ORDNANCE SURVEY GB

OS MASTERMAP TOPOGRAPHY LAYER
– BUILDING HEIGHT ATTRIBUTE
– OVERVIEW

Version history

Version	Date	Description
1.3	10/2020	Minor changes to use of identifiers.
1.4	11/2021	Minor formatting updates. Document name change from Product Guide to Overview.

Purpose of this document

This document provides information about and insight into the OS MasterMap Topography Layer – Building Height Attribute product and its potential applications. For information on the contents and structure of OS MasterMap Topography Layer – Building Height Attribute, please refer to the Getting Started Guide and Technical Specification.

The terms and conditions on which OS MasterMap Topography Layer – Building Height Attribute is made available to you and your organisation are contained in that Ordnance Survey customer contract. Please ensure your organisation has signed a valid current customer contract to be able to use OS MasterMap Topography Layer – Building Height Attribute.

We may change the information in this document at any time, giving you the notice period set out in your contract. We do not accept responsibility for the content of any third-party websites referenced or accessed in or through this document.

This document has been screened according to Ordnance Survey's Equality Scheme. If you have difficulty reading this information in its current format and would like to find out how to access it in a different format (braille, large print, computer disk or in another language), please contact us on:
+44 (0)3456 05 05 05.

Copyright in this document

Trademarks

Ordnance Survey, OS, OS Logos, OSGB36, OS MasterMap and TOID are registered trademarks, and OS MasterMap Topography Layer – Building Height Attribute is a trademark of Ordnance Survey, Britain's mapping agency.

Contact details

OS website 'Contact us' page (https://www.ordnancesurvey.co.uk/contact-us).

Contents

1.   Introduction to the product

OS MasterMap Topography Layer – Building Height Attribute is an enhancement to, and forms part of, the OS MasterMap Topography Layer product. It provides a set of height attributes for Topographic Area features with a buildings theme within OS MasterMap Topography Layer. This initial set has been further enhanced with the inclusion of Tanks, Chimney Stacks and Glasshouses. To use the Building Height Attribution data, it must first be joined to the OS MasterMap Topography Layer holding using the topographic identifiers (TOIDs). The Getting Started Guide for OS MasterMap Topography Layer – Building Height Attribute (https://www.ordnancesurvey.co.uk/documents/building-height-attribute-getting-started-guide.pdf) is available on the OS website and will assist you with this process.

The OS MasterMap Topography Layer – Building Height Attribute product was developed in response to customer demand for height information for buildings and select structures. This additional attribution can be used to make simple 3D visualisations of buildings and structures and to assist users with a range of analytical applications across both public and commercial sectors.

1.1   Product applications

OS MasterMap Topography Layer – Building Height Attribute can be used to enhance the information obtained from OS MasterMap Topography Layer in a range of applications. It can also be integrated with other Ordnance Survey products such as OS Terrain 5 and OS MasterMap Imagery Layer. Potential applications include, but are not limited to, the following:

- To visualise urban landscapes, aiding both planning decisions and the formulation and communication of planning policy.

- To model the impact of development projects rapidly and with increased efficiency.

- To help in emergency planning and risk assessment through enabling the appropriate resources to be deployed more rapidly.

- To help companies understand issues associated with installing and maintaining utilities and services to customers, for example, water and gas pressure calculations, smart meters.

- To use in insurance calculation models through using the heights as a proxy for the number of levels in a building.

- To use in calculations of radio signal propagation and the planning of wireless networks.

- To identify appropriate sites upon which to build renewable energy infrastructures.

Figure 1: Map of an area which has been generated using OS MasterMap Topography Layer.

Figure 2: Map of the same area which has been generated using
OS MasterMap Topography Layer – Building Height Attribute. The buildings and structures are in 3D.

2. Product details

2.1 Height values source data

OS MasterMap Topography Layer – Building Height Attribute data is generated from photogrammetrically derived Digital Terrain Models (DTMs) and Digital Surface Models (DSMs). That is, information gathered from aerial surveys as part of our cyclical revision programmes. DTMs show the bare ground surface, having extruded features such as buildings, trees, etc, whereas DSMs depict the elevations of the top surfaces of buildings, trees, towers and other features elevated above the bare earth.
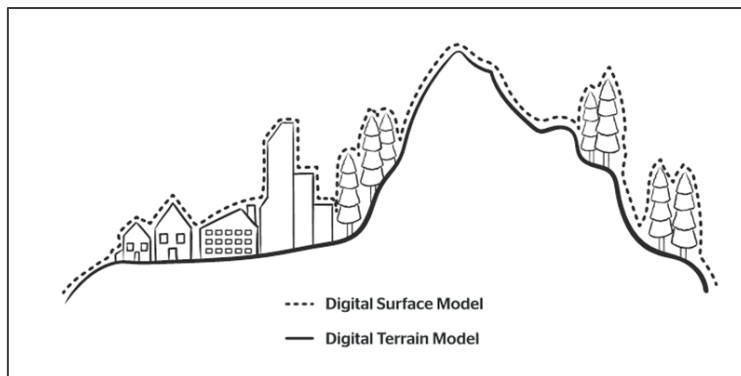

