



The Town of Caledon

Aggregate Guidance Manual

March 2026

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1.0 Introduction

The Caledon Aggregate Guidance Manual (“the Manual”) is a guidance document intended for use by applicants, municipal staff, and the public to better understand the Town’s guidelines for studies to be submitted as part of aggregate applications. The Manual includes a framework for the scope of undertaking related to the following topics and/or studies:

- Planning Justification Reports
- Surface Water
- Hydrogeology
- Ecology and Natural Heritage
- Site Plan Requirements
- Transportation
- Social Impact Assessment
- Air Quality and Noise
- Blasting and Vibration
- Cultural Heritage and Archaeology
- Operations Closure and Rehabilitation

All studies cited in this Manual are required for submission as part of a complete aggregate application. However, not all studies that are required as part of an application are within this Manual, as the Town has [existing Scope and Terms of Reference documents for several studies](#). The intent of the Manual is to establish a clear and comprehensive baseline of study expectations, by providing new and supplemental information on existing application requirements.

These guidelines in the Manual are to be applied when the Town is participating in the review of a new or amended *Aggregate Resources Act* licence or site plan. The Manual can be used by Town Staff, proponents, and members of the public to strengthen, clarify, and standardize the Town’s requirements and expectations as it pertains to

aggregate applications. It provides transparency and consistency to the application process for all parties and encourages proponents to exceed Provincially mandated minimum standards. The Manual is not a legally binding document, and it cannot mandate requirements beyond Provincial standards.

1.1 Provincial Standards and Manual Application

On January 7, 2026, the Province approved, with modifications, Future Caledon Official Plan Amendment 1 (“OPA 1”), a set of policies designed to enhance the aggregate policies in the Official Plan. The Manual is intended to clarify how the policies in OPA 1 are meant to be interpreted and applied. Further, the Province’s modifications included renaming the Manual from “Aggregate Standards Manual” to “Aggregate Guidance Manual” and adding the following qualifying text to the Manual’s intended application:

“To develop a Caledon Aggregate Guidance Manual to assist both proponents and the public in implementing the policies of [Future Caledon]. However, this guidance manual is not intended to add or detract from the Plan’s policies. In circumstances where there may be a conflict between the guidance manual and matters addressed under the Aggregate Resources Act, the Provincial Planning Statement or provincial plans, the Aggregate Resources Act, the Provincial Planning Statement and provincial plans shall prevail.”

Town Staff are duty-bound to apply the Provincial framework and standards as it pertains to aggregate applications—the Province of Ontario has made this the test for policy conformity in Caledon. However, it is the intent of the Manual to minimize social, economic and environmental impacts from mineral aggregate extraction, and achieve better than minimum standards or minimum levels of mitigation where avoidance of effects from mineral aggregate extraction is not possible: on air quality, noise, vibration, and other matters of compatibility.

Further, the Manual will seek every opportunity to bring contemporary standards across all operations, including bringing legacy sites into better compliance with modern policy and regulatory standards at any opportunity, and facilitating the continuous improvement of the environmental and operational performance of mineral aggregate extraction.

The role of the Manual as it pertains to the various parties is outlined in the following:

- **Town Staff:** The Manual will standardize the information Staff seek from each proponent, provide interdepartmental clarity on application expectations, and ensure consistency for reviewing applications in a proactive manner.
- **Proponents:** The Manual outlines what information Staff will ask for and what format to present the information in. The Manual provides an opportunity for proponents to understand the Town of Caledon's unique social and physical context.
- **Members of the public:** The Manual provides transparency regarding the process occurring between Town Staff and proponents and allows the public to observe how their feedback and concerns are reflected in the Town's process.

The Manual will be applied to all aggregate applications that occur after the Manual is approved. The Manual does not apply to any applications that were submitted or in process on or before it came into effect.

The contents of this Manual have been informed by a comprehensive community engagement process.

The standards set out in the Manual are based on relevant municipal, Provincial, and Federal policies in effect when the Manual was completed. The Manual is intended to be a flexible, living document that will be updated as the policy and legislative landscape changes. The Manual may be updated, repealed, or replaced over time, and new documents may also be adopted. To be clear, any application for new or expanded

mineral aggregate extraction shall be evaluated through the full scope of applicable policies and regulations in effect at that time.

1.2 Recommended Action for the Identification and Completion of Studies

While the Manual outlines additional standards for some required studies, it is not an exhaustive list. It is strongly recommended that applicants partake in a pre-consultation process with Staff to ensure that all required studies are identified. For more information on the pre-consultation process, see Section 1.3.

Several studies outline specialized expectations for peer review. In addition to those individual standards, it is expected that field work will be conducted to validate study findings and state of the landscape.

1.3 Ongoing Access to Linked Resources

Each section of this Manual dealing with scoping includes links to various webpages hosting the required information. Over time, these addresses may change as the webpage host updates or otherwise change websites. If a link appears broken, a search engine should be able to point you to the most current information using the terms used in the Manual. If the information is not available, contact the agency responsible for the information to obtain it. The Town will endeavor to maintain current information in this Manual.

1.4 Importance of Report Integration

As with any development application, it is essential that the supporting studies' source data, recommendations, and conclusions are integrated with each other. A critical issue in the development application process is when studies do not align. Examples include:

- Monitoring results for water levels of a wetland have not been captured in the groundwater model.
- The Noise Study concludes there are no operational concerns, but it does not consider the operational movement of on-site operational vehicles (including the use of impulsive noise from tailgate closing or banging).
- The surface water, hydrogeology, and ecological reports do not have linked conclusions. It is critical that the entire hydrologic regime be completely defined with an integrated model and not segregated by discipline.
- Technical reports do not analyze the same scenario, plan, or concept.

If care has not been taken to ensure that all items are integrated, this may result in questions from CAART, the public, and Council. While this Manual has been structured as individual chapters, it must be read as a whole to ensure report integration.

1.5 Supplemental Municipal Requests

The requests for information and additional questions that are included within the Manual are not exhaustive. The Town reserves the right to request supplemental information, and applicants are expected to respond to such requests, as part of the development process.

While the Town makes every effort to keep its policies and guidelines up-to-date, circumstances may arise where other standards or policies are updated, or the science in various areas improves or evolves. The Town may have additional questions to consider in the review of a development proposal for mineral aggregates which are not in the Manual, based upon those broader contextual considerations.

1.6 Municipal Context and Background

In 1996, the Region of Peel and Town of Caledon jointly initiated the Caledon Community Resource Study (CCRS), shortly after the Province modified the Region's then-newly adopted Official Plan by identifying "High Potential Mineral Aggregate

Resource Areas.” The intent of the CCRS was to develop a policy framework at the Regional and Town level for the management of aggregate resource extraction.

The CCRS concluded in the adoption of Official Plan Amendment 161 (OPA 161) in May 2003, which included new, locally specific aggregate policies in the Town’s 1978 Official Plan, as well as maps identifying Caledon’s High Potential Mineral Aggregate Resource Areas.

The policies put forward in OPA 161 were in effect and housed in Section 5.11 of the 1978 Town of Caledon Official Plan and incorporated (with updates as adopted by Council and modified by the Province) into the Future Caledon Official Plan through Official Plan Amendment 1. OPA 1 was approved with modifications by the Province on January 7, 2025, which included the removal of some of those policies and protections.

The Supplementary Aggregate Policy Study (2024) that resulted in Official Plan Amendment 1 built upon the [Peel Region and Town of Caledon Joint Aggregate Policy Review \(2023\)](#) and the [Town’s Aggregate Rehabilitation Master Plan](#) process. The Study examined the history of aggregates in Caledon, reviewed aggregate Official Plan policies, and made recommendations for improvements to those policies. The overall intent of the Study was to consider how the mineral aggregate policies and mapping of the new Caledon Official Plan and the zoning standards of Zoning By-law 2006-50 are best implemented and updated where appropriate into the Council-adopted Future Caledon Official Plan.

The Study resulted in a series of reports, as well as an Official Plan Amendment and Zoning By-law Amendment with updated aggregate policies:

- Background Report (May 2024)
- [Policy Options Report \(July 2024\)](#)
- [Recommendation Report \(October 2024\)](#)
- [By-law 2024-082 Official Plan Amendment](#)
- [By-law 2024-083 Zoning By-law Amendment](#)



The Future Caledon Official Plan (“the Plan”) was adopted by Caledon Council on March 26, 2025. On October 22, 2025, the Ministry of Municipal Affairs and Housing issued a decision to approve the Future Caledon OP with modifications.

The aggregate policies in the Plan arose from the Supplementary Aggregate Policy Study and OPA 1. The policies are hosted in Chapter 20 of the Plan. The Plan establishes the “Mineral Resource Extraction Area Designation” (which includes permitted and prohibited uses, in accordance with the *Aggregate Resources Act*), and outlines planning objectives for mineral aggregates, application requirements, and environmental protection policies. It also provides technical aggregate policies, including policies related to blasting, air quality, and transportation.

Schedule E12 of the Plan (“Caledon High Potential Mineral Aggregate Resource Areas”) identifies potential mineral aggregate resource areas in the Town, including the type of resource. The Schedule uses Provincial data and is a result of the Peel Region and Town of Caledon Joint Aggregate Policy Review (2023).

While Section 20 contains the Town’s aggregate policies, it should be noted that the entirety of the Official Plan needs to be read, and all the policies considered in justifying any proposal, as outlined in Policy 1.4.1:

“The Plan is to be read in its entirety as a comprehensive and integrated policy framework for setting priorities and making decisions. All relevant policies applying to a given situation should be considered together.”

The Town of Caledon’s Comprehensive Zoning By-law is structured to require an amendment for most new extraction or changes in operations not otherwise exempted by the *Aggregate Resources Act* (e.g., the depth of extraction was removed from the purview of *Planning Act* regulation in 2019). Through this process, the Town assesses proposals for consistency with the Provincial Planning Statement (PPS 2024), conformity with applicable Provincial plans, and conformity to the Future Caledon Official Plan.

1.7 Aggregate Approvals Process

Role of the Province

The Province sets out the framework for all aspects of the regulation of mineral aggregate operations through legislation, including the *Aggregate Resources Act*, the *Planning Act*, the Provincial Planning Statement (PPS 2024), the Greenbelt Plan, and the Niagara Escarpment Plan.

The Ministry of Natural Resources (MNR) is responsible for the management of aggregate resources in the Province. The MNR sets out the requirements for licensing mineral aggregate operations and issues licences to extract aggregate resources across Ontario municipalities under the *Aggregate Resources Act*. MNR also monitors mineral aggregate operations for compliance. Ultimately, the framework for mineral aggregate operational approvals and enforcement is the responsibility of the Province and MNR.

The MNR notifies the relevant municipality when an aggregate licence operation is being processed to confirm that the proposed operation complies with municipal zoning and land use plans. These proposed operations are submitted to the Town as a new licence application or a Site Plan Amendment, depending on the context.

Role of the Town

Municipalities are responsible for the land use elements of an application (e.g., if a *Planning Act* application such as an Official Plan and/or Zoning By-law Amendment is required as part of the proposed mineral aggregate operation). Demonstration of zoning compliance is one of the checks in Ministry of Natural Resource's overall review process.

The Town reviews *Planning Act* applications on the basis of land use compatibility, and considers issues related to transportation infrastructure, human health, the environment, surface water and groundwater resources, noise, dust, and vibration. The *Aggregate*

Resources Act process reviews the same. The Town does so within the confines of the legislative and policy framework established by the Province of Ontario, as codified through the Province's modifications to the Town-adopted OPA 1.

The Town employs a multidisciplinary, integrated review process via a Town-led Caledon Aggregate Agency Review Team (CAART).

The Town provides comments to the MNR during the aggregate licence application process and may also submit to and secure objector status through the *Aggregate Resources Act* process. Members of the public can also participate in both processes—submitting and securing objector status through the *Aggregate Resources Act* process and participating in the *Planning Act* process.

Municipalities are also responsible for the identification and protection of aggregate resources, in accordance with the Provincial Planning Statement Policy 4.5.1.1:

“Mineral aggregate resources shall be protected for long-term use and, where provincial information is available, deposits of mineral aggregate resources shall be identified.”

As well as Policy 4.5.2.1:

“As much of the mineral aggregate resources as is realistically possible shall be made available as close to markets as possible. Demonstration of need for mineral aggregate resources, including any type of supply/demand analysis, shall not be required, notwithstanding the availability, designation or licensing for extraction of mineral aggregate resources locally or elsewhere.”

Municipal legislation and guidelines are superseded by the *Aggregate Resources Act*, due to Section 66(1) in the Act, which states:

“This Act, the regulations and the provisions of licences and permits and site plans apply despite any municipal by-law, official plan or development

agreement and, to the extent that a municipal by-law, official plan or development agreement deals with the same subject-matter as this Act, the regulations or the provisions of a licence or permit or a site plan, the by-law, official plan or development agreement is inoperative.”

2.0 Planning Justification Report and Summary Statement

2.1 Study Purpose

A Planning Justification Report is a required component of many development applications, including aggregate applications, to provide the background context of a proposal and establish a professional planning rationale. The Planning Justification Report must demonstrate how a proposal conforms to planning legislation and planning policy documents and aligns with community needs.

A Summary Statement is a required component of some aggregate applications (applications for a Class A licence, Class B licence, aggregate permit, or wayside permit) to provide an overview of planning and land use considerations regarding the subject site and surrounding locations, as well as a summary of completed technical reports.

2.2 Scope

A Planning Justification Report must be completed by the proponent and submitted to the Town of Caledon as part of an aggregate-related *Planning Act* application (e.g., Official Plan Amendment and/or Zoning By-law Amendment application). The level of detail and information requested is outlined in Section 2.4.

A Summary Statement must be completed by the proponent and submitted to the Ministry of Natural Resources as part of an application under the *Aggregate Resources Act* for a Class A licence, Class B licence, aggregate permit, or wayside permit.

A Planning Justification Report and Summary Statement can be provided in the same report to the Town of Caledon as part of an aggregate-related Official Plan Amendment and/or Zoning By-Law Amendment application.

2.3 Provincial Standards

Planning Justification Report

The *Planning Act* provides municipalities the authority to require a Planning Justification Report as part of development applications.

Section 22(4) and Section 22(5) allows a municipal council to request information and/or material to inform a decision on an application.

Planning Act

22(4) A person or public body that requests an amendment to the official plan of a municipality or planning board shall provide the prescribed information and material to the council or planning board.

22(5) Subject to the regulations, a council or a planning board may require that a person or public body that requests an amendment to its official plan provide any other information or material that the council or planning board considers it may need, but only if the official plan contains provisions relating to requirements under this subsection.

With respect to Section 22(5) of the *Planning Act*, Section 27.2 of the Future Caledon Official Plan, “Complete Application Requirements,” outlines the submission of a Planning Justification Report as a required component of a complete application for Official Plan Amendments and Zoning By-Law Amendments.

The Planning Justification Report must demonstrate that the application conforms to applicable planning legislation and policy, including:

- *Planning Act*
- *Aggregate Resources Act*
- Provincial Planning Statement (2024)

- *Niagara Escarpment Plan* (2017) and the *Niagara Escarpment Planning and Development Act*
- *Greenbelt Plan* (2017)
- Future Caledon Official Plan (2025)
- Town of Caledon Comprehensive Zoning By-Law 2006-50
- Region of Peel Official Plan (2022)

Summary Statement

Section 1 of the Government of Ontario's Technical Reports and Information Standards (2020) document outlines the requirements of a Summary Statement, based on the type of application. The content and depth of the Summary Statement depend on which type of application is being filed (i.e., Class A licence, Class B licence, aggregate permit, or wayside permit).

2.4 Content/Methodology

Planning Justification Report

This section outlines the general requirements, layout, and information that is to be part of a Planning Justification Report. However, the Report must also address the points identified as part of pre-consultation process with the Town, which may vary depending on the application.

The Report shall be prepared in a manner that meets *Accessibility for Ontarians with Disabilities Act* standards and must be able to be downloaded and printed.

Introduction

This section will provide a detailed description of the proposed development and include major features or attributes, such as the size of the operation, proximity to other land uses, Natural Heritage Features, natural hazards, design, and parking. It should outline what technical studies were requested and completed as part of the application and include a description of the approvals required as part of the application process.

This section should also provide application details (e.g., date of the pre-consultation meeting and the legal description of the land).

Site Description and Context

This section will provide a description of the local context (e.g., built form, local character, nearby land uses), existing site conditions (e.g., potential contamination, topography human constraints, natural constraints, natural features, as well as the existing use of the site), transportation network, Natural Heritage System, and the history of the site. A thorough description of the quality and quantity of aggregate resources available on the site is also required.

Policy and Regulatory Context

This section must demonstrate how the proposal is consistent with all applicable planning legislation, including (but not limited to):

- *Planning Act*
- *Aggregate Resources Act*
- Provincial Planning Statement (2024)
- *Niagara Escarpment Plan* (2017) and the *Niagara Escarpment Planning and Development Act*
- *Oak Ridges Moraine Conservation Plan* (2017)
- *Greenbelt Plan* (2017)
- Future Caledon Official Plan (2025)
- Town of Caledon Comprehensive Zoning By-Law 2006-50

Planning Act and Provincial Planning Statement (2024)

Reference and quote exact policies from the *Planning Act* and the Provincial Planning Statement and include rationale as to how these policies are addressed by the proposal.

Future Caledon Official Plan (2025) and Comprehensive Zoning By-law 2006-50

Reference and quote exact policies from Future Caledon Official Plan (2025) with respect to the Plan's vision, goals, and planning principles. Reference any applicable master plans or secondary plans, environmental policies, and heritage policies and include rationale as to how these policies are addressed by the proposal.

Provide an overview of the current Official Plan and Zoning By-law designations for the site, permitted/prohibited uses, and relevant development standards. Describe areas of non-compliance in the proposal and why the policies cannot be met.

Fiscal Impact Assessment

Provide the anticipated licence fees and annual royalty fees for the Town, as well as the estimated change in property taxes and estimated net-new jobs created from the operation.

Demonstrate that there will be no public costs associated with the proposal, rehabilitation, and ongoing monitoring requirements.

If there will be public costs, outline them and provide an in-depth explanation regarding the nature of the costs and why they cannot be avoided.

2.5 Additional Town Questions

Regarding the Summary Statement, the Town of Caledon may ask applicants to provide additional information as to:

- How the Manual guidelines have been applied and used, with respect to each requested supporting study, as part of their proposed mineral aggregate operation application.
- What additional public engagement has occurred, or is to occur, beyond *Aggregate Resources Act* requirements.



Regarding the Planning Justification Report, the Town of Caledon may ask applicants:

- There are Community Liaison groups, or other community operator partnership models, where mineral aggregate operational matters are reviewed and discussed. Is such a group going to be established for the proposed application?
- Data sharing between the Town and applicants is important for a transparent planning process. What data sources and inputs were used throughout each study? Is the data publicly available (without relying on Ministry data transfers)?
- Have the financial impacts and benefits to the Town of Caledon been quantified? How does that balance out associated costs?

3.0 Air Quality and Noise

3.1 Study Purpose

The Land Use, Air Quality and Noise Study is required by the Province of Ontario as part of the application process for new or expanded aggregate quarries. Its purpose is to evaluate the compatibility of the proposed mineral aggregate operation and its potential uses with surrounding land uses, and to demonstrate how adverse effects will be minimized throughout appropriate design, buffering, and operational controls.

In doing so, the Study will demonstrate how:

1. The proposed use and potential after uses will be compatible with surrounding land use.
2. Potential impacts to a receptor will be minimized during and post extraction.
3. Potential adverse effects will be prevented through design, buffering, and/or separation.

In more detail, the Study will:

- a) Document those factors that need to be considered in making a determination on land use compatibility.
- b) Identify a strategy to minimize the impacts of the proposed development on surrounding land uses.
- c) Identify appropriate buffers from environmental features and existing surrounding land uses to ensure compatibility with natural features and surrounding land uses.
- d) Identify potential sources and receivers of noise, vibration, and dust resulting from the proposed development.
- e) Develop a strategy to minimize impacts and prevent adverse effects through site design and operation timing.

Section 8.3 of Future Caledon solidifies the basis of the Land Use Compatibility Study, as Policy 8.3.1 states:

“Major facilities and sensitive land uses will be planned and developed to avoid, or if avoidance is not possible, to minimize and mitigate any potential adverse effects from odour, noise, and other contaminants, minimize risk to public health and safety and to ensure the long-term operational and economic viability of major facilities in accordance with provincial guidelines, standards and procedures.”

3.2 Scope

The Land Use Compatibility (LUC) assessment will follow the guidance in the Land Use Compatibility documents ([D-1](#) and [D-6](#)) by the Ministry of the Environment, Conservation and Parks (MECP).

LUC studies examine the emissions from a facility and decide whether it is possible that those facilities will have an adverse effect on the neighbours. The LUC guidelines provide distances, outside of which an impact is not expected. These distances are conservative, so adverse effects are unlikely outside those distances.

Inside those distances, there could be an impact, so a more detailed assessment must be prepared to determine whether there will be an adverse effect or not. Therefore, if a neighbour to an aggregate facility is within the Potential Influence Area (PIA) of the property line of the proposed mineral aggregate operation, the LUC must recommend an Air Quality Impact Assessment (AQIA) and Noise Impact Assessment (NIA). If the LUC recommends an AQIA and NIA, those assessments must accompany the LUC for it to be considered complete.

