AutoCAD Map 3D – Integrating Open Source

Cadline's DynamicMaps team are experts in Open Source Software, Standards and Spatial Data. Providing support, training, development and consultancy services for applications such as QGIS, GeoServer, PostGIS and OpenLayers. We are also strong advocates of utilising Open Source Datasets for example; **OS Open Local** and background mapping services from crowd sourced organisations like **OpenStreetMap**. Utilising these datasets and software tools can allow you to implement a fully Open Source geospatial environment.

However, Open Source doesn't necessarily mean that you will meet all your requirements and often you may need more specialised applications such as **AutoCAD Map 3D** to integrate your Open Source mapping with more customised CAD tools. Utilising advanced Data Connectivity tools Map 3D allows you to connect to many proprietary data formats including; ESRI.Shp, SQL, Oracle, and multiple Raster data formats. In addition, you can also access Open Source data formats such as WMS, WFS and PostgreSQL.
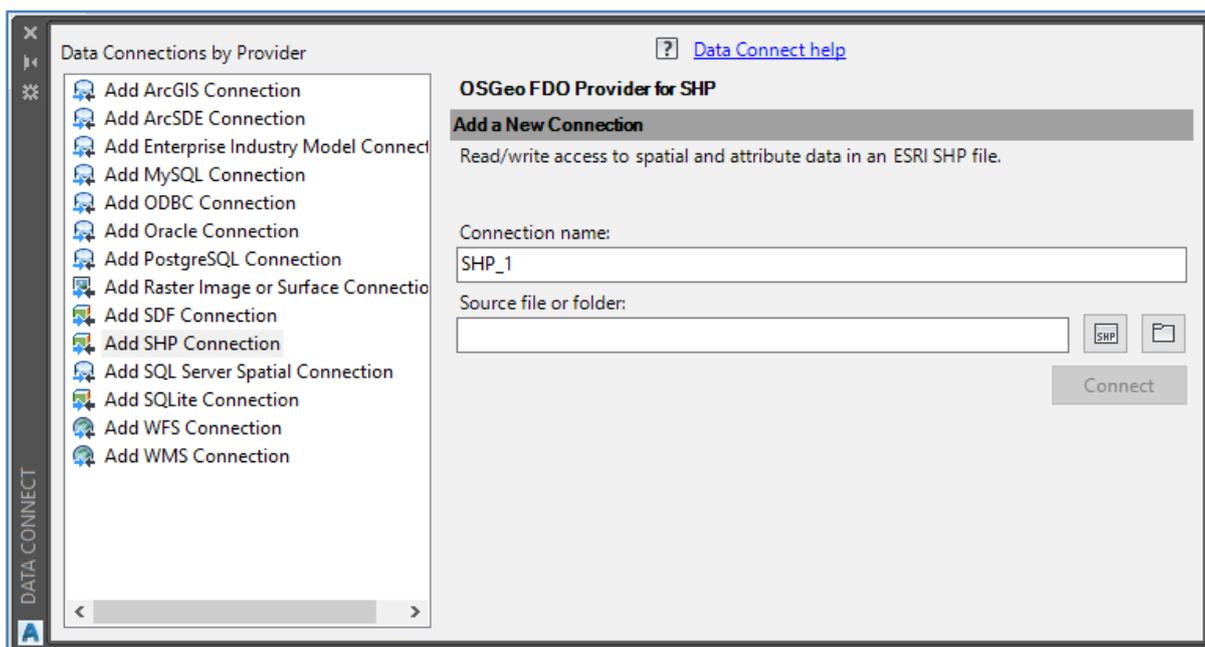
Firstly, let's explore utilising Map 3D to access spatial data from a PostGIS database. **PostGIS** is the spatial extension to the Open Source spatial database – PostgreSQL - http://postgis.net/ PostGIS is released under the GNU General Public License (GPLv2 or later) and allows you to store spatial data in both vector and raster formats in one consolidated 'GeoStore', which can then be accessed at the same time by multiple client applications such as Map3D, QGIS and a webGIS.

I have PostGIS installed on my local machine, although this would likely be installed onto a server allowing multiple users to access the data at the same time. The PostGIS database can be viewed using the **pgAdmin** console, where the Database Administrator (DBA) can import new files and manage spatial datasets.
