ORDNANCE SURVEY GB

OS TERRAIN 50™ – TECHNICAL SPECIFICATION

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Ordnance Survey

Version history

Version	Date	Description
1.3	03/2017	Minor updates.
1.4	07/2021	Introduction of GeoPackage and vector tiles formats to the product.
1.5	02/2022	Minor updates.
1.6	07/2023	GeoPackage format attribute name changes.

Purpose of this document

This document provides information on the contents and structure of OS Terrain 50. For information about and insight into the OS Terrain 50 product and its potential applications, please refer to the Overview.

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1. Introduction

The purpose of this technical specification is to:

- Provide users with a brief description of the presentation of OS Terrain 50 in its supply formats.
- Provide licensed system suppliers with as much detail as necessary to enable OS Terrain 50 files to be easily understood and processed by application software.

1.1 Product overview

OS Terrain is the name given to Ordnance Survey's two height products. The two products provide detailed three-dimensional digital terrain models (DTMs) of Great Britain. A DTM primarily defines the ground surface, having removed all protruding features (such as buildings and trees) elevated above the bare earth. The main difference between the two products is their level of resolution.

- OS Terrain 5 is a mid-resolution DTM, designed to be interoperable with our large-scale data.
- OS Terrain 50 is a lower-resolution DTM product, designed for landscape visualisation and analysis over large areas. It is an Open Data product and, as such, it is free to view, download and use for commercial, educational and personal purposes.

1.2 Available formats

OS Terrain 50 is published as both grid data and contour data in a variety of formats. Both data types are created from the same source data and are supplied as 10km-by-10km tiles. These tiles are identified by quoting the National Grid reference of the south-west corner of the area they cover.

- **OS Terrain 50 grid**: A grid of heighted points with regular 50m post spacing.
- **OS Terrain 50 contours**: A contour dataset of 10m interval standard contour polylines. This includes mean high water and mean low water boundaries and spot heights.

OS Terrain 50 is available to download in the following formats:

- A 50m grid in ASCII (American Standard Code for Information Interchange) grid and Geography Markup Language (GML) 3.2.1 (simple features profile – level 0)
- 10m contours in GML 3.2.1 (simple features profile – level 0)
- 10m contours in Esri shapefile
- 10m contours in GeoPackage
- 10m contours in vector tiles (MBTiles)

The product will be supplied separately for grid or contour as compressed folders for each geographic tile of data. Each compressed folder will contain data plus several additional files.

2. Grid data

2.1 ASCII grid and GML

2.1.1 Overview

ASCII grid is a generic, text-based DTM format, which is sometimes referred to as ArcInfo ASCII grid or ArcGrid ASCII. This data can be read by most standard GIS software without additional translation.

Grid data is available to download in ASCII format. ASCII grid data is provided alongside GML data in the OS Terrain 50 data supply. In the gridded data supply, the .gml file effectively provides metadata (such as location, grid spacing and the vertical reference system) to allow ASCII data to be read as GML. It also contains spatial reference information in a software independent form.

2.1.2 Data structure

The ASCII data is specified as a raster grid, with each height value being calculated from the centre of each pixel. To represent this in ASCII grid format, the initial coordinates in the map header originate on the north-west corner of the tile. The data is presented in rows that read from west to east, with 200 pixels per row. Each pixel is 50m by 50m, so the next row will begin 50m south of the origin and progress at 50m intervals to the east.

