

Establishment of Farmland GIS – Lot1

Digitization of Parcellary Maps & Farmland Database Development

Project duration: March ~ September 2019



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Basic knowledge of GIS

Specification of Parcellary (Lot 1)

- Specification is a detailed description of how something should be the project to be done or made.

1. Specification of Parcellary (Lot 1)

- Layer - A layer represents geographic data, such as a theme of data. Examples of map layers include streams and lakes, terrain, roads, political boundaries, parcels, building footprints, utility lines, and orthophoto imagery.
- Attribution - The process of assigning attributes (characteristic, relationship, information) to features.

1.1 Layer

1. Road

2. Canal

3. Parcellary

4. River

5. Residential

1.1 Layer (Field Definition)

Road

Field name	Type	Length
osm_id	Text	254
name	Text	254
highway	Text	254
waterway	Text	254
aerialway	Text	254
barrier	Text	254
man_made	Text	254
other_tags	Text	254

River

Field name	Field name	Length
name	name	80
Type	Type	80

Canal

Field name	Type	Length
canal_id	Whole	10
Canal_type	Text	80
remarks	Text	80

Residential

Field name	Type	Length
name	Text	80
Type	Text	80

Parcel

Field name	Type	Length	Precision
lot_code	Text	50	
lot_number	Text	100	
area	decimal	18	15
remarks	Text	254	
updatedby	Whole	10	
updated	Text	254	

1.1 Layer (Road)

Trace the road features in the middle of the road with reference to the satellite image. Enable snapping to connect on endpoints and intersections.



1.1 Layer (Canal)

Trace the canal features at the middle of the canal with reference to the satellite image. Enable snapping to connect on endpoints and intersections.



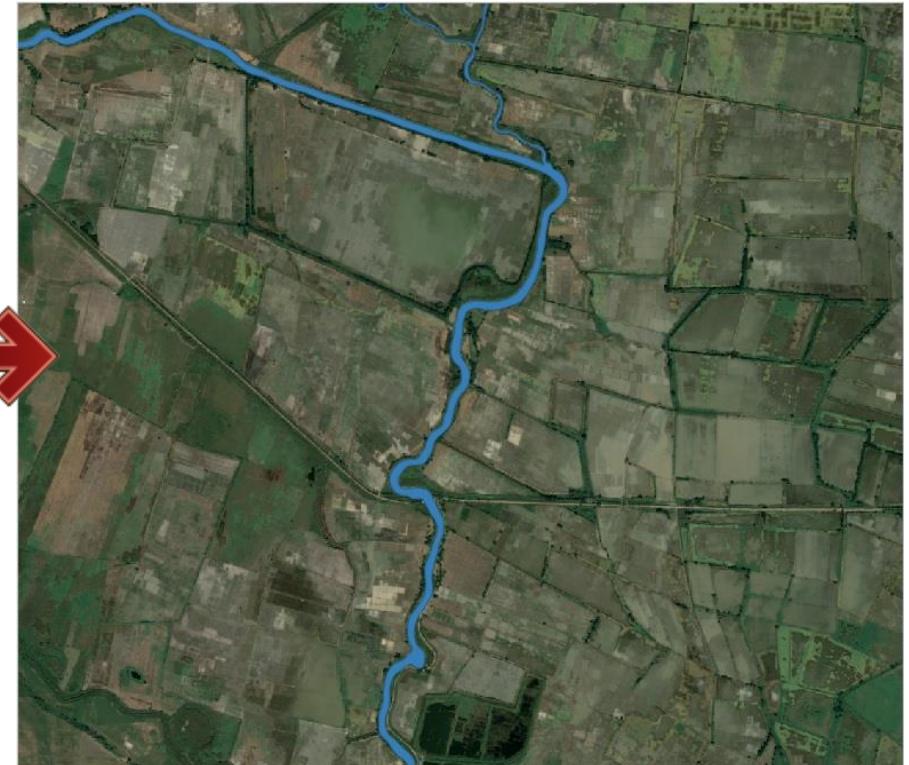
1.1 Layer (Parcellary)

Enable snapping. Adjacent parcel boundaries must not intersect other boundaries. Points along the common boundary lines must be snapped.



1.1 Layer (River)

River must be digitize at the river edge. In case river are in curve shape, the points should be inputted equally spaced to make it smooth

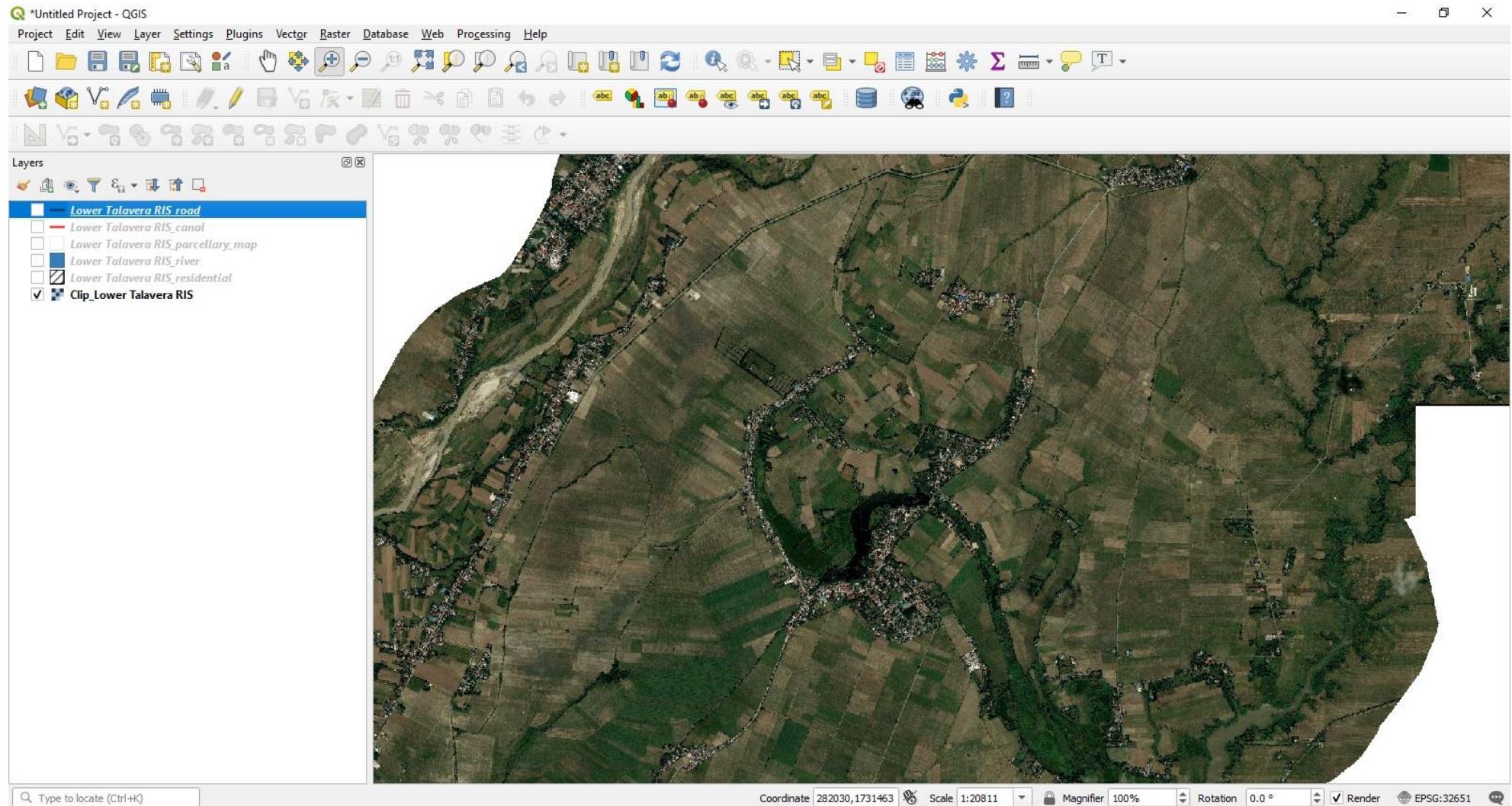


1.1 Layer (Residential)

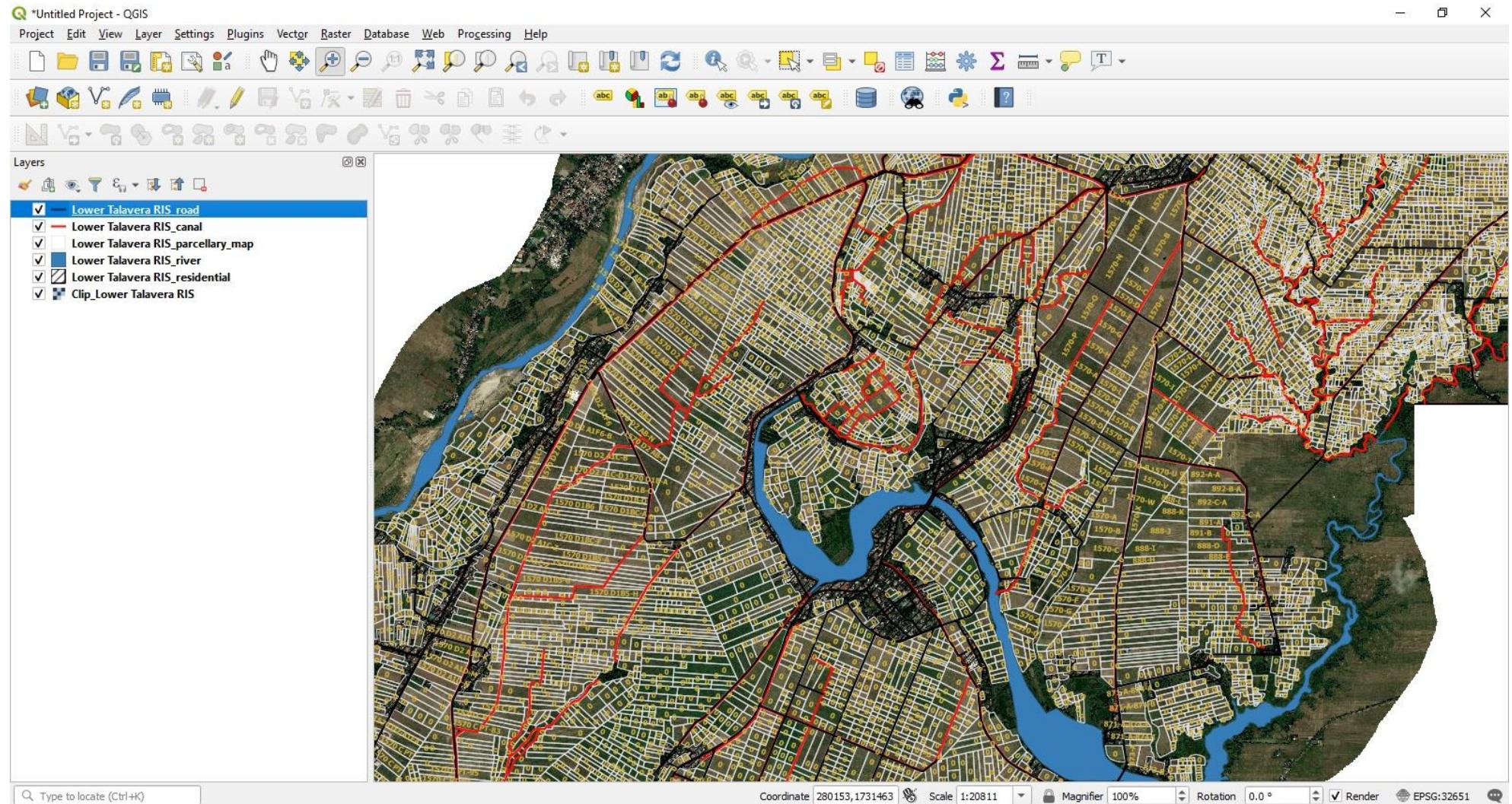
Proper Residential digitization should be observed. It should be acquire/digitize at the outline or edge of the Residential.



1.1 Layer (Output)



1.1 Layer (Output)



1.2 Attribution

- The process of assigning attributes (characteristic, relationship, information) to features.

Q Lower_Talavera RIS_Line :: Features Total: 193, Filtered: 193, Selected: 0

	Id	Name	Type	Remarks	FNAME
1	0				ROAD
2	0				ROAD
3	0				ROAD
4	0				ROAD
5	0				ROAD
6	0				ROAD
7	0				ROAD
8	0				ROAD
9	0				ROAD
10	0				ROAD
11	0				ROAD
12	0				ROAD
13	0				ROAD

Show All Features

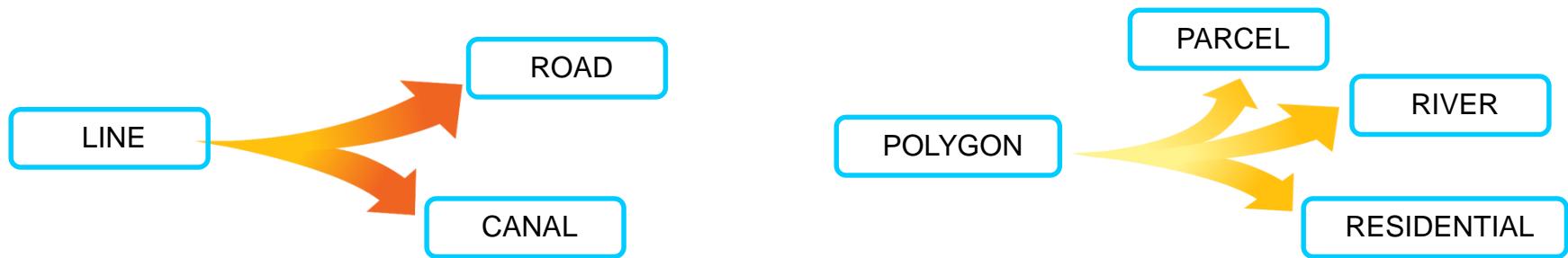
Q Lower_Talavera RIS_Polygon :: Features Total: 18604, Filtered: 18604, Selected: 0

	Id	Lot_code	Remarks	FNAME
1	0 0			PARCEL
2	0 0			PARCEL
3	0 1570D2BB			PARCEL
4	0 1570D2BB			PARCEL
5	0 1570D2BB			PARCEL
6	0 1570D2BB			PARCEL
7	0 1570D2BB			PARCEL
8	0 1570D2BB			PARCEL
9	0 0			PARCEL
10	0 1570D2BB			PARCEL
11	0 1570D2BB			PARCEL
12	0 1570D2BB			PARCEL
13	0 1570D2BB			PARCEL

Show All Features

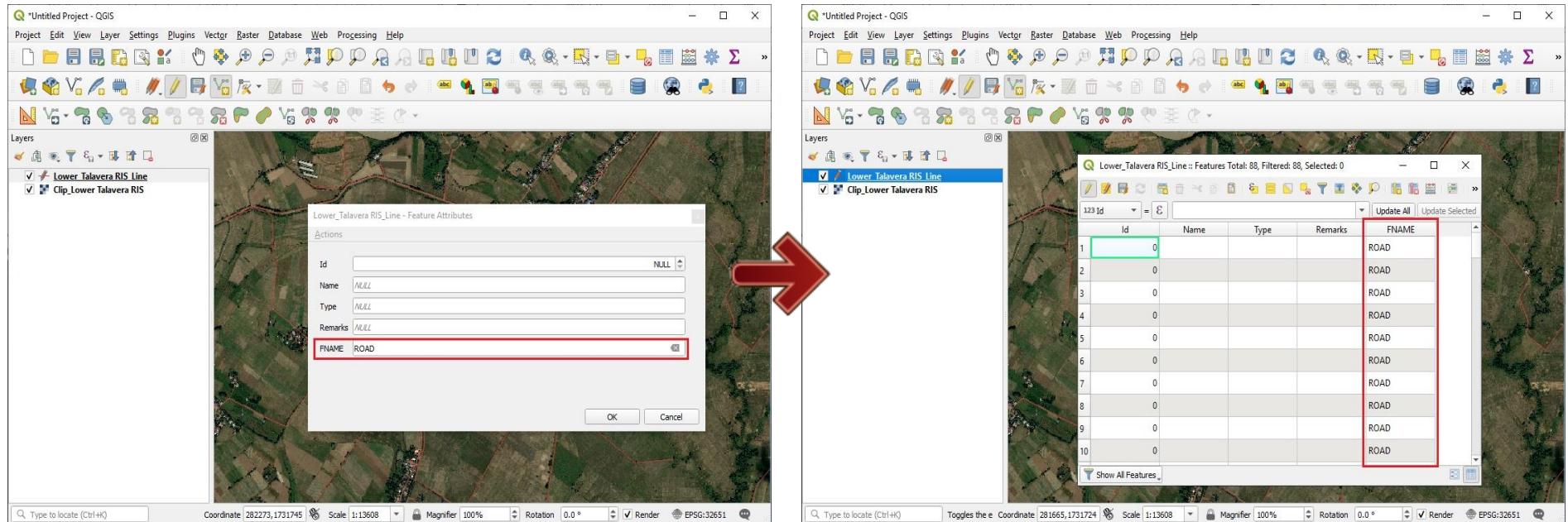
1.2 Attribution

- Two shapefiles (Line and Polygon) to be used to create five feature classes based on existing Layer.



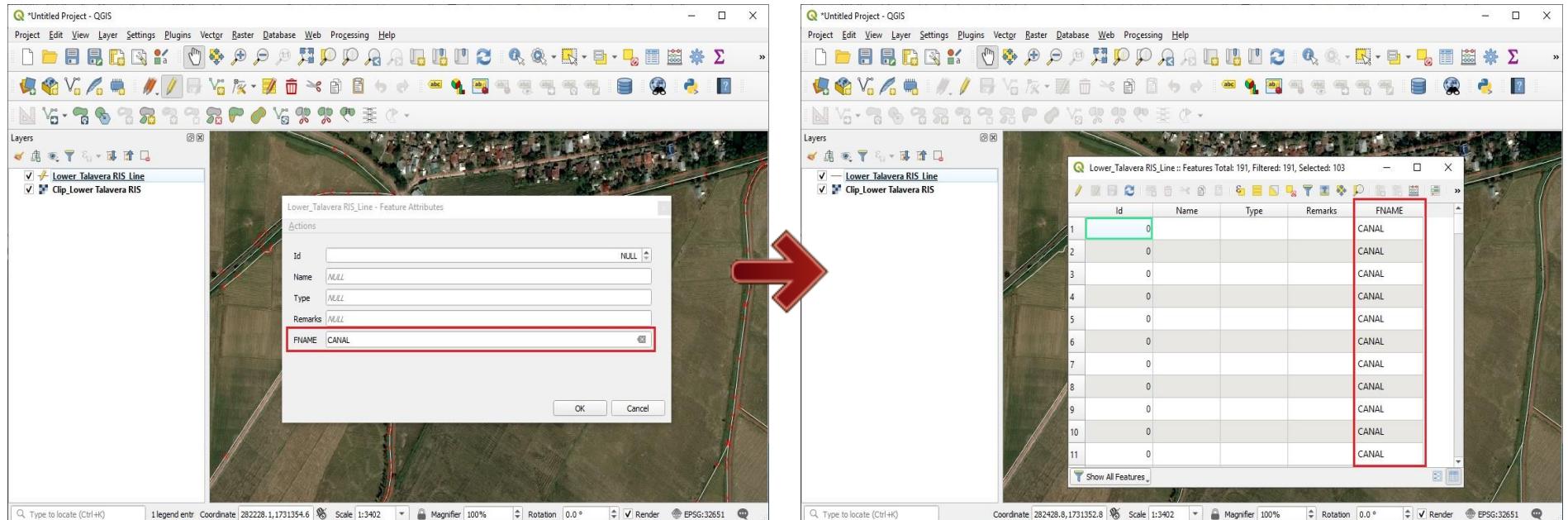
1.2 Attribution (Line)

- Line (Road) – after digitization of a particular road, input “ROAD” under the field “FNAME”



1.2 Attribution (Line)

- Line (Canal) – after digitization of a particular canal, input “CANAL” under the field “FNAME”

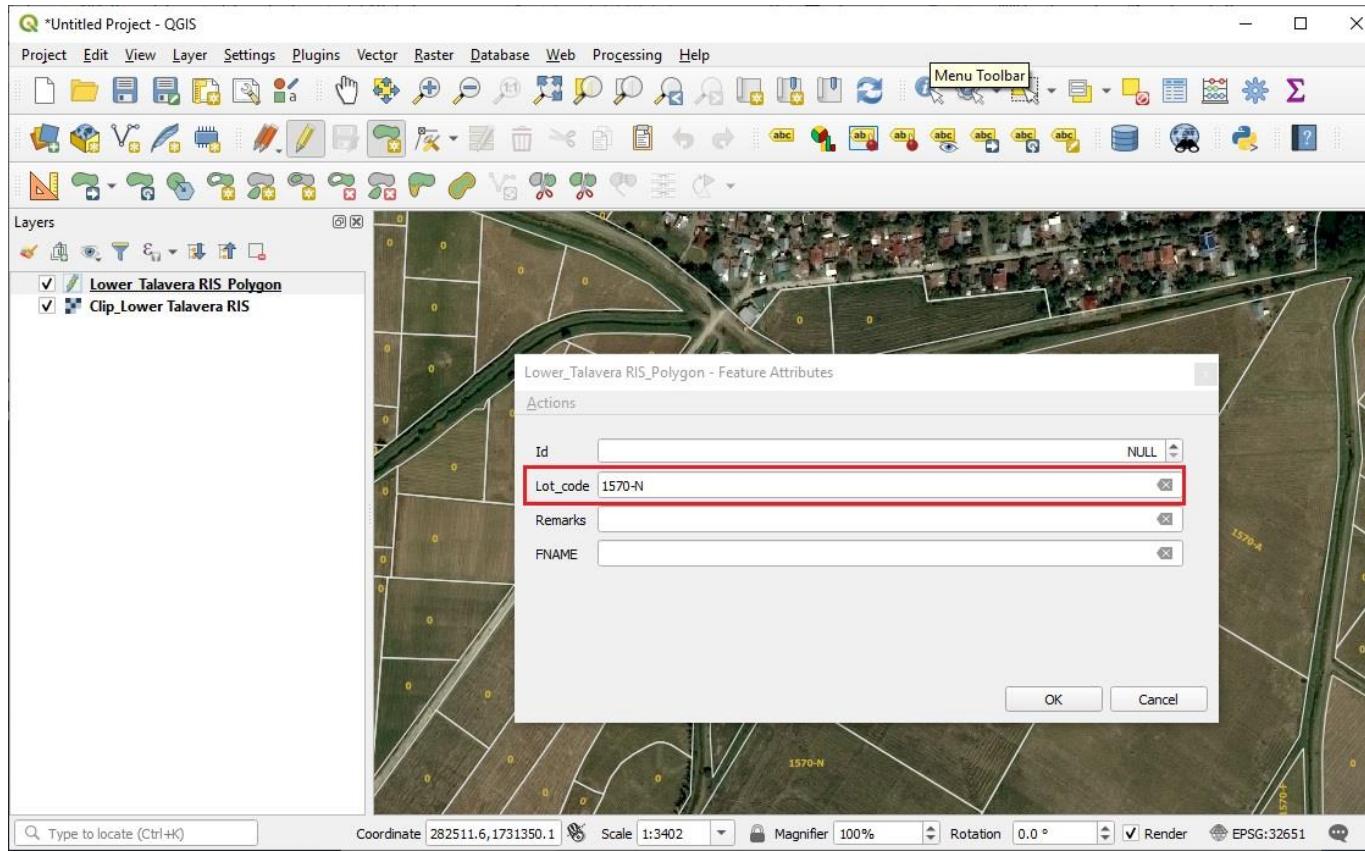


1.2 Attribution (Polygon)

- Polygon (Parcellary) – after digitization of a particular parcel, encode necessary information for the following fields.
 - Lot_code
 - Remarks
 - FNAME

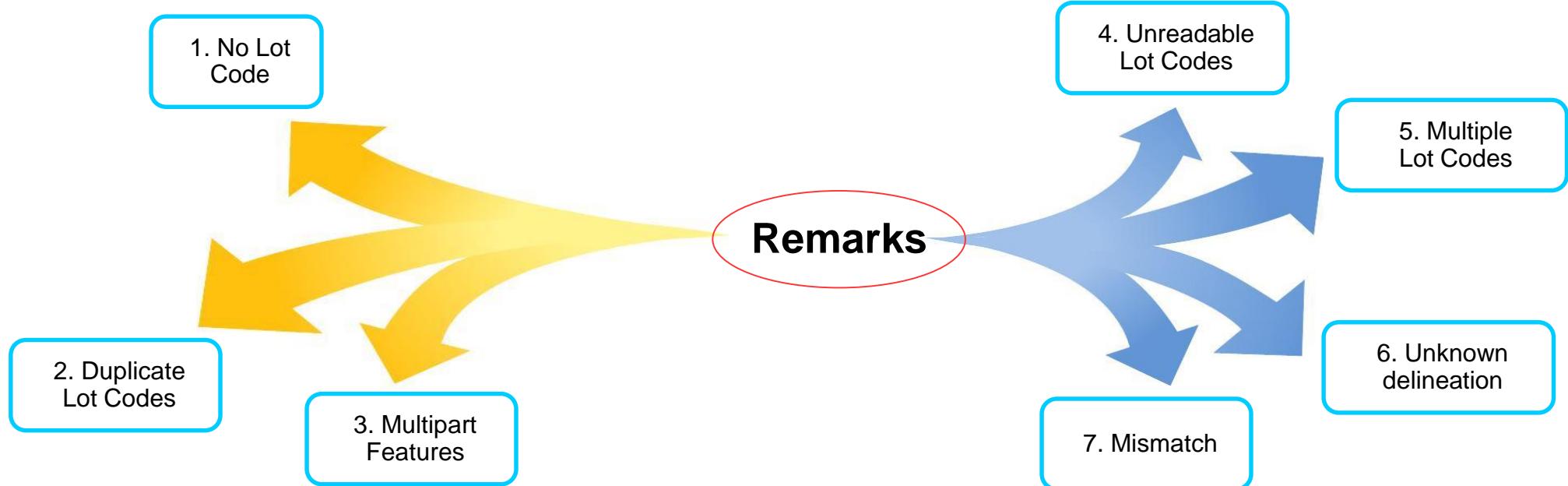
1.2 Attribution (Polygon)

- Lot_code - it is pertaining to the value of parcel given in the base map or existing blue print maps.



