December 2022 / Rev February 2023

Volume 1

Environmental Assessment of the Township of North Dundas Waste Management Plan

GOLDER
MEMBER OF WSP

TOWNSHIP OF
North Dundas

Executive Summary

Introduction

This document is the environmental assessment study report (EA Study Report or EASR) for the environmental assessment (EA) of the Township of North Dundas Waste Management Plan (the EA Study) being undertaken by the Township of North Dundas (the Township). This is an individual EA completed under the provincial *Environmental Assessment Act* (EAA).

The proposed EA Study is the EA of the Township's waste management plan for a 25 year planning period.

The Township of North Dundas is the proponent for the proposed EA Study. The Township is located in eastern Ontario about 40 kilometres (km) south of Ottawa within the United Counties of Stormont, Dundas and Glengarry.

The Township, through its Waste Management department, currently provides curbside waste collection and disposal services to its ratepayers for residential and some institutional, commercial and industrial waste. It also provides waste diversion services, including recyclable materials, tire recycling, as well as the collection of household hazardous waste (HHW) and Waste Electrical and Electronic Equipment (WEEE). The Township's diversion rate in 2017 and 2018 was approximately 23 percent and similar in 2019 and 2020.The material recycling facility, the HHW and WEEE transfer station as well as the waste disposal facility are located at the Township's Boyne Road Landfill site.

The Boyne Road Landfill is located on Lot 8, Concession VI in the former Township of Winchester, along the south side of Boyne Road about 2 km east of the Village of Winchester, which is approximately mid-way between the two main population centres within the Township – the Villages of Winchester and Chesterville. The service area for the landfill is the Township of North Dundas. The site has been operating as a licensed landfill for the disposal of solid, non-hazardous waste since 1965, and is the only operational waste disposal site in the Township and receives all the residential and some of the IC&I waste from the entire Township. The landfill site is estimated to have approved disposal capacity to operate through 2023 and into 2024.

The Boyne Road Landfill operates under Environmental Compliance Approval (ECA) No. A482101 and currently has an approved disposal area of 8.1 hectares (ha). The land area that comprises the landfill property consists of the original disposal area and the addition of parcels of adjoining land, corresponding to a total land area of approximately 97.13 ha. In addition to the landfill property, the Township has acquired groundwater easements, referred to as Contamination Attenuation Zones (CAZs).

Operation of the landfill site, including its diversion facilities, is carried out by the Township in accordance with the requirements of its ECA conditions. The existing landfill site is a natural attenuation landfill, without an engineered bottom liner and leachate collection system. Compliance of the landfill with the applicable requirements for protection of off-site

groundwater quality relies on natural processes in the subsurface. The results of the landfill monitoring programs show that the Boyne Road Landfill is performing acceptably and the impacts on the natural environment are deemed acceptable.

Additional detail on the site history, design, operations and performance is provided in Sections 1.3 and 2.1 of the EASR.

Overview of the Environmental Assessment Process and Environmental Assessment Study Report

In 2014/2015, the Township undertook an evaluation of long-term waste management alternatives. Using an assumed planning period of 25 years, the evaluation considered four alternatives: landfill site closure and waste export, landfill site expansion, a new landfill site and alternative waste technologies. The result of that comparative evaluation was that expansion of the existing Boyne Road Landfill was identified as the preferred long-term waste management alternative. Based on the findings of this evaluation, a Council resolution was passed in November 2015 to pursue approval to expand the landfill site via an Environmental Assessment pursuant to the Ontario *Environmental Assessment Act* (EAA).

When the Environmental Assessment commenced in late February 2017, the EA was for the expansion of the Boyne Road Landfill site. Based on comments received on the Proposed Terms of Reference (ToR) from the MECP in December 2018, it was determined that the scope of the EA should be modified to review and re-assess the waste management alternatives that are reasonable for the Township to consider within the EA process and identify the preferred alternative. To reflect this revised approach, the title of the EA Study was changed to Environmental Assessment of the Township of North Dundas Waste Management Plan.

The purpose of the proposed EA Study has been reviewed since approval of the ToR and is confirmed as:

To provide environmentally safe and cost-effective long-term waste management for the Township of North Dundas for a 25 year planning period.

The Township prepared the ToR for the EA of the Township Waste Management Plan and it was approved by the MECP on July 1, 2020.

This EASR is presented in four volumes. Volume 1 (this volume) describes the EA studies, consultation results, effects assessment of alternatives, identification of the preferred alternative and effects assessment of the preferred alternative.

Volume 2 contains the approved ToR and Technical Appendices to this EA.

Volume 3 contains supporting documents to this EA, consisting of the New Landfill Site Selection Assessment and the Waste Diversion Study.

Volume 4 contains the Consultation Record for this EA.

Methodology for the Assessment

The EA was carried out in accordance with the approach described in the approved Amended ToR, which was approved on July 1, 2020. The EA was undertaken in a series of fourteen steps as described below. Additional details about each step are further described in Section 3.0 of this EASR. Consultation with the public, Indigenous communities, GRT members, and other stakeholders was ongoing throughout the EA process.

1. Identify Study Areas and Characterize Existing Environmental Conditions of the Waste Management Plan Study Area
2. Confirm 'Alternatives To' and Evaluation of 'Alternatives To'
3. Update the Waste Diversion and Residual Waste Requirements
4. Characterize Study Areas and Prepare Environmental Component Work Plans and Comparative Evaluation Criteria for the Preferred 'Alternative To' – Landfill Site Expansion
5. Characterize the Existing Environmental Conditions for the Preferred 'Alternative To'
6. Identify and Develop 'Alternative Methods' of Landfill Expansion
7. Comparison and Evaluation of 'Alternative Methods' and Identification of Preferred Alternative
8. Describe the Preferred 'Alternative Method' of Landfill Expansion
9. Refine the Mitigation Measures and Determine the Net Effects of the Preferred Alternative
10. Consideration of Climate Change
11. Cumulative Impact Assessment
12. Develop Monitoring and Contingency Plans
13. Summarize Commitments
14. Preparation of the EA Study Report

Consultation Methods and Activities

The consultation program for the EA was carried out in accordance with the approved ToR. The results of the program and supporting documents are contained in Section 4 of Volume 1 and in Volume 4 - Consultation Record, respectively.

Prior to commencing the ToR, the Township of North Dundas developed a Consultation Plan to support the development of the approved Amended ToR as well as support the EA process. This plan was updated prior to and during the EA. Consultation with the public, agencies, Indigenous Communities and other stakeholders was ongoing throughout the EA process.

The consultation activities carried out during the EA consisted of:

- Letter and email correspondence distributed to the public, interested stakeholders, GRT, and Indigenous communities
- Notices published in local newspapers
- Notices published on the EA website (https://www.northdundas.com/municipal-services/environmental-assessments)
- Three technical bulletins summarizing results at key milestones in the EA (Diversion Study Results; 'Alternatives To' Assessment; 'Alternative Methods' Assessment)

- An in-person and virtual Open House for the local community to present the results and conclusions of the EA
- Meetings and telephone calls between the Township, the EA consultants, and the MECP
- Meeting with the Huron-Wendat Nation
- Informal meetings, telephone calls and discussions with neighbours to the existing Boyne Road Landfill on an as needed basis throughout the EA
- The Draft EASR was made available for the GRT, Indigenous communities and public for comment for a four week review period prior to finalization and submission to the MECP.

A complete list of issues and concerns raised and responses was compiled and is included in Volume 4 – Consultation Record; a summary of these issues, responses and how each was addressed in the EA is provided in Section 4.7 of the EASR. The input received during various consultation events was carefully considered and incorporated into the EA, where applicable. The following are some of the questions and concerns raised during the EA process:

- The types of archaeological studies anticipated during the EA
- Guidance from Ministry of Heritage, Sport, Tourism and Cultural Industries (MHSTCI) regarding archaeology and cultural heritage studies
- The remaining capacity at the Boyne Road Landfill site and whether it will be sufficient until such time that the expansion is approved
- Whether the proposed landfill expansion includes waste from beyond North Dundas
- Consideration of projected population growth in the Township in view of the recent increase in demand for water and sewage services in the serviced villages
- Clarification on the rationale for selection of expansion of the Boyne Road Landfill as the preferred ‘Alternative To’
- Was consideration given to establishing a new landfill on the north side of Boyne Road opposite the existing site
- Consider allowance for an archaeology monitor periodically during expansion construction activities involving excavation
- Clarification on the calculation of projected waste and daily cover volumetric needs
- Consider using polyfluoroalkyl substances (PFAS) for distinguishing leachate impacts in groundwater and surface water.
- Clarification on the measures to control leachate impacts from site-specific surface water features, surface water receptors, and offsite flows through the expansion area
- Additional information needed on select species and habitats identified during the biology surveys

As part of this EA, a Stage 1 Archaeology Assessment was completed, and a Stage 1 Archaeology Assessment Report was prepared. As established in the ToR stage for this project, the Huron-Wendat Nation identified an interest in the archaeological studies at the Boyne Road Landfill site. The results of the studies along with the Stage 1 Archaeology Assessment Report were shared with the Huron-Wendat Nation, as well as the Algonquins of Ontario and the Mohawks of Akwesasne. The Huron-Wendat Nation and the Mohawks of

Akwesasne indicated they had no further questions or comments about the Stage 1 Archaeology Assessment Report.

Also, detailed work plans for select environmental components (atmosphere, biology, groundwater, and surface water) were provided to the MECP, MNRF and conservation authorities for review and comment.

Waste Management Plan Study Area and Existing Conditions

The overall waste management plan Study Area is the whole of the Township of North Dundas. The Township was formed in 1998 by the amalgamation of the former Townships of Winchester and Mountain, as well as the Villages of Winchester and Chesterville. The Township is located south of the City of Ottawa, within the United Counties of Stormont, Dundas and Glengarry. The total land area comprising the Township is 503.2 km^2. The 2016 population was 11,278; approximately one-third of the population is within Winchester and Chesterville, with the remainder located in several smaller communities and spread across this largely rural municipality.

Section 5.0 of the EASR provides a description of the existing natural, social, economic, cultural and built environment that may be affected by the waste management plan. The components include atmosphere (air quality and noise), geology and hydrogeology, surface water, biology, land use planning and agriculture (population projections, labour force characteristics and activities, agriculture), cultural heritage resources (archaeology, built heritage resources and cultural heritage landscapes), socio-economic (population and labour, municipal finances and economic development trends and plans) and transportation.

The existing conditions relevant to the ‘Alternatives To’ assessment are detailed for each component in Sections 5.2 to 5.9 of the EASR.

Assessment of ‘Alternatives To’ the Undertaking

Description of and Rationale for ‘Alternatives To’

The Township developed a reasonable range of ‘Alternatives To’ the undertaking. For the Township, the ‘Alternatives To’ are fundamentally different approaches for long term waste management in the Township. Previously, four waste management alternatives were proposed for the Township in the 2015 Waste Management Alternatives Evaluation. Two additional alternatives were added in this Environmental Assessment compared to the preliminary 2015 Waste Management Alternatives Evaluation. The comparative assessment of these ‘Alternatives To’ identifies the preferred waste management alternative.

Environmental Components, Criteria and Indicators for 'Alternatives To'

A broad set of criteria, together with rationale, indicators and data sources, were developed for comparative evaluation of the 'Alternatives To'. These were presented in the ToR and refined during the EA and are summarized in Table 6-1 of the EASR. These evaluation criteria cover the components that comprise the natural, social, economic, cultural and built environment as listed in Section 5.0 above; another component – technical considerations – was added to the list of components to be evaluated in the 'Alternatives To' assessment.

Identification and Feasibility of 'Alternatives To'

The 'Alternatives To' available to the Township consist of the following:

- Alternative 1 – Existing Landfill Site Closure and Export Waste for Disposal. Under Alternative 1, the Boyne Road Landfill would be closed. The Township would likely continue to operate waste diversion activities at the landfill site or elsewhere, and the remaining waste would be exported to an appropriately licensed landfill in Eastern Ontario for disposal.

- Alternative 2 – Landfill Site Expansion. Under Alternative 2, the process to obtain approval for an increase in the disposal capacity of the Boyne Road Landfill would be undertaken so that waste disposal would continue at this location under the ownership of the Township. An envelope that could be used to accommodate an estimated 400,000 m^3 of additional landfill airspace would be required.

- Alternative 3 – Existing Landfill Site Closure and Establish New Landfill Site in the Township. Under Alternative 3, the Township evaluated the potential to establish a disposal site at a new location within the municipality (for details, refer to Volume 3, Appendix I). This involved a screening approach using a set of general exclusionary criteria that are typically used for landfill siting, together with published information to screen out areas of the Township that are not suitable and cannot be considered for a new landfill site. Areas surviving this screening represent potential locations for siting a new landfill. A preliminary total land area required for development of a landfill having a new airspace of approximately 400,000 m^3 and following the requirements of *O.Reg*. 232/98 was determined, and the size of the potential locations assessed to determine whether they are large enough. The results of the screening exercise revealed few potential areas large enough or in accordance with the land use policies set by the Township for use as a new waste management facility site. Of the screened potential areas, the most preferred area was the parcel of land containing the existing active Boyne Road Landfill site. Although there is an area suitable for new landfill development within the Township, it was concluded that this is not an alternative that the Township should reasonably pursue. Alternative 3 was eliminated from the comparative evaluation.

- Alternative 4 – Existing Landfill Site Closure and Alternative Waste Management Technologies. Under Alternative 4, the Township evaluated the potential to use an alternative waste management technology such as an energy from waste facility (EFW), where waste is combusted at extremely high temperature, resulting in heat that can be

used in a steam powered generator for example) at a new location within the municipality. The Boyne Road Landfill would therefore be closed. The use of this EFW technology would require the service to be provided by a private sector operator of this type of facility, since it is beyond the capability of the Township both financially and operationally. It is expected that a new site within the Township would have to be established for this process. It was concluded that the Township could consider establishing a new regional EFW facility with neighbouring municipalities to share the capital expenditures and financial liability with and to improve the facility's steady state processing rate.

- Alternative 5 – Enhanced Waste Diversion. This alternative would require the Township to consider and look for opportunities to increase diversion from disposal by considering public feedback, evaluating current legislation and funding mechanisms and assessing diversion opportunities in alignment with the small, rural nature of the Township. To fulfill this alternative, a Waste Diversion Study Report (refer to Volume 3 Appendix J). the following recommendations for the Township to enhance its current waste diversion program were identified: i) Develop and implement a backyard composting program for source separated organics; ii) optimize the current blue box recycling program with a dual-stream recycling program with the purchase of new split collection vehicles; iii) develop an on-site leaf and yard waste composting program at the Boyne Road Landfill site and expand the collection program for leaf and yard waste, and; iv) develop new and reinforce existing waste management policies.

  The implementation of these waste diversion program enhancement is reasonably estimated to increase the Township's residential solid waste diversion rate from the current 23% to 33%. With the exception of a zero-waste solution, this alternative does not have the ability to fully address the stated problem being assessed but can reduce the amount of post-diversion waste requiring management. This waste diversion alternative can be used to estimate the amount of residual waste requiring management over the 25 year planning period; however, it is not in itself a means of managing residual waste and cannot be compared as a standalone alternative. For this reason, Alternative 5 was not included in the comparative evaluation of waste management 'Alternatives To'.

- Alternative 6 – Do-Nothing. In EAs, the Do-Nothing alternative is considered in the evaluation of 'Alternatives To' as a benchmark against which the potential environmental impacts and the advantages and disadvantages of the alternatives being considered can be measured and compared. For the Township of North Dundas, the Do-Nothing alternative would be to close the Boyne Road Landfill when it reaches its approved capacity and not pursue any other solution for waste management for the Township. It is noted that one of the Township's basic requirements as a municipality is to provide municipal services and infrastructure for its ratepayers. As such, the Do-Nothing alternative is not an 'Alternative To' that could be considered to resolve the long-term waste management problem.

Comparative Evaluation of 'Alternatives To'

The potential effects and/or implications of each of the remaining Alternatives 1, 2 and 4 were generally identified and described for each of the evaluation criteria. A qualitative assessment methodology was applied to complete a comparative assessment of remaining Alternatives 1, 2, and 4. The methodology consisted of assigning an overall relative rating from most preferred to least preferred for each alternative, first for each of the criteria and then for the environmental component. Qualitative comparative rating of potential impact used the descriptors most preferred, less preferred, least preferred and equally preferred. The details of the comparative assessment are presented in Tables 6-2 to 6-10 in Section 6.0 of the EASR and included consideration of the Do-Nothing scenario. The advantages and disadvantages of each 'Alternative To' are described in Table 6-11, including Do-Nothing.

Identification of the Preferred 'Alternative To'

In determining the overall preferred 'Alternative To', key factors for the Township were maintaining control over waste management and associated costs, having the ability to operate and being able to spread the capital costs out over time and minimizing annual operating costs. Also, for any alternative, potential effects on groundwater, surface water and the natural environment, as well as mitigation of any archaeological resources, would have to be mitigated in accordance with provincial requirements to obtain the required approvals and to be able to continue operations.

Alternative 2 was Most Preferred overall. Compared to Alternatives 1 and 4, it was most preferred for air quality, transportation, built heritage resources and cultural heritage landscapes, nuisance, ability of the Township to operate and cost of implementation. It was not least preferred for any criterion.

Overall, Alternative 1 was Less Preferred and Alternative 4 was Least Preferred.

The preferred 'Alternative To' from the assessment is Alternative 2 – Boyne Road Landfill Site Expansion.

Updated Diversion and Residual Waste Disposal Requirements

As an Ontario municipality responsible for providing waste services for its ratepayers, the Township's objective in undertaking the EA is to obtain approval for a long-term solution for waste disposal while concurrently evaluating diversion opportunities to reduce the amount of waste generated for disposal over the planning period, which is a 25-year planning period, i.e., 2023 through 2048. The Waste Diversion Study (Volume 3 Appendix J) identified a combination of waste diversion options to improve diversion in the Township consisting of:

- backyard composting for source separated organics (SSO)
- dual Stream Recycling program
- curbside collection and chipping or composting of leaf and yard (L&Y) waste at the Boyne Road Landfill site
- existing and new waste management policies

Using population projections and historical information on the volume of landfill airspace consumed annually by waste disposal, and assuming that a residential diversion rate of 28% and 33% by 2025 and 2030, respectively, can be achieved and then maintained going forward, it was determined that the expansion of the Boyne Road Landfill will have to accommodate waste corresponding to the consumption of approximately 417,700 m^3 of landfill airspace (excluding final cover) beyond 2023 for the 25 year planning period.

Study Areas and Environmental Component Work Plans for Landfill Expansion

Study Areas

For the purpose of assessing the existing conditions and the potential effects from the proposed landfill expansion, the environment was defined by natural, social, economic, cultural and technical components. The natural components include atmosphere (air quality, noise) geology and hydrogeology, surface water (quality and quantity) and biology (aquatic and terrestrial ecosystems). The social and economic components include socio-economic (local economy, residents and community and visual), land use and agriculture. The cultural components include cultural heritage resources (archaeology, built heritage resources, cultural heritage landscapes). The technical components include traffic and site design and operations/financial.

The study areas were defined as follows:

- **Site Study Area** – A portion of the existing Boyne Road Landfill site where the landfill could be expanded, consisting of the existing Boyne Road Landfill waste footprint and an area 300 m to the south of the existing waste footprint.
- **Site-vicinity Study Area** – The lands in the area immediately adjacent to the Site Study Area that have the potential to be directly affected by the landfill expansion and activities with the Site Study Area. The extent of the Site-vicinity Study Area was determined for each of the environmental components. For most environmental components, a Site-vicinity Study Area of 500 metres from the Site Study Area is appropriate.
- **Wider Study Area** – An area that takes on the broader community generally beyond the immediate site vicinity and for specific environmental components may include the entirety of the Township of North Dundas, as appropriate.

Environmental Component Work Plans

Work Plans were developed for each of the environmental components. The work plans describe the general scope of technical and field studies for each of the environmental components, the way in which the comparison of ‘Alternative Methods’ of landfill expansion and prediction of environmental effects for the preferred ‘Alternative Method” of landfill expansion will be carried out, and data sources.

Detailed work plans for biology, groundwater, surface water and atmospheric components were developed in consultation with the MECP, Conservation Authorities and MNRF as

relevant and submitted for review and concurrence. The summary table of all work plans was shared on the EA website with Indigenous communities and the public and they were invited to view the work plans and submit comments.

Description of the Environment Potentially Affected for Landfill Expansion

Section 9.0 of the EASR provides a description of the natural, social, economic, cultural and technical components, which together are defined as the existing environment that may be affected by the proposed landfill expansion.

The existing conditions relevant to assessment of potential effects from the proposed 'Alternative Methods' of landfill expansion are detailed for each component in Sections 9.1 to 9.10 of the EASR.

Description of and Rationale for the 'Alternative Methods' of Landfill Expansion

'Alternative Methods' are the different ways that the proposed expansion of the Boyne Road Landfill could be implemented to gain an additional 25 years of disposal capacity. Due to the physical constraints associated with the configuration of the existing waste footprint and its location on the existing landfill site property, the 'Alternative Methods' are limited to vertical expansion above the existing waste footprint and/or lateral expansion to the south within the landfill property and the Site Study Area.

Design of Expansion Alternatives

A number of factors were considered in designing the expansion alternatives. The major factors were as follows:

- The geometry of the landfill expansion is to follow the requirements of *O.Reg*. 232/98, i.e. landfill sideslopes of 4 Horizontal : 1 Vertical (4H:1V, 25 %) or flatter and landfill top area slopes not flatter than 20H:1V (5 %).
- The existing landfill footprint of 8.1 hectares is not large enough to accommodate the required landfill airspace of 417,700 m^3 for waste and daily cover beyond 2023 above the existing footprint. Therefore, all 'Alternative Methods' will require a horizontal expansion of the waste footprint.
- The existing Boyne Road Landfill operates as a natural attenuation site, where leachate generated by the landfill is allowed to enter into the groundwater below the disposal area and the leachate-impacted groundwater then moves in the direction of groundwater flow. The MECP Reasonable Use Guideline (RUG) B-7 (MOE, 1994) and *O.Reg*. 232/98 Landfill Standards define the allowable effects of leachate on off-site groundwater quality. Due to high capital and operating costs associated with an engineered leachate collection and treatment system; constraints on the available capacity of Winchester and Chesterville communal sewage treatment systems in the Township; and the presence of a receiving watercourse for treated effluent from an on-site leachate treatment facility that does not have year round flow (i.e., would be a dry ditch receiver), the only economically

viable approach for the Township is to continue operating an expanded Boyne Road Landfill as a natural attenuation site.

- Stormwater runoff from the expanded landfill will be managed by a stormwater management system to be provided at the northeast corner of the landfill property and discharging to the roadside ditch on the north side of Boyne Road.
- It is proposed to install a culvert in the roadside ditch along the north side of Boyne Road (Volks Municipal Drain) opposite the landfill site frontage. This measure would isolate and convey surface water past the landfill site from upstream (west) to downstream (east) and prevent leachate-impacted groundwater from seeping into the surface water in the ditch.
- Waste diversion activities related to recycling, WEEE and HHW are expected to continue operating at their current location near the site entrance, in the north central part of the site.

'Alternative Methods' for Landfill Expansion

Based on the above factors, three 'Alternative Methods' for expansion of the Boyne Road Landfill were developed. These alternatives are referred to as:

- Alternative 1 – Combined horizontal and vertical expansion with larger east and west buffers
- Alternative 2 – Combined horizontal and vertical expansion with larger south buffer
- Alternative 3 – Primarily horizontal expansion

Alternative 1 consists of a combination of raising the elevation over the current disposal area and tying this into the capacity achievable above an expanded footprint to the south, with the geometry satisfying the slope angle requirements of *O.Reg*. 232/98. The height of Alternative 1 (and all three 'Alternative Methods') is about 15 m above typical ground level on the southern part of the property. This is about 2.5 m higher than the existing landfill. The horizontal expansion to the south provides a 100 m buffer to the east, 50 m to the west, approximately 44 m to the southeast end of the property and approximately 300 m to the southwestern end of the property. The design includes the construction of an approximately 1 m thick pad of imported permeable fill material (for example, sandy material) above the ground surface to provide a base for waste disposal. The lateral expansion footprint for this Alternative is approximately 3.9 ha.

Alternative 2 also consists of a combination of raising the elevation over the current disposal area and tying this into the capacity achievable above an expanded footprint to the south. The buffer to the south was increased compared to Alternative 1 at the expense of the east buffer for the horizontal expansion. The horizontal expansion to the south still provides a 71 m buffer to the east, 34 m to the west, approximately 52 m to the southeast end of the property and approximately 309 m to the southwestern end of the property. The lateral expansion footprint for this Alternative is approximately 4.5 ha. The 1 m thick pad of imported permeable fill material is also required for this alternative.

Alternative 3 has the vertical expansion above the approved top of waste contours limited to the southern half of the current footprint, tying it with the horizontal expansion to the south and its more elevated crest (the maximum height) is reached approximately 220 m south of Boyne Road (compared to less than 70 m for Alternatives 1 and 2). The horizontal expansion to the south provides a 100 m buffer to the east, 30 m to the west, approximately 57 m to the southeast end of the property and approximately 314 m to the southwestern end of the property. The lateral expansion footprint for this Alternative is approximately 3.8 ha. The 1 m thick pad of imported permeable fill material is also required for this alternative.

Comparison and Evaluation of Landfill Expansion Alternatives

For each of the three proposed expansion alternatives, the potential for environmental effects was assessed based on the broad definition of the environment, using a set of evaluation criteria. The evaluation criteria consist of components, sub-components and indicators; the components represent a high level aspect of the environment, each of the sub-components represents a specific aspect of the environment, and the indicators represent a potential effect of the proposed landfill expansion.

For each sub-component, the potential effects associated with each expansion alternative were identified and comparatively evaluated using either qualitative, quantitative or a combination of each method; as well, an assessment of advantages and disadvantages of each alternative was completed. Within this assessment, the Do-Nothing scenario was considered to document the advantages or disadvantages of the proposed undertaking. Based on the results, for each indicator the alternative methods were ranked as one of ‘most preferred’, ‘less preferred’, ‘least preferred’, and ‘equally preferred’. The next step was to compile the individual component comparative evaluations of the ‘Alternative Methods’ and select the overall preferred method of landfill expansion.

The detailed comparative assessment for each indicator is provided in Section 11.2, subsections 11.2.1 through 11.2.10 of the EASR; the rationale for the selection of the overall preferred method of landfill expansion is provided in Section 11.4 of the EASR.

The comparative evaluation of ‘Alternative Methods’ of expanding the Boyne Road Landfill identified Alternative 3 – primarily horizontal expansion – as the overall preferred method of expansion.

Of the 17 sub-components that were comparatively assessed, 13 were ranked as equally preferred for the three expansion alternatives. These included components or sub-components that are often considered to be most important such as geology and hydrogeology and surface water quality. The high number of equally preferred rankings reflects the similarity among the available expansion alternative designs in terms of location on the landfill property, physical dimensions to provide the required airspace and considerable distance from potential off-site sensitive receptors.

Of the four sub-components where there are differences in preference, Alternative 3 was most preferred for all four. Alternative 1 was most preferred for two sub-components (ranked the same as Alternative 3) and less preferred for the other two. Alternative 2 was ranked as less preferred for two of the sub-components and least preferred for the other two.

Alternative 3 was identified as the preferred expansion alternative for the Boyne Road landfill. The advantages of Alternative 3 are that it has the least potential for disruption/adverse effects on the natural environment (both aquatic and terrestrial), the least potential for impacts on surface water quantity and the lowest capital cost for implementation of the expansion.

Description of the Preferred Undertaking

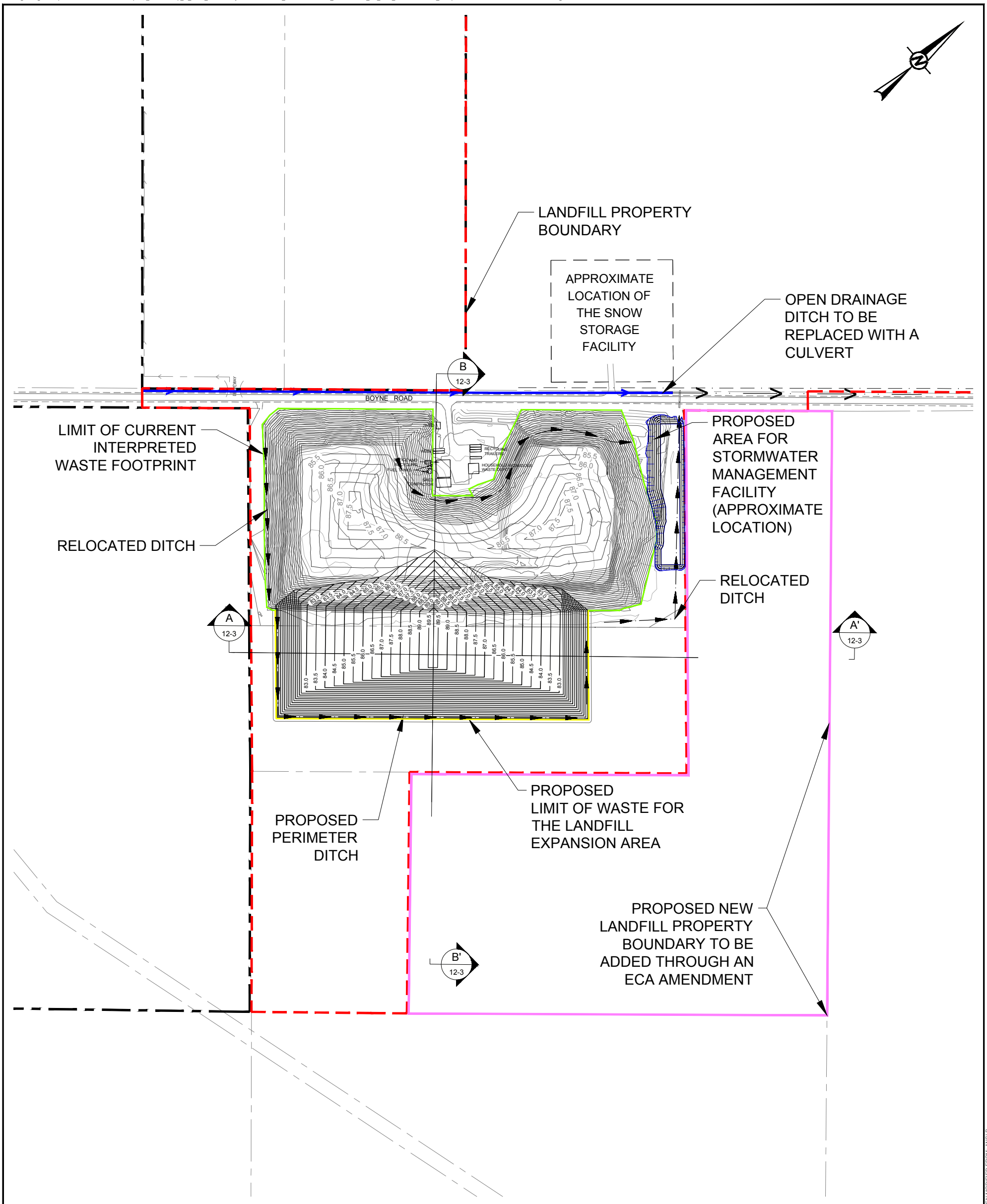
Following the identification of Alternative 3 as the proposed expansion, the expansion design concept was further refined at an EA level of detail to provide the basis to carry out a detailed impact assessment. Details of the refined concept design are provided in Section 12.0 of the EASR and summarized as follows and shown on Figure ES-1.

The horizontal expansion adds an additional 3.8 ha of footprint, for a total landfill footprint of 11.9 ha. The total expanded landfill capacity for waste and daily cover, including the additional 450,000 m^3 beyond 2020 (or 417,700 m^3 beyond 2023) provided by the expansion, is 1,060,750 m^3. The maximum elevation of the landfill will be along its peak at elevation 89.75 masl, which is approximately 15 m above the average ground surface elevation in the vicinity of the landfill expansion and approximately 2.5 m higher than the existing approved landfill.

The landfill site property is currently 97.13 ha. It is proposed to add the 16.21 ha of Township-owned property to the east and southeast to the landfill property, resulting in a proposed total landfill property area of 113.3 ha. The proposed landfill property and expanded landfill footprint are shown on Figure ES-2. The landfill expansion will have a 30 m buffer within the landfill property on the west side (followed by the Contaminant Attenuation Zone (CAZ) lands), and with the addition of the Township-owned lands to the east and southeast a 257 m wide buffer on the east side and a 313 m wide buffer on the south side.

It is proposed that the expanded Boyne Road Landfill will continue to operate as a natural attenuation site, noting that it may be necessary for the Township to acquire additional property and/or CAZ easement agreements to protect off-site groundwater quality in compliance with the Reasonable Use Guideline. The need for any additional CAZ lands and their location will be determined from the results of predictive modelling to be carried out as part of the detailed groundwater impact assessment for the proposed expansion.

The design of the expansion will include an approximately 1 m thick pad of imported permeable fill material (for example, sandy material) above the existing ground surface to provide a base for waste disposal. The base will be constructed in sections prior to waste placement in accordance with the site development plan for the expanded landfill cells/phases.



LEGEND

- 85.0 — GROUND SURFACE CONTOURS (MASL), BASED ON RESULTS OF THE SURVEYS CONDUCTED IN 2008, 2010, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019 AND 2020
- 89.5 — PROPOSED EXPANSION TOP OF WASTE ELEVATION CONTOURS (MASL)
- APPROXIMATE PROPERTY BOUNDARY OF LANDFILL SITE
- APPROXIMATE BOUNDARY OF EXISTING CONTAMINANT ATTENUATION ZONE EASEMENT LANDS
- PROPOSED PERIMETER DITCH
- EXISTING ROADSIDE DITCH TO BE REPLACED WITH A CULVERT (APPROXIMATE LOCATION)
- PROPOSED NEW LANDFILL PROPERTY BOUNDARY TO BE ADDED THROUGH AN ECA AMENDMENT

REFERENCE(S)

1. BASE PLAN SUPPLIED IN ELECTRONIC FORMAT BY STANTEC CONSULTING LTD.
2. 2008 AND 2010 SURVEYS COMPLETED BY STANTEC CONSULTING LTD.
3. MAY 2012, JULY 2013, NOVEMBER 2014, DECEMBER 2015, NOVEMBER 2016, DECEMBER 2017, DECEMBER 2018 AND NOVEMBER 2019, APRIL 2020 AND DECEMBER 2020 SURVEYS COMPLETED BY GOLDER ASSOCIATES LTD.
4. COORDINATES SYSTEM: MTM ZONE 9 NAD83 DATUM CGVD28

0 100 200
1:4,000 METRES

CLIENT
TOWNSHIP OF NORTH DUNDAS

CONSULTANT
WSP GOLDER

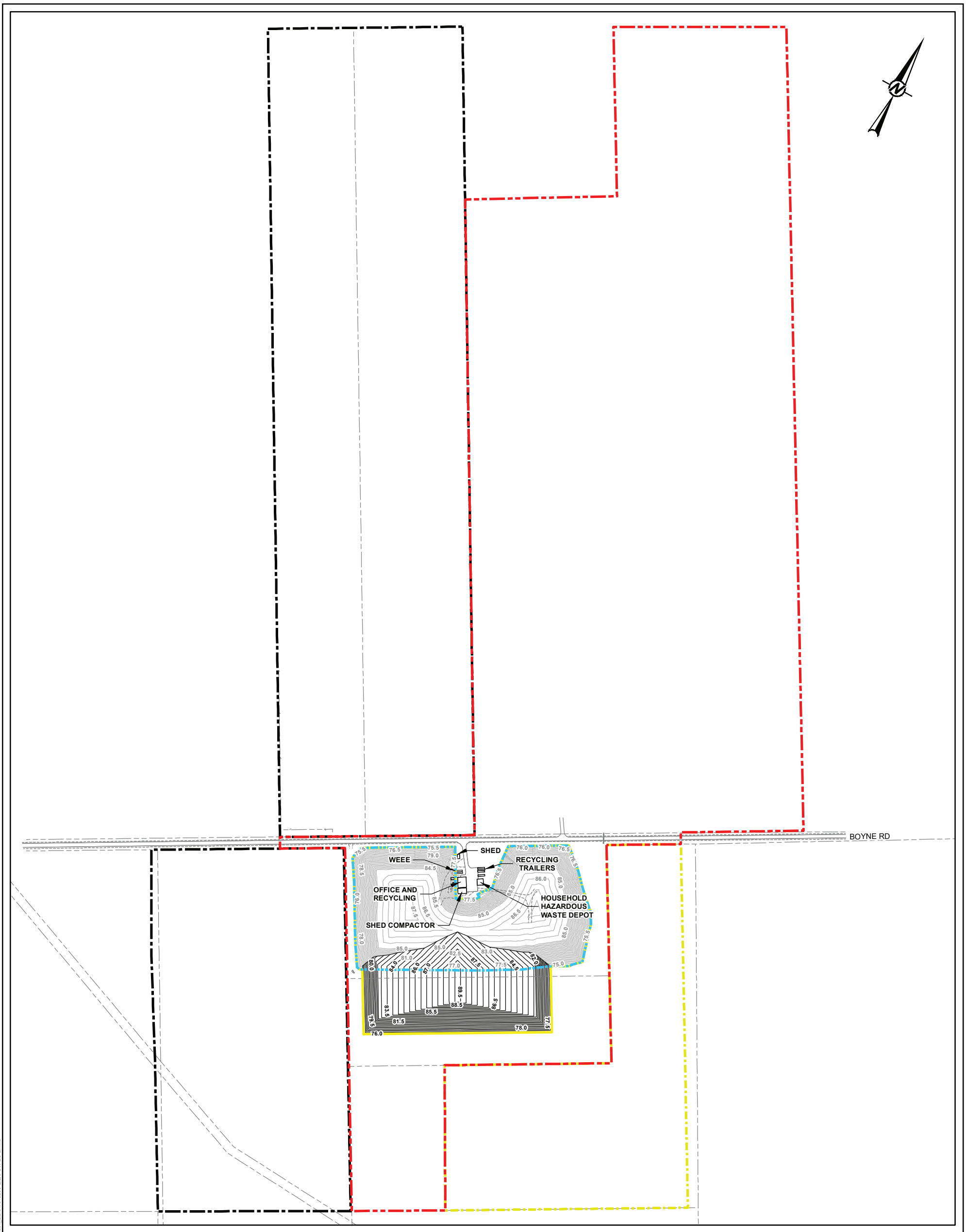
YYYY-MM-DD	2021-11-16
DESIGNED	YJM
PREPARED	ABD
REVIEWED	PLE
APPROVED	PAS

PROJECT
INDIVIDUAL ENVIRONMENTAL ASSESSMENT OF THE TOWNSHIP OF NORTH DUNDAS WASTE MANAGEMENT PLAN

TITLE
SITE PLAN OF PROPOSED EXPANSION

PROJECT NO.	PHASE/TASK	REV.	FIGURE
1648253	2.0\2.2.0.	0	ES-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm
0



LEGEND

- EXISTING LANDFILL FILL AREA
- PROPOSED LIMIT OF WASTE FOR THE LANDFILL EXPANSION AREA
- APPROXIMATE BOUNDARY OF CONTAMINATION ATTENUATION ZONE
- PROPOSED NEW LANDFILL PROPERTY BOUNDARY TO BE ADDED THROUGH AN ECA AMENDMENT
- APPROXIMATE LANDFILL SITE PROPERTY BOUNDARY
- GROUND SURFACE CONTOURS (mASL), BASED ON RESULTS OF THE SURVEYS CONDUCTED IN 2008, 2010, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019 AND 2020
- PROPOSED EXPANSION TOP OF WASTE ELEVATION CONTOURS (mASL)

REFERENCES

1. BASE PLAN SUPPLIED IN ELECTRONIC FORMAT BY STANTEC CONSULTING LTD.
2. 2008 AND 2010 SURVEYS COMPLETED BY STANTEC CONSULTING LTD.
3. MAY 2012, JULY 2013, NOVEMBER 2014, DECEMBER 2015, NOVEMBER 2016, AND DECEMBER 2017 SURVEYS COMPLETED BY GOLDER ASSOCIATES LTD.

