Karst Assessment / Karst Contingency Plan

PURPOSE:

This document provides guidance for the completion of Karst Assessments / Karst Contingency Plans, which may be required for the submission of an application under the *Planning Act*. All Karst Assessments / Karst Contingency Plans shall follow the requirements referenced in this document and as may be further identified by the City or Conservation Authority.

A Karst Assessment / Karst Contingency Plan provides information regarding the presence or potential presence of karst features and related hazards on a property. A Karst Assessment / Karst Contingency Plan will be required where development is proposed in areas of known or suspected karst. It is used to identify and evaluate the potential presence of karst features, to provide a geological, hydrological, and hydrogeological characterization of features present, and to identify associated hazards and risks related to development of a site. The assessment should provide recommendations on the most appropriate strategies for conserving karst features and functions, and/or for mitigating associated hazards as may be determined to be appropriate.

PREPARED BY:

The Karst Assessment / Karst Contingency Plan must be prepared by a consultant registered as a Professional Engineer (P.Eng.) or Professional Geoscientist in the province of Ontario. The consultant must affix their stamp and seal and specifically identify the engineer who prepared the work. The consultant is expected to be a qualified consultant experienced in karst.

CONTENTS:

A Karst Assessment / Karst Contingency Plan is generally comprised of five (5) stages or phases as outlined below. The minimum requirement for a Karst Assessment / Karst Contingency Plan is completion of Stages 1-3. The findings from these stages (1-3) will determine if the remaining stages (4-5) are to be completed. The level of effort and detail to be included in any given stage should be based on site conditions and complexity, as well as the type and scale of development proposed. Large-scale and intensive developments, sites with complex geological/hydrogeological conditions, or areas with known karst features will require a more detailed assessment to be completed.

Stage 1 - Background Information Review:

- Review available mapping for site, including topography, geology, physiography, soils, hydrology, hydrogeology, etc.;
- Review and compare current and historic aerial photos and imagery for the site;
- Review available surface and groundwater well records; and,
- Review existing available technical studies and scientific reports relevant to the site and surrounding area.

Stage 2 - Site Inspection:

- Undertake a visual inspection of the site to review and confirm Stage 1 findings;
- More than one site visit may be required to observe site under different conditions, including during/after rain events;
- Review site topography, depressions, drainage patterns, soils, etc.; and,
- Document and photograph site conditions.

Stage 3 - Summary Report:

- Review findings and observations from Stages 1 and 2 to determine if further site investigation is required to confirm and characterize site conditions and karst features/hazards; and,
- Document Stage 1 and 2 work in a summary report, including description of site and hazards, and any recommendations related to site development.

Stage 4 - Subsurface Investigation:

- Design and carry-out subsurface investigation to confirm and map extent of karst features, to identify surface/sub-surface drainage patterns, and to assess hazards; and,
- Indirect/passive (geophysical approaches such as ground penetrating radar) and/or direct/invasive (test pits, drilling/boring, dye tracing, etc.) investigation methods may be required depending on site characteristics and type of proposed development.
- Consider the use of LiDAR-based terrain analysis to support identification and assessment of karst features, and define contingency measures for addressing unexpected karst features encountered during construction.

Stage 5 - Analysis and Detailed Report:

- Document Stage 1-5 work in a detailed report to characterize site conditions and hazards and provide appropriate recommendations related to the conservation of karst features/functions, hazard mitigation, and site development.

OTHER INFORMATION:

Ministry of Natural Resources (1996). Hazardous Sites Technical Guide.

Brunton, F. (2013). Karst and Hazards Lands Mitigation: Some Guidelines for Geological and Geotechnical Investigations in Ontario Karst Terrains.

Buck, M.J., S.R.H. Worthington and D.C. Ford. (2003). Earth Science Inventory and Evaluation of the Eramosa Karst Area of Natural and Scientific Interest.

REVIEWED AND APPROVED BY:

Natural Heritage, Planning and Economic Development Department

The Conservation Authority with regulatory authority over the subject lands, namely:

- Hamilton Conservation Authority
- Conservation Halton
- Niagara Peninsula Conservation Authority
- Grand River Conservation Authority

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