimated at 85%.
- The current landfill gas destruction system is a flare; however, a landfill gas to energy system is in the planning stages.
- Leachate is collected and disposed to willing municipal licensed receivers. There is also seasonal disposal to an onsite poplar plantation.

It is noted that the survey sent to Twin Creeks operators was completed in April 2015. At that time, it was estimated that the landfill had 25 years of capacity remaining. In 2017 the landfill has received an ECA Notice allowing for double its previous fill rate. The Environmental Screening Report [29] completed to support the increased fill rate indicates that the landfill will now reach its approved capacity by 2034 rather than 2047. Thus, at the date of this report, the Twin Creeks Landfill has only 15 years of capacity remaining.

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[28] https://www.ontario.ca/data/large-landfill-sites, data current to October 21, 2011 (accessed October 30, 2019).

[29] Source: http://twincreekslandfill.wm.com/documents/Environmental%20Screening%20Report%20-%20Twin%20Creeks%20Landfill%20Proposed%20Fill%20Rate%20Increase%20(March%202017)%20(1).pdf

ZION LINE

NAUVOO ROAD

Bear Creek / Vankessel Drain

OUR LADY HELP OF CHRISTIANS RC CEMETERY

WATFORD CEMETERY

CONFEDERATION LINE

N

0 150 300 450 600 750

Metres

Sources:

1. Ministry of Natural Resources and Forestry, © Queen's Printer for Ontario.
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Background satellite / air photo circa 2015 obtained from https://www.lambtongis.ca/arcgis_adaptor/rest/services

Legend

- Residence within 120m of Landfill Property
- Property Boundary - 120m Buffer
- Property Boundary
- Watercourse

BURNSIDE

Client: **TOWN OF ST. MARYS**

Figure Title

FUTURE SOLID WASTE DISPOSAL EA

TWIN CREEKS LANDFILL
EXISTING ENVIRONMENT

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File Path: O:\Project\300\032339 (St. Marys)\2022 Solid Waste Disposal EA\032339 Figure 3-4 Twin Creeks Environment.mxd Print Date: 2022/06/05 Time: 05:41 PM

3.7.2.2 Social and Cultural Environment

Land Use and Socio-economic Conditions

Surrounding lands are primarily agricultural with a small number of commercial properties along Nauvoo Road. Two small cemeteries are located to the immediate southwest of the site. There are approximately seven residences within 120 m of the landfill, as shown on Figure 3-4.

According to the information provided by Waste Management of Canada Corporation through the private landfill operators survey, described in Section 3.4.1, the Twin Creeks Landfill has a number of agreements in place to provide benefits to stakeholders, including:

- A Community Host Agreement with Warwick Township;
- Impact Benefit Agreement with Walpole Island First Nation;
- Impact Benefit Agreement with landfill neighbours;
- Property Value Protection; and
- A local liaison committee.

Employment levels at the landfill are unknown.

Archaeological and Cultural Heritage Resources

With the exception of the two cemeteries adjacent to the landfill, the presence of archaeological or cultural heritage resources is unknown. It is assumed that because the landfill has been approved any concerns with archaeological and cultural resources have been addressed.

Treaties and Traditional Territory

Indigenous peoples made use of the lands in the Study Area for thousands of years before European contact. Bear Creek was likely used a travel and trade route and source of fish. The landfill property has not been used directly by Indigenous communities in recent times; however, its location in close proximity to Bear Creek gives it historical significance. Bear Creek and surrounding natural areas may continue to be used by Indigenous communities for traditional purposes.

Similar to the St. Marys Landfill, the Twin Creeks Landfill is also within the lands covered by Treaty 29 (1827). The modern signatories to this treaty are:

- Aamjiwnaang First Nation (formerly Chippewas of Sarnia First Nation);
- Caldwell First Nation;

- Chippewas of Kettle & Stoney Point;
- Chippewas of the Thames First Nation; and
- Walpole Island First Nation.

The Haudenosaunee Development Institute (representing the Haudenosaunee Confederacy) and Six Nations of the Grand River also have an interest in the Site due to its location within the area covered by the Nanfan Treaty.

The Indigenous communities listed above are believed to have Indigenous Rights, Treaty Rights, or both, affecting the subject property. This list may not be exhaustive.

- Traffic Conditions

The landfill is accessed through an entrance off County Road 79. The landfill currently results in 19 landfill-related vehicles per hour travelling along various haul routes. It is assumed that between 1/3 and half of these would travel from the west along Highway 402 to the landfill [30] along a similar route that would be taken by St. Marys waste collectors, should this alternative be selected.

3.7.2.3 Natural Environment

A watercourse, known as the Vankessel Drain runs from the landfill to the west, where it discharges to the Bear Creek system. Current water quality conditions in the Vankessel Drain are not known. Bear Creek is known to provide critical habitat for a number of Endangered mussel species.

There are several large woodlands to the southeast and southwest of the landfill, with portions on the landfill site itself.

Source Water Protection

The Twin Creeks Landfill is located in the Thames-Sydenham and Region Source Protection Area. Mapping for the 2015 Assessment Report shows that the landfill is not within any Wellhead Protection Areas or Intake Protection Zones for municipal water supplies. There is a large Significant Groundwater Recharge Area with a vulnerability score of 2 mapped east of the site and covers the southeastern part of the landfill property.

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[30] Based on a discussion of increased truck traffic in Section 1.3 of the Environmental Screening Report (2017).

It is assumed that some of the neighbouring residences may have individual wells as a potable water source. Impacts to drinking water quality are not known; however, it is assumed that if any concerns have been identified, they have been addressed as required under the landfills' ECA.

Air Quality

According to the Twin Creeks Landfill Emission Summary and Dispersion Modelling (ESDM) Report, dated March 1, 2017 prepared by RWDI as part of an Environmental Compliance Approval (ECA) amendment application, predicted ground level concentrations for the contaminants emitted at the Twin Creeks landfill do not exceed 50% of the MECP criteria and majority are well below 10%. At the time of the ESDM report, there were no odour complaints from the surrounding residents. However, there were several odour related complaints in 2018 and 2019. Once these issues are resolved at the Twin Creeks landfill, an addition of the waste from St. Marys landfill will have little impact on the emissions considering the size of the Twin Creeks landfill.

3.7.3 Haul Route Between St. Marys and the Twin Creeks Landfill

Existing conditions along the haul route were shown on Figure 3-1.

The most likely route to the Twin Creeks facility would follow Hwy 7 to Ailsa Craig then County Road 19 to Hwy 402 with a final turn on County Road 79 S to the waste facility. The route is approximately 79.5 km. Except for the collection routes through the Town of St. Marys, the route noted includes County Roads maintained by Perth and Lambton Counties and Hwy 402, a Provincial highway.

Land Use and Socio-economic Conditions

The route is entirely through rural landscapes with agricultural and agricultural-related businesses being the primary economic driver. A small number of other uses are present (i.e., a golf course, churches, a group home, small businesses and restaurants, bed and breakfast establishments and a campground). The route also passes through the communities of Ailsa Craig and Nairn in the Municipality of North Middlesex.

Archaeological and Cultural Heritage Resources

The presence of any archaeological or cultural heritage resources along the haul route is unknown.

Traffic Conditions

Approximately 389,400 tonnes of waste will require disposal during the 40-year planning period (see Section 3.1.3.7). It is estimated that approximately 90 trucks per week would be required to deliver waste to the Twin Creeks Landfill. BRA's trucks currently travel from their depot in South Huron, to St. Marys, to the St. Marys Landfill and then back to the depot. This is a distance of 36 km if we ignore the collection route and assume the truck does not complete additional collections in St. Marys or in other BRA communities after tipping at the St. Marys Landfill. Delivering to the Twin Creeks Landfill adds 107 km to each collection vehicle's trip. Based on trucking industry estimates [31], at least 21,000 tonnes of CO_2e would be generated; similar [32] to the greenhouse gases emitted by 4,470 cars operated for a year (or 112 cars operated for each year of the EA Planning Period).

Natural Environment

The route crosses the Thames River and a number of other smaller watercourses. Some woodlots and wetlands are present along the route. No Provincially Significant Wetlands, Areas of Natural and Scientific Interest, Conservation Areas or other designated features are present along the route.

Source Water Protection

The haul route begins and ends in the Thames-Sydenham & Region Source Protection Area, with the centre section (from approximately Elginfield to the 402) crossing the Ausable-Bayfield Source Protection Area. The haul route does not cross any Wellhead Protection Areas or Intake Protection Zones. It passes through some Significant Groundwater Recharge Areas.

Air Quality

There are no significant industries along the haul route. Emissions primarily emanate from traffic and agricultural operations in the area. Air quality is typical of Southern Ontario conditions.

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[31] Estimates are based on http://www.equipmentworld.com/owning-and-operating-costs-8 (accessed April 28, 2017), "Guidelines for Measuring and Managing CO2 Emission from Freight Transport Operations", Cefic and ECTA, March 2011, and http://data.ec.gc.ca/data/substances/monitor/canada-s-official-greenhouse-gas-inventory/Emission_Factors.pdf (accessed November 4, 2019).

[32] https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references (accessed November 4, 2019).

3.8 Evaluation of the Net Effects of the Alternatives to the Undertaking

The evaluation of *Alternatives to the Undertaking* is summarized in the following sections.