0 60 120 180 240 300

1:6,500 METRES

CLIENT
TOWNSHIP OF NORTH DUNDAS

PROJECT
INDIVIDUAL ENVIRONMENTAL ASSESSMENT OF THE TOWNSHIP OF NORTH DUNDAS WASTE MANAGEMENT PLAN

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-11-16
PREPARED	JEM
DESIGN	PLE
REVIEW	YJM
APPROVED	PLE

TITLE
PROPOSED LANDFILL PROPERTY AND EXPANDED LANDFILL FOOTPRINT

PROJECT NO.	PHASE/TASK	REV.	FIGURE
1648253	2.0/2.2.0	0	**ES-2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
25mm
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Path: N:\Active\Spatial_IM\Township_of_North_Dundas\BoyneRoadLandfill\69_PROJ\1648253\40_PROD\Phase_2.0_Task_2.2.0\1648253-2.2.0-CW-ES-2.mxd

O.Reg. 232/98 does not require a landfill gas collection and flaring system for an expanded landfill of this size. Also, considering the high water table that is almost at ground surface on and in the area of the landfill site, off-site lateral migration of landfill gas through the subsurface is not expected.

For the expansion, it is proposed that a wetland type stormwater facility will be constructed at the northeast corner area of the landfill site on the south side of Boyne Road and outlet at the same as outlet as for the existing perimeter ditch. A ditch is also proposed on the north face of the existing landfill to help capture the majority of the existing disposal area that currently drains directly to the Boyne Road roadside ditch; this north side ditch will connect to the proposed stormwater management facility. Similarly, the existing perimeter ditch is proposed to be reconfigured and extended around the perimeter of the expansion footprint.

It is also proposed as a component of the expansion design to install a culvert in the roadside ditch along the north side of Boyne Road (Volks Municipal Drain) opposite the landfill site frontage. This measure would isolate and convey surface water past the landfill site from upstream (west) to downstream (east) and prevent potential seepage of leachate-impacted groundwater into the surface water in the ditch.

The expanded landfill will continue to operate during the same hours as the existing landfill. The existing waste diversion facilities will continue to operate in the central portion of the landfill area.

The landfill will be progressively closed in phases after the final waste contours have been reached and landfill operations have proceeded into the next Phase. The final cover on the landfill will consist of 600 mm of soil and topped with 150 mm of soil capable of sustaining vegetation.

Impact Assessment of The Preferred Undertaking

Section 13.0 of the EASR presents an overview of the predicted effects of the proposed expansion on each of the components. These assessments were conducted in accordance with the requirements set out in the approved ToR (Volume 2, Appendix A) and detailed in the work plans for specific components and as described in Section 8.2 of the EASR. For some of the components, additional supporting detail to that provided in the main EASR Volume 1 is provided in Technical Appendices in Volume 2, Appendices B through H.

Atmosphere

The Atmosphere environment component is comprised of two sub-components: air quality (including dust, odour, greenhouse gas (GHG)) and noise.

Air Quality

The effects of the proposed landfill expansion on air quality were identified through comparing the existing landfill and the proposed expansion, using the following three steps:

- Calculating representative emissions rates for each of the significant sources
- Carrying out atmospheric dispersion modelling to predict off-Site concentrations of the indicator compounds
- Comparison of predicted concentrations to existing conditions and the Applicable Guidelines

The emission estimation methods followed accepted MECP practices including, where applicable, guidance in the Ontario MECP document Procedure for Preparing an Emission Summary and Dispersion Modelling Report Version 4.1 (MECP, 2018b).

In calculating these emissions, all potential sources of emission at the proposed landfill expansion were considered; however, only sources with emissions rates that are expected to be either negligible or infrequent were not considered. Emissions during existing operations and after expansion are expected to be greater than during the post-operation phase (i.e., closure) because the level of on-site activities will be greater during the operational phase; therefore, the air emissions and associated effects during the operational phase represent the greatest potential impacts.

To determine potential effects of the proposed project on air quality and odour, the predicted concentrations of indicator compounds were compared to the applicable guidelines, which are the Ontario's Ambient Air Quality Criteria (AAQC) (MECP 2020) and the Canadian Ambient Air Quality Standards (CAAQSs) (CCME 2014).

The maximum cumulative concentrations of all indicator compounds are below the relevant guidelines for all indicator compounds. As such, the predicted compound concentrations associated with the expansion are predicted to meet the relevant air quality criteria.

All predicted maximum concentrations for all compounds occurred at the closest residence west of the Boyne Road Landfill along Boyne Road, located about 0.7 km to the west.

In addition to the assessment of the effects of the proposed landfill expansion on ambient air quality and odour, consideration was given to an evaluation of compliance by determining whether an ECA for air and noise under Section 9 of the *Environmental Protection Act* (Ontario, 1990d) could be obtained based on whether the facility is in compliance for those sources regulated under *O.Reg*. 419/05. At the landfill, this would include landfill gases and materials handling emissions. All mobile equipment is exempt from compliance requirements under *O.Reg*. 419/05. The assessment indicates that the proposed landfill expansion is expected to operate in compliance with Schedule 3 of *O.Reg.* 419/05.

The potential effects of climate change on infrastructure associated with the proposed landfill expansion have been included in this report to qualitatively assess potential climate change effects. The activities associated with the landfill expansion that will produce greenhouse gases (GHGs) include the following:

- Landfill gas
- On-site transportation fuel combustion emissions
- Stationary combustion emissions from propane used for comfort heating in the buildings
- Land clearing as part of the expansion

The GHG emission estimates, where applicable, followed quantification guidelines for both provincial and federal reporting:

- Federal reporting under Section 46 of the *Canadian Environmental Protection Act*, (CEPA), SC 1999: Greenhouse Gas Emissions Reporting Program (GHGRP).
- Provincial reporting under Ontario's Greenhouse Gas Emissions: Quantification, Reporting, and Verification Regulation, *O.Reg*. 390/18.

The results of the GHG assessment indicate that the increase in emissions from the existing landfill to the proposed expansion would have a negligible contribution of less than 0.003% to the Ontario emissions and less than 0.0006% to the Canadian emissions; therefore, the proposed landfill expansion will have a negligible effect on climate change.

Noise

The noise impact assessment for the proposed expansion describes and summarizes a noise assessment that considers the existing conditions and potential effects of the landfill expansion on the outdoor acoustic environment.

The following methodology was carried out to assess the potential impacts due to the proposed landfill expansion:

- Determination of future noise levels with the Boyne Road Landfill proposed expansion
- Determination of potential noise impact due to the Boyne Road Landfill proposed expansion
- Assessment of noise mitigation, if required

The methodology used for the noise assessment was based on the MECP publications "Noise Guidelines for Landfill Sites" (Landfill Guidelines) (MECP 1998) and NPC-300 (MECP 2013). These guidelines outline the sound level limit criteria for evaluating landfilling operations and ancillary facilities (i.e., stationary noise sources).

The noise assessment was carried out at the representative points of reception (PORs) identified within the Site-vicinity Study Area, which included both existing PORs and vacant lot PORs. All representative PORs identified in this noise assessment are conservatively described as being located in a Class 3 area, as defined in NPC-300 as a rural area with an acoustical environment that is dominated by natural sounds.

Noise predictions of landfilling operations, ancillary equipment, and off-site haul routes were each assessed independently against the applicable guidelines. Noise levels associated with landfilling operations and ancillary equipment met the applicable sound level limits.

During the proposed landfill expansion predictable worst-case hour, the change in noise levels at PORs along the haul route compared to there being no landfill present ranges from insignificant to noticeable. General industry practice typically does not require action to be carried out unless a significant rating is predicted. Note that if the Boyne Road Landfill proposed expansion worst case hour noise levels were compared to existing worst case hour noise levels with the existing Boyne Road Landfill traffic included (more representative of current conditions), changes in noise level would be insignificant.

Geology and Hydrogeology

A series of analytical contaminant transport calculations were conducted based on a conceptual model of groundwater flow and contaminant transport at the site to calibrate to current conditions and assess expected future expanded landfill site compliance with MECP Reasonable Use Guideline B-7. Guideline B-7 establishes a quantitative benchmark for protecting off-site groundwater quality for drinking water purposes. The calculations were completed using GoldSim to simulate the passage of contaminants in the landfill leachate from the source area (i.e., the active and expanded landfill areas) through the overburden groundwater flow system to the downgradient boundary of the CAZ.

The overburden conditions in the area consist of discontinuous topsoil/peat, underlain by discontinuous silt/clay, underlain by silty sand/sandy silt glacial till. Bedrock, consisting of limestone (interbedded with shale) is present beneath a total overburden thickness ranging from 1.4 and 9.0 m. The model considered two groundwater flow directions (pathways) from the disposal area, one towards the south and one towards the north.

The model assessed the impact of groundwater contaminants chloride and boron as representative conservative indicators of leachate migration through the groundwater system.

The model indicates that chloride concentrations are simulated to be closer to the Guideline B-7 allowable concentrations than boron. The predictive results indicate that chloride concentrations are likely to meet Guideline B-7 for overburden groundwater beyond 700 m downgradient of the fill area, for both the northward and southward groundwater flow pathways) for the proposed landfill expansion. To achieve compliance in future, it will be necessary for the Township in future to obtain control over an additional 400 m of groundwater travel distance towards the south as CAZ through either property acquisition or groundwater easement below this land area. It is noted that this additional CAZ land is not needed immediately, and the timing such that the landfill site remains in compliance with the Reasonable Use Guideline will be dependent on the ongoing groundwater monitoring program results.

An evaluation of the proposed expansion in terms of Source Water Protection for existing communal water supply wells was also carried out. The proposed Boyne Road Landfill expansion is within the existing Wellhead Protection Area (WHPA)-D of the Chesterville

wellfield. The proposed Boyne Road Landfill expansion is not interpreted to have an impact on the Winchester, Chesterville, or nearby residential wells due to its location within the geological setting, the local hydrogeology and its remote location from residents.

Using the source concentration output files from POLLUTE (Volume 2 Appendix D-3), the contaminating lifespan of the proposed expanded landfill (the time period which leachate from the landfill can be expected to have an adverse effect on groundwater quality) was estimated using the parameter chloride. It is estimated that the contaminating lifespan will be below the RUPO at approximately year 2070 or 22 years post closure. This is a relatively short amount of time, but not unexpected for a natural attenuation landfill with a permeable soil cover.

Surface Water

In terms of surface water, the impact assessment considers both surface water quality and surface water quantity.

There is currently no quality or quantity control system for stormwater management in place for the existing landfill except for the existing perimeter ditch that collects and conveys runoff to the Volks Municipal Drain ditch along the north side of Boyne Road. For the expansion, it is proposed that a wetland type stormwater management (SWM) facility will be constructed at the northeast corner area of the landfill site on the south side of Boyne Road and outlet at the same location as the existing perimeter ditch.

As a requirement of the MECP SWM Planning and Design Manual (MECP, 2003) the design of the SWM pond requires Enhanced Level Protection (80% total suspended solids (TSS removal)) and matching post-expansion outlet flows from the ponds to corresponding pre-expansion flows for selected storm events. Surface drainage from potentially contaminated areas, i.e., originating from active landfilling areas, will be contained locally within berms and will discharge into the waste. Surface drainage from non-contaminated areas such as road areas and areas with interim or final landfill cover will be conveyed to the SWM pond via the internal drainage ditches. As mentioned as part of the description of the preferred undertaking, leachate-impacted groundwater presently and in the future will discharge into the Volks Municipal Drain located to the north of the landfill. To mitigate this, the installation of a culvert in the drain to prevent this groundwater discharge is proposed, thereby protecting the surface water quality within the drain.

A 20% increase of design storm intensity values was applied to the 1:100 year return period design storm to “stress test” the proposed SWM system and evaluate potential climate change effects.

Because of the required quality and discharge quantity control for the expanded landfill, there is not expected to be an adverse impact on off-site surface water quantity or quality. The net result is an improvement compared to existing conditions.

Biology

The Biology environment component is comprised of two sub-components: aquatic and terrestrial.

The impact assessment considers the potential direct and indirect impacts of the proposed landfill expansion on the aquatic and terrestrial ecosystems within the Site and Site-vicinity Study Areas for the construction, operations and closure stages of the landfill expansion. Potential direct impacts to natural heritage features and functions are those that result in an immediate loss of the feature or function as a consequence of the landfill expansion. Potential indirect impacts are those whereby the landfill expansion causes impacts to an adjacent or downstream feature or function through the alteration of the site.

Aquatic Biology

Direct Impacts:

- The removal of an area of evaluated and unevaluated wetland; and relocation and / or re-grading of the existing perimeter ditch (effects on marginal and seasonal fish habitat)
- Modifying Volks Municipal Drain in an approximately 588 m long pipe along the north side of Boyne Road to isolate and convey surface water past the landfill site from upstream (west) to downstream (east) will remove fish habitat

Potential residual effects of the expansion (i.e., those that cannot be fully mitigated) that could result in the death of fish or the harmful alteration, disruption, or destruction of fish habitat (HADD) will need to proceed through the Department of Fisheries and Oceans (DFO) review process, and a DFO *Fisheries Act* Authorization for the landfill expansion may be required. The DFO permit application will include a comprehensive impact assessment that will incorporate the landfill expansion detailed design.

It is considered that the resulting improvements in water quality from the SWM facility into Volks Municipal Drain, a fish bearing watercourse, will outweigh the loss of access to the seasonal, low quality habitat within the perimeter ditch.

To mitigate the effects on fish habitat by enclosing a section of Volks Municipal Drain in a culvert, it is proposed that an alternative approach consisting of a low permeability lined ditch be considered at the design stage. This approach would maintain the watercourse as an open ditch and would reduce the likelihood of potentially leachate-impacted groundwater seepage entering the watercourse and also maintain fish passage and access to upstream habitats.

Once the proposed expansion is constructed, potential direct impacts related to the landfill during the Operations Stage on surface water features are expected to be limited to effects related to the use of site operations equipment, which can be avoided through the implementation of standard operational measures.

Activities during the landfill Closure Stage will include the addition of final cover soil, organic material capable of supporting vegetation growth (such as topsoil) and revegetation; as such,

potential direct impacts to aquatic systems are considered minor and can be readily mitigated with standard practices.

Indirect Impacts:

Potential indirect effects on fish and fish habitat during the Construction Stage can be minimized or eliminated using appropriate mitigation measures and best practices, and development and implementation of an Erosion and Sediment Control Plan and Spill Contingency Plan.

With the addition of the SWM pond and modifications to Volks Municipal Drain and implementation of appropriate mitigation measures (i.e., erosion and sediment control, existing standard operational measures, and groundwater and surface water quality/quantity monitoring), potential indirect impacts to fish and fish habitat during the Operations Stage are considered minor.

Indirect impacts to fish habitat as a result of landfill closure are not anticipated.

Terrestrial Biology

Direct Impacts:

- The proposed expansion will result in disturbance of 9.3 ha of naturally occurring vegetation, which are: habitat for endangered or threatened species (little brown myotis); significant woodland; evaluated non-Provincially Significant Wetland (PSW) (Melvin Swamp) and unevaluated wetlands; significant wildlife habitat – species of conservation concern (wood thrush and eastern wood-pewee); and significant wildlife habitat – interior forest.
- The loss of habitat for little brown myotis, which is designated endangered under the Endangered Species Act (ESA), will require an Information Gathering Form to be prepared and submitted to the MECP prior to any works being undertaken to determine the need for permitting, if any, under the ESA.
- It is not expected that the proposed expansion will affect the function of the woodland for provision of wildlife habitat, or have a significant impact on the remaining portions of the wetlands or their functions, or reduce the ability of wood thrush or eastern wood-pewee to continue to use the remaining forest adjacent to the proposed expansion for breeding.

The proposed expansion has the potential to cause direct mortality to wildlife during the Construction Stage. To avoid contravention of the Migratory Birds Convention Act, clearing of vegetation should take place outside of the breeding bird nesting period (April 1 – August 31) to protect birds, their nests and young. Other wildlife has the potential for direct mortality during construction, such as snakes and mammals. A Wildlife Encounter Protocol should be developed for use during construction, and all staff should be trained on the contents of the protocol.

Once the proposed expansion is constructed, direct impacts related to the Operations Stage of the landfill are expected to be limited to potential, occasional mortality of wildlife.

Activities associated with landfill closure, i.e., the addition of final cover soil, organic material capable of supporting vegetation growth (such as topsoil) and plantings of native vegetation, will result in some compensation for natural communities lost during construction and operations. No negative direct impacts are anticipated.

Indirect Impacts:

Potential indirect impacts of the construction phase include typical construction-related impacts such as:

- Accidental spills or sedimentation in adjacent vegetation communities
- Dust deposition on vegetation in adjacent vegetation communities
- Noise related impacts to wildlife in adjacent habitats
- Introduction of invasive plant species via construction equipment

These indirect impacts are not considered significant and are mitigatable with standard construction best management practices.

Potential indirect impacts during the Construction Stage are not considered significant and are mitigatable with standard construction best management practices.

During the Operations Stage of the proposed expansion, potential indirect impacts to terrestrial ecosystems are likely to be limited and can be readily mitigated.

Indirect impacts as a result of landfill closure are not anticipated.

Land Use Planning

The assessment of impacts from the proposed expansion of the Boyne Road Landfill on land use considered the relevant provincial policy, County official plan, municipal zoning by-law and provincial guidelines to discern land use composition in the existing Site Area and Site-vicinity Study Area characteristics.

The preferred expansion for the landfill site is primarily a horizontal expansion to the south of the existing landfill. The expansion will add an additional 3.8 ha to the landfill footprint, as well as 16.21 ha of Township-owned property to the east and southeast of the overall landfill property as buffer lands. These Township-owned lands are not currently zoned for landfill use and will remain zoned as Rural.

In regard to the Provincial Policy Statement (2020), The landfill expansion will help to promote an efficient land use pattern to help sustain the financial well-being of the Province and Township over the long term. In this regard, the landfill expansion is expected to increase the available capacity of the landfill to the year 2048, which will allow the Township to continue to use these lands as designated for waste to be disposed of locally.

The lands for the expansion are Class O (Organic) soils, which are not considered as being lands that would normally be considered for protection as Prime Agricultural Lands nor included within a Prime Agricultural Area for long-term protection for agriculture. The landfill

expansion is to take place within the existing landfill property, avoiding the need to use additional undeveloped lands.

In terms of the County Official Plan, the denotation of the landfill site on the Official Plan Schedule is a symbol, and does not designate spatial usage; as such, an Official Plan Amendment will not be required to expand the landfill site. Also, according to the OP schedule, the existing landfill is surrounded by Agricultural and Rural land uses. Through the land use analysis, agricultural fields were identified surrounding the landfill site. It is considered that the expansion of the landfill will not have any direct negative effects on these existing land uses.

In the Zoning By-law, the current active Boyne Road Landfill site is zoned SRD; the balance of the Township-owned lands is zoned as Rural. Waste disposal sites are not a permitted use within the Rural designation; however, the area proposed for the expansion is already owned by the Township and is simply being added to the designated part of the lands as an additional buffer to accommodate the landfill expansion and will not be used for waste management services. Therefore, a re-zoning of this property is not required to accommodate the proposed landfill expansion. However, it is recommended that once the EA has been approved confirming that this additional land is to be reserved as part of the landfill site property for buffer area, the Township rezone the lands to ensure that the 500 m separation distance between SRD uses and dwelling units is correctly identified when using the land use schedule to the Zoning By-law, as this is the only tool available to the general public in regard to potential development within the 500 m restricted zone around the landfill site.

Agriculture

In the United Counties of Stormont, Dundas and Glengarry Official Plan, the majority of the Township of North Dundas is designated as Agricultural Resource Lands outside of the Urban Settlement Area. The County Official Plan defines Agricultural Resource Lands as lands predominated by prime agricultural lands and other large tracts of land characterized by viable farming activity.

In the Township of North Dundas, subject lands that are in the former Township of Winchester immediately surrounding the Boyne Road Landfill site are designated as Rural, where agricultural use is a permitted use. Lands on the perimeter of these Rural lands are designated Agricultural Zone.

The Ministry of Agriculture, Food and Rural Affairs Agricultural Maps shows the landfill site within a Muck soil area. Muck soil, as defined in the Soil Survey of Dundas County is generally not suitable for agriculture and has traditionally not be included in an Agricultural designation, as it requires a great deal of work to prepare for crops and the rate of return is low. The proposed landfill expansion is to take place within this Muck soil area.

An Agricultural Impact Assessment (AIA) is a study that evaluates the potential impacts of non-agricultural development on agricultural operations and the Agricultural System and recommends ways to avoid or, if avoidance is not possible, minimize and mitigate adverse impacts. The assessment of effects on agricultural land use, while not an AIA, provides an

AIA-based summary of the potential effects from the proposed landfill expansion, considering the requirements described in the Draft Agricultural Impact Assessment Guidance Document.

There are five active farming operations in proximity to the landfill site. The Township engages in regular discussions with the owners of these farms, and they are aware of the expansion and the expansion process.

It is expected that neighbouring agricultural operations will continue to implement normal farm practices. It is anticipated that any nuisance effects associated with the landfill expansion will be at worst occasional and of low magnitude. As identified in studies completed for the EA, elevated dust levels can pose a potential impact to nearby crops. Mitigation measures will be implemented to minimize the amount of airborne dust such as enforcing on-site speed limits and applying site fugitive dust best management practices, as necessary and appropriate (e.g., watering or applying dust suppressant to on-site road surfaces).

The expansion is not expected to cause issues with farm vehicles in the area. The volume of farm vehicles and observations during a September 2021 traffic counting period did not identify any major impacts at intersections or along the roadways due to the equipment.

No active agricultural operations will be affected with the proposed landfill expansion. Lands adjacent to the landfill site and used as agricultural fields will continue to be used for this purpose.

Cultural Heritage Resources

Archaeological Resources

A Stage 1 Archaeological Assessment was completed for the Site Study Area. The northern portion of the Site Study Area has been disturbed by the existing landfill, while the southern portion of the Site Study Area is not associated with any features indicating archaeological potential and is thus considered to have low potential for archaeological resources. As such, the Site Study Area does not meet the requirements for further archaeological assessment based on the MHSTCI Standards and Guidelines for Consultant Archaeologists (MHSTCI, 2011) and no further archaeological assessments are recommended.

Cultural Heritage Landscapes and Cultural Heritage Resources

The Counties' Official Plan identifies the study area as an active landfill site within a Rural District and across from Crown Land located on part of Lot 8, Concession 7. The Counties' Land Use Schedules B1 and B2 indicate that the Site-vicinity Study Area is surrounded by wood lots, organic soils and non-significant wetlands but no identified built heritage resources or cultural heritage landscapes. There is also no evidence that any part of the Site-vicinity Study Area is considered to be a cultural heritage landscape.

Socio-economic

The assessment of impacts on the socio-economic environment looked at both direct and indirect effects and the level of change that may result to the baseline environment.

Direct effects – These are effects to the socio-economic environment that occur as a direct result of a change to a socio-economic feature such as population change, employment effects or visual effects.

Indirect effects – these are effects to the socio-economic environment that occur indirectly as a result of landfill expansion related changes on other aspects of the environment (e.g., increased noise, dust or odour creating nuisance effects).

Local Economy

The following indicators (and criteria) were evaluated to assess effects to the local economy:

- Expected effect on local employment (Employment opportunities during landfill expansion construction and operation
- Expected effects on local businesses and commercial activity (Potential effects to local commercial businesses in the Site-area, excluding agriculture)
- Expected effects on municipal finances (Capital costs associated with construction and operation)

The proposed landfill expansion is expected to neither create nor decrease jobs in the community, the existing landfill workforce is deemed sufficient. The annual operating cost are expected to remain the same at approximately $55,000. No significant changes to local traffic around the landfill as a result of the landfill expansion are predicted. Other businesses (excluding farms) in the Site-vicinity Study Area are not anticipated to be affected negatively or positively as a result of the landfill expansion.

Revenue to the landfill is expected to remain generally the same with mild increases related to inflation and the modest population increase forecast.

Residents and Community

The following factors (and criteria) were evaluated to assess effects to residents and community:

- Displacement of residents (Proximity to nearby residences)
- Expected interference with use and enjoyment of residential properties, i.e., nuisance effects (Biophysical and social interactions with nearby residential and community receptors (i.e., noise, dust, odour, and nuisance wildlife/pests))

The physical landfill expansion does not require any displacement of residences. There are no properties with existing homes or community features within the 500 m Site-vicinity Study Area. To date, the Township has never received a complaint from neighbours about the operation of the landfill related to noise, traffic, dust, odours or visual. Current noise, dust and

odour sources within the Site-vicinity Study Area will primarily be agricultural and traffic as well as potential noise, dust and odour from the existing site.

Studies of air quality and noise conclude that with the use of standard site operating practices, the expansion is not expected to result in adverse effects off-site. Similarly, the traffic study shows the anticipated increase in traffic as a result of increasing population is not forecast to cause any issues with traffic movement along the haul routes to the landfill site, or at the site entrance/exit location.

Visual

The proposed expansion that is somewhat higher than the currently approved top of waste contours is limited to the southern half of the current footprint. For the horizontal expansion area, trees and vegetation will be removed to prepare for the expansion. A row of trees and bushes along the western and southern boundaries will remain in place and grow over time to further screen the view from potential off-site receptors.

A computer-generated 3D landscape model was developed in a geographic information system (GIS) and available land cover information to account for potential vegetation screening, and 3D modelling of the proposed expansion design. The 3D model was used to conduct visibility analysis and determine potential key representative public locations for viewing the landfill site within a 1 km Site-vicinity Study Area. This model also allowed for the rendering of simulated images of the proposed expansion from key viewpoints. These simulated images were combined with field survey photographs to produce photo-composite images to portray the relative scale and extent of the proposed expansion within the existing viewing conditions and to support the assessment of potential visible effects.

A detailed assessment of potential visible impacts was completed for a total of four identified key off-site vantage points along Boyne Road and from the south. The assessment concluded that the expansion will be not visible or only be visible to a limited extent from off-site. The weak level of contrast does not change the overall rural landscape character of the area.

To further mitigate visibility and reduce contrast with the surrounding landscape, it is recommended that additional trees be planted within the tree line between the proposed expansion and the southwestern property boundaries.

Transportation

The traffic impact study evaluated the operation of the Access/Boyne Road, St. Lawrence Street/Main Street and County Road (CR) 7/Boyne Road intersections and examined the lane configuration and left turn lane warrants. The analysis was conducted for the traffic using 2021 traffic counts, and the expected 2048 traffic, which represents the end of the 25 year planning period for the landfill expansion. The time period selected for the analysis was the weekday peak a.m. and p.m. hours, which are expected to be the peak traffic periods for both the landfill facility and the background traffic.

The trip generation analysis determined that following the expansion of the Boyne Road Landfill site, the facility would generate 11 trips entering and 10 trips exiting the site during the weekday peak a.m. hour for a total of 21 vehicle trips, and 21 trips entering and 20 trips exiting during the peak p.m. hour for a total of 41 vehicle trips.

The landfill site is currently operating with one access onto Boyne Road. The access is a single lane entering and one lane exiting the site. An analysis of the expected 2048 traffic determined that there would be no roadway modifications required to the site access and Boyne Road intersection due to the expansion of the landfill facility. The traffic analysis further examined the St. Lawrence Street/Main Street intersection in the Village of Winchester, and CR 7/Boyne Road intersection located 6.6 km east of the landfill site. The expected site trips at both intersections would have a minor impact on the operation of the intersections with no modifications required.

Design and Operations

In terms of landfill expansion development, the landfill expansion involves a limited vertical expansion on the south portion of the existing landfill and a new 3.8 ha horizontal expansion footprint area. The horizontal expansion area will have a constructed base consisting of a pad of imported permeable fill. It is proposed that the expansion area would be constructed and filled in three or four phases; final cover would be placed progressively as the landfilling in a phase is completed. It is anticipated that the development would proceed from east to west, since the proposed SWM pond is located along the east side of the site and this would allow drainage from the first phase of the landfill cover into the pond. It is also noted that the expansion is located south of the existing landfill and is of similar height to the existing landfill; the combination of the existing landfill and forested areas will be quite effective at screening the view of the expansion operations from Boyne Road and other off-site vantage points.

In terms of leachate management, the proposed expansion will continue to reply on natural attenuation to control potential adverse effects on off-site groundwater quality. The results of the hydrogeological impact assessment are that the expanded landfill site requires some additional CAZ lands to the south to remain in compliance with the MECP Reasonable Use Guideline. With the addition of more CAZ lands to the south, adverse impacts to off-site groundwater quality are not expected. In addition, the development and operation of the landfill do not involve lowering of the groundwater level or taking of groundwater; as such, no effects on off-site groundwater availability are expected.

In terms of landfill gas, it is neither required by regulation nor proposed to install a landfill gas collection system at the Boyne Road Landfill site. The air quality assessment demonstrates that air emissions from the expanded landfill (air quality, odour, dust) are expected to comply with provincial requirements. Also, the estimated GHG generation from the expanded landfill is indicated to negligibly contribute to provincial GHG release. Off-site lateral migration of landfill gas through the subsurface is not expected; it is expected to vent to atmosphere through the landfill cover soils. It is also noted that there are no existing structures within 500 m of the landfill site other than the landfill building. As such, there is no potential for

off-site lateral migration of landfill gas from the existing landfill or the expansion area to cause adverse effects.

In terms of soil balance, there are no potential sources of earth borrow materials on the landfill site property for use in construction of the expansion or future site operations. The construction of the landfill expansion will require the importation of approximately 38,000 m^3 of permeable sandy soil for the landfill base; additional imported soil will be required for construction of the stormwater pond berms. As is done for the current landfill operations, daily cover for the expansion waste will consist of imported soil materials as well some alternative daily cover materials and will consist of a combination of surplus soils from construction projects within the Township as well as material from licensed pit sources; an estimated 84,000 m^3 of soils would be required.

The proposed final landfill cover is proposed to consist of a general soil final cover meeting the requirements of *O.Reg*. 232/98. Again, imported soil (suitable soils that are surplus from construction projects and/or from licensed pits) and topsoil will be required.

In terms of capital and operational costs, an estimate of possible costs for the main components of the capital costs (in 2021 dollars) was prepared, as follows:

- Clearing, excavation and fill placement to construct the expansion base pad: approximately $1,300,000 to $1,500,000.
- Construction of the SWM wetland facility and north side landfill ditching: approximately $171,500 to $365,000.
- Construction of the mitigation measure in the north side Boyne Road ditch (Volks Drain): approximately $615,000 to $950,000 for the culvert option, which is expected to be the more expensive option.

These capital costs will be phased with progressive construction and filling of the expansion. As such, the capital costs associated with the expansion can be planned within the Township's annual capital expenditures budgeting process. The operating costs are expected to be comparable to the current operating costs. These cost components are not expected to adversely impact municipal finances.

In summary, there are no significant impacts expected as related to site design and operations.

Comparison to Do-Nothing

For the Township, the Do-Nothing alternative would be to allow the Boyne Road Landfill to reach its approved capacity and not pursue any other solution for residual waste management for the Township. The predicted effects of the preferred alternative were compared to the Do-Nothing scenario for each of the environmental components, sub-components and indicators to better understand and appreciate the magnitude of any predicted effects of the proposed expansion design.

Not all effects of landfill expansion were negative, a few were positive, and some effects were similar whether considering Do-Nothing or landfill expansion. However, all negative effects

are mitigatable to within regulatory limits, as landfill expansion is a well-known and well understood type of approach in terms of landfill development, operations and performance.

One of the Township's basic requirements as a municipality is to provide municipal services and infrastructure for its ratepayers including waste management. As such, the Do-Nothing Alterative would not be practical to implement. If the Township actually did nothing, individual residents would be responsible for finding their own solution to waste management such as hiring a private waste management company or disposing of waste on their own property. The comparison of the Do-Nothing alternative does not include the potential actual impacts of the Do-Nothing alternative.

Climate Change Considerations

The document entitled "Considering Climate Change in the Environmental Assessment Process" (MECP, 2019) was used as a guide for incorporating measures in the landfill expansion design that reduce both the potential impact of climate change on the landfill (i.e., climate change adaptation) and its potential impact on climate change (i.e., climate change mitigation).

Potential Impacts of Climate Change on the Landfill Expansion

It is expected that the planned 25 year operational period of the landfill expansion, i.e., through 2048, will be too short to be significantly affected by impacts from climate change. However, during the post-closure period, longer term changes in precipitation and temperature could possibly affect the vegetative cover growth on the closed landfill and/or runoff of surface water from the landfill final cover and the performance of the components that comprise the stormwater management system (SWMS). For example, an increase in precipitation and/or an increase in storm intensity or duration compared to historical design storms would increase the amount of runoff, potentially resulting in surface erosion of the vegetated landfill final cover surface and exceedance of the capacity of the SWMS.

Climate change adaptation was incorporated into the design of the landfill expansion in terms of design of the SWM pond to remove suspended solids prior to discharge, including larger storm events, and increasing the design storms for the SWM system by 20 percent above the 100 year design storm to account for and assess the impact of possible climate change effects.

Adaptation of landfill operations to climate change effects was also assessed and mitigation measures proposed, i.e., extremes of heat or cold, stronger winds as related to litter control, effects of increased precipitation casing increased leachate generation.

In summary, the potential impacts from climate change related to precipitation have been considered in terms of design of the stormwater management system for the expanded landfill. Adjustments to landfill operations can be made, as required, in future to mitigate potential effects from climate change.

Potential Impacts of the Landfill Expansion on Climate Change

The potential effects of the landfill expansion on climate change were assessed to quantify potential climate change effects. The two main ways that a landfill expansion could affect climate change are the generation of GHG that enters the atmosphere, and reduction of GHG sequestration by removal of forested areas.

A comparison of the Boyne Road Landfill site's proposed expansion GHG emissions to the provincial and Canadian totals indicates that the increase in emissions from the existing landfill to the proposed expansion would have a negligible contribution of less than 0.003% to the Ontario emissions and less than 0.0006% to the Canadian emissions; therefore, the proposed landfill expansion will have a negligible effect on climate change.

Cumulative Impact Assessment

A cumulative impact assessment of the potential effects of the proposed landfill expansion in combination with past, present and reasonably foreseeable future activities, where possible, was carried out following a framework often used in federal EA processes. The cumulative effects analysis involved a scoping phase and an analysis of effects phase. For the scoping phase, the components that had residual negative effects (after mitigation) from the proposed landfill expansion were identified. After this, other projects or activities in the area that may affect the same components were identified.

During the analysis of effects phase, the other projects or activities were evaluated to assess if their effects would overlap in timing or spatial extent with the effects of the landfill expansion, accounting for and including the proposed landfill expansion mitigation. The nature and extent of the possible cumulative effects were then identified along with any possible mitigation and/or monitoring strategies.

Of the natural, social, economic, cultural and technical components for which impact assessments associated with the proposed landfill expansion were carried out, the identified components with potential residual negative off-site effects after proposed mitigation measures are in effect were identified.

The existing zoning and land use in the vicinity of the landfill was considered in determining the other projects and activities to include in this cumulative assessment. There are no known new future planned land uses in the Site-vicinity. As such, the only expected activity in the Site-vicinity whose effects could possibly overlap with those from the landfill expansion is farming operations.

The potential overlap in effects was limited to the atmosphere component, i.e., dust, odour, air quality, noise, GHG. With the use of the proposed mitigation measures during landfill site operations, the resultant effects are expected to be within allowable limits.

Monitoring and Contingency

The proposed expansion of the Boyne Road Landfill has been designed to incorporate mitigation measures to minimize the potential for unacceptable environmental effects. Following the identification of mitigation measures, the environmental effects of the proposed expansion were evaluated. Although, efforts have been made to conservatively estimate potential impacts associated with the proposed landfill expansion, there is always some potential for variability between predicted and actual conditions. Effective monitoring and contingency measures are intended to address this potential variability and confirm the assumptions used in this assessment.

For the proposed expansion, it is proposed that the groundwater and surface water monitoring programs that are ongoing as part of the site operations continue, modified as appropriate for the expansion. It is proposed that a stormwater pond discharge monitoring program be added for the expansion

The proposed groundwater, surface water and stormwater monitoring programs are summarized in Section 16.1 of the EASR and will be finalized and confirmed during the ECA amendment application for the expansion in consultation with the MECP. The existing groundwater and surface water trigger mechanisms will also be reviewed and modified as appropriate at that time.

In the event that the ongoing groundwater or surface water monitoring programs detect unexpected problems, it may be necessary to implement contingency measures to further reduce the potential for any adverse environmental effects associated with the proposed expansion of Boyne Road Landfill. An overview of the proposed contingency measures that could be put into effect are described in Section 16.2 of the EASR.

Other Approvals

Following approval of the Boyne Road Landfill expansion EA by the Minister of the Environment, Conservation and Parks, the following other approvals will be required:

- Approval under the *Environmental Protection Ac*t (EPA) and the *Ontario Water Resources Act (*OWRA) will then be required; these approvals will take the form of amendments to the existing landfill Waste ECA, and a new OWRA ECA for the SWM works.
- Preparation and submission of a DFO Request for Review will be required to determine any additional mitigation and potential compensation in consultation with DFO.
- An Information Gathering Form will be prepared and submitted to the MECP prior to any works being undertaken to determine the need for permitting, if any, under the ESA.
- An approval under the provincial Drainage Act for the alternations/improvements in the portion of the Volks Drain on the north side of Boyne Road opposite the landfill site to construct the proposed mitigation measures.

- Re-zoning of the landfill is not required to accommodate the proposed landfill expansion. However, it is recommended that once the EA has been approved confirming that the additional land to the south and east is to be reserved as part of the landfill site property for buffer area, the Township rezone the lands to ensure that the 500 m study area is correctly identified when using the land use schedule to the Zoning By-law.
- A work permit from the Conservation Authority is expected to be required to undertake the site work associated with the expansion.

Summary of Commitments

Section 18.0 of the EASR lists the 17 commitments made by the Township during the ToR process, how they have been considered in the preparation of the EASR and their current status. All of these commitments have been completed during the EA process.

Commitments made by the Township during the EA study process are also listed in Section 18.0. These commitments are relevant to one or more of the pre-construction, construction, operations and post-closure stages of the landfill expansion. The Township will report on the status of these commitments via compliance monitoring to the MECP annually until such time as all commitments are completed or addressed/superseded in EPA/ OWRA conditions of approval. Generally, these commitments relate to effects monitoring requirements, design of site components, operating procedures, mitigation measures and best management practices.