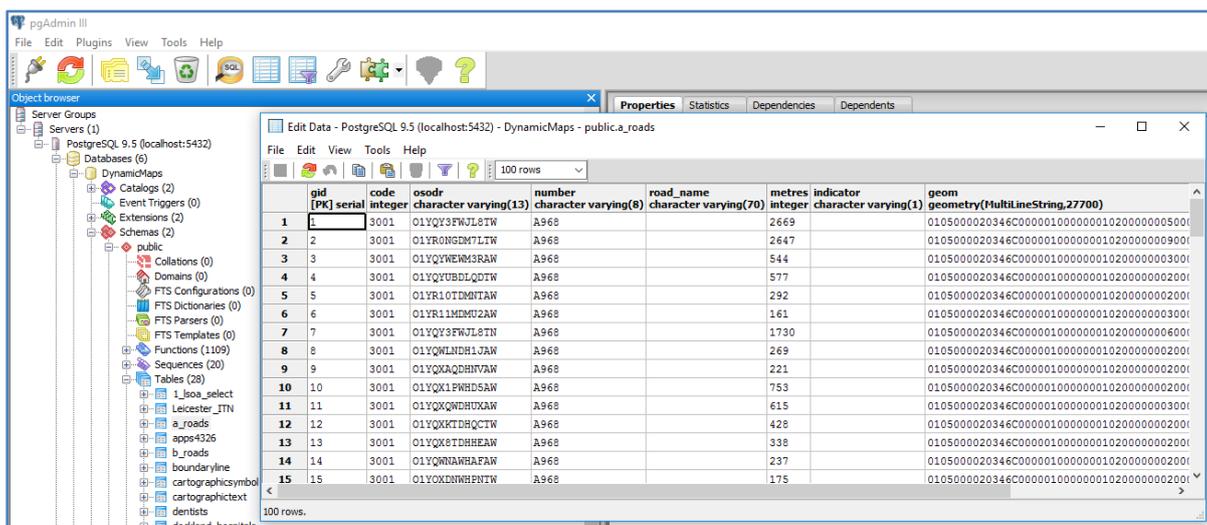
As with many software applications the biggest obstacle and most time-consuming elements are often configuring the settings required to open external data sources. Luckily I have done the hard work for you, and using the settings below you will be able to link Map 3D to data within your PostGIS database.

In Map 3D choose **> Data** > **Connect to Data** and from the **Providers** list choose PostgreSQL. The **Service Name** will be the name of the server or **computer** where PostGIS was installed.
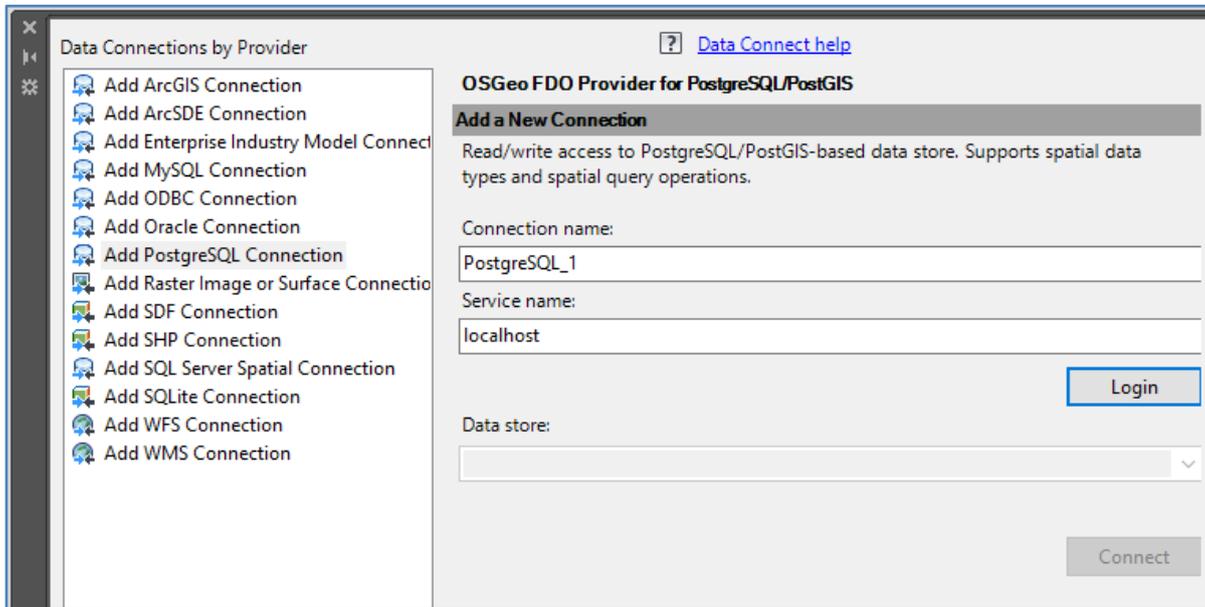
In the above example, I have installed PostGIS onto my local machine, so the Service Name will be **localhost.**

Now choose **Login,** and specify the username and password to access your PostGIS database and then press Login.
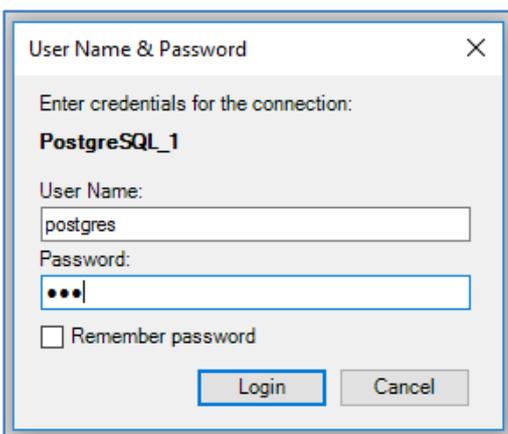
Having successfully logged into PostGIS, using the **Data Store** list, you can now select which PostGIS database to connect to.
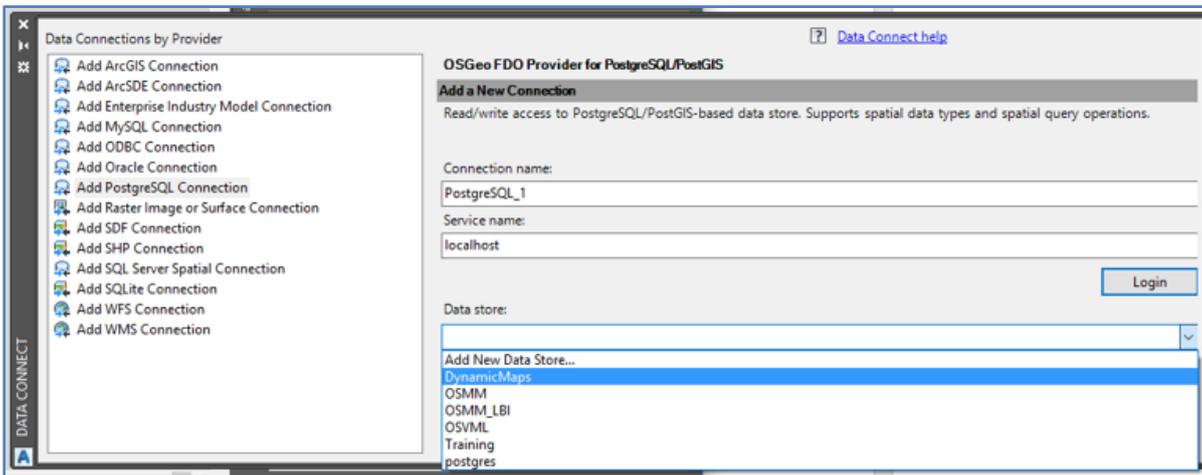
In this example I have selected my **DynamicMaps** PostGIS database and to view the spatial tables I have pressed **Connect.** The Data Connections window will now update with a list of all spatial tables within the chosen PostGIS database.
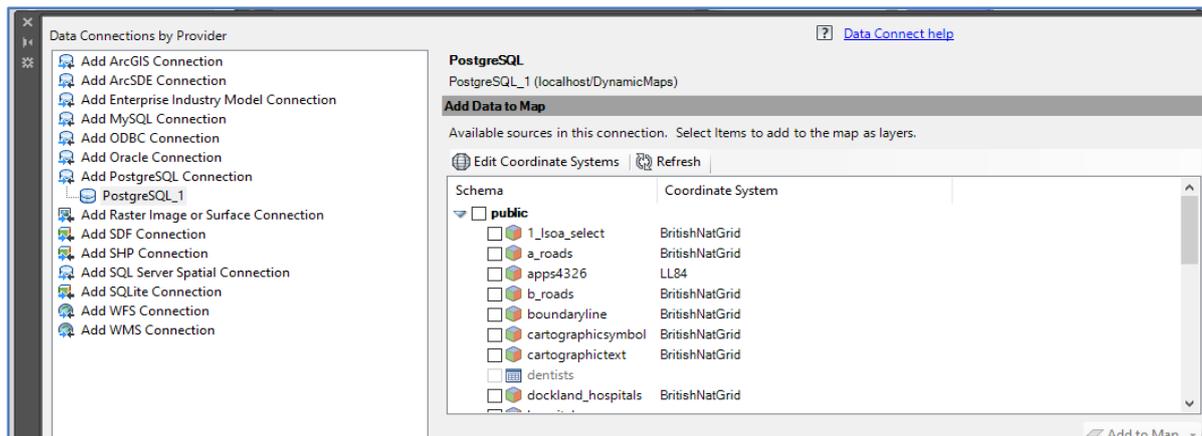
Note - that any PostGIS tables **without geometry** (e.g. the Dentists table) will be shown in the list but you will be unable to tick them and add them to your map.

Before adding your specified PostGIS table into your map, you may wish to edit the **Coordinate Reference System (CRS)** for that data. The CRS will be read directly from the properties of your PostGIS database table, however, using the **Edit Coordinate Systems** tab you can re-project the data if required. For example, using the Edit CRS, we could choose to re-project our data to Lat and Long using the **WGS84** projection which has the SRID of 4326.
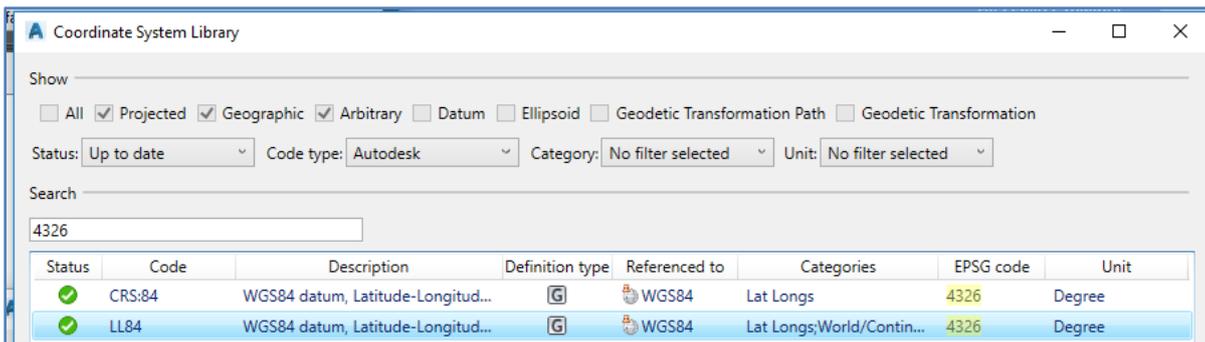
In this example, I have chosen to keep the source projection as its default - **British National Grid – SRID 27700.**
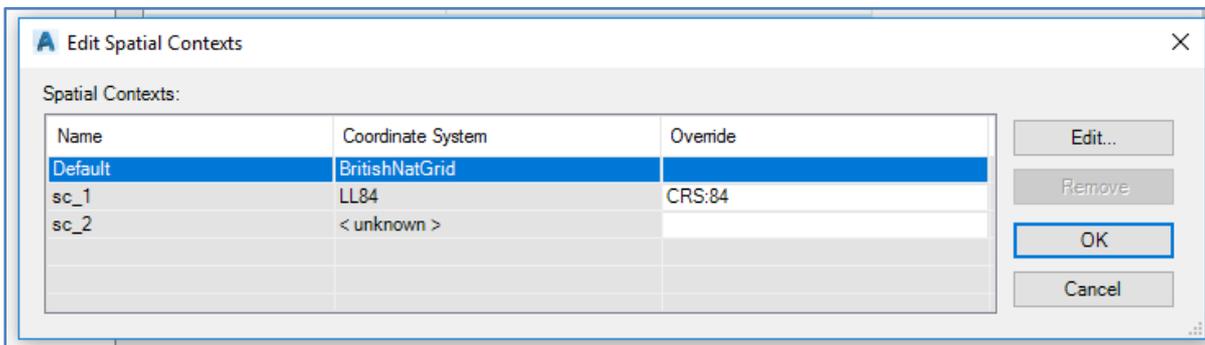
Having chosen the specified CRS, use the **Add to Map** button to now add the spatial table to the map.