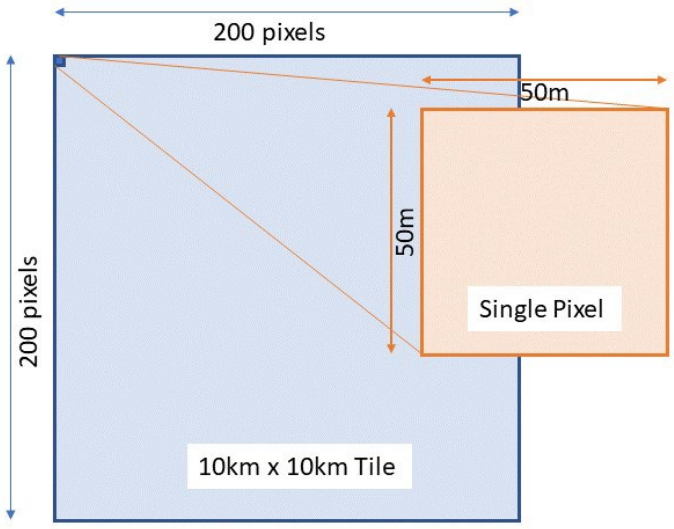

Figure 1. ASCII data is represented as a 10km x 10km tile raster grid of 50m x 50m pixels

The height values are presented in the standard ASCII grid format as a series of real values. The height values are given to the nearest 0.1m.

The structure of the layers provided with the ASCII grid and GML download is outlined in the following table.

Layer name	Layer description
<tile name>.asc	Esri ASCII grid data.
<tile name>.gml	Open Geospatial Consortium (OGC) file for the ASCII grid to enable the data to be loaded as GML format.
<tile name>.prj	File containing the spatial reference system in a format defined by Esri.
<tile name>.asc.aux.xml	A file which provides parameters to enable default styling in Esri applications. This ensures that the shading is consistent across the data but allows you to apply your own choice of colour ramp.
Metadata_<tile name>.xml	A metadata file for grid data, providing information on the flying date and so on.

2.1.3 Data header

The following is the data header found in the first six rows of the ASCII grid file:

```
ncols 200
nrows 200
xllcorner 290000 (example)
yllcorner 80000 (example)
cellsize 50
```

3. Contour data

3.1 GML

3.1.1 Overview

OS Terrain 50 contour layers are supplied in GML 3.2.1. It is recommended that you read this section in conjunction with the Open Geospatial Consortium (OGC) document, Geography Markup Language 3.2.1 (https://portal.ogc.org/files/?artifact_id=20509). An understanding of XML (Extensible Markup Language) and XML schemas is required. The XML specifications that GML is based on are available from the World Wide Web Consortium (W3C) website (http://www.w3.org/).

3.1.2 Data structure

The layer structure of the GML contour layers in the product is outlined in the following table.

Layer name	Layer description
<tile name>.gml	GML data file.
Metadata_<tile name>.xml	A metadata file for contour data, providing information on the flying date and so on.