Figure 3: Graphic depicting the difference between DSMs and DTMs, which together form the source data used to create OS MasterMap Topography Layer – Building Height Attribute.

2.2 Height values

2.2.1 Absolute height values

Absolute height values represent absolute heights against Ordnance Datum Newlyn (ODN) at three distinct points within the building structure. The absolute heights require the use of additional terrain height information to provide context to these heights, such as by using them in conjunction with the OS Terrain 5 DTM product. The absolute heights are denoted with the prefix 'Abs'. The unit of measurement used for absolute heights is metres.

AbsHMin
AbsHMin (Absolute Height Minimum) represents the lowest point extracted from the DTM within the footprint of the building as represented in OS MasterMap Topography Layer. This aims to represent the lowest absolute height of the intersection of the external building walls and the underlying ground surface.
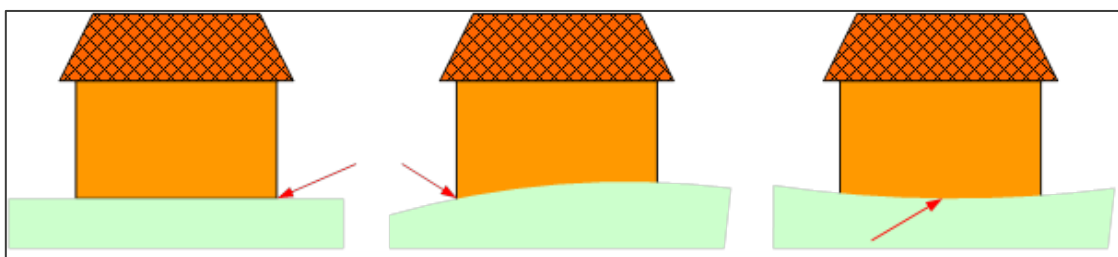

Figure 4: Illustration of absolute minimum height at ground locations.

AbsHMax

AbsHMax (Absolute Height Maximum) represents the highest point of the building extracted from the DSM within the footprint of the building or structure as represented in OS MasterMap Topography Layer. The highest point could be represented by any structure on top of the building, provided it is of sufficient size to be captured in the DSM source data. This may include industrial chimney stacks, machinery and any substantial structures that may be present on top of the building. Smaller structures like chimney stacks as found on residential buildings will be excluded from the AbsHMax measurement.
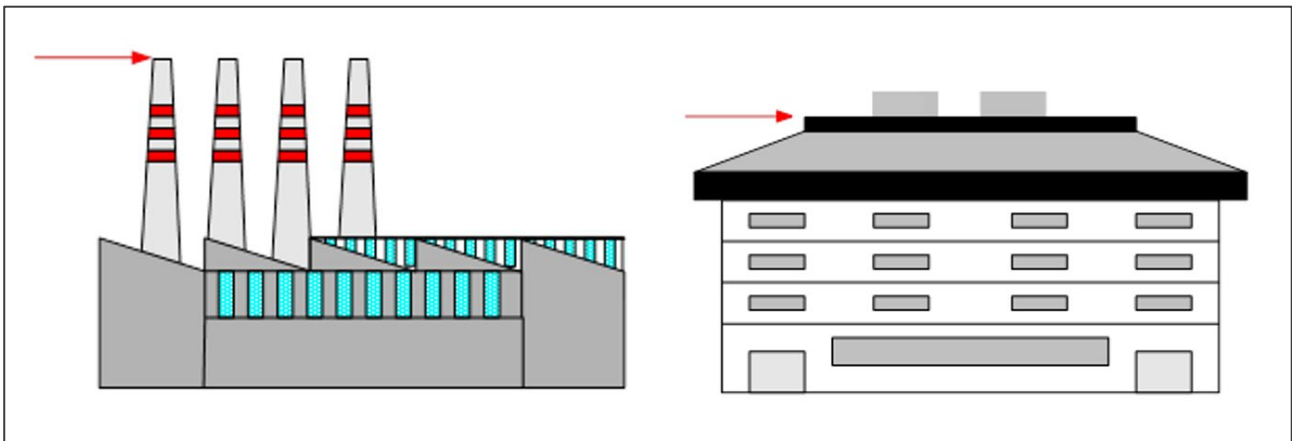

Figure 5: Illustration of possible absolute maximum heights for two buildings.

AbsH2

AbsH2 (Absolute Height 2) is a calculated value which aims to represent the lowest point where the roof intersects the alignment of the external vertical walls of the principal part of the building. This is usually referred to as the building eaves.

The principal part of the building is defined as the main structure, excluding elements at higher or lower elevation. In buildings with multiple heights (for example, a main two storey building with a smaller single storey extension), the eave height is calculated from the largest building extent.
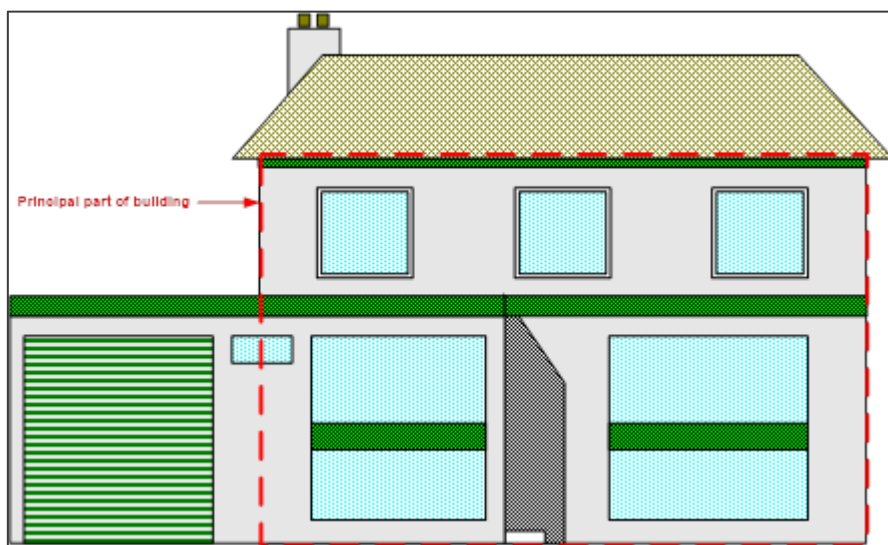

Figure 6: Illustration showing the principal part of a building.

2.2.2 Relative height values

The two relative building height values are generated from the differences between the absolute elevation values. The relative heights can be used in isolation to provide a third dimension to buildings, while all other features will be flat as they refer only to the height of the building, rather than the height above Ordnance Datum Newlyn (ODN). Relative heights are denoted with the prefix 'Rel'. These attributes are also applicable to the Tank, Glasshouse and Chimney Stack structures included in the data. The unit of measurement used for relative heights is metres.

RelHMax
RelHMax (Relative Height Maximum) is the derived value from the calculation of AbsHMax, the calculated absolute value for the building height, minus AbsHMin, the calculated absolute value for ground height (i.e. RelHMax = AbsHMax – AbsHMin).

RelH2
RelH2 (Relative Height 2) is the derived value from the calculation of AbsH2, the calculated absolute value for the eave height, minus AbsHMin, the calculated absolute value for ground height
(i.e. RelH2 = AbsH2 – AbsHMin).
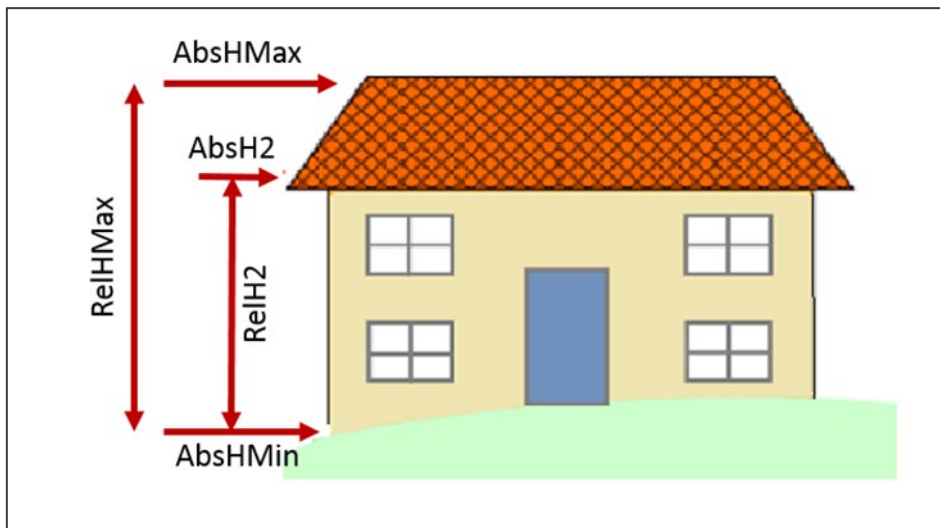