The studies (LUC, AQIA, and NIA) must be prepared by people who are experienced and competent to prepare them. In Ontario, these reports are typically prepared by engineers who specialize in AQIAs and NIAs.

3.3 Provincial Standards

The process for approving mineral aggregate operations is established by the Province and the Ministry of Natural Resources, and the Province is responsible for decisions on aggregate applications. Per the *Aggregate Resources Act*, in considering whether a licence should be issued, the Minister will consider criteria such as the effect of the mineral aggregate operation on nearby communities, the effect of the operation of the pit or quarry on the environment, and the comments provided by the municipality. The consideration of air quality is defined as being part of the environmental considerations.

The LUC, AQIA, or NIA to be prepared by the applicant should demonstrate to the Town of Caledon how the proposed mineral aggregate operations comply with Provincial policy objectives to protect public health, safety, environmental, and economic impacts from new development.

Provincial policies that are relevant to the LUC, AQIA, or NIA are referenced in the Provincial Standards section below. Specific policies that address mineral aggregate operations and Air and Noise Quality impacts are shown below (noting that proponents shall independently review the PPS (2024) and all relevant Provincial documents for up-to-date policies).

Provincial Planning Statement (2024)

2.9 Energy Conservation, Air Quality and Climate Change

1. Planning authorities shall plan to reduce greenhouse gas emissions and prepare for the impacts of a changing climate through approaches that:
 - d) promote green infrastructure, low impact development, and active transportation, protect the environment and improve air quality.

3.5 Land Use Compatibility

1. Major facilities and sensitive land uses shall be planned and developed to avoid, or if avoidance is not possible, minimize and mitigate any potential adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term operational and economic viability of major facilities in accordance with provincial guidelines, standards and procedures.
2. Where avoidance is not possible in accordance with policy 3.5.1, planning authorities shall protect the long-term viability of existing or planned industrial, manufacturing or other major facilities that are vulnerable to encroachment by ensuring that the planning and development of proposed adjacent sensitive land uses is only permitted if potential adverse affects to the proposed sensitive land use are minimized and mitigated, and potential impacts to industrial, manufacturing or other major facilities are minimized and mitigated in accordance with provincial guidelines, standards and procedures.

Niagara Escarpment Plan (2017)

- 2.9.1. In addition to all other relevant policies of this Plan, proposals for mineral aggregate operations including wayside pits and quarries, accessory uses, accessory facilities and haul routes shall:
 - g) minimize negative impacts of mineral aggregate operations and their accessory uses on surrounding land uses.

O. Reg. 1/17 (Under the Environmental Protection Act, Registrations Under Part 11.2 of the Act – Activities Requiring Assessment of Air Emissions)

29. (1) For the purposes of clause 20.21 (1) (c) of the Act, a person who engages in an activity prescribed by section 2 of this Regulation shall ensure that the following requirements are complied with if the most recent EASR ESDM report in respect of the facility at which the person engages in the activity identifies a source of fugitive dust:

1. At all times when engaging in the activity, a best management practices plan for fugitive dust control in respect of the facility that meets the requirements in subsection (2) must be available at the facility.
2. The plan must be implemented in accordance with its contents.

The LUCs are to be prepared following the MECP's D-1 and D-6 guidelines.

AQIAs are to be prepared according to the Provincial standard for preparing Air Quality Impact Assessments for Environmental Assessments (EAs). The modelling requirements are provided in the Air Dispersion Modelling Guideline for the Province of Ontario (ADMGO).

NIAs are to be prepared following the Provincial standard for preparing Noise Impact Assessments for Environmental Assessments (EAs). The modelling requirements are provided in the "Environmental Noise Guideline – Stationary and Transportation Source – Approval and Planning" (NPC-300).

O. Reg. 419/05 (Air Pollution – Local Air Quality)

49. Except for heat, sound, vibration or radiation, no person shall,
 - a) construct, alter, demolish, drill, blast, crush or screen anything or cause or permit the construction, alteration, demolition, drilling, blasting, crushing or screening of anything so that a contaminant is carried beyond the limits of the property on which the construction, alteration, demolition, drilling, blasting, crushing or screening is being carried out; or
 - b) sandblast or permit the sandblasting of anything so that a contaminant is emitted into the air, to an extent or degree greater than that which would result if every step necessary to control the emission of the contaminant were implemented.

3.4 Content/Methodology

The Report will provide the results of the investigative process below.

Identify Sensitive Receptors

Determine whether the Aggregate facility will be a Class II or Class III facility.

Prepare a table listing the sensitive receptors within 300 m of the proposed aggregate facility.¹ The table should include address, distance measured property line to property line, and an indication of whether the sensitive receptor is inside the Minimum Separation Distance (MSD) or the Potential Influence Area (PIA).² If there are no sensitive receptors in a direction (North, South, East, or West) within 300 m, the nearest sensitive receptor in that direction should be identified and the table should indicate that it is outside both the MSD and the PIA.

If any sensitive receptor is located within 300 m of the proposed aggregate facility, the LUC should recommend both an AQIA and a NIA. Note that the Class II MSD is 70 m, but noise and dust impacts from aggregate facilities are frequently felt outside 70 m, so the report should be prepared using 300 m regardless of whether that distance is the PIA or the MSD for the facility.

Prepare Air Quality Impact Assessment (AQIA)

The AQIA should be prepared following the typical methodology for preparing an AQIA for an EA in Ontario. Note that these reports use the Canadian Ambient Air Quality Standards (CAAQS) and the Ontario Ambient Air Quality Criteria (AAQC). The assessment should include dust: particulate matter less than 44 µm in diameter (PM₄₄),

¹ Note that 300 m is the PIA for a Class II facility and the MSD for a Class III facility. Dust and noise impacts are not often experienced over 300 m from an aggregate facility; however, if the facility is expected to be a Class III facility, then justification should be provided that 300 m is an acceptable distance to assess.

² The MSD is the distance inside which a detailed assessment is required if the facility emits that contaminant (dust, odour, noise or vibration). The PIA is the distance inside which a detailed assessment may be required if the facility emits that contaminant (dust, odour, noise or vibration). Note that dust and noise should be assessed if any receptor is within 300 m of the aggregate facility.

fine particulate matter: particulate matter less than 2.5 µm in diameter (PM_{2.5}), and nitrogen oxides (NO_x) as a minimum.

If there is to be equipment that requires an Environmental Compliance Approval (ECA) or Environmental and Sector Registry (EASR) (collectively known as an Environmental Approval), then an Emissions Summary and Dispersion Modelling (ESDM) report should also be prepared. Note that an AQIA includes road dust while an ESDM does not. However, an ESDM must show compliance with all criteria everywhere off property, while an AQIA may show some exceedances as long as the frequency of those exceedances is assessed and found to be acceptable.

The Town will look for the AQIA to be based on a minimum of three sampling locations for ambient air monitoring, one located upwind and two downwind of the proposed operation. The downwind samples are to be located in or near existing sensitive receptors, such as residential areas. If an AQIA indicates a PM_{2.5} level less than an annual average of 5.0 µg/m³, a supplementary Air Quality Assessment shall be conducted, on a dispersion model that permits a maximum 75% mitigation rate to achieve the ambient air quality objective of a PM_{2.5} level less than an annual average of 5.0 µg/m³. Where the findings of the supplementary Air Quality Assessment indicate a mitigation rate of more than 75% is required to achieve PM_{2.5} levels less than an annual average of 5.0 µg/m³, the Application will not be by Staff supported for approval.

Prepare Noise Impact Assessment (NIA)

The EA-style NIA includes all equipment on site with significant noise emissions, which would include truck traffic, impulsive noise from tailgate closing or banging, and any on-site sorting or crushing equipment or conveyors. Note that “tailgate closing” is the sound a tailgate makes when all the material has left the truck bed and the tailgate is being secured before leaving site. “Tailgate banging” is the sound a tailgate makes when the truck moves with the tailgate open so that it will bang against the bed, causing vibrations (and loud noises) to cause the material to leave the bed. Many jurisdictions

do not support tailgate banging. This is one example of where appropriate operational design could avoid this issue.

Both the NIA and the AQIA must be prepared considering the worst-case scenario. If there are several sensitive receptors around the proposed aggregate facility, there may be more than one worst-case scenario. The AQIA and NIA must assess all of them. The worst-case scenario typically occurs when the equipment and emissions are closest to the sensitive receptor. Therefore, the worst-case scenario for one receptor is unlikely to occur during the same time or in the same place as the worst-case scenario for another receptor.

The AQIA and NIA must also consider the rehabilitation phases of the project.

3.5 Additional Town Questions

1. How has the location of the entrance to the property been selected to minimize dust or noise impacts on the neighbours?
2. Has the site plan or phasing been prepared to use existing features for as long as possible as barriers to noise or to prevent dust impacts?
3. Have stockpiles of mineral aggregates incidental to mineral aggregate extraction been limited in size, designed to be temporary, and managed to avoid dust and particle emissions?
4. How has the operation addressed Town of Caledon expectations around pollutants such as PM_{2.5}?
5. If the Town passes an air quality by-law, how has its standards been considered?

4.0 Blasting and Vibration

4.1 Study Purpose

The Blast Impact Assessment (BIA) is a Technical Study required by the Province of Ontario as part of the application process for new or expanded aggregate quarries, which encompasses a review of applicable guidelines and standards, and predictive modeling for ground vibration and air overpressure. The Study's primary purpose is to evaluate whether the potential effects of blasting can be effectively controlled to meet stringent Provincial guidelines and minimize adverse effects on people, buildings, and the natural environment, such as fisheries and spawning beds. This is demonstrated using robust scientific analysis and site-specific modelling, based on worst-case scenarios and recommended blast design parameters.

The Study will:

- a) Assess anticipated ground vibration and air overpressure associated with blasting activities;
- b) Demonstrate through scientific analysis and modeling that blasting can be conducted within Provincial limits;
- c) Identify potential receptors, including buildings, infrastructure, and natural features, such as fisheries and spawning beds; and,
- d) Recommend mitigation measures and blast design requirements to ensure public safety and environmental protection.

4.2 Scope

A BIA is required for any Class A quarry application under the *Aggregate Resources Act* involving blasting where any sensitive receptor is located within 500 m of the limit of extraction. “Sensitive receptors” are defined as any residence or facility where people may sleep—including homes, long-term care facilities, hospitals, trailer parks, campgrounds, as well as schools and childcare centres.

Preparation of the BIA must be undertaken by a qualified professional—typically a Professional Engineer (P. Eng.) or a Professional Geoscientist (P. Geo.) with relevant blasting experience and knowledge of blasting operations. They must also include a statement of qualifications preparing and reviewing the report.

A peer review of the BIA must be conducted by an independent engineering firm or consultant with no business ties to the applicant and at least five years of relevant experience. The peer review must also include a statement of qualifications of those preparing and reviewing the peer review report.

4.3 Provincial Standards

Blasting in aggregate quarries is regulated under a comprehensive framework of Provincial legislation, regulations, and technical standards.

Legislation and Regulations

Aggregate Resources Act

The Aggregate Resources Act provides management and regulation of mineral aggregate operations in Ontario. It requires that site plans and technical reports, including BIAs, be submitted and prepared to prescribed standards, and that operations minimize adverse environmental and community impacts.

Ontario Regulation 244/97

Ontario Regulation 244/97 sets out technical and procedural details relating to aggregate licence and permits. It prescribes conditions for flyrock, vibration and overpressure monitoring, time of blasting, dictates when and by whom technical reports must be prepared and reviewed, and blast monitoring reports retention time.

Environmental Protection Act

The Environmental Protection Act prohibits discharge of contaminants—including flyrock, dust, noise, and vibration—beyond property boundaries where adverse effects may occur.

Technical Standards and Guidance

Aggregate Resources of Ontario: Technical Reports and Information Standards

(2023) The Standards require BIAs for any quarry proposing to blast where a sensitive receptor is within 500 m of the limit of extraction to demonstrate that the guidelines for blast overpressure and ground vibrations can be satisfied.

NPC-119 (Model Municipal Noise Control By-Law, MECP, 1978)

The NPC-119 is a Provincial guideline for maximum allowable ground vibration (12.5 mm/s Peak Particle Velocity [PPV]) and air overpressure (128 dBL), measured at the nearest sensitive receptor. These limits are among the strictest in North America and are intended to prevent cosmetic building damage and mitigate significant annoyance or health effects.

Fisheries and Oceans Canada Guidelines (Wright and Hopky, 1998)

The Guidelines provide national standards for the use of explosives near fisheries water: 13 mm/s for ground vibration at spawning beds during spawning windows, and 100 kPa for water overpressure.

Application and Reporting Requirements

- **Mandatory Monitoring:** All quarry blasts must be monitored for ground vibration and air overpressure. Reports must be retained by the licensee for at least seven years, and made available to the municipality, Ministry of Natural Resources and Forestry (MNRF), and Ministry of the Environment, Conservation and Parks (MECP) upon request.
- **Blast Hours and Exclusion Periods:** No blasting on holidays or between 6 p.m. and 8 a.m. unless special conditions apply, and no sensitive receptor exists within 2,000 m.
- **Flyrock Containment:** Where sensitive receptors exist within 500 m, all reasonable measures must be taken to prevent flyrock from leaving the property.

This is also a firm requirement under Provincial law (O. Reg. 244/97 s.0.13(1)(28).

4.4 Content/Methodology

The core of the BIA is a detailed, site-specific technical analysis that demonstrates, using established models, that the proposed blasting operation will comply with all regulatory requirements and that impacts on sensitive receptors will be minimized. The methodology should be logical, transparent, and evidence-informed, generally incorporating the following key steps:

A. Site Characterization and Sensitive Receptor Inventory

1. Define the Blast Area and Extraction Limits: Delineate the proposed extraction boundary and blast area using site plans and topographic surveys (metric units). Clearly show limits of extraction, phases/benches, and buffer zones.

2. Map Sensitive Receptors: Accurately identify, map, and list all sensitive receptors within at least 500 m of the proposed or existing extraction area. Distances to each receptor must be reported—and updated if phased expansion changes in proximity.

3. Describe Environmental and Geotechnical Context: Summarize bedrock type, overburden depths, topography, nearby water bodies, and existing structures in and around the site.

B. Predictive Modelling of Vibration and Overpressure

1. Ground Vibration – Peak Particle Velocity (PPV):

- Use accepted empirical models to predict vibration at each receptor for various blast sizes and geometries. The most commonly used formula for predicting PPV is known as the Bureau of Mines (BOM) prediction formula or Propagation Law. This formula is used as a standard engineering tool to predict vibration levels induced by the blasting at a given distance from a source of explosion (blast) and

is also adopted by the blasting industry. For predictive calculations, the minimum distance to a receptor is used.

- If available, use and develop site-specific attenuation relationships based on blast monitoring from comparable or prior operations. These provide more reliable predictions. If site-specific data does not exist, use conservative (95th percentile) values from nearby quarries with similar geology, or published data such as the International Society of Explosive Engineers (ISEE) recommended attenuation (regression) prediction formulas.

2. Air Overpressure (Peak Sound Pressure Level):

- Factors such as climatic conditions affect overpressure levels induced by the blasting and are highly variable. Since they are not the same on a given day, predicting noise and overpressure levels based on explosive load is extremely difficult. There are, however, factors that can be controlled and observed, such as length of blast-hole collar, avoidance of blasting on an overcast day, or during temperature inversions that can minimize the impact of noise and overpressure induced by the blasting operations.
- Cube-Root Scaling Law for calculating predicted overpressure levels recommended by the ISEE for average climatic conditions, explosive confinement for overpressure suppression, and a maximum explosive quantity per delay period can be used for prediction purposes.

3. Flyrock Range Assessment:

- Evaluate flyrock risk using theoretical equations and empirical data.
 - Identify key mechanisms: face bursting, cratering, and stemming ejection.
 - Calculate maximum theoretical throw distances for given blast loads and site conditions.

4. Additional Considerations/Limits:

- If pipelines, transmission towers, water wells, or heritage buildings are within proximity, ensure that vibration limits of relevant authorities (e.g., 50 mm/s for pipelines) or structures apply.

4.5 Additional Town Questions

A key element to community engagement and reducing blasting-related complaints is maintaining a rigorous notification procedure to ensure neighbours, municipalities, and the public are informed about upcoming blast schedules and safety measures. Multiple methodologies may be prudent depending on location and community preference, including signage around the site, email, phone call/voicemail, text, or physical letter to each sensitive receptor within 500 m of the limit of extraction. Further, Town Staff will ask how blasting will be reported and if there will be a notification procedure in place for blasting-related incidents if they were to occur. To that end, the Town requests that the blast impact assessment clearly demonstrates how flyrock shall be contained within the subject site, and that vibration monitoring is provided at the property lines of mineral aggregate extraction operations when using blasting.

The Town will enquire whether the blast design report, flyrock management plan, and vibration management plan were prepared by an experienced and qualified Blaster or Blasting Engineer, as well as whether the person designing a blast and the person carrying out a blast will be an experienced and qualified Blaster or Blasting Engineer.

There may be locations in the Town where blasting is inappropriate under any circumstance. The presence of sensitive uses shall be considered in determining if blasting is the best measure for extracting mineral aggregate resources, or if reduced blast intensity is appropriate.

5.0 Closure, Rehabilitation, and Importation of Excess Soil Backfill

5.1 Study Purpose

The Closure, Rehabilitation, and the Importation of Excess Soil Backfill Study is a Technical Study required by the Province of Ontario as part of the application process for new or expanded aggregate quarries. The purpose of the Closure, Rehabilitation, and Importation of Excess Soil Backfill Study is to assess the long-term management of the pit or quarry following resource extraction, including the proposed use of the void space, rehabilitation activities, and the importation of excess soil. The Study evaluates the physical, environmental, and geotechnical implications of the Closure Plan and identifies measures to ensure the site is restored to a geotechnically stable and environmentally protective condition.

Applications for a licence under the *Aggregate Resources Act* include a Closure Plan detailing how the pit will be managed once the resource is exhausted. This often involves some type of rehabilitation to ensure the site is geotechnically stable and in an environmentally protective condition. This frequently includes the importation of fill material to stabilize slopes and the addition of topsoil and establishment of vegetation. Once minimum standards of physical and environmental conditions are confirmed, the licence could be surrendered to end MNR oversight.

Near the Greater Toronto Area, the potential to use the void space as a repository for excess soil has significantly changed the potential risk and impact of Closure Plans.

The closure and rehabilitation of a mineral aggregate operation through the importation of excess soil must be considered a significant component of the overall impact of the lifespan of the pit.

Closure, rehabilitation, and importation of excess soil backfill will involve environmental and other impacts that differ from the effects of aggregate extraction. For example, the

hydrogeological impacts and monitoring related to the excavation and removal of natural in situ aggregates will be significantly different than the potential impacts and risks involved with the backfilling of the void space with imported excess soil from various locations.

The goals and objectives of the Study must consider the impact of the proposed Closure Plan to address issues not considered during the aggregate extraction period of operations.

Proposing a minimal closure plan without reference to the potential future use of the void space is not an acceptable practice.

5.2 Scope

Closure, rehabilitation, and importation of excess soil backfill must be considered as part of the preparation of a Closure Plan at the time of the licence application or at the time of a Significant Amendment for an existing licenced operation.

If it is located within current or future economical trucking distance of potential excess soil generation sources such as the GTA with subway, condominium, and development projects, the potential for the void space in the pit or quarry to be utilized for the beneficial reuse of excess soil should be considered. Provincial policy of reuse and recycling in a circular economy cannot be ignored during pit planning.

A multidisciplinary team will be required for the Closure, Rehabilitation, and Importation of the Excess Soil Backfill study as there are a range of potential impacts from the rehabilitation, as well as the fact that it could extend the active period of the operation by many years to decades.

The work should include:

- Hydrogeology
- Surface water
- Site planning
- Transportation
- Social impacts
- Noise
- Air quality
- Vibration
- Ecology

The focus is on the post-aggregate production activities, and in particular the activities that differ from the aggregate production, such as the impact of the importation of excess soil.

These studies should be peer reviewed at the time of initial *Aggregate Resources Act* application and include the commitment for further peer review as the details of the plans are amended to reflect updated goals and legislative changes that may occur during the operational phase of extraction.

5.3 Provincial and Federal Laws, Policies, Regulations, Standards

The current Provincial and Federal laws, policies, regulations, and standards, as well as industry's best management practices must be referenced when developing closure, rehabilitation, and importation of excess soil backfill studies and planning.

The following key legislation and BMP's must be referenced:

Laws

The *Environmental Protection Act* establishes a framework for environmental protection in Ontario. It covers various aspects, including air and water quality, waste management, and the regulation of contaminants. This *Act* empowers the government to set standards and enforce compliance to mitigate adverse environmental impacts.

The Aggregate Resources Act is the primary legislation in Ontario that regulates the extraction of aggregate resources, which include materials such as sand, gravel, clay, and stone. This *Act* aims to balance the need for these resources with environmental protection and community interests.

Regulations

Ontario Regulation 406/19, On-Site and Excess Soil Management made under the Environmental Protection Act

Ontario Regulation 406/19 regulates the management of excess soil in alignment with other regulations, including Ontario Regulation 153/04 and Ontario Regulation 347.