3.8.1 Evaluation Criteria

The TOR identified the environmental components and criteria that could be used in both the evaluation of Alternatives To and the evaluation of Alternative Methods. The TOR specifically noted that the *Alternatives to the Undertaking* will be subject to a qualitative screening based on the following criteria:

- Natural Environment, including:
  - Atmosphere (air quality, odour, noise, etc.);
  - Geology and hydrogeology;
  - Surface water (quality and quantity); and
  - Biology (terrestrial, aquatic).
- Cultural Environment [33], including:
  - Archaeological resources;
  - Built Heritage; and
  - Cultural Heritage Landscapes.
- Socio-Economic Environment:
  - Transportation routes;
  - Land use;
  - Employment effects;
  - Economic conditions (local business with a direct link to the landfill or its operations); and
  - Aesthetics/Enjoyment of life.
- Indigenous Connections to the Land:
  - Traditional uses;
  - Historical uses;
  - Land claims/treaty rights/Indigenous rights; and
  - Other areas of interest.
- Financial Factors:
  - Capital costs; and
  - Operational and maintenance costs.

[33] Criteria listed in the TOR were “Buildings, Viewscapes and Archaeological Resources”. Criteria were changed upon advice from MTCS (Now MHSTCI).

- Technical Factors:
  - Technical ability to carry out each alternative.

Detailed indicators and evaluation metrics were not identified in the TOR as the assessment was intended to primarily be a high-level, qualitative screening, based only on information from existing data sources and information to be gathered through a short survey. As such, a qualitative discussion regarding each of the above noted criteria is provided in the following sections. The evaluation considers impacts under current conditions (i.e., baseline) and the net effects of the "Do Nothing" Alternative. Alternatives 1 and 2 are then compared to the Do Nothing Alternative based on a qualitative description of the number of post-mitigation impacts of high magnitude, long duration, repetitive frequency and which have a limited chance to be reversed. These net effects are then compared using the following descriptors:

- **Preferred** – preferred over the Do Nothing Alternative.
- **Somewhat preferred** – somewhat preferred over the Do Nothing Alternative.
- **Equally preferred** – equally preferred to the Do Nothing Alternative.
- **Somewhat less preferred** – somewhat less preferred than the Do Nothing Alternative.
- **Less preferred** – less preferred than the Do Nothing Alternative.

The preferred alternative overall is the Alternative that was identified based on the sum of the rankings in each category. No criteria were given greater weight or significance than others.

The qualitative screening is provided in the following sections.

3.8.2 Natural Environment

3.8.2.1 Potential Impacts to Atmosphere

Potential impacts to the atmosphere, including impacts associated with air quality, dust, odour, and noise are as follows:

Alternative 1: Expand the St. Marys Landfill:

- With the alternative to expand the St. Marys landfill, the quantity and rate of waste to be landfilled will not change in the short-term. As population increases over the next 40 years, some additional increase in waste is expected as a result of population growth. As such, emissions and noise are not expected to increase in the short-term and will increase minimally in the long-term. Thus, greenhouse gas emissions as well as other MNOCs, dust and particulates are expected to be maintained at current levels which cause few complaints and meet regulatory criteria. There have been no noise complaints recorded in the Annual Monitoring reports for 2013 through 2018

(inclusive). A single noise complaint was received in 2019 according to Town records. Although there may be a minimal increase in noise and dust during the construction period associated with the expansion, noise impacts overall are expected to be minimal.

- Current air quality and odour conditions at the St. Marys Landfill are below acceptable limits set by the Province. As the rate of waste disposal will only minimally increase in the future, this is not expected to change. There are approximately 16 residences in proximity to the St. Marys Landfill. There have been occasional odour and dust complaints in recent years. As time progresses, the working face will move eastward, away from the residents on Water Street S., so the number of complaints is expected to decrease.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- The atmosphere in the vicinity of the St. Marys Landfill environment will have fewer emissions, dust, odour, and noise than current conditions. However, ongoing emissions from the adjacent aggregate industries may limit this improvement. Similarly, ongoing use for public waste drop-off and composting at the St. Marys Landfill site may further limit any improvements. There will be a minor short-term increase in work on the site associated with closure of the St. Marys Landfill. This work is not expected to increase dust or noise levels significantly.
- Hauling waste from St. Marys to Twin Creeks will add an additional 160 km roundtrip travel for each collection vehicle (90 vehicles per week). Approximately 1/3 of the trip would be along Hwy 402. Impacts to air emissions along the highway would be negligible. The remaining 2/3 of the trip would be along County and local roads through rural communities and landscapes. The additional traffic along these routes would contribute to a minor increase in emissions from current conditions.
- The waste from St. Marys is a relatively small volume compared to the total amount of waste received by Twin Creeks. This amount will not significantly change operations at Twin Creeks and emission, odour and noise levels in the vicinity are not expected to change by any perceptible amount.
- No landfill gas (LFG) collection system is currently in place at the St. Marys Landfill, and one is not expected to be constructed as part of the expansion. An LFG collection system is in place at Twin Creeks, collecting approximately 85% of the LFG. Thus, this Alternative will result in lower emission of landfill gases relative to Alternative 1.
- The Twin Creeks Landfill has experienced an increased number of complaints associated with odour since the landfill received approval to increase its fill rate in 2017. The addition of waste form St. Marys is not expected to result in an increased number of complaints.

In summary, impacts to the atmosphere are expected to be minimal as a result of both Alternatives 1 and 2.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- Both landfills have operational plans in place to manage dust, odours, and noise. It is expected that these plans would be continued should either alternative be selected.
- All haul trucks would be expected to be maintained in good working conditions and to haul full loads to the extent possible to minimize vehicle emissions and vehicle-related noise associated with hauling waste to Twin Creeks.
- Construction activities associated with expanding or closing the St. Marys Landfill would occur during business hours only, respecting the Town's noise by-laws.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), air quality and odour across the Study Area (i.e., at St. Marys Landfill, Twin Creeks Landfill and haul route in between) are within provincially set limits.

No changes from baseline conditions are expected with the Do Nothing option.

Under Alternative 1: Expand the St. Marys Landfill, net effects after mitigation include:

- Ongoing emission of landfill gases.
- Minor emission of dust, odour, and noise associated with St. Marys Landfill operations within acceptable provincially-set limits.
- Minor emission of dust and noise during construction of the landfill expansion.

Under Alternative 2: Export Waste to the Twin Creeks Landfill, net effects after mitigation include:

- Ongoing emission of a relatively small amount of landfill gases that escape the LFG collection system.
- Minor emission of dust, odour and noise associated with Twin Creeks Landfill operations within acceptable provincially-set limits.
- Emissions from vehicles used to haul waste from St. Marys to the Twin Creeks Landfill.
- Minor emission of dust and noise during closure of the St. Marys Landfill.

The magnitude, frequency, duration, and reversibility of these net effects are summarized in Table 3-8.

Table 3-8: Net Effects to the Atmosphere

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Magnitude	Low/Moderate – Air emissions and odour emitted at levels below provincial limits; however, no greenhouse gas collection system is in place. This alternative has lower vehicle related emissions compared to Alternative 2 and fewer receptors potentially affected. Noise levels are below provincial limits. Construction activities will add to current noise levels.	Low – Air emissions and odour emitted at levels below Provincial limits with landfill gas emission reduced through the site's flaring system. Truck emissions along haul routes create a minor increase in air emissions. Noise levels are below provincial limits. Additional truck traffic along haul routes creates a minor increase in noise in addition to a minor increase associated with work to close the St. Marys Landfill.
Duration	Long-term – Contaminants, greenhouse gases, dust, and odour will be emitted for the full duration of the 40-year planning period and beyond. Noise will be created for the full duration of the 40-year planning period and beyond. Construction-related noise will occur in the short-term only as new cells are developed in the landfill	Long-term – Contaminants, greenhouse gases, dust, and odour will be emitted for the full duration of the 40-year planning period and beyond. Noise will also be created for the full duration of the 40-year planning period and beyond.
Frequency	Continuous – Emissions from landfilling will be continuous while emission from truck traffic will be repetitive during business hours. Noise from landfilling activities will be continuous during business hours.	Continuous – Emissions from landfilling will be continuous while emission from truck traffic will be repetitive during business hours. Noise from landfilling and hauling activities will be continuous during business hours.

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Reversibility	Non-reversible – Some impacts associated with contaminants and odour can be reversed once landfilling has ceased. Other emissions such as methane will continue for some time beyond the closure of the landfill. Effects associated with noise are reversible immediately upon ceasing landfilling and hauling activities.	Non-reversible – Some impacts associated with contaminants and odour can be reversed once landfilling has ceased. Other emissions such as methane will continue for some time beyond the closure of the landfill. Effects associated with noise are reversible immediately upon ceasing landfilling and hauling activities.
Preference Relative to the Do Nothing Alternative	Equally Preferred	Preferred

3.8.2.2 Potential Impacts to Geology and Hydrogeology

Potential impacts to geology and hydrogeology are as follows:

Alternative 1: Expand the St. Marys Landfill:

- Leachate is created as a result of landfilling activities. Leachate from an expanded landfill would be collected and disposed to the Town's sanitary sewer system and treated at the Town's wastewater treatment plan. The current leachate collection system at the St. Marys Landfill is effective and it is expected that an expansion of the system would continue to appropriately manage leachate. No significant impacts to groundwater quality are expected.
- As discussed in Section 3.7, there is a CKD stockpile in the northwestern corner of the St. Marys Landfill property from historic SMC operations. There appears to be sufficient acreage at the St. Marys landfill property to expand the landfill without directly affecting the CKD pile. There is potential that the small watercourse through the site may need to be relocated to accommodate a landfill expansion. If the watercourse needs to be relocated, some work in proximity to the CKD pile may be required. There is some risk that disturbing the pile could release contaminants into ground and surface water. However, channel relocation also offers the opportunity to improve conditions, separating the channel from potential impacts from the CKD stockpile and the landfill, and creating a more robust buffer to filter surface runoff to the watercourse.
- The St. Marys Landfill is not within any Wellhead Protection Areas or Intake Protection Zones, and therefore, there will be no impacts to municipal drinking water sources. There are a number of residents who received potable water from individual wells. Regular groundwater monitoring has not identified concerns with drinking water quality in neighbouring wells. The current leachate collection system at the St. Marys Landfill is effective and it is expected that an expansion of the system would continue to appropriately manage leachate. Monitoring will be ongoing. No significant impacts to groundwater quality or drinking water are expected.
- The potential for spills is similar to current conditions. Spills are possible if the leachate collection system fails.
- The geology of the area is not expected to be affected. The aggregate extraction licence held by SMC has been relinquished and there are no aggregate resources present on the landfill property.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- With closure of the St. Marys Landfill, the existing leachate system will continue to be in place and maintained in accordance with all provincial requirements. Over time, it

is expected that the leachate strength and production will decline as no further waste is disposed and the fill areas are capped.

