

## 0.1 Overview

The main goal of this session is to construct a GCF project visualization by geocoding one GCF project and mapping the project locations on QGIS. At the end of this session, you will have an in-depth knowledge of geocoding procedure and be able to code most GCF projects using geojson.io

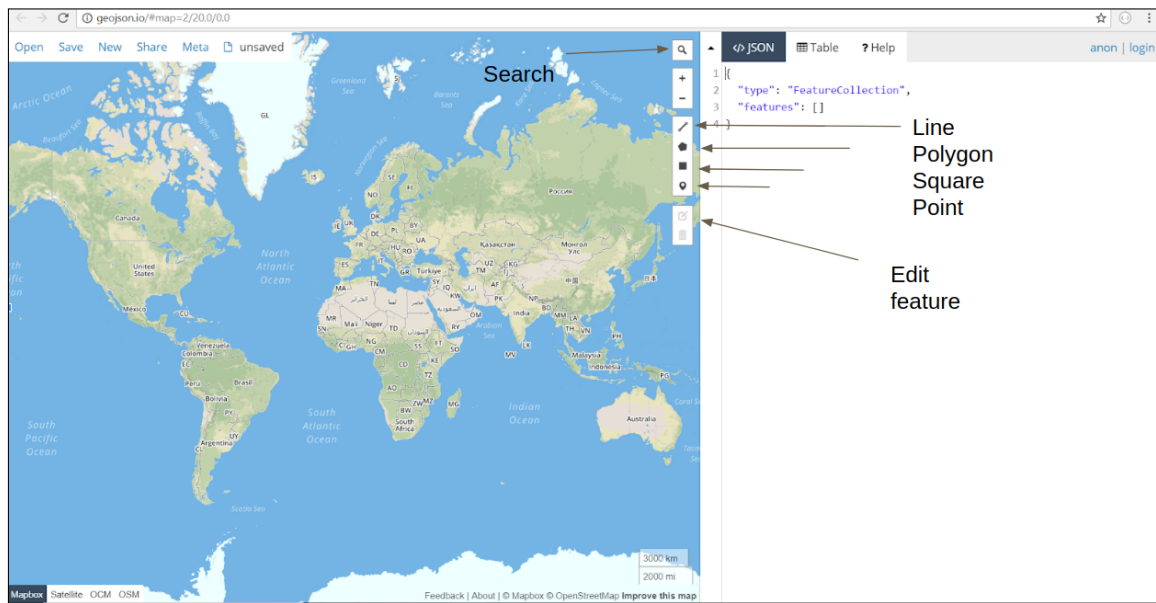
## 0.2 Geocoding

Geocoding is the process of transforming a description of a location, such as an address or a name of a place, to geographic coordinates (i.e., latitude and longitude) on the earth's surface. Those geographic coordinates could be visualized and analyzed by utilizing the geographic information system platforms such as QGIS and ArcGIS.

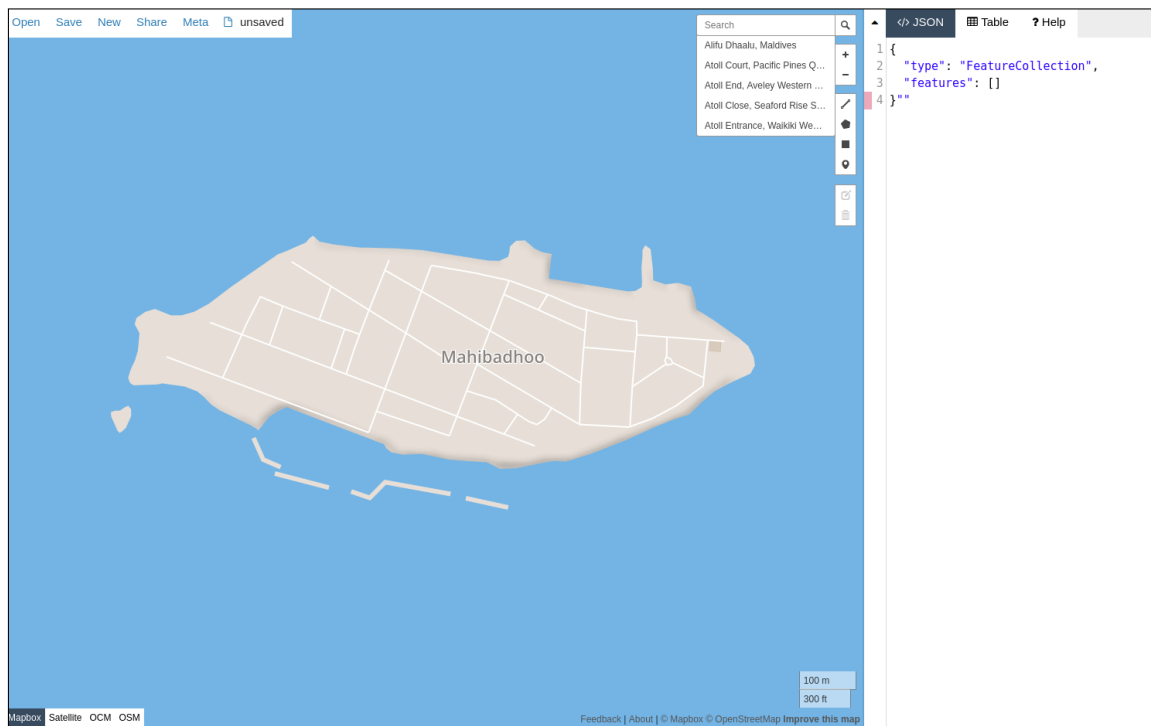
We are going to use geojson.io to geocode all of the project locations. The output file would be a GeoJSON file, which is an open standard format designed for representing simple geographical features, along with their non-spatial attributes. The geographic features include points (addresses and locations), lines (streets and highways), and polygons (buildings, facilities, administrative boundaries). The result GeoJSON file can be visualized using QGIS.

The GCF project "Support of Vulnerable Communities in Maldives to Manage Climate Change-Induced Water Shortages" will be used as an example to learn the geocoding process.

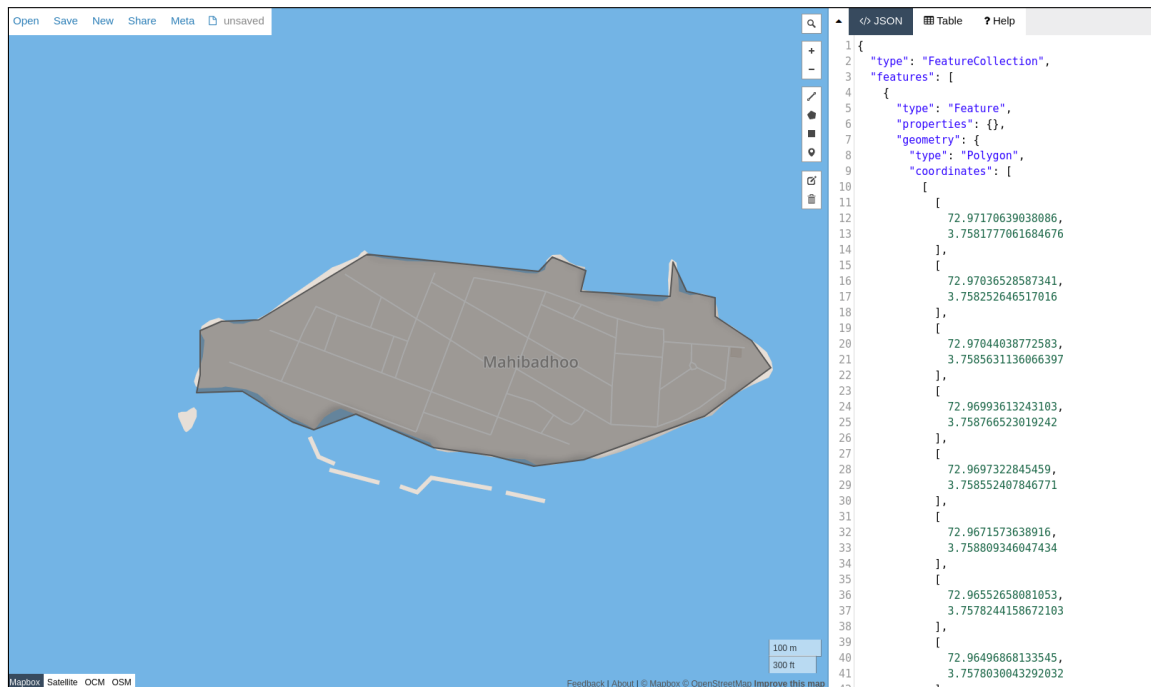
1. Use the project documents or other source materials to identify relevant project locations. To save time, the project document has been provided in "../Desktop/raw\_data/FP007.pdf". In the project document page 14, the project will improve on and scale up the integrated approach tested by the GoM with support from UNDP in the islands of Mahibadhoo (Alifu Dhaalu Atoll), Ihavandhoo (Haa Alifu Atoll) and Gadhdhoo (Gaaf Dhaal Atoll). We are going to use the island of Mahibadhoo (Alifu Dhaalu Atoll) as an example to demonstrate the geocoding process, from this paragraph, the island of Mahibadhoo which belongs to Alifu Dhaalu Atoll is identified.
2. Identify the location (feature) type as an island, types can be found: <https://www.geonames.org/export/codes.html>.
3. Open a web browser and type geojson.io, there are five main elements to the geojson.io interface:



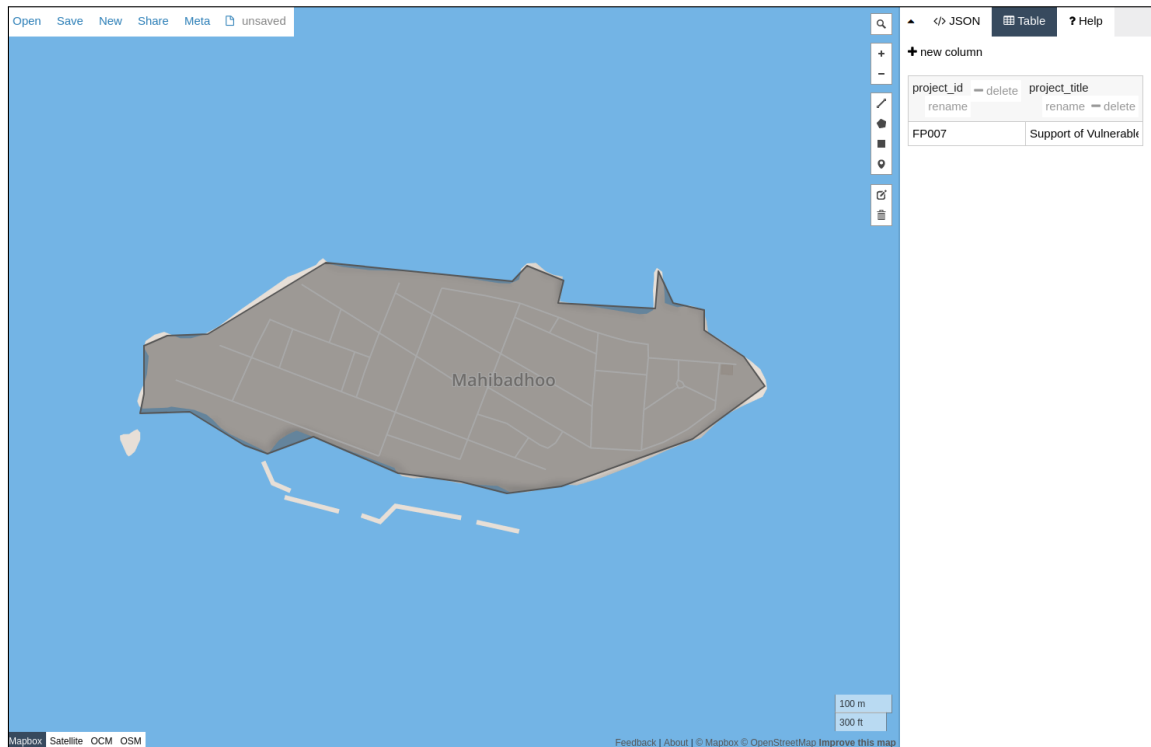
- (a) In the **mapping window** on the left, you can find a global scale web map.
- (b) The **GEOJSON info window** is on the right, where you can find a geojson format feature information once you code a project.
- (c) The **Toolboxes** include four features drawing tools, which can be used to draw points, lines, polygons, and rectangles.
  - i. Line: only used for linear features such as streets, roads that you can find exactly location.
  - ii. Polygon: used for all populated places, topographic features, administrative divisions ADM3 - ADM5.
  - iii. Rectangle: this feature is only used to draw buildings, where the shape of feature is rectangle or square.
  - iv. Point: this feature is not normally used for the new geocoding method, unless it is a small feature such as well, statue, fountain, etc.
- (d) The zoom in "+" and zoom out "-" buttons are used to navigate to selected area.
- (e) The **edit feature** can be used to modify the geocoded features.
4. Before you code any project, always make sure you know the hierarchy of the location by doing some research. In this case, the location has to belong to the administrative division of Alifu Dhaalu Atoll in Maldives.
5. In order to find Mahibadhoo, type "Alifu Dhaalu Atoll" in the searching box, the map will be zoomed in to Alifu Dhaalu Atoll, Maldives. Zoom in to Mahibadhoo, Maldives.