Referenced by Regulation

Rules for Soil Management and Excess Soil Quality Standards, Ministry of Environment Conservation and Parks (MECP, 2024)

This standards document is referenced in Ontario Regulation 406/19. It provides a set of soil quality tables for various land uses and site conditions and outlines the use of the Beneficial Reuse Assessment Tool (BRAT) and Risk Assessment.

MECP Best Management Practices and Supporting Documents

Management of Excess Soil – A Guide for Best Management Practices MECP

(2014) This document sets out expectations for all those managing soil and encourages the beneficial reuse of excess soil in a manner that promotes sustainability and the protection of the environment.

The Excess Soil Policy Framework, MECP (2016)

This framework document outlines the management of excess soil in a responsible way that is integral to building sustainable communities.

Rationale Document for Development of Excess Soil Quality Standards, MECP

(2019) This document provides the scientific derivation process to develop the Excess Soil Quality Standards.

Federal Guidelines

Excess Soil Reuse Guidance, **The Canadian Council of Ministers of the Environment (CCME, 2025)**

This guidance document highlights the beneficial reuse of excess soil.

Industry Best Management Practices and Supporting Documents

- ***Scientific Report, Beneficial Reuse of Excess Soil at Aggregate Pits and Quarries***, Ontario Society of Professional Engineers, 2021.
- ***Best Management Practices for Aggregate Pit and Quarry Rehabilitation in Ontario***, Ontario Society of Professional Engineers, 2021.
- ***Excess Soil Guidance for Aggregate Producers***, Ontario Stone, Sand and Gravel Association (OSSGA), 2021.

In addition, other relations such as *Ontario Regulation 153/04* may be applicable in certain circumstances, such as the need to file a Record of Site Condition and the completion of the rehabilitation prior to a more sensitive final land use.

5.4 Content/Methodology

The Closure, Rehabilitation, and Importation of Excess Soil Backfill study should be conducted by the applicant's consulting team, recognizing the multidisciplinary potential impacts from the rehabilitation and that it could extend the active period of the pit by many years to decades.

The study should include:

- Hydrogeology – To evaluate the impacts of potential importation and placement of excess soil of differing physical and chemical quality than the aggregate that

was extracted. A new monitoring network would be required to evaluate the potential impacts and long-term monitoring of the impact of backfilled materials.

- Traffic – To evaluate the different traffic patterns created by trucking excess soil from various locations to the site.
- Noise – Truck traffic and on-site management of materials will generate a different noise signature than aggregate extraction, including tailgate banging.
- Nuisance impacts – Impacts such as dirt and mud on roads, increased road shoulder, and ditch maintenance are common issues. Excess soil importation will generate a distinct set of nuisance impacts from aggregate extraction, which must be taken into consideration.
- Social Impacts – The backfilling rehabilitation stage operates with a different business focus than aggregate extraction, including fee structure and payments to the Town of Caledon. Business requirements change after extraction with changes to staff, equipment, and socioeconomic circumstances that will impact the community.
- Timing – An excess soil backfill rehabilitation program will extend the active period of site operations well beyond extraction, and the long-term timing implications for the local area must be considered.
- Excess Soil Quality – The management of the backfilled excess soil must be conducted in accordance with the requirements of Ontario Regulation 406/19 and the referenced Rules for Soil Management and Excess Soil Standards. A Fill Management Plan for the site prepared by a Qualified Person will be required.
- Registration with Resource Productivity and Recovery Authority (RPRA) – RPRA is the regulator mandated by the Government of Ontario to enforce the Province's circular economy laws. Any excess soil receiving site exceeding 10,000m³ must register with RPRA and have a Qualified Person engaged.
- Rehabilitation Planning – To demonstrate how the site will be rehabilitated to a land use that is compatible with the land use of the area and in conformity with Provincial, Regional and Caledon policy.

- Rehabilitation Monitoring – Identify requirements for monitoring and rehabilitation to ensure that the rehabilitation of the site is consistent with the requirements of applicable policy documents. Monitoring to be conducted in accordance with Best Management Practices and regulations for the proposed end use.
- Record of Site Condition – Should the final land use following the closure rehabilitation program by backfilling with excess soil be considered a more sensitive land use in accordance with Ontario Regulation 153/04, there may be the regulatory requirement to file a Record of Site Condition. This would have to be conducted by a Qualified Person.

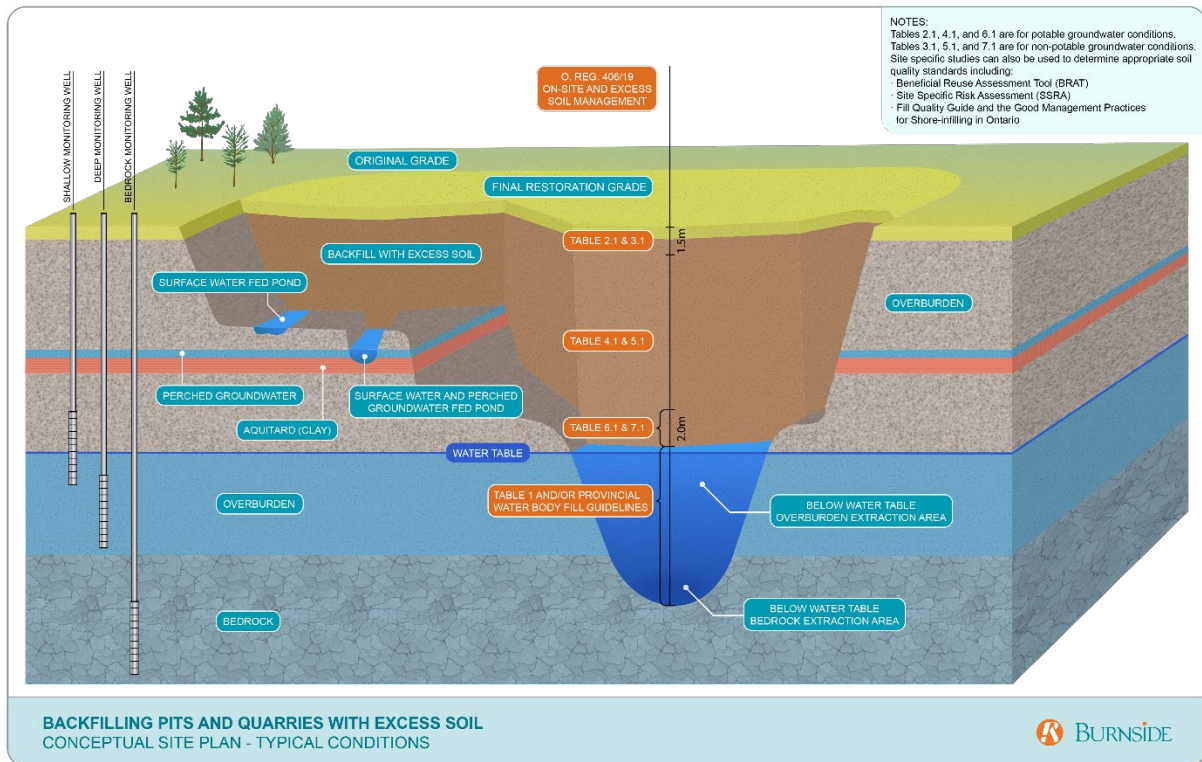


Figure 1: Backfilling Pits and Quarries with Excess Soil Conceptual Site Plan (with Typical Conditions). For an accessible description, see Appendix A: Extended Descriptions for Complex Images.

5.5 Additional Town Questions

If a fill or site alteration by-law applies in the Town, the Town may ask questions as to how its parameters, standards, or measures are reflected in the proposal.

Based on the review of an application and the closure, rehabilitation, and importation of excess soil backfill, the Town of Caledon may ask applicants to provide additional information to support the implementation of mitigation measures and/or support community engagement regarding the application, including:

1. How can the risks of the importation of excess soil from outside of the Town be avoided (which is the Town's preference, but if not avoided, then minimized or mitigated where allowed by the PPS 2024)?
2. How can the traffic impacts for backfilling former pits be avoided (which is the Town's preference, but if not avoided, then minimized or mitigated where allowed by the PPS 2024)?
3. How can the risk to groundwater, residents, and the environment by backfilling former pits with excess soil be avoided (which is the Town's preference, but if not avoided, then minimized or mitigated where allowed by the PPS 2024)?
4. When will the closed site be considered fully rehabilitated?
5. How does final rehabilitation compare with pre-extraction conditions and integrate with the post-rehabilitation environmental conditions of the surrounding area that may have changed from pre-extraction conditions?
6. How will security deposits and insurance coverage (such as pollution liability insurance) be updated when the site switches to a higher environmental risk phase of fill importation?

6.0 Cultural Heritage Resources

Significant cultural heritage resources can be understood as *built heritage resources*, *cultural heritage landscapes*, and *archaeological resources* that have been determined to have cultural heritage value or interest for the important contribution they make to our understanding of the history of a place, an event, or a people. The Province has established processes and criteria for determining cultural heritage value or interest under the authority of the *Ontario Heritage Act* and has prepared guidance documents to assist in the identification and evaluation of cultural heritage resources. These include the [Ontario Heritage Tool Kit](#), and the [Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes – A Checklist for the Non-Specialist](#).

Cultural heritage, as a matter of national, Provincial, and Indigenous interest, must be addressed as part of aggregate resource projects. This includes areas to be used for temporary storage, staging, and work. The Province of Ontario has established specific requirements for cultural heritage projects under the *Aggregate Resources Act*, which shall be discussed below. Within the Town of Caledon, these have been augmented by municipally specific requirements for application types falling under its jurisdiction, such as *Planning Act* and *Ontario Heritage Act* matters. If an application is considered both by the Province of Ontario and by the Town of Caledon, applicants should confirm the specific requirements of each, as there can be differences between judications. Some of these will be outlined below.

Built Heritage Resource: means a building, structure, monument, installation, or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community. (PPS 2024).

Cultural Heritage Landscape: means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or

interest by a community, including an Indigenous community. The area may include features such as buildings, structures, spaces, views, archaeological sites, or natural elements that are valued together for their interrelationship, meaning, or association. (PPS 2024).

Archaeological Resources: includes artifacts, archaeological sites, and marine archaeological sites, as defined under the *Ontario Heritage Act*. The identification and evaluation of such resources are based upon archaeological assessments carried out by archaeologists licenced under the *Ontario Heritage Act*. (PPS 2024)

Cultural heritage value or interest means:

- (1) for archaeological resources, the cultural heritage value or interest of any archaeological resource as determined in accordance with the Standards and Guidelines for Consultant Archaeologists (2011 or as updated), and
- (2) for built heritage and cultural heritage landscapes,
 - (i) the cultural heritage value or interest of a property as determined in accordance with [Ontario Regulation 9/06](#) under the *Ontario Heritage Act* or
 - (ii) in respect of properties of provincial significance, as determined in accordance with [Ontario Regulation 10/06](#) under the *Ontario Heritage Act*. (Government of Ontario)

6.1 Study Purpose (Applications Under the *Aggregate Resources Act*)

For applications under the *Aggregate Resources Act*, a Cultural Heritage Report must be prepared. The report must be consistent with Provincial requirements under the *Ontario Heritage Act* and the Provincial Planning Statement, 2024. Cultural heritage resources present within or near the proposed aggregate licenced/permited area must be identified prior to mineral aggregate operations, and, if applicable, protected during mineral aggregate operations to prevent or mitigate any potential negative impacts.

The purpose of a Cultural Heritage Report is to assess potential impacts of the proposed mineral aggregate operations on cultural heritage resources, and how they will be prevented or mitigated during operations. The report must address archaeological resources, as well as built heritage resources/cultural heritage landscapes.

The Study will:

- a) Identify cultural heritage resources within the project area and associated temporary uses areas (e.g., staging, storage, and work areas);
- b) Where necessary, evaluate cultural heritage value or interest using Provincial criteria, including O. Reg. 9/06, O. Reg. 10/06, and the Standards and Guidelines for Consultant Archaeologists;
- c) Determine whether the project may impact identified resources, including built heritage features, cultural heritage landscapes, or archaeological sites; and,
- d) Recommend appropriate mitigation, conservation strategies, or further assessments, as required by the *Aggregate Resources Act* and municipal requirements.

6.2 Archaeological Resources

Archaeology is regulated by the Ministry of Citizenship and Multiculturalism. Archaeological assessments can only be prepared by an archaeologist who is licenced under the authority of the *Ontario Heritage Act*. A list of Provincially Licenced Archaeologists is available on the [Province of Ontario website](#). Licenced archaeologists can also be found through professional organizations such as the [Association of Professional Archaeologists](#) and the [Canadian Association of Heritage Professionals](#). Archaeological studies and fieldwork must be completed in accordance with the Province's [Standards and Guidelines for Consultant Archaeologists](#) (2011), Provincial guidance documents, as well as the Provincial policy for Cultural Heritage Reports.

The Town of Caledon has developed an archaeological management plan, which includes the mapping of known archaeological sites and areas of archaeological potential. This mapping should be examined in advance of any application to determine any areas requiring archaeological assessment. Information regarding up-to-date mapping and questions about the archaeological management plan should be directed to the Town's Heritage Planning Staff.

The Cultural Heritage Report must include the following information for archaeological resources:

- Any archaeological assessment report(s), prepared according to the Standards and Guidelines for Consultant Archaeologists (2011 or as updated).
- If applicable, a letter from the Ministry of Citizenship and Multiculturalism that:
 - Confirms the archaeological assessment reports were submitted satisfactorily, and added to the Provincial register; and,
 - Endorses the Consultant Archaeologist's recommendations, including any recommendations for avoidance and protection.

6.3 Provincial Standards

The Province of Ontario requires two standard archaeological conditions for all aggregate site plans. These are:

- **Standard Discovery Clause:** If archaeological resources are discovered during mineral aggregate operations, then the aggregate operator must immediately cease any activities which may alter the resource, or site of the discovery, and engage a licenced Consultant Archaeologist to carry out an archaeological assessment.
- **Human Remains Discovery:** If human remains are discovered during mineral aggregate operations, then, per the *Funeral, Burial and Cremation Services Act*, the person who discovered the remains must immediately cease all activities and notify the police or coroner. If the discovered human remains are determined to

be associated with archaeological resources, then the aggregate operator must immediately cease any activities which may alter the remains and the site of their discovery and notify the Ministry of Citizenship and Multiculturalism.

6.4 Initial Built Heritage/Cultural Heritage Landscape Screening

Potential aggregate projects need to address possible impacts on built heritage resources and/or cultural heritage landscapes. As part of this process, applicants must download and complete the Province of Ontario's [Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes – A Checklist for the Non-Specialist form](#) to identify any known or potential resources. This checklist can be completed by a non-specialist. However, if the results show there are known or potential built heritage resources or cultural heritage landscapes in the area, the applicant must hire a Qualified Person to complete any further studies.

Qualified Person (QP): means an individual having relevant, recent experience in the conservation of cultural heritage resources. The Town of Caledon has identified specific requirements for Qualified Persons within its Terms of Reference for Heritage Impact Assessments.

The Town of Caledon has several resources that can assist with completing this checklist. The location of heritage properties can be found on the Town's [Online Heritage Register](#). The Town has also completed a [Cultural Heritage Landscape Study](#) and has [a heritage conservation district in Bolton](#). Applicants are encouraged to contact Heritage staff to confirm if there are other possible resources relating to their project location. The [Caledon Heritage Foundation](#) has also developed a list of local resources on its website that may assist with this identification process.

6.5 Cultural Heritage Evaluation Report (CHER)

If there are potential built heritage resources and/or cultural heritage landscapes within the proposed project area or known resources that do not have an updated statement of cultural heritage value or interest in accordance with current provincial requirements (including existing s. 27 Part IV OHA “Listed” and s. 29 Part IV OHA Designated properties), a Cultural Heritage Evaluation Report (CHER) must be completed. Known resources may also need to be re-evaluated to confirm if there is cultural heritage value or interest of Provincial significance. The purpose of the CHER is to inventory and evaluate these resources. There are specific requirements that must be included within this report:

- The report must contain sufficient information to understand the proposed licenced/permitted area;
- The report must provide a record of the evaluation process and document the results of the evaluation. The evaluation must consider whether these resources have cultural heritage value or interest. Cultural heritage value or interest is determined in accordance with Ontario Regulation 9/06 under the *Ontario Heritage Act* and/or as a property of provincial significance in accordance with Ontario Regulation 10/06 under the *Ontario Heritage Act*; and,
- If the site is found to be of cultural heritage value or interest, then the Cultural Heritage Evaluation Report must include a draft Statement of Cultural Heritage Value which describes the attributes that need to be conserved/protected. The Statement of Cultural Heritage Value must include a brief description of the property and its cultural heritage value, and a description of the heritage attributes.

6.6 Heritage Impact Assessment

If there are *protected heritage properties* or a completed CHER identifies properties that meet the Provincial criteria for cultural heritage value or interest, a Heritage Impact Assessment (HIA) must be completed.

The HIA, which must be prepared by a Qualified Person, must identify potential impacts from the proposed operations and recommend options and mitigation measures to reduce negative impacts and conserve any cultural heritage value or interest present. Applicants should contact the Ministry of Citizenship and Multiculturalism to confirm specific requirements for any HIA in advance of preparation.

Cultural Heritage Report Requirements

The Cultural Heritage Report must include the following information regarding built heritage resources and/or cultural heritage landscapes:

- A completed copy of the Province of Ontario's Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes – A Checklist for the Non-Specialist;
- Any Cultural Heritage Evaluation Report(s) (as necessary); and/or
- Any Heritage Impact Assessment Report(s) (as necessary).

6.7 Additional Town Questions

In addition to the requirements of the Province of Ontario, the Town of Caledon has its own expectations that need to be considered for applications under its jurisdiction.

6.7.1 Properties Designated under the Ontario Heritage Act

If the site of a proposed aggregate project is located on a property designated under the *Ontario Heritage Act*, Town of Caledon Heritage Staff must be contacted to confirm any requirements. The location for these properties and the Town's requirements for *Ontario Heritage Act* applications can be found on the [Town of Caledon website](#).

6.7.2 Archaeological Resources

In addition to the Town of Caledon's Archaeological Management Plan, the Town has also developed [Terms of Reference \(TOR\) for Archaeological Assessments](#). If an aggregate project requires any of the following and falls within an area of archaeological potential, an archaeological assessment will be required. Town of Caledon Heritage Staff should be contacted to confirm requirements.

- Official Plan Amendment;
- Zoning By-law Amendment;
- Plans of Subdivision/Condominium;
- Site Plan Control; and,
- Consent and/or Minor Variance applications (as required).

6.7.3 Built Heritage Resources/Cultural Heritage Landscapes

The Town of Caledon has developed Terms of Reference for Heritage Impact Assessments (HIA). Applicants must ensure that any HIA submitted to the Town addresses these requirements, which may be different from those of the Province of Ontario. Applicants should confirm that they have the most recent version of any Terms of Reference. Applicants should also review the Town's current Official Plan to confirm any specific heritage planning requirements. Proponents must contact Town Staff for a copy of the document.

7.0 Ecology and Natural Heritage

The Town of Caledon contains some of the most ecologically rich and environmentally sensitive landscapes in southern Ontario. Its natural heritage system is shaped by major Provincial planning frameworks, including the Oak Ridges Moraine, Niagara Escarpment, and Greenbelt, which together protect extensive forests, water resources, wildlife habitat, and geological formations.

Key features that need to be considered as part of ecological studies supporting aggregate extraction and operations include, but are not limited to:

- Significant Woodlands
- Habitat of Threatened and Endangered Species
- Credit and Humber River subwatersheds, wetlands, and groundwater systems
- Sensitive fish habitat (i.e., Brook Trout populations)
- Other key natural heritage features identified through subwatershed and natural heritage system studies

7.1 Study Purpose

The purpose of an Environmental Impact Study (EIS) is to ensure that a proposed aggregate extraction project does not negatively affect natural heritage features or their ecological functions and to demonstrate conformity with the applicable policies. It aims to show that the project can proceed while minimizing environmental impacts, and maintaining or improving the diversity, connectivity, and long-term ecological health of the natural heritage system. Specifically, within the Niagara Escarpment Plan (NEP) area, the proposal must demonstrate compatibility with the surrounding natural environment and contribute to preserving the Escarpment as a continuous natural landscape. The requirements of other Provincial policy documents, including the Provincial Planning Statement (2024) and the Greenbelt Plan (2017), need to be considered.

The general objectives of an EIS are to identify natural heritage features that could be affected by the project, analyze their ecological connections, and assess potential impacts of the project. This is typically achieved through the completion of multiseasonal field studies which are to be scoped at the outset of project initiation with the Town of Caledon. Through field study and collaboration with other disciplines (notably surface water and groundwater specialists), the EIS seeks to determine necessary mitigation and monitoring measures to minimize environmental impacts, evaluate the potential for environmental improvements, and to ensure net environmental gain, both during and after the project. In the NEP area, the EIS also considers both individual and cumulative impacts on the natural environment to support responsible decision-making.