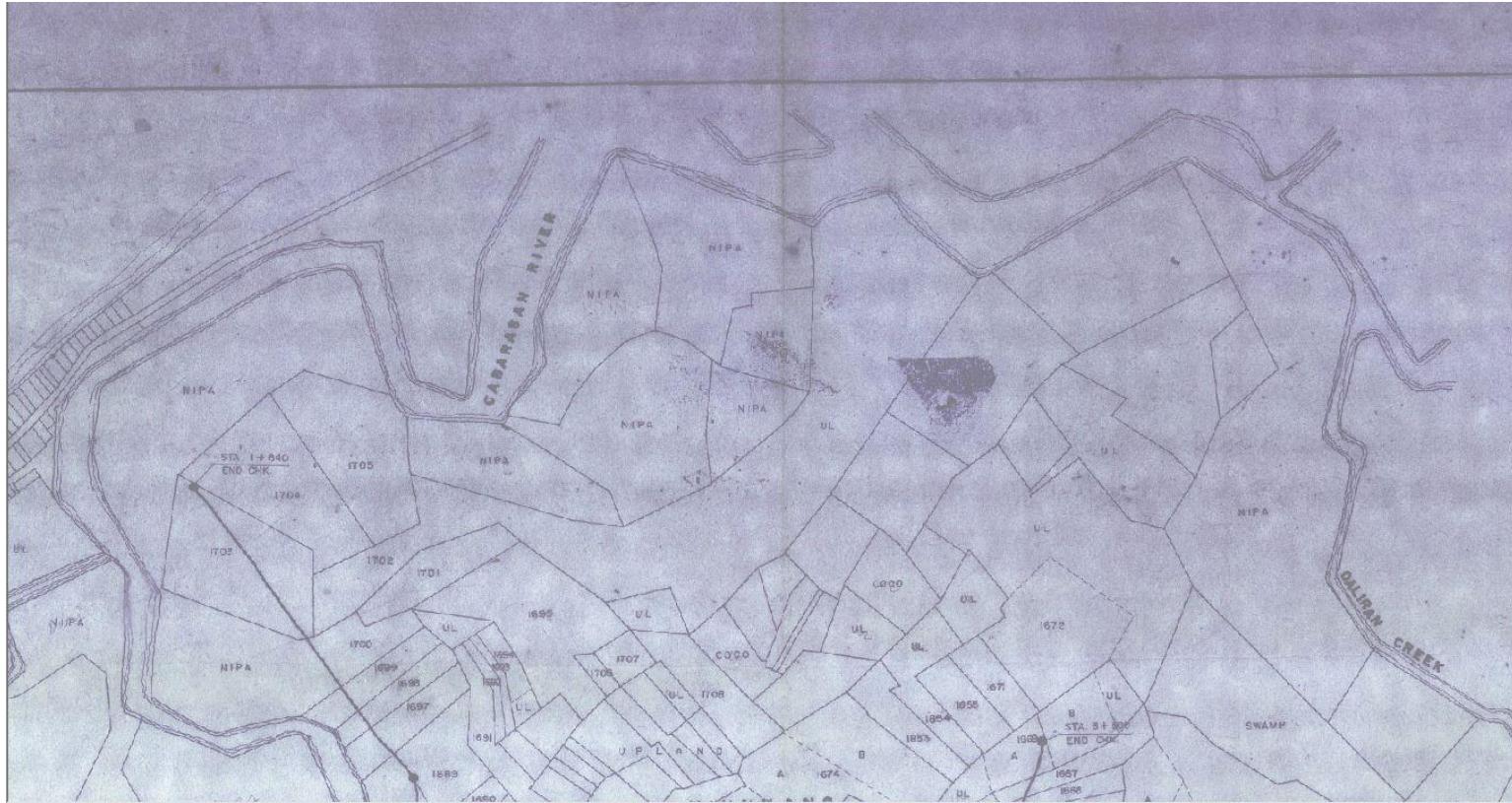
1.2 Attribution (Polygon)

- Remarks - it is pertaining to the validation code to be used in field survey. There are 7 codes provided to know each characteristics.



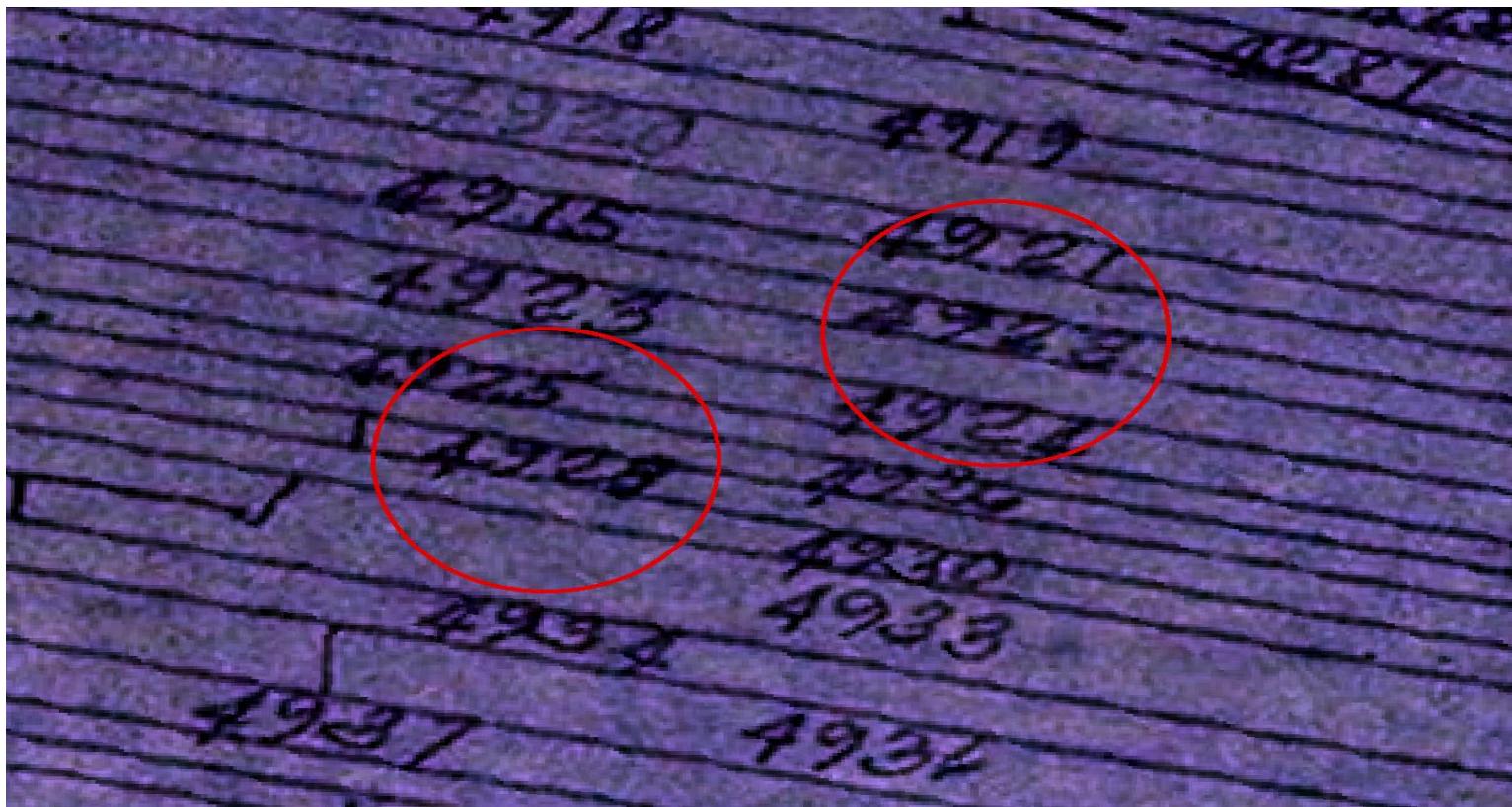
1.2 Attribution (Polygon)

- › 1 - No Lot Code (The Lot code does not exist in the blue print or parcellary map)



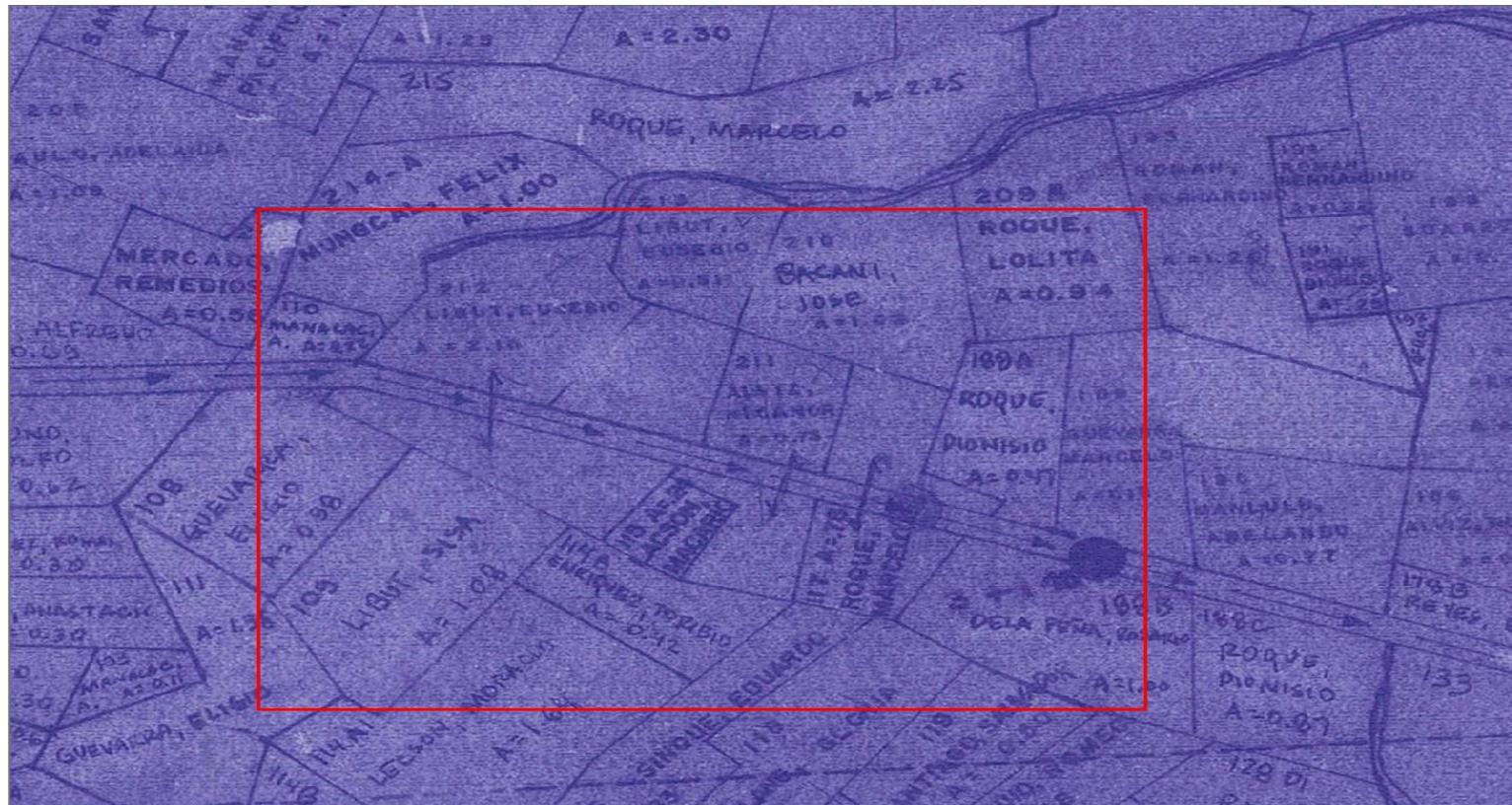
1.2 Attribution (Polygon)

- 2 - Duplicate Lot Codes (Lot code has the same value in parcellary map)



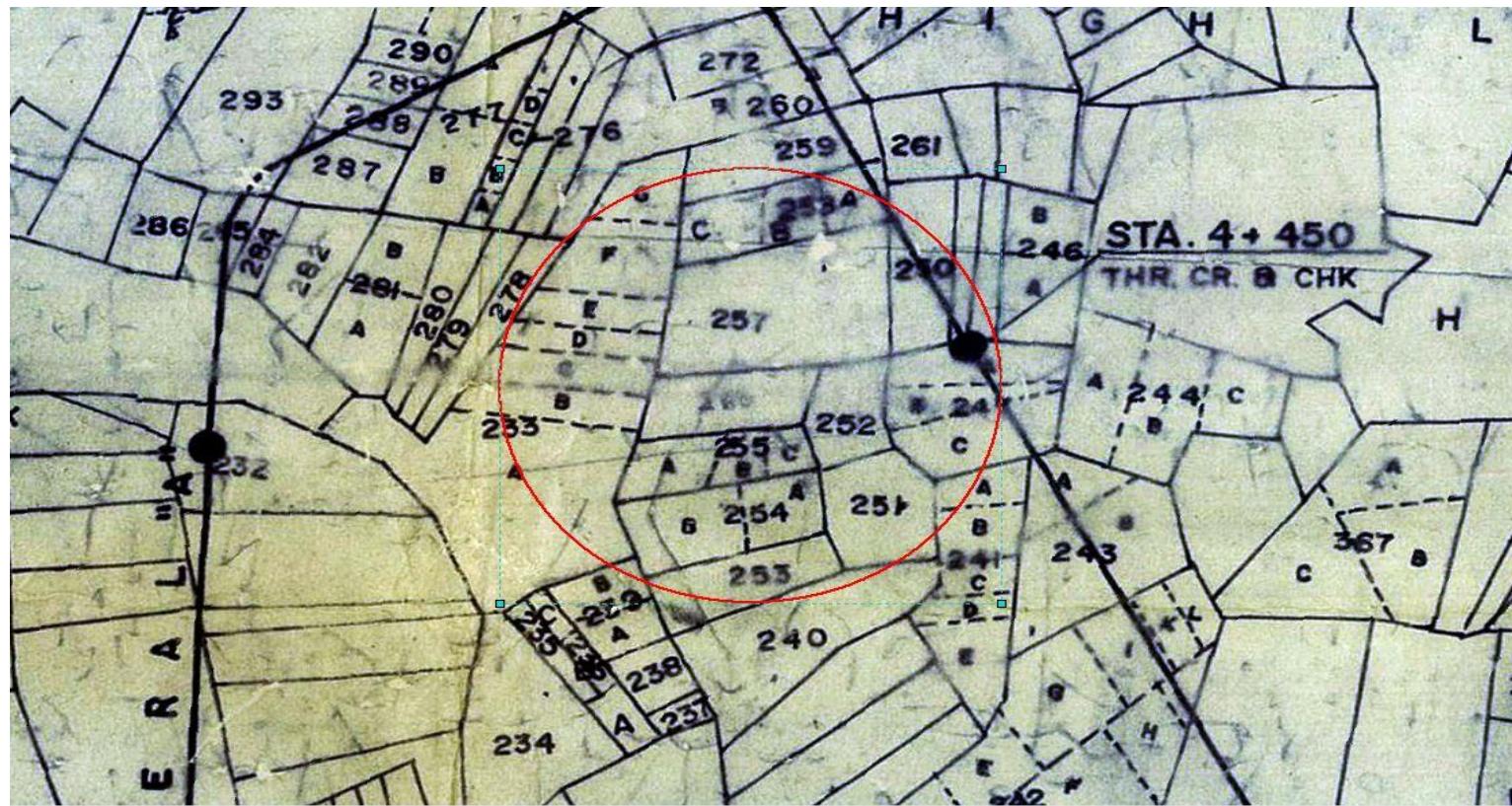
1.2 Attribution (Polygon)

- 3 - Multipart Features (Two parts/polygons that has one lot code value)



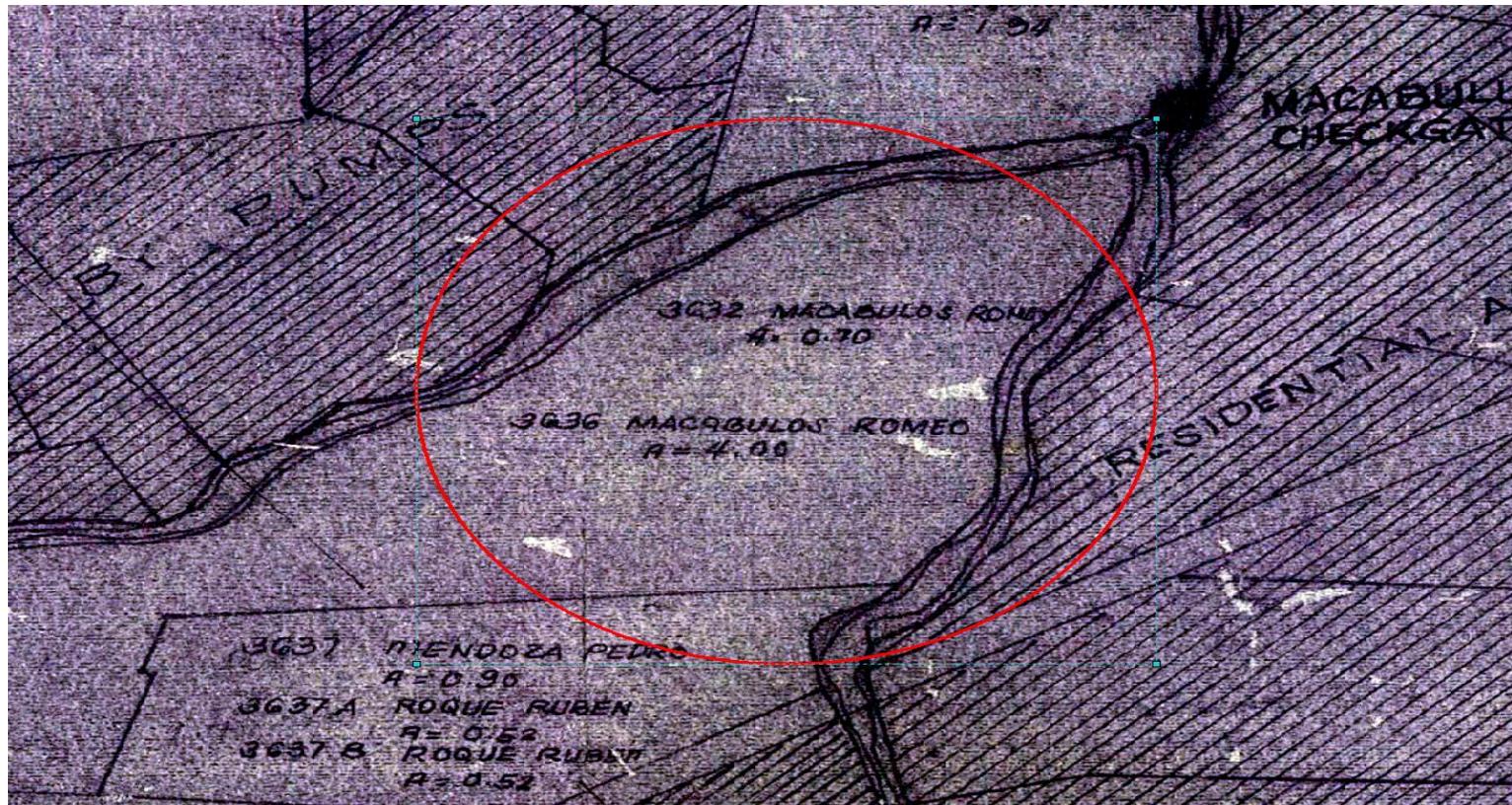
1.2 Attribution (Polygon)

- 4 - Unreadable Lot Codes (The lot code is not clear in the blue print and can't be read)



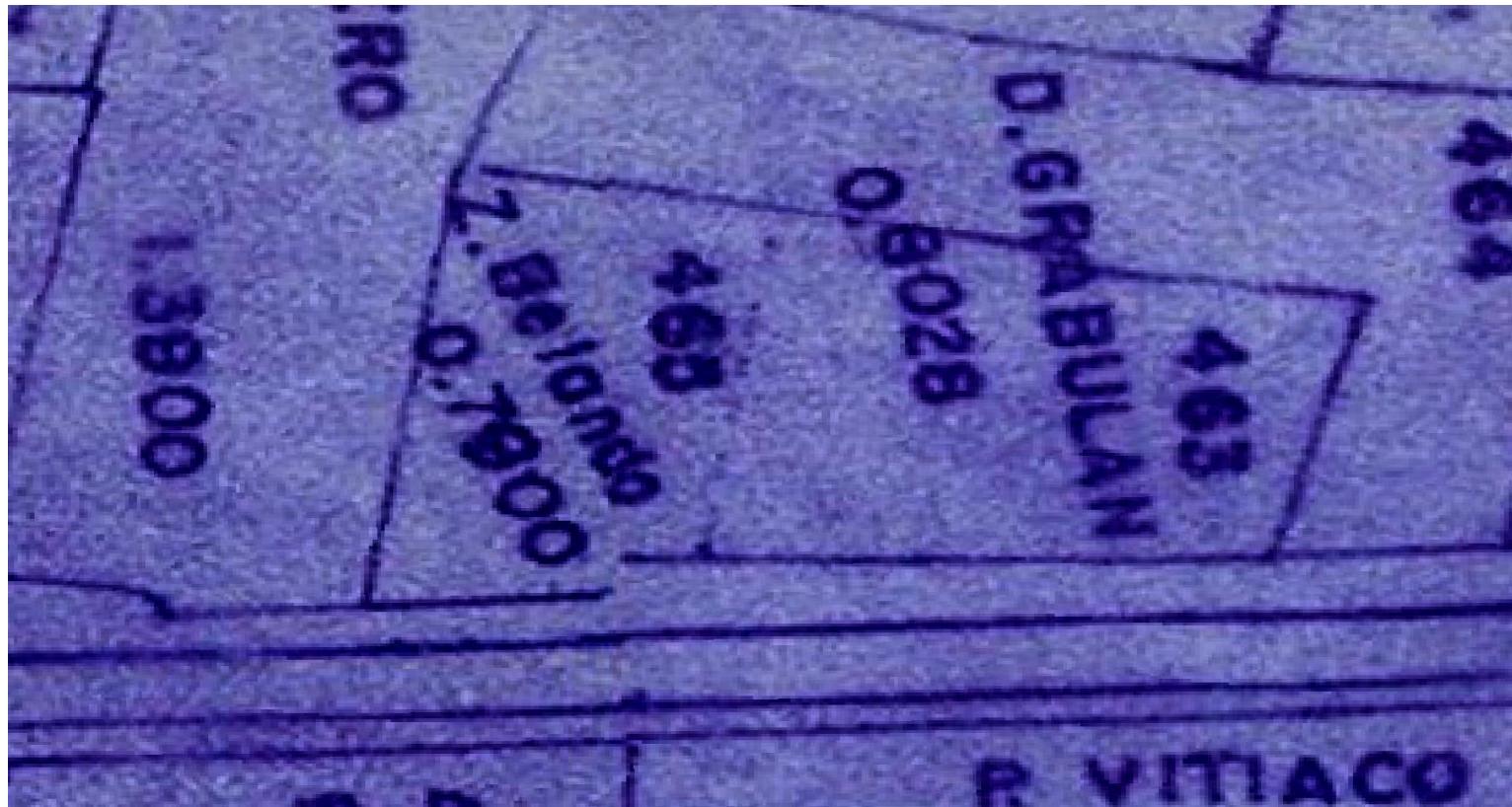
1.2 Attribution (Polygon)

- 5 - Multiple Lot Codes (That have two or more Lot codes in one parcel)



1.2 Attribution (Polygon)

- 6 - Unclear delineation (Boundary for each parcel was cannot be determine or recognize)



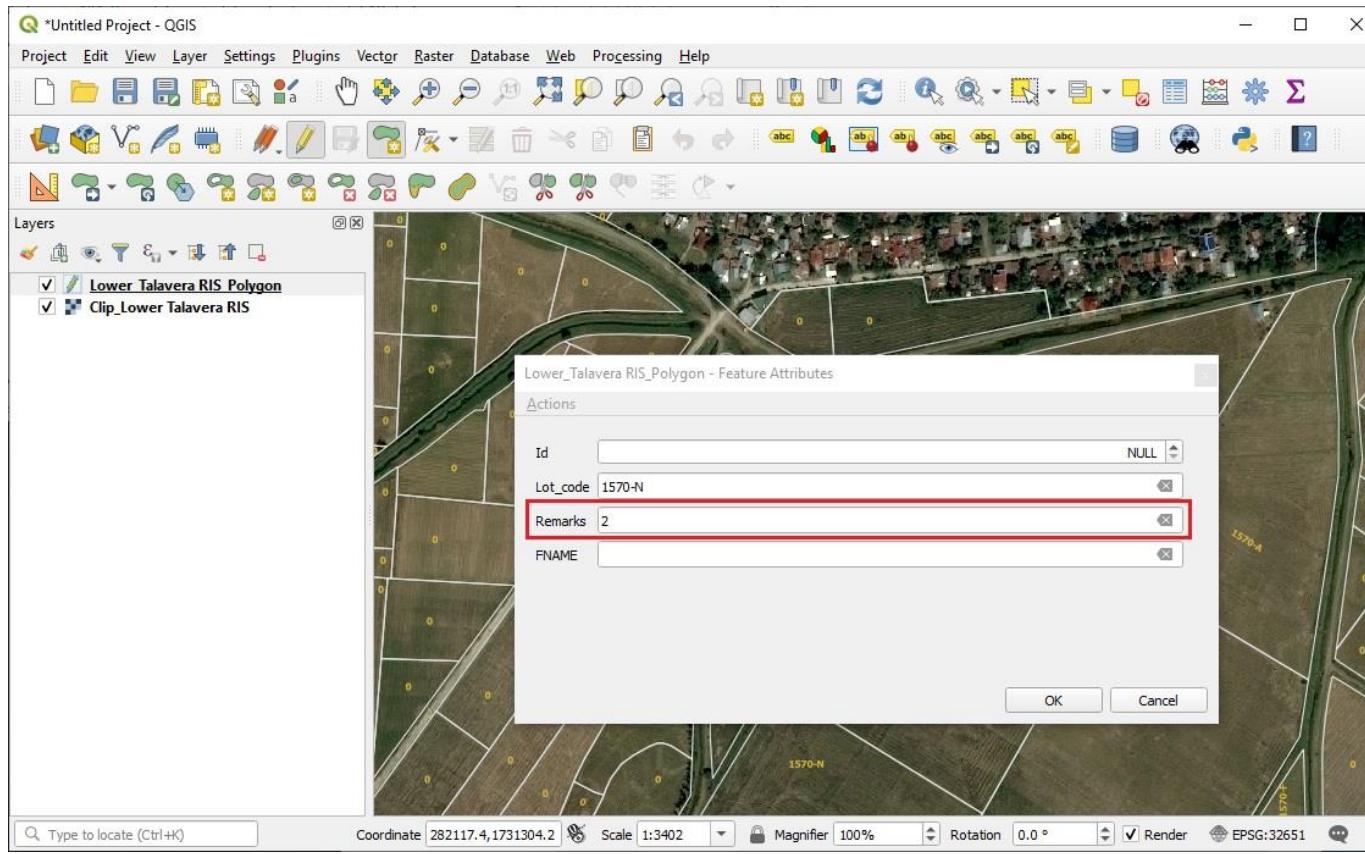
1.2 Attribution (Polygon)