- With respect to the Twin Creeks Landfill, leachate is collected and disposed to willing municipal licensed receivers. There is also seasonal disposal to an on-site poplar plantation. It is assumed that the leachate collection system functions properly in accordance with provincial requirements.
- The Twin Creeks Landfill is not within any Wellhead Protection Areas or Intake Protection Zones and the landfill is not a threat to municipal drinking water sources.
- There is some potential for spills during the transport of the St. Marys waste along the haul route. There is also potential for spills at the Twin Creeks landfill, should the leachate collection system fail or potential for spills related to vehicle accidents in moving leachate to area municipalities for treatment.
- No significant geology or aggregate resources are present at the Twin Creeks landfill site and no impacts to geology are expected.

Mitigation

Mitigation can be applied to minimize effects, including the following:

- Both landfills have leachate monitoring, collection, and treatment systems in place as well as spill response plans and emergency procedures.
- With expansion of the St. Marys Landfill, a new leachate collection system will be installed with consideration to the existing infrastructure. An expanded monitoring program to take in account expansion areas will also be developed.
- A plan to manage and monitor the CKD stockpile will be developed should work be required in its vicinity. Any work in its vicinity will include measures to minimize contaminants from the stockpile reaching surface or groundwater.
- It is not expected that any additional mitigation will be required at the Twin Creeks Landfill beyond existing measures.
- All haul trucks would be expected to have appropriate equipment to properly manage the waste load. Drivers must be trained in spill response procedures in accordance with regulations.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), impacts to geology and hydrogeology are managed at both landfills, primarily through leachate collection and treatment.

No changes from baseline conditions are expected with the Do Nothing option.

Under Alternative 1: Expand the St. Marys Landfill, net effects after mitigation include:

- Minor potential for leachate spills and groundwater contamination on the landfill property.
- Minor potential for unexpected release of contaminants from the CKD pile, if disrupted.

Under Alternative 2: Export Waste to the Twin Creeks Landfill, net effects after mitigation include:

- Minor potential for leachate spills and groundwater contamination on the landfill property.
- Minor potential for spills along the haul route with low potential to contaminate groundwater resources.

The magnitude, frequency, duration, and reversibility of these net effects are summarized in Table 3-9.

Table 3-9: Net Effects to Geology and Hydrogeology

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Magnitude	Low – Effects on groundwater are expected to comply with all provincial requirements. The risk is low with appropriate spill prevention and response measures in place. Risks associated with the CKD pile can be reduced.	Low – Effects on groundwater are expected to comply with all provincial requirements. There is potential for spills along the haul route and at the landfill. The risk is low with appropriate spill prevention and response measures in place.
Duration	Short/Long-term – Spills occur in the short-term. There is potential for longer term effects from leachate spills at the site.	Short/Long-term – Spills occur in the short-term. There is potential for longer term effects from leachate spills at the site.
Frequency	Rarely – Spills are not expected to occur.	Rarely – Spills are not expected to occur. There is a slightly higher risk with the length of travel required to transport waste.
Reversibility	Generally Reversible – Any spills will be cleaned up in accordance with provincial requirements. There is potential for longer term effects that are not immediately reversible from leachate spills at the site.	Generally Reversible – Any spills will be cleaned up in accordance with provincial requirements. There is potential for longer term effects that are not immediately reversible from leachate spills at the site.
Preference Relative to the Do Nothing Alternative	Equally Preferred	Equally Preferred

3.8.2.3 Potential Impacts to Surface Water

Potential impacts to surface water (quality and quantity) are as follows:

Alternative 1: Expand the St. Marys Landfill:

- An unnamed watercourse is present on the St. Marys landfill property site. The watercourse discharges to the Thames River. Surface water runoff from the landfill site could cause contaminants to enter both watercourses.
- With the option to expand the St. Marys landfill, the watercourse may need to be relocated. Construction could negatively affect water quality; however, channel relocation also offers the opportunity to improve conditions, separating the channel from potential impacts from the CKD stockpile and the landfill, and creating a more robust buffer to filter surface runoff to the watercourse.
- The potential for spills is similar to current conditions. Spills to surface water features are possible if the leachate collection system fails.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- The Van Kessel Drain flows through the Twin Creeks landfill property, discharging to Bear Creek. Surface water runoff from the landfill site could cause contaminants to enter both watercourses.
- There is some potential for spills during the transport of the St. Marys waste along the haul route. There is also potential for spills at the Twin Creeks landfill, should the leachate collection system fail.
- With closure of the St. Marys Landfill, there will be no new inputs that could potentially affect surface water quality in the unnamed watercourse. Water quality in the unnamed watercourse is minimally affected by the landfill. Water quality conditions are similar both upstream and downstream of the site. Therefore, water quality is not expected to improve significantly with closure of the landfill.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- Both landfills have stormwater management systems in place as well as spill response plans and emergency procedures. At both landfills, the stormwater systems discharge to the watercourse flowing through the sites.

- With expansion of the St. Marys Landfill, a new stormwater management system will be constructed with consideration to the existing infrastructure. An expanded monitoring program to take in account expansion areas will also be developed. A plan to manage and monitor the CKD pile will be developed should work be required in its vicinity. Any work in its vicinity will include measures to separate the CKD pile from surface water systems.
- It is not expected that any additional mitigation will be required at the Twin Creeks Landfill beyond existing measures.
- With export to the Twin Creeks Landfill, all haul trucks would be expected to be equipped with appropriate equipment to properly manage the waste load. Drivers should be trained in spill response procedures.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), impacts to surface water are managed at both landfills, primarily through stormwater management systems and leachate collection and treatment.

No changes from baseline conditions are expected with the Do Nothing option.

Under Alternative 1: Expand the St. Marys Landfill, net effects after mitigation include:

- Minor potential for stormwater management and leachate spills to surface water on the landfill property.
- Minor potential for unexpected release of contaminants from the CKD pile, if disrupted.

Alternative 2, Export Waste to the Twin Creeks Landfill net effects after mitigation include:

- Minor potential for stormwater management and leachate spills to surface water on the landfill property.
- Minor potential for spills along the haul route with low potential to contaminate surface water resources.

The magnitude, frequency, duration, and reversibility of these net effects are summarized in Table 3-10.

Table 3-10: Net Effects to Surface Water

	Alternative 1: Expand the St. Marys Landfill	Alternative 2: Export Waste to the Twin Creeks Landfill
Magnitude	Low – Effects on surface water are expected to comply with all provincial requirements. The risk is low with appropriate spill prevention and response measures in place. Risks associated with the CKD pile can be reduced.	Low – Effects on surface water are expected to comply with all provincial requirements. There is potential for spills along the haul route and at the landfill. The risk is low with appropriate spill prevention and response measures in place.
Duration	Short/Long-term – Spills occur in the short-term. There is potential for longer term effects from leachate spills at the site.	Short/Long-term – Spills occur in the short-term. There is potential for longer term effects from leachate spills at the site.
Frequency	Rarely – Spills are not expected to occur.	Rarely- Spills are not expected to occur. There is a slightly higher risk with the length of travel required to transport waste.
Reversibility	Generally Reversible – Any spills will be cleaned up in accordance with provincial requirements. There is potential for longer term effects that are not immediately reversible from leachate spills at the site.	Generally Reversible – Any spills will be cleaned up in accordance with provincial requirements. There is potential for longer term effects that are not immediately reversible from leachate spills at the site.
Preference	Equally Preferred	Equally Preferred

3.8.2.4 Potential Impacts to Biology

Potential impacts to biology (terrestrial and aquatic) are as follows:

Alternative 1: Expand the St. Marys Landfill:

- There are very few natural features present on the St. Marys landfill property. A small number of surface depressions provide wetland conditions. The unnamed watercourse provides indirect fish habitat. Some grassland areas are present on inactive and closed landfill cells. These grassland areas provide habitat for Eastern Meadowlark, a Threatened species. Expansion may result in the loss of the small wetlands and some grassland areas. Protection under the ESA applies to grassland habitat for Eastern Meadowlark. Authorization under the ESA (conditional exemptions O.Reg. 830/21) is required for any impacts to Eastern Meadowlark or its habitat.
- The unnamed watercourse runs through the center of the landfill property and may need to be relocated. This watercourse provides indirect fish habitat. Relocation will affect the watercourse temporarily but also offers opportunity for habitat improvements. Downstream impacts to the Thames River are possible.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- The Van Kessel Drain flows through the Twin Creeks landfill property. Water quality and fish habitat conditions are unknown. The addition of St. Marys' waste would not significantly change this habitat and no Species at Risk would be affected by this alternative.
- Several wooded areas are present around the landfill. It is not expected that any will be affected beyond existing conditions as a result of accepting St. Marys' waste.
- Several watercourses and wooded areas are present along the haul route. Any spills or blowing waste could negatively affect these natural areas.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- As stated above, authorization under the ESA (conditional exemptions under O.Reg. 830/21) is required for any impacts to Eastern Meadowlark or its habitat. Compensation in the form of new grassland habitat will either be created elsewhere in accordance with the ESA Regulations, or a species conservation charge can be paid to the Species at Risk Conservation Trust (effective April 29, 2022).
- Any work associated with the unnamed watercourse on the St. Marys property will include measures to improve aquatic habitat. Any trees removed can be replaced with new plantings around the landfill edges or in other locations with the goal of improving the Town's overall natural heritage system.