6. For this example, select **Draw a polygon** on the drawing tools, and trace the coastal line along Mahibadhoo. You can always delete the feature if you accidentally code wrong, or delete the last point you traced by right click the mouse and delete. You will find the location's geometry in the **GEOJSON info window** once you finish coding.



7. The next step is to add non-spatial attributes to the feature you just coded. The attribute information is the basis of geographic features, allowing you to visualize, query and analyze your data later.
8. Click "Table" in the **GEOJSON info window**, add a new column "projectid" and assign the value to "FP007". Add another column "project title" and assign the value to "Support of Vulnerable Communities in Maldives to Manage Climate Change-Induced Water Shortages". You can always add other columns/fields to your layer.



9. Once you finish editing the attribute of the layer, save the geocoded output to GEOJSON format by clicking "Save" button on the top of screen, the output layer will be downloaded to your computer.
10. Find the "map.geojson" file you just downloaded, and rename it "FP007\_location1.geojson".
11. Congratulations on your first coding project.
12. Try to code havandhoo (Haa Alifu Atoll) and Gadhdhoo (Gaaf Dhaal Atoll) as an exercise.

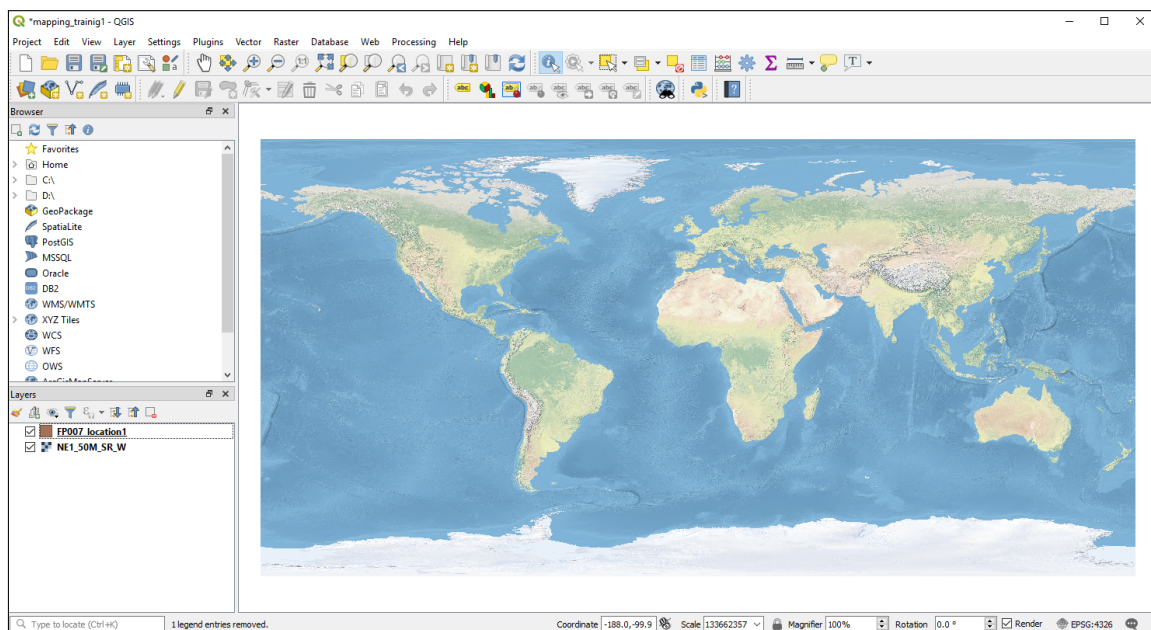
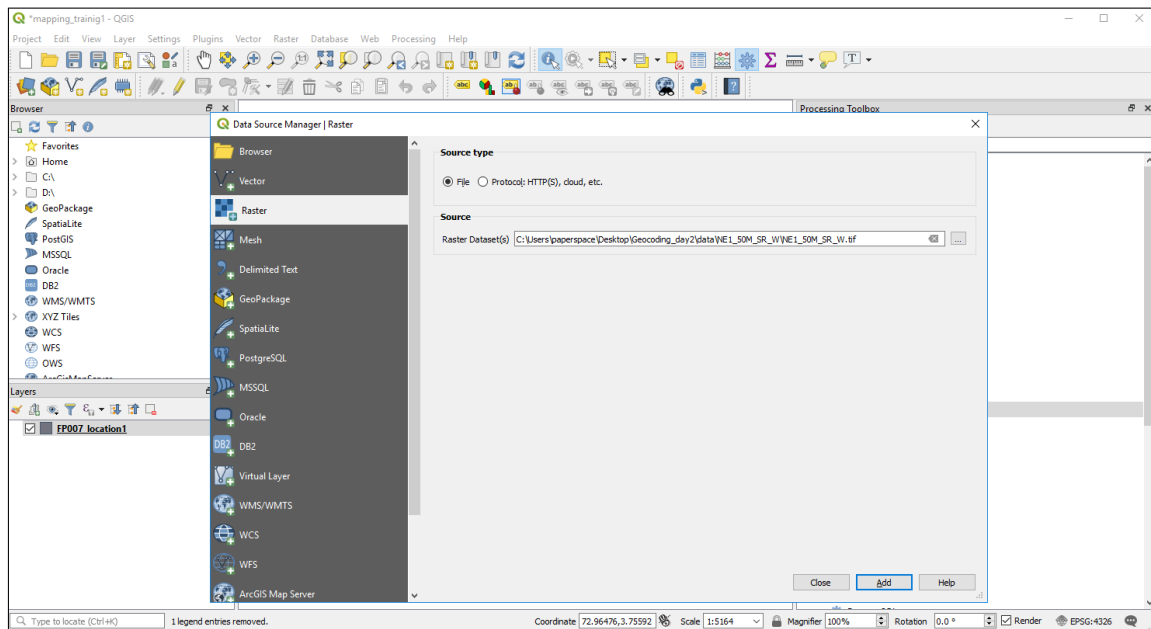
### 0.3 Data Visualization

In this section, we are going to visualize the project you just finish coding in last section.

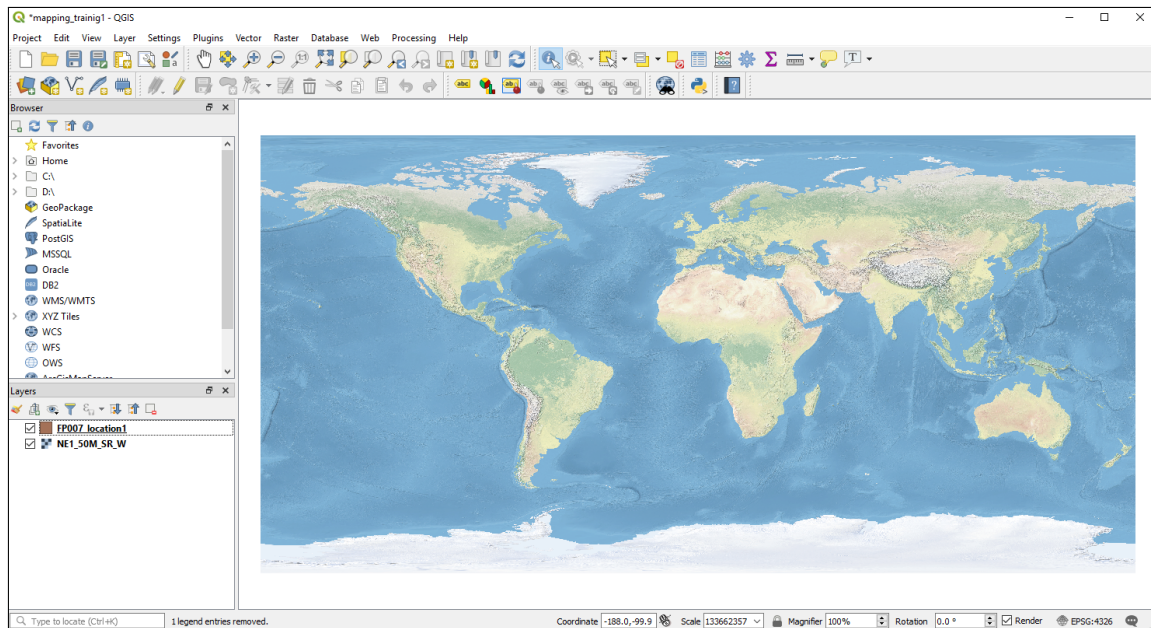
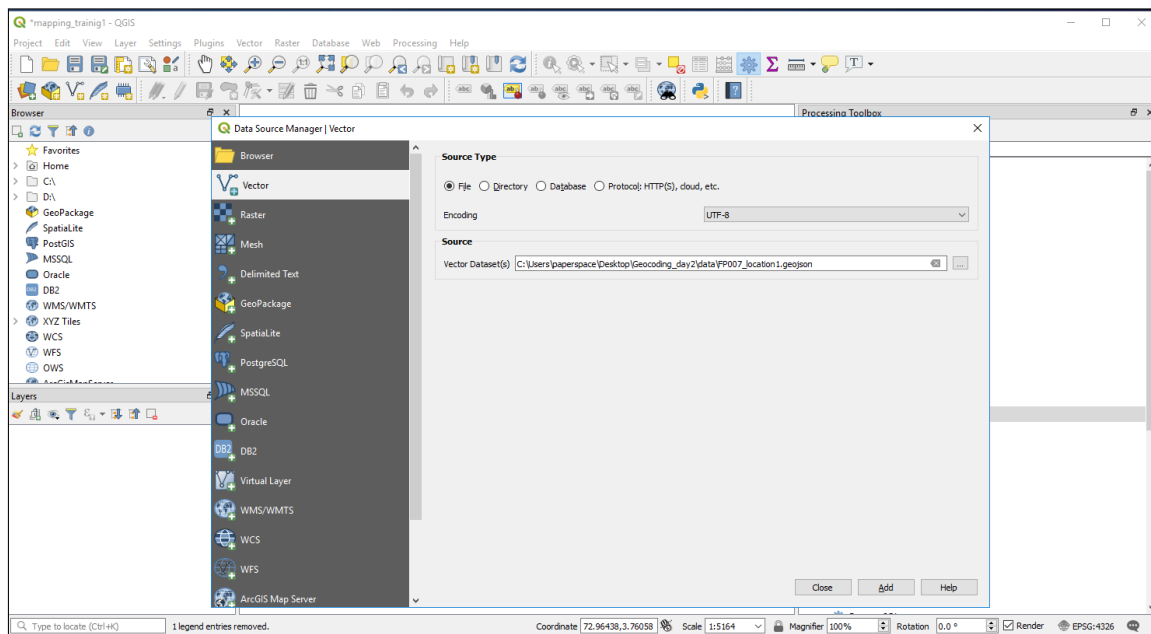
First, let's open QGIS, if you do not know where QGIS stored on your computer, you can always find it by search in the application on windows, and open QGIS desktop.