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Acronyms

Acronym	Definition
AAC	Agricultural Advisory Committee
AADT	Average Annual Daily Traffic
AAQC	Ambient Air Quality Criteria
AIA	Agriculture Impact Assessment
ANSI	Area of Natural and Scientific Interest
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
BP	Before Present
C_2H_3Cl	Vinyl Chloride
C of A	Certificate of Approval
CAAQS	Canadian Ambient Air Quality Standards
CadnaA	Computer Aided Noise Attenuation
CAZ	Contaminant Attenuation Zone
CEPA	Canadian Environmental Protection Act
CHVI	Cultural Heritage Value or Interest
CLI	Canada Land Inventory
CO	Carbon Monoxide
CO_{2e}	Carbon Dioxide Equivalents
CR&D	Construction, Renovation and Demolition Waste
CVC	Credit Valley Conservation
DFO	Department of Fisheries and Oceans
DOC	Dissolved Organic Carbon
EA	Environmental Assessment
EAA	Environmental Assessment Act (Ontario)
EASR	Environmental Assessment Study Report

Acronym	Definition
ECA	Environmental Compliance Approval
ECCC	Environment and Climate Change Canada
EFW	Energy from Waste
ELC	Ecological Land Classification
EOWHF	Eastern Ontario Waste Handling Facility
EPA	Environmental Protection Act (Ontario)
ESA	Endangered Species Act
ESC	Erosion and Sediment Control
GHG	Greenhouse Gases
GHGRP	Greenhouse Gas Emissions Reporting Program
GIS	Geographic Information System
GRT	Government Review Team
HADD	Harmful alteration, disruption or destruction
H	Horizontal
H_2S	Hydrogen Sulphide
HDF	Headwater Drainage Features
HHW	Household Hazardous Waste
HVAC	Heating, Ventilation and Air Conditioning
IC&I	Industrial, Commercial and Institutional Waste
IDF	Intensity Duration Frequency
L&Y	Leaf and Yard
LF	Landfill
LFG	Landfill Gas
LIO	Land Information Ontario
L_{LM}	Logarithmic Mean Impulse Sound Level
LOS	Level of Service

Acronym	Definition
MECP	Ministry of the Environment, Conservation and Parks (formerly MOE, MOECC)
MHSTCI	Ministry of Heritage, Sport, Tourism and Cultural Industries
MMAH	Ministry of Municipal Affairs and Housing
MNDM	Ministry of Northern Development and Mines
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MTCS	Ministry of Tourism Culture and Sport
MTO	Ministry of Transportation Ontario
NAPS	National Air Pollution Surveillance Network
NOC	Notice of Commencement
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NHIC	Natural Heritage Information Centre
NHRM	Natural Heritage Reference Manual
NAAQO	National Ambient Air Quality Objective
NRVIS	Natural Resource Values Information System
O_3	Ozone
OHA	Ontario Heritage Act
OMB	Ontario Municipal Board
O. Reg.	Ontario Regulation
OP	Official Plan
OSAP	Ontario Stream Assessment Protocol
OWES	Ontario Wetland Evaluation System
OWRA	Ontario Water Resources Act
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances

Acronym	Definition
PPS	Provincial Policy Statement
$PM_{2.5}$	Particles Nominally Smaller than 2.5 µm in Diameter
PM_{10}	Particles Nominally Smaller than 10 µm in Diameter
PoE	Pathways of Effects
PORs	Points of Reception
POW	Plane of Window
PSW	Provincial Significant Wetland
PWQO	Provincial Water Quality Objectives
RPRA	Resource Productivity and Recovery Authority
RRC	Raisin River Conservation
RUG	Reasonable Use Guideline
SAR	Species at Risk
SARA	Species at Risk Act
SCS	Soils Conservation Service
SDG	United Counties of Stormont, Dundas and Glengarry
SNC	South Nation Conservation
SO_2	Sulphur Dioxide
SOCC	Species of Conservation Concern
SPM	Suspended Particulate Matter
SRD	Special Rural – Waste Disposal Zone
SSO	Source Separated Organics
SWH	Significant Wildlife Habitat
SWHECS	Significant Wildlife Habitat Ecoregion Criterion Schedules
SWHMiST	Signification Wildlife Habitat Mitigation System Tool
SWHTG	Significant Wildlife Habitat Technical Guide
SWM	Stormwater management

Acronym	Definition
SWMP	Stormwater Management Pond
SWMS	Stormwater management system
SWP	Source Water Protection
TDS	Total Dissolved Solids
ToR	Terms of Reference
ToT	Time of Travel
TRCA	Toronto and Region Conservation Authority
TSS	Total Suspended Solids
US EPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit
V	Vertical
VES	Visual Encounter Survey
VOC	Volatile Organic Compound
WHPA	Wellhead Protection Area
WEEE	Waste Electrical and Electronic Equipment
WWIS	Well Water Information System

Units of Measure

Acronym	Definition of Units
dBA	decibels
cm	centimetre
ha	hectare
g	gram
hr	hour
km	kilometre
km^2	square kilometres

Acronym	Definition of Units
m	metre
masl	metres above sea level
mm	millimetre
m^3	cubic metre
L	Litre
$L_{eq,1hr}$	one hour equivalent sound level
OU	Odour Unit
s	second
scfm	standard cubic feet per minute
$\mu g/m^3$	Microgram per cubic metre
yr	year

GLOSSARY OF TERMS

Term	Definition
'Alternative Methods'	Alternative methods of carrying out the proposed undertaking are different ways of doing the same activity associated with an undertaking. Alternative methods could include consideration of one or more of the following: alternative technologies; alternative methods of applying specific technologies; alternative sites for a proposed undertaking; alternative design methods; and, alternative methods of operating any facilities associated with a proposed undertaking.
'Alternatives To'	Alternatives to the proposed undertaking are functionally different ways of approaching and dealing with a problem or opportunity.
Ambient Air	Open air not enclosed in a structure, machine, chimney or stack.
Aquifer	A layer of permeable soil, i.e., sand and/or gravel, or bedrock through which groundwater flows and can yield enough water to supply wells for use.

Term	Definition
Berm	At a landfill site, a narrow mound or ridge comprised of soil (for example, a screening berm used to block the view of the landfill activities from off-site)
Borehole	A hole drilled into the ground to obtain information on the soil, bedrock and groundwater conditions and characteristics. A borehole can be completed as a groundwater monitoring well.
Buffer Area	The part of the landfill site not used for waste disposal, usually between the perimeter of the disposal area and the landfill property boundary.
Certificate of Approval (Waste)	An approval issued by the Ministry of the Environment for the establishment and operation of a waste management site/facility. Now referred to as an Environmental Compliance Approval.
Township of North Dundas	The Township of North Dundas (the proponent); used when referencing the political or corporate administrative body.
CR&D Waste	Waste generated by the Construction, Renovation and Demolition sector of the economy.
Criteria	A description of each environmental component to be considered in the environmental assessment, consisting of the rationale for including the component and the indicator(s) to be used in the assessment.
Cumulative Effects	The net effects of the proposed undertaking combined with the predicted effects of other existing and identified certain and probable projects in the area of the proposed undertaking, where the effects would overlap.
Disposal Area	The area within the landfill property approved for the disposal of residual waste; also referred to as the waste footprint.
EA Study	The activities associated with the EA for the Township of North Dundas Waste Management Plan, as described in the approved Terms of Reference (ToR).

Term	Definition
Environment	As defined by the *Environmental Assessment Act* [1], environment means: • Air, land or water, • Plant and animal life, including human life, • The social, economic and cultural conditions that influence the life of humans or a community, • 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, or • Any part or combination of the foregoing and the interrelationships between any two or more of them (ecosystem approach).
Environmental Assessment	An environmental assessment, commonly known as an individual EA, is a study that is completed by the proponent to assess the potential environmental effects (positive or negative) of an individual undertaking.
Environmental Compliance Approval	An approval issued by the Ministry of Environment, Conservation and Parks for the establishment and operation of a waste management site/facility.
Environmental Components	Environmental components are different aspects of the natural, social, economic, cultural and built environments.
Greenfield Site	A parcel of land that has not been previously developed for urban use, i.e., rural or agricultural land or green space.
Groundwater	Water below the ground surface contained in the pore spaces in soil or in openings within the bedrock.
Haul Route	Public roadways used by vehicles transporting waste to a landfill site.
Hazardous Waste	Waste generated from any source that is defined as hazardous by the regulations of Ontario.
Indicators	Specific characteristics of the environmental components that can be measured, qualified, quantified or determined in some way.

Term	Definition
IC& I Waste	Waste generated by the Industrial, Commercial & Institutional sector of the economy.
Landfill	An approved site used for the long-term disposal of residual waste.
Landfill Capacity	The volume approved for disposal of residual wastes and cover materials, described in cubic metres. Also referred to as the approved airspace.
Landfill Expansion	An increase in the approved landfill capacity.
Landfill Gas	Gases generated from the anaerobic decomposition of organic waste materials; mainly consisting of methane and carbon dioxide and traces of other gases
Landfill Gas Collection System	The system used to collect the gases generated by decomposition of the waste in the landfill, typically consisting of a network of gas wells and/or horizontal piping attached to vacuum to extract the gas and convey it to a location where the gas can be combusted in a gas flare or processed for subsequent use.
Leachate	The liquid produced when water (typically rainwater or snowmelt) passes through a landfill and contains contaminants as a result of coming in contact with the waste.
Leachate Collection System	The system used to collect leachate generated by a landfill, usually consisting of a network of piping and drainage stone beneath or around the perimeter of the disposal area.
Mitigation Measures	Design features and/or operational approaches used to control the potential effects of the landfill on the environment.
Monitoring Well	An installation at a selected depth in a borehole in which the groundwater level can be measured and groundwater samples obtained for chemical analysis to determine its quality. At a landfill, this information is typically monitored at some frequency over time and is referred to as a groundwater monitoring program.
Non-hazardous Solid Waste	Waste generated from any source that is defined as non-hazardous and solid by the regulations of Ontario.
Ontario Regulation 232/98	The regulation that governs the design, operation, closure and post-closure of new or expanding waste disposal sites in the province of Ontario.

Term	Definition
Proponent	A person, corporation, government agency or other legal entity who: a) Proposes to carry out an undertaking, or b) Is the owner or person having charge, management or control of an undertaking. For this EA Study and undertaking, the proponent is the Township of North Dundas.
Reasonable Use Guideline (or Concept)	The Ministry of Environment, Conservation and Parks guideline used to determine the acceptable level of impact from landfill leachate on off-site groundwater quality, and used to assess compliance of landfill sites in terms of effects on groundwater resources.
Receptor	A specific location where the effect(s) from a waste management facility may be received. Also referred to as Points of Reception (PORs).
Residential Waste	Waste generated by residences (ranging from singe to multi-residential units).
Residual Waste	The waste material that cannot be diverted through recycling or other processes and requires disposal.
Service Area	The geographic area from which generated waste can be received at a recycling or disposal site, in accordance with the approval for the recycling or disposal site.
(the) Site	(the) Township of North Dundas.
Site Life	The period of time during which the Boyne Road Landfill can continue to accept wastes.
Stormwater Management System	An engineered system to manage/control the quantity and/or quality of stormwater runoff from the site, typically consisting of ditches and ponds that discharge to the natural environment.
Surface Water	Water on top of or flowing across the ground surface, i.e., lakes, rivers, ditches.

Term	Definition
Terms of Reference	A document prepared by the proponent and submitted to the Ministry of Environment, Conservation and Parks for approval. The Terms of Reference (ToR) document sets out the framework for the planning and decision-making process to be followed by the proponent during the preparation of an EA. In other words, it is the Township of North Dundas' (the proponent's) work plan for what is going to be studied. If approved, the EA must be prepared according to this ToR. The ToR also provides the framework for evaluating the EA.
(the) Undertaking	The activities associated with the EA for the Township of North Dundas Waste Management Plan, as described in this EASR.
Waste Generation Rate	The quantity of waste generated by an individual(s) on a daily or annual basis, typically described in tonnes (or kilograms) per person per year.

1.0 Introduction

This document is the environmental assessment study report (EA Study Report) for the environmental assessment (EA) of the Township of North Dundas Waste Management Plan (the EA Study) being undertaken by the Township of North Dundas (the Township). This is an individual EA completed under the provincial *Environmental Assessment Act* (EAA). This EA was prepared following the 2014 *Code of Practice for Preparing and Reviewing Environmental Assessments* in Ontario (MOECC, 2014). This EA has been completed and will be submitted to the Ministry of Environment, Conservation and Parks (MECP) following the approved Terms of Reference (ToR) as required by subsection 6.1(1) of the EAA, and in accordance with the requirements of subsection 6.1(2) of the EAA.

An EA is a planning study that assesses environmental effects and advantages and disadvantages of a proposed undertaking. The environment is considered in broad terms to include the natural, social, and technical aspects of the environment. The first step in the individual EA process is to develop a ToR, which provides the framework for the preparation of the EA. Two public open house meetings were hosted by the Township as part of the consultation process for the development of the ToR. A ToR was developed by the Township, submitted to the MECP on Aug 2, 2019 and approved by the MECP (Minister) on July 1, 2020. An overview of the ToR development and approval process is provided in Section 2.2 of this EA Study Report (EASR). The approved ToR is provided in Volume 2 Appendix A.

Consultation was an important component for the development of the ToR. The Township has developed a Consultation Plan as part of the ToR to be considered throughout the EA process. The key vehicles in the Consultation Plan that were used to engage the public and the other stakeholders and elicit feedback were open houses, letter/email correspondence, the Township's Environmental Assessment North Dundas Waste Management Plan website (the EA Website) and newspaper and social media advertisements.

The following sections identify the proponent and describe the site, the need for the EA Study and the purpose of the EA Study. They also provide an overview of the history of the EA Study, along with the development of the ToR, and the scope of approvals being sought. An outline of the entire EASR is provided in Section 2.4.2 of this report.

1.1 Description of the EA Study

The proposed EA Study is the EA of the Township's waste management plan for a 25-year planning period. The description and rationale have evolved during the preparation of the EA. A description of the undertaking was defined after a preferred undertaking was identified during the EA. Therefore, the final description of the proposed undertaking and the rationale for it are included in the EA once the alternatives were considered and evaluated.

1.2 Identification of Proponent

The Township is the proponent for the proposed EA Study. The Township is located in eastern Ontario about 40 kilometres (km) south of Ottawa within the United Counties of Stormont, Dundas and Glengarry as shown in Figure 1-1, and has a total area of 503 square kilometres (km^2) and a 2016 population of 11,278. The contacts for this project are as follows:

Danielle Ward
Interim Director of Environmental Services
Township of North Dundas
636 St. Lawrence Street
P.O. Box 489
Winchester, ON K0C 2K0
Telephone: 613-774-2105 ext. 238
Fax : 613-774-5699
E-mail : dward@northdundas.com

Trish Edmond, P.Eng.
EA Project Manager
WSP Canada Inc.
1931 Robertson Road
Ottawa, ON K2H 5B7

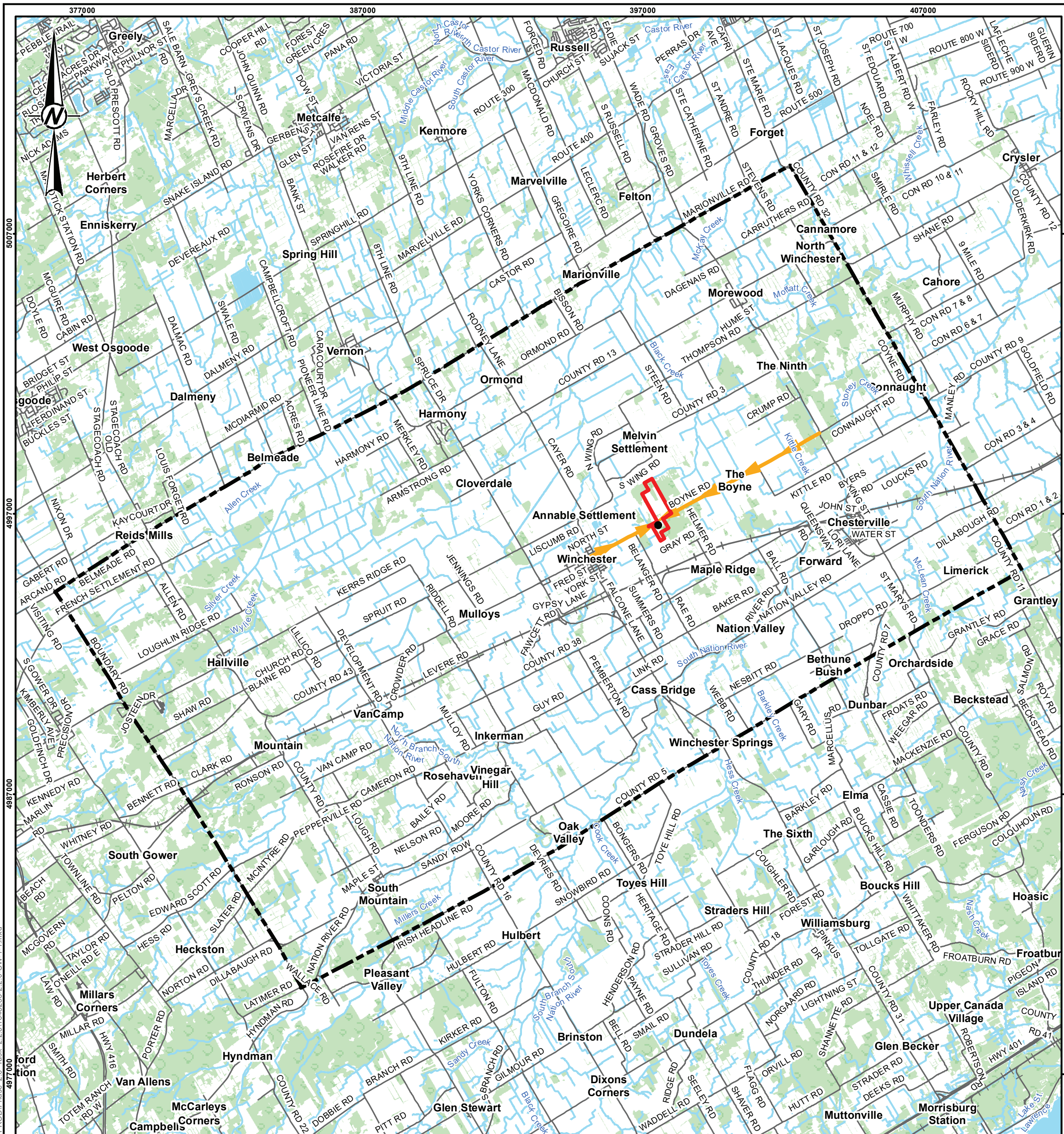
Telephone: 613-592-9600

E-mail : trish.edmond@wsp.com

1.3 Current Waste Management System

1.3.1 Overview of Waste Management System

The Township, through its Waste Management department, currently provides curbside waste collection and disposal services to its ratepayers for residential and some institutional, commercial and industrial waste. It also provides waste diversion services, including recyclable materials, tire recycling, as well as the collection of household hazardous waste (HHW) and Waste Electrical and Electronic Equipment (WEEE) for export to authorized processing facilities. A pilot program for leaf and yard waste is currently providing collection services for this material to two villages in the Township, with two collection events per year. The HHW facility also serves the Township of South Dundas. The Township's diversion rate, as reported in 2017 and 2018 to Resource Productivity and Recovery Authority, is approximately 23 percent (%) (RPRA, 2017, 2018). The waste diversion rate for the Township is expected to be similar in 2019 and 2020.



LEGEND

- ● DISPOSAL AREA
- HAUL ROUTES
- TOWNSHIP OF NORTH DUNDAS
- CURRENT ACTIVE BOYNE ROAD LANDFILL SITE PROPERTY

0 2 4 8

1:200,000 KILOMETRE

REFERENCE(S)

1. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9 VERTICAL DATUM: CGVD28

CLIENT

TOWNSHIP OF NORTH DUNDAS

PROJECT

INDIVIDUAL ENVIRONMENTAL ASSESSMENT OF THE TOWNSHIP OF NORTH DUNDAS WASTE MANAGEMENT PLAN

TITLE

STUDY LOCATION MAP

CONSULTANT

GOLDER MEMBER OF WSP

YYYY-MM-DD	2019-02-25
DESIGNED	PLE
PREPARED	JEM
REVIEWED	YJM
APPROVED	PLE

PROJECT NO.	PHASE/TASK	REV.	FIGURE
1648253	2.0/2.2.0	0	1-1

The material recycling facility, the HHW and WEEE transfer station as well as the waste disposal facility are located at the Township's Boyne Road Landfill site. All recyclables (metal, plastic, paper, cardboard) collected within the Township are taken to the recycling transfer station at the Boyne Road Landfill site, from where they were transferred out of the Township by a recycling contractor. In 2019, the following recyclable materials were collected and diverted from landfill: approximately 127 tonnes of paper, 336 tonnes of cardboard, 32 tonnes of plastic, 10 tonnes of aluminum, and 30 tonnes of steel cans. Between January and June 2020, the following materials were collected by a recycling contractor: approximately 194 tonnes of cardboard, 48 tonnes of paper, 92 tonnes of plastic, and 17 tonnes of steel. From July through December 2020 onwards, the Township directed the following recyclable material collected at curbside to the recycling facility in Brockville: 119.57 tonnes of plastic, cans, and glass; and 264.43 tonnes of fibrous material (paper and cardboard). The tonnages reported for paper and cardboard are derived from both residential and industrial, commercial and institutional (IC&I) sources, whereas the other materials are primarily residential.

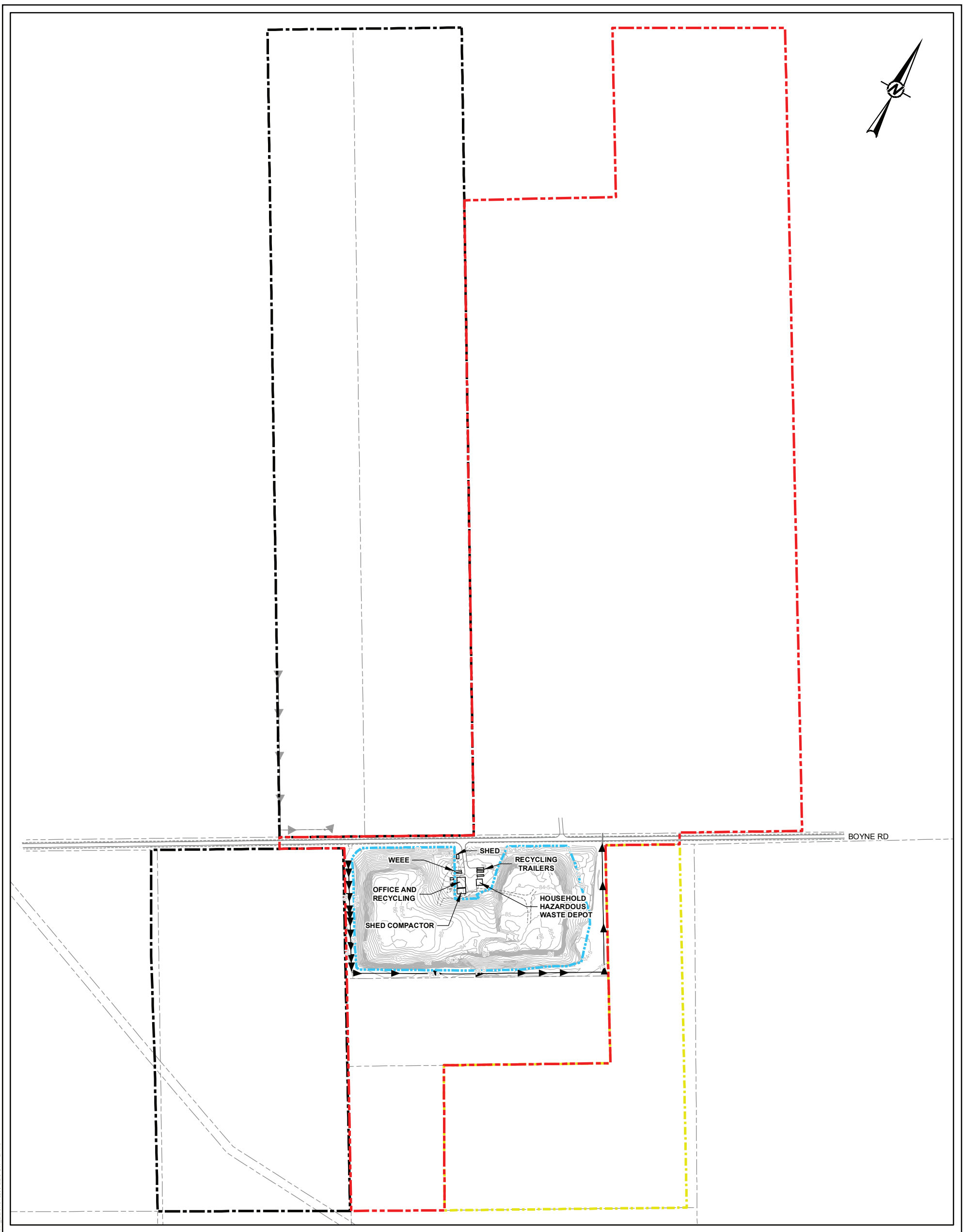
1.3.2 Residual Waste Disposal (Boyne Road Landfill Site)

The Boyne Road Landfill is located on Lot 8, Concession VI in the former Township of Winchester, along the south side of Boyne Road about 2 km east of the Village of Winchester, which is between the two main population centres within the Township – the Villages of Winchester and Chesterville. The service area for the landfill is the Township of North Dundas. The current extent of the landfill site property is shown on Figure 1-2. The site has been operating as a licensed landfill for the disposal of solid, non-hazardous waste since 1965. The Boyne Road Landfill is the only operational waste disposal site in the Township and receives all the residential and some of the IC&I residual waste from the entire Township. The waste collection vehicles haul along the municipal road network directly to disposal at the landfill site; there is no transfer station facility. The Township is mainly rural with several small villages, with Winchester and Chesterville being the two largest villages. The landfill site operates under Environmental Compliance Approval (ECA) No. A482101.

The main haul routes to the Boyne Road Landfill are indicated on Figure 1-1. The main haul route is via Boyne Road, either directly out from the Village of Winchester to the west or from the Village of Chesterville to the east using County Road 7 and then westward along Boyne Road to the landfill site.

The Boyne Road Landfill currently has an approved disposal area of 8.1 hectares (ha). The land area that comprises the landfill property consists of the original disposal area and the addition of a number of parcels of adjoining land between 1992 and 2018 located around the original disposal area, corresponding to a total land area of approximately 97.13 ha. This includes a 20 metre (m) wide strip of Boyne Road across the northern edge of the landfill footprint and a 73.48 ha parcel of land located north of Boyne Road, both added to the landfill in 2018 as per Notice No. 9 of the ECA dated January 31, 2018. For purposes of this EA, which proposes to consider all reasonable waste management options including the alternative of expanding the Boyne Road Landfill, the Township acquired an additional 16.21 ha (40.05 acres) of property to the east and southeast to possibly be added to the site

pending the outcome of the EA, eventually bringing the total site area to approximately 113.34 ha. In addition to the landfill property, the Township has acquired groundwater easements (referred to as Contamination Attenuation Zones (CAZs) 1 and 2 in the ECA). These parcels are shown on Figure 1-2.



LEGEND

- EXISTING LANDFILL FILL AREA
- APPROXIMATE BOUNDARY OF CONTAMINANT ATTENUATION ZONE
- TOWNSHIP OWNED PROPERTY
- APPROXIMATE LANDFILL SITE PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF PERIMETER DITCH AND FLOW DIRECTION
- GROUND SURFACE CONTOURS (masl), BASED ON RESULTS OF THE SURVEYS CONDUCTED IN 2008, 2010, AND 2012 THROUGH 2020

REFERENCES

1. BASE PLAN SUPPLIED IN ELECTRONIC FORMAT BY STANTEC CONSULTING LTD.
2. 2008 AND 2010 SURVEYS COMPLETED BY STANTEC CONSULTING LTD.
3. MAY 2012, JULY 2013, NOVEMBER 2014, DECEMBER 2015, NOVEMBER 2016, AND DECEMBER 2017 SURVEYS COMPLETED BY GOLDER ASSOCIATES LTD.

0 60 120 180 240 300

1:6,500 METRES

CLIENT
TOWNSHIP OF NORTH DUNDAS

PROJECT
INDIVIDUAL ENVIRONMENTAL ASSESSMENT OF THE TOWNSHIP OF NORTH DUNDAS WASTE MANAGEMENT PLAN

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-05-27
PREPARED	JEM
DESIGN	PLE
REVIEW	YJM
APPROVED	PLE

TITLE
BOYNE ROAD LANDFILL SITE PLAN

PROJECT NO.	PHASE/TASK	REV.	FIGURE
1648253	2.0/2.2.0	0	**1-2**

Path: X:\Active\Spatial_IM\Township_of_North_Dundas\BoyneRoadLandfill\69_PROJ\1648253\40_PROD\Phase_2.0_Task_2.2.0-1648253-2.2.0-CW-1-2.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
25mm
0

Based on the original application for licensing of the landfill in 1971, the approved landfill site capacity was approximately 395,000 cubic metres (m^3). When it was first determined in late 2014 that the landfill site was in an overfill situation, the volume of waste in place was approximately 462,000 m^3. As of December 1, 2020, the volume of waste in place was about 560,000 m^3. Additional details regarding the current status of the landfill site to be able to continue to receive waste for disposal are provided in Section 2.1 of this EASR.

As of the end of 2020, there was approximately 48,000 m^3 of approved airspace remaining in the landfill, which is expected to allow for disposal until the end of 2023 to mid-2024.

Operation of the landfill site, including its diversion facilities, is carried out by the Township in accordance with the requirements of its ECA conditions. The existing landfill site is a natural attenuation landfill, without an engineered bottom liner and leachate collection system. Compliance of the landfill with the applicable requirements for protection of off-site groundwater quality relies on natural processes in the subsurface. An annual monitoring program, consisting of groundwater and surface water monitoring, is part of the current landfill site operations. The results of the 2020 monitoring program (Golder 2021) indicate that with respect to protection of off-site groundwater quality, the landfill is operating in compliance with the Ministry of Environment, Conservation and Parks (MECP) Reasonable Use Guideline (MOE, 1994). Surface water quality in the often-stagnant water within the drainage ditch along the north side of Boyne Road that receives surface water runoff from the landfill site is interpreted to experience discontinuous marginal impacts by landfill leachate but is generally in compliance with provincial surface water management policies. The results of the landfill monitoring programs show that the Boyne Road Landfill is performing acceptably and the impacts on the natural environment are deemed acceptable as described in the most recent ECA amendment approving continued landfilling (dated January 30, 2019).

2.0 Overview of the Environmental Assessment Process and Environmental Assessment Study Report

2.1 Rationale and Purpose of the Proposed Undertaking

As part of a 2013 application procedure intended to update a number of items related to the Boyne Road Landfill operations and amend the Boyne Road Landfill ECA, the MECP determined in late 2014 that the landfill had exceeded its originally approved capacity and was in an overfill situation. At that time, it had been estimated that the landfill had approved disposal capacity through 2022. Due to the elements governing the originally approved landfill site capacity, the Township was unexpectedly required to evaluate waste management alternatives to deal with this overfill situation at the landfill.

To continue using the landfill in the short-term, an amendment to the ECA for extension of approval for continued landfilling (emergency ECA) was received from the MECP and required the Township to evaluate long-term waste management alternatives (Golder, 2015).

Using an assumed planning period of 25 years, the previously completed study provided an evaluation of waste management options to address the overfill situation at the Boyne Road Landfill using a combination of technical, approvability and financial factors to assist the Township in identifying a preferred course of action to provide both short-term and long-term waste management services for the municipality. This previous assessment of waste management alternatives was summarized in Section 4.0 of the approved ToR (Volume 2, Appendix A).

The alternatives considered by the Township consisted of the following:

- Alternative 1 – Landfill Site Closure and Export of Waste for Disposal
- Alternative 2 – Landfill Site Expansion
- Alternative 3 – Establish New Landfill Site in the Township
- Alternative 4 – Alternative Waste Management Technologies (thermal treatment, e.g., Energy from-Waste).

Alternatives 3 and 4 were not expected to be financially viable alternatives for a small rural municipality considering the small population and relatively small volume of waste generated within the Township; as well, these alternatives would involve a lengthier and likely more contentious approvals process, and/or the need to collaborate with other municipalities. Alternatives 3 and 4 were therefore screened out early in the evaluation, and in the assessment only Alternatives 1 and 2 were considered in detail.

Alternative 1 would involve the following steps: 1) preparation of a closure plan for the landfill site; 2) application to establish a waste transfer facility at the site; 3) negotiation of a disposal contract at a privately owned landfill facility and commence hauling for disposal; and 4) completion of the landfill closure works. Post-closure monitoring and maintenance of the landfill would be ongoing. For Alternative 1, two scenarios were considered: Alternative 1a where services would be provided to export both the residential and non-residential waste that is currently disposed at the Boyne Road Landfill (estimated 8,000 tonnes/year), and Alternative 1b

where service would be provided for only the residential waste component (estimated 2,900 tonnes/year). For Alternative 1b, the owners of all non-residential generated waste would have to make their own arrangements for disposal at facilities other than those provided by the Township.

Alternative 2 would involve a landfill expansion of more than 100,000 m^3 of capacity and require an individual EA according to the Waste Management Projects Regulation (Ontario Regulation 101/07) and the following steps would be followed: 1) obtain MECP approval to continue landfilling operations on the existing approved footprint at the Boyne Road Landfill site during the expansion approvals process; 2) identify the property and easements that may be required for the expansion and if possible secure options to acquire them during the ToR or EA; 3) commence EA process; 4) assuming landfill expansion was selected during the EA, after EA approval, apply for an amended ECA for expanded site operations (expected 5 to 6 year combined EA and ECA approvals process); and 5) construct initial phase and associated works for the expansion area and commence landfilling within the expansion.

For Alternative 2, preliminary studies were undertaken to assess potential impacts associated with a conceptual expanded Boyne Road Landfill layout on specific aspects of the environment: groundwater, surface water, atmospheric (air, odour, noise) and natural environment (biology). For purposes of this preliminary assessment, a conceptual design configuration of the expansion was located on the south side of the existing landfill.

To compare Alternatives 1 and 2, the following evaluation factors were considered:

- Technical feasibility
- Likelihood to obtain MECP Approval
- Opinion of Probable Costs (capital expenditures and long-term annual operating costs over 30 years)

The advantages and disadvantages of Alternatives 1 and 2 were also determined and considered. The result of the comparative evaluation was that expansion of the existing Boyne Road Landfill was identified as the preferred long-term waste management alternative. Based on the findings of this evaluation, a Council resolution was passed in November 2015 to pursue approval to expand the landfill site via an Environmental Assessment pursuant to the Ontario *Environmental Assessment Act* (EAA).

The Environmental Assessment commenced in late February 2017 and open houses on preparation of the ToR were held in March and October 2017, followed by preparation and circulation of the Draft ToR in late April 2018. At this point, the EA was for the expansion of the Boyne Road Landfill site. Based on comments received on the Draft ToR from the MECP in December 2018, it was determined that the 2015 assessment of waste management alternatives was not completed with the necessary detail to support the identified preferred 'Alternative To' – expansion of the Boyne Road Landfill – at a level of detail considered appropriate for an EA. As such, key changes were made to the Draft ToR and were presented in the Final ToR to review and re-assess the waste management alternatives that are reasonable for the Township to consider within the EA process and identify the preferred

alternative. To reflect this revised approach, the title of the EA Study was changed to Environmental Assessment of the Township of North Dundas Waste Management Plan.

Starting in 2015, the Township applied annually for an extension to allow continued landfilling operations at the site. Subsequently in 2019, the MECP identified that the Township was not required to seek annual ECA extensions, but rather should apply for an administrative amendment to the landfill site ECA to request that the expiry date for continued landfilling currently provided in Condition 2.1 (a) of the ECA be removed and instead allow continued landfilling operations until reaching the final waste contours design presented in Section 7.0 and Figure 3 of the 2013 Design & Operations Plan (Golder, 2013) while the Township pursues an EA for its long-term waste management plan. The ECA amendment approval permitting this change was received from the MECP in January 2020.

An EA Study location map is provided on Figure 1-1 showing the Township of North Dundas and the location of the current active Boyne Road Landfill.

The purpose of the proposed EA Study has been reviewed since approval of the ToR and is confirmed as:

To provide environmentally safe and cost-effective long-term waste management for the Township of North Dundas for a 25 year planning period.

The purpose statement will be influenced by diversion studies proposed by the Township and made as a commitment in the ToR. It was proposed that the diversion studies be conducted during the EA, early in the process to provide input into post-diversion residual waste management requirements. Diversion is also an 'Alternative To' in this EA. The Waste Diversion Study is provided in Volume 3 Appendix J to the main EASR and the results are summarized in Sections 6.3.5 and 7.0 of this report. The Township has reviewed the purpose of this EA throughout the EA process. The purpose has not changed from that discussed in the approved ToR.

2.2 Approval of the Terms of Reference (ToR)

The Township prepared the ToR for the EA of the Township Waste Management Plan according to the Code of Practice *Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (MOECC, 2014b). The ToR was submitted to the Minister on August 2, 2019. The ToR was approved by the MECP on July 1, 2020.

The first step in the EA process is the preparation of the ToR. Once approved, the ToR becomes the framework for conducting the EA. The ToR was submitted to the MECP, government review team (GRT) members, Indigenous communities and the public for review and comments. The comments received by the MECP were considered in their review of the proposed ToR and in the decision regarding approval to carry out an individual EA under the EAA.

As noted in the approved ToR, the Township committed to preparing and submitting an EA to the MECP for review and approval in accordance with the approved ToR as required by subsection 6.1(1) of the EAA, and in accordance with the requirements of subsection 6.1(2) of the EAA.

The subsections that will be addressed by the EA are listed in Table 2-1.

2.3 Development of the EA Study Report

2.3.1 Concordance of ToR and EA Study Report Documentation

As noted previously, the ToR provides the framework for conducting and evaluating the EA. This EASR fully addresses the requirements of the ToR.

Table 2-1 documents the concordance between the legislative EA requirements under the EAA and this document. It is intended to assist readers that wish to review and evaluate the EA. The left column of the table states the requirements listed in the ToR and the right column indicates the location(s) in the EASR where the requirement is addressed.

Table 2-1: Concordance Table

Subsection of EAA (Ontario, 1990a)	EA Requirements	Section of the EASR
6.1(2)(a)	A description of the purpose of the undertaking.	Section 2
6.1(2)(b)(i)	A description of and statement of the rationale for the undertaking.	Section 2
6.1(2)(b)(ii)	A description of and statement of the rationale for the 'Alternative Methods' of carrying out the undertaking.	Section10
6.1(2)(b)(iii)	A description of and a statement of the rationale for the 'Alternatives To' the undertaking.	Section 6
6.1(2)I(i)	A description of the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly.	Sections 5 and 9
6.1(2I)(ii)	A description of the effects that will be caused or that might reasonably be expected to be caused to the environment.	Sections 6 and 13
6.1(2)(c)(iii)	A description of the actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment.	Sections 10 and 12

Subsection of EAA (Ontario, 1990a)	EA Requirements	Section of the EASR
6.1(2)(d)	An evaluation of the advantages and disadvantages to the environment of the undertaking, the 'Alternative Methods' of carrying out the undertaking and the 'Alternatives To' the undertaking.	Sections 6.4 and 11.2
6.1(2)(e)	A description of any consultation about the undertaking by the Township and the results of the consultation.	Section 4

2.3.2 Organization of the EA Study Report

This EASR is presented in four volumes. Volume 1 (this volume) describes the EA studies, consultation results, effects assessment of alternatives, and identification of the preferred alternative.