- 7 - Mismatch (Parcel in blue print does not match versus to the (VHRSI) Satellite Image)



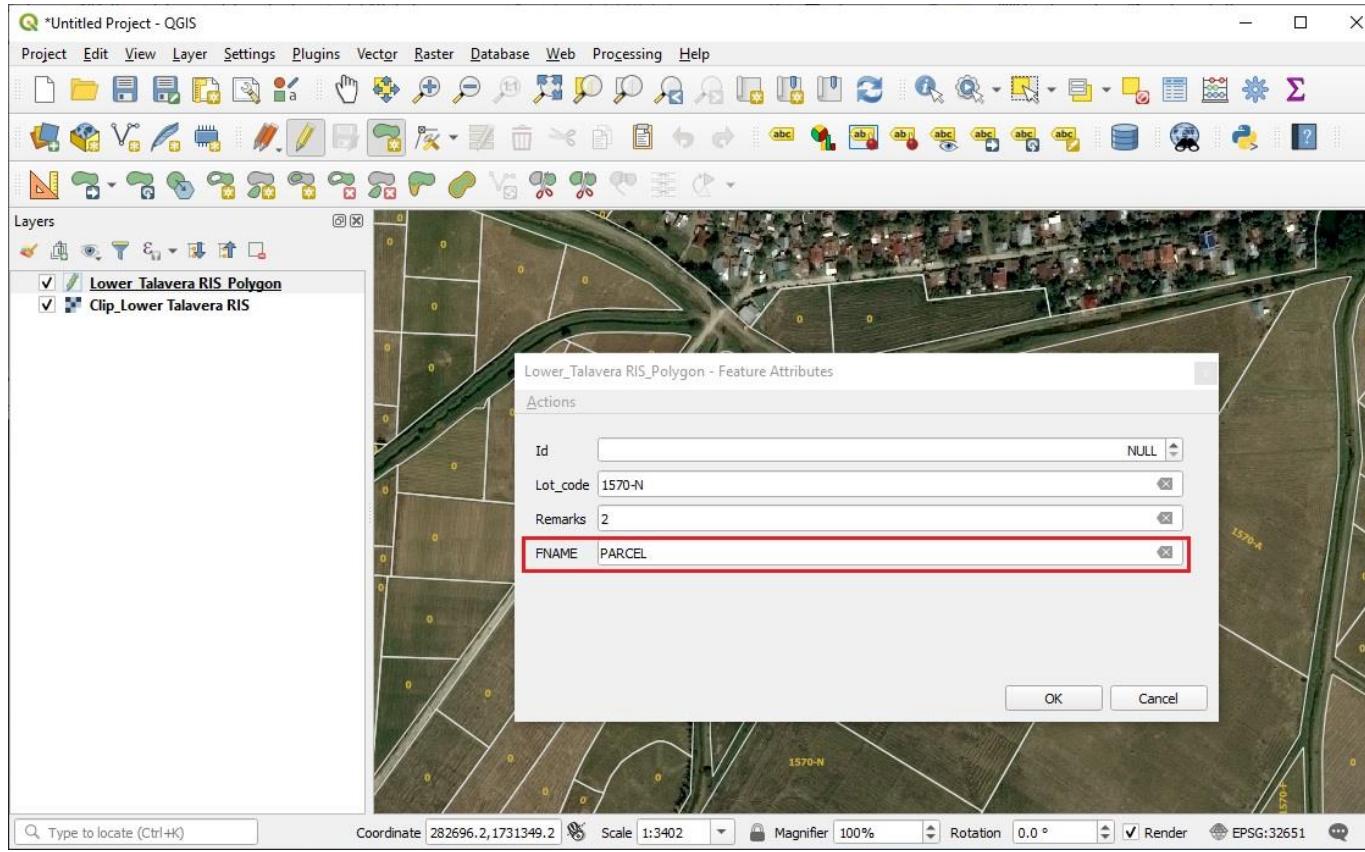
1.2 Attribution (Polygon)

- Remarks – assigned value is “2” (Duplicate Lot Codes)



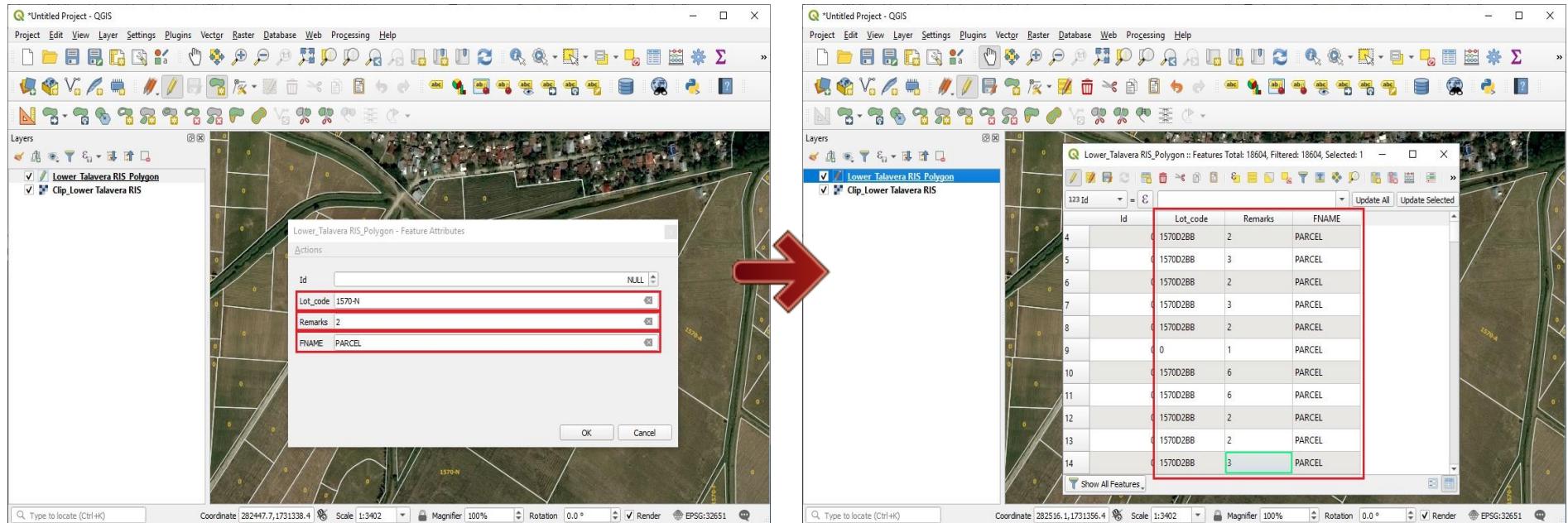
1.2 Attribution (Polygon)

- FNAME - Input “PARCEL” under the field “FNAME”



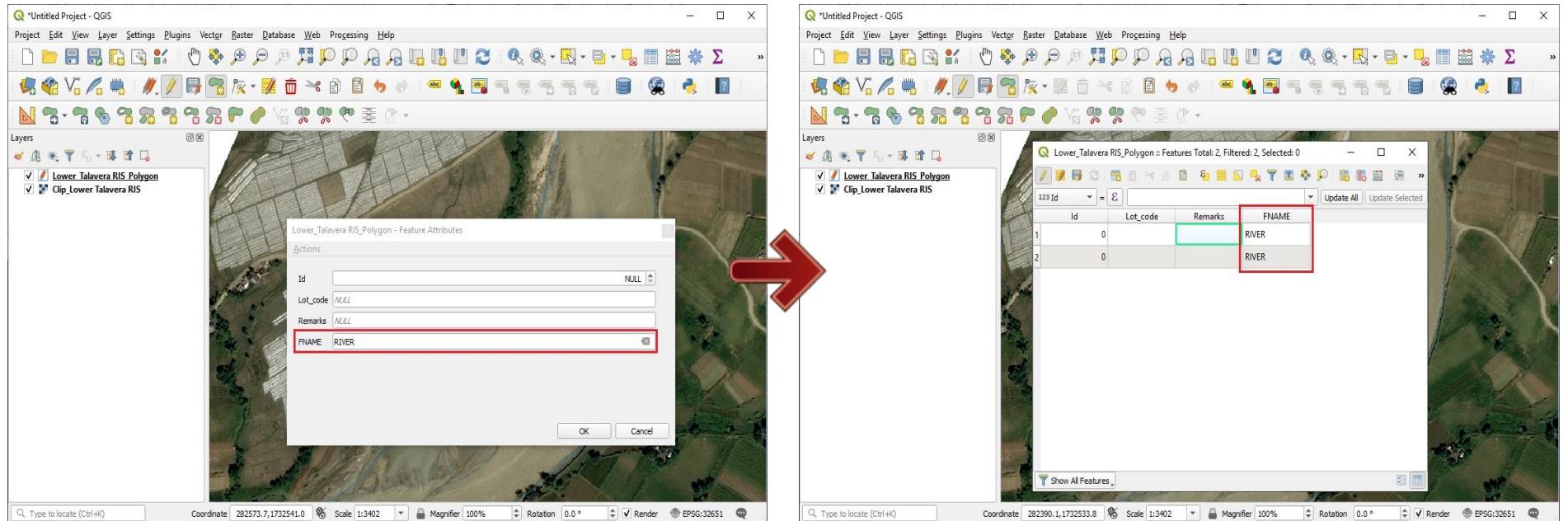
1.2 Attribution (Polygon)

- Polygon (Parcellary) – already assigned value for the following fields.



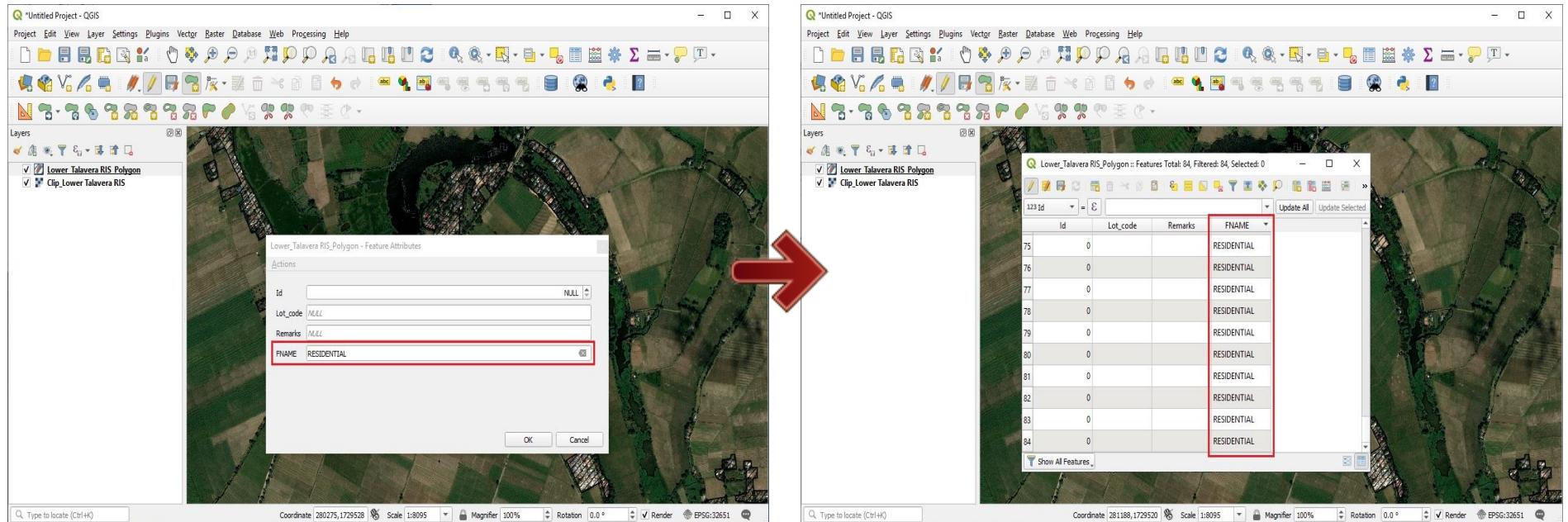
1.2 Attribution (Polygon)

- Polygon (River) – after digitization of a particular river, input “RIVER” under the field “FNAME”



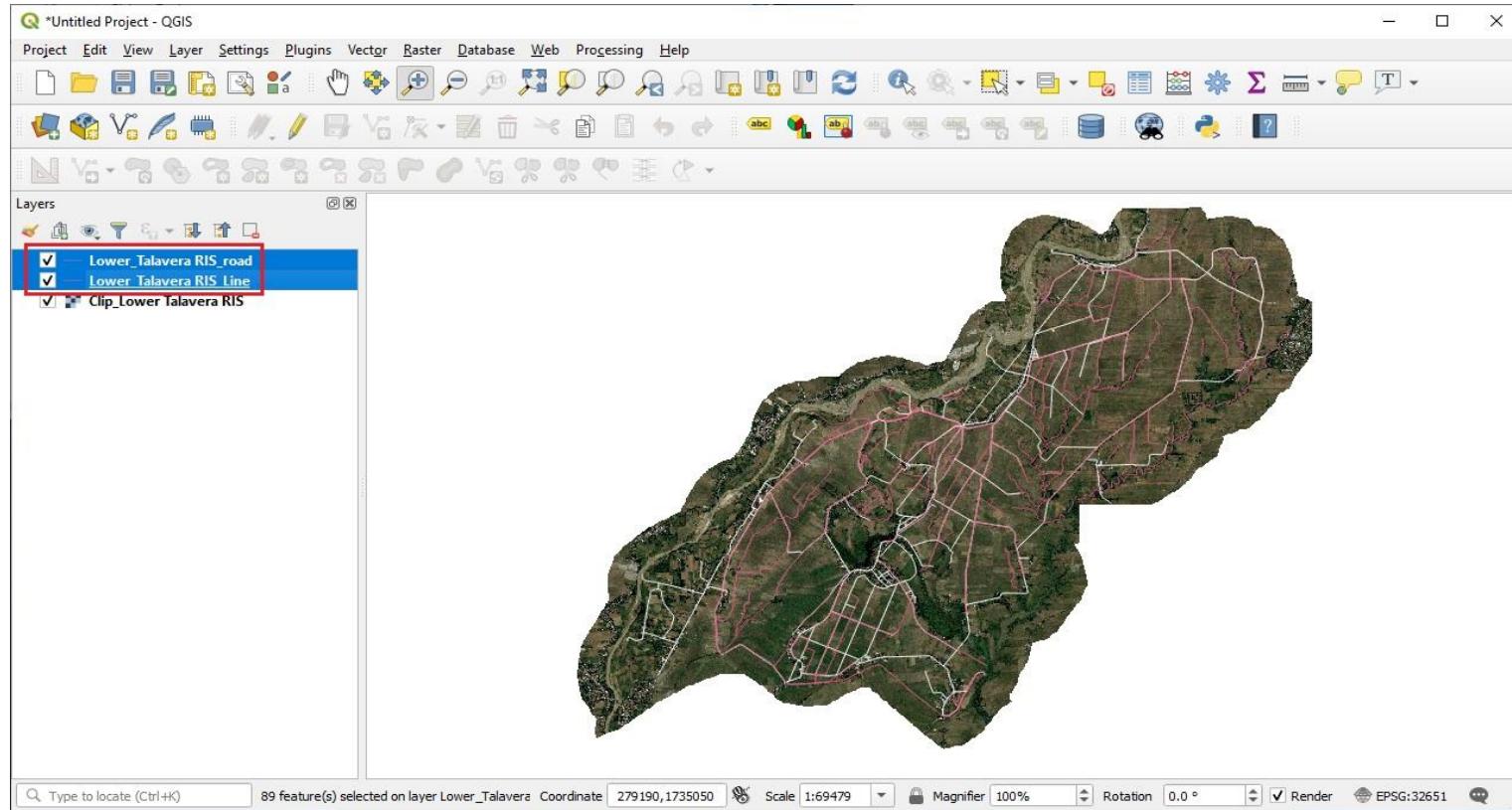
1.2 Attribution (Polygon)

- Polygon (Residential) – after digitization of a particular residential, input “RESIDENTIAL” under the field “FNAME”



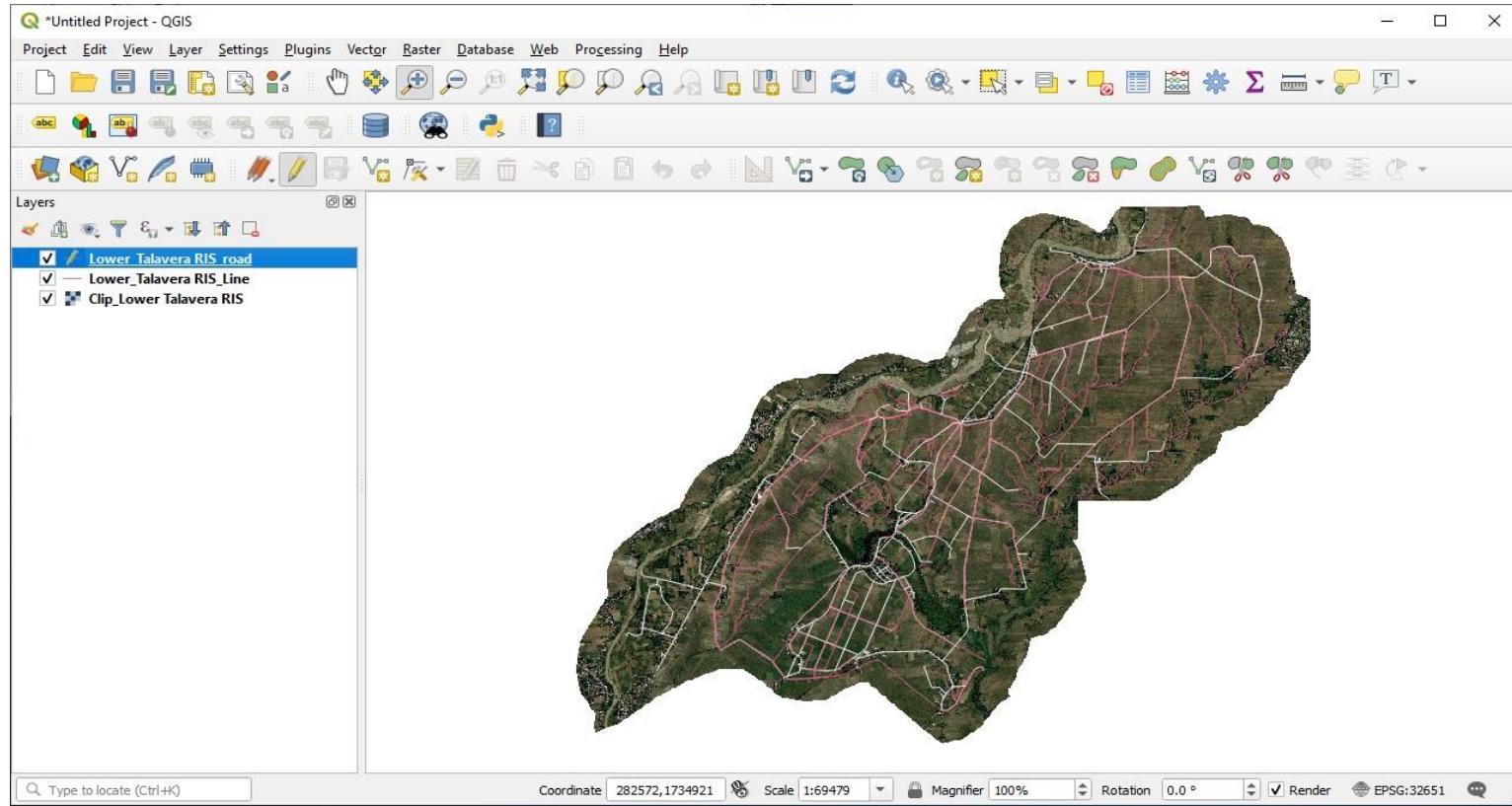
Extraction (Line - Road)

- Line (Road) - Load the created shapefile (Line) and the template layer (Road) to the QGIS Software.



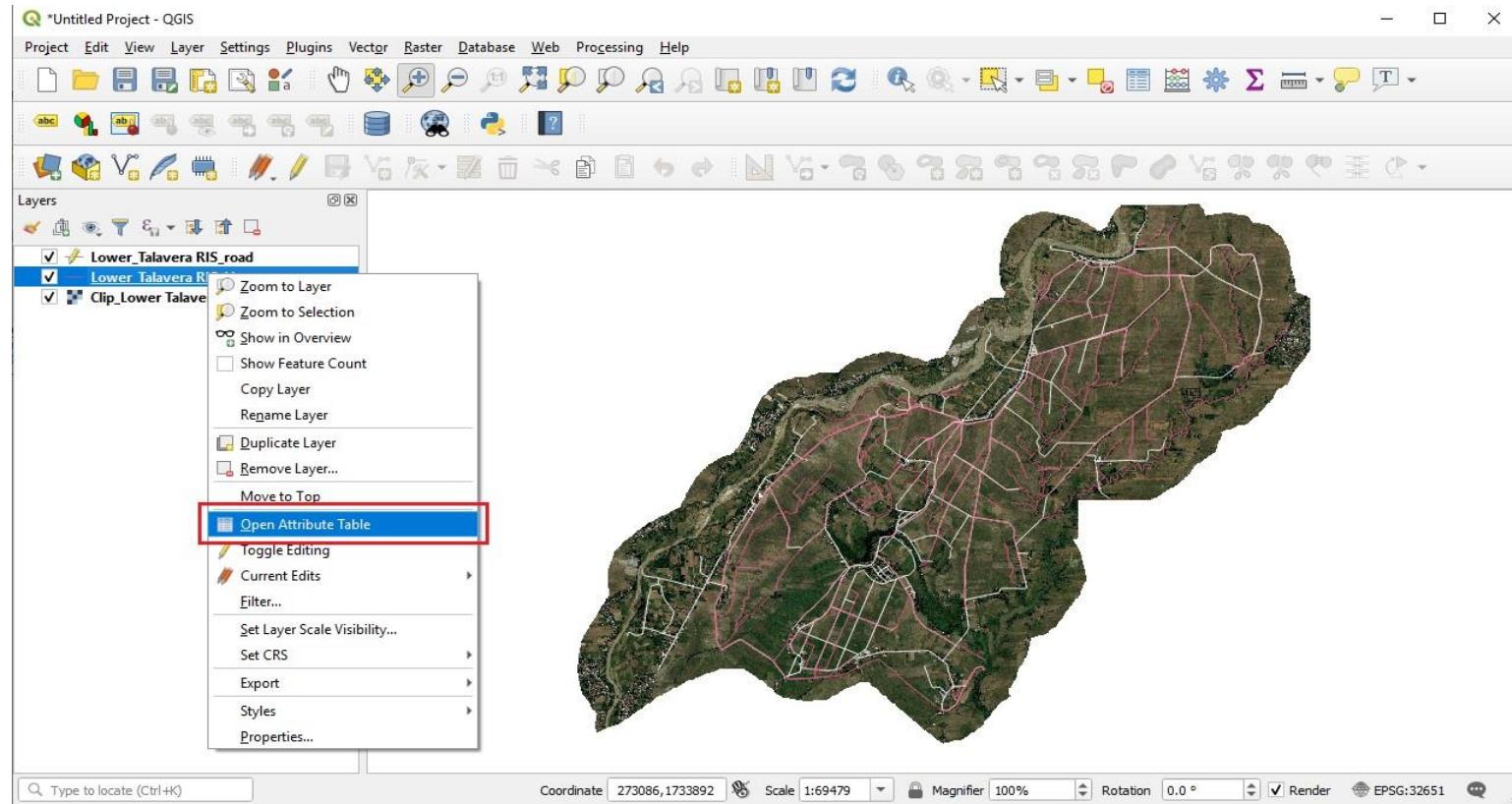
Extraction (Line - Road)

- Click on the template layer (Road). Then click “**Toggle Editing**” button on the Digitizing Toolbar.



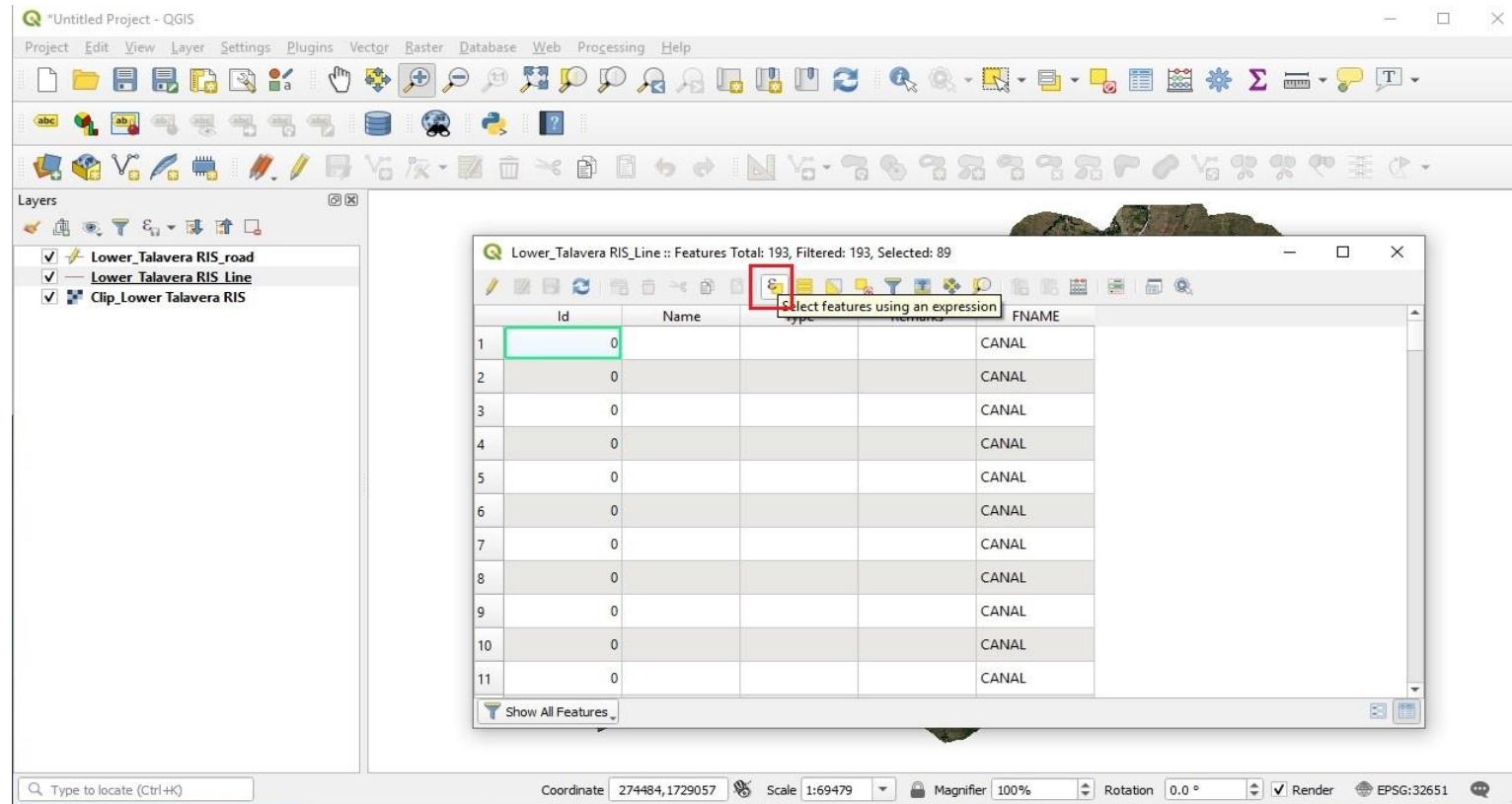
Extraction (Line - Road)

- Right click on the created shapefile (Line) then select the button “Open Attribute Table”.



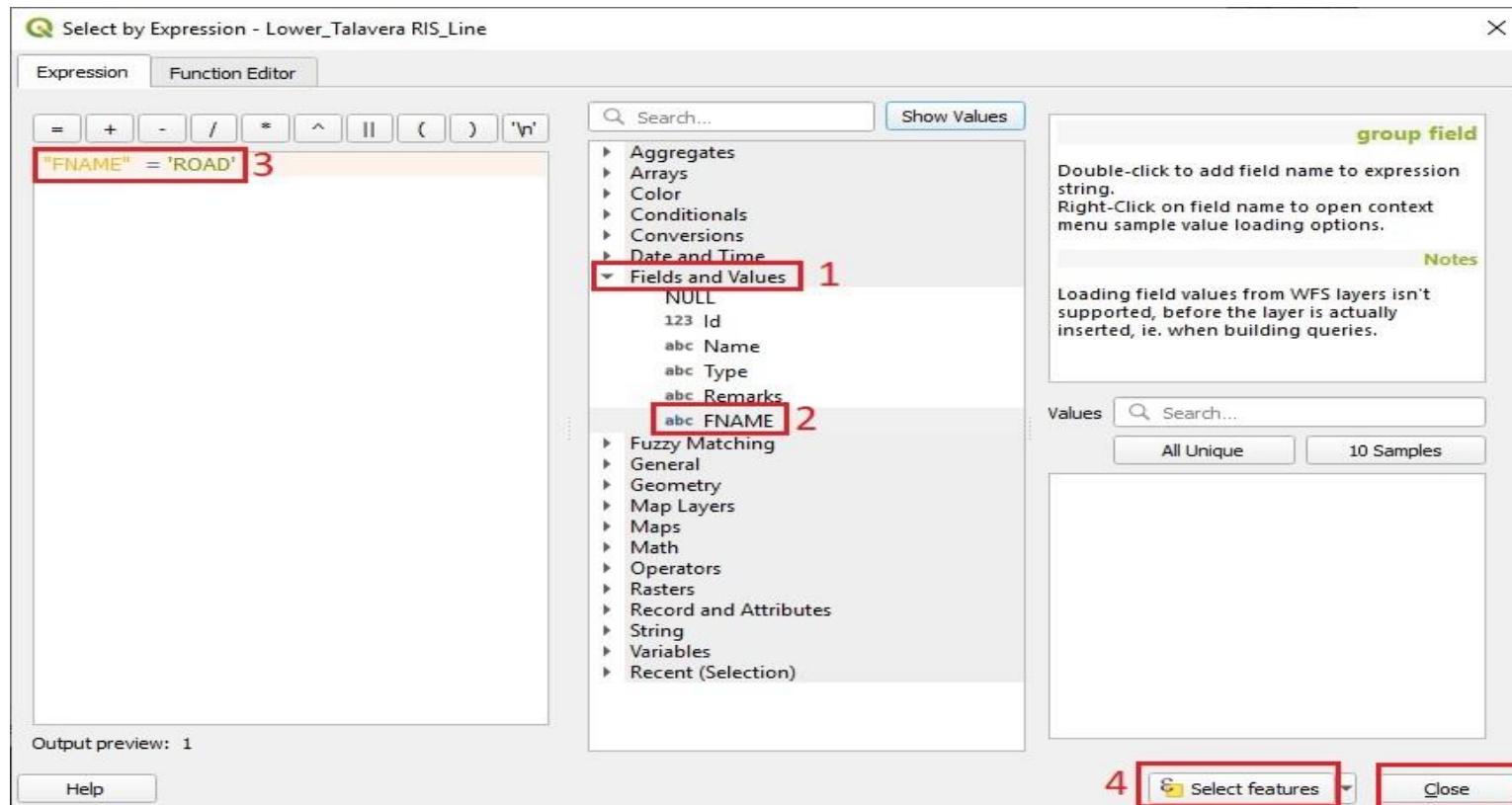
Extraction (Line - Road)

- Table window will now pop-up. Click the button “Select features using an expression” .



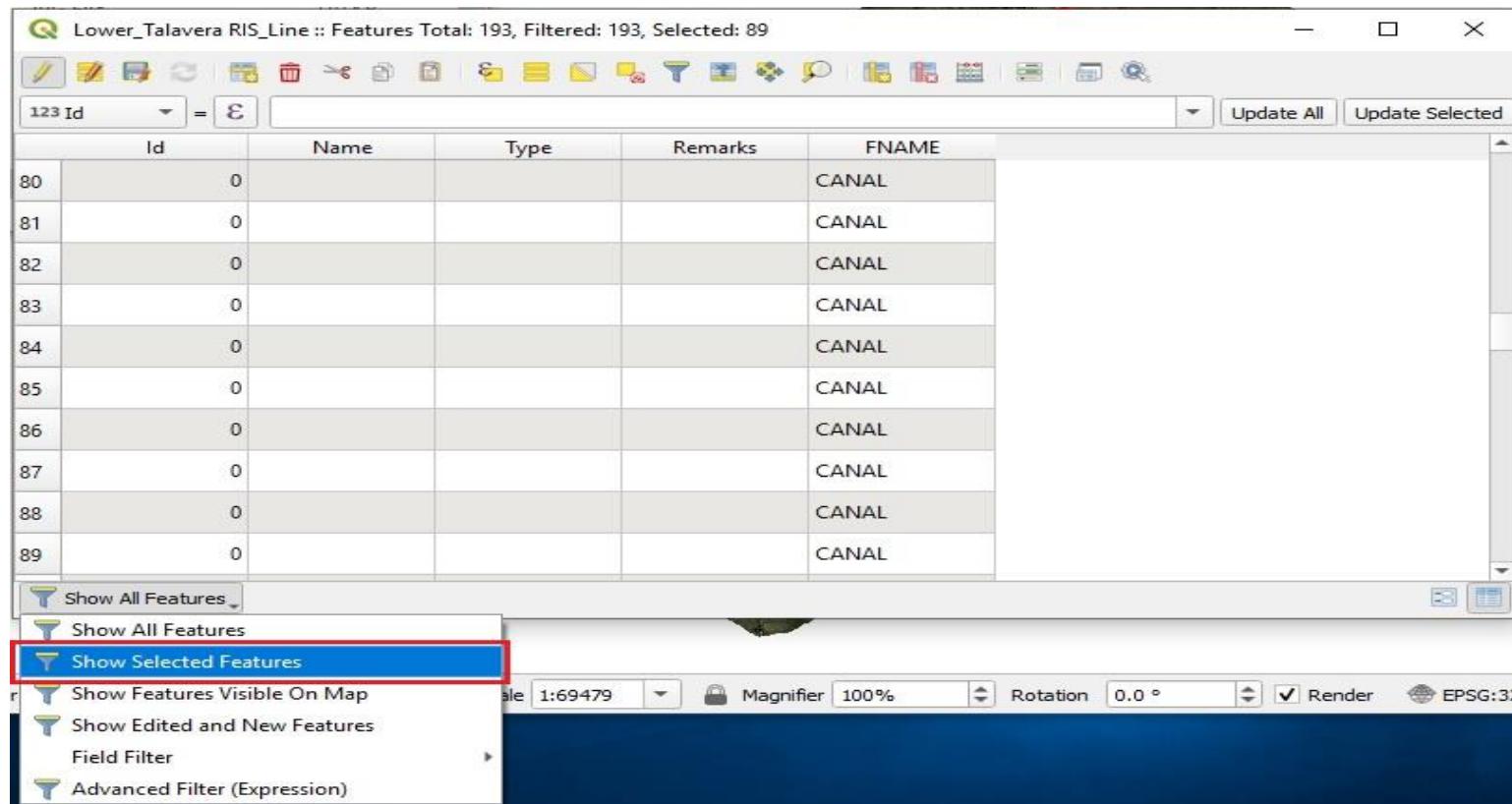
Extraction (Line - Road)

- Double click the dropdown “Fields and Values” and select “FNAME”. Output will be shown “FNAME = 'ROAD'” in the expression text field. Then click the button “Select features”. Then click “Close”



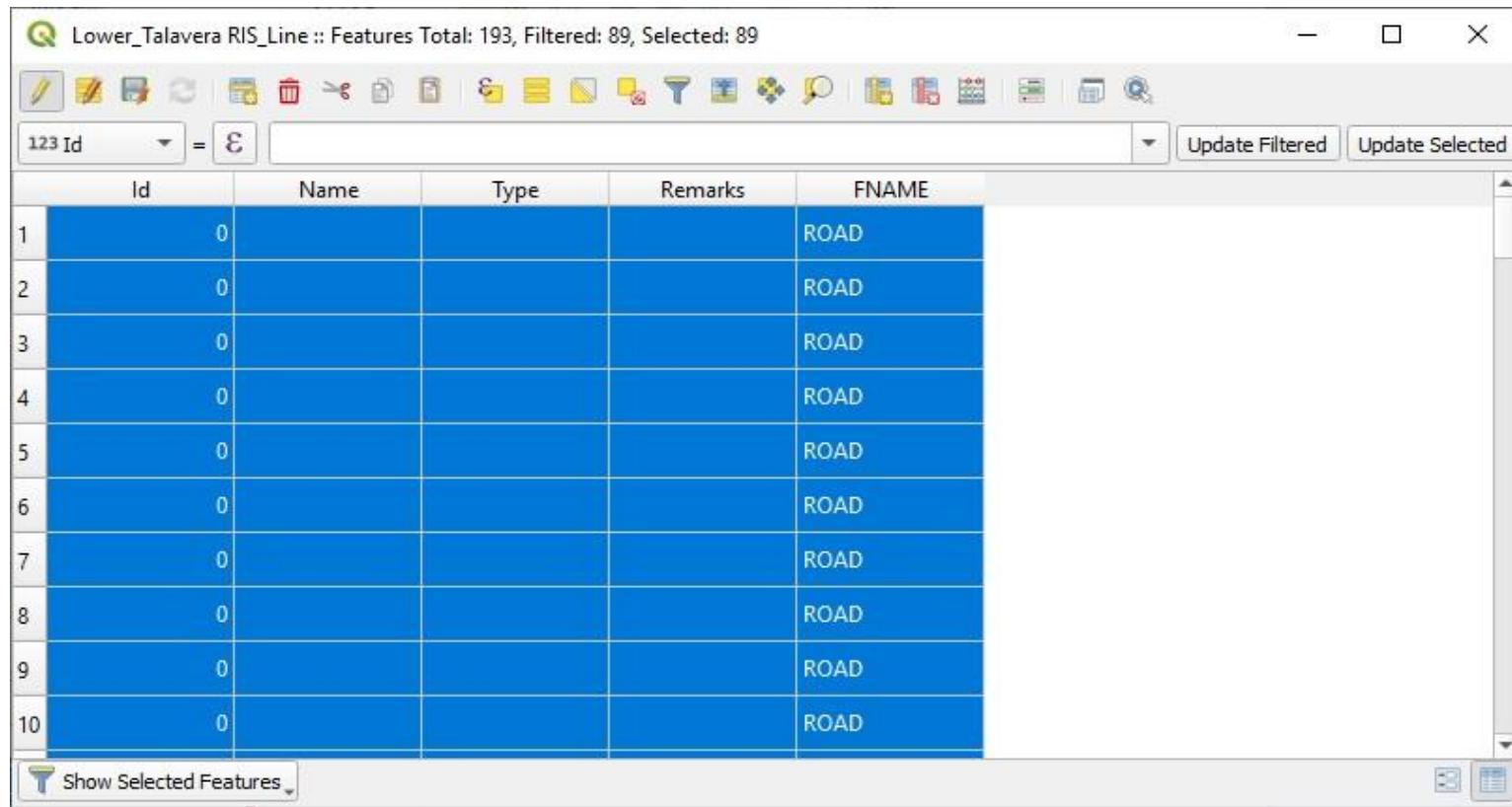
Extraction (Line - Road)

- From the attribute table click and select “Show Selected Features”.



Extraction (Line - Road)

- Selected features for Road will now highlighted.

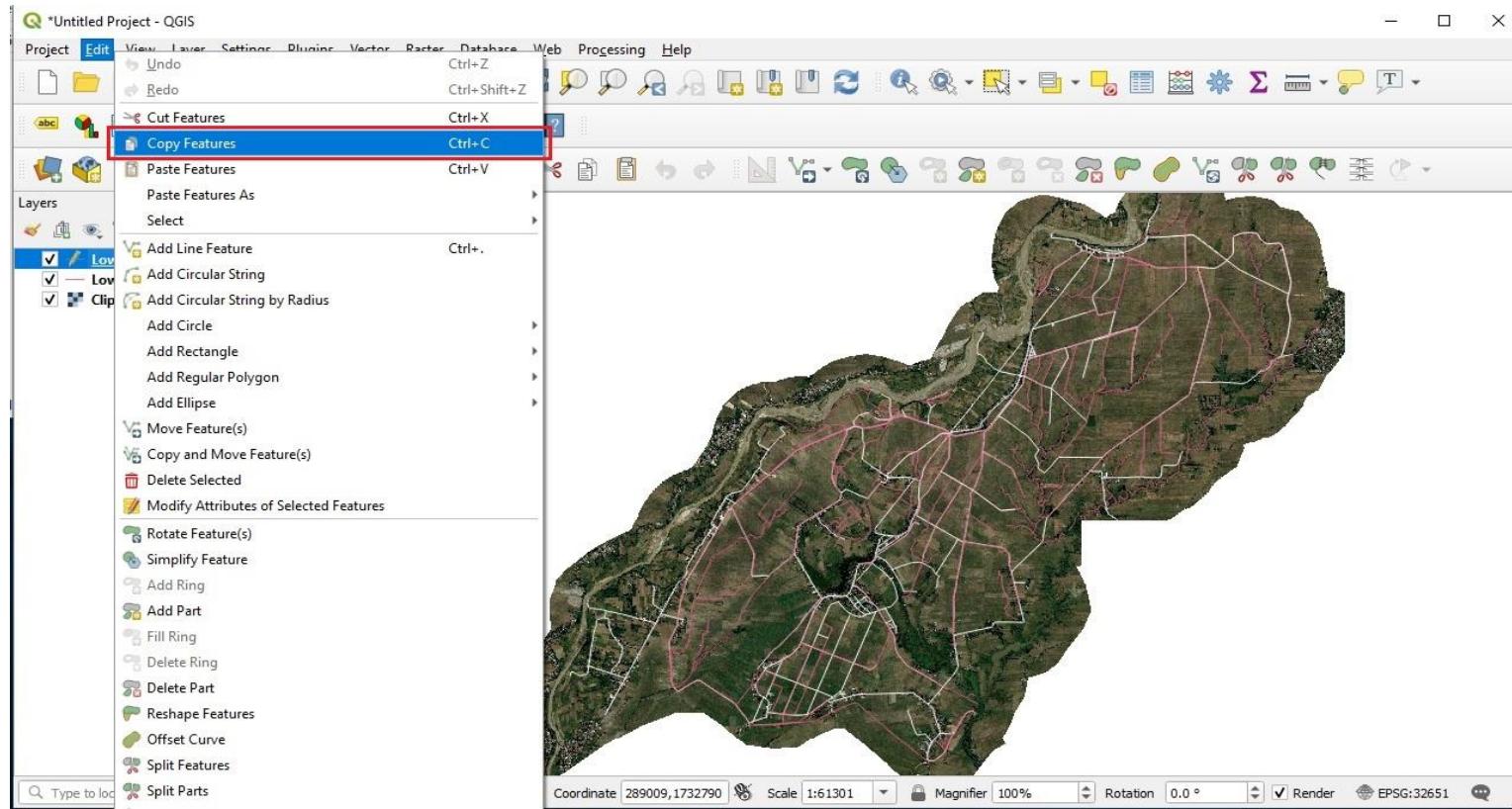


The screenshot shows a software interface for managing geographic features. The title bar reads "Lower_Talavera RIS_Line :: Features Total: 193, Filtered: 89, Selected: 89". The toolbar contains various icons for editing, filtering, and querying data. Below the toolbar is a search bar with fields for "Id" and "Name", and buttons for "Update Filtered" and "Update Selected". The main area is a table with columns: Id, Name, Type, Remarks, and FNAME. The rows show 10 selected features, all of which have an "FNAME" of "ROAD". A button at the bottom left says "Show Selected Features".

Id	Name	Type	Remarks	FNAME
1	0			ROAD
2	0			ROAD
3	0			ROAD
4	0			ROAD
5	0			ROAD
6	0			ROAD
7	0			ROAD
8	0			ROAD
9	0			ROAD
10	0			ROAD

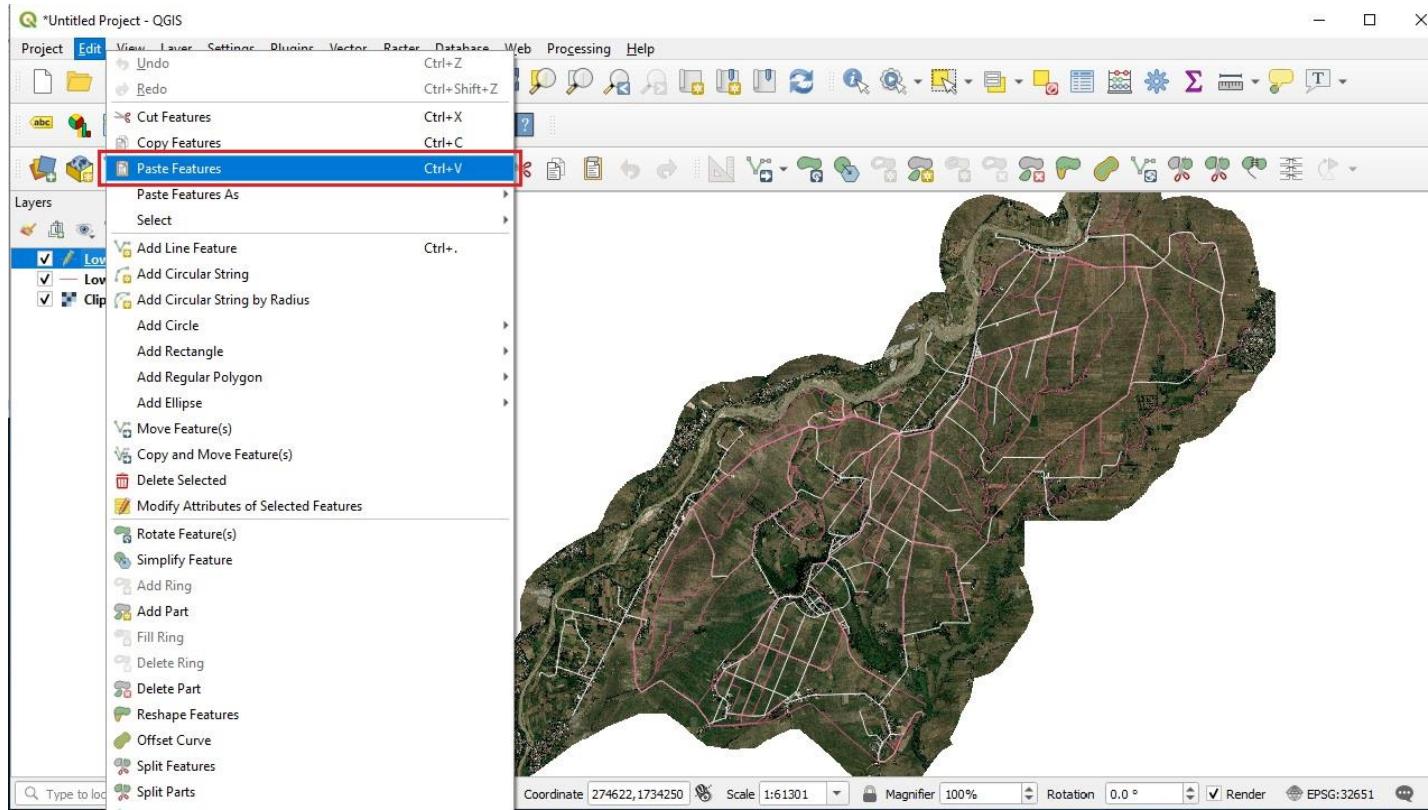
Extraction (Line - Road)

- From the main window of QGIS, select the “Edit” menu bar and click “Copy Features”



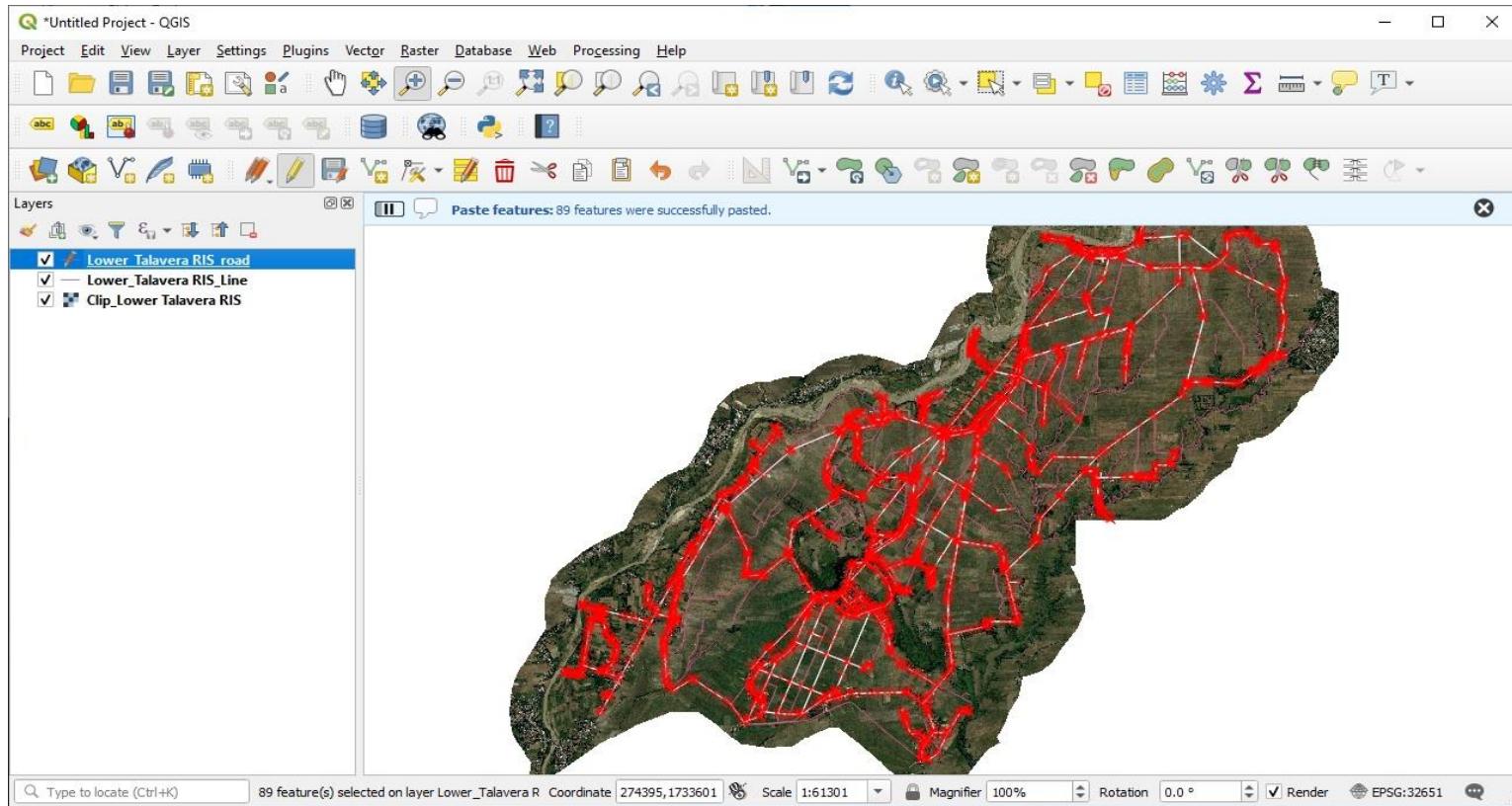
Extraction (Line - Road)