7.2 Scope

The trigger for an EIS typically is the presence of natural heritage features with a zone of influence of a proposed development. The zone of influence is the area where the project could reasonably cause a measurable change to natural heritage features or their ecological function. The zone of influence is dependent on both the magnitude of the proposed undertaking, the proximity to natural features, and the sensitivity of the features. The Province's Natural Heritage Reference Manual (2010) provides guidance on adjacent lands distances and studies required to demonstrate that there will be no negative effects on features and functions.

Impact studies are to be completed by recognized industry natural heritage professionals who understand and adhere to industry standards, typically via an environmental consulting firm. To ensure the credibility and comprehensiveness of the EIS, it is essential that these professionals are supported by teams capable of handling complex and multiyear projects from a collaborative and interdisciplinary perspective.

It is essential that the selected teams bring together expertise in ecology, hydrology, land use planning, Indigenous consultation, and regulatory compliance. This

collaborative and multidisciplinary approach ensures that all natural heritage impacts are thoroughly assessed, and that mitigation strategies are properly developed and implemented.

At the review stage, it is possible that a third-party peer reviewer may be retained by the Town to support the regulatory review process.

7.3 Provincial Standards

Comprehensive policy review and policy conformity sections are essential components of an EIS. The applicable natural heritage policies and subsections should be referenced, particularly those that describe the characterization of natural heritage features and the methods of their protection, primarily via a buffer, setback, or minimum vegetation protection zone (MVPZ). Applicable policies need to be overlain to interpret the appropriate framework for a given application, and the EIS must describe the prevailing guidance or requirements.

At minimum, policies and legislation from the most current versions of the following must be considered and summarized in the EIS:

- Provincial Planning Statement, 2024
- *Aggregate Resources Act*
- Niagara Escarpment Plan and the *Niagara Escarpment Planning and Development Act*
- Greenbelt Plan
- Region of Peel Official Plan
- Town of Caledon Official Plan
- *Conservation Authorities Act*
- *Endangered Species Act*
- *Species at Risk Act*

Demonstrating policy conformity for the proposed development is a requirement to progress to an approval. Each of the relevant policies is described in the Report's policy framework review and should be subsequently referenced to demonstrate how these are being adhered to and addressed by the proposal.

7.4 Content/Methodology

Project Introduction

This section should introduce the municipal address and study area of the application. A site location graphic should be included that clearly outlines the boundaries of the application. The general surroundings should be briefly described, as well as the proposed development. The overall objectives of the EIS should be stated, and the relevant project history should be included, as appropriate.

Project Scoping

Applicants should provide draft Terms of Reference prior to the project initiation which outlines the proposed field tasks and report components. This is to be sent to the Town for review and approval. The Terms of Reference should be included in the EIS as an appendix.

Correspondence Summary

A summary of relevant agency correspondence leading up to the application should be included. This may pertain to the regulatory scoping of the field program and report, and communication excerpts can be included as an appendix to the report.

Policy Framework

This section should be inclusive of a comprehensive natural heritage policy review, in the context of the proposed aggregate application. Separate headings for different policy documents should be presented, with specific policy numbers and subsections referenced as appropriate. Applicable policies need to be overlain to interpret the

appropriate framework for a given application, and the EIS must describe the prevailing guidance or requirements.

Methodology

This section is related to desktop tasks undertaken, as well as the seasonal field program. The desktop section may include the use of screening tools or existing databases (e.g., data from the relevant Conservation Authority) to better inform the study, as well as engaging in agency correspondence to seek data or direction with the application.

Typically, the largest component of this section is the description of field studies undertaken. Each task should be described separately and reference the applied protocols. A corresponding graphic is helpful to demonstrate the locations of survey locations (e.g., vocalizing anuran survey locations). Restrictions on timing and weather parameters should be described under each survey.

A chronological table of field studies should be included for ease of reference, which includes the date, year, and amount of effort for each task.

Existing Conditions

The existing conditions section will consist of the field findings of each taxonomical group. This should include site physiography, aquatic conditions, terrestrial conditions, as well as a discussion on regulated species. Corresponding graphics are required to visualize the existing conditions. Depending on the complexity and size of the site, multiple existing conditions graphics may be appropriate to minimize visual clutter and enhance utility.

The aquatic conditions summary should include mention of any watercourses and/or headwater drainage features on site, as well as their permanence, thermal regime, and fish community composition.

The terrestrial conditions summary should typically include a detailed section on vegetation communities (ELC) with corresponding photographs and graphics. A botanical inventory summary should follow. The results of breeding bird surveys and any insect, mammals, reptile, or amphibian surveys should come next, with lists in an appendix. Some of these surveys may be multiseason, and therefore year-to-year comparisons may be appropriate depending on the application. A discussion on confirmed regulated species or those that could occur within the study area should be provided and linked to the ESA and SARA status.

A review of historical aerial imagery may be appropriate if comments are made on habitat transitions or land use within the study area over time.

Significant Wildlife Habitat Assessment

A Significant Wildlife Habitat assessment should be completed and linked to the appropriate ecoregional criteria.

Natural Heritage Features Summary

This section should pull together the existing conditions and provide a summary of the natural heritage features present. This may include watercourses, significant woodlands, other woodlands, Provincially Significant Wetlands, other wetlands, valley features, or habitat of regulated species.

Report Graphics

Report graphics are critical for the reviewer to understand the EIS. All report graphics should have the subject property boundary along with a scale, title, number, and legend outlining what is being shown. Aerial imagery should be current and of an appropriate resolution and scale to ensure details are readily visible.

At minimum, report graphics should include:

- site location;
- existing conditions;

- proposed development; and
- impacted areas and restoration areas.

The locations of regulated species or their suitable habitat should be depicted on the existing conditions figure.

Impacts Assessment and Recommended Mitigation Measures

This section should start by identifying the potential impacts that may occur if the proposed development is approved. The assessment of impacts should be conducted in accordance with the guidance set forth within the Natural Heritage Reference Manual, Section 13.5. The impact section should be written prior to the application of mitigation measures. Impacts should consider both short-term, temporary, and long-term elements, as well as direct and indirect effects. The impact assessment should consider the overall development limit, including temporary disturbances such as grading, as well as technical reports prepared by others, including surface water and hydrogeology (See Section 8.0).

The mitigation section should be prepared in such a way that directly addresses the identified impacts in the preceding section. This section of the report should be collaborative, with reference reports prepared by other members of the technical team, as these impacts do not occur in isolation. For example, alteration to surface water and groundwater studies must be reviewed in the context of impacts to natural features. Mitigation measures should be feasible and appropriate in response to the impacts and overall application.

A concluding paragraph on net impacts should be prepared to provide an overall commentary on the anticipated impacts, following the implementation of mitigation measures.

Policy Conformity

Demonstrating policy conformity for the proposed development is required to progress to an approval. Each of the relevant policies described in the report's policy framework review should again be referenced to demonstrate how they are being adhered to and addressed.

Conclusion

A summary and concluding remarks should be provided at the end of the report.

Cited References

A full and properly formatted list of all sources and references used in the preparation of the EIS should be included.

7.5 Additional Town Questions

The Town and proponent should confer to develop an environmental monitoring plan which may include pre, during, and/or post-construction elements. The discussions should confirm the timing and scale of environmental monitoring, as well as annual reporting requirements thereafter. Contingency measures related to monitoring will be confirmed, including adaptive management practices.

The Town may ask for correspondence from other regulatory bodies, including the Provincial government or the Caledon Aggregate Agency Review Team (CAART).

8.0 Hydrogeology

Mineral aggregate operations alter landforms and subsurface conditions and may influence groundwater levels, flow directions, recharge and discharge processes, and groundwater–surface water interactions. Changes to these systems can affect private and municipal water supplies, surface-water features, wetlands, and groundwater-dependent ecosystems if not accurately assessed and managed. Accordingly, hydrogeological assessments play a critical role in protecting water resources, maintaining hydrologic functions, and supporting environmental protection and public safety objectives.

Hydrogeological assessments shall be undertaken in an integrated manner with surface water and natural environment disciplines, recognizing the spatial and temporal variability inherent to groundwater systems and the interdependence of groundwater, surface water, and ecological functions. This integrated approach ensures that potential impacts are identified early, evaluated comprehensively, and addressed through appropriate design, mitigation, monitoring, and adaptive management measures.

In known or suspected karst settings, the assessment must explicitly characterize karst features (e.g., sinkholes, enlarged fractures, solutionally enlarged bedding planes, springs) and their influence on recharge, flow paths, and discharge points.

8.1 Study Purpose

The purpose of this component of the Aggregate Guidance Manual is to establish clear, consistent, and defensible requirements for hydrogeological studies in support of aggregate applications, including baseline characterization, impact assessment, mitigation planning, monitoring, and adaptive management, to inform Town and agency review and to protect Caledon’s groundwater resources throughout all phases of operation and rehabilitation.

The primary objective of the hydrogeological assessment is to evaluate the integrated hydrogeological system setting (conceptual model), describe its functions, and assess the potential impacts of proposed mineral aggregate operations on the integrated system.

The study shall provide regional and site scale context, defensible technical information to support regulatory approvals, environmental protection, and adaptive management throughout the lifecycle of the project: Permitting, Operational phases, Closure, and Post-closure.

A hydrogeological assessment—coupled with an integrated assessment of groundwater–surface water dynamics and cause-effect relationships, for mineral aggregate extraction projects—is intended to be a tool to protect or restore the quality and quantity of groundwater and surface water resources. There should be no negative impacts, including to public health and safety and the natural systems function, in accordance with Chapter 20 – Mineral Aggregate Policies in the Town of Caledon Official Plan (2025).

As aggregate extraction has inherent potential to alter groundwater regimes through excavation and dewatering, and because hydrogeological analysis provides critical input to natural heritage, surface water, and social impact assessments, proponents are strongly encouraged to submit hydrogeological studies early in the application process. Where possible, the hydrogeological report should be submitted in advance of, or concurrently with, other technical studies. The timing and scope of hydrogeological studies shall be discussed during pre-submission consultation with the Town.

Key Components

Conceptual and Integrated System Understanding

- Develop a conceptual model that characterizes baseline hydrogeological and surface water conditions, identifying groundwater features and areas as defined in the PPS (2024).
- Explains system functions, sensitivities, and linkages to natural heritage features and functions.
- Supports integrated assessment of groundwater–surface water dynamics and cause-effect relationships.
- Identifies and maps karst indicators and features (e.g., dolines, sinking streams, springs, solutionally enlarged joints/fractures).

Numerical Modelling

- Develop, refine, and evolve the numerical model to represent the conceptual model and enable simulations and forecasts of groundwater flow system and interactions with the surface water systems through all project phases.
- Apply numerical models to simulate baseline conditions and evaluate groundwater–surface water linkages.
- Forecast potential impacts of mineral aggregate operations under multiple scenarios and phases of operations.
- Compare mitigation alternatives and assess their effectiveness.
- Recognize and quantify data and model uncertainty, and implications for potential impacts and mitigation and monitoring, through sensitivity and uncertainty analyses.
- Identify data gaps and inform monitoring program design (including locations, frequency, early warning indicators) to reduce uncertainty and guard against unexpected impacts

- Ensure that numerical model metrics, targets, thresholds, and impact/effect criteria are developed through a multidisciplinary process (e.g., hydrogeology, ecology, surface water, and closure planning).

Data, Monitoring, and Thresholds

- Define baseline data requirements, including monitoring locations and frequency and recharge/discharge mapping.
- Use data and models to establish thresholds and triggers for adaptive management.
- Support risk assessments for nearby wells, wetlands, and streams.

Impact Assessment and Regulatory Support

- Evaluate risks to water quantity, quality, and ecological functions.
- Quantify changes in recharge, discharge, and streamflow.
- Explicitly describe groundwater–surface water linkages in karst (e.g., losing reaches, spring-fed baseflow, conduit flow) and their ecological dependencies.
- Provide technically system-based, conceptual model-informed input for environmental impact studies (EIS) and permit applications (e.g., ARA s.2.2.4, O. Reg. 387/04 – PTTW).
- Demonstrate consistency with PPS (2024), and other Provincial policies.

Adaptive Management Planning

- Prepare an integrated Adaptive Management Plan (AMP) for all aggregate proposals where measurable changes to groundwater, surface water, or natural heritage features are possible, or where closure involves excess soil backfilling.
- An AMP should provide a transparent, enforceable framework for:
 - (i) early detection of departure from predicted conditions;
 - (ii) timely response to protect receptors; and
 - (iii) formal re-evaluation of design, operations, and approvals when necessary.

- Baseline monitoring and impact prediction should be sufficiently robust to minimize uncertainty prior to approval, with adaptive management intended only as a supplementary tool and not a replacement for primary study.

8.2 Scope

A baseline hydrogeological assessment is required for all aggregate proposals and for operational changes that could reasonably affect groundwater or surface water condition.

Enhanced hydrogeological studies are required for aggregate proposals or operations that are located below or near the water table (within approximately 1.5 m), or where sites are within or adjacent to significant groundwater recharge areas, municipal wellhead protection areas (WHPAs), or surface-water features. It is also mandatory for any proposal that involves dewatering large enough to require a Category 3 Permit to Take Water (PTTW), Environmental Activity and Sector Registry (EASR) registration, or an *Aggregate Resources Act* licence under Section 2.2.4.

The scope of the hydrogeological study shall include identification, assessment, and protection of private and communal wells within the study area, including evaluation of potential well interference during all phases of operation and closure.

1. The study is expected to include the following components:
 - (1) Baseline Hydrogeological assessment
 - (2) Impact Assessment
2. Background Review of Existing Hydrogeological Data, Maps, and Analysis from:
 - (1) Regional, Watershed, and Subwatershed Studies
 - (2) Source Water Protection Studies
 - (3) Oak Ridges Moraine Groundwater Program (ORMGP) Data, Maps, Models
 - (4) Conservation Authority and Municipal Models
 - (5) Municipal Water Supply and Stormwater Management Studies

(6) Adjacent

(7) Other Mineral Aggregate Operations Reports

(8) Other reports with hydrogeologic data, monitoring.

3. Regulatory hydrogeological reports (where required):

- A Maximum Predicted Water Table Report (MPWT), as defined in *Aggregate Resources Act* Technical Reports and Information Standards, is a standalone report required that documents how the MPWT was determined (in masl) and how it relates to the proposed excavation depth. The report is a preliminary screening tool to identify the potential for the operations to be within 1.5 m of the water table and therefore requires a more detailed assessment of impacts and mitigation needs.
- For applications proposing to excavate below or near the MPWT (within 1.5 m); or sites within, or adjacent to, significant groundwater recharge areas, wellhead protection areas (WHPAs), or surface-water features, or if the operation requires dewatering large enough to require a Permit to Take Water (PTTW) proponents must also complete:
 - Level 1 Water Report (screening to determine potential for Impacts; includes WHPA-Q/source protection policy identification where applicable);
 - Level 2 Water Report when Level 1 identifies potential for impacts, requiring an impact assessment (significance and mitigation) addressing features within the zone of influence, plus monitoring plans and technical support data; and
 - A Category 3 Permit to Take Water Hydrogeological Report as established under *OWRA* s. 34 and s. 34.1 and O. Reg. 387/04; MECP classifies applications into Categories 1–3 for administrative risk-based review (Category 3 = higher scrutiny).

4. Monitoring Requirements:

- At least one full year of groundwater and surface-water monitoring (capturing all seasonal extremes) is expected (baseline), with two or more years expected where natural heritage features are water-dependent, hydrogeologic conditions are complex, or baseline data show high variability.
- Given the sensitivity of water resources in Caledon, a minimum of two years of baseline monitoring is strongly encouraged where groundwater-dependent ecosystems, private wells, complex hydrogeologic settings, or high variability are present.
- Monitoring frequency shall be risk-based and scaled to site sensitivity.

5. Numerical Modeling Guidelines (for enhanced hydrogeological studies):

- Develop integrated groundwater–surface water models using accepted platforms (e.g., MODFLOW, FEFLOW, GSFLOW, MIKESHE, Hydrogeosphere).
- Ensure model metrics, targets, thresholds, and impact/effect criteria are developed through a multidisciplinary process involving hydrogeology, ecology, surface water, and closure planning.
- Include calibration, sensitivity analysis, uncertainty analysis, and scenario testing for cumulative impacts and climate variability.
- Model development, calibration, application, sensitivity, and uncertainty analysis should follow best practices, current at the time of the application (e.g., Australian, Groundwater Modelling Guidelines 2017) and approach and scope should be discussed and approved with by the Region, Municipality supported by the ORMGP, or other authorities.

6. Adaptive Management Framework:

- Incorporate an enforceable Adaptive Management Plan (AMP) with early-warning triggers, tiered mitigation responses, and conditions for model re-evaluation.
- Link AMP to other disciplines (surface water, ecology, closure/excess soil) to ensure integrated decision-making.

7. Professional Qualifications: All reports must be prepared, signed, and stamped by a licenced Professional Geoscientist (P.Geo.) or Professional Engineer (P.Eng.) with hydrogeological assessment and impact assessment expertise.

Where numerical modelling is used to support the studies, it must also be prepared, signed, and stamped by a licenced Professional Geoscientist (P.Geo.) or Professional Engineer (P.Eng.) with specific modelling expertise.

8. Peer Review: The Town and/or Region may retain a third-party hydrogeologist for technical peer review. Peer review may be mandatory for high-risk or below-water table proposals.
9. Conservation Authorities: Where applicable, the Town may request technical input from the relevant Conservation Authority to inform the review of hydrogeological and surface-water studies, recognizing their watershed-based expertise and monitoring programs.

8.3 Provincial Standards

Aggregate proposals in the Town of Caledon are reviewed within a Provincial regulatory framework that is primarily established under the *Aggregate Resources Act*, the *Ontario Water Resources Act*, the *Environmental Protection Act*, the *Clean Water Act*, and applicable Provincial land use policy (including the Provincial Planning Statement, 2024, and applicable Provincial plans).

This Provincial framework operates in conjunction with, and must be implemented in a manner consistent with, Chapter 20 – Mineral Aggregate Policies in the Town of Caledon Official Plan (2025), which establishes local policy requirements for the protection, improvement, or restoration of water resources and the avoidance of negative impacts to public health and safety.

These standards are summarized below.

Applicable Legislation

Aggregate Resources Act

The Aggregate Resources Act governs how pits and quarries are licenced and operated in Ontario. Ontario Regulation 244/97 and the Aggregate Resources of Ontario: Technical Reports and Information Standards (s. 2.2.4 Water Resources Report), establishes mandatory reporting requirements for aggregate licence and permit applications, including the preparation of Maximum Predicted Water Table and Level 1/Level 2 Water Reports to assess and mitigate potential impacts on groundwater and surface-water systems.

Ontario Water Resources Act

The OWRA regulates water takings, including dewatering for below-water-table extraction. Per O. Reg. 387/04 – Water Taking and Transfer and MECP Technical Guidance: Hydrogeological Studies for Category 3 PTTW (2016), any taking above defined thresholds requires a Permit to Take Water (PTTW) issued by the Ministry of the Environment, Conservation and Parks (MECP). For large or impactful activities such as sustained dewatering of a quarry floor or other higher-risk/large-volume takings (Category 3), MECP requires a supporting hydrogeological study to demonstrate that the proposed taking will not cause unacceptable impacts to nearby wells, natural features, or surface-water systems. These technical guidance documents set out a consistent approach for groundwater characterization, pumping/slug tests, zone-of-influence delineation, water quality baseline sampling, impact prediction, cumulative effects assessment, and mitigation/monitoring design.

Clean Water Act

The *Clean Water Act* and its Technical Rules (most recently updated in 2021) require the protection of municipal drinking water sources through the identification and management of vulnerable areas, such as wellhead protection areas (WHPAs) and significant groundwater recharge areas (SGRAs). Where aggregate proposals intersect or influence these areas, the hydrogeological assessment must explicitly address the

risks to municipal water supplies and demonstrate consistency with applicable Source Protection Plan policies, including identification of any risk management measures or operational conditions needed to ensure that the activity is compatible with policy.

Provincial Land Use Planning Legislation and Policy

Land use approvals for new or expanded mineral aggregate operations in Caledon must also be consistent with Provincial planning policy. The PPS (2024) requires that mineral aggregate resources be made available as close to market as possible. However, this statement also requires that planning authorities protect, improve, or restore the quality and quantity of water, maintain natural hydrologic features and functions, and minimize social, environmental, and economic impacts of extraction. This requirement includes demonstrating that the operation will not cause unacceptable impacts on groundwater or surface water features, including wetlands and coldwater streams that depend on groundwater discharge. These water protection policies in the PPS (2024) operate alongside Provincial plans in this region, including the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan, the Niagara Escarpment Plan, and A Place to Grow: Growth Plan for the Greater Golden Horseshoe, all of which contain additional constraints on activities that could alter recharge, lower water tables, or interfere with headwater drainage and baseflow.

Standards and Technical Guidance

Aggregate Resources of Ontario: Technical Reports and Information Standards

These standards define the required scope, methodology, and reporting content for hydrogeological and water resources studies submitted under the ARA, including expectations for baseline characterization, impact assessment, mitigation, monitoring, and professional accountability.