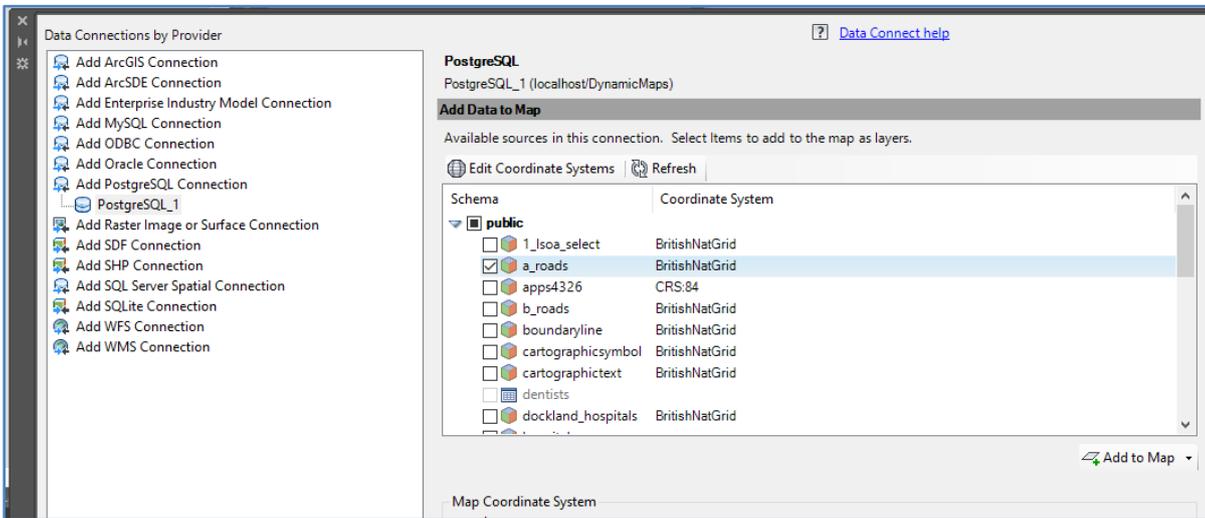
Depending on the size of the dataset, after a few seconds the PostGIS data will be added to the map where the geometry will be shown. Using the **Table** option within the **Display Manager** you can then view the attributes for each geometric feature.
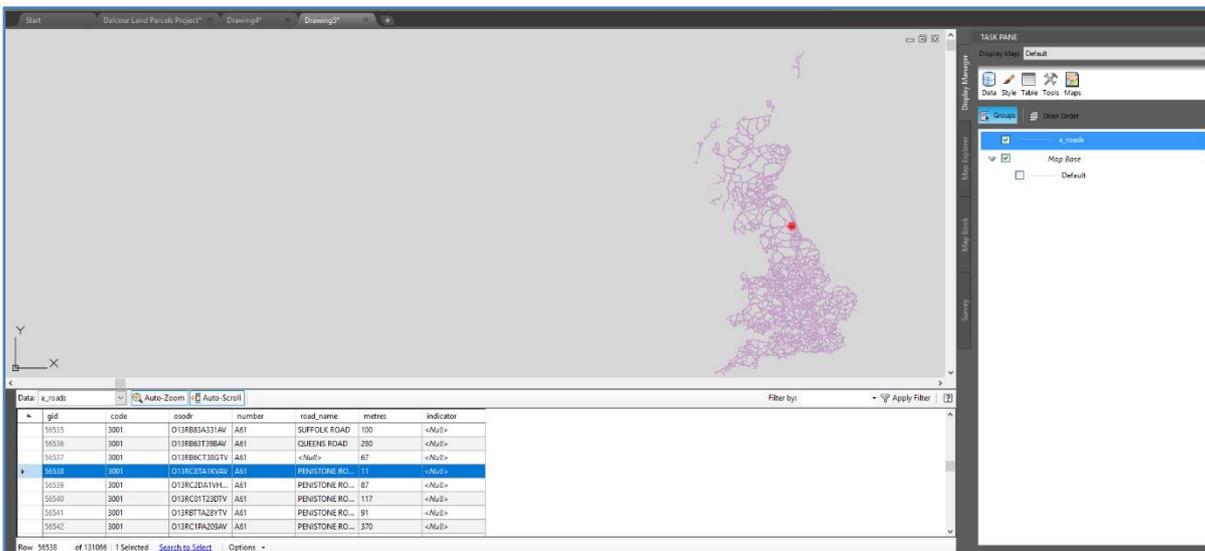
Having now added spatial data from a PostGIS database, Map 3D will allow you to undertake additional GIS routines. For example, use the **Query to Filter tool** to query the attribute data and find all A_Roads where the **road number is 'A4'**.