Volume 1 of the EASR contains 19 sections as follows:

- Section 1 – Provides an introduction to the EA and relevant background information
- Section 2 – Provides an overview of the EA process
- Section 3 – Presents the methodology used in the assessment
- Section 4 – Presents the consultation process and results of each event
- Section 5 – Describes the existing conditions in the Study Area for the assessment of 'Alternatives To', which is the Township of North Dundas
- Section 6 – Provides the description, rationale for and assessment of 'Alternatives To' for waste management and identifies the preferred 'Alternative To'
- Section 7 – Provides updated residual waste disposal requirements including findings of the Waste Diversion Study Report (Volume 3 Appendix J)
- Section 8 – Provides the Study Areas and environmental component work plans related to assessment of 'Alternative Methods'
- Section 9 – Describes the existing environmental conditions within the study areas for landfill expansion for each of the environmental components
- Section 10 – Provides a description of and rationale for the 'Alternative Methods' to landfill expansion

- Section 11 – Presents the potential effects of each 'Alternative Method' for landfill expansion and the comparative evaluation of alternatives, including consideration of advantages and disadvantages of each alternative, as well as the identification of the preferred 'Alternative Method'
- Section 12 – Describes the proposed undertaking
- Section 13 – Presents the prediction of effects of the proposed undertaking and assesses the need for additional mitigation measures
- Section 14 – Presents climate change considerations for the undertaking
- Section 15 – Presents a cumulative impact assessment
- Section 16 – Describes the follow-up monitoring programs to assess that the landfill is performing as expected and presents contingency measures that would be implemented should the proposed undertaking not perform as expected
- Section 17 – Describes other approvals required to implement the undertaking
- Section 18 – Summarizes the commitments made in the approved ToR and EA
- Section 19 – Provides a list of reference documents used in preparation of this EA

Note that J.L. Richards and Associates Limited and D.J. Halpenny & Associates Ltd. contributed to the component write-ups in Sections 5.6, 9.5, 9.6, 13.5 and 13.6 and in Sections 5.9, 9.9 and 13.9 of the EASR, respectively.

Volume 2 contains the approved ToR and Technical Appendices to this EA that are mostly supporting information, calculations, etc. unless otherwise noted. The following Appendices are contained in Volume 2:

- Appendix A: Approved ToR (Volume 1)
- Appendix B: Air Quality and Odour Technical Appendices
- Appendix C: Noise Technical Appendices
- Appendix D: Geology, Hydrogeology and Geotechnical Technical Appendices
- Appendix E: Surface Water Technical Appendices
- Appendix F: Biology Technical Appendices
- Appendix G: Cultural Heritage Resources Technical Appendices including the Stage 1 Archaeological Assessment in Appendix G-2
- Appendix H: Traffic Technical Appendices (completed by D.J. Halpenny & Associates Ltd.)

Volume 3 contains supporting documents to this EA. The following Appendices are contained in Volume 3:

- Appendix I: New Landfill Site Selection Assessment memo on Alternative 3 – New Landfill Site Selection Assessment, Application of Exclusionary Criteria and Mapping to Identify Potential Sites
- Appendix J: Waste Diversion Study Report

Volume 4 contains the Consultation Record for this EA.

3.0 Methodology for the Assessment

The methodology used to conduct the EA is loosely described in sections 4.2 and 5.1 of the approved ToR (see Volume 2 Appendix A) and further refined and summarized in the sections below. The methodology included characterization of the existing environment for both the assessment of 'Alternatives To' and 'Alternative Methods', consideration of 'Alternatives To' and then 'Alternative Methods' for carrying out the proposed undertaking, prediction and assessment of the likely effects of these alternatives on the natural, social, and technical aspects of the environment, and identification of a preferred alternative through a comparative evaluation of alternatives. Consultation with the public, Indigenous communities, GRT members, and other stakeholders was ongoing throughout the EA process.

The following steps were followed:

3.1 Identify Study Areas and Characterize Existing Environmental Conditions of the Waste Management Plan Study Area

Study areas and existing conditions for the 'Alternatives To' assessment related to the waste management plan were identified in the ToR and updated in the EASR.

3.2 Confirm 'Alternatives To' and Evaluation of 'Alternatives To'

The preliminary identification of environment categories and preliminary evaluation criteria presented in the ToR were further refined into the proposed components, criteria and indicators for the evaluation of 'Alternatives To'.

The list of 'Alternatives To' were identified and approved as part of the ToR. These 'Alternatives To' were considered and determined to still be the representative alternatives available to the Township of North Dundas for a 25-year planning period.

To provide a basis for comparative evaluation, each of the alternatives was developed at a conceptual level so that their feasibility of implementation, potential effects on the environment and relative advantages and disadvantages could be identified.

The potential effects and/or implications of each alternative was generally identified and described for each of the evaluation criteria. A qualitative assessment methodology was then used to complete a comparative assessment. The methodology consisted of assigning an overall relative ranking from most preferred to least preferred for each alternative, first for each of the criteria and then for the environmental component.

As part of the comparative assessment, the advantages and disadvantages of each 'Alternative To' were then described. The Do-Nothing alternative was included in this comparison.

The outcome of this ranking exercise was the identification of the preferred 'Alternative To' for waste management for the Township.

3.3 Update the Waste Diversion and Residual Waste Requirements

To update the residual waste management requirements, it was first necessary to complete a waste diversion study considering current policy and legislation requirements around diversion in Ontario for smaller rural populations like the Township of North Dundas. This study looked at existing diversion activities accomplished by the Township and areas for improvement, along with timing of new or improved diversion programming. After this was completed, this information was used as the basis for estimates of existing residual waste generation and projected future residual waste generation.

3.4 Characterize Study Areas and Prepare Environmental Component Work Plans and Comparative Evaluation Criteria

This step included the characterization of the proposed study areas for the evaluation of 'Alternatives Methods', which were different than the study areas for evaluation of 'Alternatives To'. The environmental components were further refined as they pertain to the preferred 'Alternative To' and work plans with new (different) components, rationale, criteria, indicators and methods to evaluate 'Alternative Methods', methods to complete impact assessments for the preferred 'Alternative Method', and data sources were developed. These were established during the EA in consultation with the MECP, conservation authorities and the Ministry of Natural Resources and Forestry (MNRF) for select work plans. All the work plans were also provided to Indigenous communities, and the public for comment.

3.5 Characterize the Existing Environmental Conditions for the Preferred 'Alternative To'

Next, more detailed existing environmental conditions relevant to the preferred 'Alternative To' were described. As mentioned in Section 3.4, the environmental components for the 'Alternative Methods' were different than those for 'Alternatives To' and hence more component descriptions were prepared related to the preferred 'Alternative To'.

3.6 Identify and Develop 'Alternative Methods'

In EA terminology, 'Alternative Methods' are the different ways that the preferred 'Alternative To' can be implemented. The MECP Code of Practice (MOECC, 2014) states that a reasonable range of alternative methods should be considered that address the need and are within the proponent's ability to implement. The alternative methods should be determined by the significance of potential environmental effects of the preferred 'Alternative To' and the circumstances specific to the preferred 'Alternative To', such as the proponent's situation, timing and financing.

The individual 'Alternative Methods' were identified and developed during this step.

3.7 Comparison and Evaluation of 'Alternative Methods' and Identification of Preferred Alternative

The EA Study team qualitatively and/or quantitatively (as appropriate for the environmental component) predicted the effects for each 'Alternative Method' on the environment. The assessment was done for each component based on the conceptual designs for each alternative, including design-based mitigation and the existing environmental conditions.

If needed, if the assessment indicated that any additional mitigation measures were required to achieve site compliance with provincial standards, they were developed, and the assessment repeated to incorporate these measures.

In this step, each 'Alternative Method' was examined to determine if it would ultimately be approvable under the any applicable regulations or Acts. This screening step is included to eliminate any alternative that would not likely be approvable. If needed, any alternative found to not be approvable due to unacceptable net effects (i.e., no further refinement of mitigation is possible) or technical reasons, then the alternative was eliminated from further consideration. At this point, the EA Study team also considered additional 'Alternatives Methods for' the EA Study that may have been identified by the public or other parties during the EA process, if available.

As part of this comparison assessment, the advantages and disadvantages of each 'Alternative Method' were described.

The outcome of this ranking exercise was the identification of the preferred 'Alternative Method'. The preferred alternative became the preferred undertaking for the EA Study.

3.8 Describe the Preferred 'Alternative Method'

The outcome of this step was the description of the preferred 'Alternative Method' in enough detail that net effects and any additional mitigation measures could be identified by the environmental component study teams.

3.9 Refine the Mitigation Measures and Determine the Net Effects of the Preferred Alternative

The prediction of potential future environmental effects associated with the preferred 'Alternative Method' (assuming that conceptual design mitigation measures are in place) was carried out. Assessment of potential effects was done using appropriate objectives, standards, policies, and regulations. The remaining effects or net effects, if any, were documented and any need for refinement of mitigation measures recorded.

Also, a qualitative comparison was made between the predicted effects of the preferred alternative and the Do-Nothing alternative considering the indicators for the environmental components.

3.10 Consideration of Climate Change

The 2017 Guide- Consideration of Climate Change in EA in Ontario (MOECC, 2017) describes two basic aspects to be considered: 1) Undertaking Effects on Climate Change (for example greenhouse gases), and 2) Climate Change Effects on the undertaking (for example stormwater management or other infrastructure requirements). For this EA, climate change has been assessed with these considerations in mind.

3.11 Cumulative Impact Assessment

The net effects of the proposed undertaking, as determined by the analysis completed was qualitatively combined with the predicted effects of other existing and identified certain and probable projects in the area, where the effects would overlap in time or space. The evaluation considered potential effects on the various components to determine if there are any unacceptable predicted cumulative impacts, as measured against applicable regulatory standards and considered the effects of climate change.

3.12 Develop Monitoring and Contingency Plans

Appropriate monitoring programs and contingency plans for those environmental components where they are necessary were developed. These programs and plans were developed at a level of detail appropriate for an EA and will be finalized during other future approvals, as necessary.

3.13 Other Approvals

Any other anticipated approvals, whether through municipal, provincial or federal requirements, were determined and discussed in this step.

3.14 Commitments

Commitments from both the ToR and the preparation of this EA were developed and documented.

3.15 Preparation of EA Study Report

A Draft EASR was prepared, consisting of the main EASR, technical supporting documents as appropriate, and a Consultation Record. The components of the EASR are described in Section 2.3.2. The EASR contains an Executive Summary, a list of references consulted, and appropriate maps illustrating various aspects of the overall undertaking and aspects of the technical component studies.

4.0 Consultation Methods and Activities

The consultation program for the EA was carried out in accordance with the approved ToR. The results of the program and supporting documents, including copies of notices, presentation materials, comments, and correspondence are contained in the Consultation Record, which is Volume 4 of this EASR. The following sections provide a summary of the consultation program including the consultation program objectives, the individuals/groups involved, the methods of consultation, and a brief summary of the results of the consultation activities.

4.1 Overview

The Consultation Record is part of the requirements of the EA and was prepared following the 2014 *Code of Practice for Consultation in Ontario's Environmental Assessment Process* (MECP, 2014a). The results of the consultation program are summarized in this section of this EASR.

Prior to commencing the ToR development process, the Township of North Dundas developed a Consultation Plan to support the development of the approved Amended ToR as well as support the EA process. This plan was updated prior to and during the EA, renamed the Consultation Plan and a copy of the current Consultation Plan is provided in Volume 4 Appendix A.

During the preparation of the EA, the Township developed a list of potentially interested persons, which included identified members of the public, government agencies (known as the government review team (GRT)), and Indigenous communities. As the EA development process progressed, the Township updated the consultation list to reflect additional parties interested in the proposed undertaking. This same consultation list was then used to communicate with stakeholders throughout EA activities, unless otherwise noted in the sections below.

4.2 Consultation Objectives

Engagement of and consultation with the public and other stakeholders is a key component of the EA process. It enables stakeholders to participate in the planning process and enhance the quality of the project. The key vehicles of the consultation process used to engage the public and the other stakeholders and elicit feedback were the in-person and virtual open house, distribution of technical bulletins, letter/email correspondence, newspaper advertisements, and the Township of North Dundas's Environmental Assessments website.

As stated in the approved ToR, the objectives of the Consultation Plan for the EA process were to:

- Engage stakeholders from the beginning of the process through the use of a variety of consultation events and activities including technical bulletins, open houses, letters/emails, and the undertaking website.
- Ensure that there are adequate opportunities for stakeholders to learn about the EA Study and to provide input, feedback and comments concerning the undertaking and EA process, and that these comments are considered by the EA Study team.
- Engage local elected officials to ensure that they are provided with regular and timely information concerning the EA process.
- Engage stakeholders as early as possible in the development of the ToR and the EA and to facilitate their involvement in the process in ways that meet their needs.
- Ensure the engagement process is open, transparent and inclusive.
- Document all issues and concerns identified by the public, Indigenous communities, agencies and other stakeholders and to demonstrate how these concerns and issues have been incorporated into the EASR.
- Fulfill the EA process public consultation requirements.

Details of the engagement related to the development of this EASR is documented within the Volume 4 Consultation Record. The following sections summarize the primary engagement activities that have occurred throughout the development of this EA.

4.2.1 Key Decision-Making Milestones

To meet the objectives of consultation, Open Houses with the public and other stakeholders and technical bulletins were scheduled during the following key decision-making milestones in the EA process. In situations where Open Houses were proposed in the approved ToR but could not be held due to public safety associated with the COVID-19 pandemic, technical bulletins were distributed in their place. The main milestones are:

1) Results of the Waste Diversion Study through distribution of Technical Bulletin #1.
2) Identification of the preferred ‘Alternatives To’ was to be via Open House but instead was through distribution of Technical Bulletin #2.
3) Identification of the preferred ‘Alternative Method’ through distribution of Technical Bulletin #3.
4) Reviewing the draft EA including results of the impact assessment through in-person and virtual Open House #3.

The frequency and timing of consultation allowed for public and other stakeholders with an interest in the waste management plan the opportunity to contribute to decision making and to influence decision before moving forward to the next step in the planning process.

4.2.2 Issues Resolution Strategy

Throughout the EA process, the Township solicited feedback and information from the local community, government agencies, Indigenous communities, and other interested persons about the proposed waste management plan. Issues identified were reviewed by the Township and a reasonable effort was made to respond to concerns raised throughout the planning process. The Township has attempted to resolve all issues or disputes to reach a resolution that is amenable, recognizing that interests of multiple stakeholders and/or regulations may sometimes dictate a resolution that may not be desirable to all parties. There were no issues where mutually agreeable resolution was not achieved and the matter had to be referred to the MECP for guidance.

4.3 EA Consultation Methods

Various consultation events and activities were used during the EA process to achieve the objectives noted above as part of the Consultation Plan. The consultation events were designed to optimize engagement of the potentially interested persons in the process of the EA studies. The consultation activities carried out during the EA consisted of:

- Letter and email correspondence distributed to the public, interested stakeholders, GRT, and Indigenous communities.
- Notices published in local newspapers.
- Notices published on the EA website (https://www.northdundas.com/municipal-services/environmental-assessments).
- Three technical bulletins summarizing key results.
- An In-person and Virtual Open House for the local community.
- Meetings and telephone calls between the Township, the EA consultants, and the MECP.
- Informal meetings, telephone calls and discussions with neighbours to the existing Boyne Road Landfill on an as needed basis throughout the EA.
- A meeting with the Huron-Wendat Nation.
- The Draft EASR was made available for the GRT, Indigenous communities and public for comment for a four week review period prior to finalization and submission to the MECP.

The results of the consultation activities are recorded in the EASR, specifically in Volume 4 Consultation Record. A summary of each consultation event was prepared documenting comments and issues that were raised. If no comments or issues were raised, then this was documented as well.

4.4 Undertaking Contact List

The Township has maintained a contact list of persons and organizations who might have an interest in being involved in the process. Anyone on the contact list was notified of all community engagement events (Open Houses and Technical Bulletins) as well as provided with general updates of the EA process on a regular basis through e-mail. The undertaking contact list is comprised of the following groups:

- GRT members
- Indigenous communities
- Property Owners and Tenants located within a 1 kilometre (km) radius of the Boyne Road Landfill
- Persons or organizations who requested to be added to the contact list

GRT and Indigenous communities are summarized below, and the full list is provided in Volume 4 Appendix B and Appendix C for GRT and Indigenous communities, respectively. In total there were 35 property owners or tenants within 1 km and other persons or organizations who requested to be added to the contact list. For privacy reasons, their names and contact information is not publicized in Volume 4.

4.4.1 Agencies

The following federal and provincial government departments, health units, municipal offices, and school boards, were kept informed throughout the progress of the EA.

Federal Agencies

- Environment and Climate Change Canada

Provincial Government

- Ministry of Agriculture, Food and Rural Affairs
- Ministry of the Solicitor General
- Ministry of Energy, Northern Development and Mines
- Ministry of Municipal Affairs and Housing
- Ministry of Natural Resources and Forestry
- Ministry of the Environment, Conservation and Parks
- Ministry of Heritage, Sport, Tourism and Culture Industries

Other

- Catholic District School Board of Eastern Ontario
- Conseil des écoles catholiques du Centre-Est
- Conseil des écoles publiques de l'Est de l'Ontario
- Upper Canada District School Board
- Eastern Ontario Health Unit
- Winchester Fire Department

- Ottawa International Airport
- Rideau Valley Air Park
- South Nation Conservation
- Raisin River Conservation
- Counties of Stormont, Dundas and Glengarry
- Township of North Dundas

4.4.2 Indigenous Communities

It is recognized that Indigenous communities have specific interests and rights regarding consultation on projects that might potentially affect them. The consultation with Indigenous communities provided insight into the potential effects on Indigenous communities, including the potential effects on use of lands for traditional purposes. It is also recognized that Indigenous communities may have specific and differing needs regarding how they would like to be consulted. To address these interests, the Township continued to inform Indigenous communities about the proposed undertaking and invite their participation during the EA process.

As documented in the approved Amended ToR, a list of three potentially affected Indigenous communities was developed in consultation with the MECP and Northern Affairs Canada. Throughout the EA process, the Township provided notification and offered to consult with each of the following Indigenous communities.

- Algonquins of Ontario
- Mohawks of Akwesasne
- Huron-Wendat Nation

4.5 Schedule of Events

The principal consultation events that took place during the development of the EA included:

- Notice of Commencement (NOC) of the EA – September 10, 2020
- Technical Bulletin #1 (Diversion Study Results) – January 13, 2021
- Technical Bulletin #2 (‘Alternatives To’ Assessment) – March 3, 2021
- Select agency Review of Draft EA Work Plans – June 2021
- Technical Bulletin #3 (‘Alternative Methods’ Assessment) – November 22, 2021
- Review of preliminary draft EASR by the MECP
- Public and Indigenous Community Review of Draft EA Work Plans – February 2022
- Open House #3 (held in-person and virtually) – April 7, 2022
- Submission of the draft EASR – May 2022 (expected)
- Submission of the final EASR – August 2022 (expected)
- Social Media and EA Study Website Postings (throughout the process)

These consultation events are further described in the following sections. All referenced materials, including copies of all comments received, and the subsequent responses are available in Volume 4 - the Consultation Record of this EASR.

4.6 Summary of Consultation Events

The following is a summary of the principal consultation events that occurred during the EA phase. Note that the Appendices referred to in this Section 4.6 refer to Volume 4 – the Consultation Record of this EASR.

4.6.1 Notice of Commencement of the EA

The Township initiated the EA process by publishing the NOC of the EA on September 10, 2020 (Volume 4 Appendix D1) as required by the EAA.

The NOC provided information about the approval of the Amended ToR, a brief overview of the proposed undertaking, information about the project location, information about the EA process, contact information for the Township and EA Study team, as well as information about how to obtain further information and participate in the process.

The NOC of the EA was posted on the Township's website and is provided at: https://www.northdundas.com/municipal-services/environmental-assessments (Volume 4 Appendix D1). The NOC of the EA was also published in the Chesterville Record and in the Nation Valley News on September 10, 2020 (Volume 4 Appendix D2). Note that the Winchester Press, where the material from the ToR had previously been advertised, closed in January 2020.

The NOC of the EA, accompanied by a letter from the Township, was also emailed or mailed to the GRT, Indigenous communities, neighbours within 1 km of the Boyne Road Landfill, and interested persons and organizations who asked to be on the EA Study contact list. Examples of this correspondence are provided in Volume 4 Appendix D2 for all stakeholders, with the exception of Indigenous communities that are discussed in Section 4.7 and examples provided in Volume 4 Appendix C2. Responses from members of the GRT are available in Volume 4 Appendix D3. There were no responses from the public. Consultation with and responses from Indigenous communities are available in Volume 4 Appendix C2 (see Section 4.7 for additional details).

4.6.2 Technical Bulletin #1 – Diversion Study Results

The Township distributed the Technical Bulletin #1 accompanied by a tailored feedback form on January 13, 2021 (Volume 4 Appendix E1).

Technical Bulletin #1 presented a general overview on the EA process and Waste Diversion Study (Volume 3 Appendix J), including the purpose of the Waste Diversion Study, the current status of diversion practices in the Township, the diversion options considered, and the evaluation criteria for the diversion options. The technical bulletin also invited public participation by completing the feedback form or by providing comments. Contact information for the EA Study team was provided in the technical bulletin so feedback and comments could also be submitted by phone, mail, or email.

Technical Bulletin #1 and its associated feedback form was posted on the Township's website and can be found at: https://www.northdundas.com/municipal-services/environmental-assessments . An advertisement to promote the technical bulletin and solicit public input was published in the Nation Valley News on January 13, 2021 (Volume 4 Appendix E-2). The

advertisement again included contact information for the EA Study team so feedback and comments could also be submitted by phone, mail, or email. Technical Bulletin #1 was also advertised by the Township's social media platforms on Facebook and Twitter (Volume 4 Appendix E2).

Technical Bulletin #1, accompanied by a letter from the Township, was also emailed or mailed to the GRT, Indigenous communities, neighbours within 1 km and interested persons and organizations who asked to be on the EA Study contract list. Examples of this correspondence are provided in Volume 4 Appendix E-2. Comments received from members of the GRT are provided in Volume 4 Appendix E3. These comments are further discussed Section 4.7. There were no responses from the public. Consultation with and responses from Indigenous communities are available in Volume 4 Appendix C3 (see Section 4.7 for additional details).

4.6.3 Technical Bulletin #2 – 'Alternatives To' Assessment

The Township distributed the Technical Bulletin #2 accompanied by a tailored feedback form on March 3, 2021 (Volume 4 Appendix F1).

Technical Bulletin #2 presented a general overview of the EA process, the criteria and methodology used to identify the preferred 'Alternative To', the environmental components and criteria used to assess 'Alternatives To', the preliminary results of the 'Alternatives To' assessment and proposed next steps. The technical bulletin also invited public participation by completing the feedback form or by providing comments. Contact information for the EA Study team was provided in the technical bulletin so feedback and comments could also be submitted by phone, mail, or email.

Technical Bulletin #2 and its associated feedback form was posted on the Township's website and can be found at: https://www.northdundas.com/municipal-services/environmental-assessments. An advertisement to promote the technical bulletin and solicit public input was published in the Nation Valley News on March 2, 2021, with identical advertisements concurrently published in the Chesterville Record and the North Dundas Times (Volume 4 Appendix F2). The advertisement again included contact information for the EA Study team so feedback and comments could also be submitted by phone, mail, or email. Technical Bulletin #2 was also advertised by the Township's social media platforms on Facebook and Twitter.

Technical Bulletin #2, accompanied by a letter from the Township, was also emailed or mailed to the GRT, Indigenous communities, neighbours within 1 km and interested persons and organizations who asked to be on the EA Study contract list. Examples of this correspondence are provided in Volume 4 Appendix F2. Comments received from members of the GRT or public are provided in Volume 4, Appendices F3 and F4, respectively. These comments are further discussed in Section 4.7.1. Consultation with and responses from Indigenous communities are available in Volume 4 Appendix C4 (see Section 4.7 for additional details).

4.6.4 Work Plans

As required in the approved ToR detailed technical work plans for each of the environmental components related to criteria, indicators, how 'Alternative Methods' would be compared, how the impact assessment would be completed and data sources were developed and are provided in Section 8 of this EASR.

The EA Study team first prepared a detailed work plan for the required biology environmental component in October 2019 and shared it with MNRFF and MECP (Volume 4 Appendix G1). Comments on this work plan were received from MECP on December 16, 2020 and are provided in Volume 4 Appendix G2. Follow up emails were sent to MNRF on multiple occasions, but no comments on the work plan were received from MNRF.

the Township then provided draft detailed work plans for groundwater, surface water, and atmosphere (air and noise quality) to MECP technical reviewers and the local conservation authority for review and comment. These draft detailed work plans shared with MECP and Conservation Authority reviewers are provided in Volume 4 Appendix G1.

A teleconference meeting was held on June 10, 2021, to discuss the proposed draft atmosphere environmental component work plan. The meeting was hosted by members of the EA Study team and attended by relevant technical reviewers from the MECP. During the meeting, the MECP technical reviewers provided feedback and comments on the proposed work plan. A draft meeting summary was prepared by the EA Study team and submitted to the MECP technical reviewers for their confirmation and comments. The finalized meeting summary is provided in Volume 4 Appendix G2.

A teleconference meeting was held on June 23, 2021, to discuss the proposed draft groundwater and surface water environmental component work plans. The meeting was hosted by members of the EA Study team and attended by relevant technical reviewers from the MECP, a representative from the Raisin River Conservation (RRC), and representatives from the South Nation Conservation (SNC). During the meeting, the MECP technical reviewers and RRC and SNC representatives provided feedback and comments on the two proposed work plans. A draft meeting summary was prepared by the EA Study team along with updated draft work plans and submitted to the meeting attendees for confirmation and comments. The finalized meeting summary is provided in Volume 4 Appendix G2.

Additionally, a copy of all environmental component work plans was posted on the EA Study website on February 3, 2022 and e-mails sent to Indigenous communities and individuals who signed up to receive notices regarding the EA directly for their review and comment. This step was meant to be completed in advance of distribution and circulation of Technical Bulletin #3; however, this was inadvertently missed. To provide opportunity to provide feedback, the work plans were circulated as soon as the error was identified and were also highlighted for consideration during review of the draft EASR. These consultation efforts with the public, along with the detailed work plans, are provided in Volume 4 Appendix G3. Consultation with Indigenous communities is available in Volume 4 Appendix C6.

Comments received on the work plans are discussed in Section 4.7.2.

4.6.5 Technical Bulletin #3 – 'Alternative Method' Assessment

The Township distributed the Technical Bulletin #3 accompanied by a tailored feedback form on November 22, 2021 (Volume 4 Appendix H1).

Technical Bulletin #3 presented a general overview on the EA process, the finalized preferred 'Alternative To', the 'Alternative Methods' to be considered, the environmental components and criteria for the comparative evaluation of those 'Alternative Methods', the preliminary results of the 'Alternative Methods' comparison and proposed next steps. The technical bulletin also invited public participation by completing the feedback form or by providing comments. Contact information for the EA Study team was provided in the technical bulletin so feedback and comments could also be submitted by phone, mail, or email.

Technical Bulletin #3 and its associated feedback form was posted on the Township's website and can be found at: https://www.northdundas.com/municipal-services/environmental-assessments (Volume 4 Appendix H2). An advertisement to promote the technical bulletin and solicit public input was published in the Nation Valley News on November 22, 2021 (Volume 4 Appendix H2). The advertisement again included contact information for the EA Study team so feedback and comments could also be submitted by phone, mail, or email.

Technical Bulletin #3, accompanied by a letter from the Township, was also emailed or mailed to the GRT, Indigenous communities, neighbours within 1 km, and interested persons and organizations who asked to be on the EA Study contact list. Examples of this correspondence are provided in Volume 4 Appendix H2. Comments received from members of the GRT are provided in Volume 4, Appendix H3. These comments are further discussed in Section 4.7.3. There were no comments from the public. Consultation with Indigenous communities is available in Volume 4 Appendix C5 (see Section 4.7 for additional details).

4.6.6 In-person and Virtual Open House #3

Open House #3 was held in-person and virtually before the distribution of the draft EASR to the stakeholders and Indigenous communities. This open house presented the proposed EA and informed the public about the confirmed identification of the preferred 'Alternative Method', as well as the results of the existing conditions studies and the predicted effects on the environment, and the commitments the Township is making to mitigate any adverse effects.

This event was designed with a formal presentation to those in person and broadcast virtually, followed by opportunities for attendees and those on-line to speak directly with the Township and the EA consulting team. Attendees were asked to sign in and were encouraged to fill out a comment sheet to provide feedback and recommendations. Contact information for the EA Study team was provided in the feedback form so feedback and comments could also be submitted by phone, mail, or email. Copies of the information available at the open house and the feedback sheets are provided in Volume 4 Appendix I2.

Open House #3 and its associated feedback form was posted on the Township's website and can be found at: https://www.northdundas.com/municipal-services/environmental-assessments (Volume 4 Appendix I2). An advertisement to promote the open house and solicit public input was published in the Chesterville Record on March 24 and 31, 2022 (Volume 4 Appendix I1). The advertisement again included contact information for the EA Study team so feedback and comments could also be submitted by phone, mail, or email. Notice of the Open House was also emailed or mailed more than a week in advance of the presentation to the GRT, Indigenous communities, neighbours within 1 km, and interested persons and organizations who asked to be on the EA Study contact list. Examples of this correspondence are provided in Volume 4 Appendix I1. The Open House was also advertised on the Township's social media platform via Facebook.

A total of 5 members of the public attended Open House #3 in person and one Township Councilor and the Mayor were also present for part of the presentation. One newspaper, one school board, the local district MECP and the SNC attended Open House #3 on-line. The overall atmosphere of the open house was professional, courteous and respectful.

No feedback forms were received during or after the Open House #3.

Only one comment was received from the GRT following Open House #3. The comment complimented the overview provided on the project and asked about a copy of the presentation. This correspondence is documented in Volume 4 Appendix I3. There were no written comments received from the public. Consultation with Indigenous communities is available in Volume 4 Appendix C8 (see Section 4.7 for additional details).

4.6.7 Preliminary Draft

A preliminary draft of Volume I EASR was shared with the MECP Environmental Assessment Services in February 2022 in advance of the draft of the full EA circulation, to get their initial thoughts on the studies completed and the EASR preparation. These comments are shared in Section 4.7.5.

4.6.8 Draft EASR

A draft of Volume I, Volume II, Volume III, and Volume IV that comprise the EASR was distributed to members of the GRT and the public in May 2022 to solicit feedback in preparation of the final EASR. The draft EASR was made available to the public and GRT from May 27, 2022 onwards and comments on the draft were requested by June 24, 2022, to accommodate a four-week review period.

Full hard copies of the draft EASR (which included Volume I, Volume II, Volume III, and Volume IV) were printed and distributed to Algonquins of Ontario, Mohawks of Akwesasne, MECP Cornwall Area Office, MECP Environmental Assessment and Permissions Branch, Ministry of Municipal Affairs and Housing Community Planning and Development reviewer, Township of North Dundas Office, Winchester Public Library, and the Stormont, Dundas and Glengarry (SDG) Office. An additional hardcopy was sent directly to a member of the public following a request made by email.

Electronic versions of the draft EASR (which included Volume I, Volume II, Volume III, and Volume IV) were distributed to members of the GRT and select members of the public via email by an electronic file download link. Examples of this correspondence are provided in Volume 4 Appendix K1.

The Draft EASR was additionally shared on the Township of North Dundas's website (https://www.northdundas.com/municipal-services/project-updates). Members of the public were notified of the availability of the draft EASR on the website and in hardcopy at three public viewing locations (Township of North Dundas Office, Winchester Public Library, and the Stormont, Dundas and Glengarry (SDG) Office. This notice included contact information for the EA Study team so feedback and comments could be submitted by phone, mail, or email. Notice of public viewing of the EASR was published two weeks before the four week review period to accommodate the public. Notices to the public were shared in the Chesterville Record on May 12, 2022, the North Dundas Times on May 18, 2022, and via the Township's social media on May 27, 2022. Records of this correspondence are provided in Volume 4 Appendix K1.

Comments from the GRT, MECP and public from the draft EASR circulation are summarized in Section 4.7.6.

4.6.9 On-going Activities

The Township continues to provide information updates regarding on-going project activities and the status of the EA process on the Township's project website, and in-person to residents visiting the Boyne Road Landfill.

Regular in-person updates have been provided by the landfill operators and staff to the neighbouring residents and neighbouring farms throughout the EA process.

The website has been periodically updated throughout the EA process with relevant updates, the updated environmental component work plans, technical bulletins, feedback forms, and requests to provide comments and documents for review.

4.6.10 Indigenous Community Involvement

As noted in Section 4.4.2, it is recognized that Indigenous communities have specific interests and rights regarding consultation on projects that might potentially affect them. Considerable efforts were made during the commencement and throughout the EA process to make and remain in contact with consultation representatives and key figures from the identified Indigenous communities. The identified Indigenous communities are:

- Algonquins of Ontario
- Mohawks of Akwesasne
- Huron-Wendat Nation

During distribution of the Notice of Commencement (NOC), Technical Bulletin #1, Technical Bulletin #2, Technical Bulletin #3, Work Plans and In-person and Virtual Open House #3, the EA Study team reached out by email and/or phone to the points of contact established for each Indigenous community. The NOC and technical bulletins, along with associated

feedback forms, were shared electronically via email to each Indigenous community. Starting with the second consultation event, Technical Bulletin #1, follow up emails or calls were conducted with Indigenous community contacts if no confirmation, feedback form, or response was received After minimal contact was confirmed from the Algonquins of Ontario for Technical Bulletin #1 and Technical Bulletin #2, additional efforts were made to re-establish contact for Technical Bulletin #3. Contact was established and receipt of all material was confirmed. These consultation efforts are recorded in Volume 4 Appendix C5.

When requested by an Indigenous community, physical and/or electronic copies of notices, technical bulletins, feedback forms, and reports were provided by mail. All three Technical Bulletins and the Stage 1 Archaeology Assessment were provided to the Mohawks of Akwesasne by mail by either hardcopy or electronically on a USB. A record of these consultation efforts is provided in Volume 4 Appendix C.

As part of this EASR, a Stage 1 Archaeology Assessment was completed, and a Stage 1 Archaeology Assessment Report was prepared. As established in the ToR for this project, the Huron-Wendat Nation identified an interest in the archaeological studies at the Boyne Road Landfill site. The results of the studies along with the Stage 1 Archaeology Assessment Report were shared with the Huron-Wendat Nation, as well as the Algonquins of Ontario and the Mohawks of Akwesasne, in December 2021 for review and comments. A record of this consultation and the responses received are provided in the consultation record, in Volume 4 Appendix C6.

Following distribution of the notice for In-person and Virtual Open House #3 the Huron-Wendat Nation indicated they would like to have further discussion about this EA. A brief call was held on April 5, 2022 where some high level details were reviewed and a more in depth teleconference was coordinated for April 21, 2022. The summary of phone conversation and teleconference minutes are provided in Volume 4 Appendix C8. Some of the issues discussed and their resolution are summarized in Section 47.4.

4.7 Summary of Concerns Raised During Consultation

Comments and questions were welcomed by the Township from participants or through the distribution of feedback forms for each of the consultation events described in Section 4.6 and 4.7. Notice of Commencement and Technical Bulletin #1

Only one comment, from an Indigenous community representative, was received by email on September 11, 2020, following the distribution of the Notice of Commencement. The same comment was received by email from the same Indigenous community representative on January 13, 2021, following the distribution of the first technical bulletin. The EA Team responded to this comment on February 9, 2021. This comment is summarized in Table 4-1. This correspondence in full is also provided in Volume 4 Appendix C2 and Appendix C3.

Table 4-1: Summary of Comments Received on Technical Bulletin #1

Commenter	Summary of Comment Received	EA Team Response
Huron-Wendat Nation	Can you please clarify if any archaeological studies are anticipated as part of the EA process?	No archaeological study has yet to be completed at this time. The project will include a desktop archaeological study, which will determine if any intrusive archaeological assessment needs to be completed.

Other responses received on the NOC and Technical Bulletin #1 from members of the GRT were not related to the content of the technical bulletin or the EASR, but requested that future emails be redirected to an alternate contact. These correspondences have been provided in Volume 4 Appendices D3 and E3.

4.7.1 Technical Bulletin #2

For the second technical bulletin, comments were received from members of the GRT, as well as members of the public. These comments are included in full in Volume 4 Appendix F3. Comments received from the GRT were received by email and are summarized in Table 4-2, along with the GRT member who provided the comment. Comments from the public were provided by email and social media. One respondent from the public also completed a feedback form. The comments from the public are included in full in Volume 4 Appendix F4. The comments received from the public are summarized in Table 4-3, and the comments received in the feedback form for Technical Bulletin #2 are summarized in Table 4-4.

Table 4-2: Summary of GRT Comments Received on Technical Bulletin #2

Commenter	Summary of Comments Received	EA Team Response
Laura Hatcher (MHSTCI)	• We recommend that 'Cultural Heritage' is changed to say 'Built Heritage Resources and Cultural Heritage Landscapes'. • "Approximate degree of potential" is unclear and may be more appropriate to say "presence of known or potential". • In addition to identifying the potential for archaeological resources, built heritage resources and cultural heritage landscapes, it is suggested the criteria also speak to the potential impact to these resources. • Please advise whether screening or technical studies for cultural heritage resources have been undertaken.	The EA Team provided a full letter response to MHSTCI to address the comments received, which is provided in Volume 4, Appendix F3.
James Holland (SNC)	• We have no comments at this time.	N/A
Joffre Côté (MNRF)	• We have no comments on Technical Bulletin #2.	N/A

Table 4-3: Summary of Public Comments Received on Technical Bulletin #2

Summary of Comments Received	EA Team Response
• We have noticed that the edges of the landfill have been built up recently. Will that provide enough space until an extension or expansion can be done? • I would like to be added to the distribution list for updates on the Environmental Assessment. • Also, since the pandemic makes it difficult to hold another open house on the EA, have you considered have a video (zoom) type of meeting, to help share the progress on the EA to residents, and what decisions are made? I think that this would help inform people in a more direct way.	• The landfill has enough space to continue operations for a short while until the EASR can be provided to the MECP for review to hopefully allow expansion of the landfill. • The submitter was added to the EA contact list. Technical Bulletin #2 was originally supposed to be an in-person Open House but was shifted to a technical bulletin in light of COVID-19 requirements and very limited public participation at past Open Houses during the ToR. This decision was made in consultation with the MECP. Future planned consultation will take under advisement the request for virtual or in-person Open House.