MECP Technical Guidance: Hydrogeological Studies for Category 3 PTTW (2016)

This guidance document establishes MECP's technical expectations for hydrogeological studies supporting higher-risk water takings. It outlines requirements for aquifer

characterization, pumping and slug testing, zone-of-influence delineation, groundwater–surface water interaction assessment, cumulative effects evaluation, and the design of mitigation, monitoring, and contingency measures.

Ministry of Natural Resources Hydrogeological Report Standards for Pits and Quarries (2006)

These standards provide Provincial standards for the scope, methodology, and reporting of hydrogeological studies for mineral aggregate operations, ensuring consistent evaluation of baseline conditions, potential impacts, and mitigation strategies.

MECP D-5-5: Private Wells – Water Supply Assessment and Water Supply Wells – Requirements and Best Practices (2014)

This guidance outlines sets out procedures for assessing potential interference with existing private or communal wells and defines best practices for well construction, maintenance, and protection of water quality and supply reliability.

MECP Draft Low-Impact Stormwater Management Guidance Manual (2022)

This guidance manual outlines the application of models and assesses impacts from development on surface water and groundwater.

Collectively, this legislative and guidance framework establishes a comprehensive and defensible basis for hydrogeological assessment of aggregate proposals in Caledon and informs the Town’s expectations for study scope, quality, and integration with surface water and natural heritage considerations.

8.4 Content/Methodology

Hydrogeological studies supporting mineral aggregate operations in the Town of Caledon must be undertaken using a transparent, science-based, and defensible approach that meets the requirements of Provincial legislation and accepted professional practice.

This section provides minimum technical requirements and report content.

The structure and content outlined in Table 1 (Conceptual Hydrogeological Report Outline) and Table 2 (Hydrogeology Compliance Crosswalk) provide the framework for submissions to meet these interrelated Provincial requirements in a consistent, reviewable, and policy-compliant manner. The structure aligns with ARA requirements for the Level 1 and Level 2 Water Reports, which also integrates the understanding from other required reports (e.g., Natural Environment Report) (ref. MNR 2020) as follows:

- water wells (including all types: municipal, private, industrial, commercial, geothermal, and agricultural)
- springs (e.g., place where ground water flows out of the ground)
- groundwater aquifers
- surface water courses and bodies (e.g., lakes, rivers, brooks)
- wetlands
- karst

The assessment must include but not be limited to the following:

- a description of the physical setting, including local geology, hydrogeology, and surface water systems;
- proposed water diversion, discharge, storage, and drainage facilities;
- water budget (e.g., how water is managed on-site);
- the possible positive or negative impacts that the proposed site may have on the water regime.

The Level 2 water report must also contain:

- monitoring plan(s);
- technical support data in the form of tables, graphs and figures, usually appended to the report.

A compliant hydrogeological submission must clearly demonstrate alignment with all relevant Provincial water protection standards defined in Section 8.3. In practice, these Provincial standards collectively establish the minimum technical requirements for hydrogeological work to be submitted to the Town. Further, a detailed inventory of all the features in Section 8.4 is expected to be included in the report.

Specifically, the hydrogeological study must:

- (i) demonstrate consistency with PPS (2024), particularly the water resource protection policies under Sections 2.2 and 2.5, as well as applicable Source Protection Plans developed under the *Clean Water Act*;
- (ii) satisfy the *Aggregate Resources Act* (ARA) Technical Reports and Information Standards (O. Reg. 244/97), including the preparation of a Maximum Predicted Water Table Report and, where applicable, Level 1 and Level 2 Water Reports that evaluate hydrogeologic function, potential impacts, and mitigation measures;

- (iii) meet the Ministry of the Environment, Conservation and Parks (MECP) technical expectations for Category 3 Permit to Take Water (PTTW) hydrogeological studies by providing defensible aquifer testing, impact assessment, mitigation design, long-term monitoring, and contingency planning;
- (iv) explicitly address *Clean Water Act* source protection policies for any Wellhead Protection Areas (WHPAs) or Significant Groundwater Recharge Areas (SGRAs) intersecting with the site; and
- (v) be conducted in an integrated manner with the surface water assessments due to the inextricable linkage of groundwater and surface water in hydrological systems.

Overall Approach

The study should follow a phased process:

- (1) Desktop Review and Baseline System Monitoring Plan;
- (2) Field Investigation;
- (3) Analysis and Modeling; and
- (4) Adaptive Management Plan: Impact Assessment, Mitigation, and Reporting.

1. Desktop Review and Baseline System Monitoring Plan

- Compile existing geological, hydrogeological, and hydrological data (e.g., OGS mapping, OGMN, CA monitoring networks, historical reports). A detailed inventory of all hydrogeological and surface-water features shall be completed, including aquifers, aquitards, recharge and discharge areas, wetlands, watercourses, springs, and groundwater-dependent ecosystems within at least 1 km of the site and summarize regional groundwater flow, recharge/discharge areas, and cumulative activities.

- The study shall include a baseline inventory and characterization of all productive private and communal wells within the study area, including construction details, yield, static water levels, and water quality where access is granted.
- Desktop studies shall identify surrounding land uses and activities that may affect groundwater quantity or quality, including existing or approved water takings, mineral aggregate operations, agricultural uses, and other long-term stressors projected over the life of the proposed operation.
- Screening for karst and soluble bedrock conditions shall be undertaken as part of the desktop review and site reconnaissance for aggregate proposals located in areas underlain by, or adjacent to, soluble bedrock formations (e.g., limestone, dolostone). In addition to the review of bedrock and vulnerability mapping, assess for springs, seeps, losing stream reaches, and subsidence or sinkhole features. Site reconnaissance shall be conducted to identify field indicators of karst or enhanced groundwater–surface water connectivity, including, but not limited to, springs, seeps, losing or disappearing stream reaches, sinkholes, subsidence features, or anomalous drainage patterns.
- Where screening indicates a reasonable potential for karst or soluble bedrock conditions, the hydrogeological assessment shall explicitly acknowledge this risk and address it through additional investigation, monitoring, and conservative assumptions, as described in the following subsections.
- In conjunction with the surface water and natural environment studies, a system monitoring plan should be developed that monitors the extents of possible impacts due to cumulative impacts of planned and existing extractive activities to key features.
- The monitoring plan will ascribe monitoring locations, monitoring protocols, duration/frequency, parameters, and how synthesis and interpretation of the data will be conducted:
 - Monitoring frequency shall be risk-based and scaled to site sensitivity. As a minimum, groundwater levels and surface-water levels shall be

monitored monthly, with continuous (logger-based) monitoring at key receptors (e.g., nearest wetlands, streams, municipal wellhead protection areas, and dewatering influence zones).

- Water quality shall be monitored at least semi-annually (spring and late summer/fall), with quarterly monitoring and/or event-based sampling required where vulnerability or operational risk is elevated (e.g., karst, below-water-table extraction, or backfilling/excess soil placement).
- The data review and monitoring programs shall be submitted to the Town of Caledon for a review and approval for conformity with the Manual and approved conditions. Responsibility for technical adequacy remains with the proponent and their qualified professionals.

2. Field Investigation

- Drilling and Monitoring Wells: Install monitoring wells in each hydrostratigraphic unit; log boreholes for grain size, lithology, and hydraulic boundaries.
- Hydraulic Testing: Perform slug and/or pumping tests; for below-water-table extraction, conduct at least one 24- to 72-hour constant-rate pumping test with multiple observation wells.
- Groundwater and Surface-Water Levels: Monitor over several seasons (e.g., a minimum of two years) to establish natural fluctuations and determine the Maximum Predicted Water Table. It is critical to have sufficient data to verify analysis and predictions.
- Water Quality Sampling: Collect baseline chemistry for major ions, nutrients, and metals to define natural conditions.
- Field investigations shall include testing of accessible private wells for water quantity and quality to establish baseline conditions and support impact assessment and contingency planning.
- Surface-Water Flows: Quantify baseflow and groundwater-surface-water exchange, especially near wetlands or headwater drainage features.

- Monitoring Requirements:
 - Where baseline data demonstrate outliers or atypical hydrologic responses, monitoring duration and/or frequency shall be extended until representative conditions are achieved.
 - Continuous (logger-based) monitoring shall be used for key receptors where environmental sensitivity is high or where hydrogeologic systems exhibit rapid response characteristics.
- Where karst or soluble bedrock conditions are identified or suspected through screening, additional investigation and monitoring may be required to reduce uncertainty and improve understanding of groundwater flow, connectivity, and potential impacts. Additional investigations may include, as appropriate:
 - Targeted drilling with detailed core logging to identify fractures, voids, or dissolution features;
 - Downhole or surface geophysical surveys to characterize subsurface heterogeneity;
 - Focused hydraulic testing, including step-drawdown or longer-duration pumping tests designed to assess rapid or non-linear system responses;
 - Tracer or dye studies to identify preferential flow pathways, groundwater velocities, and groundwater–surface water connectivity.

Monitoring programs in karst settings shall be expanded relative to non-karst environments and may include:

- Increased density of groundwater monitoring locations;
- Continuous water-level monitoring at key wells;
- Monitoring of springs, wetlands, and baseflow-sensitive streams;
- Water quality monitoring, recognizing the limited natural attenuation capacity of karst systems, and the potential for rapid transport of contaminants.

The scope and intensity of investigations and monitoring shall be proportionate to the level of risk and uncertainty and shall be justified in the hydrogeological report.

3. Analysis and Numerical Modelling

Hydrogeological analysis must integrate both empirical and numerical methods and be able to assess cumulative effects from planned and existing extractive activities and water takings, including:

- **Conceptual Model Development:** Summarize hydrostratigraphic units, recharge/discharge dynamics, boundary conditions, and hydraulic interconnections. This conceptual model forms the foundation for any numerical simulation.
- **Analytical Methods:** Use classical solutions (e.g., Theis, Hantush, or Dupuit assumptions) to estimate aquifer parameters and preliminary drawdowns.
- **Numerical Modelling:** Where below-water-table extraction, significant dewatering, or complex hydrogeologic conditions are expected, a numerical groundwater model should be developed using MODFLOW, FEFLOW, or an equivalent finite-difference/finite-element platform accepted by MECP. Model domain, grid spacing, boundary conditions, recharge distribution, and stress periods must reflect site-specific conditions and align with MECP (2016) Technical Guidance for Category 3 PTTW Studies and MNRF (2006) Hydrogeological Report Standards for Pits and Quarries.
- An integrated surface water-groundwater model should be developed where there is a need to better understand and forecast the feedback and dynamics between systems and where overall water management approach requires representation of all these processes. A smaller cutout integrated model may be used to examine impacts for specific areas to complete the site or regional scale model.
- **Baseline Conditions Calibration and Validation:**

- Calibrate the model using observed water-level data from monitoring wells and pumping tests; validate by reproducing independent datasets. Report calibration statistics (e.g., RMSE, R^2) and discuss sensitivity to key parameters (hydraulic conductivity, recharge, boundary heads).
- Hydrogeological analysis shall integrate empirical field data and numerical modelling, with models calibrated and validated using observed groundwater and surface-water data.
- Karst considerations:
 - In karst or potentially karstic settings, the CSM shall explicitly recognize that groundwater flow may be heterogeneous and anisotropic and may not conform to simplified porous-media assumptions. The CSM shall explicitly discuss limitations and uncertainty associated with representing karst systems in analytical or numerical models and shall apply conservative assumptions where uncertainty cannot be reasonably reduced.
 - Given the inherent uncertainty associated with karst systems, the CSM shall acknowledge that monitoring results may differ from predicted conditions, and that hydrogeological models may require a more iterative and ongoing refinement throughout operations and closure.
- Impact Assessment Scenarios:
 - Forecast simulations representing pre-extraction, operational, and post-rehabilitation conditions. Include sensitivity analyses to test drought, seasonal extremes, and cumulative impacts from adjacent operations.
 - The assessment shall explicitly evaluate cumulative effects on groundwater and surface water, considering existing and reasonably foreseeable land uses and water takings within the area over the full life of the proposed operation and closure.
 - Numerical models must be scenario-based and updated when new information materially changes system understanding (e.g., nearby water takings, additional extraction phases, climate-related recharge changes).

- Mitigation, Sensitivity, and Uncertainty Analysis: Should be completed as part of model calibration and for forecast simulations, to evaluate the range of impacts and effectiveness of proposed mitigation scenarios given the uncertainty in baseline conditions and the design of the mitigation system, testing key assumptions.
- Outputs: Produce maps of predicted drawdown, velocity vectors, and water-table contours; quantify potential effects on wells, wetlands, and streams.
- Documentation: Provide full input/output files and a clear explanation of assumptions so peer reviewers can replicate the model.

4. Adaptive Management Planning: Impact Assessment, Mitigation, and Reporting

An Adaptive Management Plan (AMP) should be required for all new or expanded aggregate proposals where there is potential for measurable change in groundwater, surface water, or natural heritage features, or where closure involves backfilling with excess soil. The AMP's purpose is to provide a transparent, enforceable framework for:

- (i) early detection of departure from predicted conditions;
- (ii) timely response to protect receptors; and
- (iii) formal re-evaluation of design, operations, and approvals when necessary.

The AMP is intended to supplement, not replace, robust baseline characterization and impact prediction. The AMP shall define acceptable performance limits, clear triggers, predefined response actions, and conditions requiring re-evaluation or cessation of operations. Sufficient upfront study is required in the Hydrogeology, Surface Water, Ecology, and Closure assessments to minimize uncertainty prior to approval.

The AMP shall identify responsibilities, regulatory notification requirements, and enforceable mechanisms to address circumstances where impacts exceed predicted or manageable conditions.

An AMP that assesses impacts and identifies mitigation measures must be integrated into every hydrogeological monitoring program to reduce uncertainty in the conceptual model of baseline conditions and validate the model forecasts of potential impacts and effectiveness of mitigation. In addition, the framework will provide for early detection of unexpected groundwater and surface water and outline measures to address impacts promptly.

Impact Assessment

Impact assessment includes evaluation of the magnitude, extent, and duration of predicted effects on groundwater quantity and quality, surface water features, and receptors.

An impact assessment should be supported by a monitoring program with sufficient frequency to capture both seasonal variability and operational influence. At minimum, groundwater levels should be measured monthly (or continuously at key locations), surface-water and wetland levels monthly, and water quality semi-annually, with increased frequency during active dewatering. Pumping and discharge volumes must be logged continuously.

Triggers are exceedances of predefined thresholds for monitored parameters (such as groundwater drawdown exceeding modeled predictions, reduction in wetland, or baseflow levels beyond seasonal norms) or notable geostatistical deviations in water quality that initiate corrective actions or mitigation measures.

Mitigation Planning and Tiered Response Framework

Mitigative responses to exceedances of the triggers should follow an escalating tiered response.

- Tier 1 – Verification: Confirmation monitoring, instrument checks, and rapid diagnostic assessment when early-warning triggers are exceeded. The purpose is to confirm the accuracy and cause of a potential exceedance or anomaly

before taking corrective action (e.g., re-measure groundwater/surface-water levels or collect confirmatory samples within 24–72 hours).

- Tier 2 – Operational Adjustment or Mitigation: The implementation of predefined measures to reduce or eliminate the observed deviation through immediate operational changes (e.g., temporarily reduce pumping/extraction rates to relieve localized drawdown, revised phasing, temporary relocation of discharge, surface-water augmentation, etc.).
- Tier 3 – Regulatory Notification and Contingency: Immediate notification to the Town, MECP, CA, and MNR as applicable. Implementation of contingency actions to address confirmed, significant, or persistent exceedances that could affect receptors or contravene approvals (e.g., install recharge wells or cutoff trenches, provide alternative water supply, deepen or replace impacted wells, or suspend dewatering), and re-evaluation of site plan or PTTW conditions.

Impacts to Private and Communal Water Supply Wells

The ARA provides protection for private and communal water supply wells through Water Report requirements, enforceable site plan conditions, and compliance mechanisms. These instruments require proponents to identify and assess potential well interference, implement monitoring and contingency measures, and restore affected water supplies where project-related impacts occur. MECP D-5-5 establishes best-practice guidance for assessing project-related impacts to private and communal water supply wells and for implementing reasonable measures to restore a sufficient and potable water supply where such impacts are confirmed or reasonably suspected.

Interim potable water supply shall be provided as needed. Permanent restoration measures should prioritize restoration of an on-site groundwater supply, of similar or better quality, including well deepening or construction of a replacement well, where feasible, or connection to a communal or municipal system or other permanent alternative supply options where on-site solutions are not reliable. Temporary measures such as tanks, cisterns or bottled water shall not be relied upon as permanent solutions

except where no reasonable alternative exists and is supported by regulatory agencies. Where project-related impacts are confirmed or reasonably suspected, the proponent is responsible for the reasonable costs associated with investigation, interim supply, permanent restoration (to equivalent or improved functionality), monitoring, and verification of the affected water supply. The permanent solutions should not impose new ongoing operating, maintenance and monitoring costs on the residents that did not previously exist (e.g., long-term reliance on hauled water, excessive maintenance requirements), unless no reasonable alternative exists and the arrangement is clearly agreed upon.

Karst-Specific Mitigation Measures and Adaptive Management

Where karst or soluble bedrock conditions are present, mitigation strategies shall prioritize avoidance and minimization of impacts before reliance on mitigation or adaptive management measures. Mitigation measures may include, but are not limited to:

- Maintaining setbacks from identified karst features, springs, and losing stream reaches;
- Limiting extraction depth, phasing, or dewatering rates to reduce disturbance to sensitive flow pathways;
- Avoidance or enhanced control of activities that introduce potential sources of contamination, including blasting and backfilling.

Given that karst systems may respond rapidly and non-linearly to changes in groundwater conditions, the AMP shall incorporate karst-specific provisions, including:

- Enhanced monitoring and early-warning triggers for groundwater levels, spring discharge, wetland water levels, and water quality;
- Clearly defined thresholds that trigger re-evaluation of models, mitigation measures, or operational practices;

- Identification of circumstances where exceedances may require modification of approvals, additional studies, or temporary suspension of activities.

Geomorphic/Landform Impacts

Aggregate extraction alters site topography, grading and landforms due to overburden removal, pit deepening, bench formation, and slope modification, all of which significantly influence recharge, groundwater vulnerability, hydraulic gradients, sediment movement, and groundwater–surface water interaction. A site hydrogeological study of an aggregate extraction project must assess the geomorphic changes at the site, including topographic lowering, exposure of new hydrostratigraphic units, creation of depressional storage and infiltration areas, and altered drainage pathways throughout all phases of extraction, operation and rehabilitation for potential impacts to water levels and water quality. The hydrogeological assessment must demonstrate how the proposed geomorphic alterations to the topography remain consistent with Provincial and Source Protection policies, Town of Caledon Site Alteration regulations which require protection of recharge areas, maintenance of hydrologic function, and avoidance of negative impacts on vulnerable aquifers (e.g., land surface subsidence, loss water storage capacity, altered flow paths, open-water ponds/lakes in below-water table operations). Where geomorphic alterations intersect with WHPAs, or Significant Groundwater Recharge Areas (SGRAs) areas, the study must show how landform change affects recharge distribution, infiltration rates, and potential contaminant transport pathways.

It is expected that extraction-related topographic changes will be incorporated into numerical models, ensuring the evolving geometry of the pit floor, walls, and backfilled areas is represented in each model phase. This enables evaluation of the geomorphic controls on the site hydrogeology (e.g., depression-focused recharge, slope runoff concentration) and improves forecasting of changes in water table configuration and discharge zones. Where appropriate, it may be necessary to include geomorphic sensitivity analyses showing how different extraction geometries or slope configurations

influence the hydrogeologic predictions. Mitigation measures should be implemented if actual pit/quarry floor or slope elevations deviate from design and correspond with unexpected drawdown, seepage, or wetland/baseflow changes. Additionally, the AMP must also define contingency actions for situations where geomorphic instability increases groundwater vulnerability, creates new infiltration points, permeable layers become exposed, or landform changes create preferential pathways that were not anticipated.

Model Updating and Re-Evaluation

- The AMP should list specific conditions that require re-running or updating the hydrogeologic and surface water models (and any linked ecological response analysis), such as:
 - a. New or expanded off-site water takings.
 - b. Significant deviations between monitored and predicted water levels/flows/quality.
 - c. Changes to extraction depth, footprint, phasing, dewatering strategy, or closure/fill concept.
 - d. Discovery of unforeseen hydrogeologic features (e.g., karst, preferential pathways).
 - e. Climate-related shifts in recharge or hydrologic regime
- AMP language should state that such changes may trigger amendments to the ARA Site Plan, PTTW, CA permits, or municipal approvals as appropriate, not just internal operational tweaks.

Reporting

Monitoring results and interpretive reports shall be made publicly available through a Town-hosted or proponent-maintained website or online repository, subject to privacy and security considerations. Monitoring data shall be updated at regular intervals as defined in the approved monitoring and Adaptive Management Plan.

Results should be summarized in quarterly updates during active operations and in a comprehensive annual monitoring report comparing results to baseline data and model predictions. Any exceedances and responses must be documented, and the monitoring plan adjusted, as necessary. Post-rehabilitation monitoring (typically at one and three years' post-closure) should confirm recovery of groundwater levels and re-establishment of natural hydrogeologic function.

The report must include mapping, tables, and figures at a sufficient scale for review, with all data and model results clearly cross-referenced to Provincial standards.

Electronic data (GIS, Excel, model files) should accompany the submission to enable transparency during peer review.

