

# Foundation Drainage Guidelines

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For comments or suggestions, please email:

[foundationdrainagepolicy@toronto.ca](mailto:foundationdrainagepolicy@toronto.ca)

City of Toronto, Toronto Water  
Water Infrastructure Management  
55 John Street, 18<sup>th</sup> Floor  
Toronto, ON M5V 3C6

*All application-specific inquiries should be directed to the City  
of Toronto, Engineering and Construction Services,  
Engineering Review case manager.*

*Foundation Drainage Guidelines*

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# 1.0 Introduction

## 1.1 Purpose

The purpose of the *Foundation Drainage Guidelines* (“Guidelines”) is to provide minimum groundwater monitoring, groundwater level & flow estimation analysis and submission requirements to support development review in the implementation of the City of Toronto’s (“City”) *Foundation Drainage Policy* (“Policy”).

## 1.2 Applicability

The Guidelines are applicable to new development applications seeking to determine how foundation drainage should be managed in relation to the City’s sewer systems, in accordance with the Policy, effective January 1, 2022.

The Guidelines are intended to support the completion of the “Foundation Drainage Summary Form” (Appendix A) accompanying a “Foundation Drainage Technical Brief”, as part of the complete [Application Support Material](#) submitted for development applications.

Section 3.0 describes the application review process for how the Policy can be applied in identifying options for managing foundation drainage at development sites and subsequent submission and review requirements.

## 1.3 Limitations

The Guidelines do not supercede the requirements of the [Hydrological Review Terms of Reference](#) that may be required for obtaining [Discharge Permits & Agreements for Private Water](#), under the following scenarios, but not limited to:

- 1) Long-term discharge of foundation drainage to the City’s sewers, where exemptions to the Policy are granted.
- 2) Short-term discharge of foundation drainage to allow for future emergency repair of foundation drainage infrastructure.
- 3) Short-term discharge for for construction dewatering.

## 2.0 Groundwater Monitoring

A qualified professional with a P.Eng. or P.Geo. license shall undertake groundwater monitoring to establish the potential interaction between infiltrated stormwater and groundwater collected by foundation drainage systems (as per Policy Statement 4.3).

Groundwater monitoring findings, analysis and interpretation will be summarized in the “Foundation Drainage Summary Form” (See Appendix A) along with supporting data and information, which is to be provided in a “Foundation Drainage Technical Brief”.

### 2.1 Monitoring Wells

Monitoring well requirements shall be in accordance with the *Hydrological Review Terms of Reference*. As per the *Terms of Reference*:

- a) A minimum of five (5) groundwater monitoring wells shall be installed to measure static groundwater levels.
- b) Monitoring well locations shall be identified by the qualified professional such that that they sufficiently characterize the hydrogeology of the site.
- c) Monitoring wells shall be installed with a minimum of 3.8 cm diameter and 2 m below the lowest elevation of the proposed structure(s).
- d) At least one (1) monitoring well shall be drilled to a minimum 10 m depth below the lowest elevation of the proposed structure(s), or to bedrock, whichever is shallower.
- e) Where site-specific constraints are identified, or where the site area exceeds 30m x 30m, the number of monitoring wells, locations and depth shall be based on the qualified professional’s judgement.

## 2.2 Monitoring Period

Static GWL in the monitoring wells shall be measured manually or by using pressure transducers and data loggers (or similar instrumentation). Based on site-specific conditions and circumstances, the qualified professional may choose the monitoring period from one (1) of the following two (2) options:

- **Option 1 (Flexible, Year-Round)** - Capture a minimum of three (3) static GWL measurements, taken every two weeks, within any period of the calendar year.
- **Option 2 (Peak Season)** - Capture a minimum of six (6) static GWL measurements, taken every two weeks, within the months of April, May and June.

The first static GWL measurement must be taken at least 48 hrs after the monitoring well installation.

## 2.3 Maximum Anticipated GWL Estimation

Based on the GWL measurements observed during the monitoring period, the qualified professional will estimate the Maximum Anticipated GWL. The Maximum Anticipated GWL will be compared in relation to the lowest elevation of the building structure to determine the potential for infiltrated stormwater to interact/mix with groundwater collected by foundation drains.

The Maximum Anticipated GWL shall be calculated by adding a fluctuation allowance to the peak measured static GWL. The fluctuation allowance is intended to account for seasonal and multi-year fluctuations in groundwater and shall be determined via one of the following methods:

- Where **Option 1 - Flexible, Year-Round** monitoring approach is undertaken, the Maximum Anticipated GWL shall be determined by adding the respective fluctuation allowance to the peak measured static GWL based on the month of measurement, as tabulated in Table 1.

**Table 1: Fluctuation Allowance for determining Maximum Anticipated GWL**

<b>Month of Observed Peak Static GWL</b>	<b>Fluctuation Allowance [m]</b>
January	1.9 m
February	2.1 m
March	1.9 m
April	1.6 m
May	1.3 m
June	1.9 m
July	3.1 m
August	2.4 m
September	2.6 m
October	2.8 m
November	2.3 m
December	2.4 m

Maximum Anticipated GWL = Peak Static GWL Observed + Flucturation Allowance

Maximum Anticipated GWL cannot exceed the ground surface.

- Where **Option 2 - Peak Season** monitoring approach is undertaken, a fluctuation allowance of 0.8 m shall be added to the peak measured static GWL.

The Maximum Anticipated GWL is not intended for use in structural engineering design or as a substitute for professional judgement of the qualified professional for any other foundation drainage-related engineering design decision.

## 2.4 Peak Flow Estimation

A qualified professional with a P.Eng. license shall be responsible for the preparation of a *Servicing Report* and a *Stormwater Management Report* and determine the peak discharge flow of foundation drainage, where proposed to the City's sewer system:

- a) Where the discharge of foundation drainage is determined to contain only infiltrated stormwater during wet weather events, total peak stormwater flows from the site shall meet water quantity discharge targets in accordance with the City's *Wet Weather Flow Management Guidelines*, prior to discharge to the City's storm or combined sewer (i.e., when no storm sewers are available) system.
- b) Where the discharge of foundation drainage is proposed to the sanitary or combined system, the peak discharge shall also be estimated and assessed for all applicable flow conditions (e.g., design and extreme wet weather flow), in accordance with the City's *Sewer Capacity Assessment Guidelines*.



### 3.0 Application Review

The process for the application of the Foundation Drainage Policy, as part of the development application, is set out in the figure below:

