ORDNANCE SURVEY GB

OS MASTERMAP® TOPOGRAPHY LAYER – STYLING GETTING STARTED GUIDE

OFFICIAL
Ver 2.0

Ordnance Survey

Version history

Version	Date	Description
2.0	01/2023	Updated and restructured contents.
1.0	08/2017	Initial version named *Cartographic Styling Guidance*

Purpose of this document

This document provides information on how to style the OS MasterMap Topography Layer product. For related styling information, please refer to the Standard Styling Specification. For information on the contents and structure of OS MasterMap Topography Layer, please refer to the Overview, Getting Started Guide and Technical Specification.

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Contents

1. Introduction

OS MasterMap Topography Layer contains features that represent objects in the physical environment, such as buildings, fields, fences, and letter boxes. It also includes intangible objects, such as county boundaries and the lines of mean high or low waters. There are over 500 million features in the product.

Ordnance Survey has developed a post-processing styling method that creates a cartographic styling utilizing discrete style attributes (`style_code`, `colour_code`, `font_code` and more) to ensure that users get the most out of the rich content available OS MasterMap Topography Layer. This guide describes this styling method and the related resources provided by Ordnance Survey, and shows you how to use the resources in various geographical information systems (GIS).

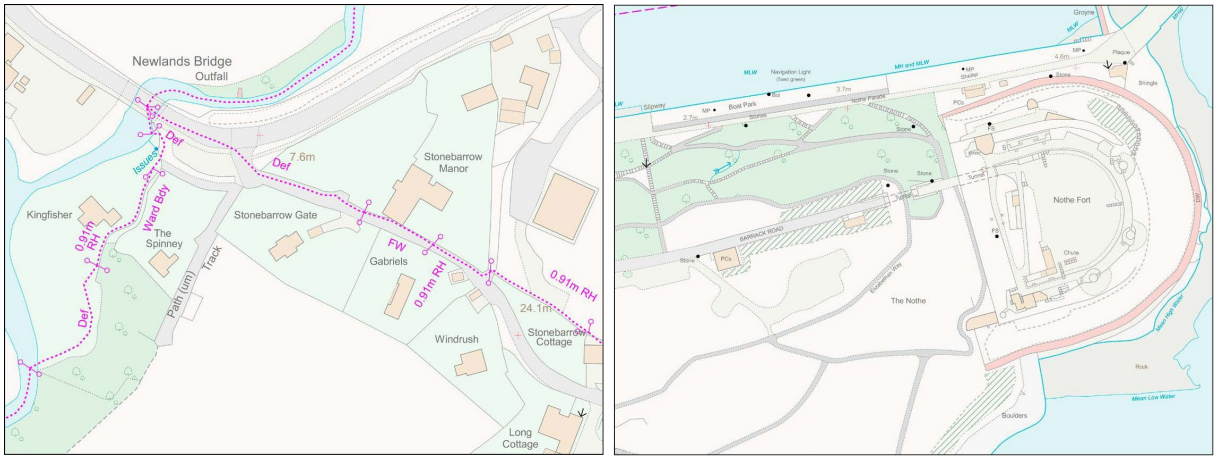

Figure 1. Example maps after styling has been applied

1.1 Background

A number of methods have been developed to style OS MasterMap Topography Layer over time:

- **featurecode**: This is the easiest method, but it provides only a limited number of styles and can result in mis-styled features when the same featurecode is used for multiple feature types.
    - **featurecode and make**: This method makes it possible to distinguish between features that share the same featurecode but have different values for 'make'. A good example of this is Rail:

      ```
      featurecode = 10167 AND make = 'Manmade'

      featurecode = 10167 AND make = 'Natural'
      ```

      This method is used in the open source stylesheets on the QGIS-UK/Styles (https://github.com/QGIS-UK/Styles/tree/master/OSMM) GitHub repository.

- **descriptiveGroup, descriptiveTerm and make**: How to use these three descriptive attributes is outlined in the *OSMM Topography Layer - Standard Styling Specification.*

- **descriptiveGroup, descriptiveTerm, make and physicalPresence**: Using these four descriptive attributes provides access to the richness of the OS MasterMap Topography Layer data but is the most

difficult method to implement.

- **Custom style attribute**: A few Partners have implemented the creation of a new style attribute during the loading/processing of OS MasterMap Topography Layer. This gives features a discrete attribute on which to style that is far more efficient.

- **OS discrete styling attribute**: Several years ago, we released Styled Layer Descriptors (SLDs) for OS MasterMap Topography Layer that used a discrete style attribute called `os_cat`. This attribute is a textual description (for example, `buildingFill`) that is created by post processing the data.

Multiple available styling methods made it difficult to provide uniform guidance for OS MasterMap Topography Layer, because the stylesheets look for a particular attribute field, which may not exist in the translated data. For example, descriptiveGroup can become `descgroup` or `desc_group` or `DESCRIPTIVEGROUP`.

2. Styling method overview

To overcome the challenges posed by multiple styling methods and to ensure that users get the most out of the detailed content available, Ordnance Survey developed a post-processing method to create a new discrete style attribute that can be used to style OS MasterMap Topography Layer.

We created a key attribute, "style_code", which is populated with integers that correspond to a style for a given feature. This code is based on logic similar to the process described in our *Standard Styling Specification*, but with far fewer unique feature styles. We chose to use integers, rather than text, to improve system performance during processing. The use of integers, together with a text description, makes the new styling easy to understand and apply.

2.1 Provided resources

Styling information, SQL scripts, stylesheets and related resources are available from the Ordnance Survey OSMM-Topography-Layer-stylesheets (https://github.com/OrdnanceSurvey/OSMM-Topography-Layer-stylesheets) GitHub repository.

To support the wide variety of OS MasterMap users, the provided resources include:

- **Stylesheets**: In SLD (Geoserver), LYR (ESRI Layer), LYRX (ArcGIS Pro), QML (QGIS) formats in a backdrop style, and Mapbox GL styles.
- **SQL database scripts**: For Oracle, PostgreSQL/PostGIS and SQL Server to post process your database.
- **Symbology fonts**: OSMasterMap TrueType font and SVG images.
- **FME**: Transformer(s) for FME Workbench.
- **QGIS-Field Calculator**: Text files and instructions on how to use the QGIS field calculator to add styling attribution.

2.2 Methodology

To create the post-processing styling method, we followed these steps:

1. Queried the OS MasterMap Topography Layer database to create a list of discrete features grouped by combinations of descriptiveGroup, descriptiveTerm, make and physicalPresence. The results were ordered by total count.
2. Added a styling description for each combination.

   This was done by the Cartographic Design team who considered whether each discrete feature should have its own style rule or whether it could be styled like a similar feature.
3. Added a numerical styling code.

   This was based on previous feedback from users who had used the "os_cat" styling method. Using numbers has

important performance benefits; a stylesheet looking to match data with "Building Outline Line" is significantly slower than one matching with an integer value of "2", for example.

Table 1: Total discrete feature count for Topographic Lines

Total count	feature Code	descriptive Group	descriptive Term	make	physical Presence	Styling description	Code
148 127 807	10046	General Feature			Obstructing	Default Line	1
64 612 785	10019	Building	Outline	Man-made	Obstructing	Building Outline Line	2
29 515 251	10046	General Feature			Edge / Limit	Edge Line	3

4. Wrote SQL database scripts that post processes the database tables to add the new styling attributes, and stylesheets that look for the new style code attribute.

Appendix A contains tables that list the attributes used to create the new style rules for each OS MasterMap Topography Layer type.

3. How to use the SQL scripts

This section contains instructions on how to use the scripts in various databases (PostgreSQL/PostGIS, Oracle and SQL Server) and an overview of the key principles on which the scripts are based.

Note: The SQL scripts are available in the SQL directory of the Ordnance Survey OSMM-Topography-Layer-stylesheets (https://github.com/OrdnanceSurvey/OSMM-Topography-Layer-stylesheets) GitHub repository.

3.1 Introduction to the SQL scripts

Before using the SQL scripts, you need to determine how your OS MasterMap Topography Layer loading software handles the descriptiveGroup and descriptiveTerm attributes, because these attributes often contain multiple values. Some loaders use a simple VARCHAR(254) data type and load in the data as a comma separated list of values, while others load in the data as an array. For example, this is what a descriptiveTerm with multiple values, looks like when loading OS MasterMap Topography Layer data using:

- FME: `Rough Grassland,Scrub,Heath`
- GDAL/OGR2OGR library: `{"Rough Grassland",Scrub,Heath}`

This is an important distinction as it determines which SQL queries you can use to find the different descriptiveGroup and descriptiveTerm values. If you are unsure which method your loader uses, look at the data in your database or at the `CREATE TABLE` SQL statement that was used. Either of these will show you the data type of each attribute field. For example, in PostgreSQL/PostGIS using OGR2OGR, if the descriptive term field was created as `descriptiveterm character varying[]`, it is an ARRAY. When you know this, you can choose the correct SQL query script to use.

Note: Before running the SQL scripts, please check your schema and table names as these may be different from those used in our SQL queries. You can use find and replace in a text editor to tweak the SQL queries to match your database configuration.

3.2 PostgreSQL/PostGIS

Note: This section is only relevant if you are using GML data. The data in the GeoPackage and Vector tiles (MBTiles) formats of the product already include a `style_code` column and other additional columns where necessary.

As mentioned in the previous section, the structure of your database and data depends on how you load your data. You need to use the SQL query that correctly matches your data structure. Different operators are available to find the attribute values, depending on whether your data is loaded as a string or an array.

For example, in PostGIS:

- **String**: You can use the ~operator to find a value within the string of values, for example:

```
WHEN descriptivegroup ~ 'Building' AND descriptiveterm IS NULL THEN 'Building
Fill'
```

- **Array**: You can use the `@>` (contains) operator to find a value within the array of values, for example:

```
WHEN descriptivegroup @> '{Building}' AND descriptiveterm IS NULL THEN
'Building Fill'
```

Both types of SQL query create a new table using a `CASE` statement. This is more efficient than using an `UPDATE SET` statement, because the PostgreSQL MVCC model creates a new row for each row affected by the `UPDATE`. This means that the original rows then need to be deleted. Previous tests that compared the methods showed that the `CASE` method took seven hours for a GB OS MasterMap Topography Layer set, whereas the `UPDATE` method took several days.

Because the queries essentially create duplicate tables, you need to ensure that you have enough server hard drive space before running them.

Note: The example below uses pgAdmin III.

To run either SQL query:

1. Open pgAdmin.

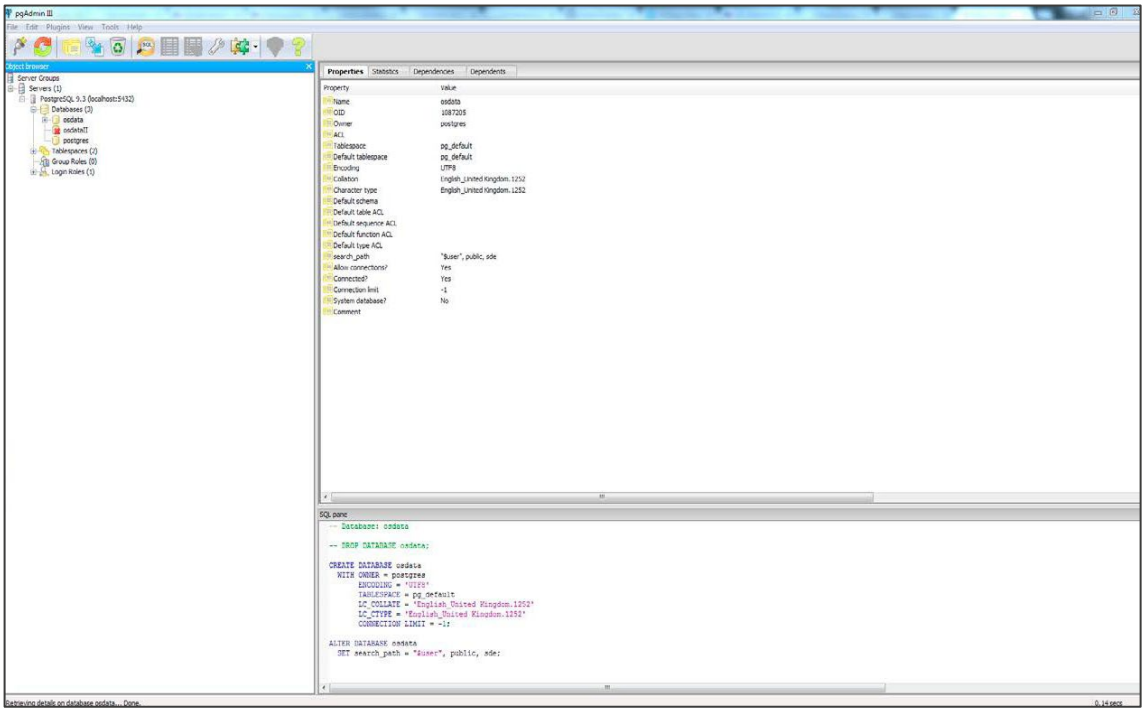

Figure 2. Opening screen of pgAdmin III UI

2. Click  (Execute SQL Query) in the toolbar.
3. Copy the SQL code from the correct PostGIS SQL file and paste into the PostGIS SQL Query window.

   See Introduction to the SQL scripts above for guidance on how to choose the correct script.

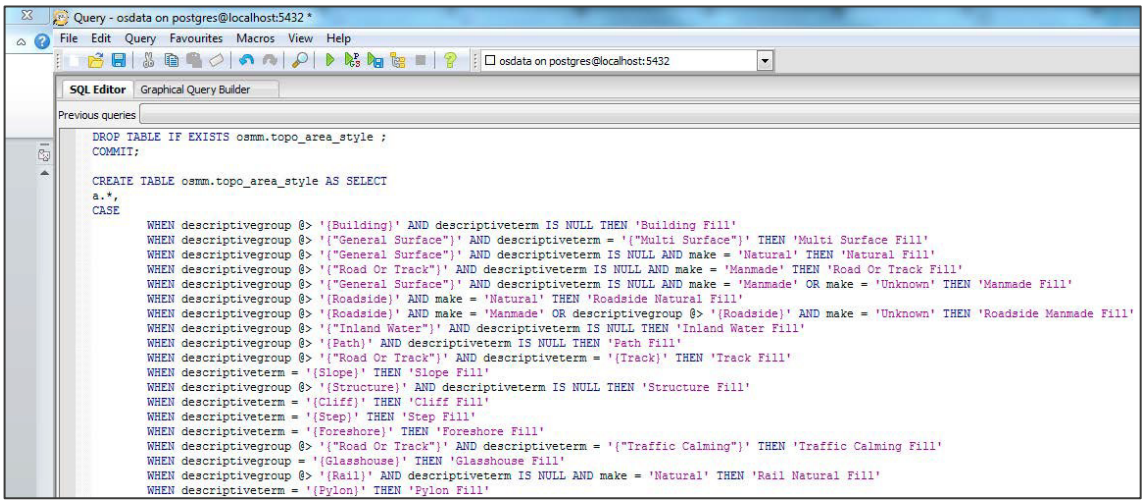

Figure 3. pgAdmin III UI showing SQL script pasted in the SQL Editor

4. Click (Execute Query) in the toolbar to run the script.

   At Ordnance Survey we run all the SQL scripts (that is, for all feature types) simultaneously. Before attempting this, please check that your PostgreSQL configuration is set to handle this approach because it may consume a lot of server resources.

   Note: Post processing may take several hours, depending on the amount of OS MasterMap Topography Layer data you have loaded and your configuration settings.

5. After the SQL query has run, you will have both your original database table (for example "osmm. topo.topographicarea") and a new table that includes the additional styling attributes (for example, "osmm_topo.topographicarea_styled"). You can manage these tables in one of two ways:

   a. `DROP/DELETE` the original table and rename the new styled table the name of the original table.

      The advantage of this is that existing connections to that database table will continue to work.

   b. `DROP/DELETE` the original table and leave the new styled table as it is.

      The disadvantage of this is that an existing database connection looking for your original table will fail; you will need to connect to the new styled database table.

3.3 Oracle

The SQL scripts for Oracle work with descriptiveGroup and descriptiveTerm attributes that are strings and use the `INSTR` function to find attribute values within the string. We chose to use `INSTR` rather than `LIKE` because in our tests `INSTR` SQL queries ran faster. The Oracle scripts `UPDATE` and `SET` the new `style_description` and `style_code` attributes and you need to add extra columns to your database tables for these attributes before running the SQL scripts.

The example below adds the `style_description` attribute to the "topographicarea" table. We use SQL Developer to run the SQL script.

To run the Oracle SQL queries:

1. Open SQL Developer and navigate to the database in which your OS MasterMap Topography Layer is stored.

2. Add the extra attribute column/s:

   Our example adds a "style_description" column to the "sw_topographicarea" table.

   a. In the Connections panel select the table to which you want to add a new attribute column/s.

      In the Worksheet area, enter an SQL query to add the a new attribute column.

      ```
      ALTER TABLE sw_topographicarea ADD (style_description varchar(250),
      style_code number);
      ```

      Substitute the table name as necessary.

   b. Click ▶ (Run) to run the query.

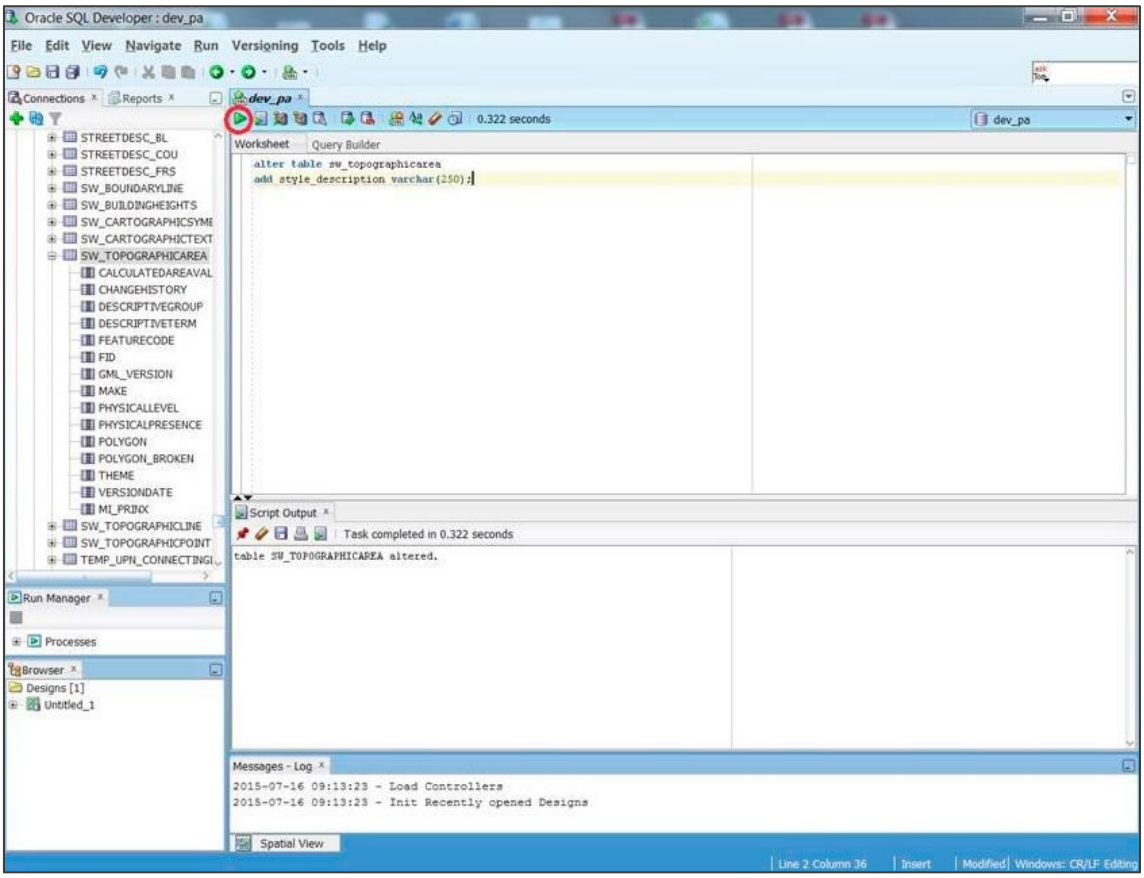

Figure 4. Oracle SQL Developer UI showing how to add a new attribute column

If the SQL runs successfully, the message "table <table name> altered" for example "table SW_TOPOGRAPHICAREA altered" will display in the Script Output area (below the Worksheet area).

c. Click in the Connections panel to refresh the list.

This ensures that the new "style_description/style_code" column displays in the list.

d. In the Connections panel, select the table (for example, "sw_topographicarea") once again.

A new tab showing the revised data structure of the table (including the new column) will open.

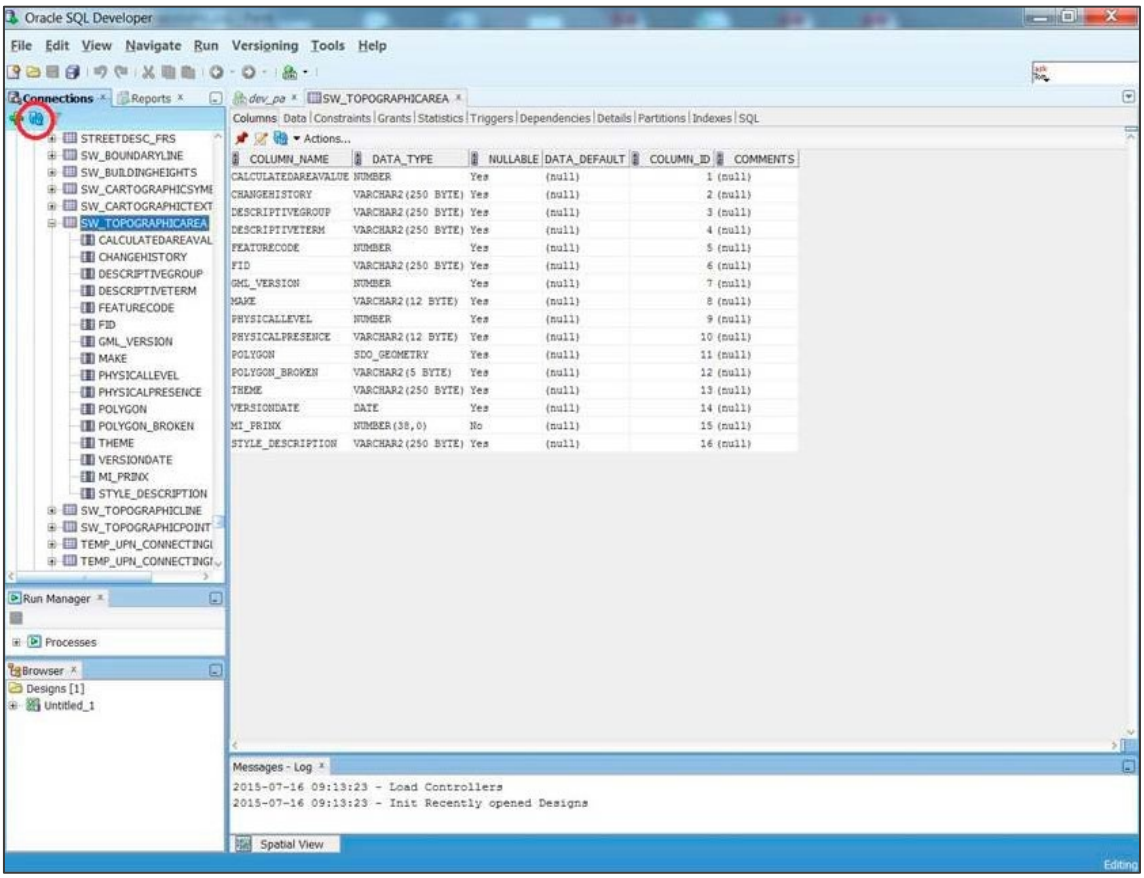

Figure 5. Oracle SQL Developer UI showing column names and data structure

e. Repeat this procedure (steps a. to d. above) for the other OS MasterMap Topography Layer database tables.

Note: CartographicText requires additional attributes to be added before running the SQL:

```
ALTER TABLE osmm_topo.cartographictext ADD (font_code number, colour_code
number, rotation number, geo_x number, geo_y number, anchor varchar(2));
```

3. Run the styling SQL scripts using the same procedure as above:

a. Select the appropriate table in the Connections panel (for example, "sw_topographicarea").

b. Copy and paste the content of the matching SQL script (for example, "topographicarea_update_string.sql") into the Worksheet area.

c. Click ▶ (Run) to run the query.

d. Repeat this procedure (steps a. to c. above) for the other OS MasterMap Topography Layer database tables.

You can now go ahead and use the new stylesheets with the data.

3.4 SQL Server

The SQL scripts for SQL Server work with descriptiveGroup and descriptiveTerm attributes that are strings and use the CHARINDEX function to find attribute values within the string. The SQL Server scripts `UPDATE` and `SET` the new `style_description` and `style_code` attributes. Before running the SQL scripts, you need to add extra columns for these attributes to your database tables.

To run the SQL Server scripts:

1. Open SQL Server Management Studio and connect to your OS MasterMap Topography Layer database.
2. Add new attribute column/s:
   a. Open the Query Editor and run the following SQL query.

```
ALTER TABLE sw_topographicarea ADD (style_description varchar(250),
style_code number);
```

Our example query adds "style_description" and "style_code" columns to a database table called "sw_topographicarea". Substitute the table name as necessary.

   b. Repeat this procedure for the other OS MasterMap Topography Layer database tables.

Note: CartographicText requires additional attributes to be added before running the SQL:

```
ALTER TABLE sw_cartographictext ADD (font_code int, colour_code int,
rotation float, geo_x int, geo_y int, anchor varchar(2));
```

3. Next, run each of styling SQL scripts using the same procedure as above.

You can now go ahead and use the new stylesheets with the data.

3.5 Key SQL query principles

The SQL scripts were written to create the new style attributes as efficiently as possible. The SQL queries are based on the key principles detailed below:

- **Rule order**: The rule order is based on the descending total count of a discrete feature.

  This means that as each feature is assessed, fewer rules need to be parsed to get to a matching rule for the feature. The only exception is in the Topographic Area SQL queries where the rules for built environment features are blocked together above the rules for natural environment features.

- **Minimal attributes**: The rules try to examine as few attributes as possible. Consider, the following example rules:

```
WHEN descriptivegroup ~ 'Building' THEN 'Building Fill'
WHEN descriptivegroup ~ 'Building' AND descriptiveterm = 'Archway' THEN
'Archway Fill'
```

In this example, the second rule would never to be used, because every feature with "Building" in the descriptiveGroup would match the first rule and therefore be styled as "Building Fill". To overcome this, we need to amend the first rule to take the descriptiveTerm into consideration.

```
WHEN descriptivegroup ~ 'Building' AND descriptiveterm IS NULL THEN 'Building
Fill'
WHEN descriptivegroup ~ 'Building' AND descriptiveterm = 'Archway' THEN
'Archway Fill'
```

This change allows Archway features to pass the first rule and get styled by the second. However, this means that the first rule needs to examine both the descriptiveGroup and descriptiveTerm attributes, making it fractionally slower than the original rule. We have tried to keep the number of attributes that need to be checked as low as possible.

- **Minimal rules**: The greater the number of rules, the greater the time to process all the features. To minimize the number of rules, we used different database operators to make finding certain attribute values easier. Consider the following example descriptiveTerms:

```
Nonconiferous Trees (Scattered),
Rough Grassland Scrub,Nonconiferous Trees
Nonconiferous Trees,Rough Grassland,Scrub
```

If we would like all of these to be styled as "Nonconiferous Tree Fill", one solution is to write three rules:

```
WHEN descriptiveterm = 'Nonconiferous Trees (Scattered),Rough Grassland' THEN
'Nonconiferous Tree Fill'
WHEN descriptiveterm = 'Scrub,Nonconiferous Trees' THEN 'Nonconiferous Tree
Fill'
WHEN descriptiveterm = 'Nonconiferous Trees,Rough Grassland,Scrub' THEN
'Nonconiferous Tree Fill'
```

A better alternative is to use one rule that looks for "Nonconiferous Tree" or "Nonconiferous Tree (Scattered)" at any position of the descriptiveTerm.

```
WHEN descriptiveterm ~ 'Nonconiferous Trees' OR descriptiveterm ~
'Nonconiferous Trees (Scattered)' THEN 'Nonconiferous Tree Fill'
```

If all of these features have a `style_description` of "Nonconiferous Tree Fill", it does not matter at which position the "Nonconiferous Tree" is as it will always be styled as "Nonconiferous Tree Fill".

4. How to use the stylesheets

Note: The stylesheets are available in the Stylesheets directory of the Ordnance Survey OSMM-Topography-Layer-stylesheets GitHub repository (https://github.com/OrdnanceSurvey/OSMM-Topography-Layer-stylesheets).

You can either fork the stylesheets from the GitHub repository or download the repository and extract the files.

Four different types of stylesheets are provided (SLD, LYR, LYRX and QML) to help users apply the styles in as many applications as possible. Each stylesheet type is discussed in a separate section below.

4.1 Styled Layer Descriptors (SLD) stylesheets

Styled Layer Descriptor (SLD) stylesheets are used by a number of desktop applications and geographic servers for styling both vector and raster data. SLDs are an OGC standard.

Note: The SLDs released by OS were written and tested in GeoServer; you may need to adapt them to work with your software.

The following steps guide you through the process of loading the SLDs in GeoServer and associating them with OS MasterMap Topography Layer.

Note: The instructions assume that you have already setup a workspace and store, and added the OS MasterMap Topography Layer data.

To use the SLD stylesheets:

1. Login to the GeoServer admin panel.

Figure 6. Geoserver UI displaying the Welcome screen

2. Click *Open Layers* in the Data menu in the left panel to view the OSMM topography layers: "boundaryline", "cartographicsymbol", "cartographictext", "topographicarea", "topgraphicline" and "topographicpoint".

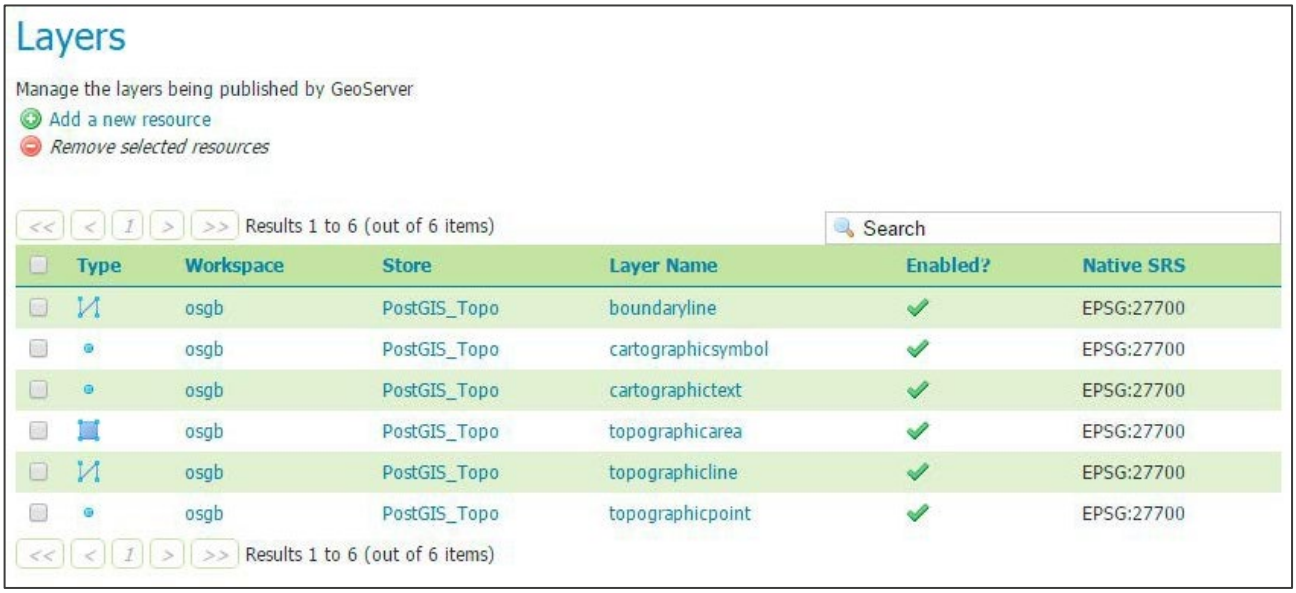

Figure 7. Geoserver Layers UI showing OSMM data layers

3. To upload the new SLD style files:

   a. Click *Styles* in the Data menu in the left panel.

Figure 8. Geoserver Data menu options

   b. Click *Add a new style*.

Figure 9. Geoserver Styles UI showing style management options

   c. Click *Choose File* in the Style file field at the bottom of the page, select one of the SLD files on your computer, and click *Upload*.

Figure 10.Geoserver Style file field in the Styles UI

d. The page will refresh to display the uploaded SLD file.

Figure 11.Geoserver New style UI showing uploaded SLD stylesheet

e. Click *Submit*.

f. Repeat this procedure (steps b. to e. above) for the other SLD files.

4. To associate the uploaded SLD files with their respective data layers:

   a. Click *Layers* in the Data menu in the left panel.

Figure 12.Geoserver Data menu options

   b. Click a layer (for example, "topographicarea") to open the Edit Layer view.

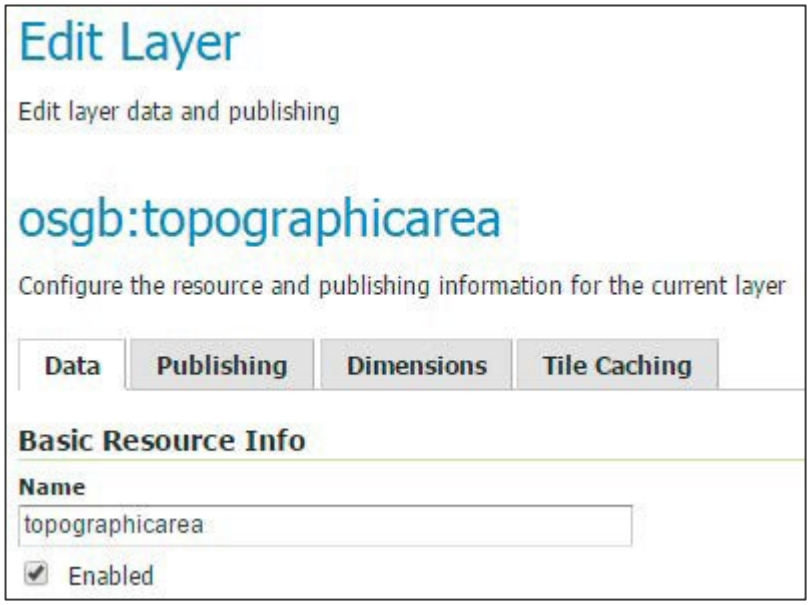

Figure 13.Geoserver Edit Layer UI

   c. Select the *Publishing* tab, scroll to the Default Style field, and select the SLD (uploaded in the previous step) that matches the selected data layer in drop-down menu.

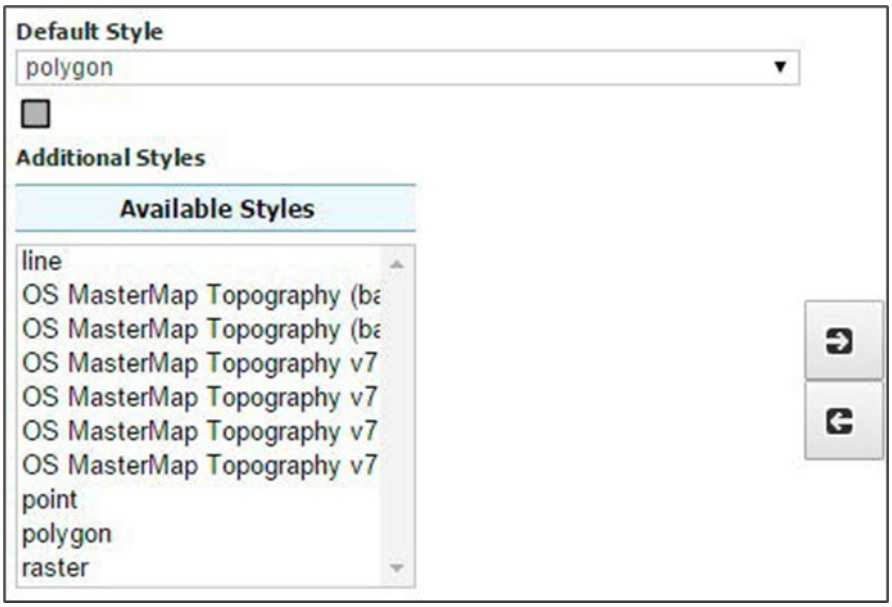

Figure 14.Geoserver Default Style field

d. Repeat this procedure (steps a. to c. above) for the other layers.

5. Once all the SLDs have been associated with layers you can view the data.

Note:
- *The SLDs have a minimum viewing scale of 1:4000.*
- *We recommend adding a background colour layer of RGB (228, 244, 247).*

4.2 LYR (Esri Layer) stylesheets

The following steps guide you through the process of loading the LYR (Esri Layer) stylesheets in ArcMap and associating them with OS MasterMap Topography Layer.

To use the LYR (Esri Layer) stylesheets:

1. Install the OSMasterMap font on your computer:

This gives you the OS MasterMap symbology.

a. Navigate to the "OSMM-Topography-Layer-stylesheets/Schema version 9/Stylesheets/ESRI stylesheets (LYR)" folder and double-click "OSMasterMap.ttf".

b. Click *Install* in the OSMasterMap (True Type) dialog.

You may need Administrator privileges to install a new font.

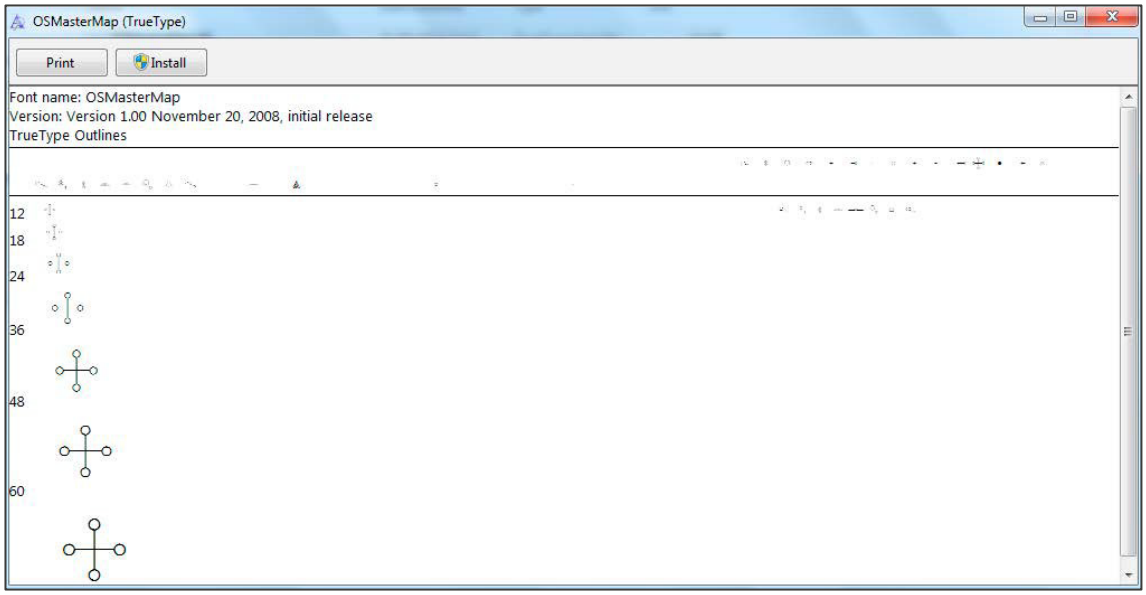

Figure 15.OSMasterMap (TrueType) dialog

2. In ArcMap, open a new blank map.

3. Use the Catalog to navigate to "OSMM-Topography-Layer-v9.lyr" and load it into your project.

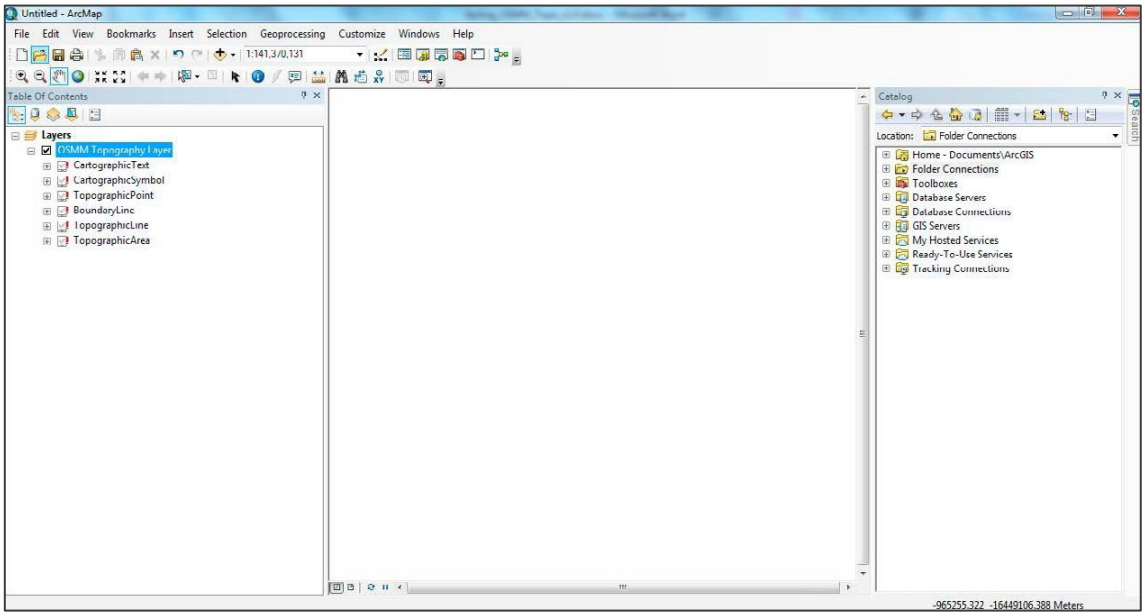

Figure 16.ArcMap UI showing OSMM Topography Layer (with all data layers) loaded in the Layers panel

Note: The red exclamation marks next to the layer names means you need to repair the data source.

4. Connect the LYR stylesheets to the OS MasterMap Topography Layer data layers:

   a. Double-click a layer, for example "TopographicArea".

   b. In the Layer Properties dialog, select the *Source* tab and click *Set Data Source*.

c. In the Data Source dialog, navigate to the database containing OS MasterMap Topography Layer, select the matching layer, and click *Add*.

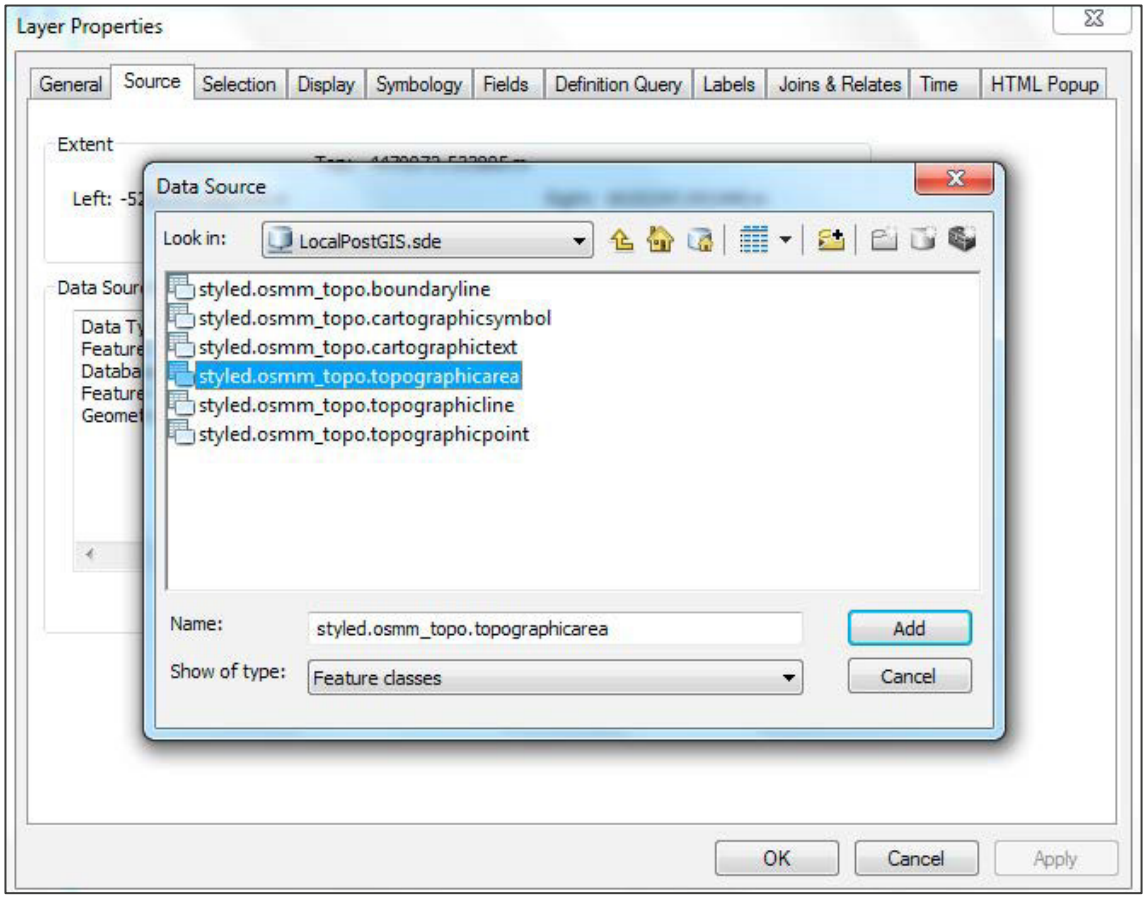

Figure 17.ArcMap Data Source dialog showing OSMM Topography data layers.

d. Repeat this procedure (steps a. to c. above) for the other data layers.

Note:

- *We recommend setting a reference scale of 1:2000 and viewing the map between 1:500 and 1:4000 for maximum legibility. The minimum viewing scale is set at 1:4000.*
- *We also recommend adding a background colour layer of RGB (228, 244, 247).*

Your map should now look similar to this:

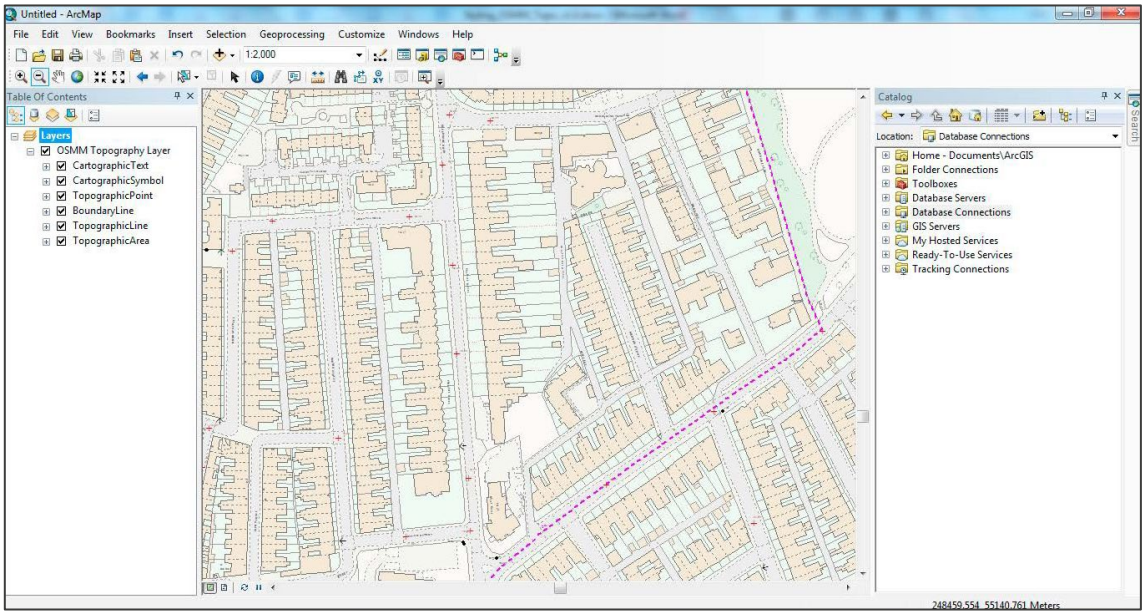

Figure 18.ArcMap UI showing styled OSMM Topography Layer in the main area

4.3 LYRX (ArcGIS Pro) stylesheets

The following steps guide you through the process of loading the LYRX stylesheets into ArcGIS Pro and associating them with OS MasterMap Topography Layer.

To use the LYRX stylesheets:

1. Install the OSMasterMap font on your computer:

   This gives you the OS MasterMap symbology.

   a. Navigate to the "OSMM-Topography-Layer-stylesheets/Schema version 9/Stylesheets/ArcGIS Pro stylesheets (LYRX)" folder and double-click "OSMasterMap.ttf".

   b. Click *Install* in the OSMasterMap (True Type) dialog.

      You may need Administrator privileges to install a new font.

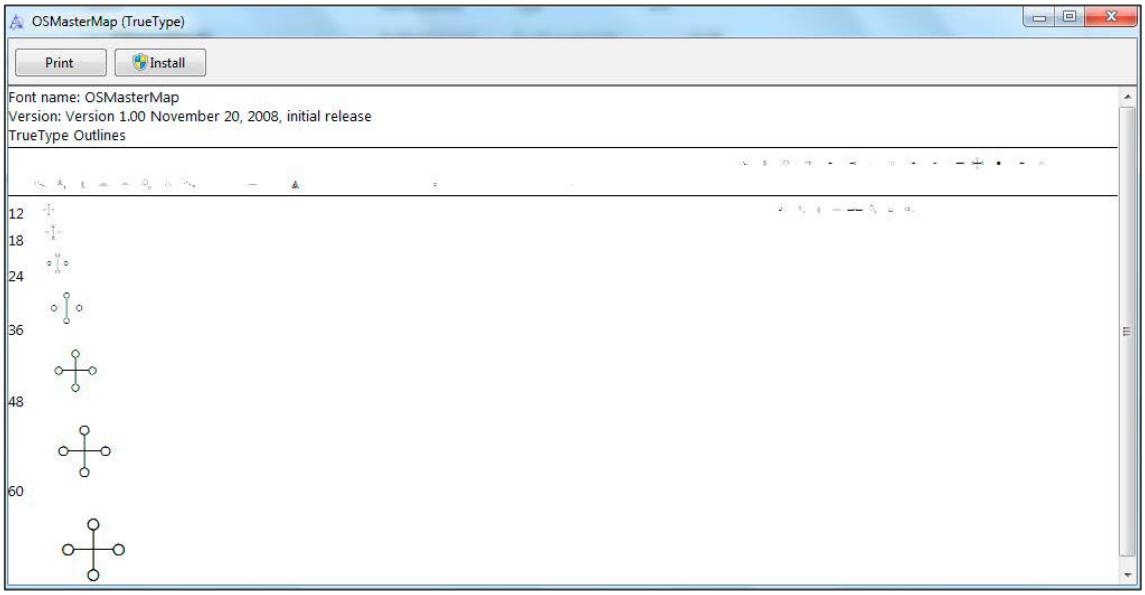

Figure 19.OSMasterMap (TrueType) dialog

2. In ArcGIS Pro, open a new blank map.

3. Use the Catalog to navigate to "OSMM Topography Layer (Preferred style).lyrx" and load it into your project.

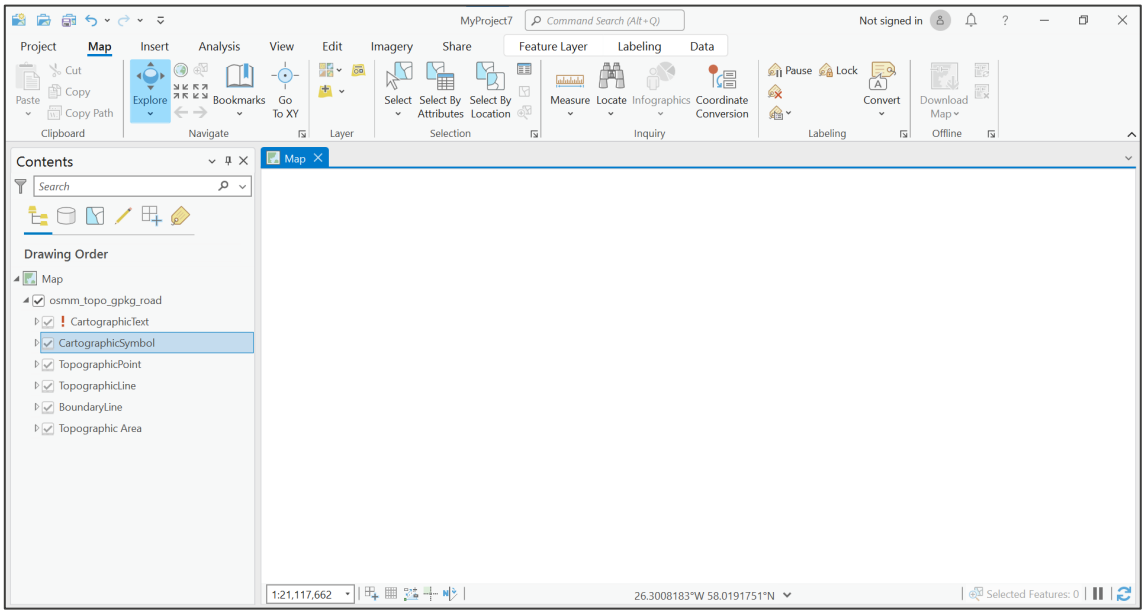

Figure 20.ArcGIS Pro UI showing OSMM Topography Layer (with all data layers) loaded in the Contents panel

Note: The red exclamation marks next to the layer names means you need to repair the data source.

4. To fix the broken data links, connect the LYRX stylesheets to the OS MasterMap Topography Layer data layers:

   a. Double-click a layer, for example "TopographicArea".

b. In the Change data source dialog, navigate to the database containing OS MasterMap Topography Layer, select the matching layer, and click *Add*.

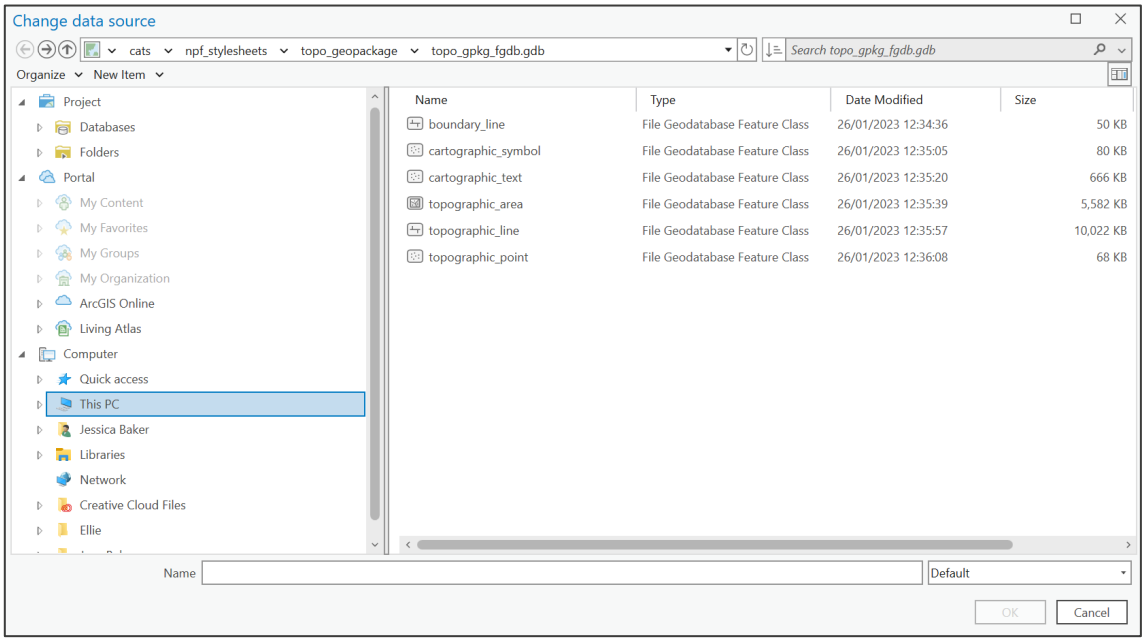

Figure 21.ArcGIS Pro Data Source dialog showing OSMM Topography data layers

c. Repeat this procedure (steps a. and b. above) for the other data layers.

Note:

- *We recommend setting a reference scale of 1:2000 and viewing the map between 1:500 and 1:4000 for maximum legibility. The minimum viewing scale is set at 1:4000.*
- *We also recommend adding a background colour layer of RGB (228, 244, 247).*

Your map should now look similar to this:

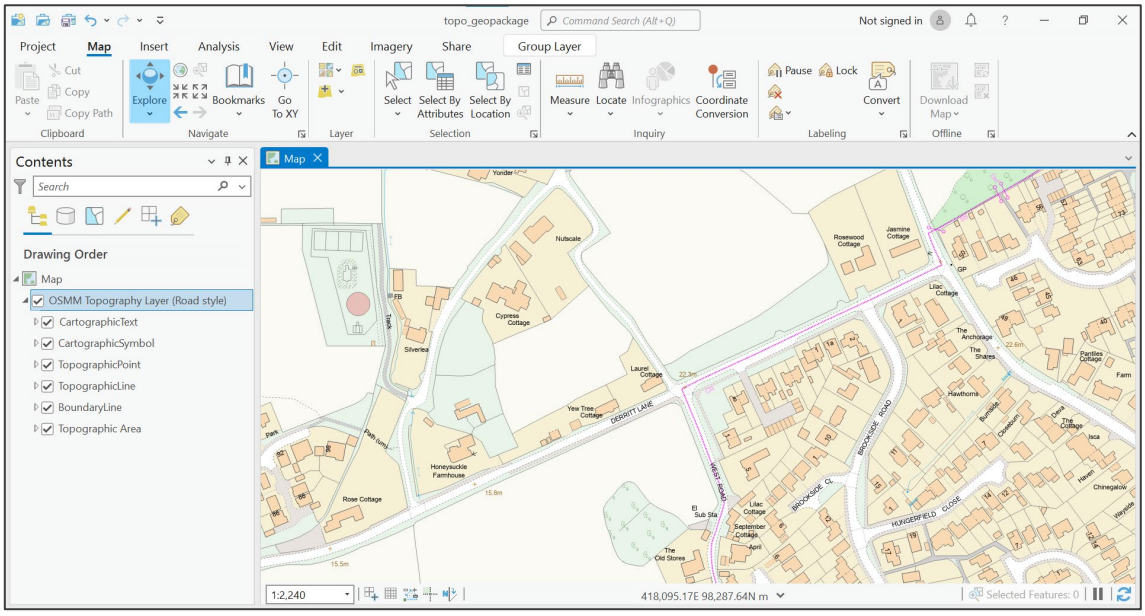

Figure 22.ArcGIS Pro UI showing styled OSMM Topography Layer in the Map area

4.4 QML (QGIS) stylesheets

The following steps guide you through the process of loading the QML stylesheets in QGIS and associating them with OS MasterMap Topography Layer.

To use QML (QGIS) stylesheets:

1. Navigate to the "OSMM-Topography-Layer-stylesheets/Schema version 9/Stylesheets/QGIS stylesheets (OML)" folder and double-click "OSMasterMap.ttf".

2. Click Install in the OSMasterMap (True Type) dialog.

   You may need Administrator privileges to install a new font.

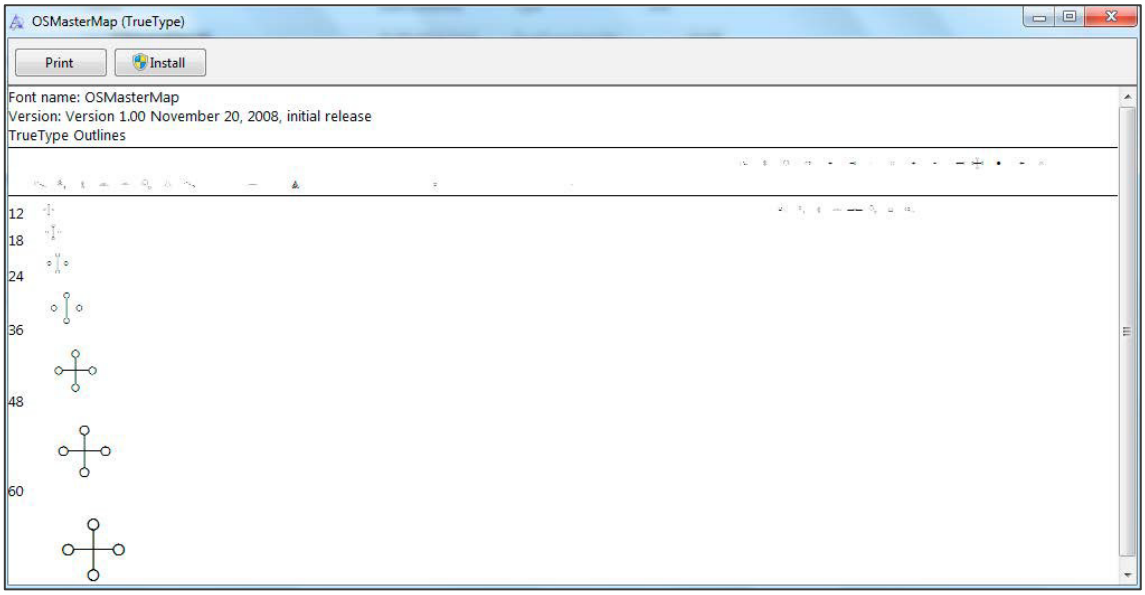

Figure 23.OSMasterMap (TrueType) dialog

3. Copy the "osmmsymbols" folder into the QGIS "svg" folder on your computer.

   The "osmmsymbols" folder is in "OSMM-Topography-Layer-stylesheets/Schema version 9/Stylesheets/QGIS stylesheets (QML)" folder of the extracted GitHub files.
   The "svg" folder is typically in "C:\<program folder>\QGIS <version>\apps\qgis-ltr\svg", for example, "C:\Program Files\QGIS 3.22.4\apps\qgis-ltr\svg".

   You may need to re-open QGIS if you had it open during this step.

4. Load in the OS MasterMap Topography Layer data from your database.

5. To load the stylesheets:

   a. Double-click a layer to open the Layer Properties dialog:

   b. In the Layer Rendering section (bottom left), click *Style* > *Load Style.*

   c. In the Database Styles Manager dialog, click "…" next to the File field, select the QML file (.qml) that matches the selected layer, and then click *Load Style*.

The QML files are in the "/OSMM-Topography-Layer-stylesheets-master/Schema version 9/Stylesheets/QGIS stylesheets (QML)*" folder of the extracted GitHub files.*

d. Click *OK* to close the Layer Properties dialog.

e. Repeat this procedure (steps a. to d. above) for the other OS MasterMap Topography Layer layers

For the best visibility, we recommend you order the layers as follows: "cartographictext", "cartographicsymbol", "topographicpoint", "boundaryline", "topographicline", "topographicarea". You can use drag and drop to reorder the layers.

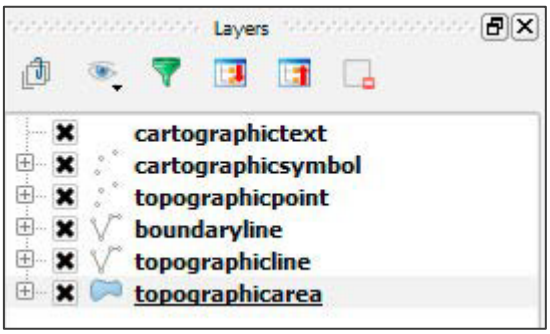

Figure 24.QGIS Layers panel showing OSMM Topography data layers

Note:

- *We recommend viewing the map at a scale of between 1:500 and 1:4000. For maximum legibility we have set the minimum viewing scale at 1:4000.*
- *We recommend adding a background colour of R:228,G:244,B:247*

Your map should now look similar to this:

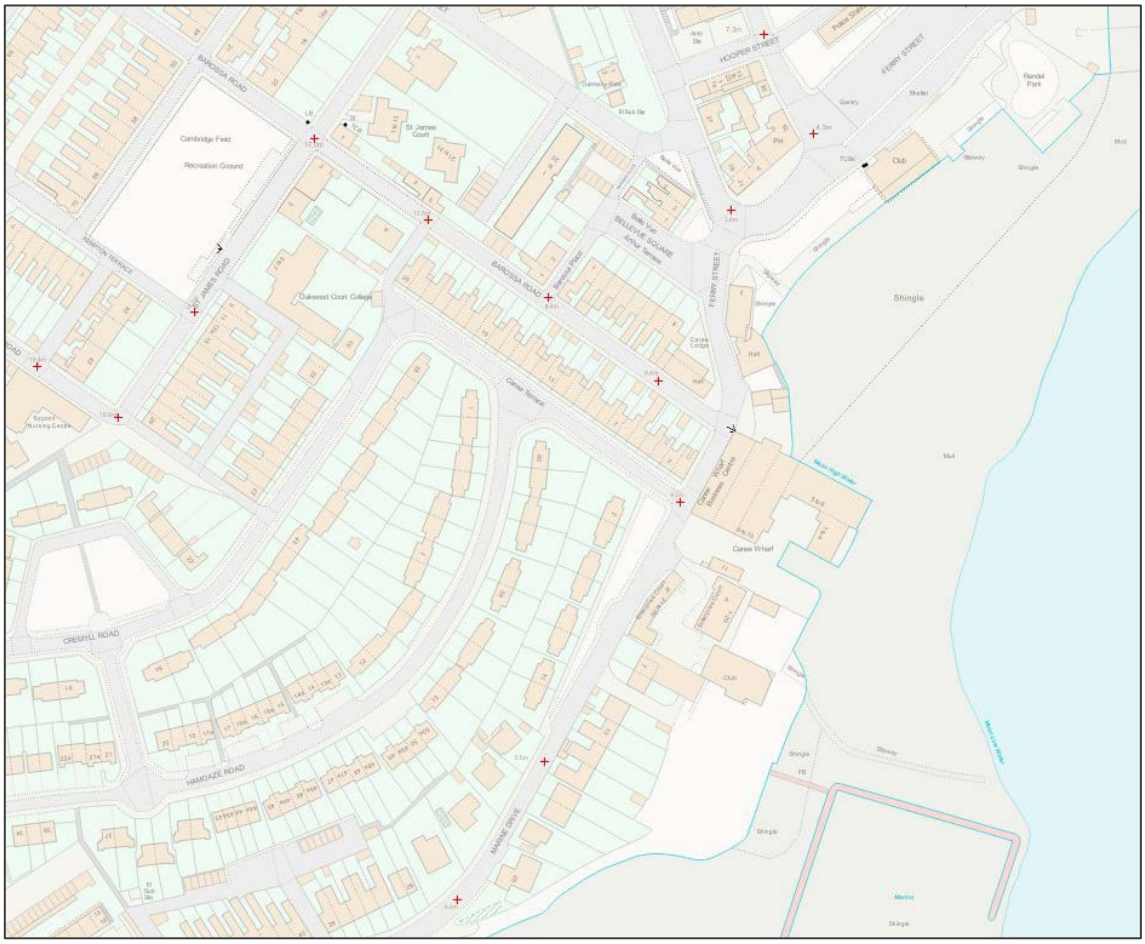

Figure 25.QGIS UI showing styled OSMM Topography Layer in the map area.

4.5 Mapbox GL styles

A Mapbox style is a document that defines the visual appearance of a map: what data to draw, the order to draw it in, and how to style the data when drawing it. A style document is a JSON object with specific root level and nested properties. This specification defines and describes these properties.

The Mapbox GL styles (.json) for OS MasterMap Topography Layer Vector Tiles are for use in Mapbox Studio, Maputnik and other compatible software.

They have been designed to work with the data as it is supplied.

The fonts and sprites required for each style are supplied for if you want to use the styles offline/locally. You will need to host these locally and input the host locations into the .json file where prompted.