Summary of Comments Received	EA Team Response
• The referenced feedback form on Technical Bulletin #2 is dated February 19, 2021. Since it is now 3 months later, has anything changed in Technical Bulletin #2? • What is the deadline date to provide comments on Technical Bulletin #2?	• It was confirmed to the commenter that Technical Bulletin #2 has not changed since it was published on the project website in February, nor had its corresponding feedback form. • Although there was no formal deadline to provide comments on this bulletin, feedback was encouraged to be provided by June 25, 2021.
• I was wondering if there have been any further updates on the Boyne Road landfill environmental assessment, in the past month. Has a third newsletter been published, or is it still planned to be published?	• It was noted that the EA Team was working on the studies required and the individual is on the contact list for future updates.
• Would you be able to provide me with more information on this initiative? I would like to know what the implications are (where the landfill will be expanded to), where the project is in terms of implementation (are we in an assessment phase or is the plan going into action ASAP) and what the impacts are going to be for residents' • I'd be more than happy to set up a phone call with either of you if you could spare a few minutes of your time.	• The EA Team had a call with the respondent to explain: • The Environmental Assessment process and the anticipated timing of the changes. • What progress has been made in the project to date and what the current next steps are. • The impacts anticipated for residents who live in proximity to the landfill. • The general estimated limits for landfill expansion alternative methods. • The respondent was satisfied with the call and had no further questions.
• We would like to be added to the project mailing lists for the environmental assessment of North Dundas' waste management plan, please.	• Respondent was added to the mailing list and provided an electronic copy of Technical Bulletin #2.

Table 4-4: Summary of Comments Received on Feedback Form for Technical Bulletin #2

Feedback Request	Comment Received	EA Team Response
Please provide any general comments regarding this Environmental Assessment Process.	• Due to the ongoing COVID-19 pandemic, some of the open houses were replaced with technical bulletins, with the opportunity for interested parties to send in any comments or questions that they may have. Are there any plans in the future for zoom type presentations, such as is often done for township meetings? • Will this EA or the eventual decision on the future of North Dundas Township's landfill consider activities taking place outside of the scope of ND? • Does this EA consider the projected population growth in North Dundas Township? With recent increases seen in the demand for water and sewer services beyond the normal projected growth, is it anticipated that the amount of waste destined to the landfill will also increase by the same amount?	• Technical Bulletin #2 was originally supposed to be an in-person Open House but was shifted to a technical bulletin in light of COVID-19 requirements and very limited public participation at past Open Houses during the ToR. This decision was made in consultation with the MECP. There is a planned Open House at conclusion of the EA. • Within the EASR we have documented our activities to pursue collaboration related to continued use of the Boyne Road Landfill. The Township remains open to collaboration for waste management services in SDG. • Yes, the EA considered the projected population growth in the Township.

Feedback Request	Comment Received	EA Team Response
The purpose of this EA is to provide environmentally safe and cost-effective long-term waste management for the Township of North Dundas for a 25 year planning period. Do you agree with or have any comments on this purpose statement?	• Why is the planning period limited to 25 years? While 25 years is a good length of time, what will happen after 25years? Will the expected lifetime of the "new" landfill be made clear in the resulting recommendations?	• A 25 year planning period for waste management is typical, as waste diversion and management options can develop, which would result in changes to a plan of longer duration.
Various components of the environment have been used to assess potential effects of the 'Alternatives To' considered for the waste management plan. Similar components are also being considered to assess and compare the 'Alternative Methods' to implement the preferred long term approach to waste management. The following table lists proposed natural, social, economic /financial and technical components of the environment being considered for this EA. Please tell us how these rank in importance to you. Is there any aspect we may have missed?	• [All components listed as 'Very Important'] • Please add "on going costs" to the Socio-Economic component	• Acknowledged. • Ongoing costs are included in the Design and Operation environmental component.

Feedback Request	Comment Received	EA Team Response
Do you agree with the identification of the preferred 'Alternative To' for this waste management plan –expansion of the Boyne Road Landfill site? If not, why not?	• In the comparison of the various six alternatives, it is not clear as to why the expansion of the Boyne Road Landfill site has been selected. Was a scoring mechanism used for each component and sub component, for each of the alternatives? How do the scores compare between each of the alternatives? • With regard to the alternative to "Establish New Landfill Site in the Township", why would the land on the north side of Boyne Road, near the existing site not be considered? How is that land used currently?	• See Section 6.4 of this report for the complete comparison of 'Alternatives To'. • Section 10.1 of the EASR provides the rationale of why the north side of Boyne Road is not a suitable location for expansion.

4.7.2 Work Plans

As discussed in Section 4.6.4, detailed work plans for select environmental components (atmosphere, biology, groundwater, and surface water) were provided to the MECP, MNRF and conservation authorities for review and commentary. The work plans for atmosphere, groundwater and surface water were primarily discussed over teleconference meetings, for which meetings summaries are available in Volume 4 Appendix G2. Outside of, or in lieu of the teleconference meetings, additional formal comments were received on the detailed work plans by some of the recipients. These additional comments are summarized in Table 4-5 and are available in full in Volume 4 Appendix G2. Work plans for all environmental components were emailed or mailed to Indigenous communities, neighbours within 1 km of the Boyne Road Landfill, and interested persons and organizations who asked to be on the EA Study contact list on February 3, 2022. Additionally, the Work Plans for all environmental components were posted on the project website for feedback and comments from the public in February 2022; no comments from these groups on the work plans were received.

Table 4-5: Summary of Comments Received on Work Plans and Meeting Summaries

Commenter	Summary of Comment Received	EA Team Response
Atmosphere Work Plan		
Ross Kircher (MECP)	• I have no comments or revisions.	N/A
Header Merza (MECP)	• It is suggested that existing traffic (with landfill) should be compared to 'no landfill' conditions • Remove the following text: "*Quantitative noise assessment requirement for public owned land can be ignored if owner of public lands provides confirmation in writing that no noise sensitive building will be built on this land.*"	The EA Team acknowledged the comments and revised the work plans and meeting summaries accordingly. As suggest during the teleconference meeting, the Township provided a letter to the MECP to confirm the Township will not permit a noise sensitive land use within 500 m of the landfill or within the existing or any future CAZ.
Surface Water Work Plan		
Beth Gilbert (MECP)	• The proposed preliminary areas to be studied appear reasonable. This includes the snow dump facility to the north of the landfill and the watercourse to the southwest of the potential expansion area. • The work plan intends to provide an impact assessment from the snow dump facility including evaluation of surface water flow in and around the snow dump. This is reasonable. The aim should include identifying any drainage pathways from the snow storage facility in relation to the landfill surface water monitoring stations at a time of year when snowmelt runoff is anticipated. Another consideration	Acknowledged.

Commenter	Summary of Comment Received	EA Team Response
	would be any potential ground-surface water interaction contributions from the snow dump to the drainage ditch along the north side of Boyne Road. • The work plan intends to obtain a sample for analysis if enough surface water is available for sampling in the watercourse (Quart Municipal Drain) located to the southwest of the existing footprint. This is reasonable. In the long-term, it would be beneficial for a baseline dataset to be developed prior to waste being deposited. • Additional leachate indicators should be explored. Per- and poly-fluoroalkyl substances (PFAS) are a group of parameters that are associated with landfill leachate and should be considered in surface water to identify the extent of leachate impact in surface water and distinguish it from other sources. • The work plan intends to update the trigger mechanism and surface water monitoring program, if required. Any changes to the trigger mechanism or surface water monitoring program would require consultation and concurrence with a Regional Surface Water Specialist. • With regard to the Evaluation of 'Alternative Methods' for the surface water quantity component, the work plan would benefit from evaluating the potential change in erosion and sedimentation effects on the perimeter drainage ditch which may result from the changes in surface water quantity conveyed/generated under the different 'alternative method' scenarios.	

Commenter	Summary of Comment Received	EA Team Response
Biology Work Plan		
Shamus Snell (MECP)	• As part of this review the SARB examined the proposed and completed studies to check if they were sufficient to detect all potential occurrences of SAR on or adjacent to the site. It is noted that observations of Bobolink (Dolichonyx oryzivorus) and Eastern Meadowlark (Sturnella magna) occur but no species specific surveys have been conducted or are proposed. It is recommended that species specific surveys be conducted for Bobolink and Eastern Meadowlark. • Numinous observations Barn Swallow (Hirundo rustica) have been detected overlapping the site. If the there are any structures or buildings onsite which have the potential to be impacted by the proposed landfill expansion they should be surveyed for the presence of Barn Swallow nests. • If SAR bats are detected during the acoustic surveys, stem surveys should be performed to help determine the amount of potential nursery habitat on site. • It is recommended that any observations of SAR which are encountered during surveys be reported Natural Heritage Information Center so that they can import it into the provincial database. The link and instructions on how to do this can be found here www.ontario.ca/page/report-rare-species-animals-and-plants, or an email with the observation details (i.e. date, time, location) can be sent directly to NHICrequests@ontario.ca.	The EA Team responded with the following: • There is no suitable habitat for BOBO or EAME on the expansion site itself, as the open fields were row crops. We do not anticipate any impacts to habitats for these species on adjacent lands resulting from the proposed expansion, and the crops in the area were again row crops. This is why we did not perform targeted surveys for these species. Please confirm that you agree with this approach. • As it relates to the SAR bats, please elaborate on what the MECP will be looking for with respect to the stem surveys mentioned in your email. We assume these surveys should be performed in winter when the trees and limbs are more visible. • Further confirmation on the above points was obtained from Shamus Snell over email, as provided in Volume 4 Appendix G2.

4.7.3 Technical Bulletin #3

For the third technical bulletin, comments were only received from the MHSTCI. These comments are included in full in Volume 4 Appendix H3. The comments received from the MHSTCI were provided by letter dated December 3, 2021 and are summarized in Table 4-6, along with the other groups who acknowledged receipt of the technical bulletin.

Table 4-6: Summary of Comments Received on Technical Bulletin #3

Commenter	Summary of Comments Received	EA Team Response
Jack Mallon (MHSTCI)	• MHSTCI recommends that the Environmental Component "Cultural Heritage" is changed to "Cultural Heritage Resources," and that the Evaluation Criterion/Criteria be subdivided into "Archaeological Resources," "Built Heritage Resources" and "Cultural Heritage Landscapes" for consistency with terminology used in provincial legislation and policy. • This Bulletin does not identify what evaluation methods were used to determine the alternative method's impact on cultural heritage resources. • The Terms of Reference (ToR) for this EA committed to undertaking a Stage 1 Archaeological Assessment and completing MHSTCI's checklist Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes. • Additionally, the ToR committed to communicating the planned schedule, studies and results of the Stage 1 Archaeological Assessment with the Huron-Wendat Nation. Please advise what technical studies have been undertaken to determine the potential impact on cultural heritage resources, and whether the schedule, studies, and results have been shared with the Huron-Wendat Nation.	The EA Team provided a full letter response to MHSTCI to address the comments received, which is provided in Volume 4, Appendix H3.

4.7.4 Open House #3

No feedback forms or follow-up questions were received following the presentation of Open House #3. Only one comment was received from the MECP Senior Environmental Officer from the Cornwall Area Office requesting a copy of the presentation material. A record of this correspondence is provided in Volume 4 Appendix I3.

4.7.5 Preliminary Draft

A preliminary draft of Volume I EASR was shared with the MECP Environmental Assessment Services in February 2022 in advance of the draft of the full EA circulation to get their initial thoughts on the studies completed and the EASR preparation. Comments received (Volume 4 Appendix J1) were predominantly procedural about EAs and requirements of the Code of Practice (MECP, 2014a), about appropriately clear and concise documentation, and an emphasis on including the Do Nothing scenario when discussing and comparing 'Alternative Methods'. A completed disposition table of the comments received, and the responses is provided in Volume 4 Appendix J1.

4.7.6 Indigenous Community Involvement

As discussed in Section 4.6, efforts were made throughout the EA process to keep the identified Indigenous communities informed of the progress of the EA study and provide opportunities for Indigenous community participation. All EA study material was communicated to Indigenous communities by email. For all consultation events following the Notice of Commencement, follow up attempts were made by both phone or email. Table 4-7 below summarizes the communications received from Indigenous communities. Full records of consultation with Indigenous communities are provided in Volume 4 Appendix C.

4.7.7 Draft EASR

As discussed in Section 4.6.8, the draft EASR (which includes Volume I, Volume II, Volume III, and Volume IV) was distributed to the GRT and public for feedback and comments in May 2022. These comments are available in full in Volume 4 Appendix K2. Comments were received from technical reviewers from the MECP, several members of the GRT, one Indigenous Community (see Volume 4 Appendix C9), and from several members of the public. Some updates and clarifications were made to Volume I and Volume II of the EASR, but no comments resulted in any significant changes to the EASR. A summary of the comments received from each respondent are presented in Table 4-8. Responses to the GRT and MECP reviewers were provided to the MECP Environmental Assessment Services to obtain concurrence with the responses from the technical reviewers in preparation of this final EASR. Responses to all comments received are presented in Volume 4 Appendix K2 and have been incorporated within this EASR as applicable.

Table 4-7: Summary of Consultation with Indigenous Communities

Commenter	Summary of Comments Received	EA Team Response
Notice of Commencement		
Huron-Wendat Nation	• Can you please let us know if any archaeological assessment is planned under the EA process?	It was communicated that no archaeological assessment had been completed yet. The project will include a desktop archaeological study, which will determine if any intrusive archaeological assessment needs to be completed.
Technical Bulletin #1		
Huron-Wendat Nation	• We acknowledge receipt of this email. • Can you please clarify if any archaeological studies are anticipated as part of the EA process?	It was communicated that no archaeological assessment had been completed yet. The project will include a desktop archaeological study, which will determine if any intrusive archaeological assessment needs to be completed.
Technical Bulletin #2		
Mohawks of Akwesasne	[Comments made over a follow up phone call on February 17, 1] • Please send me the files on a USB.	The EA Team provided the files on a USB as requested.
Technical Bulletin #3		
Mohawks of Akwesasne	• Thank you for the follow phone call. • At this time, I have no comment but would like to review the hard copy.	The EA Team provided a hard copy of Technical Bulletin #3 by mail on December 17, 2021.
Algonquins of Ontario	• Thank you for the follow-up with the Algonquins of Ontario. • We have received your correspondence.	Acknowledged.

Commenter	Summary of Comments Received	EA Team Response
Stage 1 Archaeological Assessment		
Huron-Wendat Nation	• We would like to receive the Archaeological Assessment for review and comment, is there funding available to help review it all? • Please contact us if archaeological fieldwork is required in the future for this project.	The EA Team provided the Huron-Wendat Nation with an electronic copy of the Stage 1 Archaeological Assessment and provided these comments: • The study area identified in the archaeological assessment was determined to have low potential for archaeological resources and no further archaeological assessments will be required for this study area. • It was communicated that there was no budget for review, but comments would be welcome. • It was communicated that no future archaeological field work will occur for this project, nor will a Stage 2 Archaeology Assessment be prepared.
Mohawks of Akwesasne	• At this time, I have no comment but would like to review the hard copy. • After reviewing the Stage 1 Archaeological Assessment, our office concurs with the recommendation that no further archaeological work is needed. • We have no further comment on this project.	The EA Team provided a hard copy of the Stage 1 Archaeological Assessment by mail on December 17, 2021.

Commenter	Summary of Comments Received	EA Team Response
In-person and Virtual Open House #3		
Huron-Wendat Nation	• Requested a call to discuss the EA the summary of which is provided in Volume 4 Appendix C8 • Key points discussed included: • No further comment on Stage 1 Archaeology Assessment. • Can landfilled waste be documented to record the location and type of waste landfilled to facilitate material recovery if deemed necessary or valuable in the future.	Acknowledged. Although waste diversion was historically not part of a municipality's waste management system, it has been part of the Township's waste management system for many years; it is proposed to further enhance the diversion program during the operating period of the landfill expansion. The Township's focus is on pro-active waste diversion, with the objective of having to dispose of less waste material that has value in the landfill. In this regard, the Township diverts electronic waste, tires, metal, refrigerants, and household hazardous waste (as well as typical household recyclables such as paper, glass, metal and plastics) from landfill. The Township also directs C&D wastes generated in the Township to locations other than the Boyne Road landfill for recycling or disposal and accepts only a limited amount of commercial or industrial waste materials at the landfill. Also, the municipality has an electronic Recycle Coach, to provide residents and businesses with information so they can divert as much as possible from landfill. Lastly, as part of landfill site operations, incoming loads are checked by the site attendant to direct materials to the

Commenter	Summary of Comments Received	EA Team Response
		appropriate locations, again with the objective of increased diversion. It is acknowledged that, in future, specific materials that are not currently thought to have value could be identified as having a beneficial re-use. However, considering that the landfilling will mostly be the residual from a diverted residential waste stream because of the Townships' proactive diversion approach, it is anticipated there would be little material disposed that would be of benefit in the future, and that would warrant the significant effort to locate, excavate and separate it from other wastes for re-use (let alone the regulatory approvals required to do so and the disturbance to the landfill to create such excavations). Furthermore, this a small municipality and the potential quantity of any such material would be small. Although recording the disposal position within the landfill is done for a limited number of specific types of wastes, it is not done for disposed waste in general. For all of these reasons, the Township does not propose to segregate and record the position of the post-diversion waste placed in the landfill.
	• Will the perimeter ditches and the proposed stormwater pond be vegetated and, if so, would native species be used.	The perimeter ditches will be vegetated, but it is typical to vegetate them similar to the final cover that will be like a typical seed mix. The stormwater pond will also be vegetated and it is common to use a typical seed mix. Above the wetted surface native species will be considered. A commitment has been added in Section 18.0.

Commenter	Summary of Comments Received	EA Team Response
	• During below ground surface construction activities can there be more than just the equipment operating keeping an eye out for archaeological resources.	Presently there is a commitment in Section 18 of the EA that says: "Should archaeological resources be unexpectedly encountered during the landfill expansion, a licensed archaeologist will be contacted to assess the need for additional archaeological assessment." When excavation work associated with the proposed expansion is required, the Landfill Site Manager or their designate will periodically observe the excavation area to specifically look for the presence of archaeological resources.

Table 4-8: Summary of Comments Received for Draft EASR

Commenter	Summary of Comments Received
Members of the Public	
[Redacted]	• Why was a 25-year planning period selected? • What happens to the old (current) landfill after the new landfill becomes operational? • Should the cost estimates be presented in 2022 dollars? • What is the phasing of capital costs? And when does this mean the new landfill will become operational? • For the costs presented on E29, is it true that the costs "are not expected to adversely affect municipal finances"? • Can the report be updated with the results of the 2021 Census information? • In Section 1.3.2, it says "The Boyne Landfill is located […] approximately midway between [..] the villages of Winchester and Chesterville". The landfill is not located midway as it is located 2 km from Winchester and 8 km from Chesterville. • Is there any data that shows the percentage of residents that recycle/compost their waste? How do we know if we are doing enough diversion?
[Redacted]	• I would love to see compost pickup, it would reduce the waste in the landfill and residents could get free compost.
Government Review Team	
Laura Hatcher, Ministry of Heritage Sport, Tourism and Culture Industries (MHSTCI)	• Please remove references to provincial approvals for built heritages resources and cultural heritage landscapes. • For both cultural heritage landscapes and built heritage resources, please add "Complete the MHSTCI Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes (2016) checklist" to the work plans. • The archaeology discussion should conclude with a statement about the assessed low potential for archaeological resources in the study area. • A concluding statement should be added to say there are no known or potential built heritage resources or cultural heritage landscapes in the study area.

Commenter	Summary of Comments Received
	• The Stage 1 Archaeological Assessment report is not considered complete until it has been accepted onto the Ontario Public Register of Archaeological Reports.
Sam Short, Ministry of Northern Development, Mines Natural Resources and Forestry	• Please note that relocation of fish/wildlife outside the work area will require additional license/authorization under the *Fish and Wildlife Conservation Act.*
James Holland, South Nation Conservation	• A spring survey should have been completed when water levels were higher to determine the use of the watercourses by fish. • A discussion of Reach 3 is missing from Section 9.4.2.1. • A discussion on the implications of the 2020 summer watershed drought should be added in relation to the aquatic ecosystem findings. • Quart Municipal Drain would be considered indirect fish habitat as it provides some flow, sediments, nutrients, allochthonous inputs to downstream fish habitat. • Any field refinements of boundaries for non-significant wetlands should be reviewed and accepted by the MNRF. • The piping of the Volks Municipal Drain will require a permit and submission to DFO for review. • As part of the works on the Volks Municipal Drain, invasive Phragmites plants should be removed from the drain. • The significant wildlife habitat - interior forest on Figure 13-9 and Figure 11-7 don't match. • In regard to the Species at Risk identified on or adjacent to the site, no alterations to the site can occur prior to receiving approval from the MECP. • The timing window dates for In-water work are incorrect in Table 13-27. • The new perimeter ditch should follow natural channel design principles and include an appropriate vegetated buffer. • Removal of the existing perimeter ditch will require a permit and submission to the DFO. • Native seed mixes should be used for all re-vegetation activities. • Reference to the Clean Equipment Protocol for Industry should be included.

Commenter	Summary of Comments Received
	• Consider allowing the unforested portion of adjacent Township owned property to be used to offset the loss of forest and wetlands resulting from the landfill expansion.
Michael Melaney, South Nation Conservation	• The EASR does not include any detailed geological cross-sections. • Leachate plume mapping should be included. • Additional work should be completed to fully comprehend the potential risk to the municipal wells even though the current risk may seem low. • There is uncertainty in all hydrogeological interpretation and continual assessment and adjustment is necessary. • Additional monitoring wells and testing (other than slug tests) should be completed accompanied by specific contingency plans. • It is necessary for a full understanding of the included possible contingency actions for unacceptable impacts at Compliance Evaluation Monitoring Wells.
Ministry of the Environment, Conservation and Parks	
Dale Gable, Manager – Technology Projects, Resource Recovery Policy Branch	• In Volume 3, Appendix J, batteries should be included in the list of materials that the EPR are intended to address. • A discussion on the potential impacts that the regulations under the Resource Recovery Circular Economy may have on the Township should be provided. • A discussion should be provided on the amount of home composters that the Township has provided to residents over the years to estimate the organic diversion rate. • An explanation should be provided for why the [residential] diversion rate is maintained through the planning period and not increased. • Please confirm the percentage of leaf and yard waste in regards to the overall waste composition. • Clarify the approach used to estimate the proposed volumetric disposal waste needs for the Township. • It is preferred if additional data points were provided for historical annual waste disposal volumes.

Commenter	Summary of Comments Received
	• It is suggested that the Township provide yearly population estimates for each year in the planning period. • The Township needs to provide further discussion and rationale for the included waste to daily cover ratios used in the report. • Further justification on the volumetric needs of the Township is required. • The Township should undertake a contaminant lifespan assessment for each [Alternative Method] and add that consideration to their evaluation table [in Section 10.2.5].
Thomas Guo, Hydrogeologist – Technical Support Section	• Further Assessment and appropriate contingency plans are required to ensure that all municipal water supplies and regionally significant aquifers are not at risk. • Additional monitoring wells are required if the new CAZ is established. • RUG assessments of relevant emerging contaminants (PFAS) associated with landfill leachate should be considered as part of the assessment. • The corresponding groundwater trigger mechanism should be developed in the following annual report. • An annual monitoring report should be prepared by a qualified person (P.Eng. or P.Geo.) to assess the compliance with the RUG. The report should be submitted to MECP for review.
Beth Gilbert, Surface Water Specialist – Technical Support Section	• The EASR should specify how comments on the preliminary design from the ToR were addressed. • Please describe what measures were evaluated to prevent leachate discharge to site-specific surface water features (i.e., the proposed perimeter ditches and stormwater management pond)? • Please describe how leachate will be adequately controlled relative to impacts to surface water receptors and proposed stormwater works. • Please consider describing in more detail the surface water quality management goals for the Volks Municipal Drain. • Please consider including both a UTL (upper tolerance limit) and 75th percentile evaluation for surface water quality in the EASR.

Commenter	Summary of Comments Received
	• The EA should provide commitment and confirmation that offsite flows which flow onto the proposed expansion area will be directed around the proposed expansion area/waste mound. • Could additional information be provided about the uncertainty of changes to the Site regarding a) area of historical flooding; and b) determination of groundwater table with removal of tile drains. • Consider describing in more detail the impacts of the preferred undertaking on the chemistry of surface water receptors. • If contingencies are required in the future, a leachate collection and treatment system may be required, and it is possible to discharge treated landfill leachate effluent from an on-site treatment facility to a receiving watercourse that does not have year-round flow. • The MECP issues Section 53 OWRA Approval for stormwater associated with snow dumps. • When a contingency measure is implemented, monitoring programs are adjusted accordingly to monitoring the success and effectiveness of the implemented measure. • Information about any runoff from the snow storage facility is needed to undertake a review of the surface water monitoring program locations. • It would be useful to identify whether the UTL calculation or 75th percentile calculation result in differing Policy Status and/or increased risk to the environment. • The parameter list for surface water impact assessment requires some additional parameters to meet the full list of Schedule 5, Column 3 Parameters from the Landfill Standards. • Monitoring of PFAS in surface water may be useful for distinguishing leachate impacts from other sources. • To the best of my knowledge, re-circulating leachate impacted stormwater back through the waste mound is not an acceptable contingency practice. Early closure of the landfill is an alternate contingency measure to consider.

Commenter	Summary of Comments Received
Vesna Alimpic, Program Analyst, Conservation and Source Protection Branch	• The Boyne Road Landfill expansion is not a significant drinking water threat in consideration of its location not being within groundwater protection zones WPHA A-C or surface water protection zones IPZ 1-3 and WHPA-E. This means threats can be moderate/low and select policies may still apply. • There may be other kinds of drinking water systems present that are not explicitly addressed by the source protection plan and the proponent should take these into consideration. • The proponent is reminded that the site is also located in vulnerable areas IPZ-3, HVA scoring 6 and an SGRA and encouraged to include this information in the EA. • The proponent should consult with the local source protection authority if they have not already done so.
Abdul Quyum, Senior Review Engineer, Environmental Permissions Branch	• Regional Technical Support staff are to confirm if site is in compliance with Guideline B-7 for groundwater and has a discontinuous marginal impact above PWQO for surface water related to leachate. • The site does not appear to be full screened. Site screening will be done via natural vegetative growth and will be addressed during Part V, EPA, approval stage. • It is not clear if the capacity increase for the landfill expansion includes final cover. This should be clarified. • The consultant should provide seasonal water elevation data on Figure 12-3 to confirm whether a 1 m impermeable pad would provide adequate separation from the base of waste and highest groundwater elevation. • A gas monitoring program will be included in the EPA approval to ensure compliance with landfill methane gas migration at the property boundary as well as in on-site structures. This will be done at the ECA amendment approval stage. • It is indicated that the adequacy of the current monitoring program or any modifications to it will be re-evaluated, after review of the available monitoring data, at the EPA approval stage. In addition, groundwater and surface water trigger mechanism and contingency plan will be reviewed and modified at that time. The suggested monitoring approach is deemed reasonable.

Commenter	Summary of Comments Received
	• A detailed design of the wetland type pond for stormwater management will be required at the EPA approval stage. Whether the proposed stormwater management pond will provide an effective control and containment, is to be assessed by the regional surface water reviewer.
Ross Kircher, Air Quality Analyst – Technical Support Section	• Overall, the Background Air Quality study, Emissions Calculations study, Dispersion Modelling study, and Estimate of Landfill Gas Generation study are robust, and I am confident in their respective assessments. • Select concentrations for CO and SO2 in Volume 2, Appendix B-1 should be checked and confirmed. • For the emissions calculations, it is unclear why control efficient of 40% was applied to the existing scenario and 0% applied to the expansion scenario. • Assumptions of odour flux from the working face and waste density are based on the West Carleton Environmental Centre EA (WMCC, 2012). I note that these assumptions are valid only if the waste composition is similar to that of the WCEC. • Emission rate calculations for comfort heating were not included in *Emissions Calculations*. • Results from dispersion modelling were not included in Dispersion Modelling study. • Additional rationale should be provided regarding the selection of release heights of the landfill cap and working face area sources in both existing and expansion scenarios. • No details regarding meteorological anomaly removal or other post-processing of AERMOD output data were included. • Only modelling results from the expansion scenario and O.Reg.419/05 scenario were included, therefore I am unable verify the modelling approach described was undertaken to assess the impacts of the existing scenario. • The pattern of annual waste fill rates in the expansion phase is unclear. • Modelling files were not provided for the existing landfill scenario; therefore, I am not able to comment on the accuracy and adequacy of the existing scenario results. • Dispersion modelling files for the expansion scenario were provided, however, no output files detailing the predicted concentrations of indicator compounds at sensitive receptors was provided. Therefore, I am unable to comment on the accuracy of the results reported.

Commenter	Summary of Comments Received
	• Ambient dust monitoring may be considered if the proposed expansion is constructed and seeks approval to operate.
Carolyn Hahn, Species at Risk Specialist, Permissions and Compliance Section	• What were the outcomes of the Eastern Whip-poor-will surveys carried out in 2018 on May 30, June 3 and June 26? • It is noted that no Butternut or American Ginseng were found during Plant Community Surveys carried out. However, it is noted in the EASR that both species could be present in the Site vicinity. Please clarify if either of the specifies will be impacted by the landfill expansion project. • Little Brown Myotis has been detected on site and maternity roost habitat has been identified on site. If the proponent can avoid impacts to individuals by the removal of habitat outside of the active bat season it is possible that an authorization would not be required under the ESA. • Please provide more information about available habitat features that may be present on site that support the Eastern Small-footed Myotis. More information is required to provide guidance with respect to authorization requirements under the ESA. • Please ensure that if an authorization is required under the ESA that sufficient time to obtain an authorization is factored into the project timeline.
Jordan Hughes, Project Officer, Environmental Assessment Branch	• Please include the list of Appendices and titles in the Table of Contents, as well as indicating what contents are included in each of the volumes that comprise the EASR. • Proponent should continue to engage/notify the Indigenous communities at all remaining stages, and document in the final EASR. • Include a statement that the Air quality assessment in Section 13.1.1 indicated that a collection system was not required. • Other Preliminary Draft Review comments have been adequately addressed.

5.0 Waste Management Plan Study Area and Existing Conditions

5.1 Study Area

The environment is defined as those components of the natural, social, economic, cultural and built environment that may be affected by the undertaking. This section presents an overview of existing environmental conditions within the overall waste management plan Study Area, which is the Township of North Dundas as shown on Figure 1-1.

The Township was formed in 1998 by the amalgamation of the former Townships of Winchester and Mountain, as well as the Villages of Winchester and Chesterville. The Township is located south of the City of Ottawa, within the Counties of Stormont, Dundas and Glengarry. The total land area comprising the Township is 503.2 km^2. Based on the Canadian census, the 2016 population was 11,278, only slightly larger than the 2011 population of 11,225. Approximately one-third of the population is within Winchester and Chesterville, with the remainder located in several smaller communities and spread across this largely rural municipality.

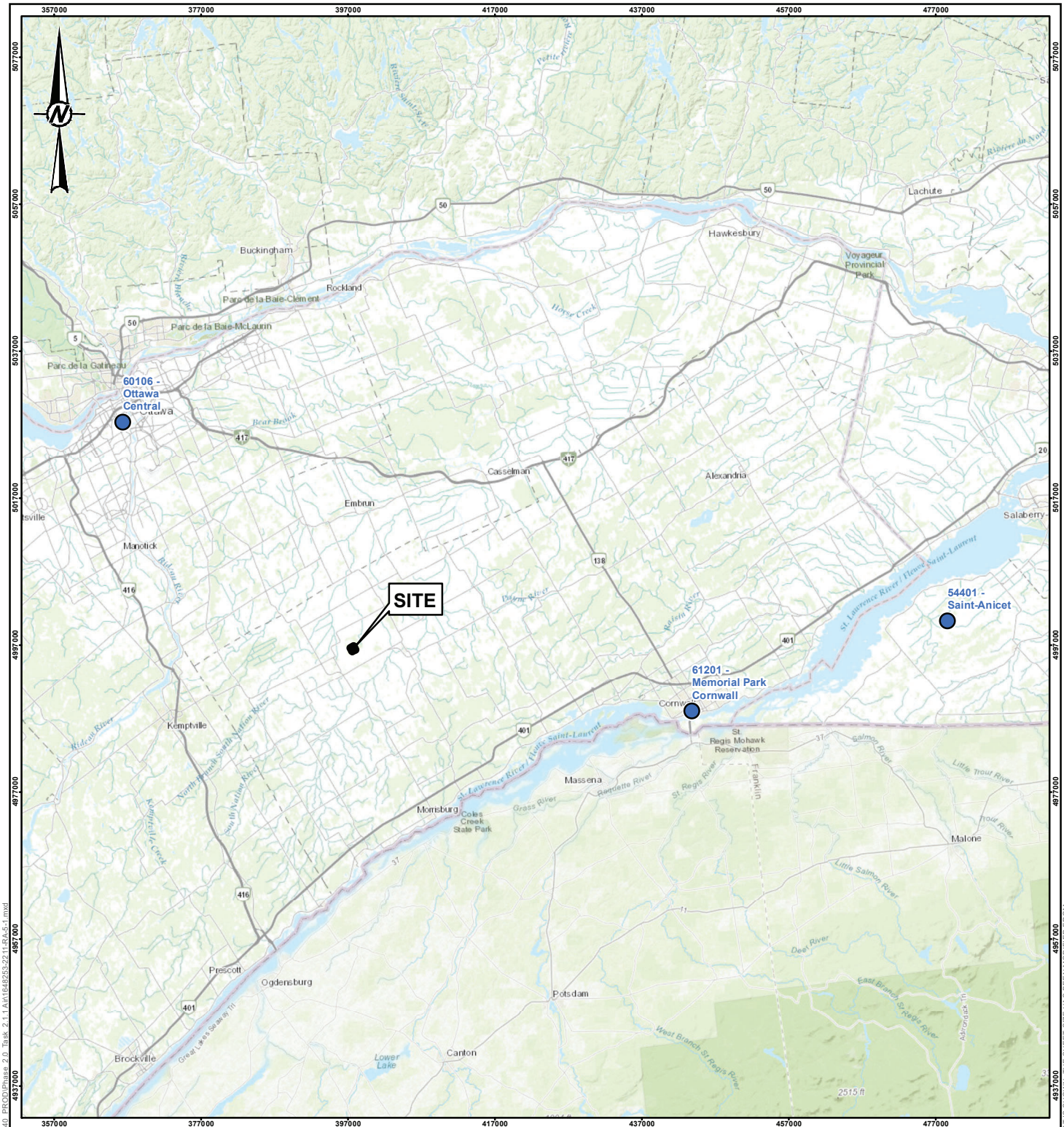
5.2 Atmosphere

5.2.1 Air Quality

Within the Township, air quality is expected to be typical of rural eastern Ontario with transportation and agricultural activities contributing to baseline air quality/odour levels. The closest air quality monitoring stations to the Township are located in Ottawa and Cornwall, Ontario; however, these are located in urban environments, which typically experience different emission sources and air quality than that of rural environments as they are impacted by different types of emission sources (e.g., residential and commercial sources, in addition to local traffic). For this reason, the Saint-Anicet, Quebec monitoring station has also been considered to represent the background air quality due to being located in an area with similar rural surrounding land use setting as the Township of North Dundas. The locations of these monitoring stations are presented on Figure 5-1 .

Within the Township, two of the main potential sources of odour include agricultural activities and the landfill. In terms of odour emissions, those from agricultural activities are often related to handling and storage of animal manures and their re-use as fertilizer. Landfills can emit two types of odours: refuse odour and landfill gas odour; refuse odour is generated by recently disposed waste, and landfill gas odour is generated during the anaerobic decomposition of organic material within the waste.

With regards to greenhouse gases, it is most appropriate to consider greenhouse gas emissions on a national or provincial scale. The primary sources of greenhouse gas emissions in Canada and Ontario are from anthropogenic sources that include the transportation sector (e.g., vehicles on 400 series highways in Ontario) and large industrial activities (e.g., manufacturing facilities) (ECCC, 2020a).



LEGEND

AIR MONITORING STATION

0 7,000 14,000 28,000

1:750,000 METRES

REFERENCE(S)

1. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9 VERTICAL DATUM: CGVD28

CLIENT

TOWNSHIP OF NORTH DUNDAS

PROJECT

INDIVIDUAL ENVIRONMENTAL ASSESSMENT OF THE TOWNSHIP OF NORTH DUNDAS WASTE MANAGEMENT PLAN

TITLE

AIR MONITORING STATIONS

CONSULTANT

GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-05-27
DESIGNED	----
PREPARED	JEM
REVIEWED	YJM
APPROVED	PLE

PROJECT NO.	PHASE/TASK	REV.	FIGURE
1648253	2.0/2.2.0	0	**5-1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

Path: X:\Active\Spatial IM\Township of North Dundas\BoyneRoad_andfill\69 PROJ\1648253\40 PROD\Phase 2.0 Task 2.1.1 Air\1648253-2211-RA5-1.mxd

5.2.2 Noise

Within the Township, existing noise levels are expected to be typical of rural eastern Ontario with transportation, agricultural and sounds of nature contributing to baseline noise levels.

5.3 Geology and Hydrogeology

The uppermost bedrock unit underlying the majority of the Township is limestone of the Gull River Formation, which is indicated to be overlain by Rockcliffe Formation shale in the south-central part of the Township.

The topography of the Township is generally flat to undulating and ground surface elevations range between 70 to 80 metres above sea level (masl) for the majority of the Township, with select pockets across the Township at higher elevations between 80 and 90 masl and the western-most portion of the Township features much higher ground surface elevations of approximately 100 to 120 masl near Mountain and Hallville. The majority of the Township is located in the physiographic region of the Winchester Clay Plain, with portions of the Township at the western, northwestern, and southeastern limits located within the Edwardsburg Sand Plain, the North Gower Drumlin Field, and the Glengarry Till Plain, respectively (Chapman and Putnam, 1984). Overburden soils generally consist of a mixture of marine silty clay and glacial till plain, with some specific areas underlain by organic soils. In the eastern part of the Township, there are two occurrences of glacial-fluvial deposits, an elongated northeast to south west trending ridge locally known as the Morewood Esker (and more regionally as the Vars-Winchester esker), and an east-west oriented terminal moraine known as the Maple Ridge Esker. There is also a northeast-southwest trending area of granular soils in the western part of the Township (Hallville area) known as Hyndmans Ridge. There are several licensed aggregate operations that extract sand and gravel from these ridge features.

The thickness of overburden soil overlying the bedrock is shown to generally range from about 5 to 10 metres (m), with some areas of both thicker and thinner soil cover. It is known from previous subsurface studies within the Township for specific purposes, i.e., water supply studies, Boyne Road Landfill site, wastewater lagoons, that the thickness of overburden can be quite variable over relatively short horizontal distances and that there can be significant departures from the general drift thickness shown on published mapping.

The Township relies on groundwater from drilled wells for potable water supply. The Villages of Winchester and Chesterville each have communal water supplies from high capacity drilled overburden wells located within portions of the Morewood Esker. The remainder of the Township relies on individual wells that generally obtain their water from zones within the bedrock.