Table 1. Conceptual Hydrogeological Report Outline

Section	Content Description
1. Introduction	Purpose, objectives, regulatory context, and study scope.
2. Background / Setting	Regional and site geology, physiography, surface-water context, and previous investigations. Identify any mapped karst hazard or vulnerability areas.
3. Data Collection Program	Borehole logs, well construction, hydraulic and water-quality testing methods.
4. Hydrogeologic Characterization	Stratigraphy, aquifer parameters, water-table mapping, recharge/discharge zones. Characterize karstic aquifer domains.
5. Numerical Modelling Approach	Conceptual model, grid design, baseline calibration/validation, forecast impacts and mitigation scenarios, sensitivity, and uncertainty analysis.
6. Water Balance and Impact Assessment	Quantification of recharge, discharge, drawdown, and effects on receptors.
7. Adaptive Management Planning – Mitigation and	Avoidance/minimization strategies, operational controls, adaptive-management triggers.

Contingency Measures	
8. Monitoring and Reporting Plan	Network design, parameters, frequency, QA/QC, and data-submission protocols.
9. Conclusions and Policy Conformity	Summary of findings, residual risk, compliance with PPS, 2024, and Source Protection Plans.
Appendices	Field logs, analytical results, model inputs/outputs, well inventory, crosswalk table.

Table 2. Hydrogeology Compliance Crosswalk: Provincial Standards vs. Report Content

Provincial Standard / Guidance	Requirement Summary	Report Section(s)	Purpose / Compliance Demonstration
ARA / O. Reg. 244/97 (Technical Reports and Information Standards)	Requires Maximum Predicted Water Table and Level 1/2 Water Reports.	1–4, 6–9	Demonstrates conformity with ARA S. 2.2.4 and protection of groundwater/surface-water resources.
MECP Technical Guidance (2016) Category 3 PTTW	Defines aquifer testing, drawdown analysis, and numerical modeling standards. Provides guidance on how to assess and evaluate impacts.	3–6	Provides a defensible simulation of groundwater response to dewatering or pumping.

Clean Water Act (2006) and Technical Rules (2021)	Protects WHPAs and SGRAs.	2, 5–8	Demonstrates consistency with Source Protection Plans and mitigates risks to municipal wells.
PPS (2024)	Requires maintenance of water quantity/quality and minimal environmental impact.	1, 6–9	Ensures policy conformity with Provincial water protection objectives.
Greenbelt, ORMCP, NEP Plans	Maintain hydrologic functions and key features.	2, 4–6, 8	Verifies no negative impact on hydrologic features; includes recharge/discharge modeling.
MNR Hydrogeological Report Standards (2006)	Defines report format, QA/QC, and mapping.	All sections	Provides standardized and reviewable documentation.
MECP D-5-5 / Water-Supply-Well BMPs (2014)	Requires evaluation of well interference and contingency.	3, 6–7	Confirms protection of domestic and commercial wells.
MECP Water Quantity Risk Assessment (2017)	Evaluates aquifer stress and long-term sustainability.	5–6	Quantifies water-quantity impacts through modeling and balance analysis.

8.5 Additional Town Questions

Based on the review of the hydrogeological studies, the Town of Caledon may ask applicants to provide additional information regarding:

- Cumulative effects with adjacent mineral aggregate operations.
- Justification for predicted drawdown limits and how these were calibrated.
- Data sources, monitoring duration, and representativeness of seasonal data.
- Potential contamination pathways (e.g., spills, fuel storage, backfill materials).
- Integration with Ecologically Sensitive Groundwater Recharge Areas (ESGRAs) mapping and WHPA boundaries.
- Details on adaptive management triggers and mitigative measures.
- Climate change.
- Phased approvals of reporting prior to proceeding to subsequent/next study phase.

9.0 Surface Water

9.1 Study Background and Purpose

Surface water represents the fraction of rainfall and snowmelt which, if not infiltrated into the ground (as part of the groundwater system), is converted to surface runoff, which in agricultural/rural settings flows through forests and over fields, and in urban settings flows into catch basins and storm sewers, and/or along roadways, eventually draining to headwater drainage features, creeks, rivers, wetlands, ponds, or lakes.

Surface water is important from a public safety perspective as related to flooding and erosion, and an environmental basis in terms of the water supply to water-dependent features such as wetlands, streams, slough forests, and other environmental systems. Mineral aggregate operations represent a change in land use, and given their spatial influence on the landscape, have the potential to disrupt the natural flow of surface water (and by extension groundwater), hence potentially affecting the integrity and health of environmental features and systems, and/or impacting public safety related to existing or planned infrastructure (e.g., roads, bridges, culverts, sewers) and private/public property.

This component of the Manual documents the required scope of surface water assessments and the approach to preparing water management plans to maintain or enhance existing conditions, in accordance with guidance established by the Province and municipality.

Surface water assessments need to consider the natural and man-made systems which influence the movement of water and are reliant on sustainable runoff quality and quantity. Surface water practitioners need to work with natural system ecologists/scientists to better understand the sensitivity of receiving systems, including watercourses, headwater drainage features, wetlands, and other natural features, as this will shape and influence the form and function of mitigation and management plans.

Further, it is important that surface water and groundwater assessments be conducted in an integrated manner, fully recognizing the unique spatial and temporal characteristics of each. Notably, surface water assessments focus on matters related to flooding and erosion which occur in sub-hourly or hourly timeframes, versus groundwater assessments, which focus on water budgets/balance and groundwater levels, which occur in daily, monthly, seasonal, and annual timeframes. Groundwater analyses are always integrated with surface water analyses (as this constitutes the supply of water, through precipitation and runoff infiltration), and their tools are unique and distinct from surface water assessments which are more often standalone. The scope of surface water and groundwater impact assessments need to be integrated accordingly.

Goals:

To prepare management plans founded on accepted scientific principles and supported by adequate and robust data which:

- a) Protect, improve, or restore vulnerable surface (and ground water) resources, sensitive surface water and ground water features and their hydrologic functions;
- b) Protect and/or enhance the water resource system;
- c) Conform to the guidance and criteria in approved watershed and sub-watershed studies.

Objectives:

Work in an integrated manner with the natural environment and hydrogeology teams to:

- a) Identify the nature of surface and groundwater features in the area (e.g. surface water courses and bodies, springs, and groundwater aquifers).
- b) Identify physical setting of the groundwater and surface water features (e.g. geology, hydrogeology, geomorphology, and surface water systems).

- c) Identify hydrologic functions responsible for the natural system integrity (e.g. groundwater-surface water interactions, discharge to surface water).
- d) Establish baseline surface water conditions in the area (e.g. hydraulics, quality and quantity).
- e) Determine effects, if any, of other activities on the proposed aggregate development area (e.g., hydrology, hydraulics, quality, quantity).
- f) Assess the adequacy of existing data and identify information gaps/uncertainties and determine new data collection and evaluation needs.
- g) Assess potential risks to surface water resources and to key hydrologic functions.
- h) Identify the nature and degree of potential impacts on surface water features (both in form and function).
- i) Identify potential effects of water diversions, storage, treatment, drainage and discharge on surface water systems.
- j) Determine the potential zone of influence of the proposed aggregate development in consideration of surficial water-related functions.
- k) Support the assessment to identify the impact of development on water budget in consideration of development stages and in terms of cumulative effects and climate change.
- l) Develop a strategy to protect, improve, or restore sensitive surface water features and their form and hydrologic function.
- m) Develop an adaptive water management and mitigation plan and a monitoring program for the aggregate development area and surrounding lands.
- n) Identify how potential impacts to cross-jurisdictional and cross-watershed impacts will be minimized.

9.2 Scope

Practitioners/proponents involved in aggregate applications need to demonstrate that the proposed future extraction operations will not negatively affect the surface water resources and conditions related to the public (land and infrastructure) and environment

(natural and water-based systems). The surface water assessments need to examine and appropriately characterize the existing conditions (pre-aggregate extraction) and use these characteristics as a baseline to gauge the potential for, and extent of, impact during and post extraction. The feedback from these assessments will thereby guide the development of water management plans (fully integrated with the groundwater assessment and natural systems assessments) to maintain and/or improve upon existing conditions in accordance with the guidance established by the Province and the Town of Caledon.

Data requirements (field and desktop) and analysis techniques need to be tailored to the study area and application, and established consultatively with the Town, Conservation Authority, and other interested parties.

9.3 Provincial Legislation, Standards and Guidelines

Regarding surface water management, Provincial guidance and standards are founded on matters related to the quantity of runoff (specific to flooding, erosion, and water budgets/balance) and quality of runoff (related to contaminants and temperature).

Legislation

The following provides background to the respective legislation which influences the management of surface water in the Province of Ontario:

Environmental Protection Act

This Act is the primary pollution control legislation in Ontario and can be used interchangeably with the *Water Resources Act*. It prohibits discharge of any contaminants into the environment that cause or are likely to cause adverse effects to the natural environment or any person.

This Act regulates activities and substances that may be discharged into the water, land, or air. As such, it limits the types of activities that may affect the environment in watersheds and the types of changes that can be considered.

Lakes and Rivers Improvement Act

This Act regulates the public and private use of Ontario's lakes and rivers, including the construction, repair, and use of dams. The Act also prohibits the deposit of refuse, matter, or substances into lakes and rivers that may impair water quality and/or quantity.

This Act regulates the types of changes that can be made to waterbodies. As such, it limits the types of changes that may be permitted to rivers and creeks in watersheds (e.g., introductions or removals of dams) and may influence management options and/or recommended monitoring.

Ontario Water Resources Act

This Act focuses on both groundwater and surface water throughout the Province. It regulates sewage disposal and "sewage works" and prohibits the discharge of polluting materials that may impair water quality. Permits to take more than 50,000 litres of water per day from ground or surface water sources are regulated under this Act. This Act also regulates well construction, operation, and abandonment in addition to the approval, construction, and operation of "water works."

This Act regulates activities including water taking and potential pollution of surface and groundwater. As such, it regulates activities that may impact the quantity and/or quality of surface or groundwater resources and may influence management options and/or recommended monitoring.

Clean Water Act

This Act was established to protect Ontario's existing and future drinking water sources as part of an overall commitment to safeguard human health and the environment. A key focus of the legislation is the preparation of local Source Protection Plans.

The goal of these plans is to eliminate and/or manage existing significant water quantity and quality threats and to ensure no future drinking water threats become significant. According to the act, Source Protection Plans must include policies and programs to (a) eliminate and/or manage existing significant threats, and (b) ensure no future activities become significant drinking water threats. These can apply to activities in Wellhead Protection Areas (WHPAs) and Intake Protection Zones (IPZ).

Conservation Authorities Act

This *Act* was recently amended (with updated Ontario Regulations 596/22, 474/24, and 41/24).

The amended *Act* maintains the advisory role of conservation authorities as it pertains to natural hazards on *Planning Act* applications. It also reaffirms Conservation Authorities' regulatory role related to activities within wetlands, the areas of interference associated with wetlands, hazardous lands, river or stream valleys, and other areas determined by the regulations.

Regulation 41/24 as related to Policies for the Administration of the Prohibited Activities, Exemptions and Permits Regulation Ontario

This Provincial regulation allows the conservation authorities, including the Credit Valley Conservation and Toronto and Region Conservation Authority, to prohibit or regulate development in or adjacent to shorelines, wetlands, floodplains, watercourses, valleys, dynamic beaches, and hazard lands.

Upon issuance of a licence, conservation authority jurisdiction is normally removed on lands covered by the licence. The conditions and features on the ARA Site Plan provide for oversight and monitoring accordingly.

Provincial Planning Statement (2024)

The policies in the PPS (2024) provide the overarching policy framework for the identification of both water resource systems (WRS) and natural heritage systems (NHS), which the Town of Caledon implements through its Official Plan.

The PPS (2024) states:

- 4.2.1 Planning authorities shall protect, improve or restore the quality and quantity of water by: (a) using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development.

Standards and Guidelines

The following provides background to the respective standards and guidelines which influence the management of surface water in the Province of Ontario:

Stormwater Management Planning and Design Manual (MOE, 2003)

This technical manual provides guidance on sizing, designing, implementing, and monitoring stormwater management measures.

Watershed Planning in Ontario Guidance, Draft (MECP/MNR, 2018)

This draft guideline is intended to support municipalities in watershed planning throughout Ontario, and to support the implementation of the applicable Provincial land use plans. The guideline includes: the context of watershed planning, engagement approaches including consideration of Indigenous perspectives, approaches and best practices for watershed characterization, approaches for setting a direction (i.e., vision, objectives, goals, targets), and guidance on how to develop a plan, including monitoring and adaptive management. While not official, it has been of assistance to municipalities.

Subwatershed Planning Guide, Draft (MECP, 2022)

This draft guide promotes a more consistent subwatershed planning approach across Ontario, leading to better coordinated and more efficient planning processes.

It includes a general framework for subwatershed planning and provides information related to roles and responsibilities amongst agencies; the purpose and principles of subwatershed planning; recommended steps, approach, and best practices for undertaking subwatershed planning; best practices for stakeholder and Indigenous community engagement in the subwatershed planning process; and some key technical tools and considerations to support subwatershed planning.

Provincial Water Quality Objectives (1994)

This document contains Provincial guidelines for the management of Ontario's water resources, including directions on how to manage the quality and quantity of both surface and groundwater for the protection of aquatic life.

These guidelines provide scientifically based thresholds for Ontario that can be used to assess and monitor surface and groundwater quality from an aquatic health perspective in the study area.

Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Conservation Authorities, 2006)

This document was prepared by the Greater Golden Horseshoe Conservation Authorities for common usage to coordinate the response of various municipalities and agencies involved in land development, construction, and water management. It focuses on erosion and sediment control plan requirements, as well as related considerations, inspections, and performance monitoring.

Technical Guide: River and Stream Systems: Flooding Hazard Limit (MNR, 2002)

Provides standardized procedures for identifying and managing flood-susceptible lands across the Province. It serves as a key technical guide to support the PPS (2024)

natural hazard policies, assisting municipalities and conservation authorities in land use planning and floodplain mapping to protect against flooding and erosion hazards.

9.4 Assessment Methodology and Deliverables

Assessment Methodology

The assessment of surface water in the context of an aggregate extraction project requires various integrated steps to properly define the extent and types of impacts. Once established, practitioners would use this understanding to establish a management strategy to protect and enhance the water resources system in accordance with legislative requirements. It is important that the surface water assessment takes guidance from and provides insights to the Natural Environment and Hydrogeology disciplines in a fully integrated manner. Other disciplines may also be required to offer insights to the potential impacts to area features. One such discipline could include Fluvial Geomorphology. For instance, if the rate of discharge to area streams/receivers/headwater drainage features is altered by the application either by reducing flows, increasing flows (through pumping or diversions) or altering the temporal distribution of when the flows reach the stream. The various steps, which are considered fundamental to this assessment, include:

1. Field Work – System Monitoring
2. Preparation of Analytical Tools to Assess Surface Water Conditions (Pre-, During, and Post-Aggregate Extraction)
 - a) Assessment of impacts on Water Balance for natural features
 - b) Flood and Erosion Hazard Assessment
3. Formulation of Surface Water Management Plan
4. Input to Monitoring Plan (Pre-During-Post)

The following provides some specific considerations for each of these steps. As noted, practitioners/proponents are expected to pre-consult with the Town of Caledon to discuss the scope of the work, and following this engagement, prepare a detailed Terms

of Reference (TOR) which outlines how each step will be conducted in the context of the broader suite of site studies, in support of the planning application. The TOR should be reviewed by the Town and others having direct interest (Conservation Authorities, Provincial ministries, and Indigenous groups and others) and ultimately approved for use in guiding the studies.

Field Work (Monitoring)

- Work with Natural Environment and Hydrogeology teams to determine the extent of possible impacts due to planned extraction and identify key features which will need to be monitored, including:
 - Wetlands
 - Watercourses
 - Headwater Drainage Features (HWDFs)
 - Other water-dependent features
- The protocols of monitoring will need to be advanced accordingly, including details on:
 - Duration
 - Location
 - Type – continuous versus event; instrumented versus manual
 - Data logging and frequency
 - Parameters – quantity (depth, velocity, etc.) and quality (constituents, temperature, etc.)
- Processing and use/interpretation of the data should also be detailed, including contingencies in the event of atypical climatic periods and/or loss of data.

Analytical Tools and Analysis (Water Budget and Flood/Erosion Hazards)

- Numerous hydrologic and hydraulic tools are available (ref. MECP, 2022, Appendix 5 – Table A.5.5); the practitioner needs to assess the site and the available data, and from this make an appropriate recommendation in order to be

able to accurately assess the impacts of the planned aggregate extraction and accordingly use this to assess the efficacy of various management strategies.

- Given that the Hydrogeology team will be preparing an integrated surface water/groundwater tool to assess water balance in detail, the role of the surface water assessment in this regard is to support and complement the overall understanding of the water system. For instance, if a continuous hydrologic simulation is being conducted for the surface water assessment of erosion conditions, it would be reasonable to use this model to provide feedback on the water budget and compare the results to the Hydrogeologic modelling results with the intent of validating the overall findings and predictions.
- Data collected should be used to calibrate and validate the modelling tools; if adequate data are not available, the monitoring period should be extended accordingly; also, post-approvals monitoring should continue in order to provide additional data for potential future model refinements which would support the adaptive management process.
- The existing conditions should be analyzed and used to set existing minimum targets for flooding, erosion, and where appropriate, water balance.
- Depending on the magnitude of predicted impact to stream features, at a minimum, there needs to be consideration for sensitive receivers by a fluvial geomorphologist; if they are not sensitive, the fluvial geomorphologist would conduct a screening to ascertain this condition.
- Future conditions analyses need to consider multiple scenarios which reflect the various phases or stages of extraction, as well as ultimate site remediation.
- Premised on the results of the future conditions modelling (fully integrated with the Hydrogeology Team and Natural Environment Team), various management strategies need to be numerically analyzed, reflecting a water management plan to minimize and mitigate predicted impacts at all phases of planned extraction.
- Important considerations in the analysis will include:
 - Available climate time series

- Modelling duration
- Calibration data
- Performance metrics
- As noted, for the water budget/balance assessment, the surface water work is likely to be used more as a “check” or “validation” rather than providing the *de facto* guidance, which as noted is expected to come from the Hydrogeologic modelling assessment.
- The surface water flood and erosion hazard assessment will need to take on two forms:
 - Hazard limit definition/refinement based on the extent of Regulatory flooding and erosion hazard limits (i.e., this is to ensure that the planned extraction is not encroaching within regulated limits).
 - Assessment of off-site flood and erosion impacts associated with extraction including consideration of (among others):
 - Pumping
 - Diversions
 - Barriers
 - Contingencies
 - Hydrologic modelling should adopt both event (flooding) and continuous (erosion and support to water budget/balance) analysis approaches.
 - Hydraulic modelling of flood limits should adopt accepted tools, including the United States Environmental Protection Agency Hydraulic Engineering Center River Analysis Software (“US EPA HEC RAS”).
 - Mapping needs to be based on the most current available topographic information, as well as field surveys of hydraulic structures.
 - All work should be executed in compliance with MNR Technical Guide – (2002) River and Stream Systems: Flood and Erosion Hazard Limit.
 - Setbacks associated with the Regulatory Allowance for flooding and erosion should be applied.

Surface Water Management Plan

- The results of the analytical assessment for each scenario (related to the respective stages of extraction) should be used to develop the surface water management strategy.
- It is particularly important to develop the plan cooperatively with the Hydrogeology Team and Natural Environment Team (and potentially Fluvial Geomorphologists and others), so that the various system targets are met in an integrated manner, and the environment and public are appropriately considered and protected.
- The targets set through the baseline or existing conditions assessment should be clearly articulated and used to validate the predictions associated with the surface water management plan; these targets should also be considered as part of an Adaptive Management Plan (AMP), if one is proposed.
- The Surface Water Management Plan should also consider and put forth contingencies in the event the performance of the water management plan is not meeting the targets; this needs to be addressed through the monitoring plan or AMP (if proposed), including appropriate triggers.

Monitoring (Pre-During-Post)

- The Surface Water Management Plan should provide insights and guidance into the monitoring required pre-, during and post-extraction, building on the monitoring conducted in support of the application.
- Some key information will include:
 - Need for climate stations
 - Gap filling based on results of monitoring to date
 - Type, duration, and location of future monitoring sites
- Monitoring data needs to be integrated with the requirements from other disciplines.
- Reporting protocols (annual, multi-Year trend analyses, etc.) need to be discussed.