5. Additional resources

The following resources provide additional information about the concepts in this guide:

- Oracle INSTR Function - https://docs.oracle.com/cd/B28359_01/olap.111/b28126/dml_functions_1103.htm#OLADM564
- PostgreSQL MVCC - http://www.postgresql.org/docs/current/static/mvcc-intro.html
- PostgreSQL Pattern Matching - http://www.postgresql.org/docs/9.4/static/functions-matching.html
- PostgreSQL Array Operators - http://www.postgresql.org/docs/9.4/static/functions-array.html
- OGC Style Layer Descriptor - http://www.opengeospatial.org/standards/sld

6. Related documentation

You can find additional information and documentation on the OS MasterMap Topograph Layer Product Support page (hhttps://www.ordnancesurvey.co.uk/business-government/tools-support/mastermap-topography-support).

We recommend you read the following guides:

- *OS MasterMap Topygraphy Layer – Overview*
- *OS MasterMap Topygraphy Layer – Technical Specification*
- *OS MasterMap Topygraphy Layer – Getting Started Guide*
- *OS MasterMap Topygraphy Layer – Standard Styling Specification*
- *Getting Started with GeoPackage*
- *Getting Started with Vector Tiles*

Annex A: Attributes tables

The following tables show the attributes used to create the new style rules.

Boundaryline

Table 2: Boundaryline attributes used to create style rules

Feature Code	Style Description	Style Code
10136	Parish Boundary	1
10131	District Boundary	2
10128	Electoral Boundary	3
10127	County Boundary	4
10135	Parliamentary Boundary	5

Cartographic symbol

Table 3: Cartographic symbol attributes used to create style rules

Feature Code	Style Description	Style Code
10091	Culvert Symbol	1
10082	Direction Of Flow Symbol	2
10130	Boundary Half Mereing Symbol	3
10066 or 10170	Bench Mark Symbol	4
10165	Railway Switch Symbol	5
10177	Road Related Flow Symbol	6

Cartographic text

Table 4: Cartographic text attributes used to create style rules

Descriptive Group	Descriptive Term	Make	Style Description	Style Code	Font Code*	Colour Code**
Contains 'Buildings or Structure'	-	-	Building Text	1	1	1
Contains 'Inland Water'	-	-	Water Text	2	2	2

Descriptive Group	Descriptive Term	Make	Style Description	Style Code	Font Code*	Colour Code**
Contains 'Road or Track'	-	-	Road Text	3	1	1
Terrain and Height	-	-	Height Text	4	1	3
Contains 'Roadside'	-	-	Roadside Text	5	1	1
Contains 'Structure'	-	-	Structure Text	6	2	1
Political or Administrative	-	-	Administrative Text	7	1	5
General Surface	-	Natural	General Surface Natural Text	8	1	1
General Surface	-	Manmade or IS NULL	General Surface Manmade Text	9	1	1
Landform	-	Natural	Landform Natural Text	10	1	4
-	Foreshore	-	Foreshore Text	11	1	4
Contains Tidal Water	-	-	Tidal Water Text	12	2	2
Built Environment	-	-	Built Environment Text	13	1	1
Contains 'Historic Interest'	-	-	Historic Text	14	3	1
Rail	-	-	Rail Text	15	1	1
Contains 'General Feature'	-	-	General Feature Text	16	1	1
Landform	-	Manmade	Landform Manmade Text	17	1	4

* Required font 1 = Arial, 2 = Arial Italic, 3 = Times New Roman Italic

** Text colour 1 = Black, 2 = Blue, 3 = Orange, 4 = Brown, 5 = Purple

Topographic area

Built Environment features

Table 5: Topographic area key attributes and style rules for Built Environment features

Descriptive Group	Descriptive Term	Make	Style Description	Style Code
Contains 'Buildings'	-	-	Building Text	1
	-	-	Water Text	2
	Is NULL	Manmade	Building Fill	1
Contains 'General Surface'	Multi Surface	Multiple	Multi Surface Fill	2
Contains 'General Surface'	Is NULL	Natural	Natural Fill	3
Contains 'Road or Track'	Is NULL	Manmade	Road Or Track Fill	4
Contains 'General Surface'	Is NULL	Manmade or Unknown	Manmade Fill	5
Contains 'Roadside'	-	Natural	Roadside Natural Fill	6
Contains 'Roadside'	-	Manmade or Unknown	Roadside Manmade Fill	7
Contains 'Inland Water'	Is NULL	-	Inland Water Fill	8
Contains 'Path'	-	-	Path Fill	9
Contains 'Road or Track'	Track	-	Track Fill	10
-	Slope	-	Slope Fill	11
Contains 'Structure'	Is NULL OR Upper Level OF Communication OR Overhead Construction	-	Structure Fill	12
-	Cliff	-	Cliff Fill	13
-	Step	-	Step Fill	14
-	Foreshore	-	Foreshore Fill	15
-	Traffic Calming	-	Traffic Calming	16
Glasshouse	-	-	Glasshouse Fill	17
Contains 'Rail'	Is NULL	Natural	Rail Natural Fill	18
-	Pylon	-	Pylon Fill	19
Contains 'Building'	Archway	-	Archway Fill	20
Contains 'Landform'	-	Natural	Landform Natural Fill	21

Descriptive Group	Descriptive Term	Make	Style Description	Style Code
Contains 'Tidal Water'	Is NULL	-	Tidal Water Fill	22
Contains 'Landform'	-	Manmade	Landform Manmade Fill	23
Rail	Is NULL	Manmade or Unknown	Rail Manmade Fill	24

Natural Environment

Table 6: Topographic area key attributes and style rules for Natural Environment features

Descriptive Group	Descriptive Term	Make	Style Description	Style Code
-	-	-	Building Text	1
	-	-	Water Text	2
	Contains a form of Nonconiferous Trees OR/AND a form of Coniferous Trees	-	Mixed Woodland Fill	25
-	Contains a form of Nonconiferous Trees	-	Nonconiferous Tree Fill	26
-	Contains a form of Coniferous Trees	-	Coniferous Tree Fill	27
-	Contains Orchard	-	Orchard Fill	28
-	Contains Coppice Or Osiers	-	Coppice Or Osiers Fill	29
-	Contains Scrub	-	Scrub Fill	30
-	Contains Boulders	-	Boulders Fill	31
-	Contains Rock	-	Rock Fill	32
-	Contains Scree	-	Scree Fill	33
-	Contains Rough Grassland	-	Rough Grassland Fill	34
-	Contains Heath	-	Heath Fill	35
-	Contains Marsh	-	Marsh Fill	36
			Unclassified	99

Topographic line

Table 7: Topographic line attributes used to create style rules

Descriptive Group	Descriptive Term	Make	Physical Presence	Style Description	Style Code
Contains 'General Feature'	Is NULL	-	Obstructing	Default Line	1
Contains 'Building'	Outline	Manmade	Obstructing	Building Outline Line	2
Contains 'General Feature'	Is NULL	-	Edge / Limit	Edge Line	3
Contains 'Road Or Track'	Public	Manmade	Edge / Limit	Road Or Track Line	4
Contains 'Building'	Division	Manmade	Obstructing	Building Division Line	5
-	Polygon Closing Link	-	-	Polygon Closing Line	6
Contains 'Inland Water'	Is NULL	-	Edge / Limit	Inland Water Line	7
-	Inferred Property Closing Link	-	-	Property Closing Line	8
Contains 'General Surface'	Is NULL	Natural	Edge / Limit	General Surface Natural Line	9
Contains 'Building'	Outline	Manmade	Overhead	Building Overhead Line	10
-	Bottom Of Slope			Bottom Of Slope Line	11
-	Top Of Slope	-	-	Top Of Slope Line	12
-	Step	-	-	Step Line	13
-	Unmade Path Alignment	-	-	Path Line	14
-	Mean High Water (Springs)	-	-	Mean High Water Line	15
-	Traffic Calming	-	-	Traffic Calming Line	16

Descriptive Group	Descriptive Term	Make	Physical Presence	Style Description	Style Code
-	Standard Gauge Track	-	-	Standard Gauge Track Line	17
-	Bottom Of Cliff	-	-	Bottom Of Cliff Line	18
-	Top Of Cliff	-	-	Top Of Cliff Line	19
-	Mean Low Water (Springs)	-	-	Mean Low Water Line	20
-	Overhead Construction	-	-	Overhead Construction Line	21
-	Culvert	-	-	Culvert Line	22
-	Pylon	-	-	Pylon Line	23
Landform	-	Natural	-	Landform Natural Line	24
Unclassified	-	-	-	Unclassified Line	99
-	Ridge Or Rock Line	-	-	Ridge Or Rock Line	25
Historic Interest	-	-	-	Historic interest Line	26
-	Narrow Gauge	-	-	Narrow Gauge Line	27
-	Buffer	-	-	Railway Buffer Line	28
-	Tunnel Edge	-	-	Tunnel Edge Line	29
Landform	-	Manmade	-	Landform Manmade Line	30
				Unclassified	99

Topographic point

Table 8: Topographic point attributes used to create style rules

Descriptive Group	Descriptive Term	Style Description	Style Code
-	Spot Height	Spot Height Point	1
-	Emergency Telephone	Emergency Telephone Point	2
-	Site of Heritage	Site Of Heritage Point	3
-	Culvert	Culvert Point	4
-	Positioned Nonconiferous Tree	Positioned Nonconiferous Tree Point	5
Inland Water	-	Inland Water Point	6
Roadside	-	Roadside Point	7
-	Overhead Construction	Overhead Construction Point	8
Rail	-	Rail Point	9
-	Positioned Coniferous Tree	Positioned Coniferous Tree	10
-	Boundary Post Or Stone	Boundary Post Point or Stone Point	11
-	Triangulation Point Or Pillar	Triangulation Point Or Pillar Point	12
Historic Interest	-	Historical Interest Point	13
Landform	Positioned Boulder	Landform Point	14
Tidal Water	-	Tidal Water Point	15
Structure	-	Structure Point	16
10080	-	Positioned Nonconiferous Tree Point	3
10120	-	Inland Water Point	4
10176	-	Inland Water Point	4
10159	-	Inland Water Point	4
		Unclassified	99