5.4 Surface Water

In regard to surface water, the Township is located within the South Nation River watershed and overlaps the Upper South Nation, Middle South Nation, and Castor River subwatersheds (SNC, 2018), all within the regulatory jurisdiction of SNC. The overall regional drainage is towards the northeast, with the majority of the Township surface water runoff towards branches of the South Nation River and the northern portion towards the South and East

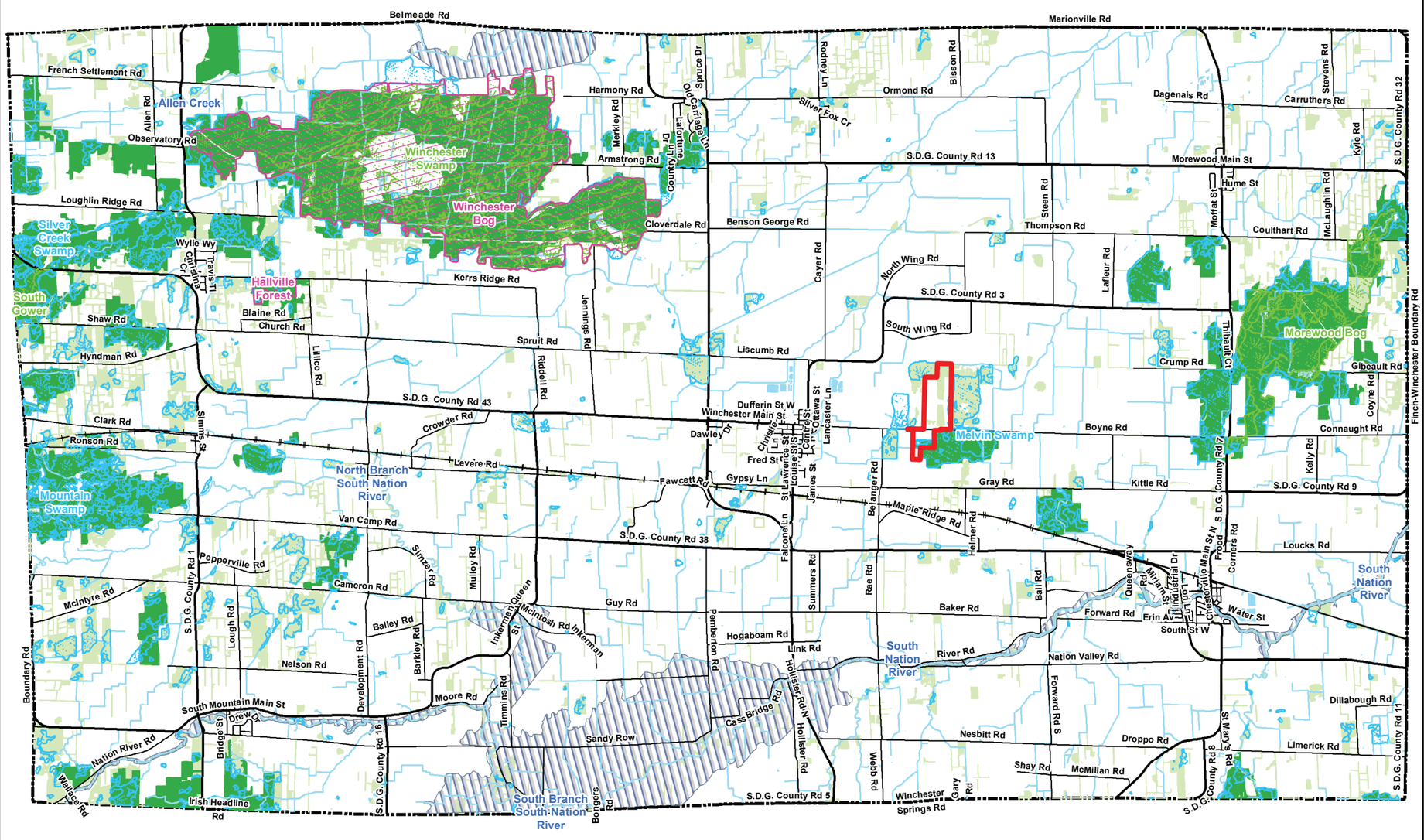
Castor Rivers, which in turn discharge to the South Nation River further to the northeast. Drainage of this largely rural agricultural area is via a network of constructed municipal drains, which have a low Department of Fisheries and Oceans (DFO) drain classification as related to aquatic habitat.

5.5 Biology

The Township is located in Ecoregion 6E (Lake Simcoe - Rideau), which covers approximately 6.4% of Ontario, extending from Lake Huron east to the Rideau River (Crins et al., 2009). The majority of this ecoregion exists as cropland (44.4%) and pasture or abandoned fields (12.8%), while water covers 4% of the ecoregion (Crins et al., 2009). Forest cover within the Township of North Dundas is 13.3% (SNC, 2016).

The Township is located in the Upper St. Lawrence section of the Great Lakes – St. Lawrence Forest Region, which contains a wide variety of both coniferous and deciduous species (Rowe, 1972). The region is dominated by sugar maple (Acer saccharum) and American beech (Fagus grandifolia) forests, with associates of red maple (Acer rubrum), yellow birch (Betula alleghaniensis), white ash (Fraxinus americana), basswood (Tilia americana), largetooth aspen (Populus grandidentata), red oak (Quercus rubra) and bur oak (Quercus macrocarpa). Hemlock (Tsuga canadensis), white pine (Pinus strobus), white spruce (Picea glauca) and balsam fir (Abies balsamea) occur on acidic soils, while white cedar (Thuja occidentalis), silver maple (Acer saccharinum), green ash (Fraxinus pennsylvanica) and black ash (Fraxinus nigra), and elms (Ulmus spp) occur in poorly drained areas (Rowe, 1972).

The Township includes the Winchester Swamp Provincially Significant Wetland (PSW) and candidate regionally significant Area of Natural and Scientific Interest (ANSI) to the northwest, the Morewood Bog PSW to the northeast, and a small portion of the South Gower PSW at the western edge of the Township. There are three wetlands in the Township that have been evaluated, but found to be non-provincially significant, namely Melvin Swamp in the area of the existing Boyne Road Landfill site; and Silver Creek Swamp and Mountain Swamp in the west. The Hallville Forest, located in the northwest portion of the Township, is considered a regionally significant ANSI. The Township contains one county forest, namely the Alvin Runnalls Forest, located within the Morewood Bog PSW. The Township is located wholly within the South Nation Watershed, and the South Nation River is the major watercourse in the Township. These natural features are illustrated on Figure 5-2. SNC also operates several small conservation areas in the Township, including Cass Bridge and Oak Valley Pioneer Park that also functions as a nut tree research site.



LEGEND

- WATERCOURSE
- ROAD
- COUNTY ROAD
- RAILWAY
- WETLAND
- PROVINCIALLY SIGNIFICANT WETLAND (PSW)
- WATERBODY
- AREA OF NATURAL AND SCIENTIFIC INTEREST (ANSI)
- REGULATORY FLOODLINE
- WOODLAND
- SIGNIFICANT WOODLAND
- TOWNSHIP BOUNDARY
- APPROXIMATE PROPERTY BOUNDARY OF THE EXISTING BOYNE ROAD LANDFILL SITE

REFERENCE(S)

1. DATA OBTAINED ON ARCGIS ONLINE THROUGH UNITED COUNTIES OF SDG, SOUTH NATION CONSERVATION AUTHORITY AND ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY.
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: MTM ZONE 9, VERTICAL DATUM: CGVD28

0 1,000 2,000 4,000

1:100,000 METRES

CLIENT
TOWNSHIP OF NORTH DUNDAS

PROJECT
INDIVIDUAL ENVIRONMENTAL ASSESSMENT OF THE TOWNSHIP OF NORTH DUNDAS WASTE MANAGEMENT PLAN

TITLE
TOWNSHIP OF NORTH DUNDAS SIGNIFICANT NATURAL FEATURES

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2022-01-31
DESIGNED	----
PREPARED	JEM
REVIEWED	YJM
APPROVED	PLE

PROJECT NO.	PHASE/TASK	REV.	FIGURE
1648253	2.0/2.2.0	0	**5-2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

Path: X:\Active\Spatial_IM\Township_of_North_Dundas\BoyneRoadLandfill\99_PROJ\1648253\40_PROD\Phase_2.0_Task_2.1.6 Tier Bio\1648253-2216-HN-5-2.mxd

5.6 Land Use Planning and Agricultural

The Township of North Dundas is located within the United Counties of Stormont, Dundas, and Glengarry (SDG). The Counties lie south of Ottawa, west of Montreal, east of Kingston, and north of New York State.

5.6.1 Population Projections

The United Counties of Stormont, Dundas and Glengarry released growth projections from 2006-2031 in 2013 (Hemson Consulting, 2013). These growth projections, including population and households, are shown in Table 5-1. Overall, the County is expected to grow over this period in both population and households. The number of households is expected to disproportionately increase compared to the population, with a projected growth rate that is 10% greater than the population growth over this period. It can be expected that based on growth trends, most growth will occur in the urban centers of the Townships.

Table 5-1: Growth Projections for the United Counties of Stormont, Dundas and Glengarry including Cornwall, 2006-2031

Year	Population	Households
2006	115,300	44,300
2011	116,600	46,000
2016	117,100	47,400
2021	118,400	48,700
2031	121,600	50,900
% change 2006-2031	5.5	15

The Township of North Dundas is similarly poised to see population growth. This growth projection, based on projections completed as part of the Township's Planning, is shown in Table 5-2.

Table 5-2: Population Growth Projections for the Township of North Dundas

Year	Total Population
1996	11,064
2001	11,014
2006	11,095
2011	11,225
2016	11,715
Projections	
2021	12,107
2026	12,640
2031	13,099
2036	13,236

In 2016, the population of Winchester was 2,394, which represents 2% of the population of the Counties and 20% of the Township of North Dundas.

5.6.2 Labour Force Characteristics and Activities

Employment and participation rates in Winchester are shown in Table 5-3. Currently, the employment rate was slightly higher in Winchester than in the Counties overall. Individual median income and household median income were also higher in Winchester than the Counties overall. These trends are reflective of the stable and successful nature of the local economy.

Table 5-3: Employment and Participation Rates

	Winchester	SDG
Total Population 15 years and over[1]	1,915	93,070
Labour Force	1,125	55,175
Employment Rate (%)	56.7	54.7
Unemployment Rate (%)	4.4	7.8
Participation Rate (%)	59.1	59.3
Individual Median Income ($)	36,389	30,935
Median Income – All Private Households ($)	66,880	59,526

Note: [1] Source: Statistics Canada. (2017).

A large portion of the land area within the Township of North Dundas is used for agricultural purposes. The main industry of employment in Winchester, according to Statistics Canada, is concentrated in health care and social assistance, followed by public administration and retail trade, respectively. These industry trends are similar to those of the Counties, where these three industries are among the highest in employment statistics. There is also a large employer involved in the dairy industry in the Village of Winchester.

5.6.3 Agriculture

Much of the land area within the Township has been cleared for farming purposes. Most of the Township is classified as being underlain by Class 1 to 3 farmland, indicating its high potential for agricultural uses. Areas of Class 4 farmland are present in the western portion of the Township, and an area of Class 5 in the far east central portion. Within the Township there are a range of active farm activities, mainly various types of crops and raising of animals.

5.7 Cultural Heritage Resources

5.7.1 Archaeology

5.7.1.1 Regional Indigenous History

Eastern Ontario was covered by the Laurentide ice sheet until approximately 11,000 years before present (BP). Following the period of deglaciation, Eastern Ontario was inundated by the Champlain Sea which is interpreted to have extended from the Rideau Lakes in the south, along the Ottawa Valley and St. Lawrence areas and terminating in the vicinity of Petawawa in the west.

During much of the Paleo Period (11,000. to 10,000 BP) Eastern Ontario would have remained inundated by the Champlain Sea, although as the Champlain Sea receded towards the end of this period it is possible that people migrated along the changing waterfront landscape eventually moving into the Ottawa Valley (Watson, 1999a).

The ridges and old shorelines of the Champlain Sea and early Ottawa River channels generally represent areas most likely to contain evidence of Paleo occupation in this region; however, identifying the location and dates of these ancient shorelines has proved challenging. As a consequence, only the margins of the Champlain Sea at its maximum extent, a time when the Ottawa region would have been fully submerged, have been reliably mapped due to the rapid inundation creating pronounced shoreline features (Loring, 1980).

The earliest possible settlement in the Ottawa Valley and its tributaries including the South Nation River would have occurred during the recession of the Champlain Sea when the vegetation and wildlife began to develop within the area, which enabled the sustainability of humans (Watson, 1999a). The ridges and old shorelines of the Champlain Sea and early Ottawa River channels reflect areas most likely to contain evidence of Paleo Period occupation in the region.

Evidence of human occupation during this period has been documented by a variety of archaeological discoveries including fluted points (laurel leaf shaped points with a channel flake scar extending from the base of the point) recorded in the Rideau Lakes area (Watson 1982; 1999b).

During the succeeding Archaic Period (ca. 10,000 to 2,800 BP), the environment of Eastern Ontario approached modern conditions (Ellis et al., 1990). Occupation within the Ottawa Valley developed as the environment became habitable, with an Early Archaic Dovetail projectile point recovered in Ottawa South sometime around 1918-1920 (Pilon and Fox, 2015), potentially representing the earliest diagnostic evidence of humans in the area.

The Ottawa River and its tributaries were important routes for the movement of natural copper, either through direct trade between individual groups, or through trips to Lake Superior to exploit the surface deposits located there. This commodity, as well as other tradable goods, was presumably transported by canoes and other vessels along the navigable waterways including the Ottawa River.

The earliest evidence of human burials within the Ottawa Valley are interpreted to date to the Archaic Period (Pilon and Young, 2009). Archaic sites have been documented within the vicinity of the Rideau River (Golder, 2017), and evidence from archaeological investigations around Honey Gables, Albion Road and Rideau Road may contain Early Archaic Period material (Swayze, 2004). Evidence of Archaic Period occupation has also been recovered from isolated find spots within the City of Ottawa (Jamieson, 1989), although the context of many of these have been poorly documented.

The Woodland Period (ca. 2,800 to 450 BP) is primarily distinguished from the Archaic Period by the introduction of ceramics (Wright, 1972). Early Woodland Period inhabitants continued to live as hunters, gatherers and fishers in much the same way as earlier populations had done. They also shared an elaborate burial ceremonialism influenced by the inclusion of exotic artifacts within grave deposits (Spence et al., 1990, p. 129).

By the Middle Woodland Period (2,400 to 1,150 BP) regional cultural expressions or traditions have been distinguished by archaeologists. These traditions have been identified based on patterns of ceramic decorations, use of lithic materials, and are the primary basis to differentiate the Middle Woodland Period from the Early Woodland Period. A greater number of known sites from this period have been investigated allowing archaeologists to develop a better picture of the seasonal round followed in order to exploit a variety of resources within a home territory. Through the late fall and winter, small groups would occupy an inland “family” hunting area. In the spring, these dispersed families would congregate at specific lakeshore sites to fish, hunt in the surrounding forest, and socialize. This gathering would last through to the late summer when large quantities of food would be stored for the approaching winter.

Another significant development of the Woodland Period was the introduction of agriculture and appearance of domesticated plants ca. 1,450 BP. Initially, only a minor addition to the diet, the cultivation of corn, beans, squash, sunflowers and tobacco gained economic importance during the Late Woodland Period. Unlike in Southern Ontario, where the shift in subsistence resulted in the development of semi-permanent and permanent villages,

evidence suggests that the Ottawa Valley remained primarily occupied by mobile hunter-gatherers. In part, this was because the terrain was less than suitable for early agriculture. It was also a reflection of the increased pressure on hunting territories and conflict over trade routes at the end of the Woodland Period.

By the end of the Late Woodland Period, distinct regional populations occupied specific areas of Southern Ontario separated by vast stretches of largely unoccupied land, including the Huron along the north shore of Lake Ontario, and the St. Lawrence Iroquois along the St. Lawrence River. Facing persistent hostilities with Iroquoian populations based in what is now New York State, the Huron moved from the north shore of Lake Ontario to the Lake Simcoe and Georgian Bay region. The St. Lawrence Iroquois relocated sometime in the late 16th century with refugees possibly dispersing among the Algonquin populations in the Ottawa Valley region (Pendergast, 1999).

The Algonquins, who occupied the lands north of the Huron, had historical hunting territories in the Ottawa Valley that may have extended as far east as the St. Maurice River in Quebec. They also claimed the lowlands south of the St. Lawrence River after the disappearance of the St. Lawrence Iroquois in the late 16th century (Trigger and Day, 1994). At the time of initial contact, the French documented several Algonquin groups residing in the vicinity of the existing Boyne Road Landfill (Heidenreich and Wright, 1987).

Late Woodland Period sites have been recorded throughout the Ottawa Valley.

The Algonquins' location along the same river networks used for transportation by early French traders positioned them to monopolize the early fur trade with the two communities becoming close allies following Champlain's expedition in 1603. Competition for furs increased existing tensions between the Algonquin communities and their neighbours including the Haudenosaunee Nations, such as the Mohawk, residing to the south in what is now Ontario and New York State. The 17th century saw a long period of conflict known as the Beaver Wars between the Algonquin and the Haudenosaunee that resulted in the significant disruption of life. Mohawk raids against Algonquin villages in the Upper Ottawa and St. Lawrence Valleys resulted in the abandonment or destruction of many Algonquin settlements in these areas (Trigger and Day, 1994). Some Algonquins found refuge in French settlements such as Trois-Riviéres, Quebec City, Sillery, and Montreal while others may have retreated to interior locations along the Ottawa River's tributaries (Holmes, 1993). At the end of the 17th century, the Haudenosaunee were driven out of much of Southern Ontario by the Mississaugas, though they continued to occupy parts of Eastern Ontario on a seasonal basis.

The French brokered a peace treaty in 1701 at Montreal where the Algonquin, the French, and the Haudenosaunee agreed to peacefully share the lands around the Great Lakes (INAC, 2011). In exchange for peace, the Algonquin gave the Haudenosaunee secure access to furs, which the Haudenosaunee used to secure their alliance with the British.

Following the Seven Years' War in the mid-18th century, the defeat of the French, Algonquin, and their allies by the British and the Haudenosaunee resulted in the further loss of Algonquin hunting territories in southern Quebec and eastern Ontario as the British seized France's colonies. The extension of Quebec's boundaries in 1774 through the Quebec Act and the use

of the Ottawa River as the boundary of Upper and Lower Canada following the 1791 Constitution Act separated the Algonquins between two government administrations (AOP n.d.).

Britain's colonial policy differed from the French in that the Crown was much more interested in securing land surrenders from the Indigenous populations for settlement by Europeans. The Royal Proclamation of 1763 issued by King George III enabled the Crown to monopolize the purchase of Indigenous lands west of Quebec. Although the proclamation recognized Indigenous rights to their land and hunting grounds, it also provided a way through which these rights could be taken away (Surtees, 1994). Land cession agreements between Indigenous groups and the Crown increased following the War of 1812 as a new wave of settlers arrived in Upper Canada primarily from Britain. The Crown implemented annuity systems in the purchase of lands from Indigenous peoples where the interest payments of settlers on the land would cover the cost of the annuity rather than pay a one-time lump sum. By the 1850s, Indigenous groups had become cautious of these agreements and began to demand the retention of reserved land and preservation of hunting and fishing rights (Surtees, 1994).

In 1839, the Crown denied the Algonquins and Nipissings the right to lease portions of their land, including islands in the Ottawa River, to settlers with whom they had previously been collecting rent payments (Holmes, 1993). Furthermore, the Crown did little to prevent further additional encroachments by settlers on Indigenous lands.

A reserve was purchased for use by the Algonquins in Golden Lake in 1873 (Holmes, 1993). The Golden Lake reserve, now known as the Algonquins of Pikwakanagan First Nation, has a registered population of around 2,000 people with over 400 living on the reserve (INAC, 2013). Additional reserves and settlements for the Algonquins were established in Quebec during the mid-20th century.

The Indian Act of 1876 framed the relationship between the Canadian government and Canada's Indigenous peoples as a paternalistic one where the government served as their guardian until their cultures were able to integrate into Canadian society (INAC, 2011).

The Algonquins of Ontario today consist of ten communities: Antoine, Algonquins of Pikwakanagan First Nation, Bonnechere, Greater Golden Lake, Kijicho Manito Madaouskarini, Mattawa/North Bay, Ottawa, Shabot Obaadjiwan, Snimikobi, and Whitney and Area (AOO n.d.).

The Ottawa Valley is unceded Algonquin land and land claim negotiations with Canada and Ontario are in progress. The Algonquin and the Government of Canada signed an agreement in principle to transfer 117,500 acres of Crown lands in Eastern Ontario to the Algonquin (INAC, 2016; Tasker, 2016). While this represents an important step in the negotiations, the talks are ongoing.

5.7.1.2 Post-Contact Regional History

Samuel de Champlain was the first European to document his explorations of the Ottawa Valley, initially in 1613 and again in 1615. He was preceded by two of his emissaries, Étienne Brûlé around 1610 and Nicholas de Vigneau in 1611. It is likely that all three travelled at least the lower reaches of the Rideau River. In the wake of Champlain's voyages, the Ottawa River became the principal route for explorers, missionaries and fur traders travelling from the St. Lawrence River to the interior, and throughout the 17th and 18th centuries this route remained an important link in the French fur trade.

At the time of initial contact, the French documented three Algonquin groups residing in the vicinity of the Boyne Road Landfill (Heidenreich and Wright, 1987). These included the Matouweskarini along the Madawaska River to the west, the Onontchataronon in the Gananoque River basin to the southwest, and the Weskarini, the largest of the three, situated in the Petite Nation River basin northeast of the existing Boyne Road Landfill. While prolonged occupation of the region may have been avoided as a result of hostilities with Iroquoian speaking populations to the south, at least the northern reaches of the South Nation River basin were undoubtedly used as hunting territories by the Algonquin at this time. The recovery of European trade goods (e.g., iron axes, copper kettle pieces and glass beads) from Indigenous sites throughout the Ottawa River drainage basin has provided evidence of the extent of contact between the Indigenous peoples and the fur traders during this period. The English, upon assuming possession of New France, continued to use the Ottawa River as an important transportation corridor.

Significant European settlement of the region did not occur until United Empire Loyalists and other immigrants began to move to lands along the Ottawa River and its tributaries in the late 18th and early 19th centuries. Commonly acknowledged as the first permanent European resident in the area that would become Hull, Philemon Wright settled in Hull Township with five families and 33 men in 1800 (Bond, 1984). The community along the north shore of the Ottawa River grew over the next few years and by 1805 Wright had begun significant lumbering activity in the region. It would take several more years for permanent settlement to spread to the south side of the Ottawa River.

The scarcity of roads and poor state of transportation beyond the Ottawa River shoreline slowed settlement in many parts of the Ottawa Valley (Belden, 1879); although with the construction of the Rideau Canal (18–7 - 1832) the new settlement of Bytown experienced its first major growth in population. This resulted in the development of two areas: Lower Bytown east of the Canal, primarily populated by French Canadian and Irish labourers and merchants, and Upper Bytown to the west of the Canal with a predominantly white Anglo-Saxon Protestant population. Bytown was incorporated as the City of Ottawa on January 1, 1855, with a population of 10,000. The selection of Ottawa as the capital of Canada in 1857 was the major catalyst in the subsequent development of the city.

The Township is situated within the South Nation River drainage basin, which is known to have been occupied by Indigenous populations since at least the Woodland Period (950 before common era – 1550 common era). A number of archaeological sites have been registered within the Township, providing evidence of previous historic land use and occupation.

5.7.2 Built Heritage Resources and Cultural Heritage Landscapes

The Euro-Canadian cultural heritage of the Township of North Dundas began around 1800. Settlers cleared land in the area for farming and the Township has remained primarily an agricultural area for the last two centuries. Villages including Chesterville, Winchester, and Winchester Springs developed and over time small family farms were combined into large, specialized farms as agricultural practices changed.

The first European immigrants to Winchester Township settled along the Nation River in 1819 (Mika and Mika, 1983, p. 657). Many of the lots in the Township were awarded to the children of United Empire Loyalists, but most chose to sell their lands, which were eventually settled by other immigrants. Early settlement and development were made difficult by the lack of roads. In the 1830s, the villages of Winchester and Chesterville developed following the construction of flour and sawmills (Mika and Mika, 1983, p. 657). The construction of the Canadian Pacific Railway Line in 1887 led to increased prosperity, particularly in Chesterville that saw its population grow from around 500 in 1884 to over 750 in 1890 (Harkness, 1946).

During the 20th century, agriculture retains a significant role. The establishment of Highway 31 in 1927 (Bevers n.d.) provided a convenient route to Ottawa and many of its present residents commute to the city.

5.8 Socio-economic

5.8.1 Population and Labour

The Township of North Dundas is part of the SDG. The Township's population in 2016 was 11,715 according to the Township's Municipal Department. The two main areas of population within the Township are Winchester and Chesterville. The Village of Winchester has a population of just over 2,394 people (Statistics Canada, 2016). Winchester has a number of commercial, institutional and recreational facilities for its residents including shops, churches, a community centre, public school and a large hospital. The community has a fire station, paramedic outpost and an OPP detachment. The hospital (Winchester District Memorial Hospital) is one of the largest employers in the area along with the Lactalis Canada dairy products facility located in the centre of Winchester The Village of Chesterville is located in the southeast part of the Township and has a population of 1,677 (Statistics Canada, 2016). Chesterville is similar to Winchester in that it has shops, churches, a community centre, a fire station and a public school. The remainder of the Township is rural with several small hamlets.

The existing Boyne Road Landfill site is located approximately 2 km east of the Village of Winchester in a largely agricultural setting, there are no residences or businesses within 500 m of the existing landfill and the closest businesses are agricultural operations or suppliers. The landfill is the only waste management facility in the municipality and accepts

household, some business waste and light construction waste; it is also the location of recycling facilities.

5.8.2 Municipal Finances

Consolidated Financial Statements from the Township of North Dundas report total revenues of $13.7 million in 2020 (Ministry of Municipal Affairs and Housing, 2021). Almost half of the revenue was derived from taxes, predominantly property taxes. The remaining revenue was from government transfers, conditional grants, and user fees and service charges. Total municipal expenses were $12.5 million in 2020.

5.8.3 Economic Development Trends and Plans

In 2016, the Township of North Dundas identified goals for sustainable economic development to address challenges associated with the local economy including: low population growth, a steady out-migration of youth, and the provincial economy changing from agriculture and manufacturing to a service-based one. The plan identified sectors of critical focus for North Dundas, including promoting agri-food manufacturing, creative professions, retail and commercial services and tourism.

5.9 Transportation

County Road (formerly Highway) 31 provides a main north-south link through the central part of the Township, connecting the City of Ottawa to the north with Highway 401 to the south. County Road (formerly Highway) 43 provides a main east-west link through the central part of the Township, connecting with Highway 416 further to the west. The Township is serviced by a network of County and Township roads. The Canadian Pacific Railway main line passes through the Township.

The nearest airport to the Township is the Ottawa International Airport. The Rideau Valley Air Park, an aerodrome, is located outside the northwest corner of the Township adjacent to the north side of the Rideau River just east of Highway 416.

6.0 Assessment of 'Alternatives To' the Undertaking

6.1 Description of and Rationale for 'Alternatives To'

As part of the environmental assessment process as set out in the approved ToR, the Township is required to develop a reasonable range of 'Alternatives To' the undertaking. For the Township, the 'Alternatives To' are fundamentally different approaches for long term waste management in the Township. Previously, four waste management alternatives were proposed for the Township in the 2015 Waste Management Alternatives Evaluation (Golder, 2015). Two additional alternatives have been added in this Environmental Assessment compared to the preliminary 2015 Waste Management Alternatives Evaluation. The comparative assessment of these 'Alternatives To' will identify the preferred waste management alternative for the undertaking.

In 2021, the United Counties of Stormont, Dundas and Glengarry (SDG) retained DFA Infrastructure International Inc. (DFA) to review the solid waste management services of its partner rural local municipalities (which includes the Township of North Dundas) and to identify opportunities for internal process changes and collaboration among the local municipalities and possibly the City of Cornwall (DFA, 2021a; DFA, 2021b). To date, DFA has prepared a Draft Phase 1 and Phase 2 Report (DFA 2021a) and a Draft Phase 3 Report (2021b) and has identified solid waste management options for SDG's consideration, including sharing capacity of an expanded Boyne Road Landfill site with neighboring municipalities, closing the Boyne Road Landfill site and opening a transfer station in its place, and exporting waste to the Eastern Ontario Waste Handling Facility (EOWHF) in Moose Creek, ON. The study by DFA is still in its initial stages and no decisions have been taken by the participating municipalities or SDG on accepting the findings or implementation. DFA's study considers fewer 'Alternatives To' solid waste management than what is presented in this EASR and does not impact or contribute to the 'Alternatives To' assessment described below.

6.2 Environmental Components, Criteria and Indicators for 'Alternatives To'

To remain consistent with the evaluation process throughout this EA, the environmental categories (as proposed in the ToR) have been reorganized into their equivalent environmental components. A broad set of criteria were developed for comparative evaluation of the 'Alternatives To' in the ToR and are summarized in Table 3-1 of the ToR. These evaluation criteria cover the components that comprise the natural, social, economic, cultural and built environment.

The proposed preliminary evaluation criteria presented in the ToR were finalized during the EA and included changes such as:

- Addition of the criteria of potential effects of noise to the atmosphere environmental component.
- The criterion for potential impacts on existing land use was expanded to also include impacts on agricultural land given the importance of the agriculture industry in the Township of North Dundas.
- The criterion that was for potential effects to the cultural environment was split into two criteria: one for archaeology and one for built heritage resources and cultural heritage landscapes.

The environmental components, evaluation criteria and indicators were outlined in Technical Bulletin #2 and shared with the MECP, Indigenous communities and the public. There was one comment from the public received indicating that all the environmental components are very important. There was also a request to add on-going costs, but this is already in the socio-economic component.

The final environmental components are as shown in Table 6-1 below with the relevant evaluation criteria, rationale, indicators and data sources used for the comparative assessment.

Table 6-1: Environmental Components, Criteria and Indicators for 'Alternatives To' Assessment

Environmental Component	Evaluation Criteria/Criterion	Rationale	Indicators	Data Sources
Atmosphere	• Potential effects on air quality (including dust, odour, Greenhouse Gas (GHG)) • Potential effects on noise	• Waste management operations can produce gases containing contaminants that degrade air quality. Associated construction activities can also produce dust and GHG. • Waste management operations and associated construction activities can produce noise that could impact the environment.	• Qualitative amount and/or type of emissions generated/offset due to alternative. • Qualitative amount of non-renewable resources conserved. • Qualitative relative expected amount of noise from alternative.	• Boyne Road Landfill studies/reports • Applicable provincial regulations, standards and guidelines • Aerial mapping
Geology and Hydrogeology	• Potential effects on groundwater resources	• Contaminants from waste management site operations could enter the groundwater and impact off-site groundwater.	• Qualitative expected effect on groundwater quality at the property boundary.	• Boyne Road Landfill studies/reports • Aerial mapping • Borehole logs • Published geology and hydrogeology maps and reports

Environmental Component	Evaluation Criteria/Criterion	Rationale	Indicators	Data Sources
Surface Water	• Potential effects on surface water resources	• Contaminants from waste management site operations could enter the groundwater or runoff directly and impact off-site surface water.	• Qualitative expected effect on surface water quality within the area. • Qualitative expected change in peak flows (within the on-site stormwater management system (SWMS) and at the property boundary). • Qualitative expected degree of off-site effects on surface water quantity within the area.	• Boyne Road Landfill studies/reports • Aerial mapping • Topographic Maps • Published hydrology maps and reports
Biology	• Potential effects on natural environment features (aquatic and terrestrial ecosystems)	• Contaminants from waste management site operations could adversely affect aquatic or terrestrial life (including rare or endangered species).	• Qualitative amount of disturbance of terrestrial and aquatic environment.	• United Counties of Stormont, Dundas, and Glengarry Official Plan • South Nation Conservation reports, mapping, data • Boyne Road Landfill studies/reports • Published natural environment reports for the area

Environmental Component	Evaluation Criteria/Criterion	Rationale	Indicators	Data Sources
Agriculture and Land Use	• Potential effects on existing land use and agriculture	• The agricultural land base or agricultural operations may be impacted by the waste management site operations. • Other land uses, such as residential, could be impacted by the waste management site operations.	• Approximate number or types of land use conflicts.	• United Counties of Stormont, Dundas, and Glengarry Official Plan • Aerial and topographic mapping
Cultural Heritage Resources	• Potential effects on archaeology • Potential effects on cultural environment including cultural heritage landscapes and built heritage resources	• Identified archaeology resources could be altered or effected by waste management site operations. • Identified heritage landscapes and built heritage resources could be altered or impacted by waste management site operations.	• Approximate degree of archaeological potential. • Approximate degree of potential for built heritage resources and landscapes disruption.	• United Counties of Stormont, Dundas and Glengarry Official Plan • Archaeological Screening where available • Published archaeology reports for the Township

Environmental Component	Evaluation Criteria/Criterion	Rationale	Indicators	Data Sources
Socio-economic	• Potential site operational effects on sensitive off-site receptors (i.e., noise, litter, air quality) • Relative costs and timing of approvals • Relative cost of implementation (capital and operational costs)	• Waste management facilities could potentially affect the use and enjoyment of sensitive uses in the vicinity of the site. • Waste management site operations can influence employment and business in the wider regional area. • Different methods of waste disposal can have different costs based on the type and amount of engineering required.	• General attitude of public toward alternative. • Approximate proximity of alternative to potential sensitive receptors. • Approximate cost per tonne. • Approximate type or amount of potential revenue offsets. • Approximate types of approvals required for alternative and level of effort to attain the approval.	• United Counties of Stormont, Dundas, and Glengarry Official Plan • 2015 Waste Management Alternatives Evaluation • Updated costing from relevant sources • Aerial mapping • Applicable provincial regulations, standards and guidelines
Transportation	• Potential effect on road network	• Waste management operations can affect the traffic in the surrounding area through changes in truck traffic to/from disposal facilities, including potential increases in traffic associated with providing waste management services.	• Qualitative assessment of additional tonnage and resulting number of trucks to site due to selected alternative.	• United Counties of Stormont, Dundas, and Glengarry Official Plan • Approximate amount of waste to manage, distance to handling location and type of trucks available

Environmental Component	Evaluation Criteria/Criterion	Rationale	Indicators	Data Sources
Technical Considerations	• Relative ability of the Township to operate • Relative technical risks associated with the operation of the alternative	• Different methods of waste management can have different risks or effects based on the development of the technology, relative maintenance or expertise required to operate.	• Availability of examples where technology used with similar tonnage. • Types of barriers to implementation.	• Boyne Road Landfill studies/reports • Applicable provincial regulations, standards, and guidelines • Practitioner expertise

6.3 Identification and Feasibility of 'Alternatives To'

In terms of 'Alternatives To', the Township has considered the range of alternatives that are reasonably available to it as a small rural municipality and has determined that the four alternatives considered in the previously completed preliminary study represent the range of the 'Alternatives To' that will be considered in the EA, along with the Do-Nothing alternative and a waste diversion alternative.

The 'Alternatives To' available to the Township consist of the following:

- Existing Landfill Site Closure and Export Waste for Disposal
- Landfill Site Expansion
- Existing Landfill Site Closure and Establish New Landfill Site in the Township
- Existing Landfill Site Closure and Alternative Waste Management Technologies
- Enhanced Waste Diversion
- Do-Nothing

This section describes each of the 'Alternatives To' and screens their feasibility for the Township to undertake as their approach to long term waste management. The 'Alternatives To' remaining after this screening have been carried forward for comparative evaluation in Section 6.4.

6.3.1 Alternative 1 – Existing Landfill Site Closure and Export of Waste for Disposal

This alternative was previously assessed in detail as part of the 2015 Waste Management Alternatives Evaluation (Golder, 2015). For the present evaluation process, the concept as described in the preliminary assessment has been updated, including soliciting an updated tipping fee cost from the Moose Creek Landfill (previously referred to as the Lafleche site).

Under Alternative 1, the Boyne Road Landfill would be closed. The Township would likely continue to operate waste diversion activities at the landfill site or elsewhere, and the remaining waste would be exported to an appropriately licensed landfill for disposal. The Township presently accepts residential and non-residential waste, with some waste self-hauled to the existing landfill. Under Alternative 1, it was assumed that the Township will operate a waste transfer station to continue providing the current level of service with the acceptance of both residential and non-residential waste. At the present time there are two landfill sites in eastern Ontario licensed to receive solid non-hazardous waste from the Township of North Dundas for disposal, both of which are owned and operated by the private sector. The two sites are Green for Life's (GFL's) Moose Creek Landfill in North Stormont near Moose Creek and Waste Management's Ottawa (Carp Road) Landfill in the western portion of Ottawa.

The Carp Road site is currently inactive and has not proceeded to construct the additional disposal capacity for which it has received provincial EA and ECA approvals. Those approvals are for an estimated 10 years of operating landfill capacity.

Within the preliminary evaluation, this alternative was considered to be technically feasible. It is noted that the estimated expenditures and annual operating costs as presented in the 2015 preliminary evaluation have increased since the initial estimate, with projected tipping fees increasing from $56/tonne in 2015 to an approximate range of $68/tonne to $78/tonne (depending on the details of contract negotiated). The only uncertainty noted for the Township under Alternative 1 would be the Conditions imposed by the MECP for approval of the landfill site closure and the establishment of a waste transfer station at the landfill site, but these requirements are common to many landfill sites and the Conditions are not expected to be onerous. The preliminary assessment also noted that the Township may face uncertainty related to the remaining capacity at the selected private waste disposal facility (the Moose Creek Landfill); however, it is noted that in 2020 GFL commenced an EA for a large expansion of the Moose Creek Landfill site. It is considered reasonable to expect that there will be disposal capacity available in future at some licensed facility to accept the Township's waste.

6.3.2 Alternative 2 – Landfill Site Expansion

Under Alternative 2, the process to obtain approval for an increase in the disposal capacity of the Boyne Road Landfill would be undertaken so that waste disposal would continue at this location under the ownership of the Township. An envelope that could be used to accommodate the estimated 400,000 m^3 of additional landfill airspace will be developed and considered.

This alternative was previously assessed in detail as part of the 2015 Waste Management Alternatives Evaluation (Golder, 2015); additional information on this 2015 evaluation is provided in Section 2.1. Although previously assessed, this alternative is being considered in this EASR without prejudice of the results of the 2015 assessment. To determine the technical and economic feasibility of this alternative, an initial technical evaluation of the expected design and operational requirements to successfully obtain approval of an expansion under the EAA as well as Ontario Regulation (*O.Reg)*. 232/98 Landfill Standards was undertaken and reported in the 2015 preliminary assessment. Based on the results of the initial technical evaluation and this update, this alternative is still considered to have a reasonable likelihood of obtaining EA approval as a natural attenuation landfill. It was concluded in the 2015 preliminary assessment and as updated herein that the technical feasibility of Alternative 2 is favourable.

6.3.3 Alternative 3 – Existing Landfill Closure and Establish New Landfill Site in the Township

Under Alternative 3, the Township evaluated the potential to establish a disposal site at a new location within the municipality. However, considering the long time period typically required to undertake waste management planning studies to obtain approval for the establishment of new waste disposal site, it is expected that a short term alternative would have to be selected from either obtaining approval to continue landfilling at the Boyne Road Landfill in the interim

period or export waste to an appropriately licensed landfill for disposal (likely the Moose Creek Landfill as per Alternative 1).

Because this alternative involves a search for and identification of a new site for a new landfill, of the available alternatives it is anticipated that this one is likely to be the most controversial (followed by Alternative 4, see below) with the public and raise the greatest concerns. Based on previous discussions between representatives of the Township and neighbouring municipalities about their need for long-term waste management options, neighbouring municipalities did not express interest in partnering with the Township for the establishment of a new regional landfill site, mostly due to their relatively close proximity to the existing privately-owned Moose Creek Landfill.

