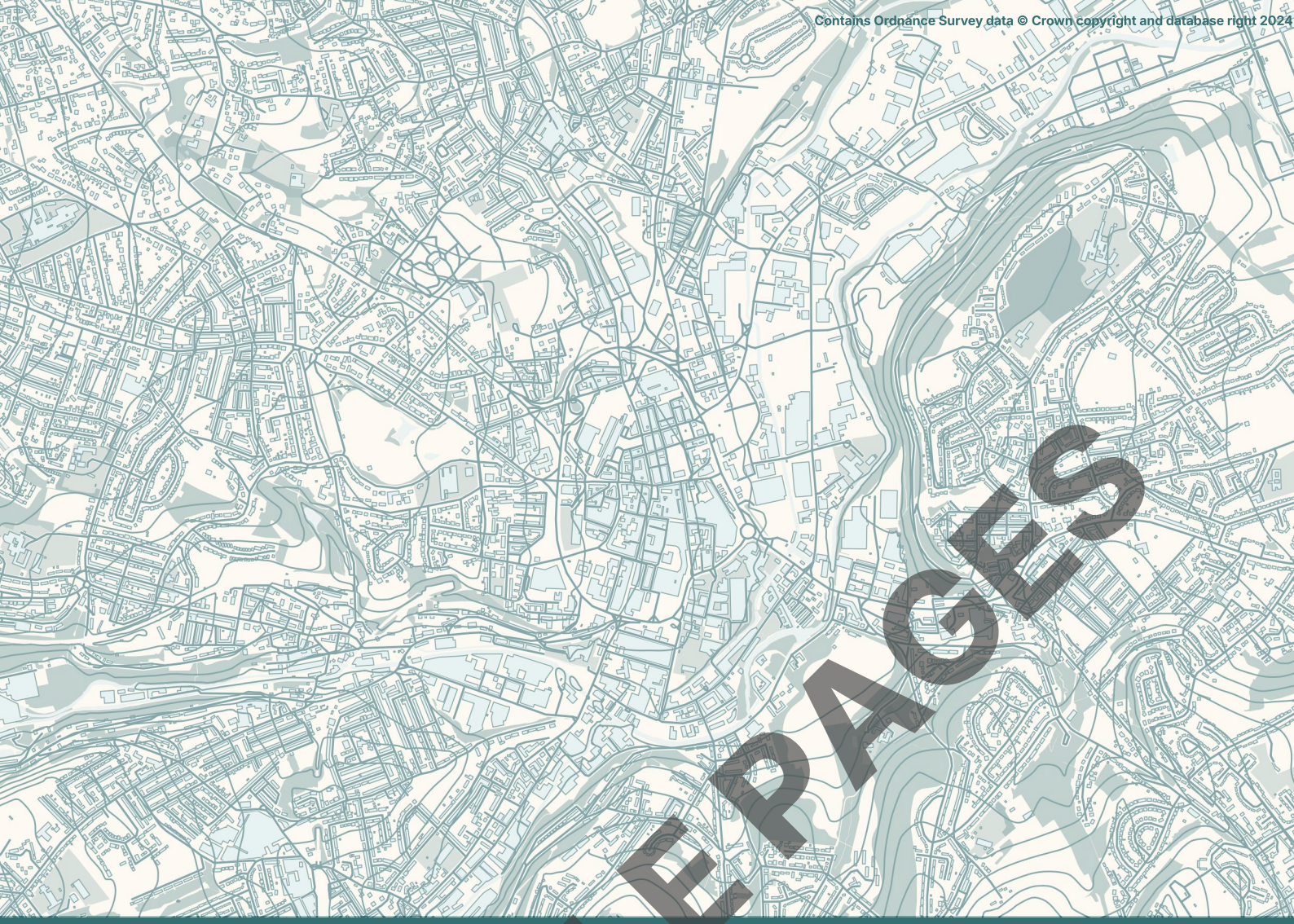

Applied QGIS for Absolute Beginners

Maptastic®

Course Booklet

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Ordnance Survey Licensed Partner