3.1.3 Detailed GML model

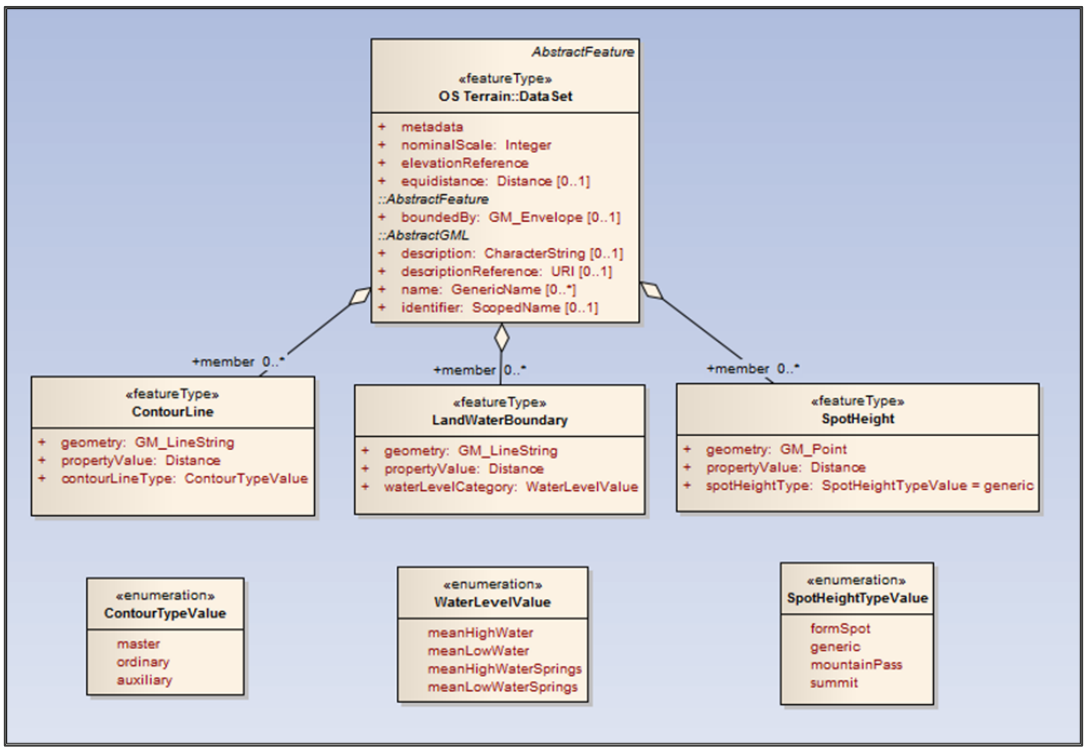

Figure 2. UML diagram illustrating the data model and the relationships between the contour and grid GML supply of OS Terrain 50

3.1.4 Spot heights

These have been created by an automated process to select the highest mass point within every closed contour. If the point is the same height as the contour, it will be removed. It is possible that some spot heights could be lower than the surrounding contour due to genuine depressions. The z value is rounded to 0 decimal places.

3.1.5 GML feature types

The model is 'feature-based' so that ContourLine, SpotHeight and LandWaterBoundary are feature types with specific attributes.

The feature types within the contours are represented as individual features to enable easier interpretation. For example, the contours can be drawn as different colours to highlight the index contours, the high-water mark, and spot heights over a certain value.

The column names have been reformatted to comply with Esri software.

ContourLine feature type

Column name	Type	Description
+geometry	GM_LineString	The structure of the feature
+propertyValue	Distance	The length of the contour
+contourLineType	String	master ordinary auxiliary

Notes: The ContourLine sub-type value names align with INSPIRE draft elevation specification. The terms 'master' and 'ordinary' represent the more traditionally recognised terms of 'index' and 'standard' (contours), respectively.

SpotHeight feature type

Column name	Type	Description
+geometry	GM_Point	The structure of the feature
+propertyValue	Distance	The z value (height above Newlyn, or other British height datum) of the feature
+spotHeightType	String	formSpot generic mountainPass summit

Notes: At launch, only the sub-type value 'generic' has been used, but the other values provide functionality to enrich the attribution if required in a later product release.

LandWaterBoundary feature type

Column name	Type	Description
+geometry	GM_LineString	The structure of the feature
+propertyValue	Distance	The length of the boundary line
+waterLevelCategory	String	meanHighWater meanLowWater meanHighWaterSprings meanLowWaterSprings

Notes: Mean High and Low Waters apply to tidal waters in England and Wales, whereas the Mean High and Low Water Springs apply to those in Scotland.

Example of the ContourLine feature type

```
<os:member>
	<os:ContourLine gml:id="os.t50.sx98.691">
		<os:geometry>
			<gml:LineString srsName="urn:ogc:def:crs:EPSG::27700"
gml:id="os.t50.sx98.691.geom">
				<gml:posList>300000 87424.1 299997 87432.8 299995.9 87445.7 299997.1
87459.6 300000 87473.8</gml:posList>
			</gml:LineString>
		</os:geometry>
		<os:propertyValue uom="m">40</os:propertyValue>
		<os:contourLineType>ordinary</os:contourLineType>
	</os:ContourLine>
</os:member>
```

Example of the SpotHeight feature type

```
<os:member>
	<os:SpotHeight gml:id="os.t50.sx98.5">
		<os:geometry>
			<gml:Point srsName="urn:ogc:def:crs:EPSG::27700"
gml:id="os.t50.sx98.5.geom">
				<gml:pos>298939.2 88163.4</gml:pos>
			</gml:Point>
		</os:geometry>
		<os:propertyValue uom="m">53</os:propertyValue>
		<os:spotHeightType>generic</os:spotHeightType>
	</os:SpotHeight>
</os:member>
```