- No mitigation would be required for the option to export waste to Twin Creeks.
- All haul trucks would be expected to be equipped with appropriate equipment to properly manage the waste load. Drivers should be trained in spill response procedures.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), terrestrial and aquatic features are limited at both the St. Marys and Twin Creeks Landfills. Aquatic habitat in the unnamed watercourse at the St. Marys Landfill is poor and much of the site has been previously disturbed. Habitat features are limited.

No changes from baseline conditions are expected with the Do Nothing option.

Under Alternative 1: Expand the St. Marys Landfill, net effects after mitigation include:

- Minor loss of potential species at risk grassland habitat, wetlands, and trees. Loss will only be temporary until compensation plantings mature. Opportunities to improve aquatic habitat are present.

Under Alternative 2: Export Waste to the Twin Creeks Landfill, net effects after mitigation include:

- No net effects to biological systems are expected.

The magnitude, frequency, duration and reversibility of these net effects are summarized in Table 3-11.

Table 3-11: Net Effects to Biology

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Magnitude	Low – Effects to species at risk grassland habitat, wetlands and trees will be minor given compensation measures. Opportunities to improve aquatic habitat are present.	N/A – No net effect anticipated.
Duration	Short-term – There is a short time in which compensation plantings need time to grow in order to return to similar or better conditions than those lost.	N/A – No net effect anticipated.
Frequency	Once – Habitat is expected to be lost once during construction.	N/A – No net effect anticipated.

	Alternative 1: Expand the St. Marys Landfill	Alternative 2: Export Waste to the Twin Creeks Landfill
Reversibility	Reversible – Habitat loss is reversible with appropriate habitat creation and plantings elsewhere.	N/A – No net effect anticipated.
Preference Relative to the Do Nothing Alternative	Somewhat Less Preferred	Preferred

3.8.3 Cultural Environment

3.8.3.1 Potential Impacts to Archaeological Resources

Potential impacts to archaeological resources are as follows:

Alternative 1: Expand the St. Marys Landfill:

- Based on the history of the landfill property and Town records, no archaeological resources are known to be present at, or in the vicinity of, the St. Marys Landfill site. The site was quarried by SMC between 1912 and 1977. Given the existing disturbance at the site and from the industrial operations in the vicinity, no effects are anticipated. Further studies will be completed at the next stage in the EA process, if required, to confirm this assumption.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- No effects to archaeological resources in St. Marys or along the haul route are expected.
- Two cemeteries are present near the Twin Creeks Landfill. No changes are expected to the footprint of the Twin Creeks Landfill thus no impacts are expected.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- Although no archaeological resources are likely to be present at, or around, the St. Marys landfill, further study will be undertaken at the next stage in the EA process, including completion of a Stage 1 Archaeological Assessment (and further assessments, if recommended) by a licensed archaeologist. If resources are identified, mitigation will be developed in accordance with the *Ontario Heritage Act*.
- No mitigation is expected to be required in association with the option to export waste to Twin Creeks.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), archaeological resources are unknown or unaffected by landfilling activities at both the St. Marys and Twin Creeks sites.

No changes from baseline conditions are expected with the Do Nothing option.

No net effects to archaeological resources are anticipated as a result of either Alternative 1 or 2.

Both Alternatives are equally preferred.

3.8.3.2 Potential Impacts to Built Heritage

Potential impacts to Built Heritage are as follows:

Alternative 1: Expand the St. Marys Landfill:

- According to the Town's Official Plan, no Built Heritage features are present at, or in the vicinity of, the St. Marys Landfill. A such, no effects are anticipated.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- No known Built Heritage resources are present in the vicinity of the Twin Creeks Landfill. A such, no effects are anticipated.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- Although no Built Heritage resources were identified to be present at, or around, the St. Marys Landfill, further study will be undertaken at the next stage in the EA process, including a Cultural Heritage Resource Assessment. If resources are identified, mitigation will be developed in accordance with the *Ontario Heritage Act*.
- No mitigation is expected to be required in association with the option to export waste to Twin Creeks.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), Built Heritage resources are unknown or unaffected by landfilling activities at both the St. Marys and Twin Creeks sites.

No changes from baseline conditions are expected with the Do Nothing option.

No net effects to Built Heritage resources are anticipated as a result of either Alternative 1 or 2.

Both Alternatives are equally preferred.

3.8.3.3 Potential Impacts to Cultural Heritage Landscapes

Potential impacts to Cultural Heritage Landscapes are as follows:

Alternative 1: Expand the St. Marys Landfill:

- According to the Town's Official Plan, no Cultural Heritage Landscapes are present at, or in the vicinity of, the St. Marys Landfill. A such, no effects are anticipated.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- No known Cultural Heritage Landscapes are present in the vicinity of the Twin Creeks Landfill. As such, no effects are anticipated.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- Although no Cultural Heritage Landscapes are likely to be present at, or around, the St. Marys Landfill, further study will be undertaken at the next stage in the EA process, including completion of a Cultural Heritage Resource Assessment. If resources are identified, mitigation will be developed in accordance with the *Ontario Heritage Act*.
- No mitigation is expected to be required in association with the option to export waste to Twin Creeks.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), Cultural Heritage Landscapes are unknown or unaffected by landfilling activities at both the St. Marys and Twin Creeks sites.

No changes from baseline conditions are expected with the Do Nothing option.

No net effects to Cultural Heritage Landscapes are anticipated as a result of either Alternative 1 or 2.

Both Alternatives are equally preferred.

3.8.4 Socio-Economic Environment

3.8.4.1 Potential Impacts to Transportation Routes

Potential impacts to transportation routes are as follows:

Alternative 1: Expand the St. Marys Landfill:

- With expansion of the St. Marys Landfill, the number of curbside collection trucks and travel routes through St. Marys will not change in the short-term. The population of St. Marys is expected to grow nearly 62% over the 40-year planning period. Waste generation is anticipated to grow at a similar rate. Although there is likely some available capacity within the trucks currently used for the collection of waste, it is assumed this additional waste will require each truck to make more collection trips and/or additional collection trucks will be needed.
- Some minor changes in collection routes through St. Marys may be required over time to accommodate the growth in waste disposal due to population, though overall these changes are considered minor.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- Some minor changes in collection routes through St. Marys may be required over time to accommodate the growth in waste disposal due to population, though overall these changes are considered minor.
- Travel to Twin Creeks will add an additional 160 km roundtrip travel for each collection vehicle. This distance (travel-time) will limit the number of trips that a single truck can make per day. Additional trucks (and crew) may be required as a result.
- Approximately 1/3 of the trip would be along Hwy 402. Impacts to traffic along the highway would be negligible. The remaining 2/3 of the trip would be along County and local roads through rural communities and landscapes. The additional traffic along these routes would represent a minor increase from current conditions.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- In all cases, trucks will be maintained in good working order and will haul full loads to the extent possible to make efficient use of each vehicle trip.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), the curbside collection vehicle collect St. Marys' residential waste and take it directly to the landfill. Waste collection and hauling vehicles associated with the Twin Creeks Landfill arrive from

various locations across southern Ontario, including along the route that would be taken by St. Marys waste collectors if that alternative is selected.

No changes from baseline conditions are expected with the Do Nothing option.

Under Alternative 1: Expand the St. Marys Landfill, net effects after mitigation include:

- No net effects to transportation routes are expected.

Under Alternative 2: Export Waste to the Twin Creeks Landfill, net effects after mitigation include:

- There will be a minor increase in truck traffic along the haul route between St. Marys and the Twin Creeks Landfill.

The magnitude, frequency, duration and reversibility of these net effects are summarized in Table 3-12.

Table 3-12: Net Effects to Transportation Routes

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Magnitude	N/A – No net effect anticipated.	Low – There will be an increased number of trucks travelling the route between St. Marys and the Twin Creeks Landfill. Effects on roadways and traffic conditions will be minimal.
Duration	N/A – No net effect anticipated.	Long-term – The increase in truck traffic will be ongoing over the planning period.
Frequency	N/A – No net effect anticipated.	Repeatedly – Truck travel will occur on a daily basis during business hours.
Reversibility	N/A – No net effect anticipated.	Reversible – Once truck traffic is suspended at the end of the planning period, any impacts to roadways and traffic conditions will be removed.
Preference Relative to the Do Nothing Alternative	Equally Preferred	Less Preferred

3.8.4.2 Land Use

Potential impacts to land use are as follows:

Alternative 1: Expand the St. Marys Landfill:

- The St. Marys Landfill property zoned for landfill uses. Adjacent extractive industrial and agricultural uses are compatible with landfill uses. No changes to the St. Marys Zoning bylaw or Official Plan designations are required to expand the landfill.
- The Township of Perth South lies adjacent to the western and southern boundaries of the landfill. The Township does not have its own Official Plan and, instead, defers to the County of Perth Official Plan. According to Schedule A of the Perth County Official Plan, lands to the immediate south and east are designated as Licensed Quarry Pit/Limestone Resource and Agricultural Lands with a small amount of Natural Resources/Environment adjacent to the Thames River. A small number of residences are located on the east side of Water Street South, immediately adjacent to the landfill. These residential areas may experience nuisance effects from noise, dust, odour and blowing litter. Disposal rates and operational practices are not expected to change after the expansion. Therefore, nuisance effects are expected to be similar to current conditions. As noted in Section 3.8.2.1, noise complaints under existing conditions have been very limited and air quality and odour levels are below provincial standards.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- The Twin Creeks Landfill is also currently properly designated and zoned. Adjacent uses to the Twin Creeks Landfill are also generally compatible; however, there are several more sensitive uses such as the two cemeteries and several businesses along Nauvoo Road in Watford that may be more sensitive to the landfill use. This alternative would not change this land use or how adjacent land uses experience the landfill.
- This alternative would allow for the closure of the existing St. Marys Landfill. Given the location of the St. Marys Landfill adjacent to extractive industry, and post-closure monitoring required, alternative uses for this site are very limited. Surrounding residential uses in the vicinity of the St. Marys Landfill may experience improved conditions; however, some activities such as composting and local waste drop-off are likely to continue at the site. The site will likely remain partially vacant or underutilized.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- Standard operational measures to minimize noise, dust, odour, blowing litter and other nuisance effects which can impact adjacent residential areas.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), lands uses adjacent to the landfill are generally compatible and include aggregate extraction, agriculture and a small number of rural residences.