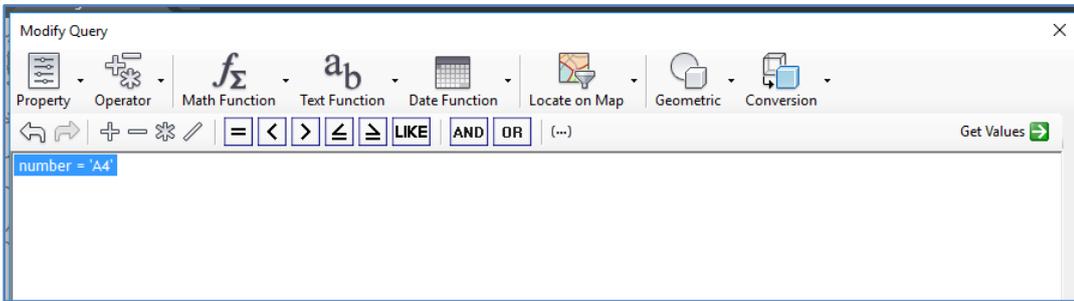
The PostGIS data will be filtered and the results shown in the **map** and **Data** table.
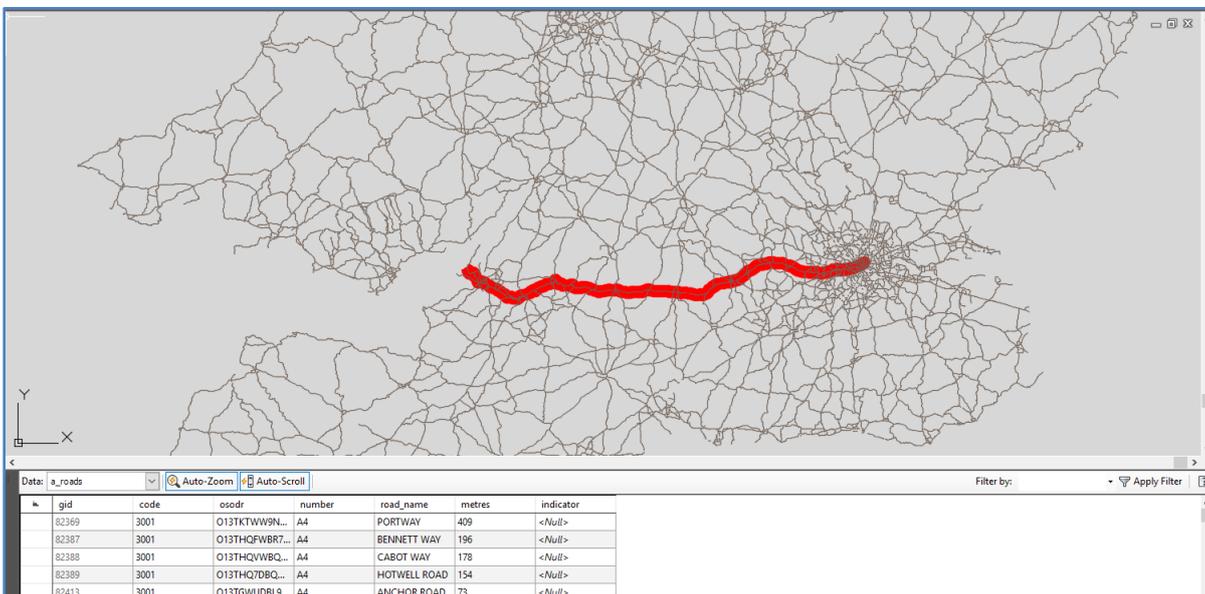
We can now undertake further spatial analysis, such as **buffering** the A4 by 1km and identifying which A_Roads **intersect** that area.
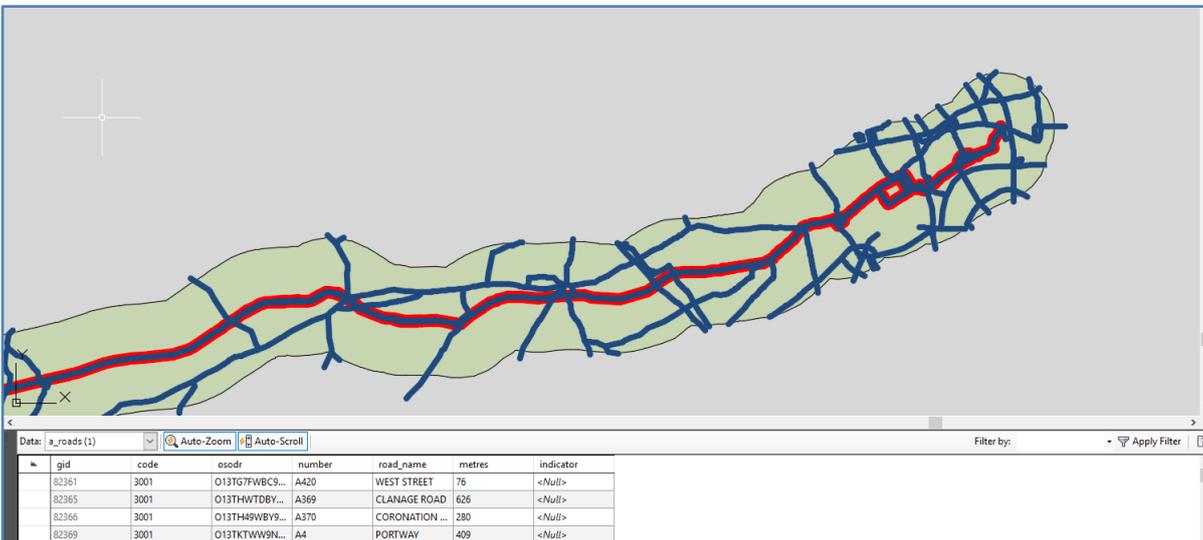
To complete our look at integrating Map 3D with Open Source we will now add a background map to give the A_Roads some context. Map 3D comes pre-built with access to **Bing** mapping which provides a backdrop map of both Roads and Aerial imagery. From the **Home** menu choose > **Online Map** > **Map Aerial**.