- From the main window of QGIS, select the “Edit” menu bar and click “Paste Features”



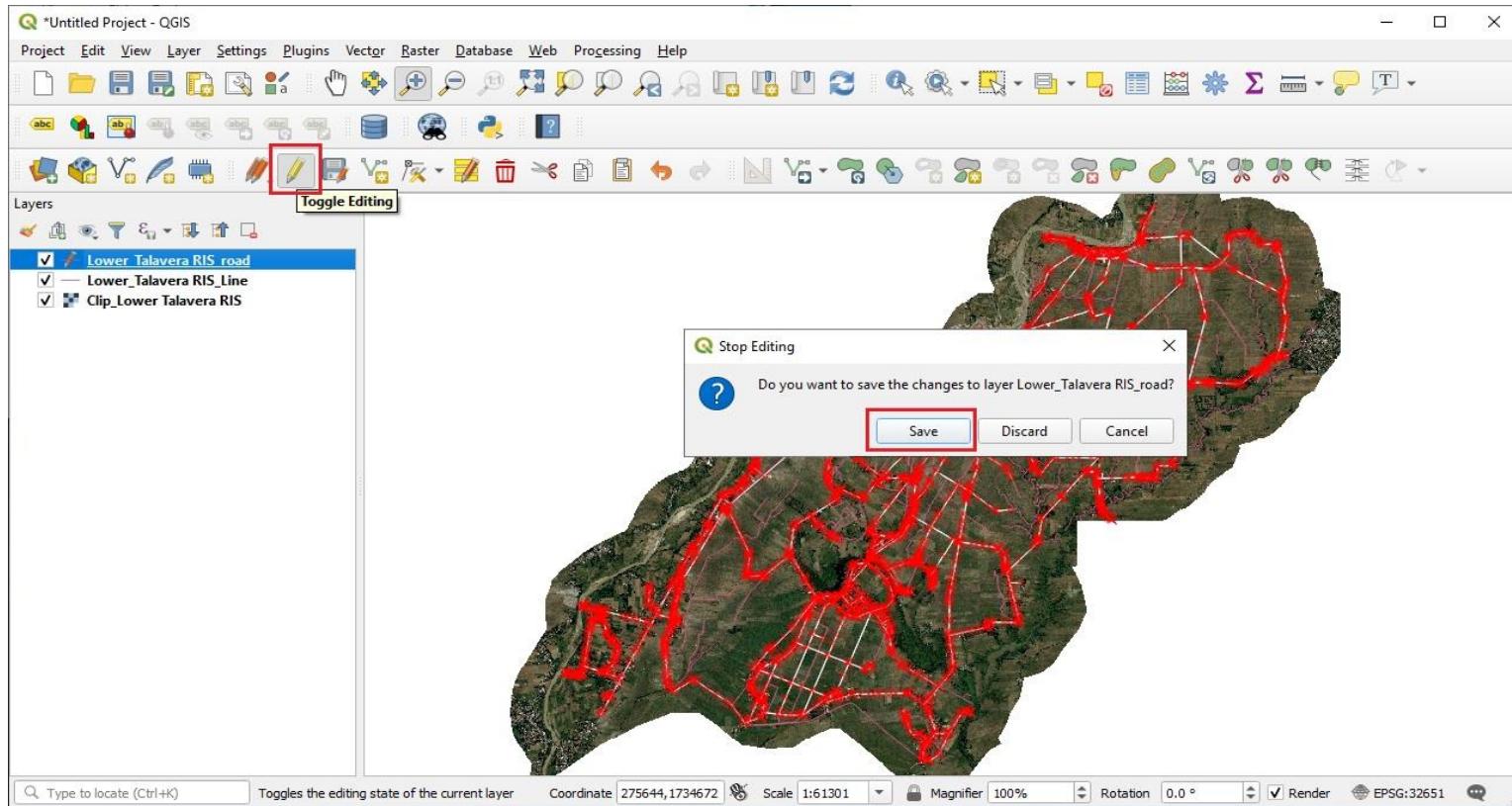
Extraction (Line - Road)

- Road features are now already transferred to the Road template. Then save it.



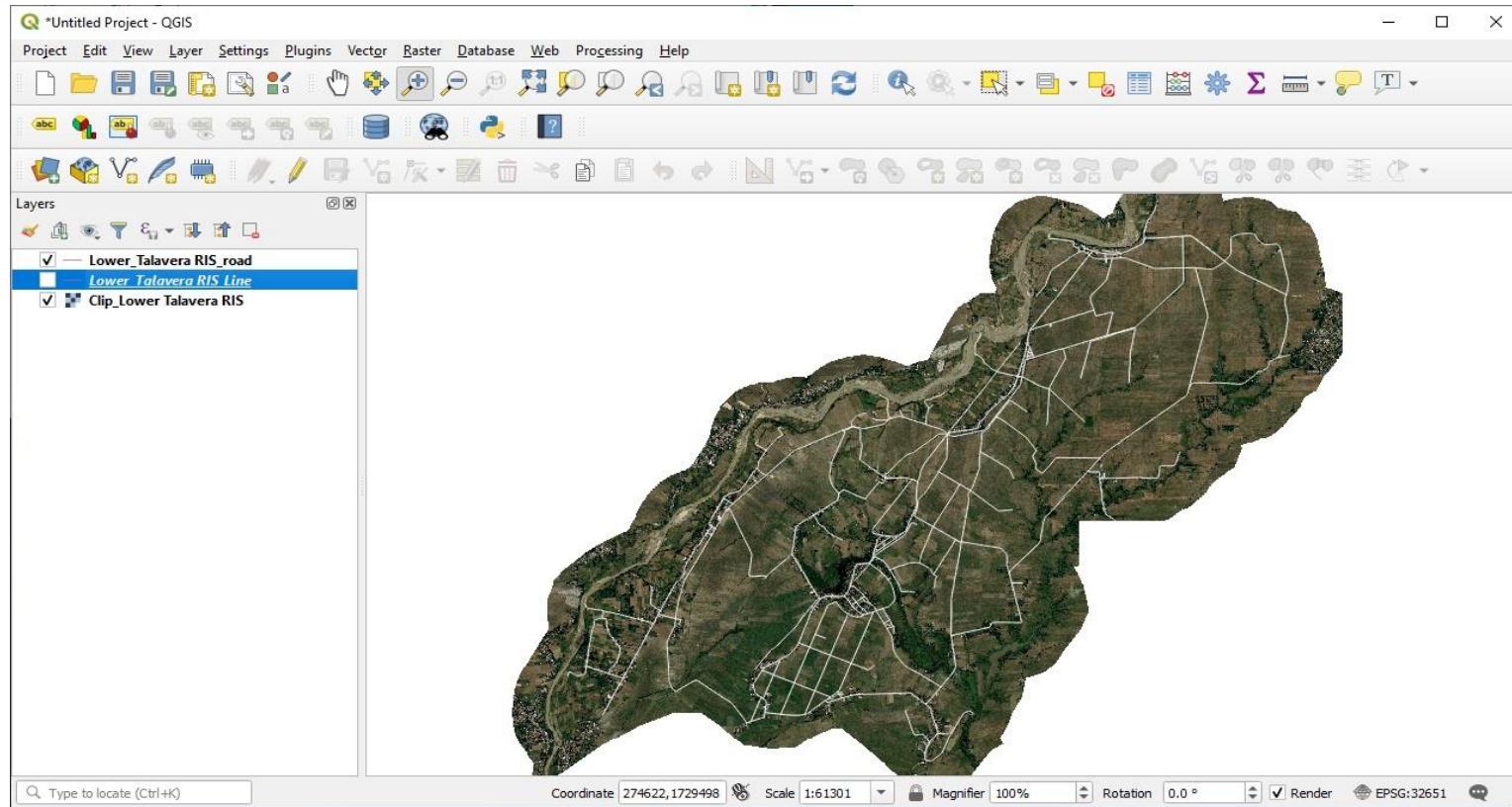
Extraction (Line - Road)

- Click the “**Toogle Editing**” to stop edit. A new window will pop-up and Click “**Save**”.



Extraction (Line - Road)

- This will be now the output data for the Road feature.



Extraction

- Line (Road) - For this approach, same procedure will apply just like the Road. Just load again the shapefile (Line), but template layer of “canal” will be used. For the expression, just change “FNAME” = 'ROAD' to “ “FNAME” = 'CANAL'.
-
- Polygon (Parcellary) - For this approach, same procedure will apply just like the Canal. Just load again the shapefile (Polygon), but template layer of “parcellary_map” will be used. For the expression, just change “FNAME” = 'CANAL' to “ “FNAME” = 'PARCEL'.

Extraction

- Polygon (River) - For this approach, same procedure will apply just like the **PARCEL**. Just load again the shapefile (Polygon), but template layer of “**river**” will be used. For the expression, just change “**FNAME**” = ‘**PARCEL**’ to “ “**FNAME**” = ‘**RIVER**’.
- Polygon (Residential) - For this approach, same procedure will apply just like the **River**. Just load again the shapefile (Polygon), but template layer of “**residential**” will be used. For the expression, just change “**FNAME**” = ‘**RIVER**’ to “ “**FNAME**” = ‘**RESIDENTIAL**’.

2. Digitization

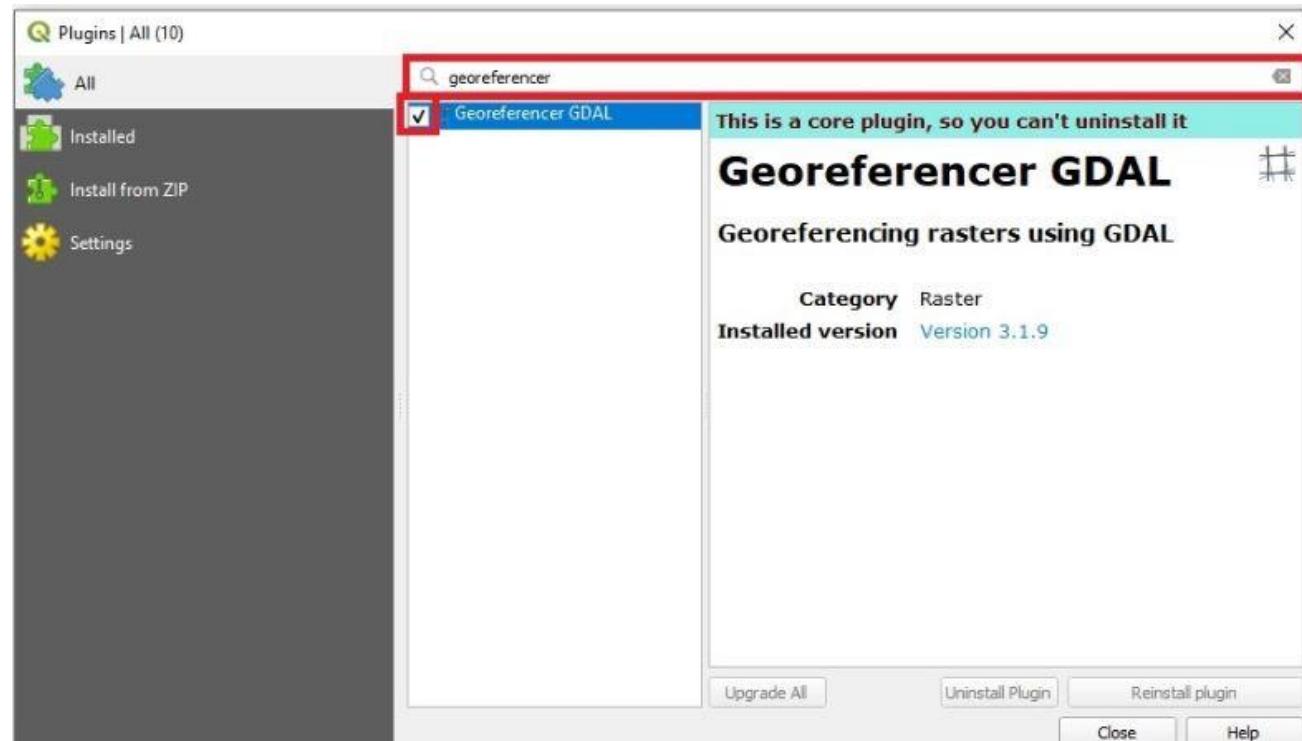
- an interactive process in which a map is created using previously digitized or scanned information. This technique may be used to trace features from a scanned map or image to create new layers or themes

2.1 Georeferencing

- Georeferencing - The process of associating a physical map or raster image of a map with spatial locations. The process of associating a physical map or raster image of a map with spatial locations.

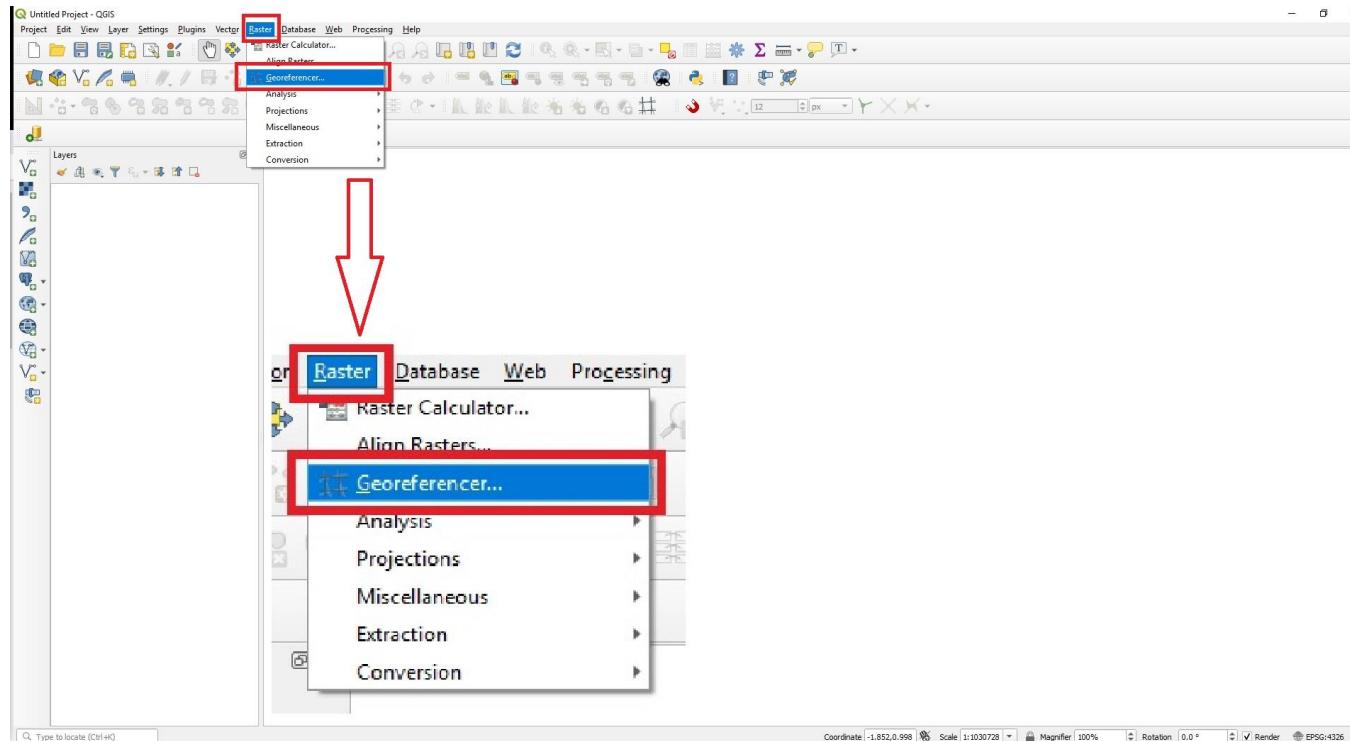
Georeferencing Process

- In Pop-up window search the word “Georeferencer” and “Check” the box then “Close”.



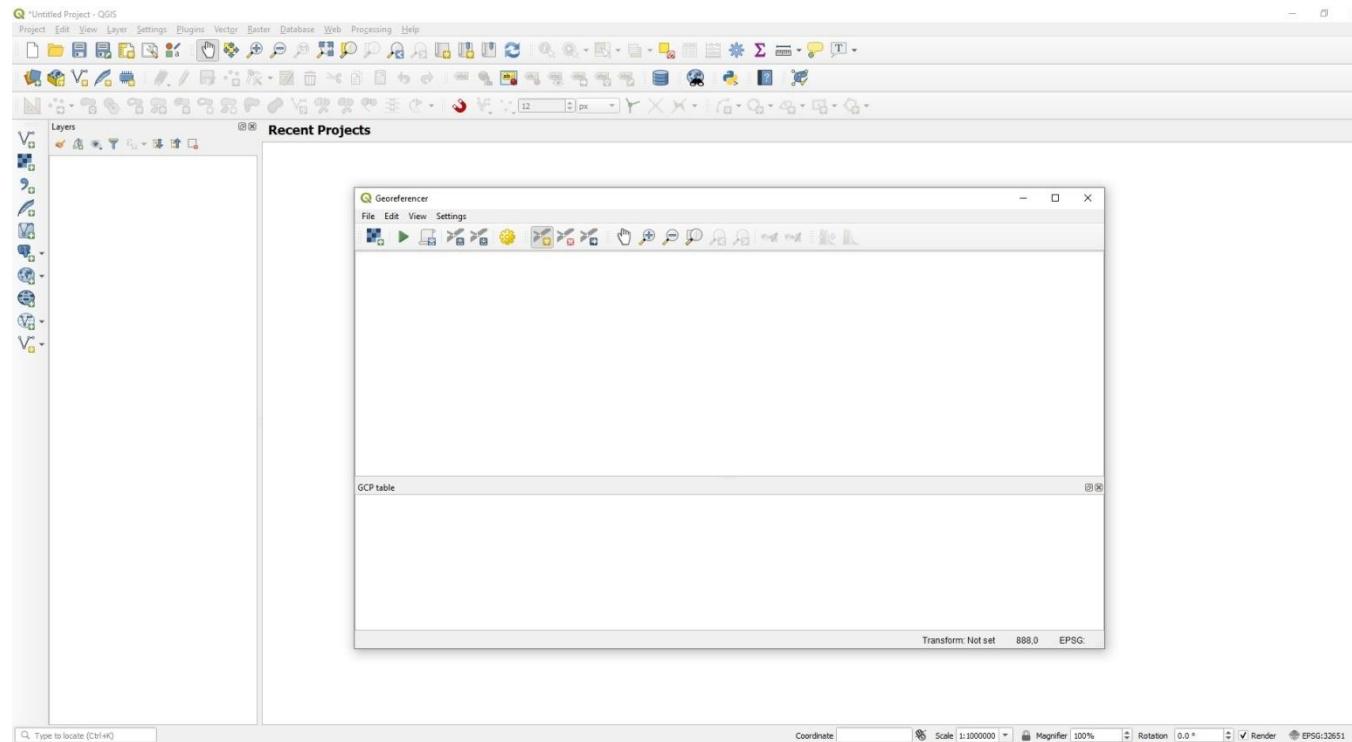
Georeferencing Process

- In QGIS Interface need to click “Raster Tool Bar” and select “Georeferencer”.



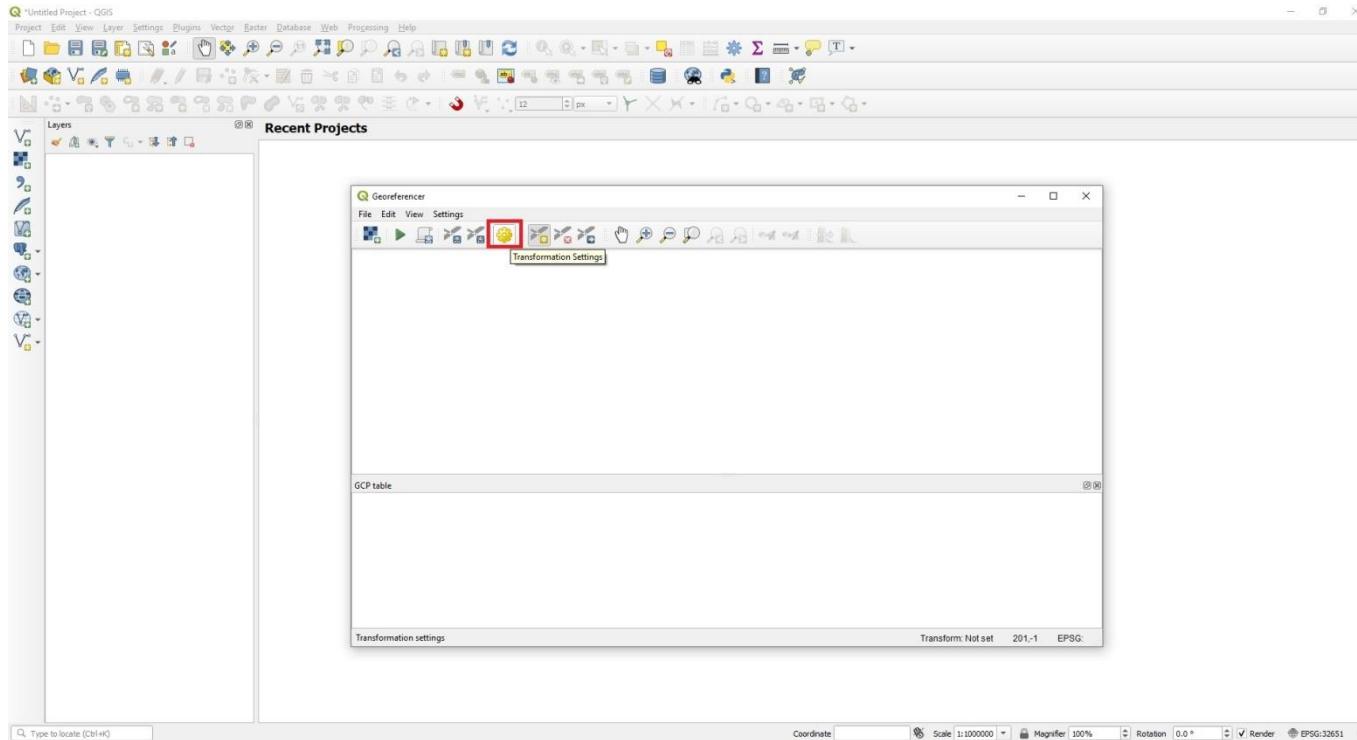
Georeferencing Process

- Pop-up window for “Georeferencer”



Georeferencing Process

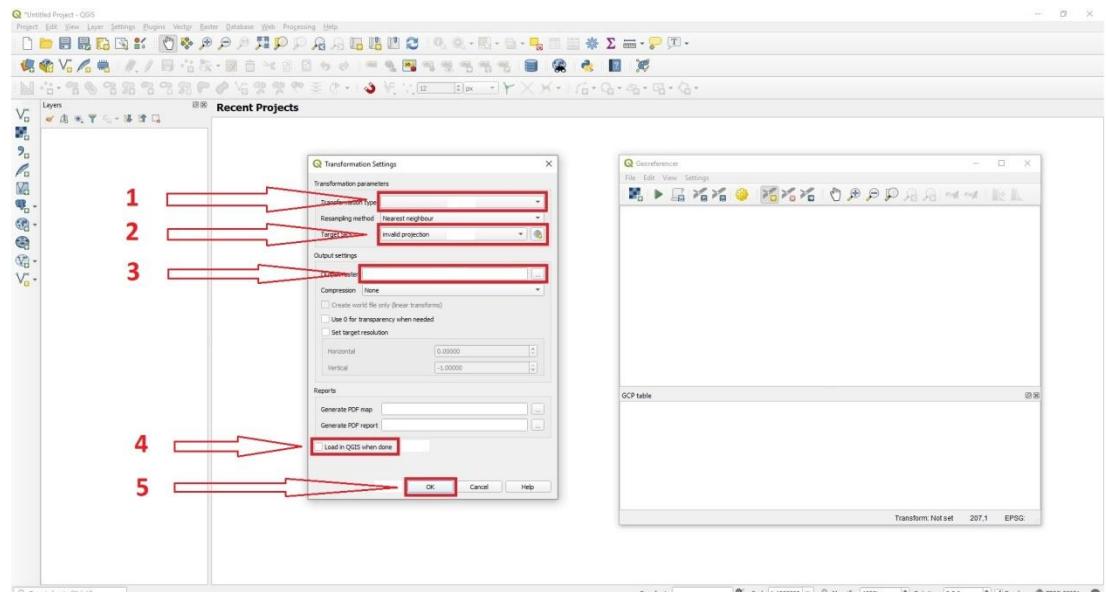
- In Pop-up window click “Transformation Settings“.