No changes from baseline conditions are expected with the Do Nothing option.

Under Alternative 1: Expand the St. Marys Landfill, no net effects beyond baseline conditions are expected. Nuisance effects will be managed.

Under Alternative 2: Export Waste to the Twin Creeks Landfill, net effects after mitigation include:

- Lands owned by the Town adjacent to the existing landfill have limited use in the future, given surrounding extraction activities and existing landfill. These lands will have no benefit to the Town and will become unusable vacant lands.

The magnitude, frequency, duration and reversibility of these net effects are summarized in Table 3-13.

Table 3-13: Net Effects to Land Use

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Magnitude	N/A – No net effect anticipated.	Moderate – Lands owned by the Town adjacent to the existing St. Marys Landfill have limited use in the future, given surrounding extraction activities and existing landfill.
Duration	N/A – No net effect anticipated.	Long-term – There will be few alternative uses for the lands in St. Marys in the long-term.
Frequency	N/A – No net effect anticipated.	Ongoing – Lands in St. Marys will be vacant on an ongoing basis into the future.

	Alternative 1: Expand the St. Marys Landfill	Alternative 2: Export Waste to the Twin Creeks Landfill
Reversibility	N/A – No net effect anticipated.	Irreversible – Previous and existing landfilling means the land use in St. Marys cannot be changed to an alternate land use in the near future.
Preference Relative to the Do Nothing Alternative	Preferred	Less Preferred

3.8.4.3 Employment Effects

Potential impacts to current employment levels are as follows:

Alternative 1: Expand the St. Marys Landfill:

- With expansion of the St. Marys Landfill, no change in employment related to the ongoing operation of the landfill is expected. The landfill will continue to employ one full-time position, one part-time position and six staff who work occasionally, as required.
- Some additional jobs may be created during the initial construction phase.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- With the export of waste to Twin Creeks, jobs for current St. Marys Landfill operators will be lost. These jobs tend to be filled by those living locally and who contribute to the Town's local economy. This likely will result in the loss of one full-time position and one part-time position. It is assumed that the occasional staff will be maintained to carry out their additional responsibilities. Some staff may still be required to oversee any ongoing composting and household waste drop-off that may remain at the site.
- Under this Alternative, waste will be picked up and transported directly to the private landfill. Thus, there would be a small number of additional driver/collection jobs or increased hours for waste collection staff given the increased distance to the disposal site. These jobs are unlikely to be filled by St. Marys residents. The current waste collection contractor, Bluewater Recycling Association (BRA), is based in South Huron, Ontario. There are no waste collection contractors currently based in St. Marys.
- The quantity of St. Marys waste is unlikely to require additional staff at the Twin Creeks Landfill.

Mitigation

No mitigation is proposed.

Net Effects

Under baseline conditions, the landfill employs one full-time position, one part-time position and six staff who work occasionally at the site (see Section 3.7.1), as required.

Under the Do Nothing option, the landfill will be closed. Therefore, the site's current employees (two full-time and one part-time) will not be required as these positions will be eliminated. However, as noted in Table 3-14, these employees may find new positions elsewhere.

Under Alternative 1: Expand the St. Marys Landfill, net effects after mitigation include:

- No changes to employment at the landfill are expected.
- Some additional short-term employment may be created as a result of the expansion construction work.

Under Alternative 2: Export Waste to the Twin Creeks Landfill, net effects after mitigation include:

- Loss of one full-time position and potentially other part-time or occasional positions.

The magnitude, frequency, duration, and reversibility of these net effects are summarized in Table 3-14.

Table 3-14: Net Effects on Employment

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Magnitude	Low – Net benefit from increase in short-term construction jobs.	Low – A minimal number of jobs may be lost. Staff may be able to be shifted to new positions elsewhere.
Duration	Short-term – Expansion construction jobs to be added only during construction.	Long-term – Landfill operator jobs will be lost in the long-term.
Frequency	Infrequently – Expansion will be constructed in phases (landfill cells) with new cells added as older cells are filled. Therefore, construction jobs will be added on a short-term	Once – Landfilling jobs will be lost once as the landfill closes.

	Alternative 1: Expand the St. Marys Landfill	Alternative 2: Export Waste to the Twin Creeks Landfill
	basis over several expansion periods.	
Reversibility	Reversible – Employment needs may change over the 40-year operational period and can be revised, as necessary.	Irreversible – Once the landfill is closed landfill operating jobs will not be reopened.
Preference Relative to the Do Nothing Alternative	Somewhat Preferred	Less Preferred

3.8.4.4 Economic Conditions

Potential impacts to current economic conditions are as follows:

Alternative 1: Expand the St. Marys Landfill:

- Under baseline conditions, some businesses in St. Marys are serviced under the Town's waste collection system. These businesses pay relatively low rates for waste collection. With expansion of the St. Marys Landfill, local businesses which are currently serviced by BRA with drop-off at the St. Marys Landfill will be able to continue to use this service. Town staff have indicated a strong belief that the landfill is an important factor in maintaining a strong business and industrial sector in the Town.
- Private waste collectors service some of the remainder of the St. Marys business community. Most of these private waste collectors use the St. Marys Landfill as a disposal location. They will be able to continue to dispose of waste at the St. Marys Landfill at similar cost. Excluding inflation, changes in regulatory, labour or market conditions – which are likely to affect all disposal alternatives, there are no changes to costs or methods of disposing of waste for businesses expected.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- With the option to export waste to Twin Creeks, the contract with BRA for curbside collection services will need to be renegotiated. Businesses currently served by BRA and the St. Marys Landfill may or may not continue to be serviced under a new contract, subject to additional costs associated with the longer travel distance. As such, some businesses may need to transfer their collection service to a private waste collector. Costs to these businesses are likely to increase. Town staff believe this could result in some business hardships, closures or relocations.
- Where businesses are currently using a private hauler that disposes of waste at the St. Marys Landfill, costs may also increase as private haulers need to travel farther

to an alternative landfill location, increasing their costs. Having local waste disposal capacity has been an economic development advantage for St. Marys.

Mitigation

No mitigation is proposed.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), some businesses in St. Marys are serviced under the Town's waste collection system. These businesses pay relatively low rates for waste collection.

No changes from baseline conditions are expected with the Do Nothing option.

Under Alternative 1: Expand the St. Marys Landfill:

- No impacts are expected.

Under Alternative 2: Export Waste to the Twin Creeks Landfill**:**

- Some local businesses may experience increased costs related to private waste disposal.

The magnitude, frequency, duration and reversibility of these net effects are summarized in Table 3-15.

Table 3-15: Net Effects on Economic Conditions

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Magnitude	N/A – No net effect anticipated.	Moderate – Costs to businesses to dispose of waste may increase, thereby decreasing competitiveness and profitability.
Duration	N/A – No net effect anticipated.	Long-term – Cost increases are likely to remain for the duration of the planning period.
Frequency	N/A – No net effect anticipated.	Occasionally – Costs to businesses may increase occasionally each time a contract with a private waste collector is renewed.
Reversibility	N/A- No net effect anticipated.	Irreversible – Once the landfill is closed the Town no longer

	Alternative 1: Expand the St. Marys Landfill	Alternative 2: Export Waste to the Twin Creeks Landfill
		has control over waste collection prices.
Preference Relative to the Do Nothing Alternative	Equally Preferred	Less Preferred

3.8.4.5 Aesthetics/Enjoyment of Life

Potential impacts to the aesthetics and enjoyment of life for neighboring residents are as follows:

Alternative 1: Expand the St. Marys Landfill:

- In total, there are 16 residences within 120 m of the landfill. These are rural residential properties. According to Annual Monitoring Reports for 2013 through 2018, inclusive, there have been 16 complaints related to odours from the St. Marys Landfill. The Town indicates they received no odour complaints in 2017, 2019 or 2020. The Annual Monitoring Reports indicate that these complaints have been resolved promptly by Town staff. While the Town's goal is to receive zero complaints, the number of complaints recorded are not considered to be out of the ordinary for a landfill.
- With an expansion, no additional odour, traffic or dust concerns are expected as the quantity of waste to be disposed will remain the same, with slight increases over time in conjunction with population growth. As time progresses, the working face will move eastward, away from the residents on Water Street, so the number of complaints is expected to decrease.
- Some nuisance effects may be experienced during construction as an increase in noise and dust may occur in the short-term.
- Additional screening of trees will be added to minimize sightlines and dampen some noise.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- With the option to export waste to Twin Creeks, property owners adjacent to the St. Marys Landfill will experience fewer odour, noise, dust and traffic concerns. However, ongoing noise and dust from the adjacent aggregate industries may limit this improvement. Similarly, ongoing use for public waste drop-off and composting may further limit any improvements.
- The Waste Management of Canada Corporation, who owns the Twin Creeks Landfill has several community benefit agreements, including:

  - A Community Host Agreement with Warwick Township;
  - Impact Benefit Agreement with landfill neighbours;
  - Property Value Protection; and
  - A local liaison committee.
- These benefits help to offset negative effects.
- Residents along the haul route would experience a small increase in traffic. This will be more pronounced on the small roads outside of St. Marys, leading to Hwy 402. However, it is anticipated that the effect is likely to be imperceptible for most of the route.
- The Twin Creeks Landfill has experienced an increased number of complaints associated with odour since 2017, when the landfill received approval to increase its fill rate.

