README: NYC 3D BUILDING MODEL

Common name of dataset

NYC 3D Model by Community District

Name of data set in spatial data warehouse

Tags

3D, NYC, Buildings, Community District, Model, Rhino

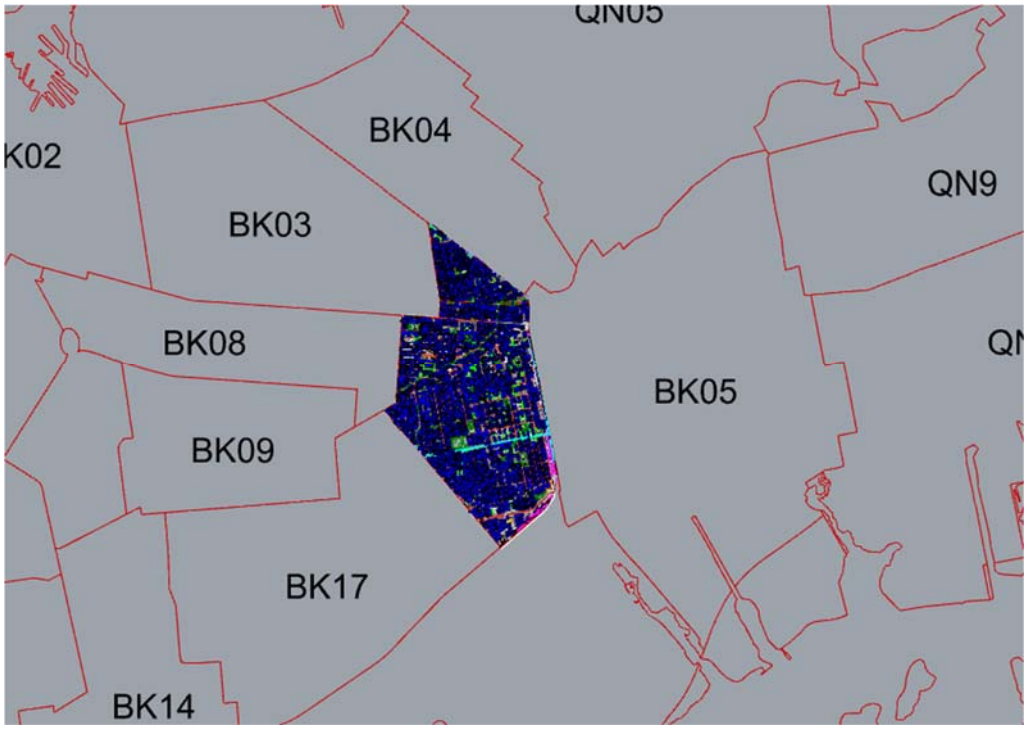
Summary

The NYC 3D Building Model is a publicly available model consisting of every building in New York City present in 2014. The model is subdivided by community district and includes base layers such as lots, streets, parks, and rail lines.

Description

A 3D Model consisting of every building in New York City present in 2014. The model is based on DOITT's 2014 aerial survey, which provides roof structure details, including a high-level of detail for certain iconic buildings. The Department of City Planning imported the DOITT files and then converted the model into .3dm format, which is compatible with Rhinoceros 3D modeling software. DCP then divided the model into the City's 59 Community Districts and enriched each CD with base layers, including lots, streets, parks, and rail lines.

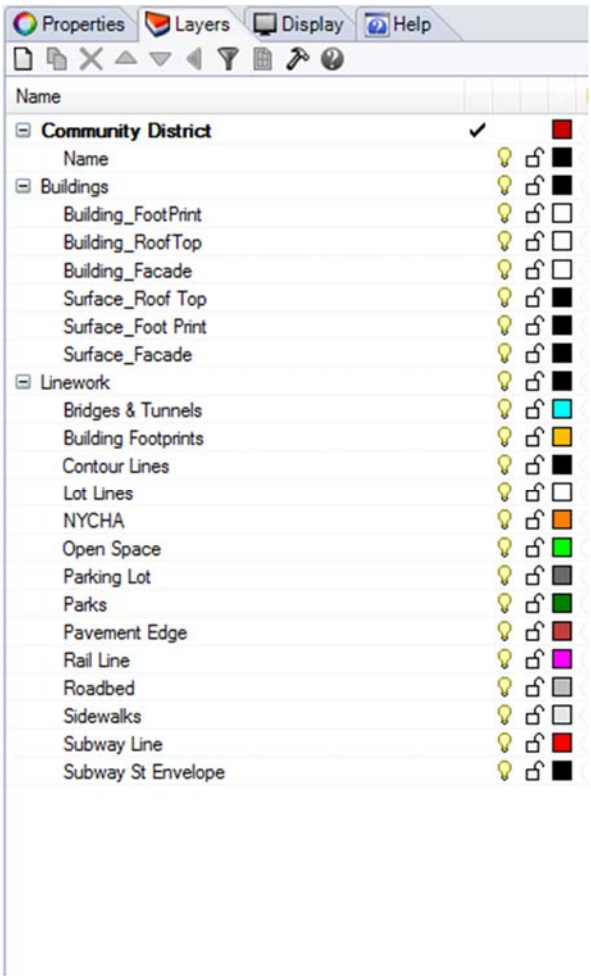
Each Community District Model is nested within a map of New York City with labels marking each individual Community District.



Each model has the same layer convention in Rhino, consisting of three primary layers with multiple secondary layers.

