

ORDNANCE SURVEY GB

OS VECTORMAP LOCAL – OVERVIEW

Version history

Version	Date	Description
2.0	10/2018	Specification changes, data updates and the addition of two new formats to the product – GeoPackage and GeoTIFF.
3.0	01/2022	Introduction of vector tiles format to the product. Formatting updates to the document.

Purpose of this document

This document provides information about and insight into the OS VectorMap Local product and its potential applications. For information on the contents and structure of OS VectorMap Local, please refer to the Technical Specification.

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

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I. Introduction to the product

OS VectorMap Local is a mapping dataset designed for providing contextual mapping output on paper, PCs, hand-held devices or the Internet. The vector format of the product consists of layers to enable you to customise and style the output to suit your needs.

The product is generated automatically from the OS Large-Scale Topographic Database with no manual cartographic input. This database is used to update other OS products, including OS MasterMap Topography Layer.

This Overview contains the basic information required to understand and use OS VectorMap Local. For a more detailed technical understanding, please refer to the product's Technical Specification, which is available on the [Product Support page on the OS website \(https://www.ordnancesurvey.co.uk/business-government/tools-support/vectormap-local-support\)](https://www.ordnancesurvey.co.uk/business-government/tools-support/vectormap-local-support).



Figure 1: OS VectorMap Local Full Colour Raster map example.

1.1 Key features of the product

- A national dataset available for backdrop raster mapping; the vector format lends itself to detailed data analysis and bespoke styling.
- Automated output taken directly from the OS Large-Scale Topographic Database, giving improved currency and consistency that's in-line with the OS MasterMap Topography Layer product and other OS generalised mapping products.
- Maintained feature-level identifiers and feature-level change-only updates (COUs) available (GML only).
- Cleaner, clearer raster GeoTIFF (Geographic Tagged Image File Format) outputs, vector stylesheets and Styled Layer Descriptors (SLDs).
- Improved generalised building geometries derived from large-scale data.
- National connected road network with additional attribution for easier styling.
- Features are not cut at tile edges; therefore, the topological relationships of features are maintained.
- The nominal viewing scale is 1:10 000, with a recommended viewing scale range of 1:3,000 to 1:20 000.

1.2 Product applications

The purpose of OS VectorMap Local data is to support a wide range of customer applications that utilise geographic information. These applications may include the following:

- **Real-world analysis:** Features are representations of real-world objects, including buildings, roads, railways, rivers and land areas, as well as non-topographic features, such as administrative and electoral boundaries, cartographic text and symbols, and height detail.
- **Backdrop web mapping:** Data can be chosen selectively and customised to suit a range of online user requirements.
- **Detailed building analysis and assessment:** Reduced building generalisation parameters in the product lets users gain a greater understanding of the proximity of natural and man-made risks, such other buildings or rivers with poor drainage.
- **Basic road routing:** The connected road network with additional attribution in the product enables enhanced routing capabilities and cartographic styling for users.
- **Evaluating possible sites for new amenities:** The level of detail provided in the product means that customers can use it to create shortlists for evaluating and planning new site locations without leaving the office.

2. Product details

2.1 Generalisation

The detail within OS VectorMap Local has been generalised from Ordnance Survey large-scale data. Map generalisation is the process of reducing the scale and complexity of map detail whilst maintaining the important elements and characteristics of the location.

Map generalisation comprises the following processes:

- **Selection / omission:** Some features that appear at larger scales are not selected at smaller scales. For example, individual features in close proximity can be grouped to become a single point.
- **Simplification:** Simplification can take a number of forms in OS VectorMap Local. It can be line simplification, for example, in a vector product, a very winding stream could have the number of data points that represent it reduced.
- **Exaggeration:** The process by which small features that are too important to a particular landscape to be omitted are instead enlarged.
- **Aggregation:** Aggregation is where a number of small features (for example, buildings) are combined to make a single larger feature.
- **Displacement:** The movement of the representation of a feature away from its ground position in order to maintain its prominence.