Example of the LandWaterBoundary feature type

```
<os:member>
        <os:LandWaterBoundary gml:id="os.t50.sx98.138">
                <os:geometry>
                        <gml:LineString srsName="urn:ogc:def:crs:EPSG::27700"
gml:id="os.t50.sx98.138.geom">
                                <gml:posList>298703.2 80000 298695.7 80002.8 298681.6 80002.1
298662.7 80000</gml:posList>
                        </gml:LineString>
                </os:geometry>
                <os:propertyValue uom="m">-0.51</os:propertyValue>
                <os:waterLevelCategory>meanLowWater</os:waterLevelCategory>
        </os:LandWaterBoundary>
</os:member>
```

3.1.6 Unique identifiers

GML 3.2.1 requires features and their geometries to have unique identifiers. For OS Terrain products, the feature identifiers have been structured as follows: os.t50.<tile name>.<sequential number>, where the second part abbreviates the product name, i.e. t50 for OS Terrain 50 and t5 for OS Terrain 5. Geometry identifiers in the GML use the same form, but with a .geom suffix.

Therefore, for a given release of the product, every feature and geometry is guaranteed to have a unique identifier. The OS Terrain products will both be updated by whole tile refresh, and there are no plans to supply feature-based change-only updates (COUs). When a tile is updated, the sequential identifiers are re-generated.

3.1.7 Coordinate reference system

The coordinate reference system for geometries in the OS Terrain 50 GML is expressed using an EPSG code embedded in a URN (urn:ogc:def:crs:EPSG::27700). This is a more generic way of expressing the reference system, rather than osgb:BNG (British National Grid) which was used in previous versions of the product.

3.2 Esri shapefile

3.2.1 Overview

Esri shapefiles are a simple, non-topological format for storing the geometric location and attribute information of geographic features. A shapefile is one of the spatial data formats that you can work with in ArcGIS.

The shapefile format defines the geometry and attributes of geographically referenced features in as many as five files with specific file extensions that should be stored in the same project workspace. The file extensions are as follows:

- .shp: The file that stores the feature geometry.
- .shx: The file that stores the index of the feature geometry.
- .dbf: The dBASE file that stores the attribute information of features. When a shapefile is added as a theme to a view, this file is displayed as a feature table.
- .sbn and .sbx: The files that store the spatial index of the features. These two files will only exist if you perform theme-on-theme selection, spatial joins or create an index on a theme's SHAPE field.
- .prj: The file that stores the projection information

3.2.2 Data structure

The layer structure of the Esri shapefile layers in the OS Terrain 50 contour supply is outlined in the following table.

Layer name	Layer description
<tile name>_line.shp <tile name>_line.dbf <tile name>_line.shx <tile name>_line.prj	Esri shapefiles for contour and tide line data.
<tile name>_point.shp <tile name>_point.dbf <tile name>_point.shx <tile name>_point.prj	Esri shapefiles for spot height data.
Metadata_<tile name>.xml	A metadata file for contour data, providing information on the flying date and so on.