Georeferencing Process

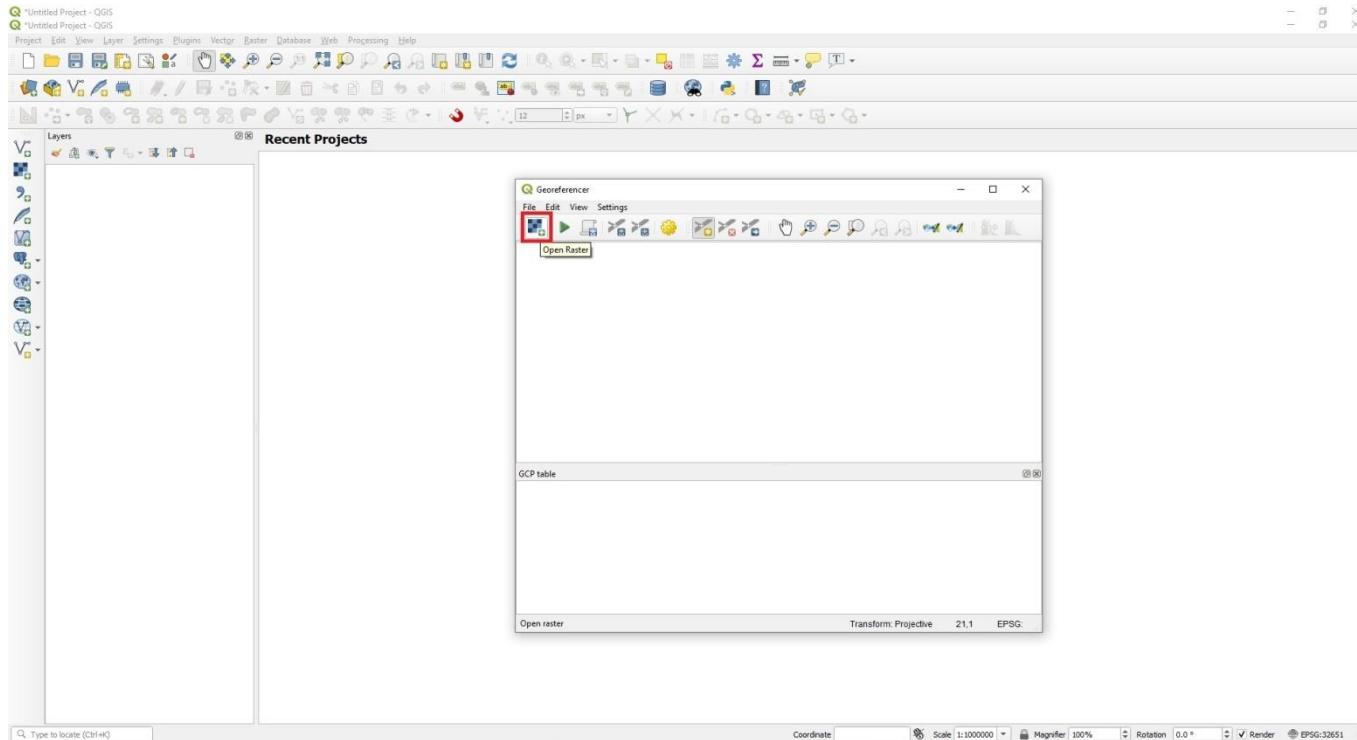
Transformation Settings

- 1) Click “Arrow Down“ Button and select “Projective“
- 2) Click the button “Select CRS“ and search the coordinates “WGS 84 / UTM zone 51N“
- 3) Set the “Output Raster Directory“ at the same time “Filename“. ex. Image.tif
- 4) Check the “Box“ for automatic loading in QGIS when done.
- 5) Then press “OK“ button



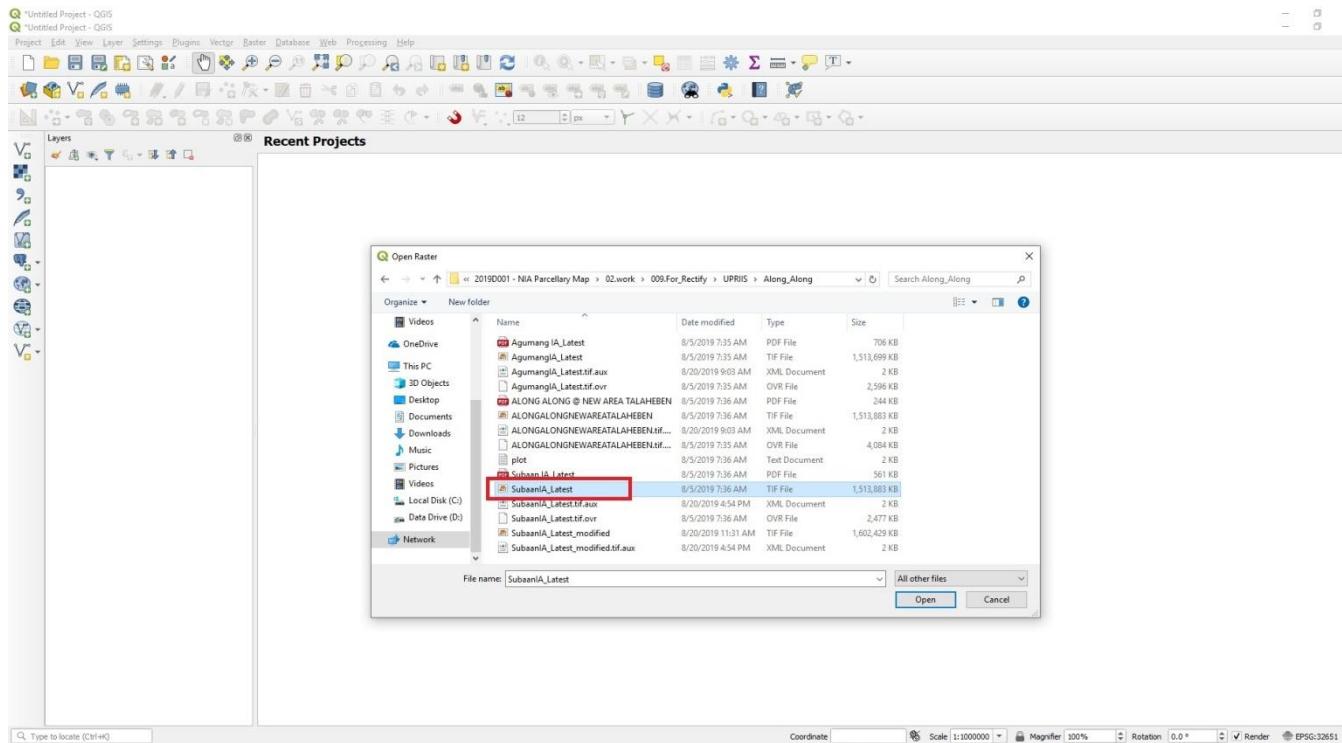
Georeferencing Process

- Loading of Raster, click the “Open Raster“ button.



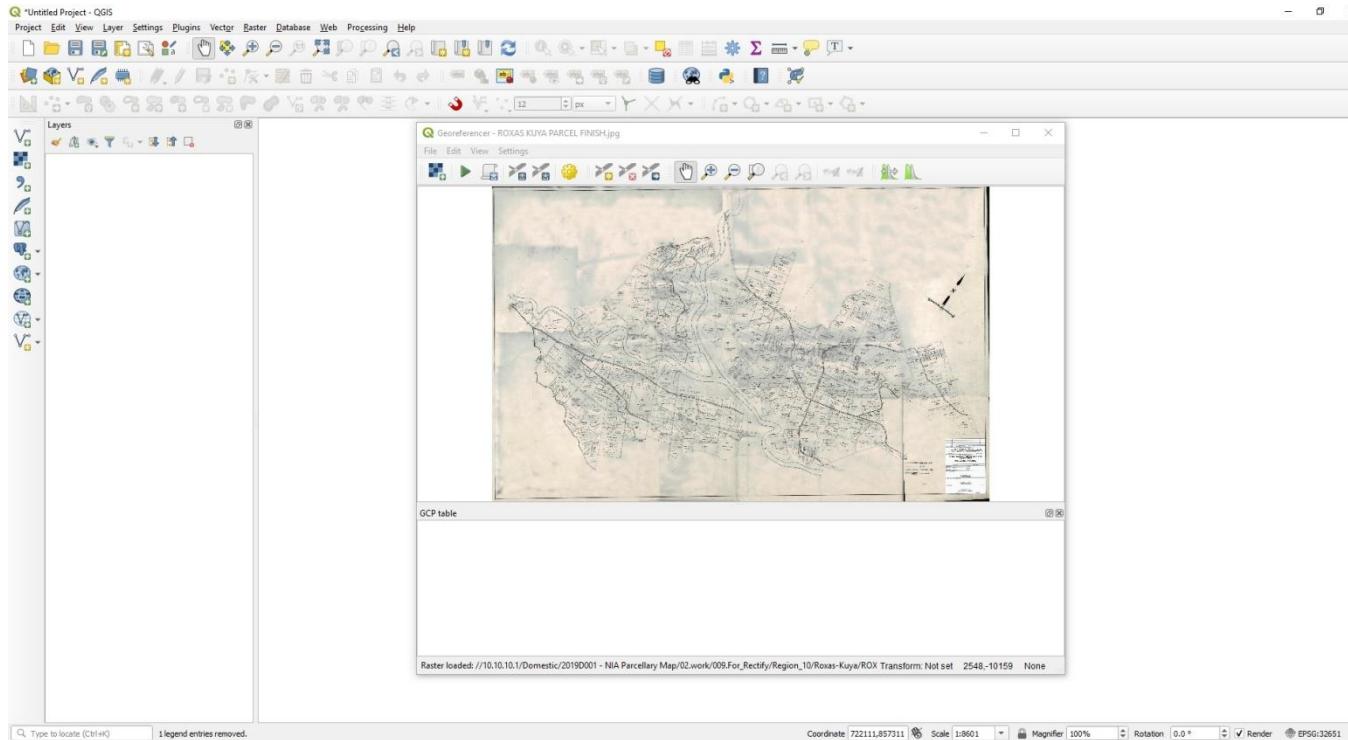
Georeferencing Process

- Find the location of the “Raster or Scanned Map” that will use in rectification process.



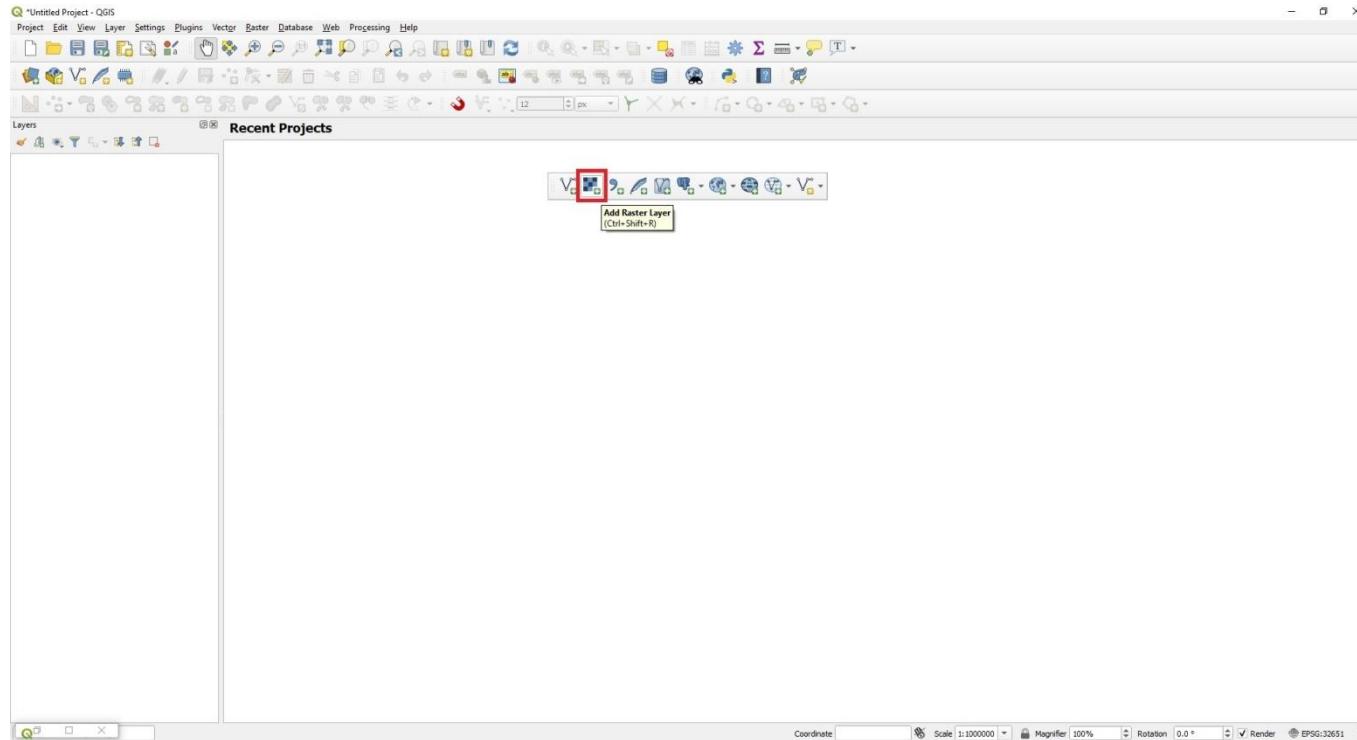
Georeferencing Process

- “Raster or Scanned Map“ automatically load in “Pop-up window“



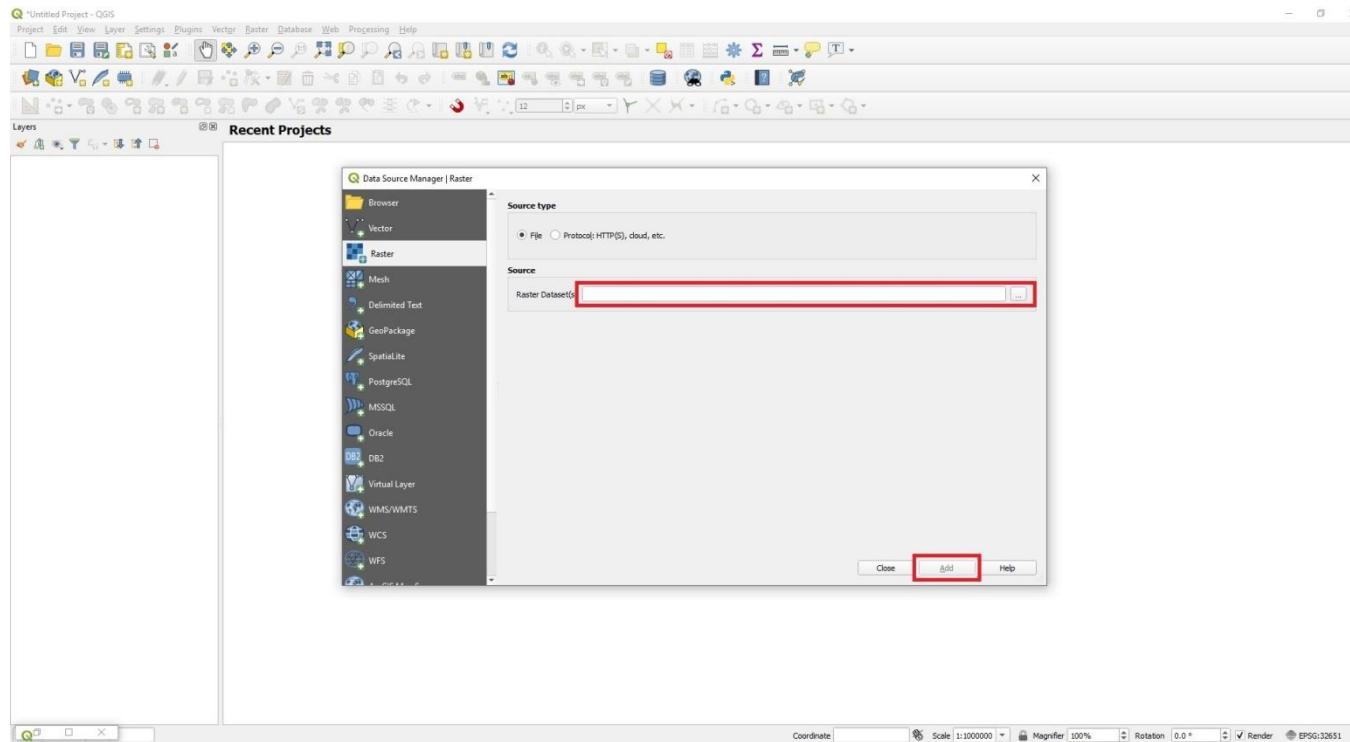
Georeferencing Process

- Loading of reference Raster Image in QGIS, just click the “Add Raster Layer” button.



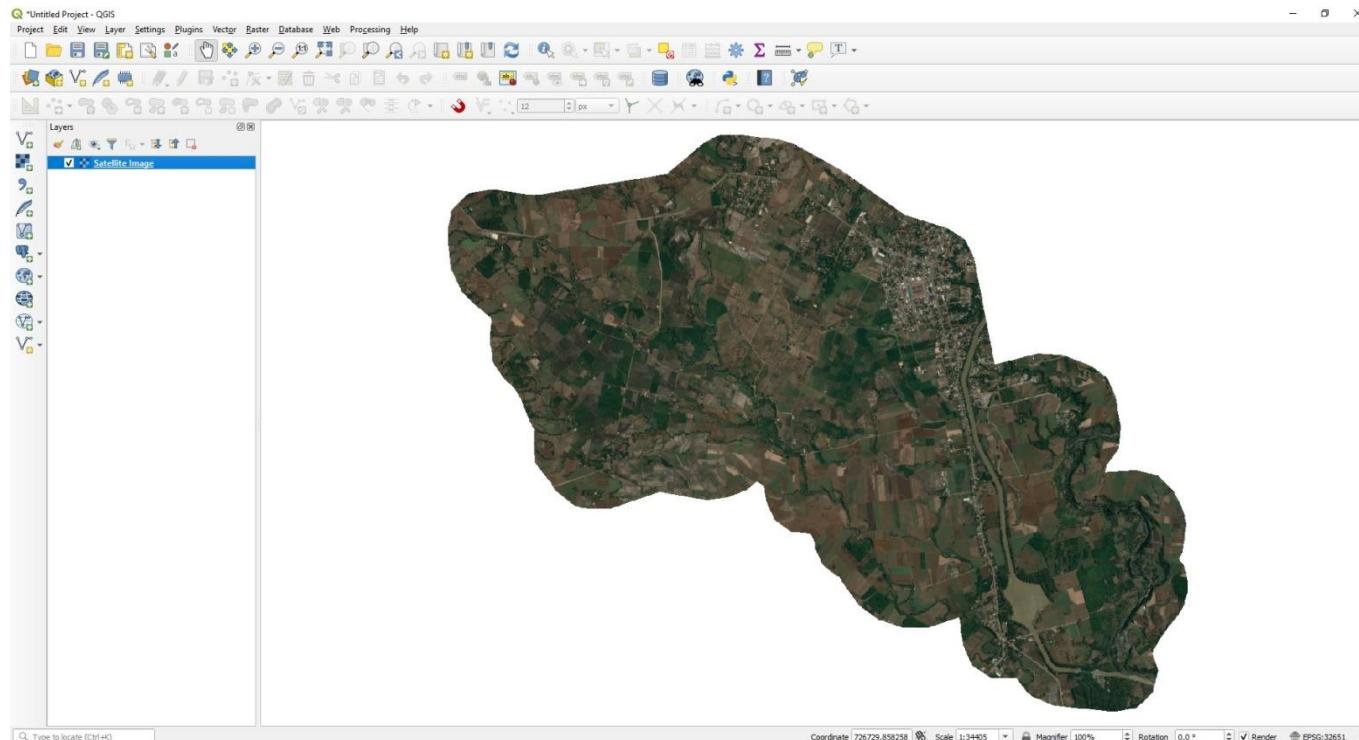
Georeferencing Process

- Find the location of the “**Satellite Image**“ that will use in rectification process as reference and click “**Add**“ to load the Image in QGIS.



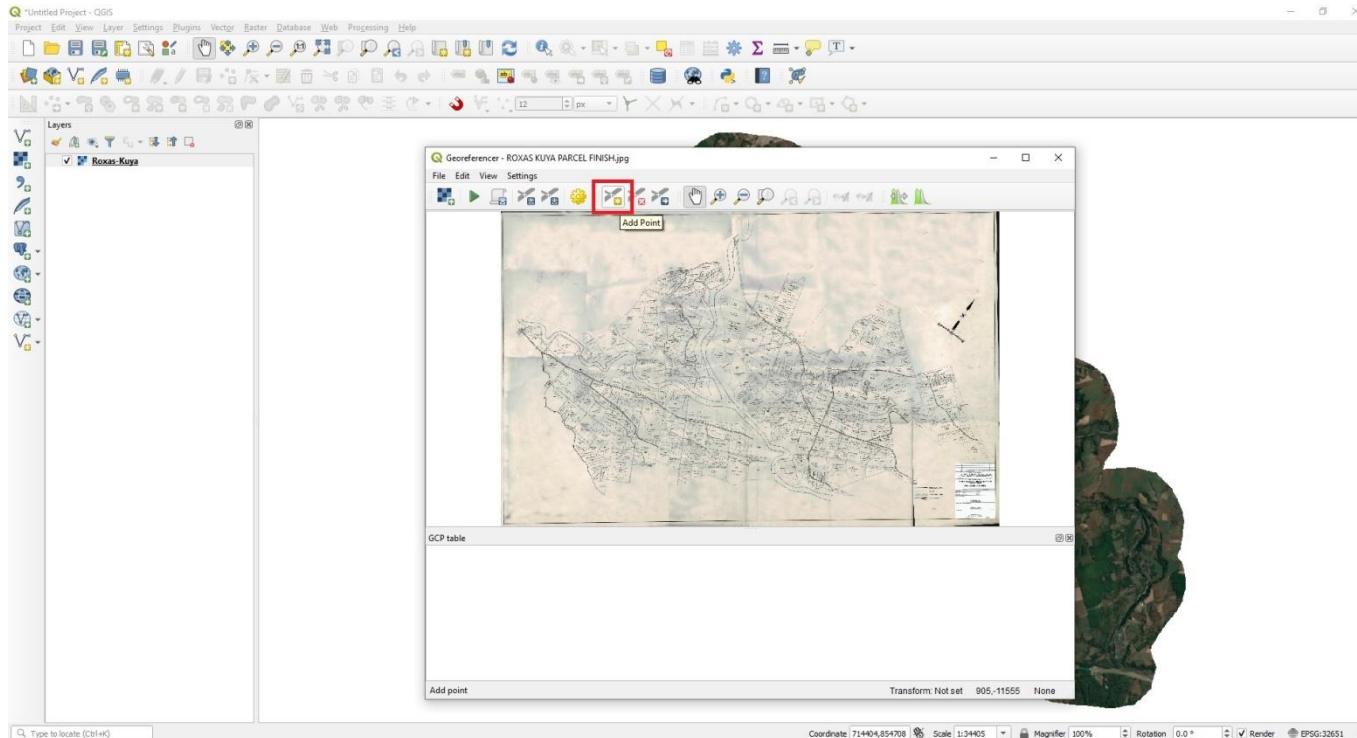
Georeferencing Process

- Satellite Image loaded in QGIS.



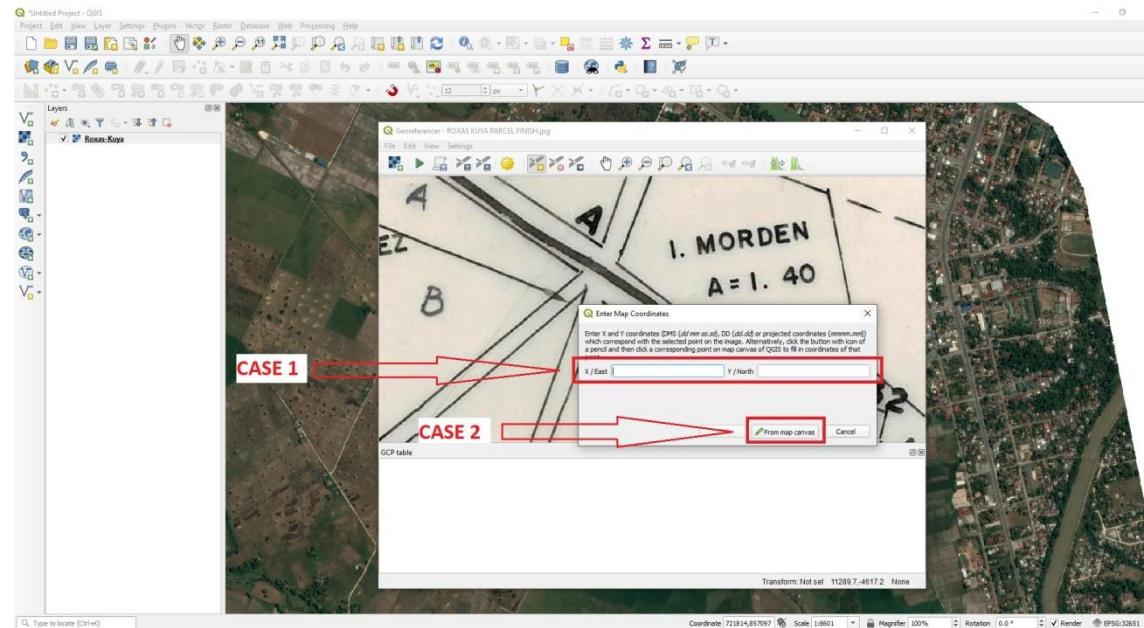
Georeferencing Process

- After loading the references, lets start the rectification. First, click “Add Point“ button to put X and Y coordinates.