As noted in the ToR, a set of general exclusionary criteria that are typically used for landfill siting have been determined for the purpose of screening out areas of the Township that are not suitable and cannot be considered for a new landfill site. Published mapping sources and information from the Township's Official Plan provided the information used in this screening exercise. Areas surviving this screening represent potential locations for siting a new landfill. A preliminary total land area required for development of a landfill having a new airspace of approximately 400,000 m^3 and following the requirements of *O.Reg*. 232/98 was determined to be approximately 80 ha; the size of the potential locations was then assessed to determine whether they are large enough.

The screening exercise as described above was carried out and is described in the technical memorandum dated June 2020 (See Volume 3 Appendix I). The application of the exclusionary criteria considered atmosphere, transportation, biology, geology and hydrogeology, surface water, socio-economic and land use. It also considered constraints imposed by the Official Plan (only land within the Rural District can be considered for a new landfill site), as well as separation buffer distances set out in the Official Plan and from natural environment features. Six main sectors within the Township were identified as potentially eligible area for siting a new landfill. Three of the six were found to be problematic for various reasons and the remaining three were qualitatively compared and their advantages and disadvantages determined.

In conclusion, the results of the screening exercise revealed few potential areas large enough or in accordance with the land use policies set by the Township for use as a new waste management facility site. Of the screened potential areas, the most preferred area was the parcel of land containing the existing active Boyne Road Landfill site. However, constructing a second neighbouring landfill within this candidate area could cause potential environmental, social and economic impacts to other areas nearby to the existing landfill. The potential extent of landfill-related impacts may be further reduced by considering expansion of the existing landfill rather than trying to establish a new landfill disposal area within the same rural district. As such, although an area is suitable for new landfill development within the Township, this is not an alternative that the Township should reasonably pursue. In accordance with this rationale, Alternative 3 is eliminated from the comparative evaluation.

6.3.4 Alternative 4 – Existing Landfill Closure and Alternative Waste Management Technologies

Under Alternative 4, the Township evaluated the potential to use an alternative waste management technology such as an energy from waste facility (EFW, where waste is combusted at extremely high temperature, resulting in heat that can be used in a steam powered generator for example) at a new location within the municipality. The Boyne Road Landfill would therefore be closed. However, considering the length of time required to select a technology provider, obtain approval and build such a facility, it is expected that a short term alternative would have to be selected from either obtaining approval to continue landfilling at the Boyne Road Landfill in the interim period or export waste to an appropriately licensed landfill for disposal (likely the Moose Creek Landfill as per Alternative 1).

There are various EFW processes on the market, commonly separated into two categories: conventional combustion (i.e., mass burn incineration) and advanced combustion (e.g., gasification, plasma arc gasification, and pyrolysis), with mass burn incineration being the most well established and commercially proven worldwide. EFW facilities are not uncommon in Canada but are much more prevalent in the waste management practices in the United States and Europe. Most EFW processes have not been demonstrated successful at a commercial scale operation in Ontario. It is noted that the two approved EFW in Ontario (Algonquin Power EFW Facility in Brampton and Durham-York Energy Centre in Clarington) have a processing capacity of 140,000 to 182,500 tonnes of waste per year, more than 10 times the current waste disposal needs of the Township. As such, and in view of thermal facilities currently licensed and operating in Ontario (albeit for private entities or a municipality far larger than North Dundas), the only thermal treatment technology that will be considered in this assessment is mass burn incineration (i.e., incineration).

In general, EFW facilities are designed to combust waste continuously and operate at a steady state processing rate for their lifetime, which is preferred for minimizing pollutants, maximizing energy recovery and reducing fuel consumption for startup procedures. Although the incineration process is highly scalable, it is more adapted for a large base load processing need. Smaller facilities can be designed for batch consumption and will only operate when sufficient volumes of waste have been accumulated, but this is more typical for remote locations or locations where there is limited access to landfill disposal.

The use of this technology would require the service to be provided by a private sector operator of this type of facility, since it is beyond the capability of the Township both financially and operationally. It is expected that a new site within the Township would have to be established for this process. The screening exercise performed for Alternative 3 indicates few possible locations for an incineration site within the Township (even acknowledging that the required site area would be much smaller than for a new landfill) and would require an amendment to the official land-use schedule if pursued. The incineration process can reduce the volume of waste required for disposal significantly; however, it is noted that with this technology there remains a need for a landfill for the disposal of remaining ash. Disposal options for the reduced volume of waste generated from the incineration process could be a limited expansion of the Boyne Road Landfill site, a new small landfill at the same site of the incinerator or export of the ash outside the Township for disposal at a licensed landfill.

The Township could consider establishing a new regional EFW facility with neighbouring municipalities to share the capital expenditures and financial liability with and to improve the facility's steady state processing rate. However, as noted with Alternative 3, previous discussions with neighbouring municipalities revealed no interest in partnering with the Township for the establishment of a new regional waste management facility.

6.3.5 Alternative 5 – Enhanced Waste Diversion

This alternative would require the Township to consider and look for opportunities to increase diversion from disposal by considering public feedback, evaluating current legislation and funding mechanisms and assessing diversion opportunities in alignment with the small, rural nature of the Township. To fulfill this alternative, a Waste Diversion Study Report (see Volume 3 Appendix J) was completed and circulated for comment in Technical Bulletin #1 of this EA. Technical Bulletin #1 was shared with the public, Indigenous communities and GRT stakeholders and no comments changing the findings of the Waste Diversion Study Report were received. The Waste Diversion Study carefully considered the current provincial direction as related to diversion. In 2017, the Strategy for a Waste-Free Ontario: Building the Circular Economy (MECP, 2020a) was released, which provided a road map for resource recovery and waste reduction. In November of 2018, the MECP released its Environment Plan (MECP, 2018a) and a subsequent discussion paper (Reducing Litter and Waste in our Communities) was released in March 2019 (MECP, 2019a) that proposes steps to implement the Environment Plan. Lastly, the Food and Organic Waste Policy Statement (MECP, 2018) supports the province's goals to move towards zero waste and zero greenhouse gas emissions from the waste sector.

Based on the careful consideration of provincial policy and the results of the Waste Diversion Study Report the following recommendations for the Township to enhance its current waste diversion program were identified:

- Develop and implement a backyard composting program for source separated organics.
- Optimize the current blue box recycling program with a dual-stream recycling program with the purchase of new split collection vehicles.
- Develop an on-site leaf and yard waste composting program at the Boyne Road Landfill site and expand the collection program for leaf and yard waste.
- Develop new and reinforce existing waste management policies.

The implementation of these waste diversion program enhancement is reasonably estimated to increase the Township's residential solid waste diversion rate from the current 23% to 33%, noting that the current diversion rate is likely higher but cannot be quantified with the available information.

With the exception of a zero-waste solution, this alternative does not have the ability to fully address the stated problem being assessed but can reduce the amount of post-diversion waste requiring management. A zero-waste solution is not presently considered possible or

available to the Township given its small size and tax base to pay for this system and no control over IC&I waste generators (which are provincially legislated).

This waste diversion alternative can be used to estimate the amount of residual waste requiring management over the 25 year planning period; however, it is not in itself a means of managing residual waste and cannot be compared as a standalone alternative. For this reason, Alternative 5 will not be included in the comparative evaluation of waste management 'Alternatives To'.

6.3.6 Alternative 6 – Do-Nothing

In EAs, the Do-Nothing alternative is considered in the evaluation of 'Alternatives To' as a benchmark against which the potential environmental impacts and the advantages and disadvantages of the alternatives being considered can be measured and compared. For the Township of North Dundas, the Do-Nothing alternative would be to close the Boyne Road Landfill when it reaches its approved capacity and not pursue any other solution for waste management for the Township. It is noted that one of the Township's basic requirements as a municipality is to provide municipal services and infrastructure for its ratepayers. As such, the Do-Nothing alternative is not an 'Alternative To' that could be considered to resolve the long-term waste management problem; rather, as stated above, it provides a basis of comparison as part of the EA process.

6.4 Comparative Evaluation of 'Alternatives To'

The potential effects and/or implications of each of the remaining Alternatives 1, 2 and 4 has been generally identified and described for each of the evaluation criteria. A qualitative assessment methodology was applied to complete a comparative assessment of remaining Alternatives 1, 2, and 4. Information on Alternative 6 is also provided as a basis of comparison. The methodology consists of assigning an overall relative rating from most preferred to least preferred for each alternative, first for each of the criteria and then for the environmental component. Qualitative comparative rating of potential impact uses the descriptors most preferred, less preferred, least preferred and equally preferred. Based on the description of potential impact for each criterion, the assignment of the qualitative descriptors should be readily apparent and understandable.

6.4.1 Summary of Comparative Evaluation of 'Alternatives To'

The comparative assessment of each criteria is presented in Table 6-2 to 6-10.

The outcome of this comparative evaluation is the identification of the preferred 'Alternative To' for long term waste management for the Township of North Dundas.

Table 6-2: Summary of Evaluation of Alternatives – Atmosphere

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Potential effects on air quality (including dust, odour, GHG)***			
Comments	Closure of the existing landfill will eliminate any off-site dust and odour impacts associated with landfill site operations. Reduced methane emissions from landfill locally over time and potentially overall if landfill gas is more efficiently managed at an external site. Landfill gas generated in greater volume at the larger site to which waste is exported. Exporting waste will eliminate odour generated from active landfilling on a local level. Increased emissions of GHG from hauling efforts.	Landfill expansion will continue to produce methane, and odour at levels comparable to the current waste management practices (noting that off-site odours are not presently a problem).	Reduced methane emissions compared to landfilling, but generation of other atmospheric emissions with often less control and/or reliability (especially depending on efficiency of steady state incinerator operations).	Landfill would be capped and closed; methane generation and release to atmosphere would be ongoing as described for Alternative 1. If the Township does not pursue another waste management alternative, this would lead to an increase in uncontrolled emissions from waste to air.
Qualitative Rating	Less preferred	Most preferred	Least preferred	–
Criteria	***Potential effects on noise***			
Comments	Closure of the existing landfill will eliminate noise impacts associated with landfill site operations at neighbouring off-site receptors. Potential for different location of haul route introduces noise impacts at receptors along the potential haul route. These would result in an increase in noise levels associated with the receiving landfill and possibly more noise at sensitive receptors along the haul route.	Landfill expansion will continue to produce noise at levels comparable to the current waste management practices (noting that off-site noise complaints are not presently a problem).	Assuming that the bulk of the thermal treatment occurs indoors, then noise associated with this option is predominantly along the haul route only.	Landfill would be capped and closed; noise would be limited to post-closure landscaping maintenance activities.
Qualitative Rating	Least preferred	Less preferred	Most preferred	–

Table 6-3: Summary of Evaluation of Alternatives – Geology and Hydrogeology

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Potential effects on groundwater resources***			
Comments	Groundwater quality at current landfill site should gradually improve following site closure. The site to which waste is exported will need to adhere to relevant environmental standards and guidelines, and potential impact to groundwater at that site should be similar to that expected without inclusion of waste from North Dundas.	Leachate can affect groundwater in the vicinity of the waste site. The expanded landfill capacity will be developed to comply with provincial standards and guidelines to protect off-site groundwater quality.	Landfilling of ash by-product from thermal treatment can affect local groundwater if not properly managed but will likely pose less serious impact than non-thermally treated waste.	Landfill would be capped and closed; leachate generation and migration in groundwater would be ongoing as described for Alternative 1. If the Township does not pursue another waste management alternative, risk of leachate generation and groundwater impacts from unregulated waste management practices.
Qualitative Rating	Less preferred	Less preferred	Most preferred	–

Table 6-4: Summary of Evaluation of Alternatives – Surface Water

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Potential effects on surface water resources***			
Comments	Effects on surface water quality in area of current landfill site should gradually improve following site closure. The site to which waste is exported will need to adhere to relevant environmental standards and guidelines and potential impact to surface water at that site should be similar to that expected without inclusion of waste from North Dundas.	Impacted groundwater can affect surface water in the vicinity of the waste site. The expanded landfill capacity will be developed to comply with provincial standards to protect surface water quality.	Landfilling of ash by-product from thermal treatment can affect local surface water if not properly managed but will likely pose less serious impact than non-thermally treated waste.	Landfill would be capped and closed; effects on surface water would be as described for Alternative 1. If the Township does not pursue another waste management alternative, risk of leachate generation and surface water impacts from unregulated waste management practices.
Qualitative Rating	Less preferred	Less preferred	Most preferred	–

Table 6-5: Summary of Evaluation of Alternatives – Biology

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Potential effects on natural environment features (aquatic and terrestrial ecosystems)***			
Comments	Existing landfill and landfill to which waste is exported could potentially impact aquatic resources if leachate enters the environment.	Expansion of landfill site could require some brush/tree clearing on landfill property that could disrupt the terrestrial environment. Any clearing would be carried out in accordance with provincial and local requirements. Expanded landfill could potentially impact aquatic resources if leachate impacts surface water at sufficiently high concentrations.	Footprint of new thermal treatment facility and landfill may damage or disrupt natural environment. Potential impact on aquatic resources from leachate associated with landfilling of ash.	Landfill would be capped and closed; effects on surface water would be as described for Alternative 1. If the Township does not pursue another waste management alternative, increased risk of waste/leachate effects on natural environment from unorganized waste management practices can be expected.
Qualitative Rating	Most preferred	Less preferred	Least preferred	–

Table 6-6: Summary of Evaluation of Alternatives –Land Use Planning and Agriculture

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Potential effects on existing land use and agriculture***			
Comments	The closed landfill site would not be suitable for agricultural or other land uses and would likely remain as its current land use designation. The landfill site to which waste is exported is also unlikely to be suited for agriculture or other uses post-closure. Official planning assesses and designates surrounding land uses to be compatible with both waste disposal sites.	Current landfill site property is designated in an area for rural land use and is suitable for landfilling. There is sufficient area on the landfill property to accommodate landfill expansion although additional contaminant attenuation zone may need to be added from the surrounding land designated as agricultural land use.	Establishing a new thermal treatment facility will need to be located on a parcel in an area designated rural. Thermal treatment operations may have an impact on surrounding agricultural operations. Depending on the footprint of the facility and the establishment of a landfill for the ash by-product, it is possible there would be a need to convert nearby agricultural land to establish an appropriate buffer for surrounding land use.	Landfill would be capped and closed; effects on land uses in vicinity of the existing landfill site would be as described for Alternative 1. If the Township does not pursue another waste management alternative, unorganized waste management practices can impact quality of agricultural lands or be incompatible with other land uses.
Qualitative Rating	Most preferred	Less preferred	Least preferred	–

Table 6-7: Summary of Evaluation of Alternatives – Cultural Heritage Resources

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Potential effects on archaeology***			
Comments	Minimal, if any, site alteration needed to close the landfill site. Approval of the site to which waste would be exported would have received the required provincial approvals regarding archaeology.	Minimal site alteration expected. Some additional land acquisition or groundwater easement may be needed for the contaminant attenuation zone. Approval of the site expansion requires provincial approvals regarding archaeology.	New thermal treatment facility location (and ash by-product landfill) may have impact on existing archaeology. Approval of the new site would require provincial approvals regarding archaeology.	Landfill would be capped and closed; effects on archaeology would be as described for Alternative 1.
Qualitative Rating	Most preferred	Less preferred	Least preferred	–
Criteria	***Potential effects on cultural environment (cultural heritage landscapes, built heritage resources)***			
Comments	Minimal, if any, site alteration expected to close landfill site. Landscape is estimated to be of no significant value and remote nature of landfill will have minimal to no impact on built heritage resources and cultural heritage landscapes. Approval of the site to which waste would be exported would have received the required approvals for protected heritage properties.	Minimal site alteration expected. Some additional land acquisition or groundwater easement may be needed for the contaminant attenuation zone. Landscape is estimated to be of no significant value and remote nature of landfill will have minimal to no impact on built heritage resources. Approval of the site expansion requires provincial approvals regarding cultural heritage.	New thermal treatment facility location (and ash by-product landfill) may have impact on existing cultural heritage landscapes and/or built heritage resources. Approval of the new site would require provincial approvals regarding cultural heritage.	Landfill would be capped and closed; effects on cultural heritage would be as described for Alternative 1.
Qualitative Rating	Most preferred	Most preferred	Least preferred	–

Table 6-8: Summary of Evaluation of Alternatives – Socio-Economic

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Potential site operational effects on sensitive receptors (i.e. noise, air quality)***			
Comments	Closure of landfill site will eliminate odour, litter, dust or noise effects off-site associated with current landfill site operations. Few to no existing sensitive receptors in proximity of current landfill due to lack of neighbours on adjacent properties. Additional hauling distances for exporting waste could lead to additional odour/noise/litter along haul routes.	Landfill expansion expected to have similar minimal effects on sensitive existing off-site receptors as current landfill site. Few to no existing sensitive receptors in proximity of current landfill due to lack of neighbours on adjacent properties. No complaints for odour, dust, litter or noise have been received at the Boyne Road Landfill site in recent years. Expansion will maintain short haul distance from largest serviced population centres.	Atmosphere discharges from thermal processing facilities and additional airborne discharges from landfilling ash by-product from thermal treatment process are expected to have more potential to create nuisance issues.	Landfill would be capped and closed; effects in vicinity of the landfill site would be as described for Alternative 1. If the Township does not pursue another waste management alternative, unorganized waste management practices could lead to broader odour issues across the Township if waste is not disposed of properly.
Qualitative Rating	Less preferred	Most preferred	Least preferred	–
Criteria	***Relative Cost and timing of approvals***			
Comments	Closure plan for existing landfill will need to be submitted before approved capacity is reached. Approval of closure plan is expected to take 3 to 6 months. Establishing a waste transfer station in the Township will require additional ECA approvals (1 to 1.5 years). Approximate total approvals cost is estimated to be $30,000 - $40,000.	Expansion of the current landfill site will require completion and approval of an EA (4 to 5 years total, likely in 2022) followed by an amendment to the site's existing ECA (1 year). Approximate total cost is estimated to be $750,000 to $800,000.	Establishing a new thermal treatment facility will require completion and approval of an EA (4 to 5 years) followed by an application for a new ECA for the new thermal treatment facility (2 years) and associated ash waste disposal. Approximate total cost is estimated to be $1,000,000 to $2,000,000.	Landfill would be capped and closed; costs associated with approvals for closure would be as described for Alternative 1.
Qualitative Rating	Most preferred	Less preferred	Least preferred	–

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Relative Cost of Implementation (capital and operational costs)***			
Comments	Capital closure expenditures and waste contract negotiation estimated at approximately $900,000. Annual operating costs and fees at the new landfill estimated at approximately $200,000/year based on current tipping fees. Uncertainty in future annual operating costs in view of increase tipping and hauling costs. 25-year costs estimated at approximately $5.9 million.	Initial capital costs for a natural attenuation landfill (including land acquisition, construction, and closure costs) estimated at approximately $4,550,000. It is noted that some of these capital costs, associated with additional construction and progressive closure will occur throughout the 25-year planning period. Annual operating costs will be comparable to current operating costs, approximately $55,000/year. 25-year costs estimated at approximately $5.9 million.	Capital costs will include the commissioning and setup of a new incineration facility and closure expenditures for the existing landfill (as described for Alternative 1). Operating costs will cover ongoing operation and maintenance costs as well as additional operational expenditures for the export and disposal of ash by-product waste Capital costs are estimated to be $9 million with annual operating costs of approximately $1.5 million. 25-year costs estimated at approximately $37.5 million.	Landfill would be capped and closed; capital costs associated with closure would be as described for Alternative 1.
Qualitative Rating	Less preferred	Most preferred	Least preferred	–

Table 6-9: Summary of Evaluation of Alternatives – Transportation

Consideration	Alternative 1: Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Potential effect on road network***			
Comments	Changing from hauling waste to a local landfill site to an alternate site outside the Township will result in increased traffic impacts along the selected haul routes. Traffic impacts are expected to increase over time as the future tonnage of waste increases.	Expansion of current landfill site would have continued traffic to site at current levels, with traffic expected to increase over time as the future tonnage of waste increases.	Increased traffic impacts are expected for the construction and delivery of material for the new thermal processing facility. Depending on the siting of the new facility, traffic impacts are anticipated to be similar to the current landfill site and will increase over time as the future tonnage of waste increases.	Closure of landfill would result in the end of waste hauling vehicle traffic.
Qualitative Rating	Less preferred	Most preferred	Less preferred	–

Table 6-10: Summary of Evaluation of Alternatives – Technical

Consideration	Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Alternative 2: Landfill Site Expansion	Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Alternative 6: Do-Nothing
Criteria	***Ability of the Township to operate***			
Comments	Main operational responsibilities will be handled through the private sector with little technical effort on the part of the Township; however, there is less control over long-term waste management planning for the Township.	Operational requirements are well understood, and ongoing operational tasks are expected to be similar to current landfilling operations at existing site. Additional surface water control and site construction will be necessary for continued expansion efforts over 25-year planning period.	Operation and maintenance of thermal processing facility is too complex for Township to operate independently and will require design-build-operate service or contracted third party support.	N/A
Qualitative Rating	Most preferred	Most preferred	Least preferred	–
Criteria	***Technical risks associated with the operation of the alternative***			
Comments	No technical risks.	Common risks and responsibilities associated with landfilling are expected (such as landfill gas generation, leachate management, nuisances such as blown litter, odour/noise).	Thermal processing (specifically incineration) is a well understood and proven technology for waste management. The technology is scalable, but the Township may have difficulty to maintain steady-state operations based on the limited waste generation by the Township. Incorrect or inefficient operation could lead to additional pollution generated.	Unorganized waste management in the Township would lead to increased future difficulty in managing environmental impacts from waste.
Qualitative Rating	Most preferred	Less preferred	Least preferred	–

6.4.2 Advantages and Disadvantages of 'Alternatives to'

As part of the comparative assessment, the advantages and disadvantages of each 'Alternative To' are described. The Do-Nothing alternative is included in this comparison. This advantage-disadvantage assessment is presented in Table 6-11.

Table 6-11: Advantages and Disadvantages of 'Alternatives to'

Alternative	Advantages	Disadvantages
Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	• None or minimal disruption of local habitat • Minimal operational efforts required for Township • Relatively fast transition (including approvals) from current waste management service • High level of certainty of obtaining approvals • Lower capital expenditures	• Additional greenhouse gas emissions from destination landfill and from hauling vehicles • Consumption of fossil fuels from hauling efforts • Higher operating costs than current practices • Less control over long-term waste management planning for Township
Alternative 2: Landfill Site Expansion	• Land use already designated for waste disposal • No increase in operational or financial effort • Socially accepted by community. No changes to residential experience • The Township has sufficient land to support a successful expansion • Lower operating costs • Waste management operations remain under Township control	• Greenhouse gas emissions from landfill • Facility will require longer ongoing environmental monitoring • Longer approvals process, with some uncertainty of outcome • Lateral landfill expansion can possibly affect the natural environment and archaeology resources
Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	• Potential for energy recovery from technology • Less greenhouse gas emissions compared to conventional landfilling if operated efficiently	• Complex technology will require design-build-operate approach • Significant environmental approval effort will be required, and approval process will be lengthy • Technology not proven effective at the Township's low waste generation volume • Can produce negative air emissions (heavy metals, dioxins)

Alternative	Advantages	Disadvantages
		• Very high capital and operating costs • Site development can affect the natural environment, agriculture, and archaeology resources
Alternative 6: Do-Nothing		• Would lead to potentially significant environmental impacts • Effects of environmental impacts would take increased effort and time to mitigate than adopting one of the other alternatives • Township would not fulfill its mandate as a municipality to manage the waste of its ratepayers

6.5 Identification of the Preferred 'Alternative To'

From the six proposed 'Alternatives To' for managing the Township's long term waste disposal needs, Alternative 3 (Existing Landfill Site Closure and Establish a New Landfill Site) was deemed unreasonable to pursue in view of the preferred landfill site characteristics, land use requirements, and land available within the Township, as determined through a new landfill site screening assessment (Volume 3 Appendix I) and summarized in Section 6.3.3. Alternative 5 (Enhanced Waste Diversion) is described in the Waste Diversion Study (Volume 3 Appendix J) and summarized in Section 6.3.5; this alternative should be implemented as part of the selected 'Alternative To' but (with the exception of a zero waste solution, which was not deemed feasible) is not a standalone solution for the management of the Township's waste management needs.

Alternative 6 (Do-Nothing) offers no advantages compared to the other three 'Alternatives To', and the major disadvantage that the Township would not fulfill its mandate to manage the waste generated by its ratepayers.

Compared to Alternatives 1 and 2 that both involve landfilling, Alternative 4 (Adopt Alternative Waste Management Technologies) would involve much more complex technology that are not proven effective at the Township's low waste generation volumes, would require a long term design-build-operate contract with a private sector provider since an alternative technology is beyond the Township's capability, and it would involve much higher capital and operational costs.

From the remaining three proposed 'Alternatives To', Table 6-12 below provides a summary of the comparative assessment from Section 6.4.1 of this report. For any alternative, potential effects on groundwater, surface water and the natural environment, as well as preservation of any archaeological resources, would have to be mitigated in accordance with provincial requirements to obtain the required approvals and to be able to continue operations.

Table 6-12: Summary of Comparative Analysis of 'Alternatives To'

Alternative	Comparison Summary	Overall Qualitative Rating
Alternative 1: Existing Landfill Site Closure and Export of Waste for Disposal	Most preferred for biology, agriculture/land use, archaeology, built heritage resources and cultural heritage landscapes, relative cost of approvals, ability of the Township to operate and technical risk. Least preferred for noise criteria.	Less Preferred
Alternative 2: Landfill Site Expansion	Most preferred for air quality, transportation, built heritage resources and cultural heritage landscapes, nuisance, ability of the Township to operate and cost of implementation. Not least preferred for any criterion.	Most Preferred
Alternative 4: Existing Landfill Site Closure and Alternative Waste Management Technologies	Most preferred for noise, groundwater and surface water criteria. Least preferred for air quality, biology, agriculture/land use, archaeology, built heritage resources and cultural heritage landscapes, all socio-economic and all technical criteria.	Least Preferred

Alternative 1 (Export Waste for Disposal) and Alternative 2 (Expand the Existing Landfill) both involve landfilling. As summarized in Table 6-12, in terms of the environmental components considered in the comparison, Alternative 2 was preferred compared to Alternative 1. Alternative 4 was least preferred.

Alternatives 1 and 2 each have advantages and disadvantages. Alternative 1 has lower capital costs but much higher annual operating costs compared to Alternative 2; the operational costs for Alternative 2 are similar to current costs and the capital costs can be spread out over much of the 25 year operating life of the expansion. With Alternative 2, the Township retains full control over waste management in the municipality, while with Alternative 1 the Township has much less control and are dependent on a private sector waste disposal site owner. From a greenhouse gas generation perspective, there will be additional gas generated by vehicles associated with the longer waste haul distance while for Alternative 2 there will be gas generated from the expanded landfill.

In determining the overall preferred 'Alternative To', key factors for the Township were maintaining control over waste management and associated costs, having the ability to operate and being able to spread the capital costs out over time and minimizing annual operating costs. As described above, Alternative 2 satisfies these key factors much better than Alternative 1.

This assessment is relatively close; however, based on the results presented in Table 6-12, and also with consideration of the advantages and disadvantages presented in Table 6-11 and the key factors that are most important to the Township, the preferred 'Alternative To' from the assessment is Alternative 2 – Landfill Site Expansion.

7.0 Updated Diversion and Residual Waste Disposal Requirements

As an Ontario municipality responsible for providing waste services for its ratepayers, the Township's objective in undertaking the EA is to obtain approval for a long-term solution for waste disposal while concurrently evaluating diversion opportunities to reduce the amount of waste generated for disposal over the planning period.

The Township proposes a 25-year planning period, i.e., 2023 through 2048, for the following reasons:

- As it relates to building strong and healthy communities, the Provincial Policy Statement (2020) states under policies in section 1.1.1 that "…necessary infrastructure and public service facilities are or will be available to meet current and projected needs. Section 1.1.2 states that "Nothing in policy 1.1.2 limits the planning for infrastructure, public service facilities and employment areas beyond a 25-year time horizon." The provision of waste management and waste disposal services is a major component of municipal infrastructure; as such, a waste management planning period of 25 years is consistent with the Provincial Policy Statement.
- A planning period of 25 years is the same as has been approved in many waste management EAs in Ontario in recent years, for both public and private sector proponents.
- It is expected that the initiatives made by the province towards achieving zero-waste are likely to take time regarding planning and policy development followed by implementation. The Township needs to have secure waste management available during this time period. It is expected that some waste policy will be first implemented in urban centres, and therefore will only come later to rural municipalities like North Dundas. This is supported by comments regarding food and organic waste being applicable to larger cities found in "A-Made-in Ontario Environment Plan", November 2018 (MECP, 2018a). The plan also says that the MECP recognizes while we work to reduce the amount of waste we produce, it is also recognized that there will be a need for landfills in the future. It is acknowledged that Section 6.8 of the "Policy Statement on Ontario's Food and Organic Waste", April 2018 states that proponents of new or expanded waste management systems for disposal should consider resource recovery opportunities for food and organic waste (MECP, 2018). The Policy goes on to note that for municipalities the size of the Township, the appropriate mechanism for organic waste management would be through home composting, community composting and local event days; the Township currently encourages home composting. The Township has considered waste diversion initiatives in alignment with Provincial policies and has studied diversion opportunities as a commitment of this EA (refer to Volume 3 Appendix J). The diversion study noted was completed in 2020. Since that time, the responsibility for the provincial diversion programs has shifted from individual stewardships, companies and organizations to the Resource Productivity and Recovery Authority (RPRA), which was established to support the transition to a waste-free Ontario. During this time period RPRA has transitioned tires, batteries, waste electrical and electronic equipment and

hazardous and special products. Blue box materials are scheduled to transition in 2023. During this transitional phase, limited change in diversion within the Township has been observed with the exception of slightly increased electronic equipment diversion. Much like organics, these RPRA programs are expected to be transitional and the impact to Township diversion likely will take more time to observe than potential increases in diversion in urban areas. The diversion study has accounted for a reasonable increase in predicted diversion over time. The Township welcomes further information, requirements, regulation, and funding on how this will work across the province. Based on the Waste Diversion Study and Provincial policy, the Township of North Dundas is likely to be reliant on having secure post-diversion waste management available for an extended period, which is reasonably proposed by the Township as a 25-year planning period.

The currently approved geometry provides sufficient capacity to continue landfilling operations until end of 2023 or mid-2024 and the Township can continue serving its ratepayers during this time when required approvals for landfill expansion can be obtained.

Residual solid waste is the waste remaining for disposal (by means of several possible alternatives) after diversion/recycling activities. For purposes of estimating the residual waste management requirements for the 25-year planning period, projections were based on the latest population growth statistics available for the Township as shown in Table 7-1.

Table 7-1: Historical Total Population

Year	Total Population
1996	11,064
2001	11,014
2006	11,095
2011	11,225
2016	11,715
Projections[1]	
2021	**12,107**
2022	12,214
2023	12,321
2024	12,429
2025	12,539
2026	**12,640**
2027	12,732
2028	12,825
2029	12,919

Year	Total Population
2030	13,013
2031	**13,099**
2032	13,127
2033	13,154
2034	13,182
2035	13,209
2036	**13,236**
2037[2]	13,317
2038[2]	13,396
2039[2]	13,477
2040[2]	13,558
2041[2]	13,639
2042[2]	13,721
2043[2]	13,803
2044[2]	13,886
2045[2]	13,969
2046[2]	14,053
2047[2]	14,137
2048[2]	14,222

Notes:
[1] From Township's Municipal Department, based on population projections completed as part of the Township's Official Plan. Only projections for 2021, 2026, 2031 and 2036 (values in b**old)** are provided as part of the Township's Official Plan, the remainder have been or this report using the projections from the Township's Official Plan.
[2] Projections from 2037 until 2048 are estimated using the reported annual growth rate of 0.6%

The United Counties of Stormont, Dundas and Glengarry Official Plan consolidated in 2018 suggests that the population compounded annual growth rate between 2016 and 2036 is expected to be approximately 0.6%.

The results of previous surveys of the active portion of the landfill completed since 2008 indicate that the annual fill rate ranges from approximately 10,400 to 18,900 m^3 per year (with one higher fill rate in 2017 and one lower fill rate in 2009). The fill rates from 2008 to 2021 are provided below.

Table 7-1A: Annual Fill Rates

Year	Annual Fill Rate (m^3)
2008	10,400
2009	9,500
2010	18,600
2012	11,500
2013	18,000
2014	18,900
2015	15,500
2016	10,360
2017	23,909
2018	18,587
2019	11,897
2020	13,844
2021	14,824

A survey of the full landfill footprint was completed in both December 2015 and December 2020; a comparison of the full landfill surface between 2015 and 2020 indicates an average annual fill rate of approximately 16,200 m^3 per year. Prior to 2008 these parameters were estimated based on car counts, which were later found to be inaccurate. It is also noted that there is not a weigh scale at the current landfill by which to determine tonnage received, diverted and disposed. The landfill does not differentiate between municipal and IC&I waste and hence detailed information on the volume of waste from each of these sectors is not available. In the Waste Diversion Study (Volume 3 Appendix J), it was estimated that 80% of waste received at the Boyne Road Landfill was residential, while 20% was IC&I. The projections presented herein are based on this estimate.

Based on the range indicated above, the annual landfill airspace consumed varies considerably from year to year, depending on specific events that occur within the Township, i.e., construction and demolition projects, structure fires, etc., and the corresponding need for disposal capacity. For purposes of estimating the post-diversion waste management requirements for the 2023-2048 (25 year) planning period to be provided, the current residential waste diversion rate of 23% and an allowance for post-diversion waste occupying 16,200 cubic metres (m^3) per year starting in 2021 have been assumed.

The Waste Diversion Study (Volume 3 Appendix J) identified a combination of waste diversion options for the preferred waste diversion system. The preferred combined waste diversion system includes:

- Backyard composting for source separated organics (SSO)
- Dual Stream Recycling program
- Curbside collection and chipping or composting of leaf and yard (L&Y) waste at the Boyne Road Landfill site
- Existing and new waste management policies

The preferred combined waste diversion system consists of curbside collection of waste and dual-stream recyclables by municipal staff using new 60/40 split collection vehicles. Collection will occur weekly, with recyclables collection alternating each week between fibres and containers. Waste material will be brought to the Boyne Road Landfill, whereas recyclable material will be transferred at the Boyne Road Landfill and then hauled to a private material recycling facility outside of the Township. According to the existing and new waste management policy options, curbside collection will only collect 2 bags of waste from residents and 4 bags of waste from farms. No waste will be collected from businesses or multi-residential buildings (following a phase out program) and receipt of concrete from IC&I sources will be limited at the landfill. L&Y waste will also be collected from specific areas of the Township at the curbside four times throughout the year: once in the spring, twice in the fall, and once in early January for collection of Christmas trees. The collection of L&Y waste will be done using the existing collection vehicles from the old waste diversion program until they have exhausted their useful lifespan; after which additional collection routes will be scheduled for L&Y waste using the new collection vehicles. Collected L&Y waste will be sent to the Boyne Road Landfill, where it will be chipped and used as daily cover for landfilling operations or be placed at a new composting pad for outdoor windrow composting. The Township will also promote residents to divert SSO material and excess L&Y waste from landfill using the backyard composting program introduced for SSO.

The preferred combined waste diversion system is estimated to have an increased diversion potential between 10 to 35 percentage points, corresponding to an increased residential diversion rate of 33 to 58%. The current residential diversion rate (23%, RPRA, 2018) may actually be higher, due to the voluntary backyard composting efforts by residents that already exist but are not quantifiable within the Township. It is expected that the new waste diversion programs will require a ramp up period before meeting their diversion potential.

Per the Waste Diversion Study, it is reasonably estimated that the Township can obtain a residential diversion rate of 28% and 33% by 2025 and 2030, respectively, and maintain this rate going forward. The effect of the residential waste diversion gradual increase has been applied only to the residential component of the waste stream, which has been assumed to be approximately 80% of the total waste received for landfilling as per information provided by the Township. Using the landfill surveys and the actual average annual airspace consumed, the projected future post-diversion waste management requirements are provided in Table 7-2 below.

Table 7-2: Projected Post-Diversion Waste Management, Township of North Dundas

Year	Estimated Residential Waste Generated (m^3)	Estimated ICI Waste Generated (m^3)	Assumed Residential Waste Diversion Rate (%)	Estimated Residential Waste Diverted (m^3)	Estimated Annual Waste Disposal (m^3)
2021	12,960	3240	23.0%	3871	16,200
2022	13,038	3259	24.3%	4115	16,100
2023	13,116	3279	25.6%	4361	16,000
2024	13,195	3299	26.9%	4610	15,800
2025	13,274	3318	28.0%	4827	15,700
2026	13,353	3338	29.0%	5029	15,700
2027	13,434	3358	30.0%	5234	15,600
2028	13,514	3379	31.0%	5441	15,500
2029	13,595	3399	32.0%	5650	15,400
2030	13,677	3419	33.0%	5862	15,300
2031	13,759	3440	33.0%	5897	15,400
2032	13,841	3460	33.0%	5932	15,500
2033	13,925	3481	33.0%	5968	15,600
2034	14,008	3502	33.0%	6003	15,700
2035	14,092	3523	33.0%	6039	15,800
2036	14,177	3544	33.0%	6076	15,900
2037	14,262	3565	33.0%	6112	16,000
2038	14,347	3587	33.0%	6149	16,100
2039	14,433	3608	33.0%	6186	16,200
2040	14,520	3630	33.0%	6223	16,300
2041	14,607	3652	33.0%	6260	16,400
2042	14,695	3674	33.0%	6298	16,500
2043	14,783	3696	33.0%	6336	16,600
2044	14,872	3718	33.0%	6374	16,700
2045	14,961	3740	33.0%	6412	16,800
2046	15,051	3763	33.0%	6450	16,900
2047	15,141	3785	33.0%	6489	17,000
2048	15,232	3808	33.0%	6528	17,100
TOTAL CAPACITY NEEDED FOR 2021 TO 2048					**~450,000 m^3**
TOTAL CAPACITY FOR THE PLANNING PERIOD (2023-2048)					**417,700 m^3**

In response to comments from the MECP Resource Recovery Policy Branch on the draft EASR, the above estimate of additional landfill airspace volume projected to be required over the 25 year planning period was checked using an alternative methodology based on published information on waste generation and waste disposal rate per person in Ontario. The full response to the comment is provided in Volume 4 Appendix K2 and summarized as follows.

The required input parameters for this generation rate volumetric methodology are waste generation rate (either including or excluding diversion) for both residential and IC&I waste; waste density; population; and waste to cover material ratio.