QGIS Small Sustaining member 2026

version 2026.001

Reference guide

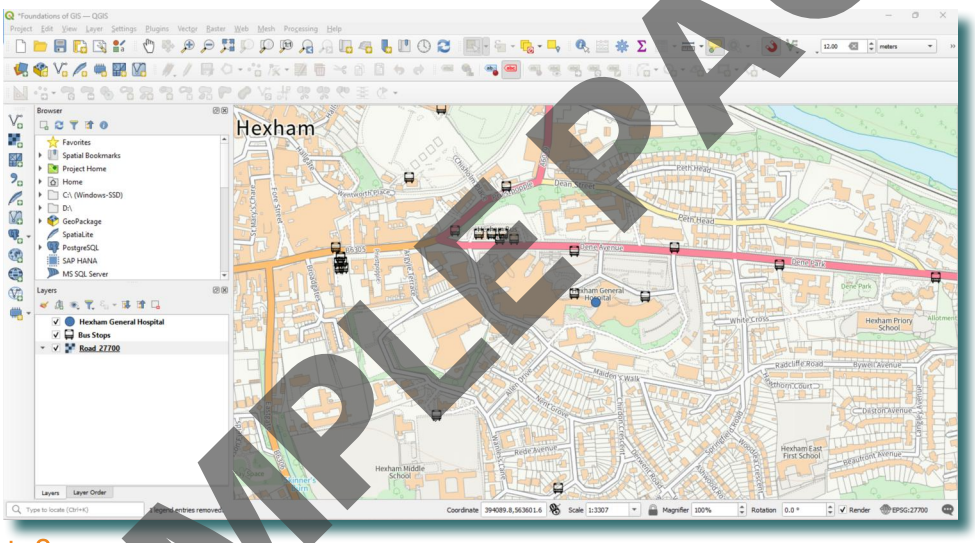
Introduction to Geographical Information Systems

GIS stands for 'Geographical Information System' and it is essentially an application for you to utilise spatial information on your computer. QGIS is a professional and freely available open-source GIS. It can match the commercial in the industry incorporating advanced features for individuals and businesses to utilise location based data.

A GIS consists of:

- **Digital Data** — Geographical information that you will view and analyse using your computer. hardware & software
- **Computer Hardware** — Computers used for storing data, displaying graphics and processing data (your laptop or desktop)
- **Computer Software** — Computer programs that run on the computer hardware and allow you to work with digital data. A software program that forms part of the GIS is called a GIS Application (i.e. QGIS).

GIS applications allow you to open digital maps, create new spatial information to add to a map, edit existing data and create printed maps for your work. You can also analyse the data to perform calculations such as area, distance or how many features are within an area. Let's look at a common use of using GIS to discover where the bus stops are near a local hospital. A combination of a basemap (think Ordnance Survey map or Googlemaps), bus stop data and the location of the hospital. This data is loaded into the GIS application and layered to show where they are in relation to each other. As you'll see the central blue dot is the location of the hospital and the black bus icons are the local bus stops.



What is GIS Data?

GIS data is information with a geographical element as we saw from the map image on the previous page. We'll take a look at the data behind the bus stops to show how the geographical element often shows up in datasets.

ID	Stop Name	Town	Easting	Northing	Longitude	Latitude
Y940638	Hexham General Hospital	Hexham	394075	563891	-2.094	54.97
Y941638	Primary care centre	Hexham	394179	563887	-2.092	54.97
Y941639	Veterinary surgery	Hexham	394222	563959	-2.091	54.97
Y942639	Veterinary surgery	Hexham	394075	563953	-2.094	54.97

The geographical data columns are:

- Easting
- Northing
- Longitude
- Latitude

The non-geographical data columns are:

- ID
- Stop Name
- Town

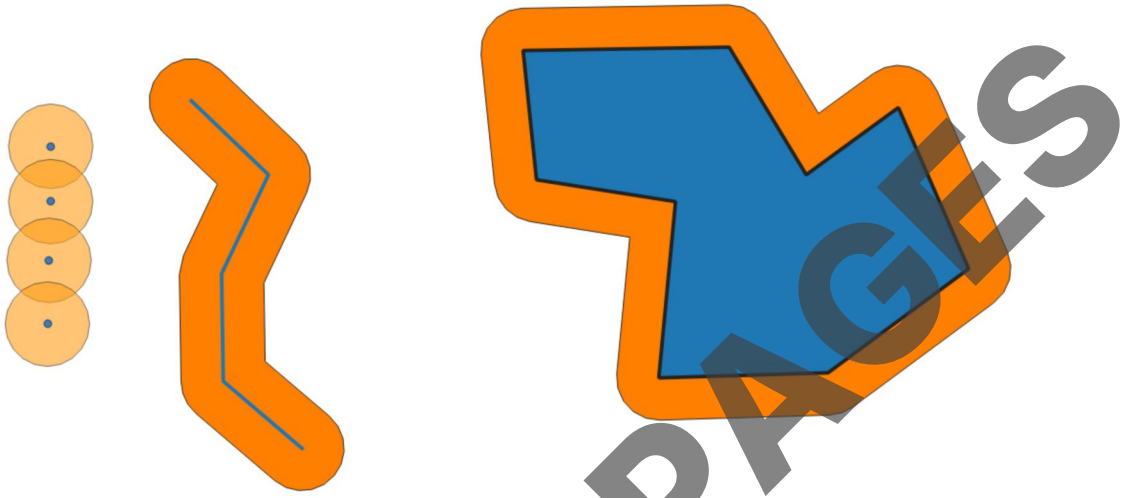
A very useful feature of GIS applications is that they allow you to combine geospatial & non-geospatial data. The bus stops have a aimple bus marker on the map but have a unique identifier, a name, town and two variations of location based data in the table behind the data.

Queries & Research

Creating buffers from your data

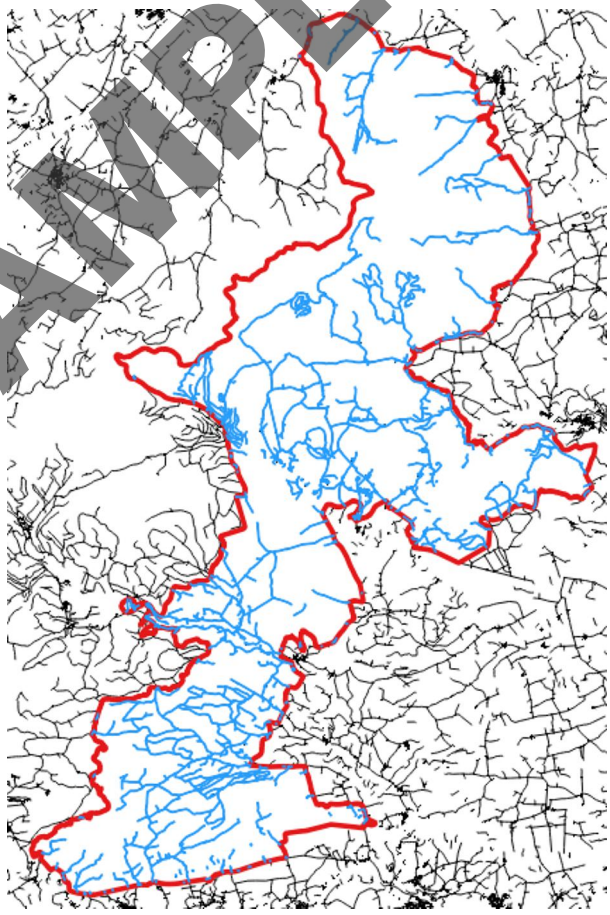
A common task in QGIS is to create buffers from points, lines and polygons. We will use the data you create in the next exercise so make sure you make a few of each type to work with.

Below is an example of a buffer on points, lines and polygons. The process takes a feature dataset and adds a polygon around the data to a distance of your choosing.



Clipping data

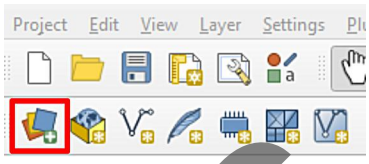
A common task in QGIS is to clip datasets with another one. In the image below is of a red boundary which is the tagert area and black lines which are roads. By clipping the roads to the red boundary you can only use data that you need and are shown in blue.



