

ORDNANCE SURVEY GB

CODE-POINT OPEN™ – TECHNICAL SPECIFICATION

Version history

Version	Date	Description
2.2	11/2019	Updated contact details.
3.0	09/2022	Maximum postcode attribute length information updated from seven to eight characters. Formatting improvements to the document.
3.1	02/2023	GeoPackage attribution and format changes.
3.2	05/2023	Update to the acknowledgement statement on the copyright page. Addition of Annex B which contains links to additional product documentation.

Purpose of this document

This document provides information about and insight into the Code-Point Open product and its potential applications. For information on the contents and structure of Code-Point Open, please refer to the Overview.

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Contact details

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

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1. Introduction

Code-Point Open is a dataset that contains postcode units for Great Britain, each having a notional geographical location. Postcodes are an alphanumeric abbreviated form of an address. Postcode units are unique references and identify an average of 15 addresses. In some cases, where an address receives a substantial amount of mail, a postcode will apply to only one address and is defined as a large-user postcode. The maximum number of addresses in a postcode is 100.

2. Product structure

2.1 Attributes

Attribute	Description
Postcode	Contains elements for postal area, district, sector, and unit.
Positional quality indicator (PQI)	A flag used to indicate the positional accuracy of the coordinates allocated to each postcode record.
Easting	Distance in metres east of National Grid origin.
Northing	Distance in metres north of National Grid origin.
Country code	Code used by the Office for National Statistics (ONS) to identify the country in which the Code-Point Open georeferenced coordinates lies.
NHS regional health authority code	English Pan Strategic Health Authority in which Code-Point Location Coordinate (CPLC) falls.
NHS health authority code	English Strategic Health Authority or Scottish Health Board in which CPLC falls.
Administrative county code*	County in which CPLC falls.
Administrative district code*	Unitary Authority, Metropolitan and Non-Metropolitan District, London Borough, or Scottish Council Area in which CPLC falls.
Administrative ward code*	Electoral Ward or Division in which CPLC falls.

An asterisk (*) indicates that the attribute is blank when the entity does not have a code. The Welsh Local Health Boards are included in Code-Point Open.

Each postcode unit location – also known as CPLC (Code-Point Location Coordinate) – is coordinated on the respective National Grid, with Eastings and Northings quoted to a resolution of 1m. The accuracy of each postcode unit coordinate pair is defined by the positional quality indicator (PQI), which provides a quality statement of that Code-Point Open record. There are seven PQI values for the positional quality:

PQI	Description
10	Within the building of the matched address closest to the postcode mean determined automatically by Ordnance Survey.
20	As above but determined by visual inspection by National Records of Scotland (NRS).
30	Approximate to within 50m of the true position (postcodes relating to developing sites may be within 100m of true position).
40	The mean of the positions of addresses previously matched in PALF but which have subsequently been deleted or recoded (very rarely used).
50	Estimated position based on surrounding postcode coordinates, usually to 100m resolution, but 10m in Scotland.
60	Postcode sector mean.
90	No coordinates available.

3. Supply formats overview

3.1 CSV and GeoPackage

GeoPackage is an open, standard, platform-independent, portable, self-describing, compact format for transferring geospatial information. For more information on this format, please see the 'Getting started with GeoPackage' guide, which is available on the [Code-Point Open Product Support page of the OS website \(https://www.ordnancesurvey.co.uk/business-government/tools-support/code-point-open-support\)](https://www.ordnancesurvey.co.uk/business-government/tools-support/code-point-open-support).

The following table gives a comparison between the CSV attributes and the GeoPackage attribution:

CSV attribution and format				GeoPackage attribution and format	
Mnemonic	Description	Data type	Size	Description	Data type
N/A	N/A	N/A	N/A	fid	int
PC	Postcode	A8	8	postcode	TEXT
PQ	Postitional_quality_indicator	I2	2	positional_quality_indicator	int
EA	Eastings	I6	*	N/A	N/A
NO	Northings	I7	*	N/A	N/A
CY	Country_code	A9	9	country_code	TEXT
RH	NHS_regional_HA_code	A9	9	nhs_regional_ha_code	TEXT
LH	NHS_HA_code	A9	9	nhs_ha_code	TEXT
CC	Admin_county_code	A9	9	admin_county_code	TEXT
DC	Admin_district_code	A9	9	admin_district_code	TEXT
WC	Admin_ward_code	A9	9	admin_ward_code	TEXT

CSV format

- Those fields containing text (A) will be enclosed by double quotes which have not been included in the sizes listed in the table above. An asterisk (*) denotes variable length.
- Fields with null data will appear as "" for text and 0 for numeric.
- Each record will be terminated with a carriage return character (ASCII 13) and a line feed character (ASCII 10).

