3D Model Submission

Terms of Reference

September 2026








MARKHAM

Introduction

WHY DO WE NEED A 3D MODEL?

Purpose

The purpose of this TOR is to establish clear and consistent requirements for the preparation and submission of 3D models for development applications in Markham's Intensification Areas.

It will ensure models are accurate, standardized, and compatible with the City's CityEngine platform to support efficient planning and urban design review.

Background

Over the past several decades, Markham has grown from a suburban municipality into one of Canada's fastest-growing and most diverse cities. Population growth, job creation, and investment in transit and municipal infrastructure have driven significant development across the city, particularly within designated Intensification Areas. As these areas continue to support higher-density and mixed-use development, new proposals must be carefully reviewed to ensure they align with the City's long-term planning, urban design, and livability goals.

To support this review, the City uses three-dimensional computer-generated models ("3D models") as part of the development application review process. These models combine proposed developments with existing and planned buildings, infrastructure, parks, and public spaces to provide a digital representation of the urban environment. This helps staff better understand how a proposal fits within its context and assess key considerations such as scale, massing, height, shadow impacts, and the relationship between a development and its surroundings.

For developments located within Markham's Intensification Areas, submitted 3D models are integrated into the City's CityEngine platform to support planning and urban design review. These Terms of Reference set out the City's requirements for preparing and submitting 3D models to ensure they are consistent, accurate, and compatible with the City's digital planning tools.



Figure 1: Example of a CityEngine model for Markham Centre

Policy Context

The submission and review of 3D models can support the implementation of Markham's Official Plan Policies:

6.1.8.2 "To design and place buildings on sites based on their relationship to their location and context, their character and use, and their ability to enhance existing site conditions and positively contribute to adjacent development and the public realm."

6.1.8.3 "To organize and distribute the density across a site through site planning to address:

a) building height and massing;
b) transition between areas of different intensities and uses; and
c) relationships between buildings, streets and open space.

6.1.8.8 "To develop and adopt built form, height and massing guidelines to guide built form and site development within Markham's communities and identify best practices that can be employed to create walkable, connected and transit-supportive neighbourhoods and communities."

WHEN IS A 3D MODEL REQUIRED?

Development Application Types

A 3D model is required for development applications involving built form submitted through the following application types:

- Official Plan Amendment (3D massing model)
- Zoning By-law Amendment (3D massing model)
- Site Plan Control (detailed 3D model)

3D Model Types: 3D Massing Models and Detailed 3D Models

At the Official Plan Amendment and/or Zoning By-law Amendment stage, applicants are required to submit a 3D massing model. A 3D massing model illustrates the overall shape, size, and form of a proposed building and is used to assess how a development fits within its surrounding context, including:

- Building height
- Overall building form
- Floor plate size
- Setbacks and stepbacks
- Building location on the site
- Shadow and view impacts
- Relationship to adjacent buildings, streets, and public spaces

At the Site Plan Control stage, the City may require a detailed 3D model. In addition to massing information, a detailed 3D model includes a higher level of architectural and site design detail to support a more comprehensive review of the proposed development. This may include:

- Building articulation, windows, balconies, and roof elements
- Exterior building materials and colours
- Ground-floor design and building entrances
- Landscape features and grading
- Streetscape elements
- Amenity areas and site furnishings

The level of detail required will be determined by the City based on the location, complexity, and potential impacts of the proposed development. Applicants should confirm the required model type and level of detail with the Project Planner and Urban Designer during Pre-Application Consultation.