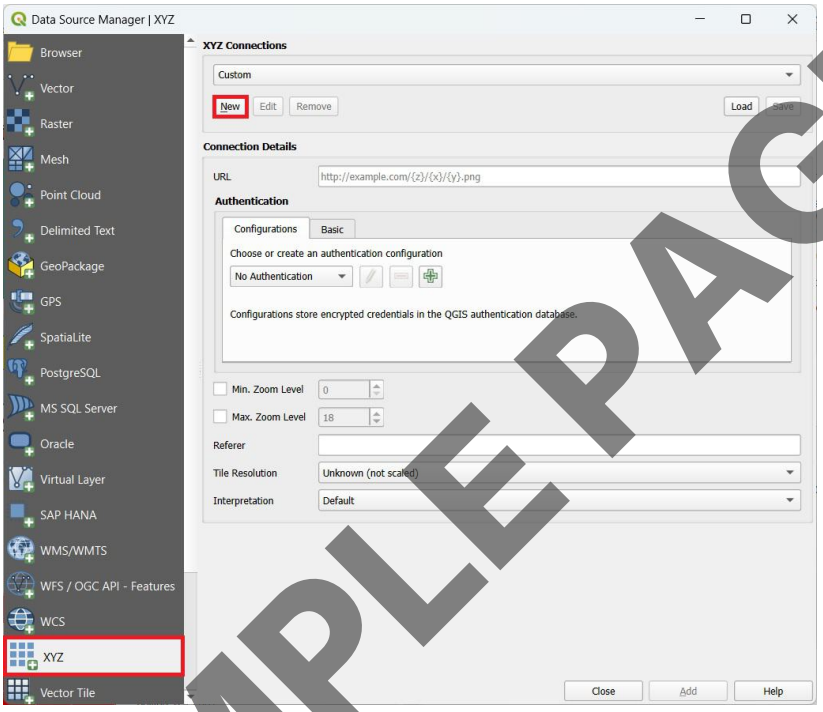
Exercise 1 - Loading data into QGIS

The following exercises use the The Data Source Manager to load in a number of different data types. It allows you to choose the data according to the type and load in correctly. It is a great way to load and manage data within your workspace.

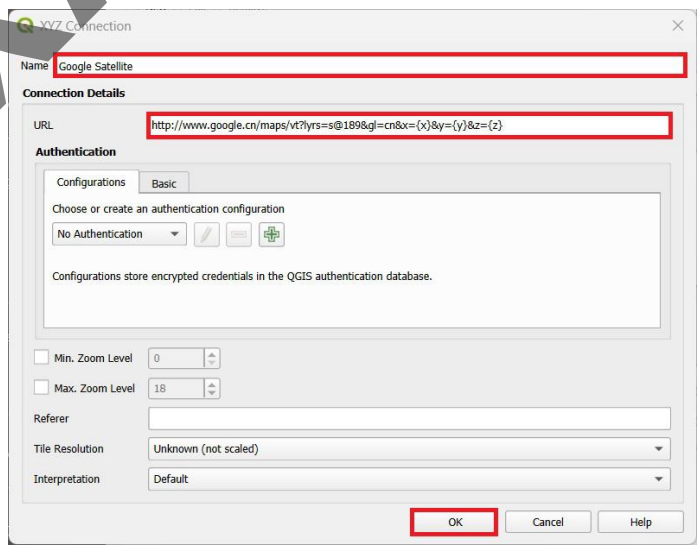
Loading a basemap (such as Googlemaps)