Waste generation rates for the province of Ontario were obtained from the Government of Canada Report from January 2022 on Solid Waste Diversion and Disposal (2022). This report incudes 2018 data on total waste disposed and diverted for the residential and IC&I sectors in Ontario. Based on this data and considering that the Boyne Road landfill is estimated to receive 80% of its waste from residential sources and 20% from IC&I sources, it is estimated that the Boyne Road Landfill receives 348 kilograms per person per year. It was assumed that the density of waste placed at the Boyne Road Landfill is placed at a density of 0.6 tonnes/cubic metre and that the site operations use a typical 4:1 waste:cover ratio. In terms of population, and as described above, the Official Plan population projections were used to project the required disposal airspace, consistent with the approach used in the approved ToR. However, the Township was aware that even prior to the onset of COVID-19 the increased demand for housing was becoming a reality in North Dundas and that there had been and continued to be significant increased interest and applications by residential developers in the Township. The actual population increases in the Township are well above the 0.6% set out in the Official Plan, with annual population increase of about 1.2% between 2011 and 2021, about 3.7% in 2022/23, and based on residential development approved and applied for is expected to be about 3% annually between 2024 and 2031. Using the above as the input, the corresponding projected waste disposal volumes at the Boyne Road Landfill site over the 2023 through 2048 planning period is about 375,000 cubic metres, which is slightly lower than but similar to the volume of 417,700 cubic metres based on volumetric surveys at the landfill site.

Based on the above assumptions and projections, the expansion of the Boyne Road Landfill is projected to have to accommodate waste corresponding to the consumption of approximately 450,000 m^3 of landfill airspace (excluding final cover) from existing ground conditions at the landfill at the end of 2020 or 417,700 m^3 for the 25 year planning period starting in 2023.

It is noted that this updated airspace requirement is slightly higher than the previous estimate made at the time of preparation of the ToR and used in the evaluation of ‘Alternatives To’ in Section 6.0. This updated airspace does not affect that evaluation or its conclusion that expansion of the Boyne Road Landfill is the Township’s preferred waste management alternative.

8.0 Study Areas and Environmental Component Work Plans for Landfill Expansion

The EAA defines the environment in a broad, general sense. The natural components include: atmosphere (air quality, noise), geology and hydrogeology, surface water (quantity and quality) and biology (aquatic and terrestrial ecology). The social and -economic component includes: socio-economic (local economy, residents and community and visual), land use and agriculture. The cultural components include cultural heritage resources (archaeology, built heritage resources and cultural heritage landscapes). The technical component includes: design and operation financial and transportation (traffic) aspects of the environment.

8.1 Study Areas

Data for the assessment of the 'Alternative Methods' was collected and analyzed for generic study areas that were confirmed and refined during the EA. Preliminary study areas considered for the work plan and existing conditions stage of the EA consisted of:

- **Site Study Area** – The existing Boyne Road Landfill site, located at 12620 Boyne Road, Lot 8, Concession VI. The extent of the Site Study Area includes the lands owned by the Township of North Dundas that consist of the existing Boyne Road Landfill waste footprint and an area 300 m to the south of the existing waste footprint.
- **Site-vicinity Study Area** – The lands in the area immediately adjacent to the Site Study Area that have the potential to be directly affected by the landfill expansion and activities with the Site Study Area. The extent of the Site-vicinity Study Area will be determined for each of the environmental components. For most environmental components, a Site-vicinity Study Area of 500 metres from the Site Study Area is appropriate.
- **Wider Study Area** – An area that takes on the broader community generally beyond the immediate site vicinity and for specific environmental components may include the entirety of the Township of North Dundas, as appropriate.

The rationale for the definition of these preliminary study areas is as follows:

- **Site Study Area** – The area of land within which 'Alternative Methods' of landfill expansion may occur has been defined and will be limited to a portion of the existing Boyne Road Landfill property, with the property as defined in the Boyne Road Landfill's ECA, which includes adjacent buffer zones and contaminant attenuation zones.
- **Site-vicinity Study Area** –The MECP Guideline D-4 Land Use on or Near Dumps (MOE, 1995a) describes that the most significant potential impacts typically occur within 500 m of the perimeter of the waste disposal area on a landfill site. For this reason, this Guideline distance is often used by Ontario municipalities in their Official Plans to establish a holding zone around landfills; development within these zones requires proponents to demonstrate that their proposed development will not be adversely affected by the landfill site and its operations. For most environmental components, a Site-vicinity Study Area of 500 m from the Site Study Area limits is appropriate. For specific

environmental components, the appropriate Site-vicinity Study Area is greater than 500 m from the existing or potential expanded disposal area. It should also be recognized that the Boyne Road Landfill has been in operation for over 50 years, and monitoring and operational data demonstrates compliance with the requirements of its ECA and the limited extent for potential adverse environmental impacts to occur off-site.

- **Wider Study Area** – An area that takes in the broader community generally beyond the immediate site-vicinity and for specific environmental components may include the entire Township of North Dundas.

The extent of the study area proposed for each of the environmental components to be studied during the EA, together with a rationale, is provided in Table 8-1 below.

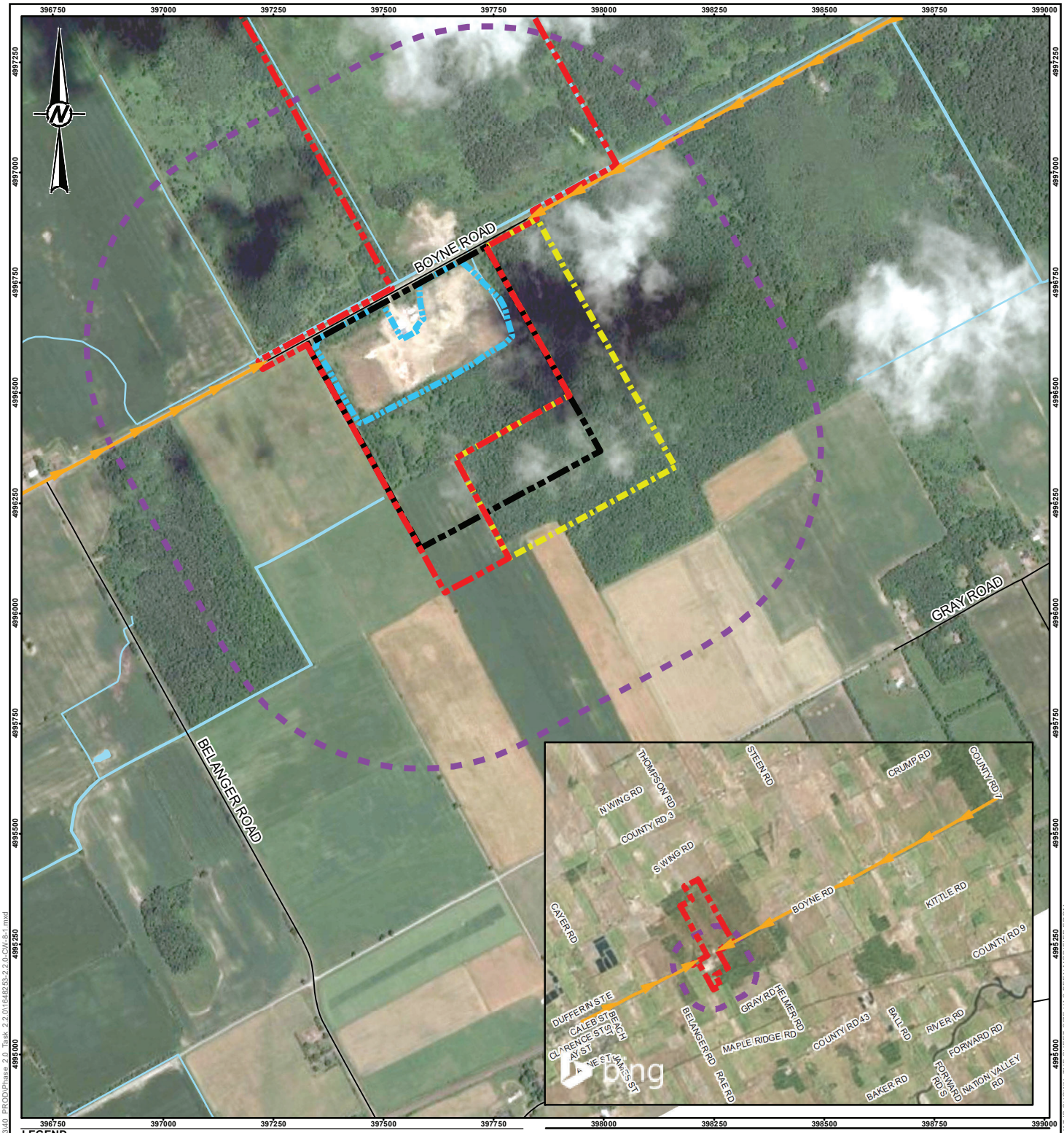
Table 8-1: Proposed Study Areas

Environmental Component/Sub-Component	Area(s) to be Studied	Rationale
Atmosphere/Air Quality	Site and Site-vicinity	Air quality and odour emissions are required to meet provincial requirements at the landfill site boundary or closest sensitive receptors. Since there are no sensitive receptors within the 500 m around the Site Study Area, the Site-vicinity Study Area will be nominally increased to extend to the nearest sensitive receptors to the east, south and west, noting that the air quality assessment will employ a grid and may extend further.
Atmosphere/ Noise	Site-vicinity	Noise emissions are required to meet provincial requirements at the closest noise sensitive receptors (existing and potential). For the purposes of this assessment, a distance of 1,500 m is considered. To assess noise due to project-related road traffic along the haul route, noise sensitive receptors within 500 m of the haul road centerlines were considered. See discussion under Transportation for a description on the Site-vicinity Study Area for the haul routes.
Geology and Hydrogeology/ Groundwater Quality	Site and Site-vicinity	Potential effects on groundwater quality have to comply with the MECP Reasonable Use Guideline (MOE, 1994) at the landfill site and CAZ boundaries.

Environmental Component/Sub-Component	Area(s) to be Studied	Rationale
Surface Water/ Surface Water Quality and Quantity	Site and Site-vicinity	Necessary to include the drainage boundaries of the subwatersheds within which the landfill site is located.
Biology/ Aquatic and Terrestrial Ecosystems	Site and Site-vicinity	Potential effects on biological resources are expected to be limited to 120 m from the Site Study Area in accordance with the provincial standard for “adjacent lands” to significant natural features in accordance with the MNRF’s Natural Heritage Reference Manual.
Land Use Planning/ Current and Planned Future Land Use	Site and Site-vicinity	Since there are provincial requirements that govern the potential emissions or discharges from the landfill site, potential effects on land use are expected to be limited to 500 m from the Site Study Area.
Agriculture	Site and Site-vicinity	Since there are provincial requirements that govern the potential emissions or discharges from the landfill site, potential effects on agriculture are expected to be limited to 500 m from the Site Study Area.
Cultural Heritage Resources /Archaeological Resources	Site	Potential disturbance of archaeological resources will be limited to areas associated with the landfill expansion.
Cultural Heritage Resources/ Built Heritage Resources and Cultural Heritage Landscapes	Site and Site-vicinity	In accordance with Ministry of Heritage, Sport, Tourism and Culture Industries requirements for cultural studies, the area of study considers properties immediately adjacent to the proposed limit of waste of the landfill expansion. All properties that fall within 500 m from the Site Study Area were considered.
Socio-economic/ Local Economy, Residents and Community	Site, Site-vicinity and Wider	To consider the potential effects of the landfill expansion within 500 m of the Site Study Area, extending to the east, south and west to the nearest sensitive receptor and on the broader community.

Environmental Component/Sub-Component	Area(s) to be Studied	Rationale
Socio-economic/Visual	Site-vicinity	Off-site vantage points from where the landfill expansion may be visible from as far as 1 km.
Transportation	Site-vicinity	To consist of the haul routes associated with the landfill, specifically Boyne Road between St Lawrence Street and the landfill and Boyne Road between County Road 7 and the landfill as shown on Figure 1-1.
Design and Operations	Site	Potential financial implications related to site development (landfill expansion) are associated with the site only.

The Site Study Area and the area extending 500 m beyond the Site Study Area are illustrated on Figure 8-1. The Wider Study Area is not depicted on this figure.



LEGEND

- ROADWAY
- WATERCOURSE
- HAUL ROUTE
- EXISTING LANDFILL FILL AREA
- SITE STUDY AREA
- 500 m SITE-VICINITY STUDY AREA
- TOWNSHIP OWNED PROPERTY
- APPROXIMATE PROPERTY BOUNDARY OF LANDFILL SITE

0 125 250 500

1:12,500 METRES

REFERENCE(S)

1. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9 VERTICAL DATUM: CGVD28

CLIENT

TOWNSHIP OF NORTH DUNDAS

PROJECT

INDIVIDUAL ENVIRONMENTAL ASSESSMENT OF THE TOWNSHIP OF NORTH DUNDAS WASTE MANAGEMENT PLAN

TITLE

STUDY AREAS

CONSULTANT

GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-05-27
DESIGNED	PLE
PREPARED	JEM
REVIEWED	YJM
APPROVED	PLE

PROJECT NO.	PHASE/TASK	REV.	FIGURE
1648253	2.0/2.2.0	0	**8-1**

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8.2 Environmental Component Work Plans

The work plans shown herein present the scope of work undertaken to complete the EA, including the general scope of technical studies for each of the environmental components, and the way in which the comparison of 'Alternative Methods' and prediction of environmental effects for the preferred 'Alternative Method" of landfill expansion will be carried out. Environmental components for the comparison of 'Alternative Methods' are slightly different than those used for comparison of 'Alternatives To' to ensure all relevant aspects of the environment are properly addressed; the key differences are as described below:

- The surface water environmental component has been divided into the sub-components of surface water quality and surface water quantity.
- The biology environmental component has been divided into the sub-components of aquatic ecosystems and terrestrial ecosystems.
- The agriculture and land use component used for comparison of 'Alternatives To' has been split into two environmental components.
- The socio-economic environmental component has been divided into three sub-components: local economy, residents and community, and visual.
- The removal of the technical considerations environmental component and its replacement with design and operations.

Detailed work plans for biology, groundwater, surface water and atmospheric components were developed in consultation with the MECP, Conservation Authorities and MNRF as relevant and submitted for review and concurrence. Copies of these work plans are provided in Volume 4 Appendix G1. The summary table of all work plans, as noted below, was shared on the EA website with Indigenous communities and the public and they were invited to view the work plans and submit comments.

Table 8-2 describes all the work plans by environmental sub-component, noting that with the identification of landfill expansion as the preferred 'Alternative To' the rationale and indicators can be developed at a higher level of detail in this table than those used for evaluation of the 'Alternatives To'. The table also includes additional detail for data collection and field work to prepare a description of existing conditions around the landfill, comparison of 'Alternative Methods' and the prediction/assessment of potential effects for the preferred 'Alternative Method'.

Table 8-2: Summary of Work Plans for the EA

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
Atmosphere/ Air Quality (health-related compounds and dust, odour, GHG)	Landfill expansion and associated operations can produce gases containing contaminants that degrade air quality if they are emitted to the atmosphere. Construction activities associated with landfill expansion and continued landfill operation can lead to levels of particulates (dust) in the air. Landfill operation can also result in odour effects.	• Potential effects on air quality (including dust, odour, GHG)	• Expected concentrations of air quality indicator compounds (selected regulated air contaminants to represent this type of project), including dust, at the property boundary and nearby sensitive receptors. • Expected site-related odour at off-site sensitive receptors. • Expected GHG emissions.	• Compile and interpret existing Environment Canada or MECP's air quality monitoring data and meteorological data. • Review aerial photographic mapping to identify sensitive receptors. • Review zoning maps. • It is not proposed to collect site-specific data.	• Identify the differences in potential air and odour concentrations from emission sources based on their distance and direction to nearest off-site receptors, the property boundary, and site characteristics such as height of the expanded landfill that will influence dispersion. • Identify difference in the expansion alternatives that will impact GHG generation such as the landfill configuration. • Qualitatively evaluate the differences in potential air quality, odour and GHG. • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Select air indicator compounds appropriate for the landfill expansion, expected to include suspended particulate matter (SPM), particles nominally smaller than 10 µm in diameter (PM_{10}), particles nominally smaller than 2.5 µm in diameter ($PM_{2.5}$), nitrogen oxides (Nox), sulphur dioxide (SO_2), carbon monoxide (CO), hydrogen sulphide (H_2S), vinyl chloride (C_2H_3Cl), odour. • Complete air and odour emission estimates based on published emission factors and available literature, as well as results from a site-specific landfill gas (LFG) generation model for input into the dispersion model. • Execute an air quality dispersion model for the currently approved landfill and for an expanded landfill.	• Environment Canada or MECP's regional air quality data, hourly meteorological data and climate normals. • Published emission factors (including odour). • Site-specific LFG generation model. • Preferred 'Alternative Method' landfill design and phasing plan. • Odour complaints history for the landfill site. • Applicable provincial regulations, standards and guidelines.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
						• Predict worst-case air quality and odour effects for sensitive receptors based on an expanded landfill operation scenario. • Calculate GHG emissions based on the expanded landfill. • If required, identify mitigation or best management practices that can be implemented into the design of the preferred alternative to allow the landfill expansion to achieve compliance with applicable air quality limits.	
Atmosphere/ Noise	Landfill expansion and associated operations will generate noise that will be emitted into the atmosphere and could impact neighbouring sensitive receptors.	• Potential effects on noise	• Noise Levels at neighbouring noise sensitive existing receptors or vacant lots (with appropriate zoning that may accommodate the future construction of sensitive noise receptors).	• Review of aerial imagery. • Review of zoning/land use mapping. • Undertake field program and/or carry out a desktop analysis to quantify existing noise levels.	• Identify existing and vacant lot noise sensitive receptors in the vicinity of the landfill. • Identify potential differences in expected noise levels based on the distance and potential line-of-site exposure of the sensitive receptors to the landfilling. Equipment/activities. • Review the direct interaction of the proposed 'Alternative Method' footprints and existing/potential. Sensitive receptors.	• Noise emission estimates based on available project-specific information, manufacturer's noise data and consultant's database of similar noise sources. • Establish applicable noise limits in accordance with accepted MECP practices.	• Landfill equipment list and expected utilization. • Preferred 'Alternative Method' landfill design and phasing plan. • Baseline noise predictions. • Manufacturer's noise data. • Consultant's database of similar noise studies. • Ministry of Transportation Ontario (MTO) / local municipal traffic count data or newer data collected to support this EA. • Applicable provincial guidelines.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
					• Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Develop a project/site-specific three-dimensional noise prediction model in accordance with MECP and internationally accepted standards. • Using the site-specific noise model described above, model the predictable worst-case noise levels from the preferred landfill expansion at identified sensitive receptors (existing or potential), and compare them to MECP noise guidelines. • If required, identify mitigation that can be implemented into the design of the preferred alternative to allow the landfill expansion to achieve compliance with applicable noise limits. • Develop monitoring, trigger and contingency plans, if relevant.	

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
Geology and Hydrogeology/ Groundwater Quality	Contaminants associated with the landfill expansion and associated operations could enter the groundwater and impact off-site groundwater or surface water.	• Potential effects on groundwater resources	• Expected effect on groundwater quality at the landfill site property boundary and/or compliance boundaries.	• Extensive field investigations and hydrogeological assessments have been completed for the existing landfill site since 2001. • Extensive hydraulic conductivity testing has been completed. • Review results of existing groundwater monitoring program. • Limited additional field work in the form of additional parameter analysis expected based on available information. • Renewed analysis of existing data to confirm groundwater flow direction(s), predominant impacts expected in the overburden and not the bedrock, leachate indicator parameters unique to the landfill and not the neighbouring snow storage area.	• Identify the differences between the alternatives that will affect the potential impact on off-site groundwater quality such as expanded waste footprint configuration, direction of groundwater flow, thickness of waste in the expansion. • Estimate qualitatively how the differences will potentially affect the off-site groundwater quality. • Rank each 'Alternative Method' based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Prepare a predictive model of landfill performance (contaminant transport model) as per *O. Reg.* 232/98. • Predict worst case concentrations in the overburden groundwater at the landfill and/or CAZ compliance boundaries for the key leachate indicator parameter chloride, with consideration of reasonable mitigation measures. [1,2] • Compare the predicted concentrations in the overburden groundwater to the Reasonable Use Criteria. • Evaluate potential for overburden groundwater discharge to surface water and consider potential impacts on surface water quality. • Revise and update mitigation measures, if necessary.	• Published regional sources and data on regional geological and hydrogeological conditions, including source water protection reports and source water protection zones in County and Township Official Plans. • Review MNRF petroleum well records. • Provincial Quaternary and Bedrock Mapping. • Ontario Water Well Records (water supply wells are considered to be sensitive receptors in terms of potential impacts). • Boyne Road Landfill Annual Monitoring Reports. • Previous site characterization/investigation reports. • Borehole logs.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
						• Compare predictive results against approved trigger mechanism and contingency plan, if required. • Update groundwater monitoring program, if required. • Predict the contaminating lifespan. • Assess the potential effects in relation to Source Water Protection.	
Surface Water/ Surface Water Quality	Contaminants associated with the landfill expansion and associated operations could seep or runoff into surface water and adversely affect water quality and aquatic life.	• Potential effects on surface water resources	• Expected effect on surface water quality in the drainage ditch along Boyne Road and within the Site-vicinity Study Area.	• Extensive field investigations and hydrogeological assessments have been completed for the existing landfill site since 2001. • Review results of existing surface water monitoring program. • Limited additional field work related to neighbouring municipal drains expected based on available information.	• Identify the differences that may impact changes in surface water quality such as expansion area layout and location. • Estimate qualitatively how the differences will affect the surface water quality. • Rank each 'Alternative Method' based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Evaluation of required construction of new on-site facilities (pond(s)) and the facility's ability to mitigate potential changes to surface water quality. • Modelling of proposed surface water facilities (pond(s)) and comparison with MECP and watershed-specific design criteria. • Update trigger mechanism and contingency plan if required. • Update surface water monitoring program if required.	• Boyne Road Landfill Design and Operations Report. • Boyne Road Landfill Annual Monitoring Reports. • Historical flow observations during sampling program. • Surface water drainage mapping. • Topographic maps. • Air photos. • Published water quality information from the MECP, Environment Canada and SNC.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
Surface Water/ Surface Water Quantity	Operations associated with the landfill expansion could alter runoff and peak flows.	• Potential effects on surface water resources	• Expected change in runoff to and peak flows in drainage features. • Expected degree of off-site effects on surface water quantity within the Site-vicinity Study Area.	• Review existing surface water management features and practices. • No additional field work expected based on available information.	• Identify the differences that may impact changes in surface water quantity such as expansion area, expansion location, proposed side slopes of the landfill, and potential effects on the existing drainage ditch adjacent to the landfill footprint. • Estimate qualitatively how the differences may potentially affect the surface water quantity. • Rank each 'Alternative Method' based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Predict and assess future surface water peak flows and quantity conditions associated with the preferred landfill expansion alternative for a range of storm events (e.g., 2, 5, 10, 25, and 100 year) as required by *O.Reg.* 232/98, as well as consideration of climate change effects. • Evaluate the need for stormwater management infrastructure to meet *O.Reg.* 232/98 and prepare EA level design for stormwater management system. • Modelling of proposed stormwater management system and comparison with MECP specific design criteria.	• Boyne Road Landfill Design and Operations Report. • Boyne Road Landfill Annual Monitoring Reports. • Historical flow observations during sampling program. • Surface water drainage mapping. • Local climate data. • Topographic maps. • Air photos. • Published water quantity and flow information from the MECP, Environment Canada and SNC. • Agricultural farm drain mapping.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources

Biology/ Aquatic Ecosystems	Landfill expansion could remove or disturb the functioning of natural aquatic habitats and species, including rare, threatened, or endangered species.	• Potential effects on natural environment features (aquatic and terrestrial ecosystems)	• Expected change in surface water quality and/or quantity within the Site Study Area and the Site-vicinity Study Area.
			• Expected impact on aquatic habitat and biota, including rare, threatened, or endangered species within the Site Study Area and the Site-vicinity Study Area.
				• Wetland boundary surveys.
				• Headwater Drainage Features assessment.
				• Fish habitat survey.
				• Fish communities survey.
					• Identify differences in potential impacts to watercourses.
					  • Waste footprint likely to cause alteration or destruction of existing habitat.
					  • Differences in discharge rate from stormwater management (SWM) system.
					  • Change in water quality to receiving water courses.
					• Rank each alternative based on the differences.
					• Describe advantages and disadvantages of the 'Alternative Methods'.
						• Identify areas of potential disturbance including:
						  • Direct habitat loss/disturbance.
						  • Indirect habitat disturbance.
						  • Impacts to aquatic species at risk (SAR) habitat and species.
						• Identify appropriate mitigation measures, if needed.
						• Develop monitoring, and contingency plans, if relevant.
							• United Counties of Stormont, Dundas and Glengarry Official Plan.
							• Field surveys.
							• MNRF Natural Heritage Information Centre (NHIC) Make-a-Map geographic explorer (MNRF, 2021a)
							• Existing and readily available information (including watershed studies) and mapping available through the SNC.
							• DFO Aquatic Species at Risk Maps (DFO, 2021).
							• Information contained in natural heritage related map layers from Ontario Base Map series, Natural Resource Values Information System (NRVIS) mapping and Land Information Ontario (LIO).
							• Existing high-resolution aerial imagery and mapping.

Biology/ Terrestrial Ecosystems	Landfill expansion could remove or disturb the functioning of natural terrestrial habitats and vegetation, including rare, threatened or endangered species.	• Potential effects on natural environment features (aquatic and terrestrial ecosystems)	• Expected impact on terrestrial vegetation communities, wildlife habitat, and wildlife, including rare, threatened or endangered species within the Site and Site-vicinity Study Areas.	• Botanical surveys.
				• Ecological land classification.
				• Herpetile surveys.
				• Bat surveys.
				• Breeding Bird Surveys.
				• Wetland Community Boundary Delineation.
				• Wildlife habitat and visual encounter surveys.
				• Species at Risk screening.
					• Identify differences in the alternatives that will potentially impact terrestrial features:
					  • Change in the site development area for the landfill.
					  • Change in the Waste Footprint Area of the landfill.
					  • Impact to SAR.
					  • Impact to Significant Wildlife Habitat (SWH).
					  • Removal of natural vegetation.
						• Identify potential impacts to SAR, SWH, wetland woodlands, and environmentally significant areas, including:
						  • Direct habitat loss/disturbance.
						  • Indirect habitat disturbance.
						  • Impacts to terrestrial SAR habitat and species.
							• United Counties of SDG Official Plan.
							• Field surveys.
							• MNRF NHIC Make-a-Map geographic explorer (MNRF, 2021a).
							• Existing and readily available information (including any watershed studies) and mapping available through the local Conservation Authority.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
					• Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Vegetation removal. • Potential impacts to species • Identify appropriate mitigation measures, if needed. • Develop monitoring, and contingency plans, if relevant.	• Atlas of Breeding Birds of Ontario (Cadman, et al. 2007). • eBird online database (eBird, 2021). • Atlas of the Mammals of Ontario (Dobbyn, 1994). • Bat Conservation International (BCI, 2021). • Ontario Odonate Atlas (Jones et. al 2021). • Ontario Reptile and Amphibian Atlas (Ontario Nature, 2021). • Information contained in natural heritage related map layers from Ontario Base Map series, NRVIS mapping and LIO. • Existing high-resolution aerial imagery and mapping.
Agriculture	The agricultural land base or agricultural operations may be impacted by the landfill expansion and associated operations.	• Potential effects on existing agriculture	• Expected effect on agricultural land base and agricultural operations within the Site and Site-vicinity Study Areas.	• Review of aerial photographic mapping. • Compile parcel fabric mapping from Township. • Review Official Plans and Zoning By-Law. • Review Canada Land Inventory (CLI) mapping.	• The potential effect of the proposed landfill expansion alternatives on the existing and potential agricultural use of on-site and off-site lands will be assessed. • Differences between alternatives will be identified, for example, proximity to livestock, use of prime agricultural areas (soil capability), degree of infrastructure/investment, impact on agricultural system (fragmentation). • Rank each alternative based on the differences.	• Based on the proposed landfill operational practices and/or results of predictive assessments of potential nuisance effects as caried out by other components; the technical and operational considerations component; and groundwater and surface water considerations, the potential effects of the preferred	• Existing site-specific studies. • Applicable provincial regulations, standards and guidelines. • Provincial Policy Statement (2020). • United Counties of Stormont, Dundas and Glengarry Official Plan. • Available soils mapping. • Aerial photographic and topographic mapping. • Statistics Canada agriculture profiles. • Relevant information available from Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
					• Describe advantages and disadvantages of the 'Alternative Methods'.	expansion method on existing and proposed on-site and off-site agricultural use will be assessed.	and Ontario Federation of Agriculture (OFA).
Cultural Heritage Resources/ Archaeological Resources	A horizontal landfill expansion has the potential to affect archaeological resources.	• Potential effects on archaeology	• Expected archaeological resources potentially affected on-site.	• Review and update existing background research including archaeological, historical, and environmental literature. • Review updated list of registered archaeological sites within 1 km of the landfill site. • Complete Stage 1 Archaeology Assessment. If necessary, complete subsequent Stages of archaeological assessment.	• Identify archaeological sites that are anticipated to be impacted by expansion alternatives. • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Archaeological sites that will be impacted by the preferred expansion alternative may require further assessment to determine spatial extent, complete a full evaluation of significance, and determine the need for strategies to mitigate impacts and provide future conservation (Stage 4 mitigation).	• Existing site-specific archaeological assessment reports. • Ontario Archaeological Sites Database. • Ministry of Tourism, Culture, and Sport (MTCS) *Standards and Guidelines for Consultant Archaeologists*. • United Counties of SDG Official Plan.
Cultural Heritage Resources/ Cultural Heritage Landscapes	Identified cultural heritage landscapes can be altered by the landfill expansion. Depending on the nature of identified cultural heritage landscapes, there could be an impact by the ongoing	• Potential effects on cultural heritage landscapes	• Expected impact on identified cultural heritage landscapes within the Site-vicinity Study Area.	• Background research of archival, published and unpublished sources, municipal heritage policies, and historic maps and aerial imagery. • Consultation with municipal heritage planner, if available. • Review of identified cultural heritage resources as part of Official Plan. • Field investigations to document and	• Identify the risk of potential direct or indirect impact using guidance and types identified in the MTCS *Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process.* • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Determine the potential magnitude, reversibility, extent, duration, and frequency of each type of impact, if present. • Methods to predict potential effects following guidance provided in the MTCS *Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process*.	• Description of proposed expansion alternatives. • Preferred landfill expansion design. • Existing site-specific studies. • Applicable provincial plans, acts, regulations, standards and guidelines, and policies. • United Counties of SDG Official Plan. • Local Historical Society, if available.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
	operation of the landfill.			evaluate existing conditions. • Complete the MHSTCI criteria for evaluating potential for built heritage resources and cultural heritage landscapes (2016) checklist. • Complete a cultural heritage resources impact assessment.		• Methods to consist of identifying key vistas and views, sources of direct and indirect impact resulting from construction and operation, and preferred landfill expansion and conservation measures to reduce or avoid impact to cultural heritage landscapes.	
Cultural Heritage Resources/ Built Heritage Resources	Heritage attributes of identified built heritage resources could be impacted by the landfill expansion and associated operations.	• Potential effects on built heritage resources	• Expected impact on the heritage attributes of identified built heritage resources within the Site-vicinity Study Area.	• Background research of archival, published and unpublished sources, municipal heritage policies, and historic maps and aerial imagery. • Consultation with municipal heritage planner, if available. • Review of identified cultural heritage resources as part of Official Plan. • Field investigations to document and evaluate existing conditions. • Complete the MHSTCI criteria for evaluating potential for built heritage resources and cultural heritage landscapes (2016) checklist.	• Identify the risk of potential direct or indirect impact using guidance and types identified in the MTCS *Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process.* • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Determine the potential magnitude, reversibility, extent, duration, and frequency of each type of impact, if present. • Methods to predict potential effects following guidance provided in the MTCS *Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process*. • Methods to consist of identifying resources, sources of direct and indirect impact resulting from construction and operation, and preferred options and conservation measures to reduce	• Description of proposed expansion alternatives. • Preferred landfill expansion design. • Existing site-specific studies. • Applicable provincial plans, acts, regulations, standards and guidelines, and policies. • United Counties of SDG Official Plan. • Local Historical Society, if available.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
				• Complete a cultural heritage resources impact assessment.		or avoid impact to protected heritage resources or newly identified resources of cultural heritage value or interest.	
Land Use Planning/ Current and Planned Future Land Uses	Waste disposal facilities could potentially be incompatible with municipal land use policy framework.	• Potential effects on existing land use	• Expected incompatibility with existing or known future land use.	• Review aerial photographic mapping. • Compile parcel fabric mapping from Township. • Review Official Plan and Zoning By-law • Review Provincial Guidelines (e.g., Land Use Compatibility, Guideline D-1, Land Use On or Near Landfills and Dumps, Guideline D-4). • Review Provincial Policy Statement 2020. • Interviews with municipal staff to confirm development activity planned in the site-vicinity and identify potential planning issues.	• Differences between alternatives will be identified with respect to land use compatibility. • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Based on the proposed operational practices and/or results of predictive assessments of potential nuisance effects as carried out by other components and the design and operation component, the potential compatibility of the preferred method with existing and proposed surrounding land use will be assessed.	• Preferred 'Alternative Method' landfill design and phasing plan. • Existing site-specific studies. • Applicable provincial regulations, standards and guidelines. • Provincial Policy Statement (2020). • United Counties of SDG Official Plan. • Land Use Compatibility, Guideline D-1. • Land Use On or Near Landfills and Dumps, Guideline D-4. • Aerial photographic and topographic mapping • Field reconnaissance. • Discussion with Township planning department.
Socio-economic/ Local Economy	The continued operation of the landfill can influence employment and business in the wider regional area.	• Relative potential changes in employment, impacts to local commercial businesses and capital costs.	• Expected effect on local employment. • Expected effects on local businesses and commercial activity. • Expected effects on municipal finances.	• Review of current and projected employment numbers (during both construction and operation phases). • Review of municipal revenues and projected change from site expansion.	• Identify total increase in employment hours/full time equivalent positions during both construction and operational phases by alternative design. • Identify loss of potential land use for commercial purposes or residential purposes as a result of landfill expansion and	• Re-evaluate property taxes or rent paid to the municipality based on larger property parcel and any potential change in land use designation. • Qualitative assessment of impacts on local	• United Counties of SDG Official Plan. • Statistics Canada 2016 Census data. • United Counties of Stormont Dundas and Glengarry website, 2020.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
				• Review of land use designations and Official Plan. • Interviews with municipal staff to understand potential costs and impacts to services from expanded site (e.g., public works, emergency management systems, transportation). • Review of local business database.	associated employment and rental income, respectively. • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	businesses from changes at the landfill site, (e.g., loss of patronage, operational impacts). • Impacts on employment as determined by change in employment numbers and resultant economic impact at the local level. • Calculate amount of increased revenue to the Township minus any potential increased costs to determine net economic effect.	
Socio-economic/ Residents and Community	Waste disposal facilities can potentially affect the use and enjoyment of their properties by residents in the vicinity of the site.	• Potential site operational effects on sensitive off-site receptors (i.e., noise, litter, air quality)	• Displacement of residents. • Expected interference with use and enjoyment of residential properties (nuisance effects).	• Review aerial photography to identify closest residential properties. • Windshield survey of study area to identify residences and businesses (including farms) as well as any other community facilities in the site-vicinity.	• Establish closest residential receptors to each alternative design. • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Review of findings from other disciplines - noise, odour, air quality, operations (litter and vermin)- to ascertain any potential nuisance effects on sensitive receptors. • Evaluate level of nuisance effects once mitigation measures and best management practices have been implemented to determine change from baseline (current) conditions.	• Site related complaints. • Discipline findings – noise, air quality, land use, operations. • Existing site or proposed expansion related best management practices. • Statistics Canada 2016 Census data. • United Counties of SDG website, 2020

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
						• Evaluate if the preferred alternative could cause displacement of residents.	
Socio-economic/ Visual	The landfill expansion can affect the local community by changes in the visual appearance of the site.	• Potential changes in visibility of the landfill	• Expected changes in landscape views from off-site.	• Field investigations to identify key viewpoints and obtain photos. • Use software to produce representative 3D perspective images for each viewpoint.	• Identify the differences in potential visual impacts based on the distance and direction to nearest off-site receptors, the property boundary, and site characteristics such as height of the expanded landfill. • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Prepare 3D models from each viewpoint for the preferred landfill expansion 'Alternative Method' and render them with appropriate surface material / vegetation cover (turf, meadow, trees, etc.). • Compare the landfill expansion model of the preferred 'Alternative Method' with the existing site conditions model and describe potential impacts. • Apply conceptual level mitigation measures to preferred landfill expansion alternative, if required. Identify the degree of visual impact.	• Google Earth. • Township of North Dundas aerial photos. • ACAD drawings of existing landfill and proposed expansion alternatives. • Site photos.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
Transportation/ Traffic	The operations at the landfill can impact the traffic in the surrounding area through changes in truck traffic to/from the landfill.	• Potential effect on road network	• Expected effect on traffic along haul routes.	• Obtain available traffic data for selected intersections and corridors within haul route study area. • Conduct traffic count estimates if recent or sufficient data does not exist.	• Assess existing traffic conditions based on haul routes and other common users. • Identify the differences in traffic operations by evaluating the alternatives for landfill expansion. • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• Assess existing hourly and daily carrying capacity of the haul route study area roads. • Assess existing intersection level of service and other performance metrics for the haul route study area intersections to confirm overall intersection and critical movement performance (capacity and delay) • Assess future traffic operation and safety requirements of defined study area (adjacent roadway and haul route) conditions. • Assess potential intersection geometric requirements for mitigation. Undertake warrants to confirm any required improvements, i.e., auxiliary lane and/or intersection control requirements, as necessary.	• Turning Movement Count, average annual daily traffic (AADT), and signal timing data, if available. • Additional tonnage and resulting number of trucks to site due to expansion. • Collision history statistics, if available. • Existing site-specific and related studies, consultant observations, and available Township planning and engineering documents. • Traffic counts if necessary.

Component/ Sub-component	Rationale	Evaluation Criterion/Criteria	Indicator(s)	Data Collection and Field Work	Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'	Data Sources
Design and Operations/ Financial	Different methods of landfill expansion can have different costs based on the design and associated requirements to construct the expansion.	• Potential effects on capital costs	• Estimated costs associated with implementation of expansion alternatives.	• Existing cost information from the Township and local construction projects. • Estimates of required earthworks for each 'Alternative Method'.	• The expected cut and fill and any additional earthworks for each 'Alternative Method' will be estimated. • Expected differences in operations between alternatives. • Rank each alternative based on the differences. • Describe advantages and disadvantages of the 'Alternative Methods'.	• A summary of the design of the preferred 'Alternative Method' including best management plans will be prepared.	• Existing landfill site or proposed expansion related best management practices. • Description of proposed expansion alternatives. • Preferred 'Alternative Method' landfill design and phasing plan.

Notes:

1 Given the relatively small nature of the existing landfill and the proposed landfill expansion, selection and identification of relevant leachate indicator parameters is likely to be different than those identified in *O. Reg* 232/98. It is known that chloride is a relevant leachate indicator parameter that can be modelled at the landfill site and, if others can be identified, then one or more will be included.

2 The existing and future leachate plume in the overburden is assumed to be more extensive than the plume in the bedrock. It is acknowledged that some portion of the plume may extend into bedrock. The vertical spreading of the plume to the bedrock would result in lower concentrations in the bedrock relative to what is represented in the overburden. The leachate plume is also assumed to travel at a lower velocity in the bedrock relative to the overburden due to the lower hydraulic gradients. As such, it is assumed that if regulatory compliance is met in the overburden, compliance would also be met in the bedrock at the same distance from the disposal area.