1. The **Community Districts** Layer is consistent throughout the model and has a sublayer with labels using the two-letter borough acronym with the community district number
2. The **Buildings** layer consists of six sublayers. These layers are split into "building" layers, which include basic linework for footprints, rooftops, and facades (each on their own separate layer) and "Surface" layers, which are the filled surfaces of the same linework. Individual buildings are not joined. Each consists of these six components spread across these secondary layers. The buildings in the model are at their correct elevation, rather than sitting on a flat plane.
3. The **Linework** layer consists of 14 secondary layers, which were imported to Rhino via the Rhino Grasshopper-Meerkat plug-in.
    - Bridges & Tunnels - New York Statewide Flyover 2014 Planimetrics
    - Building Footprints- DoITT, 8/27/2015
    - Contour Lines– DoITT Planimetrics, based on 2006 imagery
    - Lot Lines – MapPLUTO, version 18V1
    - NYCHA – New York City Housing Authority, Public Housing Developments as of July 2016
    - Open Space – DoITT Planimetrics, published 2/29/16, based on 2014 imagery
    - Parking Lot – DoITT Planimetrics, published 2/29/16, based on 2014 imagery
    - Parks – DoITT Planimetrics, published 2/29/16, based on 2014 imagery
    - Pavement Edge – DoITT Planimetrics, published 2/29/16, based on 2014 imagery
    - Rail Line – DoITT Planimetrics, published 2/29/16, based on 2014 imagery
    - Roadbed – DoITT Planimetrics, published 2/29/16, based on 2014 imagery

- Sidewalks – DoITT Planimetrics, published 2/29/16, based on 2014 imagery
- Subway Line – NYCT, published 7/15/2010
- Subway Station Envelope – NYCT, published 7/15/2010



The 3D model can be imported into most common 3D-modeling software, including Sketchup.

Data steward

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Data engineer

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Credits

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Use limitations

The NYC 3D Model is being provided by the Department of City Planning (DCP) on DCP's website for informational purposes only. DCP does not warranty the completeness, accuracy, content, or fitness for any particular purpose or use of the NYC 3D Model, nor are any such warranties to be implied or inferred with respect to the NYC 3D Model as furnished on the website. DCP and the City are not liable for any deficiencies in the completeness, accuracy, content, or fitness for any particular purpose or use of the NYC 3D Model, or applications utilizing the NYC 3D Model, provided by any third party.

Update frequency

While the original DOITT model was a one-time capture, the Department of City Planning will make incremental changes to the model over time, including the addition of newly constructed buildings and other significant interventions in the built environment.

A detailed change history will be updated over time as buildings are added to the model.

Date of last update

Data: 8/23/2018
Last Update: 8/23/2018
Metadata: 8/23/2018
Update Frequency: The 3D model was a one-time capture. Updates and extensions may be considered in the future.

Data sources and compilation process (optional)

https://github.com/CityOfNewYork/nyc-geo-metadata/blob/master/Metadata/Metadata_3DBuildingModel.md

Common uses

Environmental Analysis, Contextual Modeling, Impact Analysis (Shadows, Height, etc.), Digital Modeling

Data quality

From DOITT
3D building models were created by stereo compilation with BAE Systems' SocetSET GXP/Hexagon SSK software. Models are based on 2014 aerial photos and the building footprints feature class from the planimetric database. Using the Open Geospatial Consortium's CityGML standards as the basis, the model was developed to a hybrid specification combining elements from Level of Detail (LOD) 1 and 2. When possible, the elevation attributes (ground elevation and roof height) from the building footprint feature class were used for building base and top data collection to ensure vertical consistency. Since roof elevations from the building feature class are based on the highest point of the roof, there are some differences in elevation for the 3D roof infrastructure that is modeled.

Once building roof polygons were created, a digital elevation model (DEM) was used as a ground lattice in conjunction with building base elevation to create a solid model of the buildings. The model was then populated with projection parameters. For LOD 1.5 features, multiple roofs less than 8ft difference were considered as one roof outline and elevation points were placed at the highest point within the roof. For LOD 2 all ridges, dbomes and partitions were captured and assigned elevations with microstation tools.

Approximately 100 iconic buildings were created in LOD 2.

Building data was then converted from DGN/ESRI multipatch file geodatabase formats to CityGML using Safe Software's Feature Manipulation Engine (FME).

For LOD 1.5 buildings, domes and pitched roofs are not rendered. All roof appendages, such as chimneys, parapets, spindles, and antenna are also not included.

For buildings with complex or multiple roof structures, a generalized collection method was used. Small permanent structures (e.g. small towers, elevator shaft, stairs) with less than 10' on a side were not captured.

Caveats

Buildings in the model are not available as distinct polygons. Each model has components spread across six sublayers and will appear at elevation, rather than on a flat plane.

3D models are based on the planimetrics building footprint feature class. The horizontal accuracy (XY) of all planimetric feature classes captured is such that 95% of features are within (plus/minus) 1.25 ft of the actual horizontal location. The vertical accuracy (Z) of all planimetric

feature classes with elevation values is such that 95% of features captured are within (plus/minus) 1.6 ft of the actual elevation.

Permanent structures (e.g. stairwells, towers, etc) with lengths greater than 10' on a side or minimum 100 sq. ft. were captured. Features that are less than 10' but also align with the building planimetric outline are also included.

Future plans

While the original DOITT model was a one-time capture, the Department of City Planning will make incremental changes to the model over time, including the addition of newly constructed buildings and other significant interventions in the built environment.

A detailed change history will be updated over time as buildings are added to the model.

Distribution

Public dataset