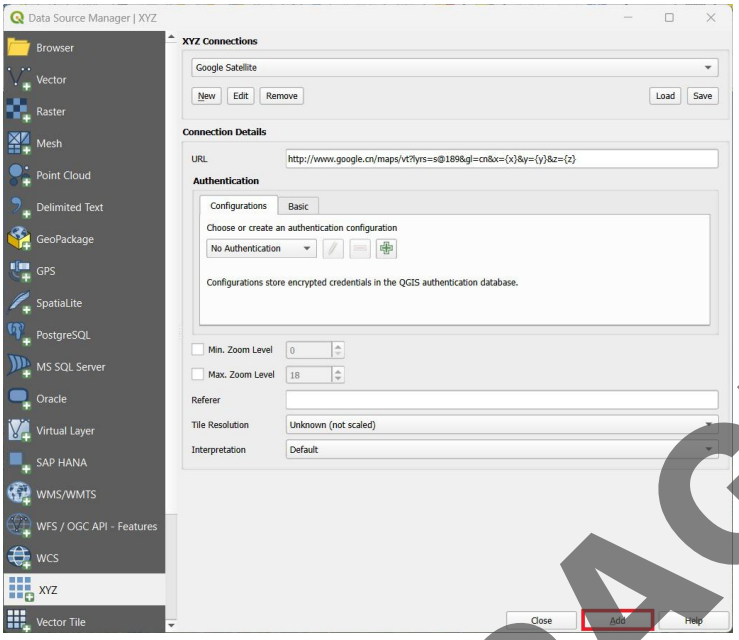
- On the top left of the toolbar select the Data Source Manager icon to open the dialog box.
- On the left-hand panel select 'XYZ' (you may need to scroll down)
- Select 'New' from the centre panel and a new dialog box will appear



- In the window that opened give the new layer a name - i.e. Google Satellite so you remember what it represents
- Type in the following url http://www.google.cn/maps/vt?lyrs=s@189&gl=cn&x={x}&y={y}&z={z} (you can find a list of urls in your qgis_training folder under copy_paste_files\xyz_keys.txt)
- Leave all the other fields as they are and click 'OK'



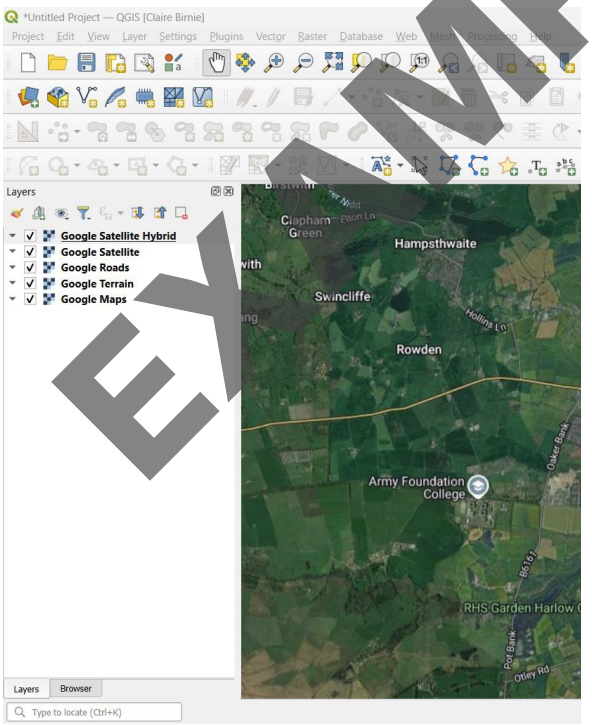
- The link will now be saved in your QGIS workspace (and unless you delete it will remain)
- Select '**Add**' to load the data into your workspace



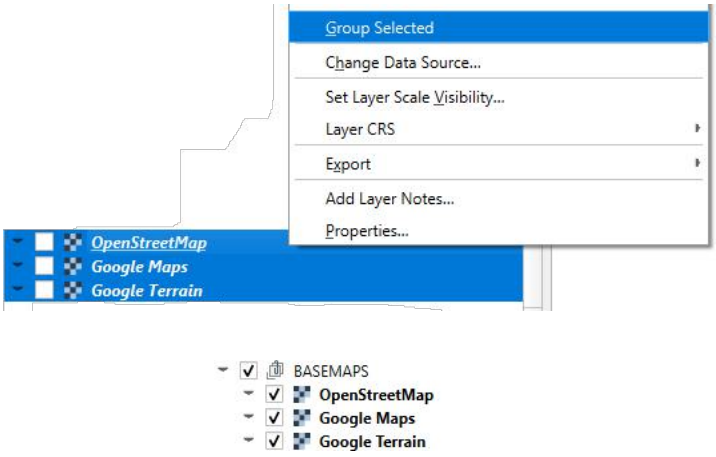
Repeat this step with the the remaining map data (you will find the codes in your text file mentioned previously.