Example of a Code-Point Open CSV record:

```
"SO16 0AS",10,437292,115542,"E92000001","E19000002","E18000009","E10000014","E07000093","E05012936"
```

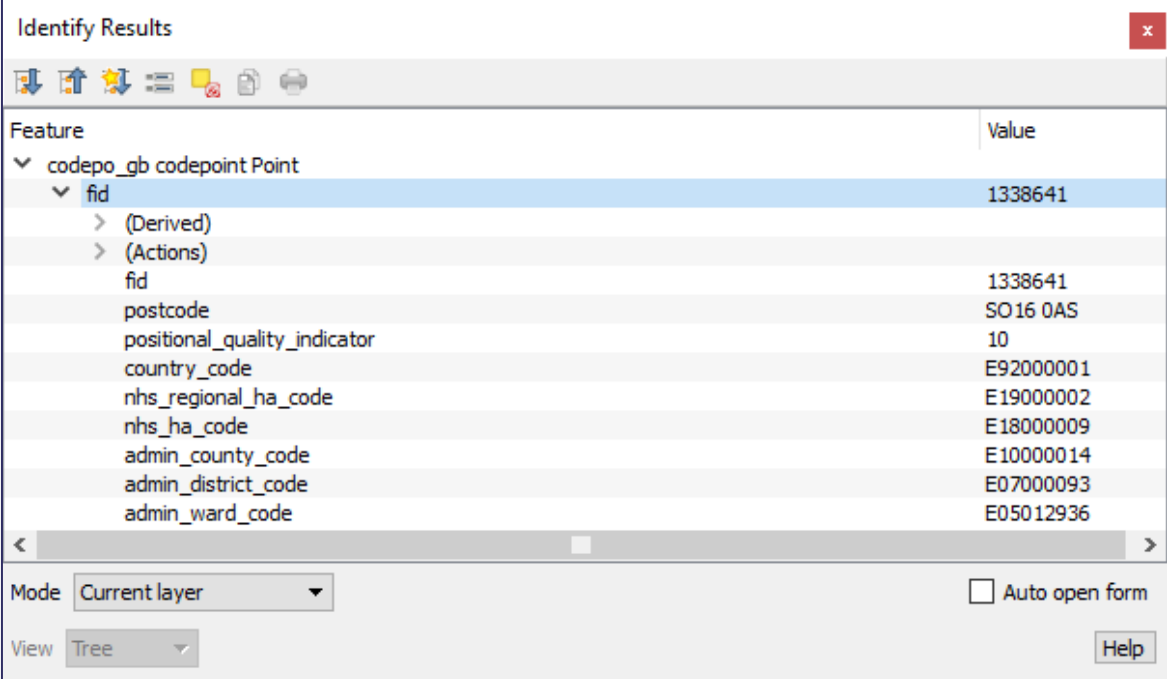
GeoPackage format

Note that there are no Eastings or Northings in GeoPackage; the geometry is already created in the GeoPackage container and is not listed as data but will be seen as a column in a database (PostGIS) called *geometry* with a coordinate reference system of British National Grid EPSG: 27700 for Great Britain (GB) postcodes.

Fields with a null value will appear as [Null] for text (PostGIS) or as an empty field in a GIS.

A null numeric value will appear as 0 in both a database and an attribute table in a GIS.

Example of a Code-Point Open GeoPackage record taken from the Information tool in QGIS:



The screenshot shows the 'Identify Results' window in QGIS. The window title is 'Identify Results' and it has a close button (X) in the top right corner. Below the title bar is a toolbar with icons for zooming, panning, and other navigation functions. The main area is a table with two columns: 'Feature' and 'Value'. The table content is as follows:

Feature	Value
codepo_gb codepoint Point	
fid	1338641
> (Derived)	
> (Actions)	
fid	1338641
postcode	SO16 0AS
positional_quality_indicator	10
country_code	E92000001
nhs_regional_ha_code	E19000002
nhs_ha_code	E18000009
admin_county_code	E10000014
admin_district_code	E07000093
admin_ward_code	E05012936

At the bottom of the window, there is a 'Mode' dropdown menu set to 'Current layer', a 'View' dropdown menu set to 'Tree', and an 'Auto open form' checkbox which is unchecked. A 'Help' button is located in the bottom right corner.

Figure 1: GeoPackage record as displayed in QGIS.

