**Map Projections Tutorial**

1. Open QGIS, and start a new project.
2. Add the Open Street Map NZ data to your project:
   * For your future reference, this can be downloaded from <http://download.geofabrik.de/>, but you can find a link to the files that I have already downloaded on Stream.
   * Add all of the shape files in Open Street Map to QGIS (recall from last week Layer>Add Layer>Add Vector Layer.
3. Add land parcels and roads to your project (see below):
   * These can be downloaded from the LINZ data service, but you can find a link to the files I have already downloaded on Stream.
   * There are five land parcel files. This is because the files are very large, with many geometries, and take a long time to load into the map. North Auckland and Northland are contained in **nz-parcels-4.shp**
4. Add place names to your project:
   * You can find a text file containing place names on Stream.
   * Use Layer>Add Layer>Add Delimited Text Layer to add this to your map. Note that you need to tell QGIS which columns contain the coordinates (you don’t have to do this with a shape file, because the geometry is stored in a ‘blob’, which QGIS knows how to find).
   * If you specify the coordinate system as NZTM, you need to select easting and northing, as NZTM uses these, rather than latitude and longitude.
5. Drag the land parcels layer down to the bottom so that it doesn’t cover the other layers.
6. Save your project for use in future tutorials.
7. Zoom into an area that you know (e.g. around the Massey campus, or where you live) and turn on all the layers. Does it look as you would expect? Do the layers align?
8. Have a look at the map projections being used, and check against the source data to see whether you have them correctly set.
   * Right click on each legend entry, then Properties>Source. Check the data source metadata (e.g. you can search in the LINZ data service to check the map projection).
9. What happens when you change the map projection for one of your layers (to something incorrect)?
10. Try changing the projection of the map view. QGIS stores a projection for each layer, and a projection for the view that you see. It transforms the layers into the view projection. The default view is EPSG:4326.
    * e.g. try EPSG:102006, from Alaska (this is optimised for Alaska, so unlikely to produce a pleasing projection in NZ or 102013 (Europe).

**Why can’t I see the place names?**

1. If you turn every layer off except place names, you will see a collection of points. This is because the QGIS map by default shows only the geometries. You have to add the place names by right clicking, then Properties>Labels>Show Labels for this Layer. Use Open Attribute Table (right click on layer) to decide which attribute you want to use to label the points.
2. Experiment with different map label displays and styles.
3. If you add these labels, you will see that when you are zoomed out they become quite cluttered. Experiment with Rule-based labelling (also under Properties>Labels), where you can set a scale range.
4. Note that I have only downloaded the place names with point geometries. Download place names that have line geometries (e.g. rivers, roads) and polygon geometries (e.g. some suburbs) from the LINZ data service to add to your map.