Figure 7: Illustration of the two relative and three absolute height values.

2.3   Other attributes

2.3.1   Tile reference

The tile reference corresponds to the OS MasterMap Topography Layer 5km tile to which the Building Height Attribute data applies. For consistency, the tile reference attribute will follow the 5km naming convention adopted by OS MasterMap Topography Layer and Building Height Attribute data, for example:

- **TQ2060** for TQ26SW

- **TQ2065** for TQ26NW

- **TQ2560** for TQ26SE

- **TQ2565** for TQ26NE

2.3.2   TOID

Building Height Attribute data contains the unique feature references, or topographic identifiers (TOIDs), from the OS MasterMap Topography Layer. This enables associated Building and Structure Height data to be joined to the Topographic Area features within OS MasterMap Topography Layer.

The TOID is a persistent and unique identification string published in the OS MasterMap Topography Layer product. These identifiers have a prefix of 'osgb', are either 13 or 16 digits in length, and are allocated sequentially when a new building feature is created. TOIDS are retained throughout their lifecycle and are never re-assigned to a different feature. In order for these TOIDs to be consistent across all OS products, the identifier should not be altered in any way.

On occasion, a building TOID in OS MasterMap Topography Layer may have no corresponding height values in the Building Height Attribute data. This can occur due to the two products having different update cycles or in cases where a building has been constructed after the capture of the source Building Height Attribute data.

2.3.3   TOID version

The TOID version attribute represents the version of the OS MasterMap Topography Layer TOID for which the height values were calculated. The Building Height Attribute production process means that in certain cases the version number for a given TOID in the Building Height Attribute data may differ from the version number in the latest Topography holding. As the two products (OS MasterMap Topography Layer and OS MasterMap Topography Layer – Building Height Attribute) have different release schedules, this issue with version numbers can occur when a Topography Layer feature has been modified since the Building Height Attribute data values were calculated or because the most up-to-date version of OS MasterMap Topography Layer is not being used.

2.3.4   Building Height Attribute process date

The Building Height Attribute process date represents the date when the Building Height Attribute data was created.

2.3.5 Building Height Attribute data confidence level

Due to the derived nature of Building Height Attribute data using multiple capture methods and the current limitation of only being able to apply one height metric to a building or structure, we are aware there are circumstances where data accuracy may be impacted. Such circumstances include, but are not limited to, the following:

• Where a building or structure is situated on a hill

• Where a building or structure has multiple heights or is in direct proximity to another feature (for example, a tree or a river) that could impact the height reading

• Where a DSM is variable in the immediate area, such as in rural areas and mountains and moorland areas

Multiple quality checks are made on the data before release to mitigate any errors, and confidence levels are high on the dataset, but please verify or contact OS if any of the data does not look correct. We are confident that this is best dataset of its kind available in Great Britain, and the data is being constantly improved, but you may want to liaise with your appointed OS Technical Consultant if you want to use the data on a large-scale project where accuracy is key.

3.   Product supply information

3.1   Product supply format

Building Height Attribute data is supplied in comma-separated values (CSV) file format. Files will not be compressed.

Data will be refreshed every six months.

3.2   Product supply mechanism

OS MasterMap Topography Layer – Building Height Attribute is supplied as an online download. You can download data in CSV format from the OS Data Hub (https://osdatahub.os.uk/).

The product is currently still available for customers to request through OS Orders (https://orders.ordnancesurvey.co.uk/sso/login.shtml).

