gbXML Geometry Benchmark Tests
Whole Building Test Case #1 - Medium-Sized Office Building

Introduction

Geometry benchmark tests help to ensure that, as building geometry produced by building designers becomes more complex, the geometry produced for energy and heating and cooling loads analysis maintains the integrity of information that is required for a proper and detailed analysis.

gbXML.org maintains this battery of benchmark tests for vendors and other interested parties to ensure compliance with gbXML.org's standards for geometry accuracy and completeness. These tests are prescriptive and serve as marks of excellence that identify the ability of a technology to translate geometry properly from its native format to gbXML

This test (Whole Building Test Case #1) is a replica of a DOE medium sized office reference building. The reference buildings are used by the DOE as a way to estimate how average building types will perform over different climate zones.

This test is a Phase 2 test, and as such, does not have Space Name constraints. There are a total of 18 zones in this model, consists of three stories, and includes 3 Plenum Zones. There is no wall thickness associated with this test, all volumes have been created with walls of zero thickness.

The dimensions of core and perimeter zones, with some additional coordinates, are listed in Figure 1 below. Each of the three floors have identical zoning arrangements and coordinates, with only differences in the z value of each coordinate. The various z-heights are shown in Figure 3.

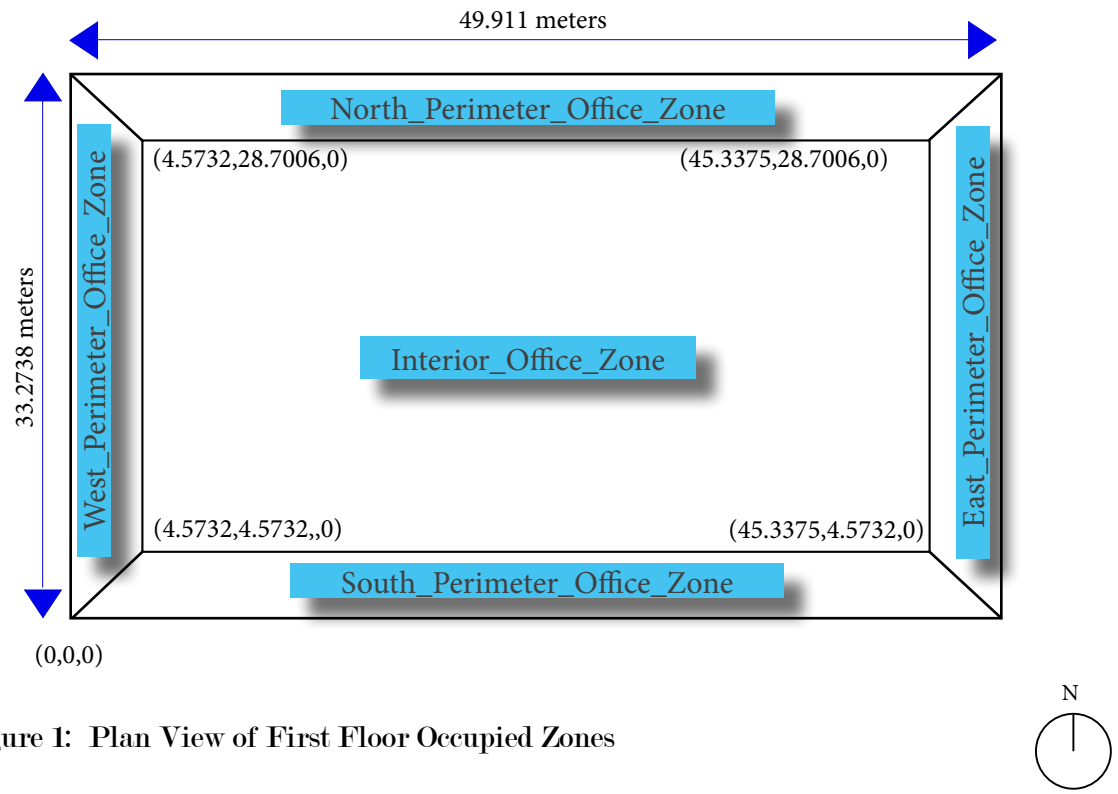

Figure 1: Plan View of First Floor Occupied Zones

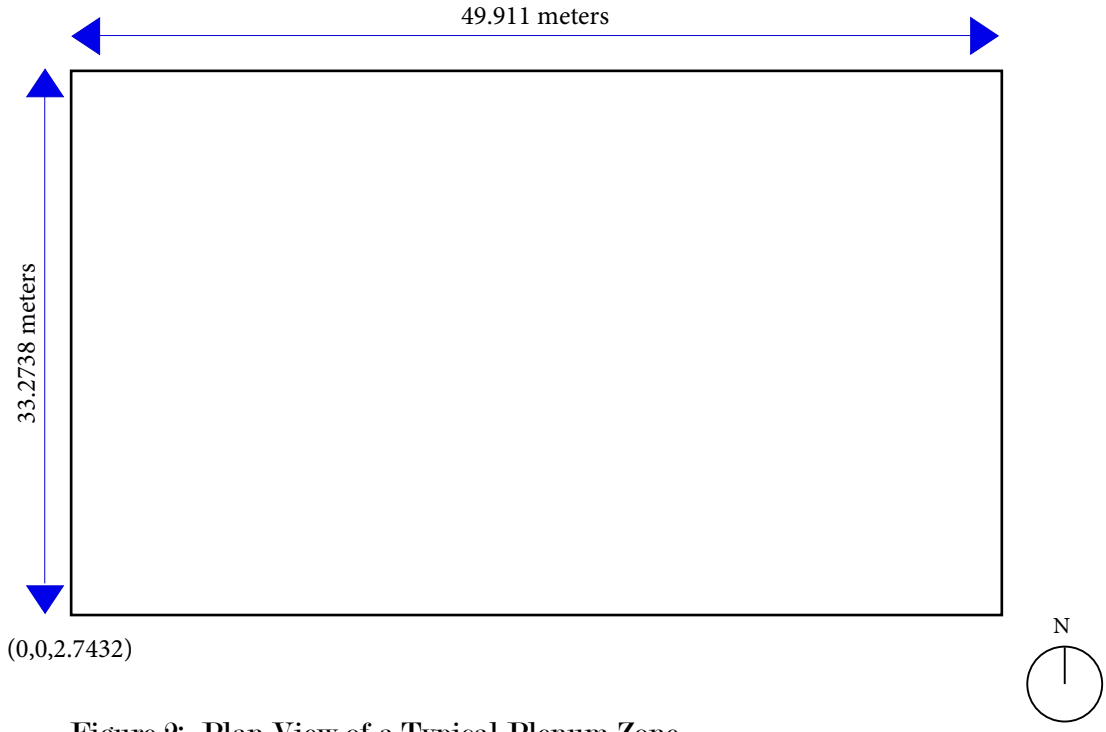

Figure 2: Plan View of a Typical Plenum Zone

The first floor plenum, shown in Figure 2 above, is stacked directly on top of the first floor zones shown in Figure 1. X,Y,Z coordinates of the lower left hand corner are shown. A stacking diagram of the whole building is shown in Figure 3, so other z-heights are known and can be used to draw the other floors not shown in Figures 1 and 2.