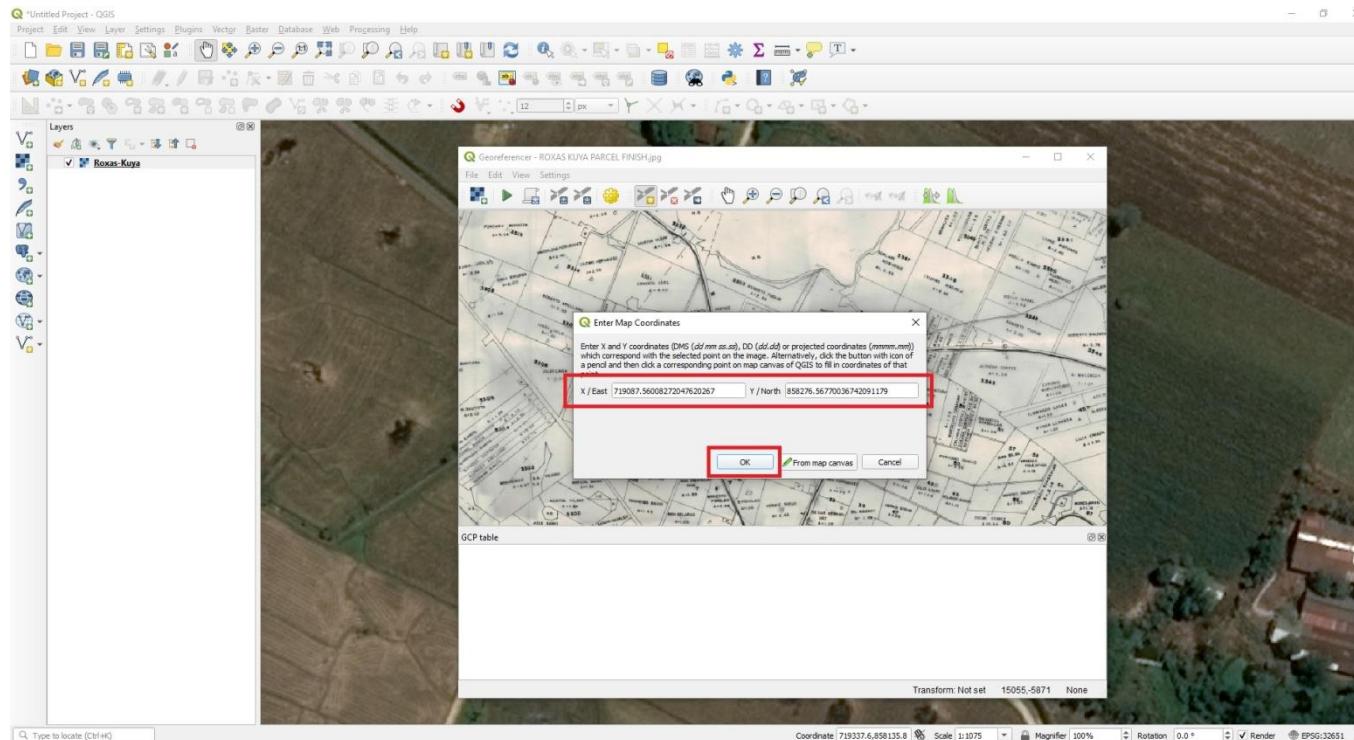
Georeferencing Process

- In popup window there are two (2) cases in “Enter Map Coordinates”.
- Case 1: If have existing X and Y coordinates that will use.
- Case 2: Need to get X and Y coordinates thru **Satellite Image** just click “from map canvas”



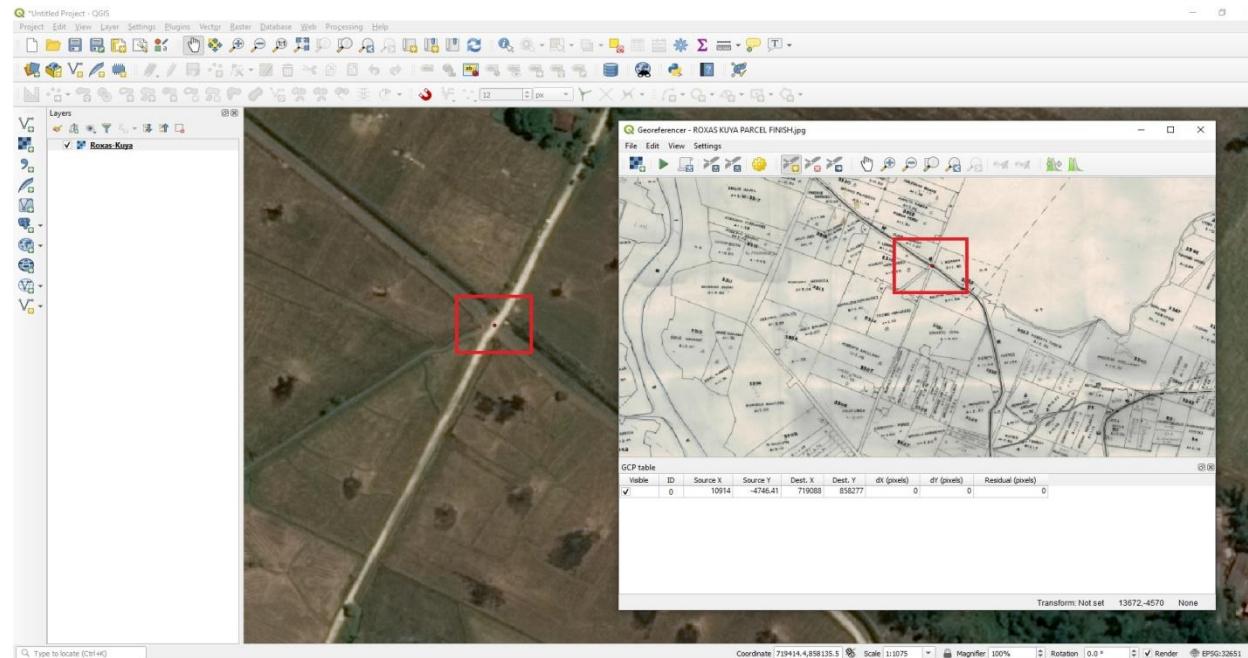
Georeferencing Process

- Basically, the one used to get X and Y coordinates is **Case 2**.
- Click “**from map canvas**“ button and get reference Point in Satellite Image and press “**OK**”



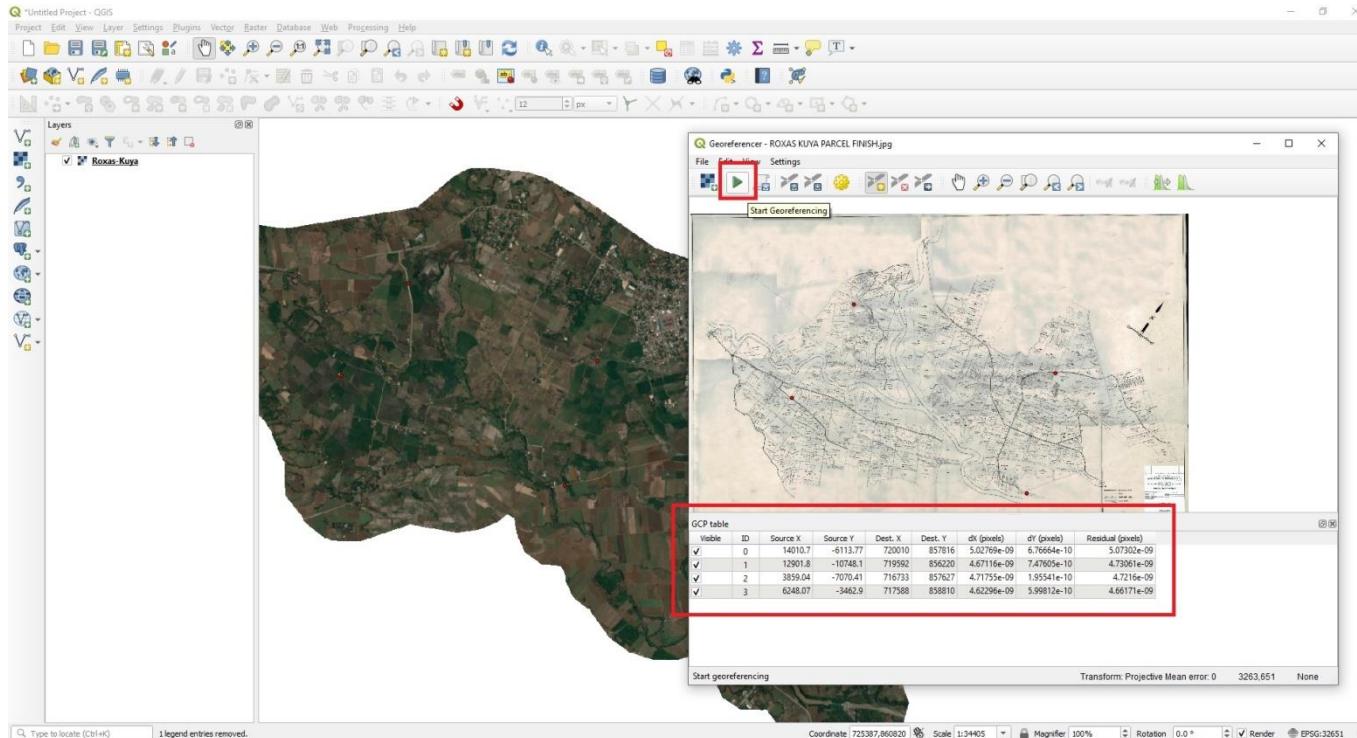
Georeferencing Process

- Output of “from map canvas“ button.
- Rule: Need to make four (4) points before running the “Start Georeferencing“ button.



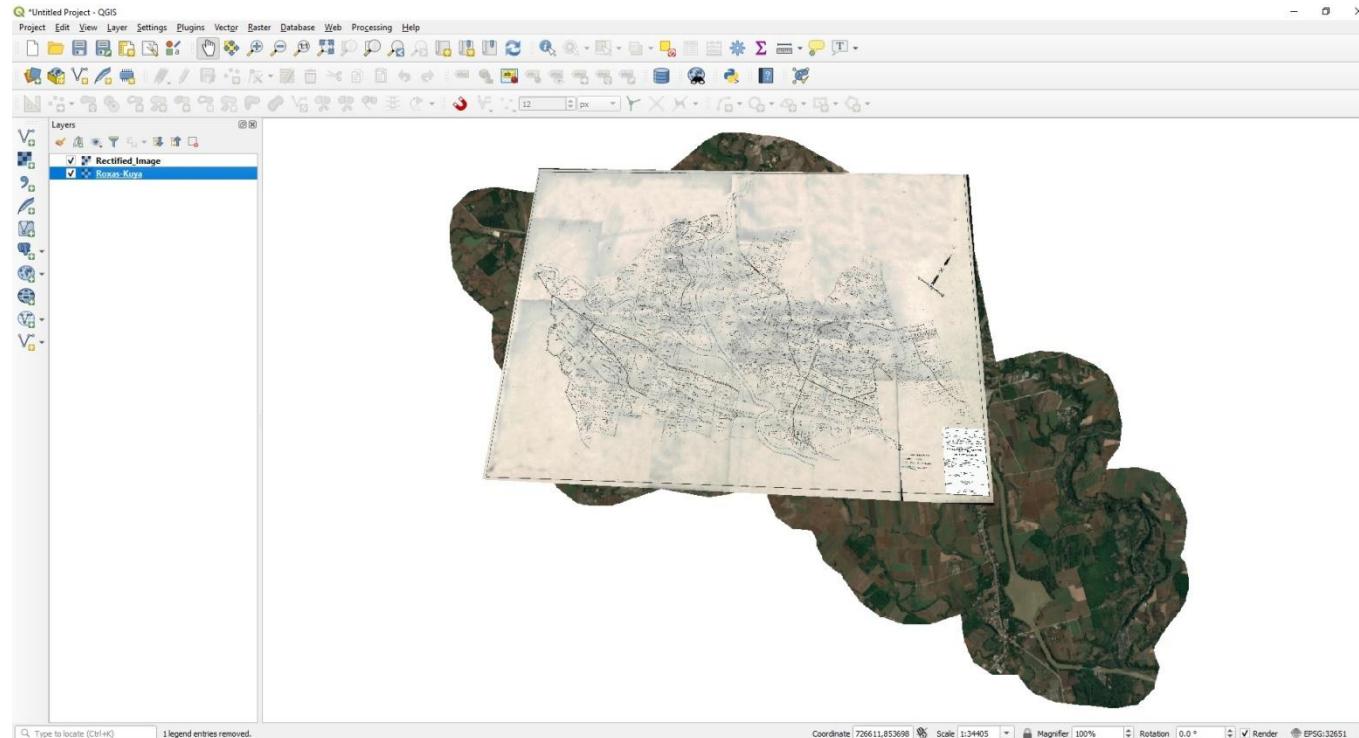
Georeferencing Process

- Have now four (4) coordinates points came from **Satellite Image** and now click “Start Georeferencing“ button.



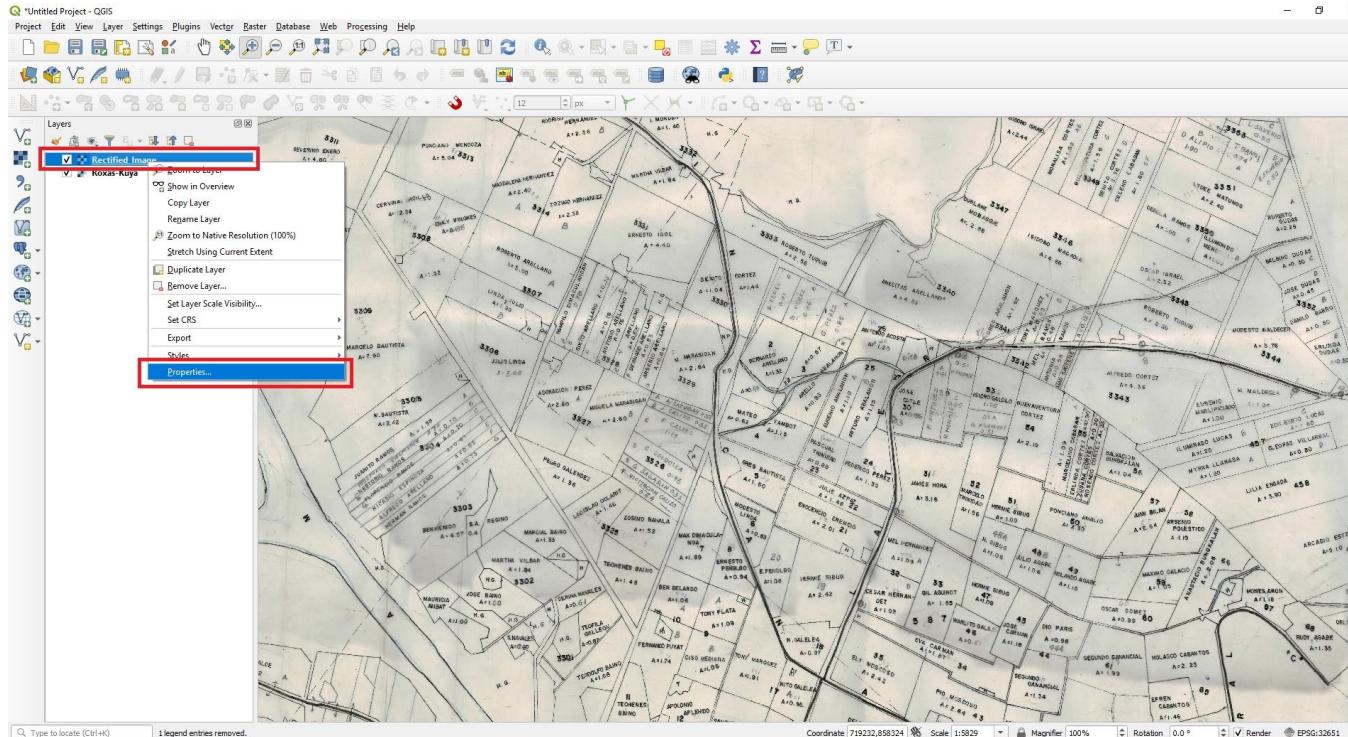
Georeferencing Process

- Output of Georeferencing.



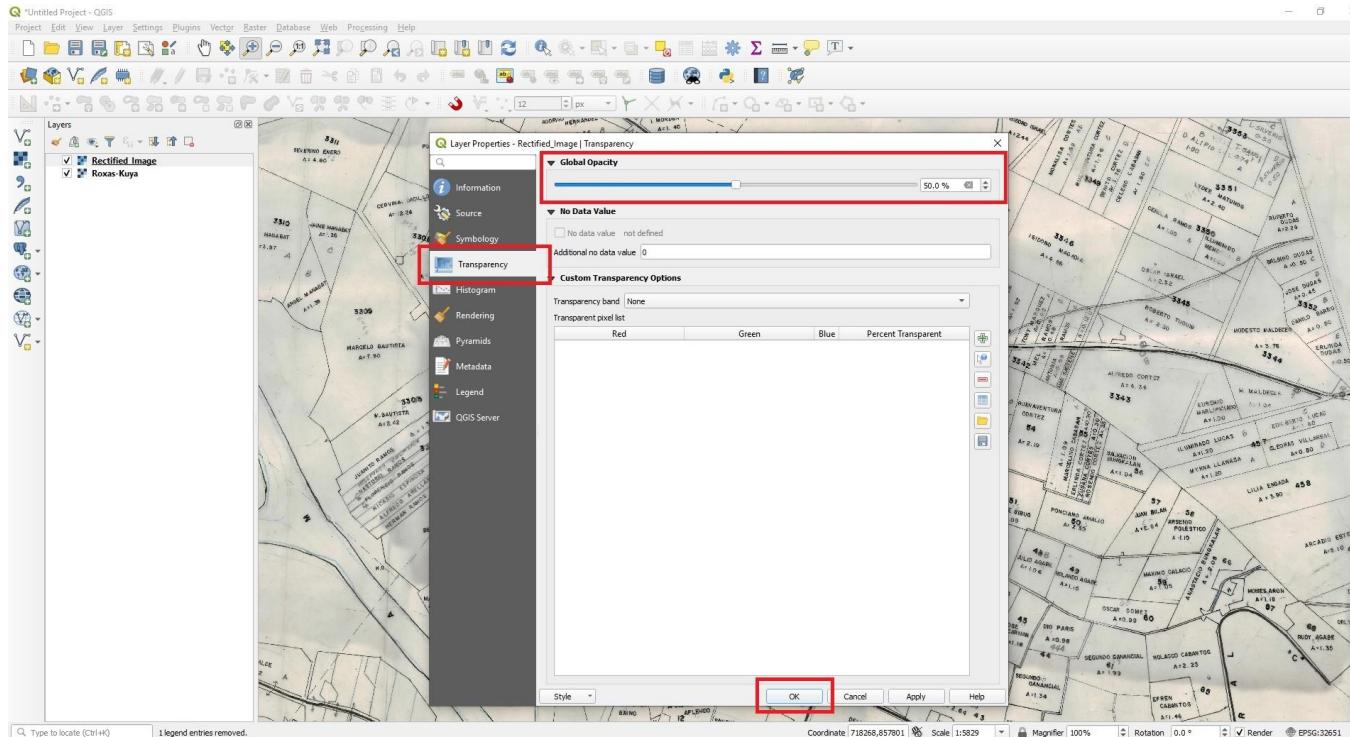
Georeferencing Process

- Transparency settings, right click the “Output Rectified Image” and
- select “Properties”



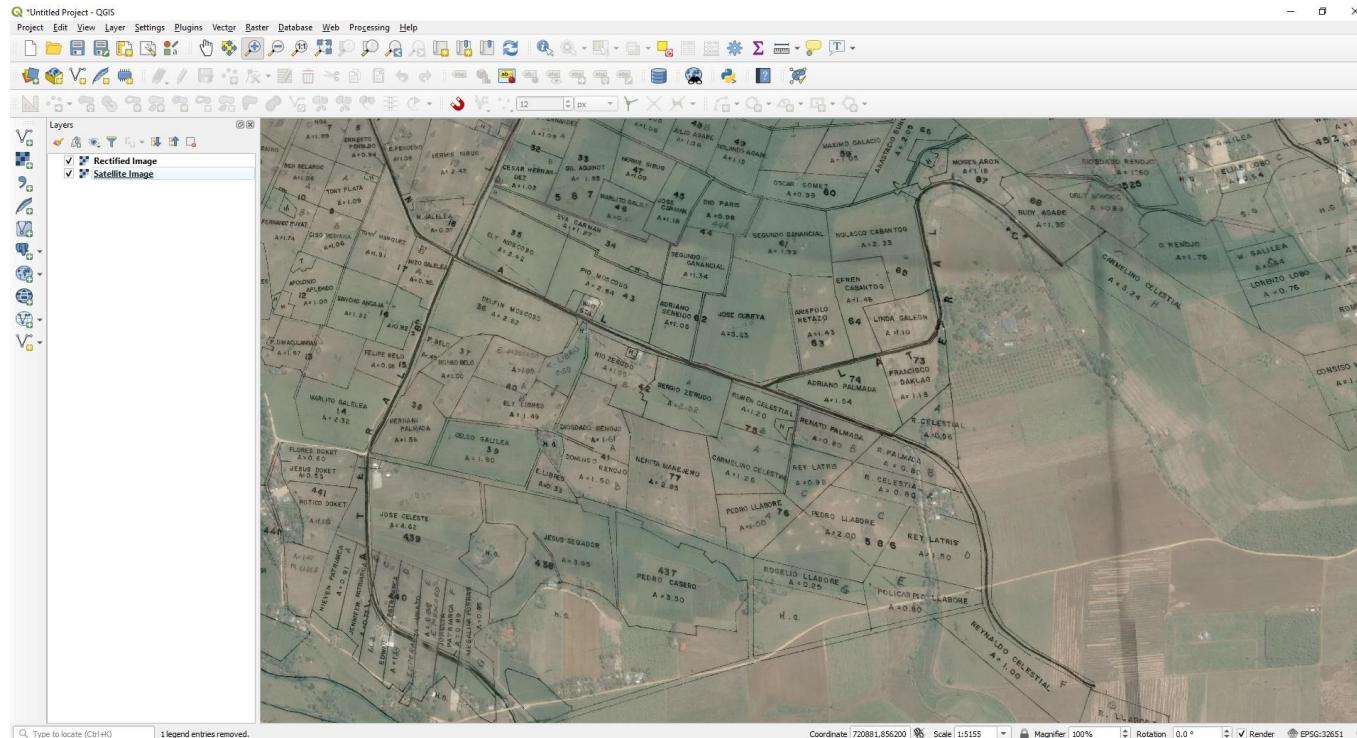
Georeferencing Process

- Pop-up window of Layer Properties select “Transparency” and set “Global Opacity” then click “OK”



Georeferencing Process

- Transparency output



Question?

2.2 Digitization

Is the process of converting geographic data either from a hard-copy or a scanned image into vector data by tracing the features. During the digitizing process, features from the traced map or image are captured as coordinates in either point, line, or polygon format.

2.2 Digitization

2.2.1 Projection Settings

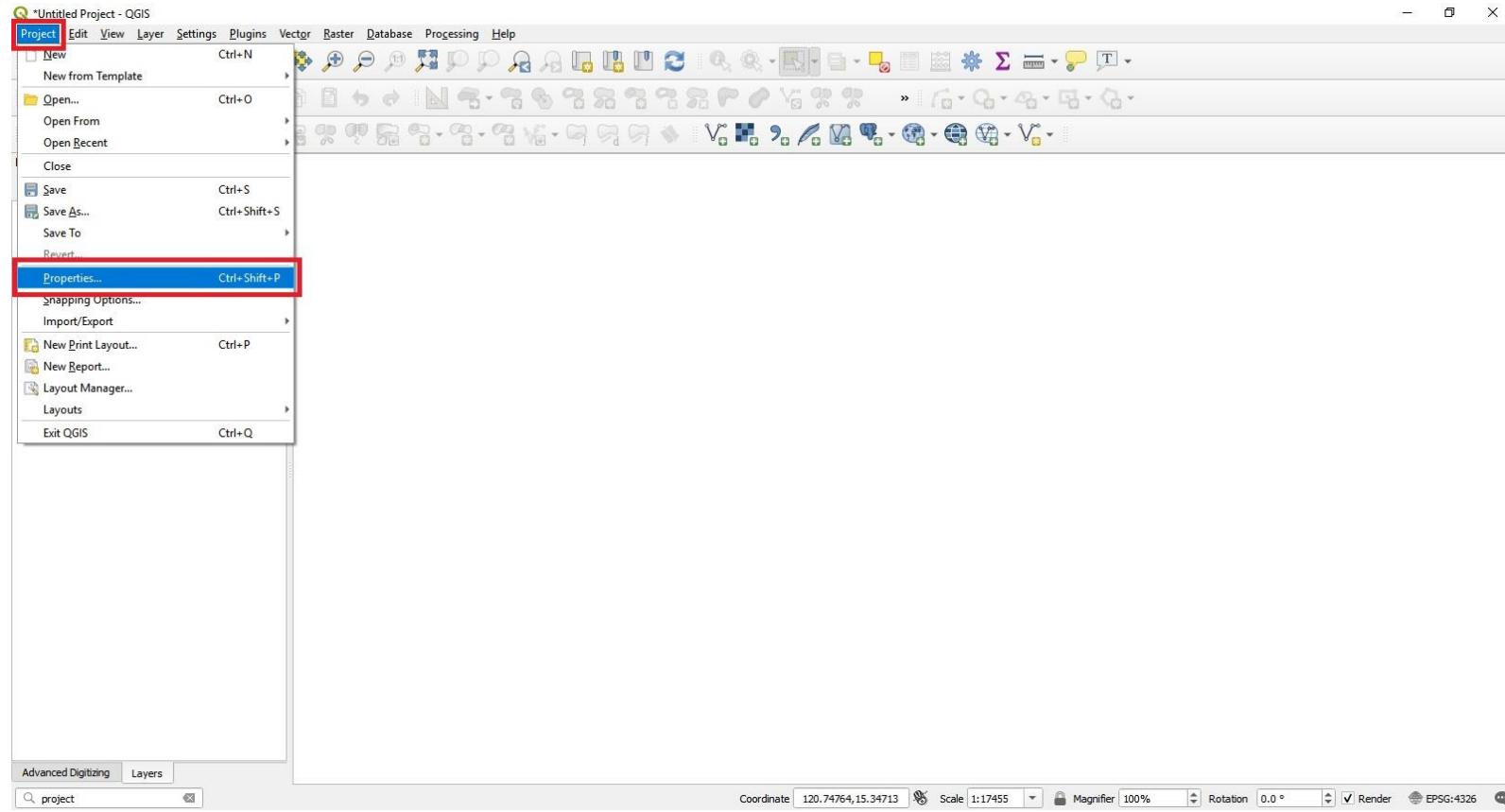
2.2.2 Input Process

2.2.1 Projection Settings

Projections determine how the map being displayed is related to real places on the earth's surface. It is important that GIS software users assign a projection to the data before carrying out any analysis so that the locations in the data match the location in the real world.