Mitigation

Mitigation can be applied to minimize any effects associated with both Alternatives, including the following:

- Both the St. Marys and Twin Creeks Landfills have operating procedures to document, manage and report dust, odour, traffic, and noise concerns and complaints. These procedures will be reviewed and updated with the expansion of the St. Marys Landfill.
- It is expected that aesthetic effects associated with an expansion to the St. Marys Landfill can also be improved through additional visual blockages that can be erected as part of the new landfill design.

Net Effects

Under baseline conditions (i.e., the Do Nothing Alternative), some complaints have been received at both the St. Marys and Twin Creeks Landfills in recent years due to odour and dust concerns. The number of complaints is not considered to be out of the ordinary with respect to landfill operations and are typically addressed quickly.

No changes from baseline conditions are expected with the Do Nothing option.

Under Alternative 1: Expand the St. Marys Landfill:

- The landfill is expected to continue to operate and accept the same volume of waste as it currently does. Therefore, a small number of odour, noise, and dust issues may infrequently affect neighbouring residents within acceptable provincially-set limits and similar to existing conditions. Effects will decrease over time as the landfill face moves eastward.

Under Alternative 2: Export Waste to the Twin Creeks Landfill**:**

- Residents adjacent to the St. Marys Landfill may experience fewer nuisance effects associated with noise, dust, and odour from the landfill. Disruptions to enjoyment of life may still persist from other adjacent land uses, such as the aggregate extraction operations.
- Residents along the haul route may experience minor disruptions to enjoyment of life as a result of a minor increase in truck traffic.

The magnitude, frequency, duration and reversibility of these net effects are summarized in Table 3-16.

Table 3-16: Net Effects on Local Aesthetics and Enjoyment of Life

	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Magnitude	N/A – No net effect anticipated.	Moderate Benefit – Residents adjacent to the St. Marys Landfill may experience improved conditions with fewer odour concerns. Dust and noise may continue to be problematic due to other adjacent land uses.
Duration	N/A – No net effect anticipated.	Long-term – Improved conditions for adjacent residents will be ongoing as long as the landfill remains closed.
Frequency	N/A – No net effect anticipated.	Ongoing – Improved conditions for adjacent residents will be ongoing as long as the landfill remains closed.
Reversibility	N/A- No net effect anticipated.	Irreversible – Once the landfill is closed it will not be reopened.
Preference Relative to the Do Nothing Alternative	Equally Preferred	Preferred

3.8.5 Indigenous Connections to the Land

3.8.5.1 Traditional and Historic Uses/Land Claims/Treaty and **Indigenous** Rights

Potential impacts to traditional and historical uses associated with Treaty and Indigenous Rights or Land Claims are as follows:

Alternative 1: Expand the St. Marys Landfill:

- The St. Marys Landfill is located in close proximity to the Thames River, which was an important travel corridor, source of sustenance and culturally significant feature for the Indigenous people who historically lived in the area. The Thames River continues to be used for hunting, gathering of traditional and medicinal plants and for spiritual purposes. The Thames River is not currently impacted by the landfill and it is expected that, with expansion, appropriate mitigation can be put in place to ensure that there will be no impacts to the Thames River.
- Traditional uses may occur in the vicinity, including the Thames River as noted above, but have not occurred on the landfill property since before SMC was active on the site. There would be no opportunity for traditional uses to be re-established in the foreseeable future if the landfill is expanded and therefore, no change from current conditions.
- The St. Marys Landfill is located within lands subject to Treaties. It is believed that six First Nations and the Haudenosaunee Confederacy have Indigenous and Treaty Rights associated with lands in, and around, the landfill, as described in Section 3.7.1.2. Expansion of the landfill represents a development within a Treaty area.
- There are no known land claims associated with the site.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- With Alternative 2, waste would be exported to the Twin Creeks Landfill, which is located in proximity to Bear Creek which would have been used as a travel corridor and source of sustenance for the Indigenous people who historically lived in the area. It is expected that some traditional uses in the vicinity continue.
- With the waste export option, there would be no opportunity for traditional uses to be re-established at the St. Marys site due to the closure and long-term monitoring required. Portions of the site are likely to continue to be used for composting, and local waste drop-off.
- The Twin Creeks Landfill is also on lands subject to a Treaty signed by the Crown and the original inhabitants of the area (Treaty 29). It is believed that six First Nations and the Haudenosaunee Confederacy have Indigenous and Treaty Rights associated with lands in, and around, the landfill, as described in Section 3.7.1.2..
- There are no known land claims associated with the site.

Mitigation

Mitigation can be applied to minimize any effects as follows:

Alternative 1: Expand the St. Marys Landfill:

- The Town will continue to consult with Indigenous communities to identify measures to mitigate potential effects, particularly with respect to the Thames River.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- It is noted that Waste Management of Canada Corporation has signed an Impact Benefit Agreement with the Walpole Island First Nation. It is not known whether any additional First Nations are covered under this agreement.
- These benefits help to offset negative effects associated with that landfill. It is assumed that any waste received from St. Marys at the Twin Creeks Landfill will be covered under existing agreements held by Waste Management of Canada Corporation and therefore there will be no additional benefit to Indigenous communities as a result of this Alternative beyond existing conditions.

Net Effects

Under baseline conditions lands at the St. Marys landfill site historically used by Indigenous communities have been subject to aggregate extraction and landfilling for nearly a century, removing any potential for traditional use and any use associated with Treaty or Indigenous Rights. Similarly, the Twin Creeks landfill has been in operation since 1972.

With regard to all Alternatives, there will be no net change to the ability for Indigenous communities to use the Thames River for traditional purposes, no net change in the inability for Indigenous communities to use the St. Marys landfill property for traditional purposes and no net change to the benefits received through the Twin Creeks landfill Impact Benefit Agreement. Therefore, there will be no overall net effects associated with Alternatives 1, 2 or Do Nothing.

3.8.6 Financial Factors

3.8.6.1 Capital and Operational Costs

A discussion and analysis of potential capital and operational costs associated with each Alternative is as follows:

Alternative 1: Expand the St. Marys Landfill:

- It is assumed that the Town's existing curbside collection process would continue unchanged. Residents and businesses currently collected by Bluewater Recycling Association (BRA) would continue to have their waste collected by BRA.

- It is expected that current collection and disposal rates by BRA would likely remain the same, with moderate increases over the next 40 years in line with the cost of living, price of fuel and other factors affecting transportation. Waste transportation cost estimates were provided by several survey respondents (see Section 3.4.2.2). Based on responses, it is assumed that a standard collection vehicle used by BRA would typically cost $2.53 to $2.97 per km (dependent on congestion)[34], with an 8-tonne capacity. For comparative purposes, this provides a cost/tonne/km of $0.372[35].
- Delivery to an expanded St. Marys Landfill: It is 3.2 km from the centre of St. Marys to the landfill site. Using the collection truck, a round trip costs $2.36/tonne.
- There are capital costs associated with constructing new landfill cells and associated infrastructure, including expanded leachate collection, stormwater and interior roads, etc. These costs have been estimated to be $7,360,000, which is equivalent to approximately $24.00/tonne over the planning period.

This assessment of costs for the expansion of the St. Marys Landfill is based on costs developed for Alternative Method 3. The total estimated present value cost for this alternative is $24,860,000. The following key items were incorporated into the cost estimate, and cost summaries are provided in Table 3-18:

- Studies, Approvals, and Construction:
  - Studies required to develop and operate the site and obtaining required approvals from relevant agencies; and
  - Construction of the facility, including:
    - Earthworks to prepare the site;
    - Cell base preparation;
    - Forcemain upgrades;
    - Upgrades to Public Drop-Off area;
    - Leachate collection system; and
    - Phased development of the four cells (estimated 10-year life of each cell).
- Closure Cost:
  - Begins 2 years after completion of the first cell;
  - Phased closure of cells; and
  - Application of vegetative cover.
- Annual Operations Costs:
  - Incurred annually during site operation;
  - General labour and staffing of site;
  - Fuel costs for on-site equipment; and

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[34] http://www.bv.transports.gouv.qc.ca/mono/0965385.pdf, accessed May 5, 2015, plus data collected from survey respondents.

[35] Value used for comparison of alternatives.

  - Annual environmental and operational monitoring.

- Post-Closure Care (operational) Costs:
  - Estimated timeline of 50 years post-closure;
  - Operation and inspection of leachate collection system; and
  - Annual environmental monitoring.

Table 3.17: Cost Summary for Alternative 1

	Present Value Cost
Studies, Approvals, and Construction	$6,590,000
Closure	$760,000
Annual Operations	$17,190,000
Post-Closure Care	$320,000
Total	**$24,860,000**
Note: Estimated based on 2015 costs.	