Deliverables

The Town of Caledon expects the findings of the surface water assessment to be provided in various phased reporting over the duration of the project. Too often reporting is provided late in the process in what is considered to be the final form, which then makes it difficult to address concerns related to any of the earlier findings, assessments, or recommendations. As such, the Town prefers to receive and approve phased reporting and data as follows, prior to the applicant undertaking subsequent/next study phases:

- Terms of Reference (Draft and Final)
- Field Data Collection Plan (Draft and Final)
- Surface Water Monitoring Report (one per year—can be integrated with other disciplines)
- Surface Water Assessment Report (Draft and Final)
- Surface Water Input to Adaptive Management Plan (not expected to be stand-alone)

9.5 Additional Town Questions and Requests

- Approval of phased reporting before proceeding to next phase, including field data collection plan
- Minimum 1 year (full seasons) of continuous surface water and groundwater level monitoring data collection is required to capture seasonal conditions with preference to 2 years to better characterize variability between years. If the initial monitoring year occurs during atypical climatic conditions (e.g., > 50% from average annual precipitation or precipitation is concentrated in a few intense events) such that precipitation or groundwater recharge conditions are materially different from long-term norms, then a second year will be required. The determination if a second year (minimum) is required will be through engagement with the Town and local Conservation Authority

- Assessment to include consideration of climate change impacts to operations and management strategy; approach to be discussed in pre-consultation and when drafting the Terms of Reference
- Cross-model performance validation (Surface water model to Integrated Surface water-Groundwater model)
- Operational design must ensure that no leachate or spills can reach the water table, with respect to stockpiles of mineral aggregates, fuel storage and transfer, processing equipment, areas for storing or processing recycled mineral aggregates, and vehicle parking.

10. Site Plan Requirements

10.1 Study Purpose

The purpose of the Site Plan Requirements section is to establish clear and consistent guidance for the preparation and submission of Site Plans in support of aggregate applications within the Town of Caledon. A Site Plan is a legally binding document that outlines the existing features, operational, progressive, and final rehabilitation activities of a licenced pit or quarry.

The Site Plan serves as the foundation for both regulatory compliance and municipal review under the *Aggregate Resources Act* (ARA) and ensures that the proposed operation implements the technical recommendations set out by professional engineers/consultants and government agencies. It is the key document for supporting enforcement of mineral aggregate operations.

This section is intended to assist municipal staff and the public in understanding the expectations for Site Plan content, format, and level of detail. It also aims to promote transparency and consistency between applications by providing a standardized framework aligned with the Ministry of Natural Resources (MNR) standards and local planning considerations.

10.2 Scope

A Site Plan is required for all licenced pits and quarries in Ontario. Aggregate Permits and Wayside Permits require Site Plans, but these documents are not as detailed as required for Licences. Ontario Regulation 244/97 sets out the requirements for Site Plans and specifies who may prepare a Site Plan under the ARA.

- 0.2(3) Every site plan accompanying an application for a Class A licence or an aggregate permit that would authorize the excavation or removal of more than 20,000 tonnes of aggregate or topsoil from the site annually

shall be prepared under the direction of and where appropriate, certified by,

- (a) a professional engineer who is a member of the Association of Professional Engineers of Ontario;
- (b) a land surveyor who is a member of the Association of Ontario Land Surveyors;
- (c) a landscape architect who is a member of the Ontario Association of Landscape Architects;
- (d) a professional geoscientist who is registered with the Association of Professional Geoscientists of Ontario;
- (e) a registered professional planner who is a member of the Ontario Professional Planners Institute; or
- (f) any other person qualified for the purposes of this section and approved in writing by the Ministry. O. Reg. 466/20, s. 2 (1).

The Town may require peer review of Site Plans and related technical studies (e.g., Hydrogeology, Ecology, Agriculture, Noise) to ensure technical accuracy and compliance with applicable standards.

10.3 Provincial Standards and Compliance Reporting

The preparation of Site Plans must conform to the *Aggregate Resources Act* and associated Ontario Regulation 244/97 (Standards for Pits and Quarries) that govern operational, environmental, and rehabilitation requirements for aggregate licences. The Site Plan is the primary regulatory instrument under the ARA and forms part of the issued licence or permit. All drawings and text within the plan are enforceable provisions of mineral aggregate operation.

On an annual basis, the Site Plan and Licence conditions are reviewed, and a report is submitted to the MNR to ensure that the Licence is operated according to the provisions of the Site Plan. The requirements for annual compliance reporting are set out below:

1.1 (4) An annual compliance report shall accurately reflect the conditions of the site at the time of the assessment and shall include,

- (a) a description of any contravention of the Act, the regulations, the site plan or the conditions of the licence or aggregate permit and a sketch showing the area of the pit or quarry affected by the contravention; and
- (b) the status of excavation and progressive rehabilitation in the previous year or during the lifetime of the pit or quarry. O. Reg. 466/20, s. 3.

General direction regarding the Compliance Assessment Reporting is provided by the MNR:

“The ARA requires all licence and permit holders to submit an annual Compliance Assessment Report to the ministry and municipalities. Regular assessment of compliance helps the licensee or permittee to stay familiar with what activities are permitted on their site. Enhanced compliance action will not be taken before the established deadline date for any contraventions disclosed in the report. All information in this report is available for public review.” (Central Forms Repository, Compliance Assessment Report, Aggregate Resources Act (Licences and Permits))

“This assessment and report can be completed anytime between April 1 to September 15. The Licensee must submit the assessment and report to the MNR and Municipalities on or before September 30.” (Annual Compliance Reporting, Aggregates Resources Ontario).

While the Province retains primary approval authority under the ARA for the Site Plan and the Licence, the Town’s review process for new Licence applications focuses on ensuring consistency with the PPS (2024) and conformity with the Town of Caledon Official Plan and Zoning By-law.

It is important to note that the *Aggregate Resources Act* and approved Site Plans override municipal policy and By-laws, as set out in section 66 (1) of the *Aggregate Resources Act*:

66 (1) This Act, the regulations and the provisions of licences and permits and site plans apply despite any municipal by-law, official plan or development agreement and, to the extent that a municipal by-law, official plan or development agreement deals with the same subject-matter as this Act, the regulations or the provisions of a licence or permit or a site plan, the by-law, official plan or development agreement is inoperative.

The MNR sets out Site Plan Standards to guide the preparation of Class A licence applications in Ontario (*Aggregate Resources of Ontario: Site Plan Standards, August 2020*).

The site plan must be submitted electronically in PDF format using metric units of measurement.

For applications for a Class A licence or an aggregate permit proposing to excavate or remove more than 20,000 tonnes annually: the site plan must consist of a minimum of three (3) separate drawings. The site plan notes must be comprised of clear unambiguous language. The site plan must be readable digitally and when printed. The site plan must include any of the following measures, programs, or areas that must be undertaken as identified in the Technical Reports and Information that are required to be prepared for an application:

- mitigation measures;
- monitoring programs;
- avoidance areas;
- temporary avoidance and protection areas; and

- refer to an adaptive management plan(s).

Each drawing included on the site plan must be numbered and indicate the total number of drawings included.

The Town will obtain, from the Ministry of Natural Resources and the Ministry of the Environment, Conservation, and Parks, the following information regarding the applicant:

- 5 years of compliance reports
- 5 years of inspection reports
- 5 years of complaints

10.4 Content and Methodology

A Site Plan includes a set of scaled drawings accompanied by explanatory notes and operational details. There must be at least three pages in the Site Plan: Existing Features, Operations and Rehabilitation. Separate pages may be required for Cross-Sections and Technical Recommendations. The Town will ask proponents to prepare Site Plans that prioritize readability and accessibility to the extent possible (e.g., enhanced font size, clear and labelled graphics, etc.).

All site plans must be prepared according to the following minimum information requirements:

1. A key map showing the location of the proposed site.
2. A general description of the geographic location of the site, including, where applicable: lot; concession; geographic township; local municipality; upper tier municipality; and territorial district.
3. UTM easting and northing coordinates, measured using a Global Positioning System receiver, for every corner of the proposed site boundary and the centre point of every entrance and exit where it intersects the site boundary. If the boundary does not follow straight lines, a digital shapefile that includes metadata and projection files for each shapefile may be provided.

4. A scale of reference using both ratio and graphic methods between a scale of 1:1000 and 1:5000.
5. Applicant's name, address, and signature.
7. Name and signature of the person that prepared the site plan if not the applicant.
8. A statement that "this site plan is prepared under the *Aggregate Resources Act* for a [Class A licence/Class B licence/aggregate permit/wayside permit] for a [pit/quarry/pit and quarry] [above/below the ground water table]".
9. A north arrow, normally pointing towards the top of the page.
10. A schedule for recording a description of site plan amendments, including dates the amendment was made or approved.
11. A legend on each page showing all symbols and acronyms used on that page.
12. The proposed boundary of the site.
13. The area of the site expressed in hectares.
14. Lot and concession lines if in a surveyed area.
15. A list of references, if any, which apply specifically to the preparation of the Site Plan drawing.

The following section provides an overview of the main components of a Site Plan.

- a) **Existing Conditions Plan** – Boundaries of the licenced area; zoning and land use (on-site and within 120 m of the site), maximum predicted water table, topography (1m or 2m contour interval expressed as metres above mean sea level); vegetation, watercourses, wetlands, floodplains, and significant natural features; adjacent land uses within 120 m; access points, fences; and on-site structures wells amongst other features.
- b) **Operational Plan** – Phasing and depth of extraction, maximum annual tonnage limit, extraction area (in hectares), soil management measures, berms, processing and stockpile areas, noise (including hours of operation) and dust controls, fuel storage, fencing provisions, operational entrance and internal haul routes, scale/scalehouse, and screening measures. Include any permanent or

temporary structures, including parking areas, storage areas, screening areas, as applicable. Outline driveway access dimensions for truck turning.

- c) The **Operational Plan** is the most detailed page of the Site Plan and includes all Technical Recommendations, including Monitoring and Mitigation Measures for the Pit/Quarry Operation.
- d) **Rehabilitation Plan** – Rehabilitation sequence and final rehabilitated end use for the site, re-vegetation of the site, slopes, drainage, statement indicating if excess soil will be imported to the site (and the maximum volume), and integration with surrounding land uses.
- e) **Cross-Sections** – The location of the cross-sections is shown on the existing conditions and rehabilitation page. Final rehabilitated conditions (with the final pit/quarry floor and depth to water table) are important elements of the cross-sections. The final sloping of side slopes is also illustrated.

10.5 Additional Town Questions

During the review process, the Town may ask the following questions:

- Does the Site Plan clearly identify extraction limits and ensure compliance with applicable setbacks determined for the proposal?
- Are phasing and rehabilitation plans coordinated to minimize disturbed areas?
- Have haul routes been reviewed and approved by the Town's Engineering Department, and are they recognized on the Site Plan?
- Are noise, dust, and visual impacts appropriately mitigated through design as potentially experienced by a broader range of neighbours?
- Do the hours of operation align with the municipal noise control By-law?
- Has the proponent demonstrated that operations will not interfere with surface water or groundwater systems?
- Are cross-referenced studies consistent with the Site Plan details?

- Do the ARA Site Plan and Town zoning permit the importation of materials to be recycled, ancillary operations, and other applicable activities appropriately and accordingly?
- Following the depletion of the resources and surrendering of the licence, will accessory/ancillary uses shown in the Site Plan be terminated?
- Following the depletion of the resources and surrendering of the licence, is the intended zoning change to agricultural/open space from extractive industrial appropriately recognized?
- Are above-ground fuel storage tanks permitted and recognized on the ARA Site Plan?
- Are portable concrete or portable asphalt plants permitted and recognized on the ARA Site Plan?
- Is portable processing equipment required to have an ECA and recognized on the ARA Site Plan?
- Can concrete, asphalt, brick, glass, or ceramics be imported to a licenced site for recycling purposes and recognized on the ARA Site Plan?
- Are all mitigation and design measures or planned operational practices included on the ARA Site Plan?
- Understanding the legal and technical nature of the document, is the Site Plan appropriately legible and accessible to readers?

Further, Town Staff may ask applicants to provide full list of business names, including numbered companies and joint projects that it has operated under for the past 5 years.

11.0 Social Impacts

11.1 Study Purpose

Social Impact Assessment (SIA) evaluates how a project affects specific individuals, groups, and communities. Social impacts include changes to daily life, cultural traditions, and community structure or services resulting from development. SIA aims to identify direct and indirect effects of a project and includes consideration of the characteristics, perceptions, and values of those impacted.

11.2 Scope

A SIA is conducted when there are potential effects on particular groups, individuals, or communities, or where such impacts are anticipated. This includes cumulative impacts on the social fabric and well-being of a community arising from long-term or multiple projects. The absence of impacts related to air quality, noise, or land use does not eliminate the requirement for an SIA. Rather than simply compiling findings from technical reports, a social impact assessment evaluates the broader implications these results hold for affected individuals, distinct population segments, and local communities.

SIA should be completed by an experienced SIA practitioner and peer-reviewed by an experienced SIA practitioner, as there is typically no one within the Provincial ministries with this expertise.

11.3 Provincial Standards

The policy references below speak to the requirement to assess the social impacts of quarries and projects which cause similar impacts, such as landfills.

Within the Province of Ontario, SIA has been undertaken as part of project approval processes since the late 1980s for projects subject to the *Environmental Assessment Act*. Technical studies such as those undertaken under the *Environmental Protection*

Act (EPA) for noise and air quality, assume that impacts affect all people the same way, whereas a SIA seeks to understand the people affected and then how those people react to the changes created by the technical impacts. For example, a noise engineer will assess the noise experiences at specific receptors. Social impact assessors assess how the changes to noise disrupt residents' day-to-day activities and whether there are people within the community particularly sensitive to noise. Some quarry proponents have recognized that to meet the requirements of the *Aggregate Resources Act* and the Provincial Planning Statement, a SIA should be done when there are homes and social features in the vicinity of the proposed quarry or quarry expansion and have completed an SIA for project proposals.

Aggregate Resources Act

The *Aggregate Resources Act* describes what matters need to be considered before issuing a licence for aggregate resource operations.

Section 3(2) (h) establishes that in the administration of the *Act*, the Minister may, “initiate studies on environmental and socioeconomic matters related to pits and quarries. Section 12 (1) states that in considering whether to issue a licence, the Minister or Board shall have regard to the effect of the operation of the pit or quarry on nearby communities.

The definition of environment in the *Aggregate Resources Act* is limited to: “air, land and water, or any combination or part thereof of the Province of Ontario.” The *Act* does not define socioeconomic matters of which social impact is a part. The *Aggregate Resources Act* relies on technical studies pursuant to the *Environmental Protection Act* to identify potential impacts on the people living in nearby communities. However, *Environmental Protection Act* standards, such as those for noise, assume all people and communities are the same (ubiquitous) and react to changes in the environment in the same way. This assumption is rarely true. SIA profiles who are living, working, and

recreating in the community and how they use their property to determine how the changes impact the people affected.

Provincial Planning Statement (2024)

The PPS (2024) outlines the requirement to balance Provincial objectives and interests, and thus, is relevant to the assessment of social impacts. The PPS (2024) represents minimum standards. Section 4.5.2.2 states that, “extraction shall be undertaken in a manner which minimizes social, economic and environmental impacts.”

The PPS (2024) provides several definitions relevant to SIA:

- The PPS (2024) references the definition of ‘Adverse Effects’ defined in the EPA:
 - ‘Adverse Effect’ means one or more of:
 - a) impairment of the quality of the natural environment for any use that can be made of it;
 - b) injury or damage to property or plant or animal life;
 - c) harm or material discomfort to any person;
 - d) an adverse effect on the health of any person;
 - e) impairment of the safety of any person;
 - f) rendering any property or plant or animal life unfit for human use;
 - g) loss of enjoyment of normal use of property; and
 - h) interference with normal conduct of business.
- Sensitive Land Uses: buildings, amenity areas, or outdoor spaces where routine or normal activities occurring at reasonably expected times would experience one or more adverse effects from contaminant discharges generated by a nearby major facility. Sensitive land uses may be a part of the natural or built environment. Examples may include, but are not limited to residences, day care centres, and educational and health facilities.
- Major Facilities: means facilities which may require separation from sensitive land uses, including but not limited to airports, manufacturing uses, transportation infrastructure and corridors, rail facilities, marine facilities, sewage treatment

facilities, waste management systems, oil and gas pipelines, industries, energy generation facilities and transmission systems, and resource extraction activities.

Despite the reference in Section 4.5.2.2 to social impacts, the PPS (2024) does not define 'social' nor 'social impact.'

With respect to the definition of 'Adverse Effects,' without the information provided in a SIA, the social impacts to the community are missing as the *Environmental Protection Act* standards do not consider the unique characteristics of communities and individuals experiencing those impacts. To assess whether there are "Adverse Effects,' there must be an understanding of the characteristics of people potentially affected, how they use their property, and the nature of their business activities. This information is gathered as part of a SIA and not typically gathered as part of any other technical study undertaken by the applicant.

11.4 Content/Methodology

Social impact assessments follow a similar approach and structure. However, what parameters are examined, and the geographic extent of the study is often determined by the project or projects under consideration and the community or communities affected. The following is the typical approach to a social impact assessment.

1. Project Scoping

Project scoping includes establishing the area of influence of the project, identifying communities, neighbourhoods, and vulnerable groups potentially affected, and identifying key issues and concerns of these groups and communities. Communities should not be defined solely by political boundaries but rather by the people who live in them by reflecting on their day-to-day travel and interactions.

2. Establishing Baseline Information

Baseline information is collected from a variety of sources. Secondary sources such as municipal data, census data, and previous studies are often used to determine basic community information related to population, demographics, social infrastructure, socioeconomics, and community growth or decline. Primary sources data collection include public survey research, neighbour surveys, key informant interviews, mining of consultation comments, and other participant and non-participant approaches. These sources add to the information collected from secondary sources and help create an understanding of community character and culture.

SIAs are informed by public consultation comments including written and oral submissions during the planning process. These comments identify local social, economic, and cultural conditions that characterize the social environment. Public consultation data is used and triangulated with data collected by other methods to assist in understanding the community. Baseline data should present some historical information about the community, the present state of the community, and how the community is seeking to evolve in the future, with the future defined to include the life of the project. Often this includes an assessment of the ability of the community to manage change that may occur as a result of the project. Finally, baseline information is used to identify vulnerable groups within the community that may be more sensitive to or affected by project effects.

3. Predicting Impacts

Assessments of social impacts examine the characteristics of the project and the potential for direct or indirect impacts on the community, in terms of how people live, work, and recreate.

Survey data collected as part of the baseline will create a profile of how those living, working or recreating in the vicinity of the proposed quarry or quarry expansion may be sensitive to the changes created by the project.

SIA is dependent, to a certain extent, on technical disciplines to identify the type of physical changes that will occur for people and communities that make up the relevant social environment. These physical changes are typically assessed in accordance with the requirements of the *Environmental Protection Act* and the *Aggregate Resources Act*. Neither of these pieces of legislation account for differences in how different groups of people experience impacts. An assessment of social impacts is not the accumulation of conclusions from individual technical reports nor the conclusions of each technical report. It is the aim of the SIA to take the results of technical studies and determine what those results mean for the individuals, specific population groups, and communities impacted. The development, operation, and rehabilitation of a quarry may cause adverse social impacts. Noise, vibration, dust, visual intrusion, and traffic can disrupt the use and enjoyment of property, resulting in a decline in satisfaction with the community or interfere with the operation of community facilities and businesses in the area. Displacement of residents and community facilities may also occur, with implications for residents, users, and operators or community facilities and ties and networks in the community. A quarry development can also have positive benefits in terms of employment, property taxes, infrastructure improvements, fees paid to the municipality, and other induced benefits. The review of public comments and complaints also establishes an understanding of how existing quarry operations affect how people live, work, and recreate within the community and how these existing social impacts have informed the perception and anticipation of social impacts from a proposed quarry.

SIA makes use of other data available through site visits, interviews, and discussions with residents to characterize the community, special population groups, and to predict how impacts are likely to be experienced by individuals, vulnerable populations, and the communities affected

4. Impact Management

The SIA considers avoidance, minimization, mitigation, monitoring, and compensation measures that can be implemented by the proponent and/or the community, maximizing

desirable and minimizing undesirable social impacts before assessing net social impacts. The surveys undertaken as part of the baseline identify what mitigation measures may or may not be working to lessen the impact on individuals and the community for other similar projects.

Based on the wide range of project experience, it is possible to provide an indication of what will most likely happen. The SIA identifies potential impacts, evaluates their significance, and develops impact management measures to avoid or reduce any negative social impacts and enhance positive impacts.

SIA studies use criteria to focus data gathering and to frame the measurement and evaluation of social impacts. The criteria are often informed by comments received through public consultation on what is important to the quality of life of residents and what is important to the management of local businesses and institutions.

Three factors determine whether negative social impacts are likely to occur and how significant they are likely to be:

1. The nature of the project.
2. The characteristics of the people and communities likely impacted.
Characteristics such as population structure, sensitive populations, daily activity patterns, and community character determine how a community may be impacted.
3. The kinds of impact management measures put in place to manage negative impacts. This includes mitigative measures, compensation, contingency measures, and community relations measures.

Within the Town of Caledon, many residents are already living with ongoing quarry operations and how they perceive these operations and experience the impacts influences how they perceive the risks and impacts associated with a new quarry.

The attitude of the people themselves and their willingness to accommodate the change(s) is an important input to an SIA. Social impacts depend on people's perceptions and the responses they choose to make. Impacts that are perceived to be significant are likely to be responded to as such. Moreover, if people come to feel they have been treated unfairly, their concerns have not been addressed and/or are not likely to be adequately addressed, or key issues remain unresolved, they are likely to perceive the proposed project negatively, which, in turn, will influence their response. The term "special impacts" has been used to describe the behavioural responses and actions that result from the perceptions of a proposed project's potential impacts and risks, the fairness and equity of the planning and decision processes, and the trustworthiness and reliability of the proponent and government regulators.