2.2 Features represented in the product

OS VectorMap Local raster and vector features codes are representations of real-world objects, including buildings, roads, railways, rivers and land area. The data also includes non-topographic features, such as administrative and electoral boundaries, and cartographic text and symbols. The three GeoTIFF raster maps (Full Colour, Backdrop, and Black & White) are designed and built from the same vectors as those that form the vector Geography Markup Language (GML), GeoPackage and vector tile outputs. In order to create clear, cartographically desirable backdrops, not all features available in the vector products are in the raster output. For example, contours and administrative boundaries are only available in the vector data.

OS VectorMap Local vector data is established as six separate feature classes:

- **Area:** For example, building polygons and urban extents
- **Line:** For example, building outlines and tunnel alignments
- **Text:** For example, building and road names
- **VectorMapPoint:** For example, pylons and spot heights
- **RoadCLine:** For road alignments
- **RailCLine:** For rail alignments

A full list of feature classes and their associated attributes is given in the product's Technical Specification, which is available on the [Product Support page on the OS website](https://www.ordnancesurvey.co.uk/business-government/tools-support/vectormap-local-support) (<https://www.ordnancesurvey.co.uk/business-government/tools-support/vectormap-local-support>).

2.2.1 Raster and vector features

Within each feature class, there are several features which are represented in both the raster and vector outputs of the product, including the following:

- **Buildings:** Only buildings over 20m² shown. These are generalised buildings and can be made up of an amalgamation of multiple buildings. Buildings are represented as both standard and important buildings in the dataset. Glasshouses are also included, provided they are over 50m².
- **Roads:** A road is defined as a metalled way for vehicles. Road alignments are approximations of the road centre lines. Roads have a number of classifications in the vector data and these classifications are used to build the road depiction in the raster outputs. The product contains a full connected road system, with additional attribution to determine levels when roads are coincident with other features, for example, bridges.
- **Rail:** All railways are represented as lines and these lines are broken when they pass under bridges, buildings and other obstructing detail. An additional feature class has been included to enable the accurate depiction of railways in both raster and vector data. This feature class contains additional attribution for potential future rail development.
- **Water:** Sea, lakes, ponds, rivers and streams are depicted in vector data as both polygons and line detail and are styled accordingly in the raster outputs. Water features are broken under bridges and other obstructing detail. Tidal limits (mean high and mean low water) are also contained in the data – in England and Wales, these represent the tide limits of mean tides, while in Scotland, these represent the tide limits of mean spring tides.
- **General line detail:** General line detail includes a number of real-world features, including fences, hedges, walls and other minor detail. Tracks and paths are classified together along with other features as general pecked detail. General line detail and general pecked detail display as solid or pecked lines in the raster. In vector outputs, general line detail and general pecked detail are split between rural and urban areas.
- **Vegetation:** Represented as polygons in vector data and styled in the raster. Vegetation does not have explicit bounding features.
- **Names and cartographic text:** There are a number of feature codes that hold names as cartographic text; these feature codes can be found in the product's Technical Specification, which is available on the [Product Support page on the OS website \(https://www.ordnancesurvey.co.uk/business-government/tools-support/vectormap-local-support\)](https://www.ordnancesurvey.co.uk/business-government/tools-support/vectormap-local-support).
- **Ornamental features:** These represent landform features, such as slope symbols, flat rock scree and cliffs. In the raster, these features are represented as facsimiles of cartographic artwork, originally drawn on paper maps. In the vector, a suitable style can be applied to provide a traditional artistic representation of landform ornament. Ornament is represented in the vector data as custom landform polygons.
- **Archaeological and antiquity information:** This information is represented in both the raster and vector outputs.

2.2.2 Vector-only features

- **Administrative boundaries:** Lines that represent the limit of government administrative areas, for example, County, Region, Island, Parliamentary, Parish, Community and District boundaries are all contained within the vector data.
- **Urban extents:** These are approximations of the extents of urban development as defined by Ordnance Survey. The extents are indicative only and not necessarily aligned to ground features. They have been used to generate different urban and rural depiction in the raster output, for example, in the depiction of Restricted Local Road Access (see the product's Technical Specification, which is available on the [Product Support page on the OS website; https://www.ordnancesurvey.co.uk/business-government/tools-support/vectormap-local-support](https://www.ordnancesurvey.co.uk/business-government/tools-support/vectormap-local-support)).
- **Contours:** A contour is a line on a map that joins points of equal height. In the product, contours are represented as both index contours at 25m intervals and standard contours at 5m intervals.