3.3   Coverage and file sizes

OS MasterMap Topography Layer – Building Height Attribute data will be supplied in 5km tiles. Data will be uncompressed and file sizes will vary significantly depending on the number of buildings and structures contained within the 5km² area. For customers with a full holding of OS MasterMap Topography Layer, a full Great Britain (GB) set is also available. For those customers who do not have a full OS MasterMap Topography Layer supply, only tiles that intersect OS MasterMap Topography Layer holdings may be downloaded.
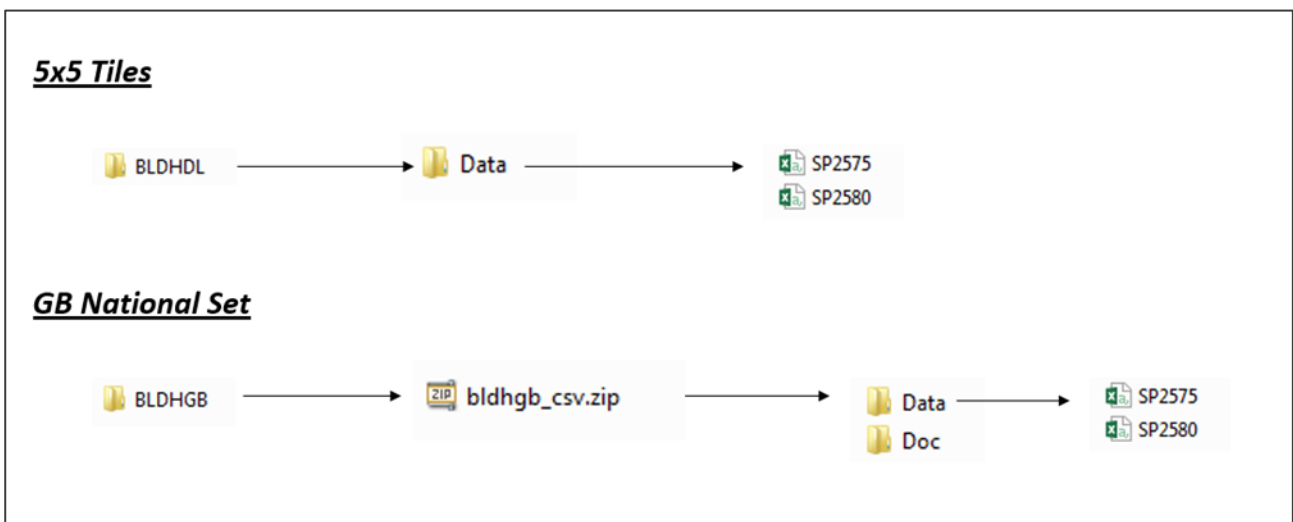

Figure 8: Illustration of the data download structure.

Each 5km² tile will contain Building Height Attribute data for any building that is partly or wholly contained within that tile. As such, buildings that traverse tile boundaries will be duplicated in contiguous holdings.

3.4   Data currency and completeness

Building Height Attribute data is derived from the latest source Digital Terrain Model (DTM) and Digital Surface Model (DSM).

3.5   Header information

For the purposes of simplifying the merging process, the individual 5km² tiles are supplied without header information. Instructions on the merging process can be found in the OS MasterMap Topography Layer – Building Height Attribute Getting Started Guide (https://www.ordnancesurvey.co.uk/documents/building-height-attribute-getting-started-guide.pdf), which is available on the OS website. The format and structure of the individual columns within the data will be consistent (see Table 1).

Table 1: Building Height Attribute header information.

OS_Topo_TOID	OS_Topo_TOID_Version	BHA_ProcessDate	Tile Ref	AbsHMin	AbsH2	AbsHMax	RelH2	RelHMax	BHA_Conf

The Building Height Attribute header file can be downloaded from the 'Links and downloads' section of the OS MasterMap Topography Layer Product Support page on the OS website (https://www.ordnancesurvey.co.uk/business-government/tools-support/mastermap-topography-support).
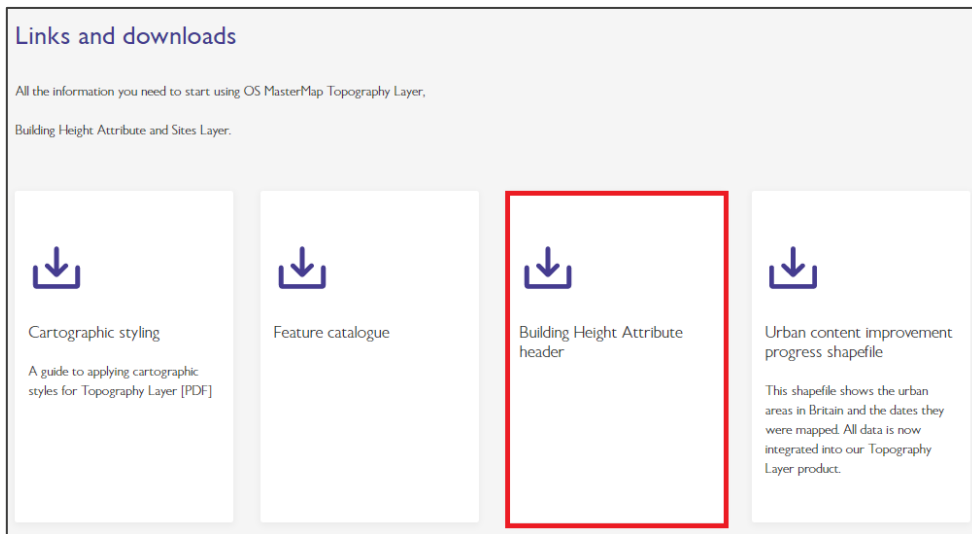