Alternative 2: Export Waste to the Twin Creeks Landfill:

- It is assumed that the Town's existing curbside collection process would continue with some minor modifications. Residents and some businesses currently collected by Bluewater Recycling Association (BRA) would continue to have their waste collected by BRA.
- Regarding collection and delivery costs, larger tractor-trailers are likely to be used to transport waste from St. Marys to Twin Creeks. Haulage using a tractor-trailer is much less expensive on a tonne/km basis because haulage vehicles carry significantly more waste than curbside collection trucks (delivery vehicles) despite being slightly more expensive to purchase and consuming slightly more fuel per km. it is assumed that a standard collection vehicle used by BRA would typically cost $3.12 to $3.84 [36], with a 32-tonne capacity. For comparative purposes, this provides a cost/tonne/km of $0.12 [37].
- It is expected that the BRA collection vehicles will leave their depot in South Huron, travel to St. Marys to complete curbside collection, drive to Twin Creeks to tip their load and finally return to their depot. Excluding the collection route in St. Marys, and using the Town centre as the measuring point, gives a trip distance of 143 km. By comparison, BRA's trucks currently travel from their depot to St. Marys, complete their collection route, travel to the St. Marys Landfill and then back to the depot. Excluding the collection route, this is a distance of 36 km if we assume the truck does not complete additional collections in St. Marys or in other BRA communities.

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36 http://www.bv.transports.gouv.qc.ca/mono/0965385.pdf, accessed May 5, 2015, plus data collected from survey respondents.

37 Value used for comparison of alternatives.

Therefore, delivery to Twin Creeks adds 107 km to the collection vehicle's trip, which is expected to cost $39.59 per tonne (rounded to $40.00/tonne). This $40.00/tonne is the anticipated additional cost for the Town's curbside collection contract with BRA.

- For disposal costs (also known as 'tipping fees'), in their export survey response, Waste Management of Canada Corporation indicated that disposal at the Twin Creeks Landfill would cost between $40.00 and $50.00 per tonne. While it is possible that the Town of St. Marys could negotiate a better tipping fee than $50.00/tonne, this cost was assumed to be a reasonable estimate for longer term planning.
- The Town will also have additional administrative costs for tendering and negotiating contracts, monitoring these contracts and making contract payments. Typically, disposal contracts with private waste service providers are in the range of 3 to 5 years. Longer periods can be negotiated, with the term-length providing the customer (i.e., Town of St. Marys) some security at the risk of paying a slightly higher disposal cost.
- According to the (2015) export survey response provided by Waste Management of Canada Corporation (see Section 3.4.2.2), they were willing to commit to a 25-year contract for disposal, corresponding with the estimated remaining lifespan of the Twin Creeks Landfill. In 2017, the Twin Creeks Landfill received Ministry approval to increase annual their rate-of-fill. The site is now expected to be full in about 15-years. It is therefore expected that a contract for disposal at the Twin Creeks Landfill will be a maximum of 15 years. This means that at least one other disposal contract, at an alternative disposal site, would be required during the 40-year planning period of this EA. While other disposal sites may result in different tipping fees and transportation costs, we have chosen to ignore this possibility for our evaluation. Overall, though considering typical contract lengths and the remaining capacity of the Twin Creeks Landfill, export costs may not be stable or predictable for the EA planning period.
- To create an even cost comparison with expanding the St. Marys Landfill, we need to incorporate an estimate of the closure and post-closure care costs for the Town's current site. Such costs are included above as part of the St. Marys Landfill expansion per tonne cost.
- In March 2018, Burnside prepared an estimate of landfill liabilities for the St. Marys Landfill in accordance with the Public-Sector Accounting Board rule PS 3270. This assessment concluded that closure and post-closure care for the existing landfill would cost between $1,800,000 and $2,900,000. This is equivalent to $4.66 to $7.56/tonne. For exporting to the Twin Creeks Landfill, we have selected $5.00/tonne as an appropriate estimated cost for closure and care of the existing (not-expanded) St. Marys Landfill.

Resulting Cost Comparison

The cost to expand the St. Marys Landfill or export to the Twin Creeks Landfill is the combination of component costs discussed above. These are summarized in the table below.

Table 3.18: Cost Comparison of Alternatives

Element	Expand St. Marys Landfill	Export to Twin Creeks Landfill
Collection Operations	Equal to existing cost	Equal to existing cost
Transportation	Equal to existing cost	Existing cost, plus $40.00/tonne
Disposal	$51.00/tonne	$50.00/tonne tipping fee
Capital Costs	$7,360,000 (=$24.00/tonne)	$1,800,000 to $2,900,000 to close existing landfill (assume $5.00/tonne)
Total	**$75.00/tonne**	**$95.00/tonne**

The Town's current disposal fee at the landfill site is $82.50/tonne [38]. From Table 3-19, above:

- Expanding the St. Marys Landfill may result in a slightly lower cost for disposal than currently enjoyed by residents and businesses that deliver waste directly to the site. Curbside collection and transportation costs are expected to be about the same. Additional costs are expected to construct new landfill cells and expand infrastructure associated with leachate collection, stormwater management, and other design features.
- Disposal at the Twin Creeks Landfill is expected to be substantially more expensive than expansion of the St. Marys Landfill – almost 30% more expensive. While curbside collection costs are not expected to change, all other aspects of the disposal cost will, including the closure and care for the existing (un-expanded) St. Marys Landfill.

Mitigation Measures and Net Effects

There are no impacts associated with costs, apart from the payment itself. While it is assumed that the Town will seek to minimize these costs, there are no specific mitigation measures that can be applied. Net effects are the costs noted above.

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38 https://www.townofstmarys.com/en/living-here/Landfill.aspx (accessed October 28, 2019).

3.8.7 Technical Factors

3.8.7.1 Technical Ability to Carry Out Each Alternative

For this indicator, the regulatory process and any associated contracts or agreements were considered.

Under the Do Nothing Alternative, there is no new approvals or regulatory process beyond the existing processes in place to operate the remainder of the capacity at the landfill and complete proper closure and post-closure approvals. However, in the long-term, this Alternative does not meet the Town's obligations to provide a solid waste disposal solution for the Town, whether that solution is inside the Town or elsewhere. By Doing Nothing, the Town will not be able to meet its obligations..

Alternative 1: Expand the St. Marys Landfill:

- Expanding the St. Marys Landfill will require extensive permitting, including approval of this EA document, detailed design, and an Environmental Compliance Approval (ECA). However, the expanded landfill will meet the Town's needs over the full planning period.

Alternative 2: Export Waste to the Twin Creeks Landfill:

- For Alternative 2, disposal at the Twin Creeks Landfill, the regulatory process would be straightforward. An Environmental Assessment or other permits or approvals are not required as Twin Creeks is already permitted to accept St. Marys' waste. Some work would be required in relation to the closure of the St. Marys Landfill and options to maintain a public drop-off facility and composting at the site. A contract with Twin Creeks would be required. Based on the information provided by Waste Management of Canada Co. (WM), as noted in Section 3.4.2.2, a contract covering the full 40-year planning period will not be possible. The contract with BRA will also need to be renewed and updated to incorporate the increased travel to the disposal site. As such, this alternative does not fully address the needs of the Town over the planning period. Through their survey response, WM noted that a 25-year contract may be possible. However, given the recent increase to the landfill's fill rate, only 15 years of capacity may be left. Thus, an alternative landfill with longer travel route may be required before even half of the planning period is over. This will result in significant uncertainty and risk for the Town as they will need to review their waste management option again soon. Costs could rise significantly from those predicted in this EA.

Mitigation Measures and Net Effects

Impacts associated with this criterion are discussed above. However, no mitigation measures can be applied. Thus, mitigation and net effects are not discussed for this criterion.

3.9 Summary of Net Effects

The evaluation of net effects relative to Doing Nothing is presented in Table 3-20. All rankings are relative to the Do Nothing Alternative.

Table 3-19: Summary of Net Effects

Criteria	Comparison to the Do Nothing Alternative	
	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Natural Environment		
Potential Impacts to Atmosphere	Equally Preferred	Preferred
Potential Impacts to Geology and Hydrogeology	Equally Preferred	Equally Preferred
Potential Impacts to Surface Water	Equally Preferred	Equally Preferred
Potential Impacts to Biology	Somewhat Less Preferred	Preferred
Cultural Environment		
Potential Impacts to Archaeological Resources	Equally Preferred	Equally Preferred
Potential Impacts to Built Heritage	Equally Preferred	Equally Preferred
Potential Impacts to Cultural Heritage	Equally Preferred	Equally Preferred
Socio-economic Environment		
Potential Impacts to Transportation Routes	Equally Preferred	Less Preferred
Land Use	Preferred	Less Preferred
Employment Effects	Somewhat Preferred	Less Preferred
Economic Conditions	Equally Preferred	Less Preferred
Aesthetics/Enjoyment of Life	Equally Preferred	Preferred
Indigenous Connections to the Land		
Traditional and Historic Uses/Land Claims/ Indigenous and Treaty Rights	Equally Preferred	Equally Preferred
Financial Factors		
Capital and Operational Costs	Somewhat Less Preferred	Less Preferred

Criteria	Comparison to the Do Nothing Alternative	
	Alternative 1: Expand the St. Marys Landfill	**Alternative 2: Export Waste to the Twin Creeks Landfill**
Technical Factors		
Technical Ability to Carry Out Each Alternative	Preferred	Somewhat Preferred
Overall Preference	**Preferred**	**Less Preferred**

3.10 Advantages and Disadvantages of the Alternatives to the Undertaking

Based on the discussion of net effects in Section 3.8, the advantages and disadvantages of the proposed Undertaking and Alternative to the Undertaking are summarized in Table 3-21.