3.2.3 Detailed Esri shapefile model

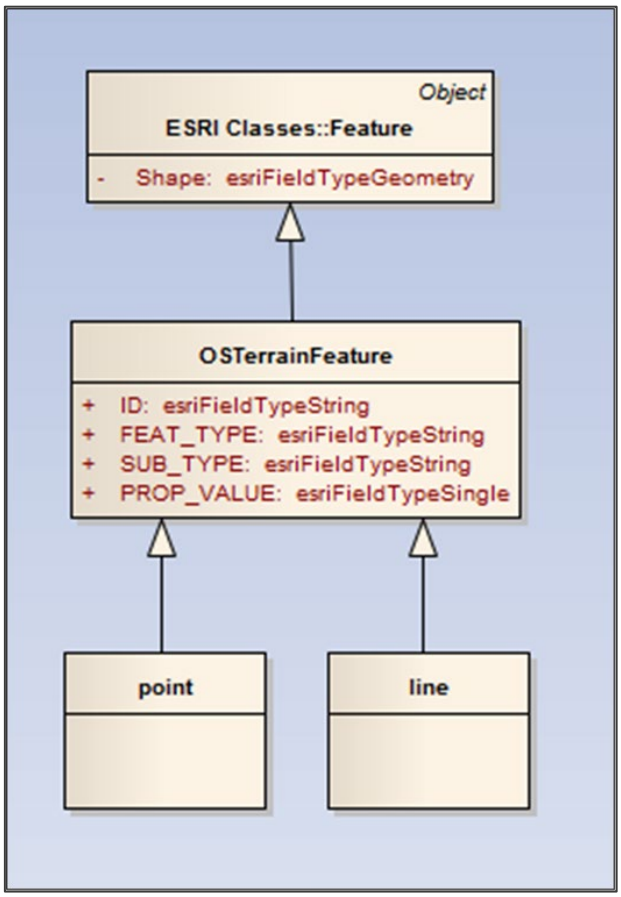

Figure 3. UML diagram illustrating the data model for the contour data provided as an Esri shapefile.

3.3 GeoPackage

3.3.1 Overview

OS Terrain 50 contours are supplied as a national GeoPackage file. GeoPackage (.gpkg) is an open, standards-based data format as defined by the 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 can be used in most GIS software in its native format without translation. GeoPackage attribute names are not limited in length. The file size limit is very large at 140 TB[1], so lots of data can be easily accommodated. GeoPackage supports raster, vector, and database formats, making it a highly versatile solution.

[1] A file size limit might be imposed by the file system to which the file is written.

3.3.2 Data structure

The names of the GeoPackage layers in the OS Terrain 50 contour supply are outlined in the following table.

Layer name
spot_height
land_water_boundary
contour_line

3.3.3 Attribute naming format comparison

The naming of attributes has been updated in accordance with guidelines to make them more user friendly.

2022 GPK Attribute name	2023 GPK Attribute name
Fid	fid
Id	id
propertyValue	property_value
propertyValue_uom	N/A
spotHeightType	spot_height_type
waterLevelCategory	water_level_category
contourLineType	contour_line_type

3.4 Vector tiles

3.4.1 Overview

OS Terrain 50 contour layers are supplied as a national vector tiles set in a single MBTiles file. This is a lightweight set of tiles that are efficient and fast to render in your software, provide high-resolution data, and which give a seamless experience when zooming in and out. The data is supplied in Web Mercator projection (ESPG:3857).

3.4.2 Data schema

The vector tiles schema is detailed in the following table. In the *Zoom levels* columns within the table, the letter *N* indicates that the specified layer and attribute are not mapped within that zoom level, whereas the letter *Y* indicates that the specified layer and attribute are mapped within that zoom level.

		Zoom levels						
Layer	**Attribute**	**0 to 8**	**9**	**10**	**11**	**12**	**13**	**14**
contour_line	id	N	Y	Y	Y	Y	Y	Y
	property_value	N	Y	Y	Y	Y	Y	Y
	contour_line_type	N	Y	Y	Y	Y	Y	Y
spot_height	id	N	Y	Y	Y	Y	Y	Y
	property_value	N	Y	Y	Y	Y	Y	Y
	spot_height_type	N	Y	Y	Y	Y	Y	Y
land_water_boundary	id	N	Y	Y	Y	Y	Y	Y
	property_value	N	Y	Y	Y	Y	Y	Y
	water_level_category	N	Y	Y	Y	Y	Y	Y

4. Metadata

The XML metadata for OS Terrain 50 follows the GEMINI metadata standard, which Ordnance Survey has committed to for the UK Location Programme and INSPIRE. Ordnance Survey has provided metadata for national sets of products (https://www.ordnancesurvey.co.uk/xml/products/). OS Terrain 5 and OS Terrain 50 also have metadata in this form, on a per-tile basis.

The XML metadata contains comments to clarify the meaning of the XML tags used in the file.