Figure 9: Location of the Building Height Attribute header file on the OS website.

3.6   Data precision

All heights have been calculated in metres to one decimal place (decimetre).

3.7   Height datum

The Building Height Attribute dataset uses Ordnance Datum Newlyn (ODN) as the national height datum for all height values across mainland Britain. Other British height datums (for example, Lerwick for the Shetland Islands) are used where applicable. All height datums are incorporated within the National Geoid Model OSGM15.

There are two resources available on the OS website that will help you gain further insight into coordinate systems in Great Britain:

- A Guide to Coordinate Systems in Great Britain (https://www.ordnancesurvey.co.uk/documents/resources/guide-coordinate-systems-great-britain.pdf)

- General introductory guide to British National Grid (BNG) (https://getoutside.ordnancesurvey.co.uk/guides/beginners-guide-to-grid-references/)
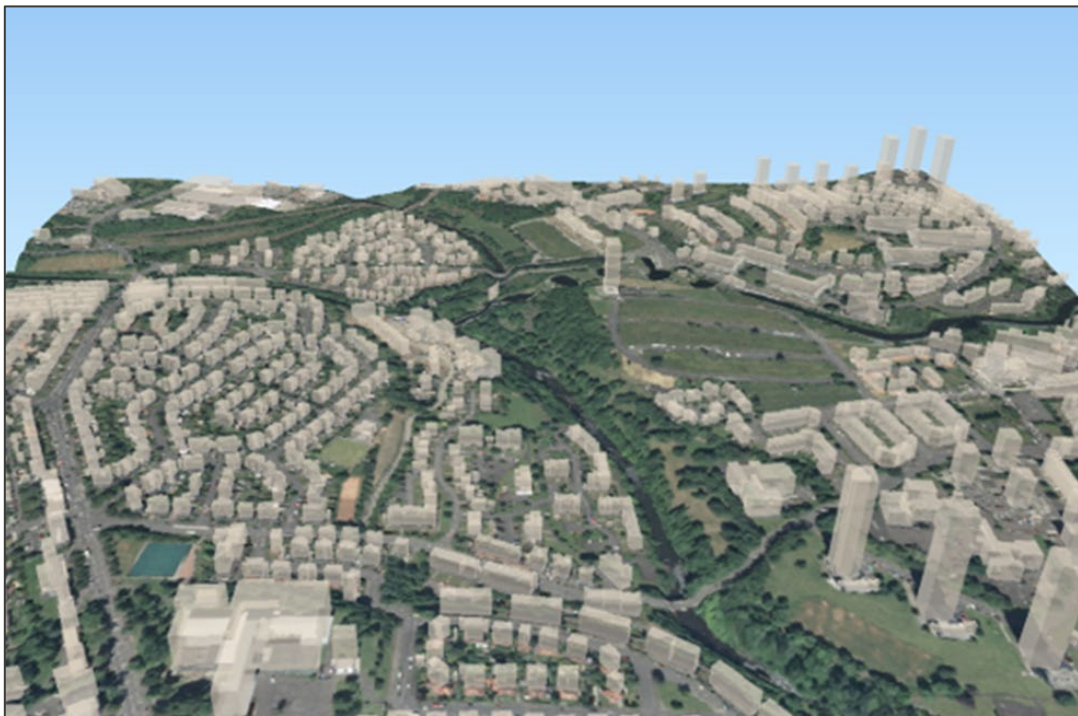

Figure 10: Image depicting OS MasterMap Topography Layer – Building Height Attribute displayed over OS Terrain 5 and OS MasterMap Imagery Layer.