2.3 Coverage

Coverage is Great Britain.

2.4 Coordinate reference system

The British National Grid (BNG) is used in OS VectorMap Local for all formats except vector tiles. The BNG spatial reference system uses the OSGB36 geodetic datum and a single Transverse Mercator projection for the whole of Great Britain. Positions on this projection are described using easting and northing coordinates in units of metres.

OS VectorMap Local in vector tiles format is supplied in Web Mercator projection (EPSG:3857). Web Mercator projection uses WGS84 geodetic datum to render the vector tiles.

2.5 Height datum

The BNG is a horizontal spatial reference system only; it does not include a vertical (height) reference system. In OS VectorMap Local, heights are given by the 'height' attribute in the 'SpotHeight' feature. The geometric attributes therefore contain horizontal geometry only.

Several orthometric height datums are used by Ordnance Survey to define vertical spatial reference systems. The most common of these is Ordnance Datum Newlyn (ODN), which is used throughout mainland Britain. The height information in OS VectorMap Local features does not specify which vertical reference system is used.

2.6 Currency

OS VectorMap Local is derived from the OS Large-Scale Topographic Database, which is the same data used to update OS large-scale product outputs such as OS MasterMap Topography Layer. This is the most up-to-date data available at OS.

2.7 Completeness

During production, numerous checks are undertaken to ensure that data supplied to customers is both accurate and complete. During digital manipulation when creating the data, all sources of that data are checked for conformance to specification. These quality control checks take the form of:

- Visual checks by operators
- Automated tests on the national dataset
- Data testing against the product specification
- Selective testing carried out on a selection of tiles from a full national set

2.8 Product update schedule

OS VectorMap Local is supplied to customers quarterly in January, April, July and October, incorporating any updates made by the revision programme.

3. Product style definition

3.1 Vector

It is the flexibility to select and style the different feature classes in different ways that makes the vector format of OS VectorMap Local such a versatile contextual mapping product. It can be flexibly styled in a wide variety of ways to best provide a geographic context to the customer’s overlay information.

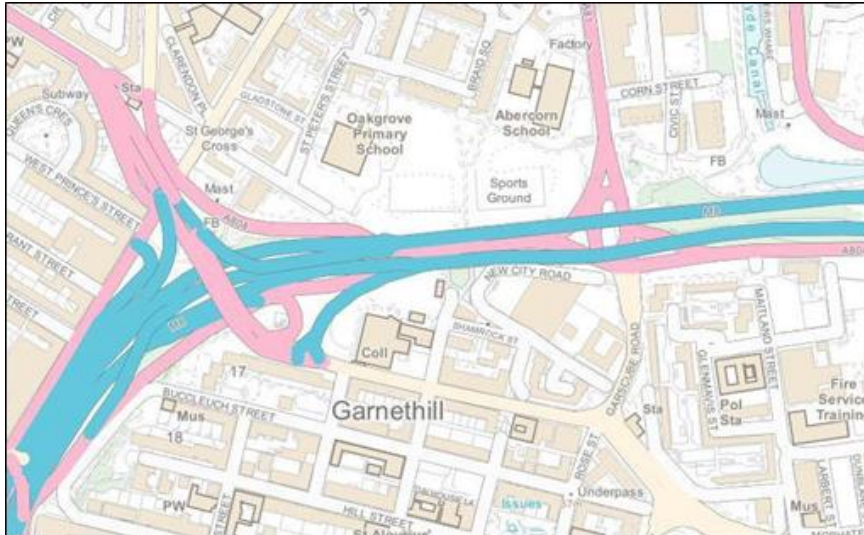


Figure 2: Backdrop styled GML in QGIS using an OS stylesheet.

3.2 Raster

The raster version of the product is styled as Full Colour, Backdrop and Black & White, and these styles are fixed within the limitations of the image viewing software.