Finally, impacts can be positive or negative, and there are four types of impacts considered in an SIA:

- Direct impacts are the immediate consequences of a project's construction, operation, or post-operation phases.
- Indirect impacts are changes that result from one or more direct impacts of a project (e.g., less use of roadways for bicyclists because of increased truck traffic).
- Induced impacts are changes that occur more broadly (e.g., diminished rural atmosphere; stimulation of other similar proposals).
- Cumulative impacts result from a proposed development in combination with other past, present, or reasonably foreseeable future developments. The individual impacts from multiple sources combine to create a greater impact than what might have been expected by simply adding them together.

11.5 Additional Town Questions

The Town of Caledon may ask applicants to provide additional information with respect to the cumulative effect of their project along with other ongoing quarry operations and



rehabilitations on community well-being and ability to absorb the cumulative changes. This would include unanticipated effects, such as inappropriate use of rehabilitating sites.

The Town will encourage proponents to establish a Community Liaison Group, or another community operator partnership model, for the proposed application. The Town will ask about how questions and concerns about the operation are to be channeled, and how data on operational performance shall be shared with the Town and community.

Finally, the Town may consider different governance arrangements or models for the management of cumulative social impacts.

12.0 Transportation

12.1 Study Purpose

The transport of aggregate resources by truck in Caledon has a significant impact on the community. The effects of transporting aggregate resources include wear and tear on road infrastructure (pavement and road structure), traffic congestion, road safety, air quality, greenhouse gas emissions, noise, dust, and debris—all of which affect the quality of life of Caledon’s residents. The purpose of a transportation study is to identify specific impacts related to a proposed mineral aggregate operation and to develop mitigating measures to minimize those impacts on the community.

12.2 Scope

Where new mineral aggregate operations are to be established or existing mineral aggregate operations are to be expanded, a transportation/haul route study needs to be undertaken by the applicant. The transportation study should assess all transportation-related impacts of the proposed mineral aggregate operations, including the transport of aggregate resources.

The transportation study should:

- Identify a haul route and connections to the goods movement network to and from the subject site.
- Identify how transportation impacts from the proposed mineral aggregate operations will comply with Provincial and local policies.
- Demonstrate how the proposed mineral aggregate operations will be safely accommodated in the transportation network.
- Establish how any adverse effects of proposed truck traffic on the transportation system and the built environment along haul routes will be mitigated.

12.3 Provincial Standards

The process for approving mineral aggregate operations is established by the Province, and the Ministry of Natural Resources is responsible for decisions on aggregate applications. Per the *Aggregate Resources Act*, in considering whether a licence should be issued, the Minister will consider criteria such as the effect of the mineral aggregate operation on nearby communities, comments provided by the Town of Caledon, and the main haulage routes and proposed truck traffic to and from the site.

The transportation study to be prepared by the applicant should demonstrate to the Town of Caledon how the proposed mineral aggregate operations comply with Provincial policy objectives to protect public health, safety, environmental, and economic impacts from new development.

Provincial Planning Statement (2024)

The PPS (2024) provides for a number of policies relating to goods movement, major facilities, avoidance (or minimizing or mitigation, where avoidance is not possible) of negative impacts, and other transportation policies. Consistency should be demonstrated with those policies in the transportation studies.

Niagara Escarpment Plan (2017)

- 2.9.1. In addition to all other relevant policies of this Plan, proposals for mineral aggregate operations including wayside pits and quarries, accessory uses, accessory facilities and haul routes shall:
- g) minimize negative impacts of mineral aggregate operations and their accessory uses on surrounding land uses.

12.4 Content/Methodology

The transportation study is required to follow the Town of Caledon's Traffic Impact Study Terms of Reference and Guidelines (2017) and as supplemented by this Manual, include the items below.

1. Define development (mineral aggregate operation) proposal
 - Application, development size, development location, access locations, study area, etc.
2. Establish existing transportation context
 - Identify nearby private dwellings, school zones, communities/hamlets, and other areas with sensitive land uses that may be affected.
 - Identify physical characteristics of existing haul routes that serve the proposed site, including (but not limited to) pavement conditions (Road Needs Study); structure conditions; truck restrictions (weight, time of day, season); posted speeds and observed travel speeds, right-of-way characteristics, including available active transportation facilities and paved shoulders; and vertical alignments, horizontal alignments, vegetation, etc., that may impact clearances and sight distances.
3. Assess economic, social, and physical effects of forecast automobile and truck traffic from the proposed site, including:
 - Forecasts of future background and site-related automobile and truck volumes (including truck classification) to an appropriate future horizon year.
 - Level of service of the haul routes/high-capacity arterials that will be used to access/egress the proposed mineral aggregate operation site. This includes an analysis of future traffic operations (volumes, capacities, delays, etc.) as well as level of service for other users of the haul route, including active transportation users, emergency services vehicles, transit, etc. Road safety for all roadway users on the haul route including pedestrians, cyclists, other motorists, transit vehicles, emergency services vehicles, etc.
 - Evaluation of alternative haul routes and identification of preferred haul route(s) with the least impact.
4. Identify mitigation measures and implementation strategy, including:
 - Multimodal, truck-supportive infrastructure along haul routes.

- Infrastructure improvements including road safety measures, road reconstruction, road widening, and/or identification of new haul routes.
- Capital cost of any required infrastructure improvements.
- Requirements of any Environmental Assessment to support infrastructure improvements.
- On-site signage/information and/or training to educate truck drivers on haul routes and their usage.
- Measures to mitigate impacts from increased truck traffic on haul routes and connecting roadways.
- Reporting protocols for *Highway Traffic Act* breaches.

12.5 Additional Town Questions

Based on the review of the transportation study, the Town of Caledon may ask applicants to provide additional information to support the implementation of mitigation measures and/or support the community engagement process.

The Town may ask applicants to indicate in the study if the operator will have their own driver employees or whether independent trucking companies and/or drivers will be hired. Further, the Town may ask whether the proponent considered the use of lower carbon and lower emitting fuels for vehicle and equipment fleets (such as renewable fuels). Additional details may be requested, either regarding the specifics of the lower emitting vehicles/alternative fuel vehicles to be used, or explanation as to why such alternatives cannot be incorporated.

13. Resources

A non-exhaustive list of legislation and policy standards considered relevant to mineral aggregate extraction and operations has been compiled below, along with a brief explanatory sentence as to how the specific legislation may apply to mineral aggregate extraction and operations:

Town of Caledon Policy and Legislation

- [Future Caledon: Our Official Plan \(2025\)](#)
- [Zoning By-law 2006-50](#)
- [Secondary Plans](#), as applicable
- [Ongoing aggregate policy projects, including the Rehabilitation Master Plan and Recycled Aggregate program](#)

Regional Policy and Legislation

- [Region of Peel Official Plan \(2022\)](#)

Core Aggregate Statute and Instruments (licensing, site plans, operating rules)

- [Aggregate Resources Act](#) — The enabling statute for mineral aggregate approvals and operations.
- [O. Reg. 244/97 General](#) — Multiple operational and approval rules, reporting, and fees requirements.
- [Aggregate resources of Ontario standards: A compilation of the four standards adopted by Ontario Regulation 244/97 under the Aggregate Resources Act.](#)

Provincial Land Use and Planning Framework

- [Planning Act](#) — The enabling legislation for land use planning permissions, including for zoning (which must be confirmed as part of an Aggregate Resources Act licence decision).
- [Provincial Planning Statement \(PPS\), 2024](#)
- [Greenbelt Act](#) and the [Greenbelt Plan, 2017](#)

- [Oak Ridges Moraine Conservation Act](#)
- [Oak Ridges Moraine Conservation Plan](#)
- [Niagara Escarpment Planning and Development Act](#) and the [Niagara Escarpment Plan, 2017](#)
- [Lake Simcoe Protection Act](#), and the [Lake Simcoe Protection Plan, 2009](#) — Area-specific environmental protection policy (where applicable in northeastern portions of the Town).
- [Municipal Act](#) — Municipal By-law powers.

Provincial Environmental and Natural Heritage (permits/approvals)

- [Ontario Water Resources Act](#) — Water takings, sewage, and stormwater works.
- [O. Reg. 387/04 \(Water Taking and Transfer\)](#) — Permits to take water (PTTW) and reporting requirements.
- [O. Reg. 525/98 \(Approval Exemptions\)](#) — Requirements for stormwater and/or sewage works exemptions.
- [Environmental Protection Act](#) — Requirement to obtain an Environmental Compliance Approval for air, noise, and spills.
- [O. Reg. 419/05 \(Air Pollution—Local Air Quality\)](#) — Emission standards and compliance approaches.
- [O. Reg. 406/19 \(On-Site and Excess Soil Management\)](#) — Excess soil management requirements.
- [O. Reg. 524/98 \(Environmental Compliance Approvals – Exemptions from Section 9 of the Act\)](#) — Exemption of backup generators (with conditions) needing approval for aggregate operators.
- [Clean Water Act](#) + [O. Reg. 287/07 \(General\)](#) — Source protection policies affecting land uses and prescribed instruments.
- [Conservation Authorities Act](#) + [O. Reg. 41/24 \(Prohibited Activities, Exemptions, and Permits\)](#) — Permissions and prohibitions in regulated areas (e.g., wetlands).

- [Lakes and Rivers Improvement Act \(LRIA\)](#) — Approval requirements for dams and alterations (e.g., dewatering structures, settling ponds with dams).
- [Endangered Species Act](#) and [O. Reg. 242/08 \(General\)](#) — Outlines registration and conditions if a Specifics at Risk habitat could be affected by an operation.
- [Ontario Heritage Act](#) + [Ontario Regulation 9/06 \(Criteria for Determining Cultural Heritage Value or Interest\)](#) + [Ontario Regulation 10/06 \(Criteria for Determining Cultural Heritage Value or Interest of Provincial Significance\)](#) — Archaeological policies, including reporting requirements.
- [Public Lands Act](#) — Work permits for certain activities when mineral aggregate operations touch Crown or shore lands.

Worker Health and Safety, Fuels (on-site operations)

- [Occupational Health and Safety Act](#) + [R.R.O. 1990, Reg. 854 \(Mines and Mining Plants\)](#) — Health and safety requirements, including training, notices, and explosives provisions.
- [Technical Standards and Safety Act](#) + [O. Reg. 217/01 \(Liquid Fuels Handling Code\)](#) and [O. Reg. 213/01 \(Fuel Oil\)](#) — Fuel storage and dispensing items on site.

Federal Laws Commonly Triggered by Aggregate Works

- [Fisheries Act](#) and Fisheries and Oceans Canada (DFO) policy — Requirements for mineral aggregate operations that include dewatering, in-water works, and culverts.
- [Migratory Birds Convention Act](#) and Environment and Climate Change Canada avoidance guidance — Requirements for mineral aggregate operations that include vegetation clearing.
- [Explosives Act](#) + [Explosives Regulations, 2013 \(SOR/2013-211\)](#) + NRCan (Natural Resources Canada) guidance — Outlines mineral aggregate operation storage and magazine licensing.

- [Transportation of Dangerous Goods Act + Transportation of Dangerous Goods Regulations](#) — Requirements for the transportation of explosives.
- [Canadian Navigable Waters Act](#) — Requirements for approvals for major works in navigable waters (where applicable).

13.1 Planning Justification Reports

- [Aggregate Resources of Ontario: Technical Reports and Information Standards \(2020\)](#), Government of Ontario
- [Future Caledon: Our Official Plan \(2025\)](#)
- [Town of Caledon Comprehensive Zoning By-law 2006-50](#)
- [Region of Peel Official Plan \(2022\)](#)

13.2 Air Quality and Noise

- [D-1 Land Use and Compatibility](#)
- [D-6 Compatibility Between Industrial Facilities](#)
- [Air Dispersion Modelling Guideline For Ontario \[Guideline A-11\]](#)
- [Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning \(NPC-300\)](#)
- [Ontario's Ambient Air Quality Criteria](#)
- [Canadian Ambient Air Quality Standards](#)
- [Ontario Stone, Sand and Gravel Associate "Acme" example for an ECA \(Air and Noise\) for an aggregate crushing operation, 2013](#)

13.3 Blasting and Vibration

- [Aggregate Resources of Ontario: Technical Reports and Information Standards \(2023\)](#)
- [Aggregate Resources of Ontario: Site Plan Standards \(2020\)](#)
- [NPC-119 Model Municipal Noise Control By-Law, 1978]

- [DFO Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters \(1998\)](#)

13.4 Closure, Rehabilitation, and Importation of Excess Soil

The closure, rehabilitation, and importation of excess soil backfill of mineral aggregate operations can be planned to occur at the end of life or progressively conducted throughout the life of the extraction operation. Assuming the work is completed while the aggregate licence is in place, the following resources provide information and technical guidance:

- [*Best Management Practices for Aggregate Pit and Quarry Rehabilitation in Ontario*](#), Ontario Society of Professional Engineers
- *Excess Soil Guidance for Aggregate Producers*, Ontario Stone, Sand & Gravel Association (OSSGA), [Ontario Stone, Sand and Gravel Association](#) (2021)
- [*Best Practices for Excess Soil Reuse Sites in Ontario*](#) (draft), Qualified Persons Community of Ontario (2025)

Should an operation surrender its licence following minimum closure requirements and in future undergo additional rehabilitation such as backfilling from minimum closure grades to original grade, the work could be administered under a Caledon Site Alteration and Fill By-law Permit with Conditions. The requirements of the Site Alteration and Fill By-law with supporting Guidelines Manual should be reviewed to ensure that activities conducted under an extraction licence are aligned with Caledon requirements for similar activities within Town jurisdiction to maintain a level playing field of environmental and other protections.

13.5 Cultural Heritage Resources

- [Standards and Guidelines for Consultant Archaeologists \(2011\)](#)
- [Funeral, Burial and Cremation Services Act](#)
- [Ontario Regulation 9/06 – Criteria for Determining Cultural Heritage Value or Interest](#)
- [Ontario Regulation 10/06 – Criteria for Determining Cultural Heritage Value or Interest of Provincial Significance](#)
- [Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes – A Checklist for the Non-Specialist form](#)
- [Town of Caledon Terms of Reference \(TOR\) for Archaeological Assessments](#)

13.6 Ecology and Natural Heritage

- [Conservation Authorities Act](#)
- [Endangered Species Act](#)
- [Species at Risk Act](#)
- [Ministry of Natural Resources \(MNR\) and Ministry of the Environment, Conservation and Parks \(MECP\) information or correspondence](#)
- [Natural Heritage Information Centre \(NHIC\) data via the Make-A-Map application](#)
- [Databases of the Ontario Breeding Bird Atlas \(OBBA\) project](#)
- [Ontario Reptile and Amphibian Atlas \(ORAA\)](#)
- [SAR range maps](#)
- [Citizen science databases – eBird and iNaturalist](#)
- [High-resolution aerial photography of the property](#)
- [Natural and physical feature layers from Land Information Ontario \(LIO\)](#)
- [Credit Valley Conservation Data](#)
- [Toronto and Region Conservation Authority Data](#)

Other sources of information, such as aerial photography and topographic maps, should be consulted prior to commencing field assessments.

13.7 Hydrogeology

- [Oak Ridges Moraine Groundwater Program](#)
- [MECP Technical Guidance Hydrogeological Studies for Category 3 PTTW \(2016\)](#)
- [MNR Hydrogeological Report Standards for Pits and Quarries \(2006\)](#)
- [Clean Water Act Technical Rules \(2021\)](#)
- [CVC / TRCA Headwater Drainage Feature Guidelines](#)
- [Professional Geoscientists Ontario Guidelines for Groundwater Assessments](#)
- [Ontario Groundwater Monitoring Network \(OGMN\) data portal](#)

Best Practice References

- [MNR \(2006\) Hydrogeological Report Standards for Pits and Quarries](#)
- Professional Geoscientists Ontario (2019) Guideline for Groundwater Assessments
- CVC and TRCA Headwater Drainage Feature Assessment Protocols

13.8 Surface Water

- [Town of Caledon, Local Subwatershed Study Terms of Reference, 2024](#)
- [Town of Caledon, Consolidated Linear Infrastructure Environmental Compliance Approval \(CLI ECA\), once approved by Town Council](#)
- [Stormwater Management Guidelines](#), Credit Valley Conservation (CVC), 2022
- [Stormwater Management Planning and Design Manual](#), Ministry of the Environment, 2003
- [Watershed Planning in Ontario: Guidance for land-use planning authorities \(Draft\)](#), Ministry of the Environment, Conservation and Parks (MECP) and Ministry of Natural Resources (MNR), 2018

- [Low Impact Development Stormwater Management Guidance Manual](#) (Draft), Ministry of the Environment, Conservation and Parks (MECP), 2022
- [Subwatershed Planning Guide](#) (Draft), Ministry of the Environment, Conservation and Parks (MECP), 2022
- [Municipal Consolidated Linear Infrastructure Environmental Compliance Approvals](#), Ministry of the Environment (MECP), 2023
- [Technical Guide: River and Stream Systems: Flooding Hazard Limit](#), Ministry of Natural Resources: Water Resources Section, 2002
- [Climate Change Master Plan 2020–2030](#), Region of Peel, 2019
- [Evaluation, Classification and Management of Headwater Drainage Features Guideline](#), Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC), 2014
- Scoped Subwatershed Study, [Part A](#), [Part B](#) and [Part C](#) – Peel Settlement Area Boundary Expansion, Wood Environment and Infrastructure Solutions, 2022
- [Erosion and Sediment Control Guideline for Urban Construction](#), Greater Golden Horseshoe Area Conservation Authorities, 2006
- [Community Climate Change Action Plan](#), Town of Caledon, 2021
- [Credit Valley Conservation Watershed Plan](#) (in progress)
- [Watershed Plans](#), Toronto and Region Conservation Authority
- [Environmental Protection Act](#)
- [Ontario Water Resources Act](#)
- [Lakes and Rivers Improvement Act](#)
- [Clean Water Act](#)
- [Conservation Authorities Act](#)
- [Ontario Regulation 41/24](#): Prohibited Activities, Exemptions and Permits
- [Ontario Regulations 596/22](#): Prescribed Acts and [474/24](#): Minister’s Reviews Under Sections 28.1 and 28.1.2 of the Act and Minister’s Orders Under Section 28.11 of the Act

13.9 Site Plan Requirements

- [Aggregate Resources Act](#)
- [Ontario Regulation 244/97: GENERAL](#)
- [Ontario Regulation 406/19: ON-SITE AND EXCESS SOIL MANAGEMENT](#)
- [Aggregate resources policies and procedures](#)
- [Annual Compliance Reporting, Aggregates Resources Ontario](#)
- [Central Forms Repository, Compliance Assessment Report Aggregate Resources Act \(Licences and Permits\)](#)
- [Aggregate Resources of Ontario: Site Plan Standards August 2020](#)
- [Provincial Planning Statement \(2024\)](#)
- [Town of Caledon Official Plan \(2025\)](#)
- [Town of Caledon Zoning By-law](#)
- [Halton Region Aggregate Resources Reference Manual \(2020\)](#)

13.10 Social Impacts

- [Good Practice in Social Impact Assessment](#)
- [Social Impact Assessment Guidance - IAIA](#)
- [Social Impact Assessment Guide, June 2023](#)

13.11 Transportation

- Caledon Traffic Impact Study Terms of Reference and Guidelines, 2017
- [Multi-Modal Transportation Master Plan](#), Town of Caledon, 2024
- [Traffic Impact Study Guidelines](#), Peel Region
- [2051 Transportation Master Plan](#), Peel Region
- [Highway Traffic Act + O. Reg. 413/05 \(Vehicle Weights and Dimensions—For Safe, Productive and Infrastructure-Friendly Vehicles\)](#)

14. Appendix A: Extended descriptions for complex images within this report

Figure 1

A cross-section illustration of a blasting pit/quarry. The illustration's title is "Backfilling Pits and Quarries with Excess Soil: Conceptual Site Plan – Typical Conditions." The image shows multiple layers beneath the grass/topsoil layer. The topsoil layer is labelled "Original Grade." A slightly different coloured section of the top layer overtop of a section of the open pit area is labelled "Final Restoration Grade," implying that the final result of a pit in-fill would be to create conditions similar to those pre-blasting.

The first level down includes sections labelled: "Surface water fed pond," "Perched groundwater," "Aquitard (Clay)," "Surface Water and Perched Groundwater Fed Pond," and "Overburden." Within this layer, there is a vertical marker with labels "Table 2.1 & 3.1," "Table 4.1 & 5.1," and "Table 6.1 & 7.1."

The next layer down has sections labelled "Overburden" and "Below Water Table Overburden Extraction Area." The vertical marker on this layer includes the text "Table 1 and /or Water Body Fill Guidelines."

The final layer is labelled "Bedrock" and "Below Water Table Bedrock Extraction Area."

Above the illustration is a text box, which reads "Notes: Tables 2.1, 4.1 and 6.1 are for potable groundwater conditions. Site specific studies can also be used to determine appropriate soil quality standards including:

- Beneficial Reuse Assessment Tool (BRAT)
- Site Specific Risk Assessment (SSRA)
- Fill Quality Guide and the Good Management Practices for Shore-infilling in Ontario