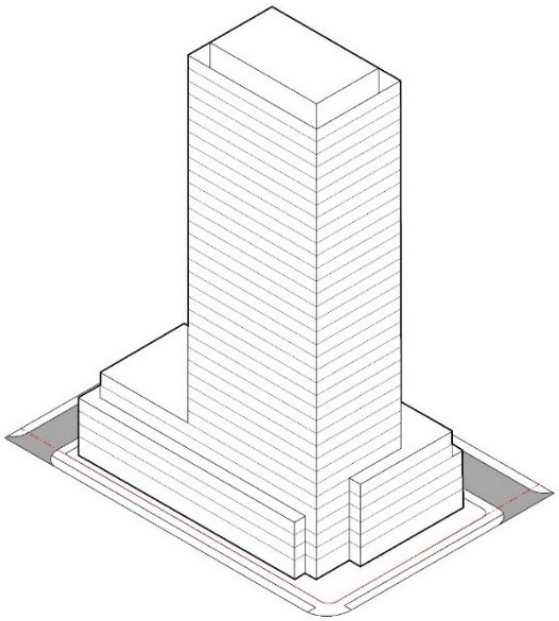


Figure 2: Example of a 3D Massing Model

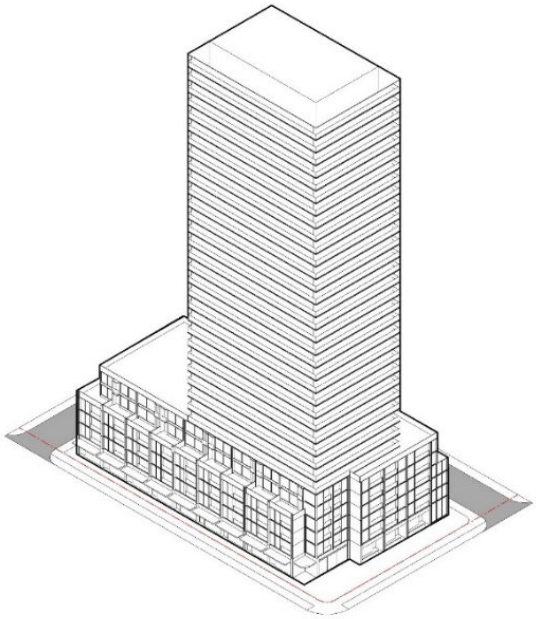


Figure 3: Example of a Detailed 3D Model

Exemptions

A 3D model is exempt for applications that do not include built form, such as parking lot expansions, transformer installations, or similar site works. Low-rise development applications, including townhouse developments and certain institutional, commercial, and industrial projects, are exempt on a case-by-case basis based on factors of scale, complexity and potential impacts on their surroundings.

WHO PREPARES THE 3D MODEL?

The development applicant or their consultant may prepare the 3D model, provided that it meets the structural and formatting requirements outlined below.

Structure and Format

WHAT SHOULD BE INCLUDED?

Submission Requirements

If a 3D model is required for the application, either massing or detailed, it must be submitted in accordance with the following requirements:

- Name the file using the following convention:

  3D_CityFileNumber_Address_R#

  Example: 3D_SPC26123456_101TownCentreBlvd_R0

  - R#: Identify the original submission as R0 and each subsequent resubmission in chronological order, such as R1 for Revision 1 and R2 for Revision 2.
  - City File Number: Use the file number assigned to the Planning Application submission.
- Compress large submissions into a ZIP file; the total submission must not exceed 75 MB.
- Use metric units at a 1:1 scale.
- Use the City's required geographic coordinate system, NAD 1983 UTM Zone 17N, and position the model geographically correctly.
- A 3D model mass that includes:
  - The building envelope and external structure only, with no interior separations.
  - Relevant landscape layers where landscape is a major component of the development.
  - Property survey information, dimensions, and average grade at sea level.
  - Closed polygons.
  - Street name labels.
  - Building outlines and minimum setbacks with dimensions.
  - Curbs, parking areas, and ingress/egress points.
  - Underground parking outline, including entrance and exit locations.
  - Loading areas and docks.
  - Separate existing and proposed conditions using distinct layers and clear naming conventions.
- Separate required model elements onto distinct layers, then create a block or group where appropriate to maintain model organization.
- Convert all Building Information Modeling components or objects to polygonal modeling objects.

- At minimum, organize the model into the following required layers: Envelope, External Structure Element, and Property Survey Information; additional layers may be used where needed for clarity, provided existing and proposed elements remain clearly separated.
- Do not encrypt drawings or apply password protection.

3D Model Format

Preferred format:

- SKP – SketchUp 2022 or newer

Acceptable format:

- DWG – AutoCAD 2024 or earlier (ensure that all work is saved in model space)
- OBJ – Wavefront Technologies
- DAE – COLLADA interchange format

KMZ – Keyhole Markup Language ZippedAll models should be able to be exported to a format compatible with CityEngine (i.e. KMZ format).

WHAT ELSE SHOULD WE KNOW?

Submission Process

Upload the 3D model and all required plans or drawings to the Drawings > Urban Design folder in ProjectDox.

City staff will conduct a Quick Review to determine whether the submitted Model is complete enough to support application review or requires revision before the application proceeds.

- If the 3D model meets the Terms of Reference:
    - The Project Urban Designer will mark the deeming quick review task in ProjectDox as “Accepted,” and the application review process may proceed.
- If the 3D model does not meet the Terms of Reference:
    - The Project Urban Designer will mark the task as “Commented” in ProjectDox, identify the reason the Model does not meet City requirements, and notify the Project Planner.

- The Project Planner will deem the application incomplete in ProjectDox and advise the applicant to revise and resubmit the Model in accordance with these Terms of Reference and any City comments provided.

WHAT OTHER RESOURCES ARE THERE?

- City of Markham Official Plan (2014)
- Markham Built Form, Height, and Massing Principles (2010)

Questions

If you have any questions about submitting a project-specific 3D model, please contact your Project Planner.

Other technical concerns may be directed to DSC@markham.ca.