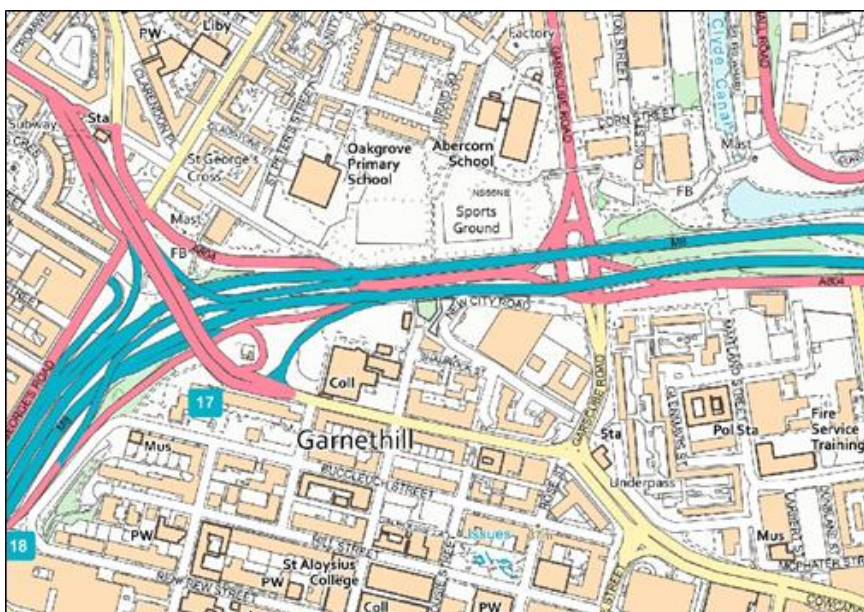


Figure 3: Full Colour Raster.

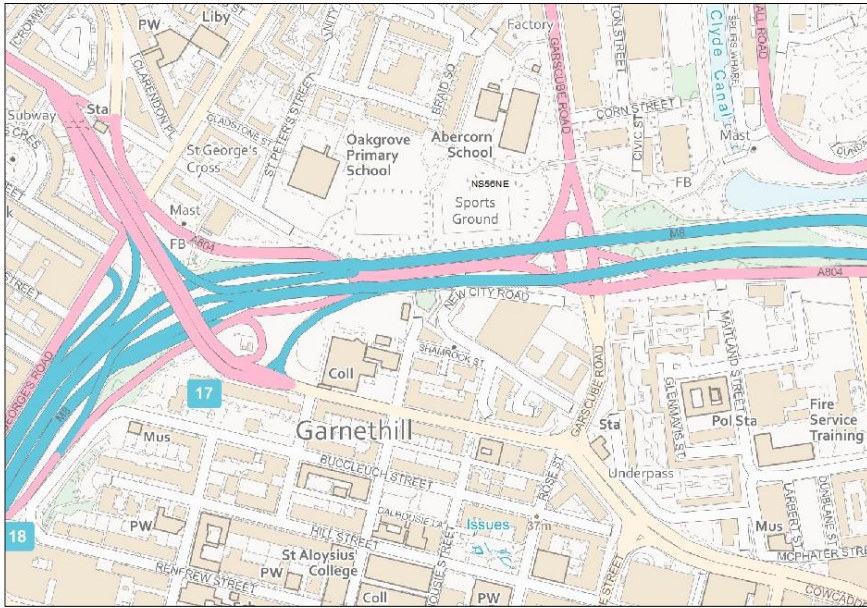


Figure 4: Backdrop Raster.