4.1 Product identification table

Name	Description	Examples
Product name	OS Terrain 50	gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd**:collectiveTitle**/gco:CharacterString
Spatial representation	The structure of the data, either grid (DTM) or vector (contours)	gmd:MD_DataIdentification/gmd:spatialRepresentationType/gmd**:MD_SpatialRepresentationTypeCode**
Tile reference	10km National Grid tile reference	gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd**:title**/gco:CharacterString
Topic category	INSPIRE theme: elevation	gmd:MD_DataIdentification/gmd:topicCategory/gmd**:MD_TopicCategoryCode**
Coordinate reference systems	The projected coordinate reference system of British National Grid and the vertical reference system of Ordnance Datum Newlyn	gmd:MD_ReferenceSystem/gmd:referenceSystemIdentifier/gmd:RS_Identifier/gmd:code/gmx:Anchor xlink:href="urn:ogc:def:crs:EPSG::27700"/**British National Grid** gmd:MD_ReferenceSystem/gmd:referenceSystemIdentifier/gmd:RS_Identifier/gmd:code/gmx:Anchor xlink:href="urn:ogc:def:crs:EPSG::5701"/**Ordnance Datum Newlyn**

4.2 Change history table

Name	Description	Examples
Flying date(s)	The date that the area was flown by Ordnance Survey for revision. To accommodate multiple flying dates within the tile, two values will be recorded: the earliest flying date and the latest flying date present. Both dates can be identical. For *Profile* content, the *Date Flown* will be recorded as <*null*>.	gmd:MD_DataIdentification/gmd:extent/gmd:EX_Extent/gmd:temporalElement/gmd:EX_TemporalExtent/gmd:extent/gml:TimePeriod /gml**:beginPosition** /gml**:endPosition**
Processing date	The date the tile was created by Ordnance Survey; not the date of the real-world change or survey.	gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd:date/gmd:CI_Date/gmd:date/gco:**Date**
Version number	An incrementing number to indicate the number of times the tile has been published.	gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd**:edition**/gco:CharacterString
Reason for change	This provides information about the update to the data and whether it is a creation (new) or a revision (modified/verified), which is described in the metadata by using *Lineage* (see the following row in this table).	gmd:MD_DataIdentification/gmd:citation/gmd:CI_Citation/gmd:date/gmd:CI_Date/gmd:dateType/gmd**:CI_DateTypeCode**
Lineage	Text to describe the current status of the tile: *'created from new imagery'*, *'some parts revised from new imagery'* or *'new imagery examined and no change*'.	gmd:DQ_DataQuality/gmd:lineage/gmd:LI_Lineage/gmd**:statement**/gco:CharacterString

4.3 Metadata viewing stylesheet

An XSLT viewing style sheet is provided (OSTerrainMetadataViewingStylesheet.xsl) to make the xml easier to read. This style sheet converts the XML to HTML for ease of viewing in a web browser. Some browsers and other software will read this automatically if the user is connected to the internet as its address is referenced in the metadata, but you can also view the style sheet on the Ordnance Survey website (http://www.ordnancesurvey.co.uk/xml/stylesheet/OSTerrainMetadataViewingStylesheet.xsl).

4.3.1 Example of the metadata XML file

The following box displays a section of the XML file in its native format, with the location of the style sheet highlighted. It can be read like this when opened in an XML viewer or basic file reader.

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl"
href="https://www.ordnancesurvey.co.uk/xml/stylesheet/OSTerrainMetadataViewingStylesheet.xsl"?>