- Google Maps: https://mt1.google.com/vt/lyrs=r&x={x}&y={y}&z={z}
- Google Satellite Hybrid: https://mt1.google.com/vt/lyrs=y&x={x}&y={y}&z={z}
- Google Terrain: https://mt1.google.com/vt/lyrs=p&x={x}&y={y}&z={z}
- Google Roads: https://mt1.google.com/vt/lyrs=h&x={x}&y={y}&z={z}
- Open Street map: https://a.tile.openstreetmap.org/${z}/${x}/${y}.png

Your workspace will now look like the below with multiple layers loaded in the left-hand layers panel.

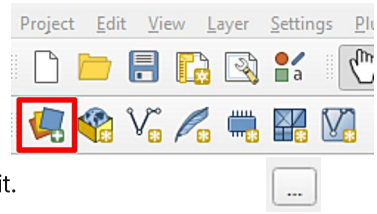


You can now group these together by selecting all of the basemap layers (they will highlight blue when they are). Right cliick and select '**Group Selected**'. QGIS will then group the layers and give you an opportunity to give it a name. Call it 'Basemaps'.

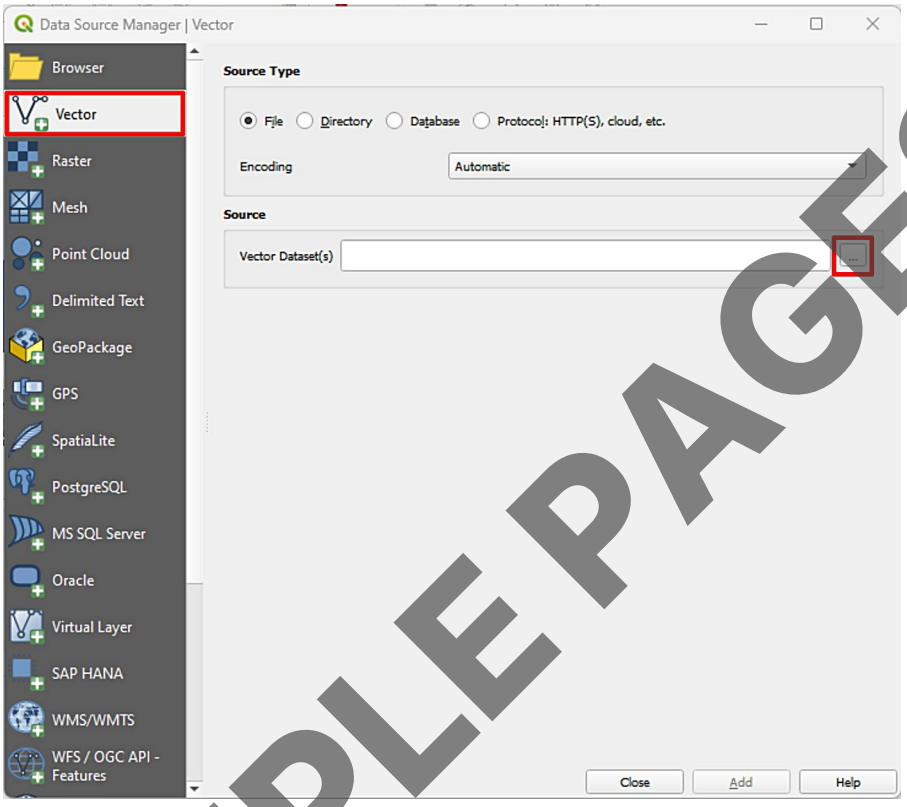


Loading shapefiles

On the top left of the toolbar select the Data Source Manager icon to open the dialog box.



- Select '**Vector**' from the left hand panel and click the button with the 3 dots on it.
- A new dialog box will open for you to navigate to your file system.



Navigate to where you saved your training course data - e.g.

C:\Users\yourname\Documents\qgis_training\vector\shapefiles\flood_risk

Select the **flood_zone_2** shapefile -the filename will have .shp at the end.

Select **'Open'** to return to the previous dialog box.