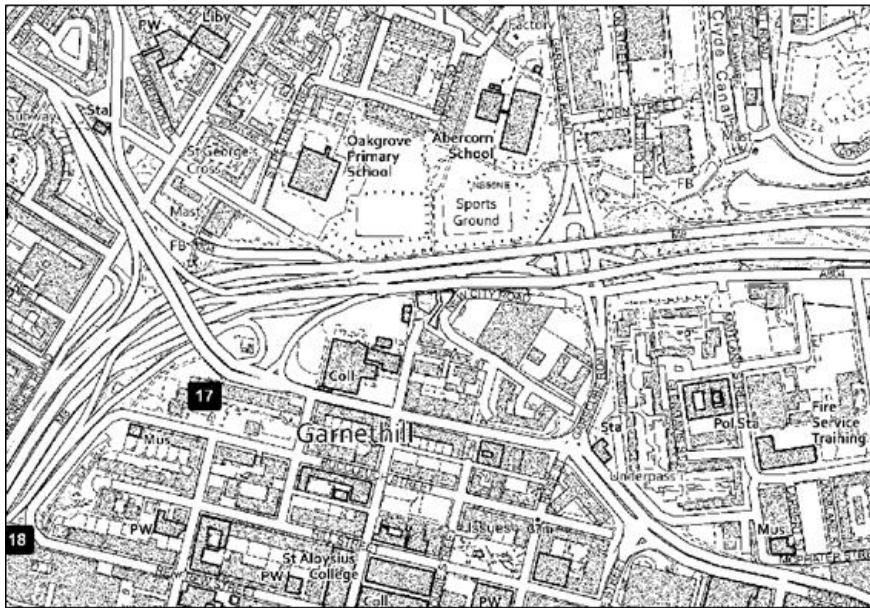


Figure 5: Black & White Raster.

4. Product supply

4.1 Available formats for the product

OS VectorMap Local is supplied in four different formats:

- **Raster:** GeoTIFF (Geographic Tagged Image File Format) LZW (Lempel Ziv Welch)
 - Full Colour
 - Backdrop
 - Black & White

Note: If LZW compressed formats are used, then registration may be required. Information is available on the [Unisys® website \(www.unisys.com\)](http://www.unisys.com).

- **Vector:** GML (Geography Markup Language) 3.2.1
- **Vector:** GeoPackage
- **Vector:** Vector tiles (MBTiles)

GeoTIFF option

GeoTIFF LZW is a TIFF file which has geographic (or cartographic) data embedded as tags within it. The geographic data can then be used to position the image in the correct location and with precise geometry on the screen of a geographic information display.

GeoPackage option

OS VectorMap Local is supplied in GeoPackage format. GeoPackage (.gpkg) is an open, non-proprietary, platform independent and standards-based data format for geographic information systems (GIS), as defined by the Open Geospatial Consortium (OGC). It is designed to be a lightweight format that can contain large amounts of varied and complex data in a single, easy to distribute and ready to use file. GeoPackage is natively supported by numerous software applications.

For information on how to open, use and understand a GeoPackage dataset, please refer to our '[Getting Started with GeoPackage](https://www.ordnancesurvey.co.uk/documents/getting-started-with-geopackage.pdf)' guide (<https://www.ordnancesurvey.co.uk/documents/getting-started-with-geopackage.pdf>).

Vector tiles option

OS VectorMap Local is supplied as a national vector tile set in a single MBTiles file (combined from individual PBF tiles). This is a lightweight set of tiles that are efficient to render in supported software, provide high-resolution data and give a seamless experience when zooming in and out. The data is supplied in Web Mercator projection (ESPG:3857).

4.2 Product supply mechanism

All formats are available to download from the [OS Data Hub \(https://osdatahub.os.uk/\)](https://osdatahub.os.uk/).

Please note that as OS VectorMap Local is a premium dataset, it requires users to hold the Premium or Public Sector Plan to access the data.

4.3 File sizes for the available formats

4.3.1 GeoTIFF

- 10 591 tiles, each covering 5km x 5km
- Each tile named as 5km, for example, NS56NE.tif
- Full supply or change-only update (COU) option; the order option will allow selection between full supply, changed tiles or no update
- Approximate file sizes:
 - Full Colour: 0.3 to 16.2mb
 - Backdrop: 0.3 to 15.8mb
 - Black & White: 0.1 to 6mb

Note: As change is generated as real-world change as well as change created through the generalisation process, COU GeoTIFF data volumes will be high.

4.3.2 GML

- 10 591 tiles each covering 5km x 5km
- Each tile named as 5km, for example, NS56NE.gz
- Full supply or COU option; the order option will allow selection between full supply, changed features (COU) or no update
- Approximate file size of 15kb–1mb

Note: As change is generated as real-world change as well as change created through the generalisation process, COU GML data volumes will be high.

Seamless data

Features that cross tile edges will not be cut, maintaining the topological relationships of all features. These tiles are often referred to as 'hairy' tiles. This avoids the creation of invalid geometries by arbitrary cutting and facilitates greater use of the data in analytical applications. Due to their size, some features (for example, tidelines and contours) will continue to be cut. There will be a requirement for some de-duplication around tile edges.