There are also Open Source alternatives to Bing, such as **OpenStreetMap** (OSM), which can also be used to add context to your spatial datasets. In order to add OSM into Map 3D we will use a **Web Map Service** or **WMS.** These are typically URL's for accessing both spatial and raster background mapping. Organisations

such as the Ordnance Survey, British Geological Survey and Environment Agency will publish their datasets via WMS, so that users can view their datasets in real time.

To view OSM within Map3D we will firstly need to sign up for a free account. Visit https://maps.omniscale.com/en/ and choose the Login button to either login or create a new account:
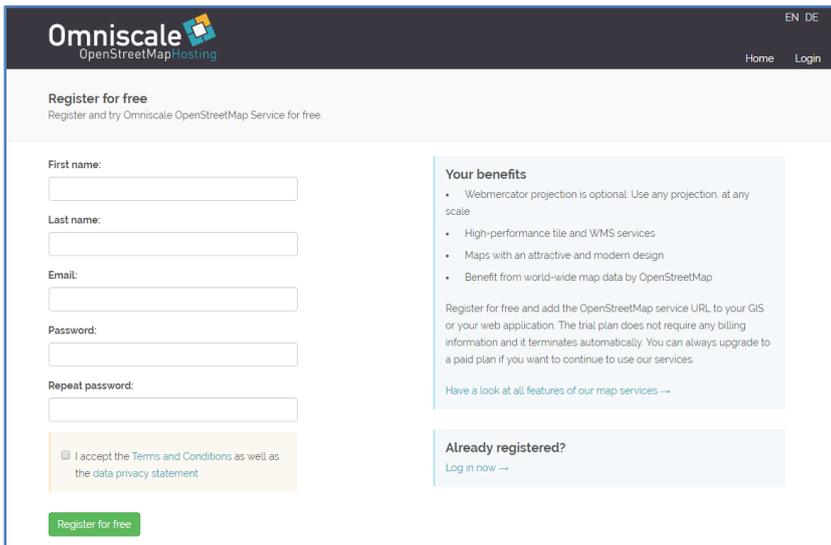
Once you have created a free account you will be provided with the URL to access OSM mapping within a client application such as Map 3D. This will be something similar to:

http://maps.omniscale.net/v2/private-your-name-xx99x9xx/style.default/map

In Map 3D choose > **Data** > **Connect to Data** and from the **Providers** list choose **Add WMS Connection**. The **Server Name** will be the URL generated within OpenStreetMap, so you can simply copy and paste the web address into the Server Name or URL box.