<gmd:MD_Metadata xmlns:gmd="http://www.isotc211.org/2005/gmd"
xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:gmx="http://www.isotc211.org/2005/gmx" xmlns:gco="http://www.isotc211.org/2005/gco"
xmlns:xlink="http://www.w3.org/1999/xlink" xsi:schemaLocation="http://www.isotc211.org/2005/gmx
http://eden.ign.fr/xsd/isotc211/isofull/20090316/gmx/gmx.xsd"><!-- Unique identifier, required if this
record is being used in a metadata management system -->
        <gmd:fileIdentifier>
                <gco:CharacterString>OSTerrain5.NT23NE</gco:CharacterString>
        </gmd:fileIdentifier>
        <gmd:contact gco:nilReason="missing"></gmd:contact>
        <gmd:dateStamp>
                <gco:DateTime>2013-01-08T03:22:25</gco:DateTime>
        </gmd:dateStamp><!-- Projected Coordinate Reference System -->
        <gmd:referenceSystemInfo>
                <gmd:MD_ReferenceSystem>
                        <gmd:referenceSystemIdentifier>
                                <gmd:RS_Identifier>
                                        <gmd:code>
                                                <gmx:Anchor
xlink:href="urn:ogc:def:crs:EPSG::27700">British National Grid</gmx:Anchor>
```

4.3.2 Example of the metadata XML file referencing the XSLT viewing stylesheet

The following box gives an example of how the same XML file displayed in the preceding box will look when it has been converted to HTML by the XSLT viewing style sheet.

OS Terrain Tile Metadata	
Product identification:	
Product name:	OS Terrain 5
Spatial representation:	grid
Tile reference:	NT23NE
Topic category:	elevation
Coordinate reference systems:	British National Grid

4.3.3 Esri grid styling – asc.aux.xml file

The XML file contains min, max, mean and standard deviation height values for the product, in a format defined by Esri. The same values are supplied for every tile. Providing these height statistics is intended to allow colour ramps to be applied by the user, such that adjacent tiles are styled consistently.

This functionality can be disabled by removing the asc.aux.xml file from each downloaded folder or adjusting the parameters of the minimum and maximum heights in a GIS, if desired.

Annex A: Glossary

Glossary term	Definition
accuracy	The closeness of the results of observations, computations or estimates to the true values or the values accepted as being true. Accuracy relates to the exactness of the result and is the exactness of the operation by which the result is obtained.
American Standard Code for Information Interchange (ASCII)	A 7-bit code for encoding a standard character set.
area	A spatial extent defined by circumscribing lines that form a closed perimeter that does not intersect itself.
attribute	An attribute is a property of an entity, usually used to refer to a non-spatial qualification of a spatially referenced entity. For example, a name or descriptive code indicating what an entity represents or how it should be portrayed.
attribute code	An alphanumeric identifier for an attribute type.
boundary	Boundaries define the areas of the various national and local government authorities and some European authorities.
chain	A closed loop of links bounding a polygon.
code	An alphanumeric attribute code used in digital map data to describe each feature in terms either of the object surveyed or its representation on the map (or both).
coding	Allocation of a feature code to a feature being created from constituent construction data – points and/or segments; with optional linking to an existing feature of the same feature code.
contour	A line connecting points of equal elevation.
coordinate pair	A coordinate pair is an easting and a northing.
coordinates	Pairs of numbers expressing horizontal distances along original axes. Alternatively, triplets of numbers measuring horizontal and vertical distances. Row and column numbers of pixels from raw imagery are not considered coordinates for the purpose of the standard.
data format	A specification that defines the order in which data is stored or a description of the way data is held in a file or record.
data model	An abstraction of the real world that incorporates only those properties thought to be relevant to the application or applications at hand. The data model would normally define specific groups of entities and their attributes, and the relationship between these entities. A data model is independent of a computer system and its associated data structures. A map is one example of an analogue data model.
data structure	The defined logical arrangement of data as used by a system for data management; a representation of a data model in computer form.

Glossary term	Definition
eastings	See rectangular coordinates.
entity	Something about which data is stored in a databank or database. For example, boundary and name. The data may consist of relationships, attributes, positional and shape information and so on. Often synonymous with feature.
Extensible Markup Language (XML)	This is a markup language written in a textual data format designed to encode documents and data structures for transfer over the Internet. It was developed by the World Wide Web Consortium (W3C). XML schemas express shared vocabularies and allow machines to carry out rules made by people. They provide a means for defining the structure, content and semantics of XML documents.
Extensible Stylesheet Language Transformations (XSLT)	This is a language for transforming XML documents into objects that can be presented in a format that is more easily read by the user, such as HTML for web pages or plain text.
feature	An item of detail within a map that can be a point and/or symbol, text or line.