Annex A: Glossary

Glossary term	Definition								
addressed premise	A permanent or non-permanent building structure with an address being a potential delivery point for Royal Mail. Examples of an addressed premise would be a house, a flat within a block of flats, a caravan site, a bollard to which several houseboats may be moored, or an organisation occupying the whole building.								
building	A physical, walled structure connected to foundations that has, or will have, a roof. This definition includes buildings surveyed at foundation stage.								
CPLC (Code-Point location coordinate)	A National Grid reference for each postcode unit . It is a two-dimensional coordinate point to a resolution of 1metre. Coordinates are attributed from GridLink using an accuracy hierarchy.								
Country code	The code used by the Office of National Statistics to indicate the country in which the Code-Point georeference lies. This has replaced the PAF update date field.								
Country Code	<table border="0"> <tr> <td>England</td> <td>E92000001</td> </tr> <tr> <td>Scotland</td> <td>S92000003</td> </tr> <tr> <td>Wales</td> <td>W92000004</td> </tr> <tr> <td>N Ireland</td> <td>N92000002</td> </tr> </table>	England	E92000001	Scotland	S92000003	Wales	W92000004	N Ireland	N92000002
England	E92000001								
Scotland	S92000003								
Wales	W92000004								
N Ireland	N92000002								
Comma-separated values (CSV)	The CSV file format is commonly used to exchange data between different applications, for example, Microsoft Excel and Access. Being text files, CSV files can also be viewed in Notepad.								
delivery point	A Royal Mail-defined point to which mail is delivered. This may be a property (private address), organisation, mailbox or even, very rarely, the name of an individual. These categories are derived from the <i>Programmers' Guide</i> from Royal Mail. This is distinct from the addressed premise because there may be more than one organisation at an address.								
GridLink	GridLink is the name given to a joined-up Government initiative involving Royal Mail, the Office for National Statistics (ONS), National Records of Scotland (NRS), Land & Property Services and Ordnance Survey. All these organisations are involved in the georeferencing of postcodes and the relating of postcodes to administrative and National Health Service areas and so on.								
inward code or incode	See postcode .								
matched address	An address, resulting from a match between the OS MasterMap Topography Layer data and PAF, which has been allocated a coordinate position. The match may								

Glossary term	Definition
	be a result of either manual or automatic matching, the latter encompassing both full and ‘fuzzy logic’ matching.
National Grid	A unique referencing system that can be applied to all Ordnance Survey maps of Great Britain (GB) at all scales. It is used by Ordnance Survey on all post war mapping to provide an unambiguous spatial reference in Great Britain for any place or entity whatever the map scale. The National Grid is defined by the OSGB36 spheroid.
National Grid reference (NGref)	<p>The National Grid provides a unique reference system that can be applied to all Ordnance Survey maps of Great Britain. The map of Great Britain is covered by 100 km by 100 km grid squares, with the origin lying to the west of the Isles of Scilly. When a National Grid reference is quoted, the easting (left to right direction) is always given before the northing (upwards direction).</p> <p>A National Grid reference (to 1 metre) will identify the spatial position of the CPLC.</p>
non-geographic postcodes	Special non-geographic postcodes are allocated to single organisations who receive an exceptionally large amount of mail. These are included in Code-Point Open.
outward code or outcode	See postcode .
Postcode Address File (PAF)	PAF now contains the postal addresses and postcodes of approximately 28 million delivery points in Great Britain.
Postal Address Location Feed (PALF)	The PAL Feed is provided to Ordnance Survey from GeoPlace, who have geocoded the PAF feed from Royal Mail, using source coordinates from Local Authorities in England, Wales and Scotland, and Ordnance Survey.
positional quality indicator (PQI)	The positional quality indicator is a flag used to indicate the positional accuracy of the coordinates allocated to each postcode record. There are seven PQI values for the positional quality of CPLCs.
postal address	A postal address is a delivery point that is currently receiving mail. There may be many delivery points within an individual building structure as shown in OS MasterMap Topography Layer data.
postcode	An abbreviated form of address made up of combinations of between six and eight alphanumeric characters. A postcode may cover between 1 and 100 addresses. The average number of addresses per postcode is 15.
postcode area	An area given a unique alphabetic coding by Royal Mail to facilitate the delivering of mail. The area is identified by one or two alpha characters at the start of the full postcode, the letters being derived from a town, city or district falling within the postcode area. There are, at present, 120 postcode areas in Great Britain, for

Glossary term	Definition
	example, SO for Southampton, MK for Milton Keynes, B for Birmingham or W for London West. The postcode area code constitutes the first part of the outward code.
postcode district	<p>A sub-area of the postcode area, specified by the character sub-string within the first half of a full postcode, which may be numeric, alphabetic or alphanumeric; for example, 42 from MK42 6GH or 1A from W1A 4WW. There are approximately 2 986 postcode districts in Great Britain.</p> <p><i>Note: There are certain non-geographic districts. In these instances, a district code is allocated to cover all large users in the postcode area.</i></p>
postcode sector	<p>A sub-area of a postcode district, whose area is identified by the number third from the end of a full postcode. There are approximately 11 200 postcode sectors in Great Britain. An example of a postcode sector code is 3, from GU12 3DH.</p>
postcode unit	<p>A sub-area of a postcode sector, indicated by the two letters of the inward postcode, which identifies one or more small-user postcode delivery points or an individual large-user postcode. There are approximately 1.7 million postcode units in the UK.</p>

Annex B: Product support links

Guides

You can find additional information and documentation about the Code-Point Open product on the '[Code-Point Open Product Support page on the OS website](https://www.ordnancesurvey.co.uk/business-government/tools-support/code-point-open-support) (<https://www.ordnancesurvey.co.uk/business-government/tools-support/code-point-open-support>).

We recommend you read the following guides:

- *Code-Point Open – Overview*
- *Code-Point Open – Getting Started Guide*
- *Getting Started with GeoPackage*