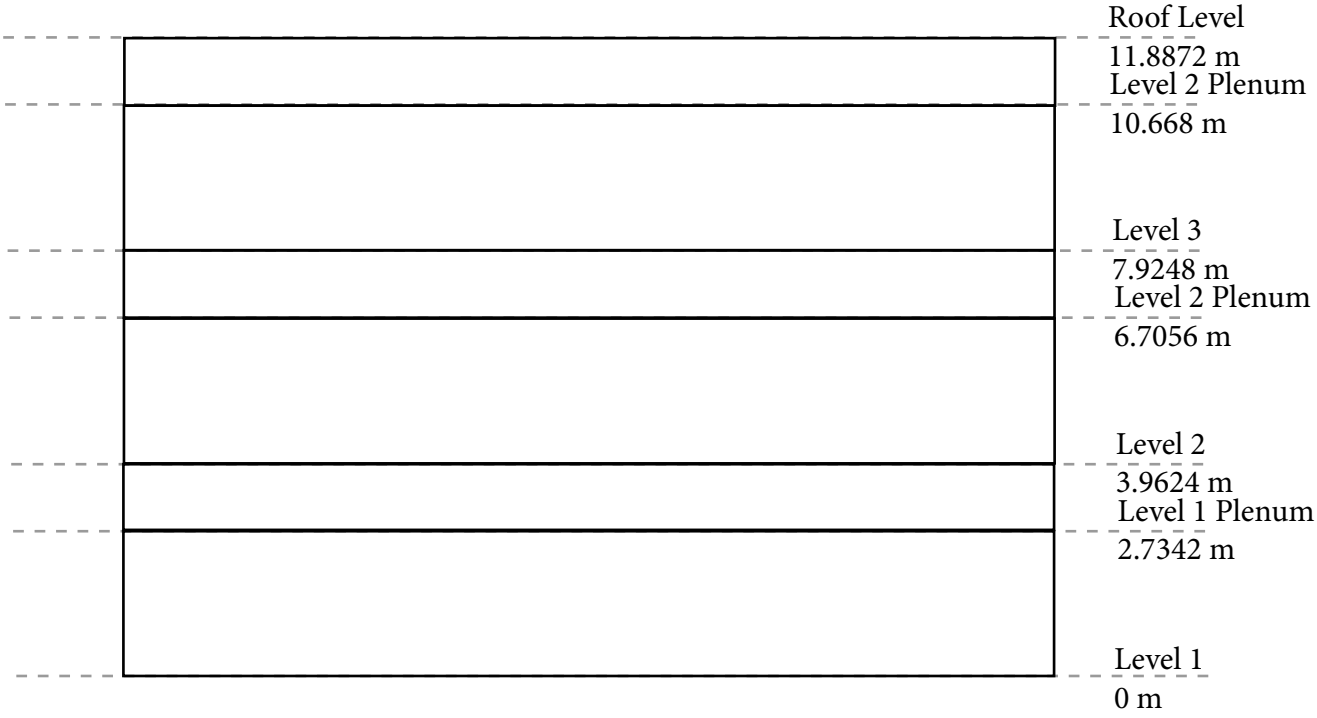

Figure 3: Stacking Diagram of Floors and Plenums

There are also windows in this model. These will not be tested for absolute placement, but the test will assure that the window to wall ratio does not exceed 40% for each facade orientation (North, South, East, and West). The wall area should include the wall area of the plenum when determining th 40% threshold.

In Figure 4 below, is a Sketchup representation of the Standard gbXML file, where the south (longer, dominant in the view) and east (shortened by perspective, secondary facade in the view) can be seen. The north and west facade are hidden.

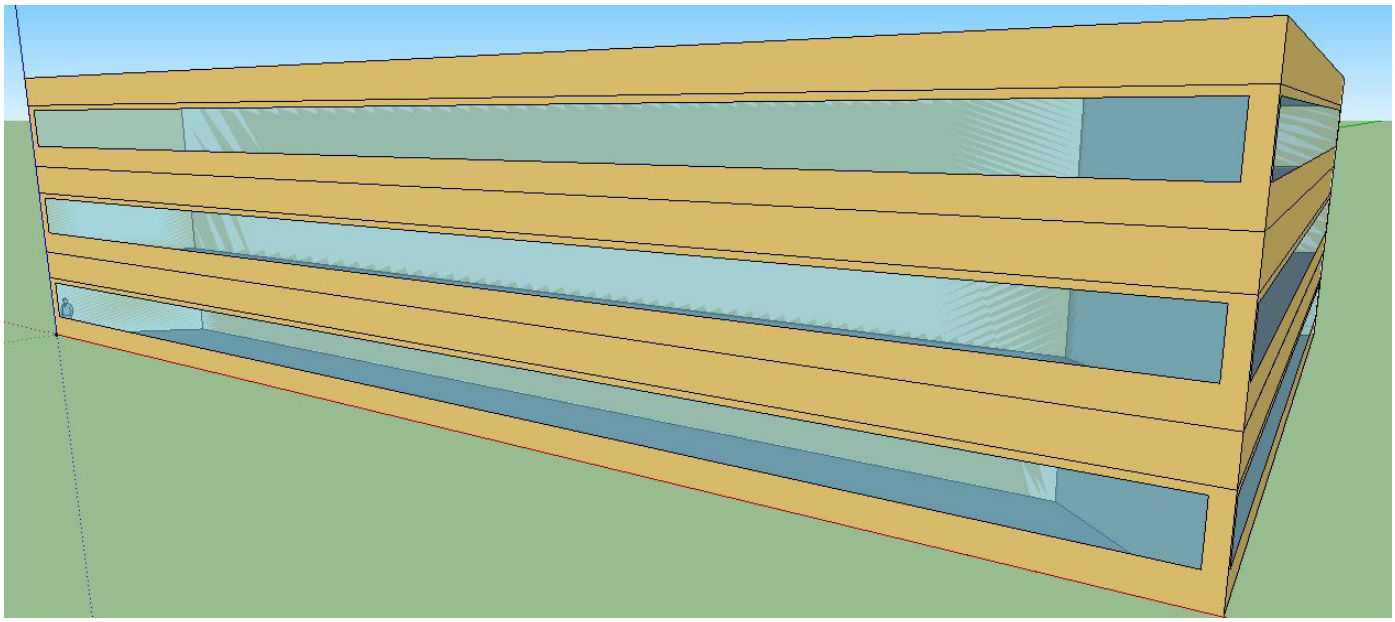

Figure 4: Axonometric View of the Finished Model

This test has not been run often in the community and therefore common mishaps are not known at this time.

Resulting common issues will be related to interested parties as different CAD/BIM vendors complete this test.