1. Let's add the basemap first. Open the Data Source Manager, select the "Raster".

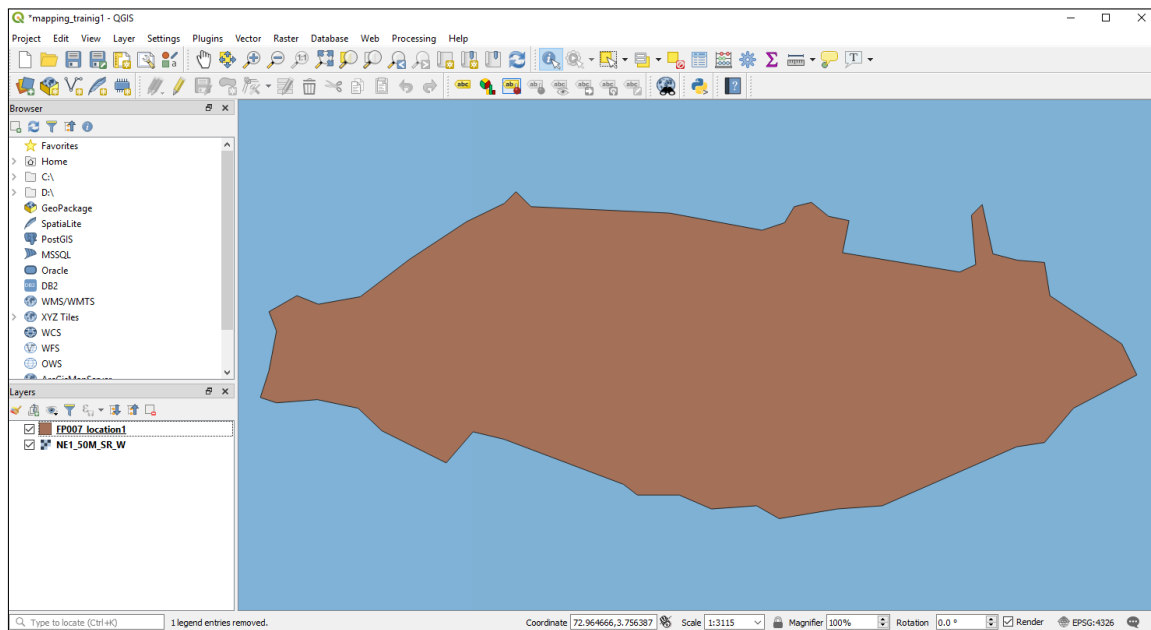
2. Find and select the "NE1\_50M\_SR\_W.tif" from the **.../Desktop/Geocoding\_day2/data/NE1\_50M\_SR\_W/NE1\_50M\_SR\_W.tif** file.



3. Open the Data Source Manager again, select the "Vector" at this time.
4. Find and select the "FP007\_location1.geojson" file you coded, we also provide you with the coded geojson file in **.../Geocoding\_day2/data/FP007\_location1.geojson** file.
5. Click "Add" to add this layer.



6. You can then right click on the "FP007\_location1" layer in the layer window and select "Zoom to Layer" to get a better view
7. Alternatively, you can use the "Zoom to Layer" button in the top toolbar.



8. Now, open the attribute table by right click the "FP007\_location1" layer, the project id and project title you added earlier are not in the attribute table.