Table 3-20: Summary of Advantages and Disadvantages

Do Nothing	Alternative 1: Expand the St. Marys Landfill	Alternative 2: Export Waste to the Twin Creeks Landfill
Advantages		
• Does not have any effect on the natural, cultural, or social environment beyond baseline conditions. • Does not have a capital or operational cost.	• Minimal transportation impacts. • Tipping fees are set and controlled by the Town. • Promotes local employment and economy. • Town maintains social and economic benefits of having disposal capacity for current and future residents and IC&I sectors. • Makes efficient use of land that would otherwise have few alternative uses. • Provides a 40-year solution.	• Reduces greenhouse gas emissions through landfill gas collection and flaring. • Improves noise, dust, and odour concerns for residents adjacent to the St. Marys Landfill. •

Do Nothing	Alternative 1: Expand the St. Marys Landfill	Alternative 2: Export Waste to the Twin Creeks Landfill
Disadvantages		
• Does not provide a solution to the Problem Statement.	• Results in a higher emissions potential as a result of the lack of LFG collection when compared to Twin Creeks. • Uses a very small amount of WWTP capacity that could otherwise be used for future development. • Causes temporary impacts to natural features, including potential habitat for species at risk and aquatic habitat that will require restoration and compensation. • May effect Cultural Heritage Resources. • Requires more permits and approvals and engineering design.	• Does not provide a solution for the full 40-year planning period. • Costs may fluctuate over the planning period and Town does not control cost increases. • May result in the loss of a small number of jobs in St. Marys. • May negatively affect businesses in St. Marys that rely on lower cost waste transportation and disposal at the St. Marys Landfill. • Results in increased trucking emissions and traffic impacts on truck route.

3.11 Input Received during Phase 1, Evaluation of Alternatives to the Undertaking

Consultation with potentially affected and other interested parties is a key component of the Environmental Assessment process. Consultation is documented in detail in Section 10.0. A summary of the consultation carried out during Phase 1 is as follows:

- A Notice of Acceptance of the Terms of Reference and Commencement of the EA was published on February 9 and 18, 2015 in the St. Marys Journal Argus and St. Marys Independent (refer to the Consultation Record, Vol IV, Appendix A).
- A copy of the notice was emailed or mailed to the contacts listed in Vol IV, Appendix A, which include:
  - Various agencies with an approval or jurisdictional relevance to the project;
  - Various stakeholder groups and organizations with potential interest in the project;
  - Utilities with infrastructure in the vicinity; and,
  - Fifty-two landowners with property within 1km of the existing landfill site.
- A copy of the notice was emailed or mailed to fourteen Indigenous communities or organizations (refer to Vol IV, Appendix A, for a contact list), including:
  - Caldwell First Nation;
  - Aamjiwnaang First Nation;
  - Chippewas of Kettle and Stony Point First Nation;
  - Chippewas of the Thames First Nation;
  - Delaware Nation (Moravian of the Thames);
  - Haudenosaunee Development Institute;
  - Mississaugas of the Credit First Nation;
  - Munsee-Delaware First Nation;
  - Oneida of the Thames First Nation;
  - Six Nations of the Grand River;
  - Walpole Island First Nation (Bkejwanong Territory;)
  - Windsor-Essex Métis Council;
  - Métis Nation of Ontario; and,
  - Association of Iroquois and Allied Indians.
- Indigenous communities and agencies also received a response form to complete and return with initial comments and indication of their interest in remaining on the Project Contact List.
- A meeting was held with Chippewas of the Thames First Nation (COTTFN) on February 4, 2014. Meeting minutes and follow-up correspondence are provided in the Consultation Record, Vol IV, Appendix H.

- Several Indigenous communities had expressed an interest in visiting the landfill site during preparation of the Terms of Reference. In follow-up to these requests, Aamjiwnaang First Nation, Caldwell First Nation, Chippewas of Kettle and Stony Point First Nation, Chippewas of the Thames First Nation, Six Nations of the Grand River and Walpole Island First Nation were offered an opportunity to visit the landfill. Ultimately, none of the communities attended. A record of correspondence is provided in the Consultation Record, Vol IV, Appendix H.
- Several Indigenous communities expressed an interest in the EA. Correspondence regarding consultation process and capacity funding were received from the Chippewas of the Thames First Nation and Aamjiwnaang First Nation. In addition, a meeting was held with the Haudenosaunee Development Institute (HDI) on February 29, 2016. Discussions related to rights associated with the Nanfan Treaty and HDI's application process, including funding.

  The Town noted its inability to provide significant funding to each of the interested communities. A suggestion to fund a single review to be coordinated among all communities was proposed but was ultimately determined to be untenable. A record of correspondence is provided in the Consultation Record, Vol IV, Appendix H.
- A Public Information Centre was held on August 26, 2015 at the end of Phase 1 of the EA process. A copy of the notice was emailed or mailed to all of the agency, stakeholder, landowner and Indigenous contacts who received the Notice of Commencement. In addition, information was posted to the Town's website and was published twice in the St. Marys Independent and St. Marys Journal Argus. Information regarding the PIC can be found in the Consultation Record in Vol IV, Appendix B.

Several comments were received from the public and interested stakeholders during Phase 1 of the EA, as summarized in Table 3-22.

Table 3-21: Comments Received During Phase 1 of the EA (Alternatives to the Undertaking)

Commentor	Comment	Comment Type	Study Team Response	How Addressed in EA
Local Landowner	Concerned with drinking water well quality	Verbal	Groundwater quality is monitored on a regular and ongoing basis as part of the current landfill operations. To date, there are no concerns related to the landfill's impact on off-site groundwater quality. Landfill monitoring reports are available online at the Town's website. The Hydrogeological Work Plan includes a drilling and monitoring program to understand soil and groundwater conditions. Impacts to ground water quality are one of many criteria used to evaluate the impacts of the Alternative Methods for the expansion of the landfill. Recommendations will be made for the Preferred Alternative to minimize groundwater (and surface water) impacts.	Potential impacts to groundwater quality were studied in the Hydrogeology Study provided in Vol III, Appendix C. Potential effects are summarized in Sections 7.5 and 9.0. No impacts to drinking water are expected.
Local Landowner	Concerned with dust from site entrance.	Verbal	Through discussion with the resident, it was found that a significant dust concern occurred a few years ago during the reconstruction of Hwy 7. Excess soils from that project were brought to the landfill for use as cover, to build berms, etc. The truck traffic on the access road caused excessive dust until calcium chloride was spread. Regular site operations have not been as problematic, though some dust from the site access road is occasionally generated. Relative to current operations, dust concerns are taken seriously by the Town. The resident was encouraged to contact the Town if dust becomes an issue again. Impacts to air quality, including dust, are one of many criteria to be used to evaluate the impacts of the Alternative Methods for the expansion of the landfill, Recommendations will be made for the Preferred Alternative to minimize and mitigate dust generation for the expanded facility.	Potential impacts to air quality as a result of dust were studied in the Emission Summary and Dispersion Modeling Report provided in Vol III, Appendix A. Potential effects are summarized in Sections 7.4 and 9.0. Dust is expected to be managed through standard measures, including the application of dust suppressants during construction and applying daily landfill cover during operations. No significant effects associated with dust are expected to be experienced by local residents.
St. Marys Cement	Concerned that thermal treatment has been discarded as an alternative at this stage in the study. Offered suggestion that kiln at St. Marys Cement could be used for a waste-to energy solution.	Verbal	Thermal treatment was discarded as an option during the TOR because it is not financially feasible for the Town based on the quantities of waste generated. SMC is not at a stage where it could begin accepting waste within the timeframe required by the Town. Also, there are questions as to what portions of the waste disposal stream would be acceptable in the kiln. It is not believed that such a facility could be financially or technically viable. The Town is always open to discussions with SMC.	Thermal treatment was not considered as an option. Communication with SMC continued throughout the EA. Refer to Section 10.0.
Union Gas Limited (August 13, 2015)	Requested additional information about the EA. Noted that there is a natural gas main located in the east side of Water Street S., and a station southwest of the existing landfill site.	Email, August 13, 2015 (a copy is provided in Vol IV, Appendix I)	Email response, providing details of the EA and a link to the Town's website. Requested that Union Gas provide a more detailed description of their facilities, including location details, for consideration by the EA Team. No response was received. Further consultation with Union Gas to be held during the detailed design stage.	A commitment to follow-up with Union Gas during the detailed design stage has been made. Refer to Section 11.1.

Commentor	Comment	Comment Type	Study Team Response	How Addressed in EA
Chippewas of the Thames First Nation	Expressed concerns with ground water and water quality in the Thames River, noting that the Thames River is important to the community. The community holds treaty rights, particularly related to hunting and fishing, downstream of the landfill. A request for recent landfill monitoring reports was made. It was also noted that the COTTFN have a preliminary traditional land use plan which could be shared	Meeting, February 4, 2014 (minutes are provided in Vol IV, Appendix H)	Annual monitoring reports were provided for the years 2010, 2011 and 2012. At the time of the meeting, the EA was just being initiated. It was noted that impacts to surface and groundwater would be considered as part of the EA process. Follow-up requests were made to obtain the traditional land use plan but to date it has not been provided.	Impacts to the Thames River are addressed in Sections 7.6, 7.7.2, 7.12 and 9.0. Mitigation measures are described in each of these sections to ensure that the Thames River is not impacted. Further consultation will occur with COTTFN, as documented in Section 11.1.

3.12 Preferred Undertaking

Based on the evaluation presented in Section 3.8, the advantages and disadvantages of each alternative and input from the public, it was determined that:

- Doing Nothing does not address the Town's waste management needs and obligations and is not a feasible solution to the Problem Statement.
- Exporting waste to the Twin Creeks Landfill has some advantages in that impacts to the Natural Environment at the St. Marys Landfill site are minimized.
- Expanding the St. Marys Landfill has greater advantages with respect to Socio-economic criteria, Financial Factors, and Technical criteria.
- Both options were equally preferred based on Cultural Heritage criteria.

Overall, expanding the St. Marys Landfill is preferred.