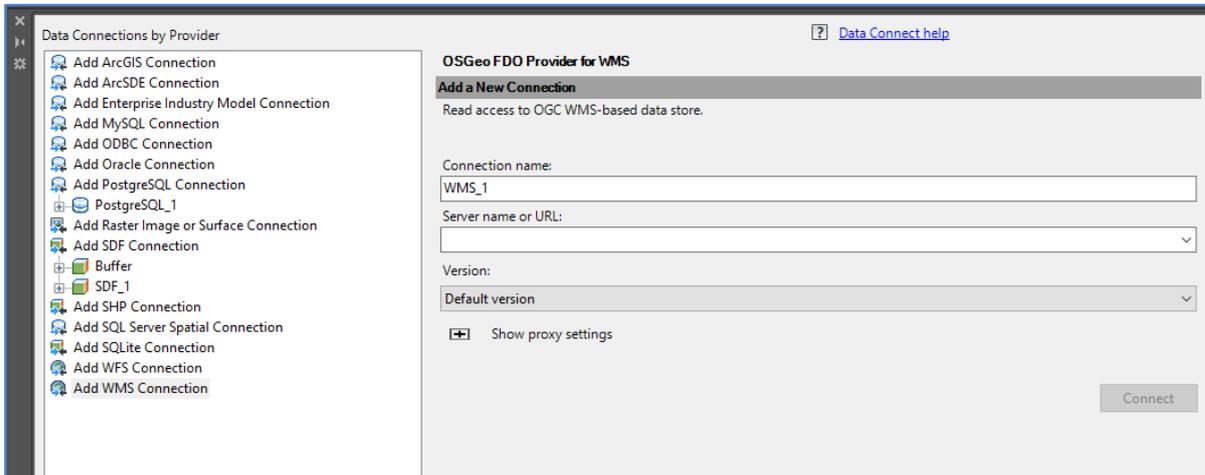
Press > **Connect** and leave the **username** and **password** values blank on the login window. Map 3D will now connect to OSM and allow you to choose from a list of sub layers such as a Basemap, Land use, POI, Roads etc.
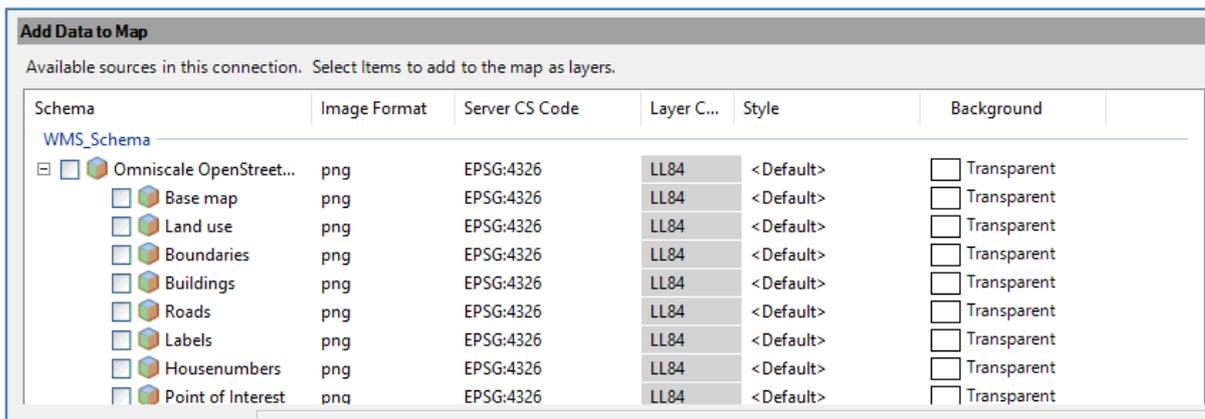
Note – that it will be good practice to load the WMS layers in the same **Coordinate Reference System** (CRS) as the map is currently projected within Map 3D. To change the CRS, simply click in the **Server CS code** and change the CRS as required. As below, you can either choose to load the individual layers…
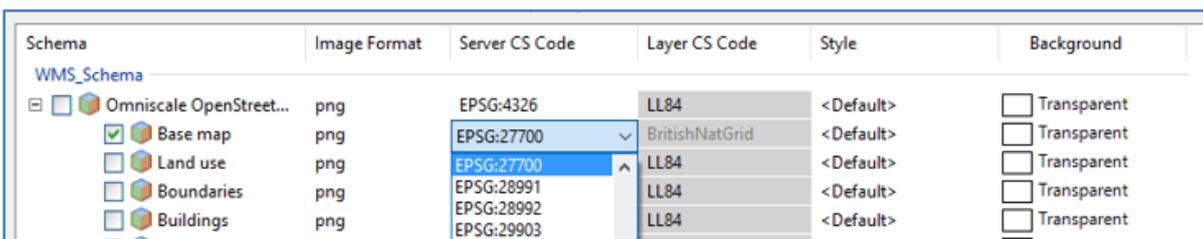
Or choose the top-level WMS **Omniscale OpenStreetMap** and the WMS will load all elements of the background map. As below you can now use the **Display Manager Task Pane** to re-order your geographic datasets so that we can see the A_Roads from PostGIS above the OSM background map.

We have now successfully linked Map 3D with spatial data within an Open Source spatial database (PostGIS) as well as opening Open Source background mapping (OpenStreetMap) via a Web Map Service.

Open Source integration within Map 3D is a great way to start enhancing how you store, manage and consume geographic data!