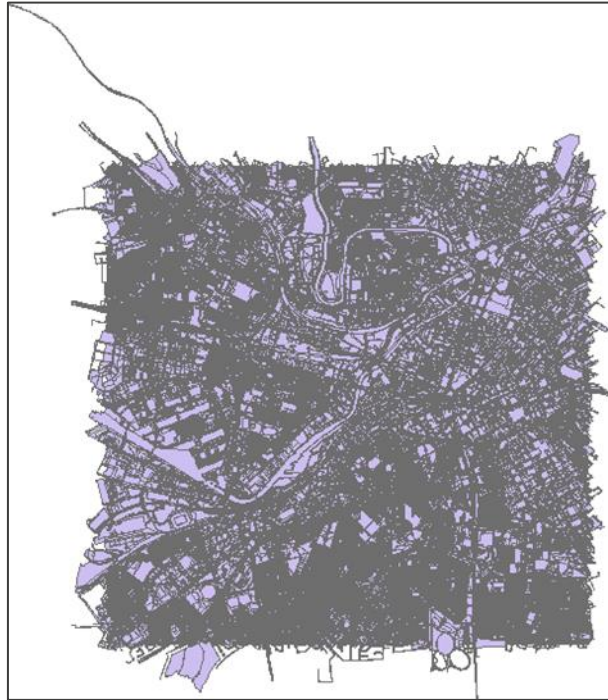


Figure 6: Seamless data around tile edges.

4.3.3 GeoPackage

- Full national set or area of interest (AOI) tiles are combined into a single GeoPackage file for each customer supply
- Single GeoPackage tiles will be de-duplicated
- Full supply option only, no COU
- Full national set with an approximate file size of 80gb

GeoPackage file naming

Full GB set:

- vml_gb_publication date'.file extension
- For example, vml_gb_20180101.gpkg

AOI orders:

- vml_ordernumber_randomnumber.file extension
- For example, vml_12345678_8765abcd.gpkg

4.3.4 Vector tiles

- A zipped file comprising a single national MBTiles file
- The single MBTiles file contains a full set of national vector tiles, with options available to split these out into individual tiles as PBF files
- Full national set with an approximate file size of 29gb
- The data is not encrypted

Vector tiles file naming

Full GB set:

- vml_gb.mbtiles
- When zipped: vml_mbtiles_gb.zip

4.4 National Grid coverage for OS VectorMap Local

Ordnance Survey divides Great Britain into 100km x 100km squares. Each of these squares has a unique two-letter reference, for example, TG in the diagram below.

OS VectorMap Local tiles are identified by quoting the National Grid reference of the southwest corner of the 100km² area they cover, for example, TG.



Figure 7: OS National Grid reference system diagram.

To describe an OS VectorMap Local raster format tile, which covers 5km x 5km, first add a two-digit reference to the 100km x 100km square reference, with the easting first followed by the northing, for example, TG23. This represents a 10km x 10km area which can be suffixed with a NE, NW, SE or SW to describe the 5km x 5km tile.

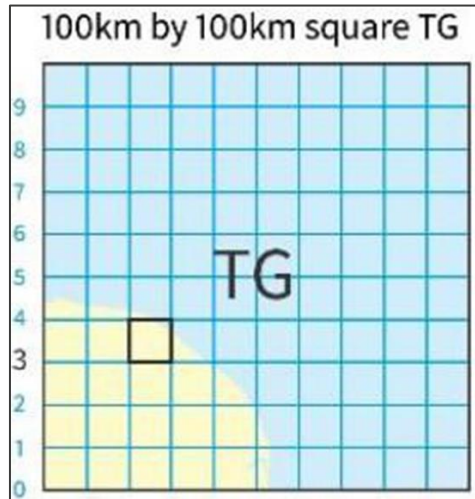


Figure 8: 100km x 100km square reference TG in the OS National Grid reference system.

A [general introductory guide to the British National Grid \(BNG\)](https://getoutside.ordnancesurvey.co.uk/guides/beginners-guide-to-grid-references/) (<https://getoutside.ordnancesurvey.co.uk/guides/beginners-guide-to-grid-references/>) is available on the OS website.