feature identifier	A unique code to identify an individual feature. A specified part of a record containing a unit of data, such as the date of digitising. The unit of data may be a data element or a data item.
feature record	The logical information, both spatial and attribute, describing a feature or entity.
geographical information system (GIS)	A system for capturing, storing, checking, integrating, analysing and displaying data that is spatially referenced to the Earth. This is normally considered to involve a spatially referenced computer database and appropriate applications software.
Geography Markup Language (GML)	GML was developed by the Open Geospatial Consortium (OGC), a global organisation of developers and users that aims to maximise the benefit of geographic information. GML is a spatially enabled dialect of XML schema.
layer	A subset of digital map data selected on a basis other than position. For example, one layer might consist of all features relating to counties and another to wards. Also known as a level.
level	A level corresponds to a single type of administrative unit, for example, a ward or a district, and is conceptual in form. See also layer.
Line	A series of connected coordinated points forming a simple feature with homogeneous attribution.
line feature	The spatial abstraction of an object in one dimension. Lines may intersect with other lines. They are defined as a series of two or more coordinate pairs and may be curved or straight. Curved lines consist of a series of very short straight-line segments. As an object abstraction, a line has no width.
line segment	A vector connecting two coordinated points.
link or edge	Links are the representation of line features. They are made up of one or more consecutive non-intersecting link segments with common attributes

Glossary term	Definition
	between two terminating nodes. Links have no connection with other links except at the start or end, via common (shared) terminating nodes (points). All links contain their terminating coordinates. Links may form the boundaries of polygons and may be shared between polygons.
map scale	The ratio between the extent of a feature on the map and its extent on the ground, normally expressed as a representative fraction, such as 1:1250 or 1:10 000.
name	The proper name or label of an object (real world) or feature (object abstraction). The descriptive name might consist of one or more text strings or be an attribute of the object or object abstraction.
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.
Northings	See rectangular coordinates.
object	A collection of entities which form a higher-level entity within a specific data model.
object (real world)	A recognisable discrete part of the real world.
origin	The zero point in a system of rectangular coordinates.
point and line data	A form of vector data designed for map production in which all map features are designated as points, lines or text. Point and line data does not carry the topological relationships between features.
polygon	Polygons are a representation of areas. A polygon is defined as a closed line or perimeter completely enclosing a contiguous space and is made up of one or more links. At least one node occurs on the perimeter of a polygon where the bounding link completes the enclosure of the area. There may be many nodes connecting the bounding links of a polygon. Links may be shared between polygons. Polygons may wholly contain other polygons or be contained within other polygons.
polygon boundary	The link(s) which enclose a polygon, projected into the horizontal plane. A chain.
record	A set of related data fields grouped for processing.
rectangular coordinates	Also known as X-Y coordinates and as eastings and northings. These are two-dimensional coordinates that measure the position of any point relative to an arbitrary origin on a plane surface (for example, a map projection).
resolution	A measure of the ability to detect quantities. High resolution implies a high degree of discrimination but has no implication as to accuracy. For example, in a collection of data in which the coordinates are rounded to the nearest metre, resolution is 1 metre, but the accuracy may be ± 5 metres or worse.
segment	A chord defined by two consecutive coordinates in a line string.

Glossary term	Definition
shapefile	This is a data format developed by Esri to describe features such as points, lines and polygons to enable spatial analysis. A shapefile consists of several files designed to hold information essential for the transfer of this data between software products which are capable of reading shapefiles.
spatial data	Data that includes a reference to a two- or three-dimensional position in space as one of its attributes. It is used as a synonym for geometric data.
spot height	A point on the Earth's surface for which the height, above a reference datum, is known and which has been fixed by observation.
String	A set of items which can be arranged into a sequence according to a rule. A sequence of coordinate pairs or triplets making up a line or a link.
structured data	Data within which collections of features (of any type) form objects. Topographically structured data also contains topological information, defining the relationships between features and objects.
Topography	The study of the physical features of the Earth. A topographic map's principal purpose is to portray and identify the features of the Earth.
Topology	The study of the properties of a geometric figure that are not dependant on position, such as connectivity and relationships between lines, nodes and polygons.
Vector	A straight line joining two data points.
vector data	Positional data in the form of coordinates of the ends of line segments, points, text positions and so on.