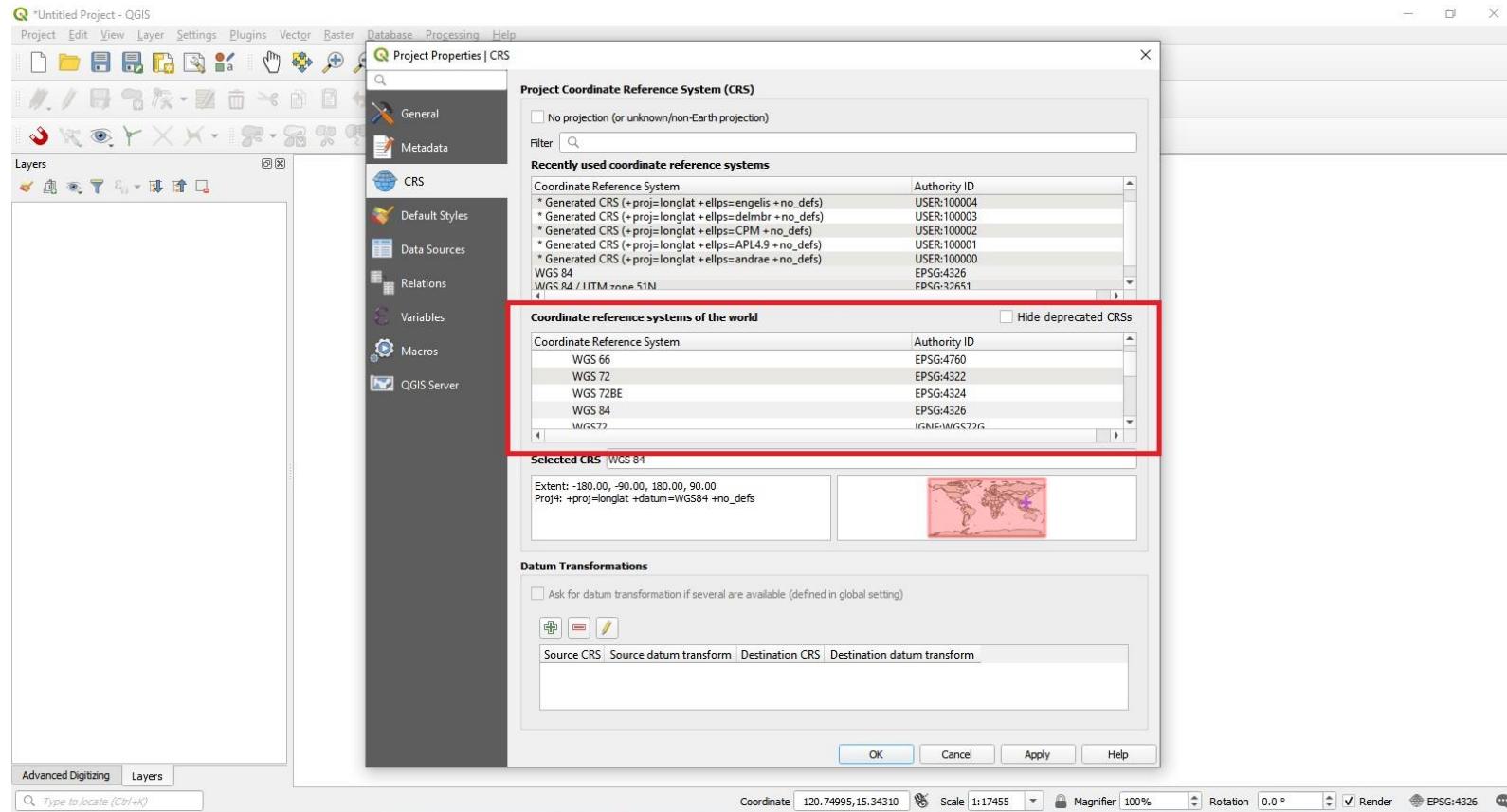
2.2.1 Projection Settings

A. In QGIS Interface you need to click “Project Tool Bar” and select “Properties”



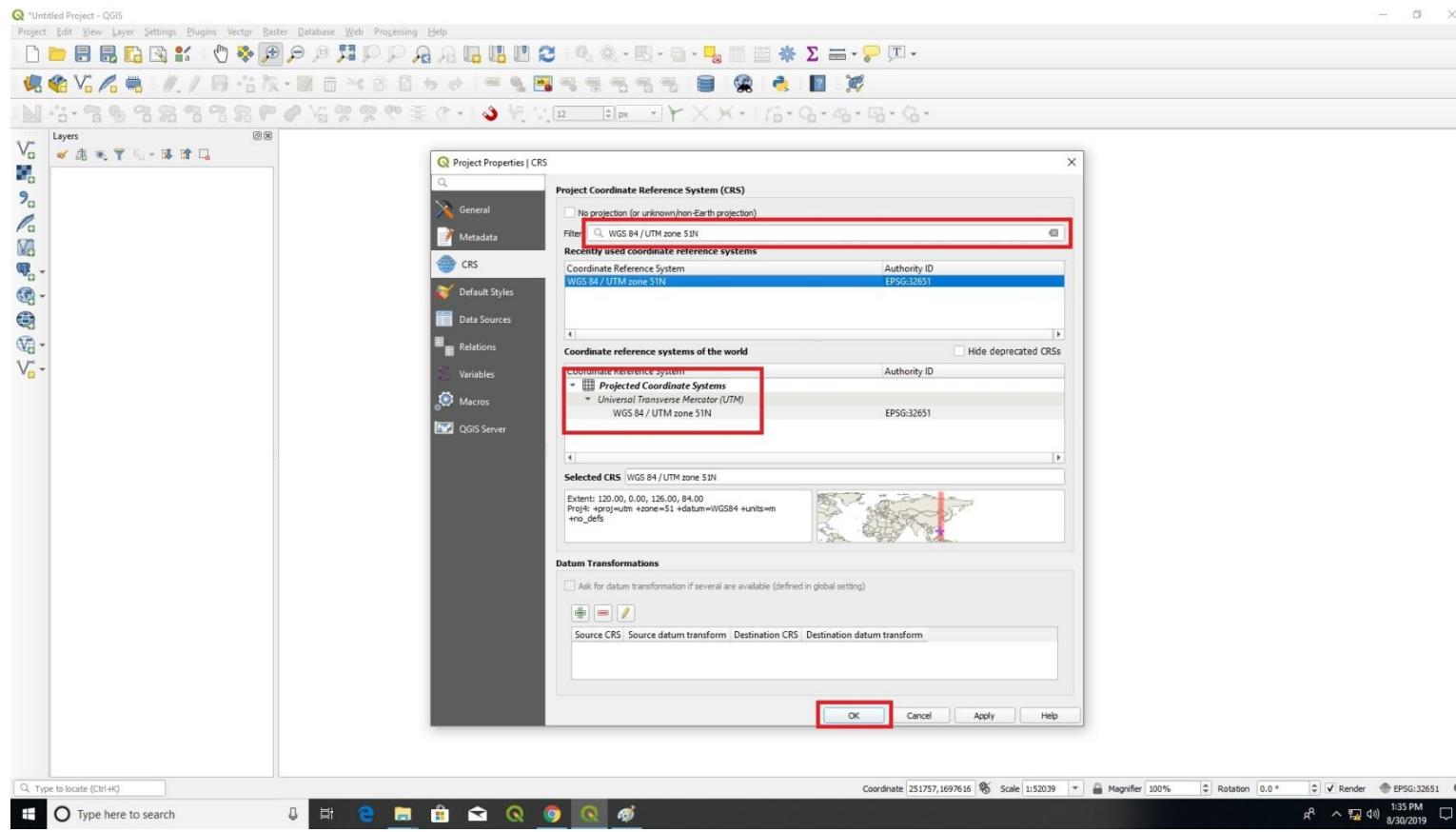
2.2.1 Projection Settings

B. A pop-up window will appear indicating different Projected Coordinate Systems.



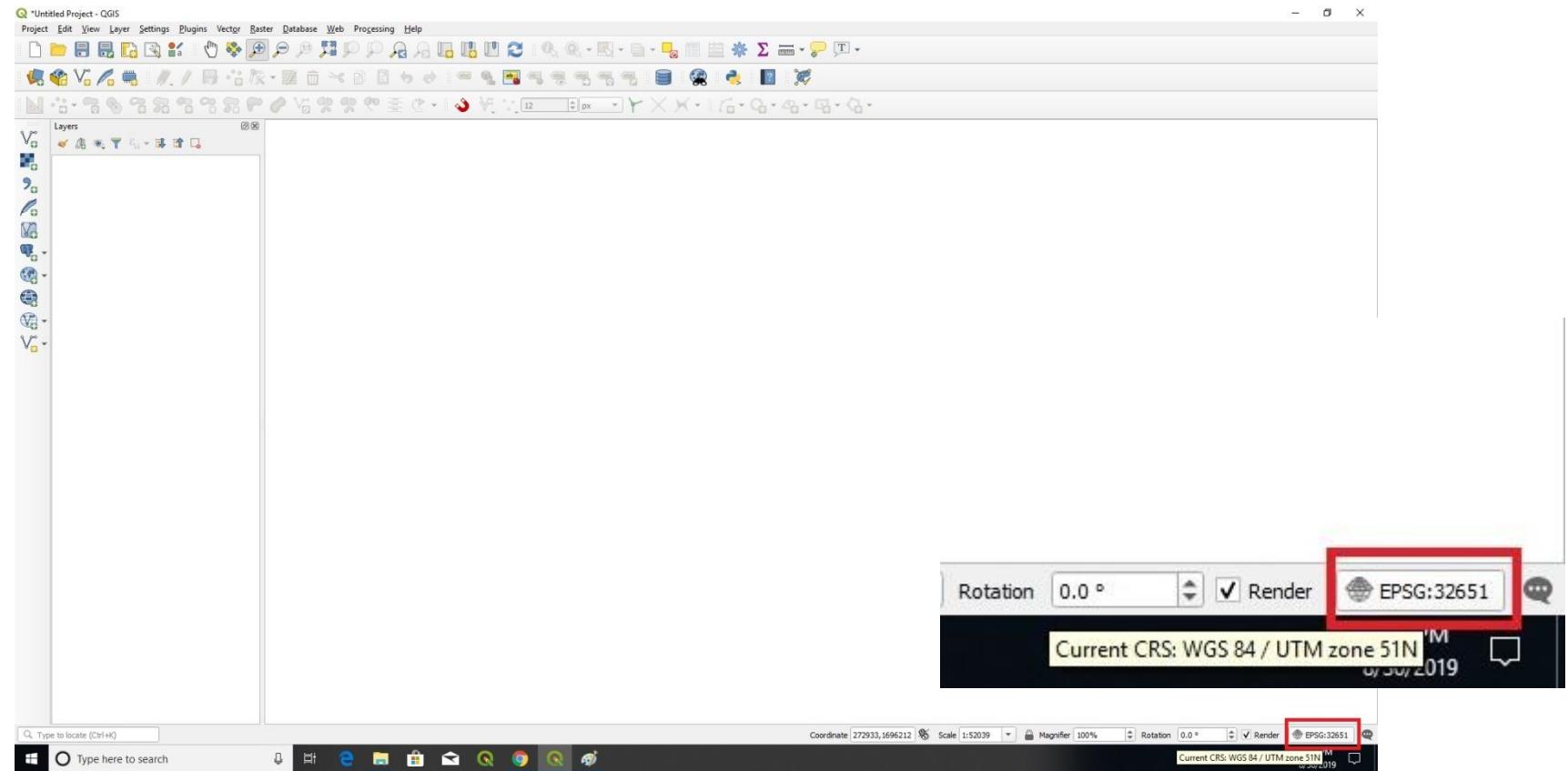
2.2.1 Projection Settings

C. If the default Coordinate Reference System was not included in the list, we can search it through the “**Filter Search Field**” (as per project specification we will use **WGS84/ UTM zone 51N EPSG:32651**)



2.2.1 Projection Settings

D. After setting the projection, you can check the current CRS below for confirmation.



2.2.2 Input Process

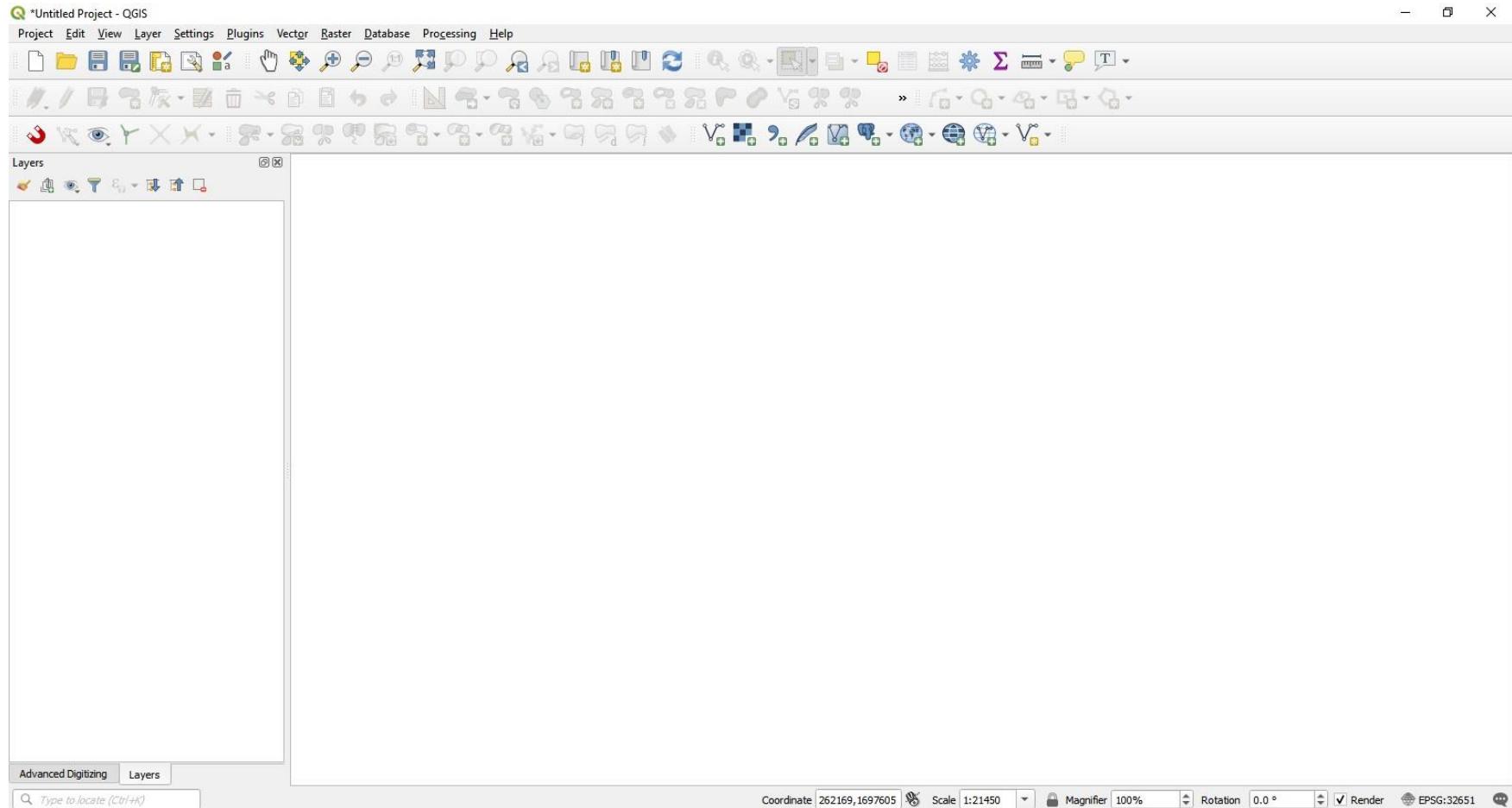
1. Shapefile Creation

2. Add Raster or Image

3. Digitization

2.2.2 Input Process

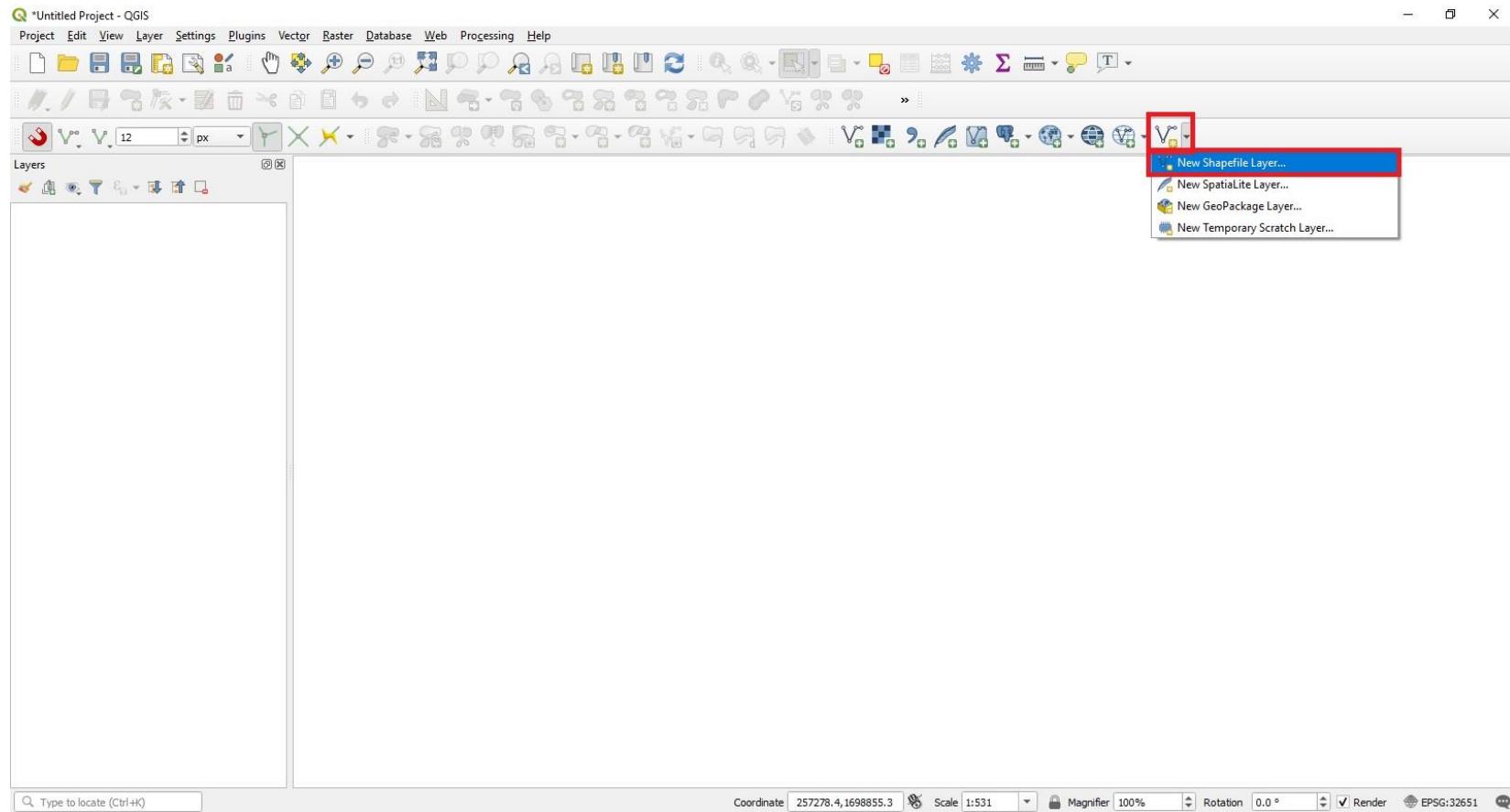
Standard Interface of QGIS



2.2.2 Input Process

➤ A. Creation of Shapefile (.shp)

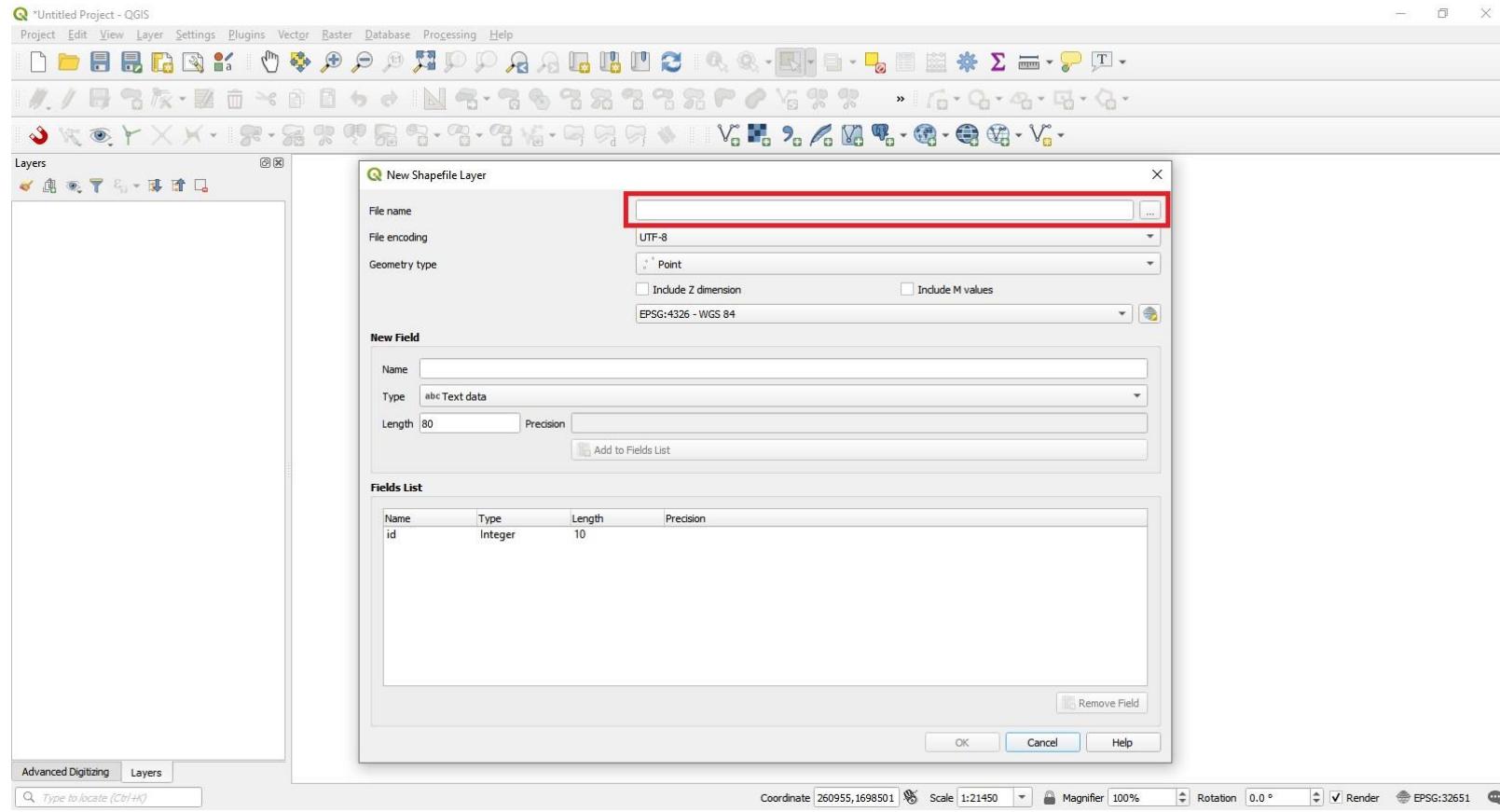
1. Select “New Shapefile Layer” in “Manage Layers Toolbar”



2.2.2 Input Process

➤ A. Creation of Shapefile (.shp)

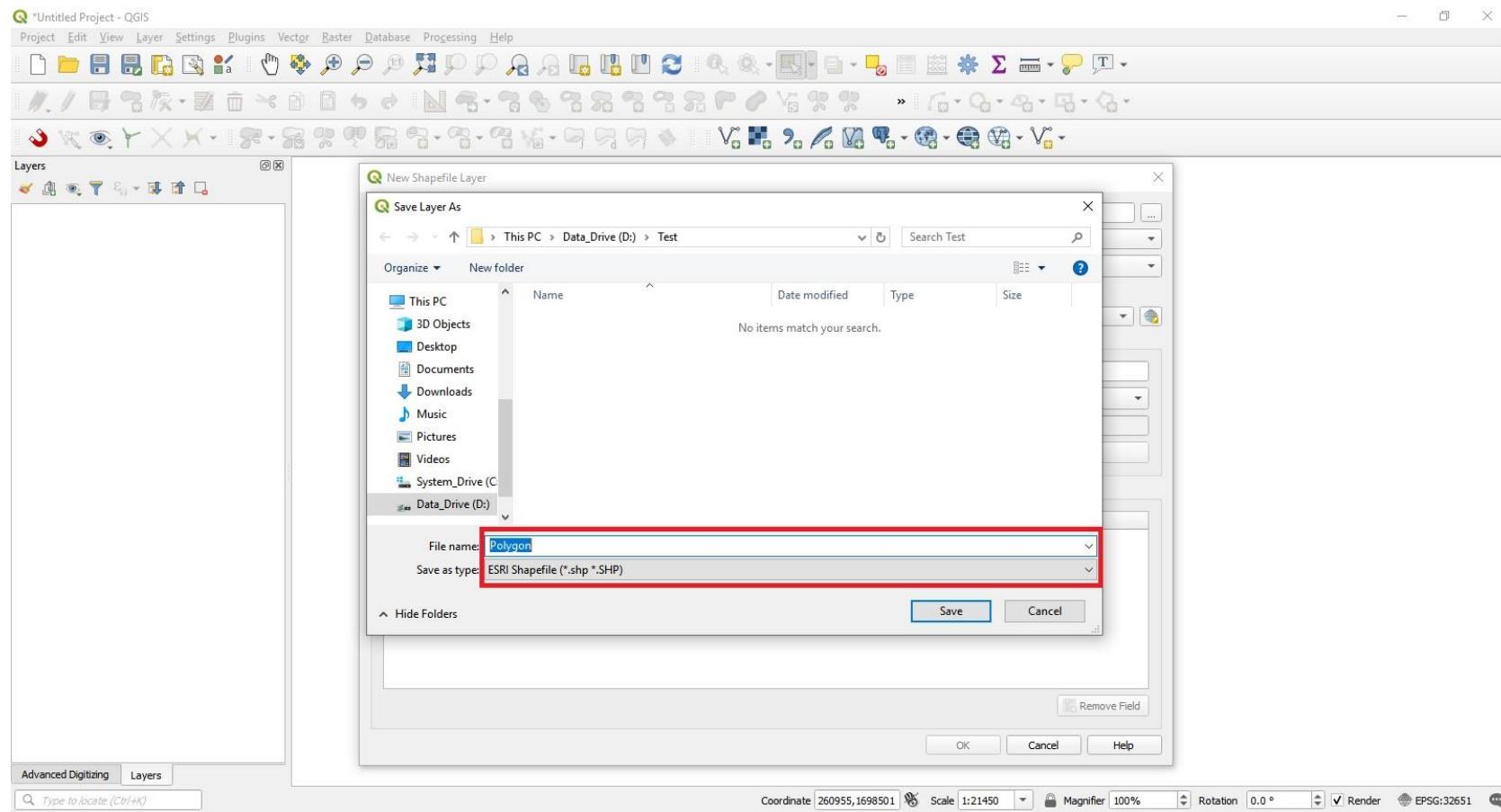
2. Select the Directory where the shapefile will be created



2.2.2 Input Process

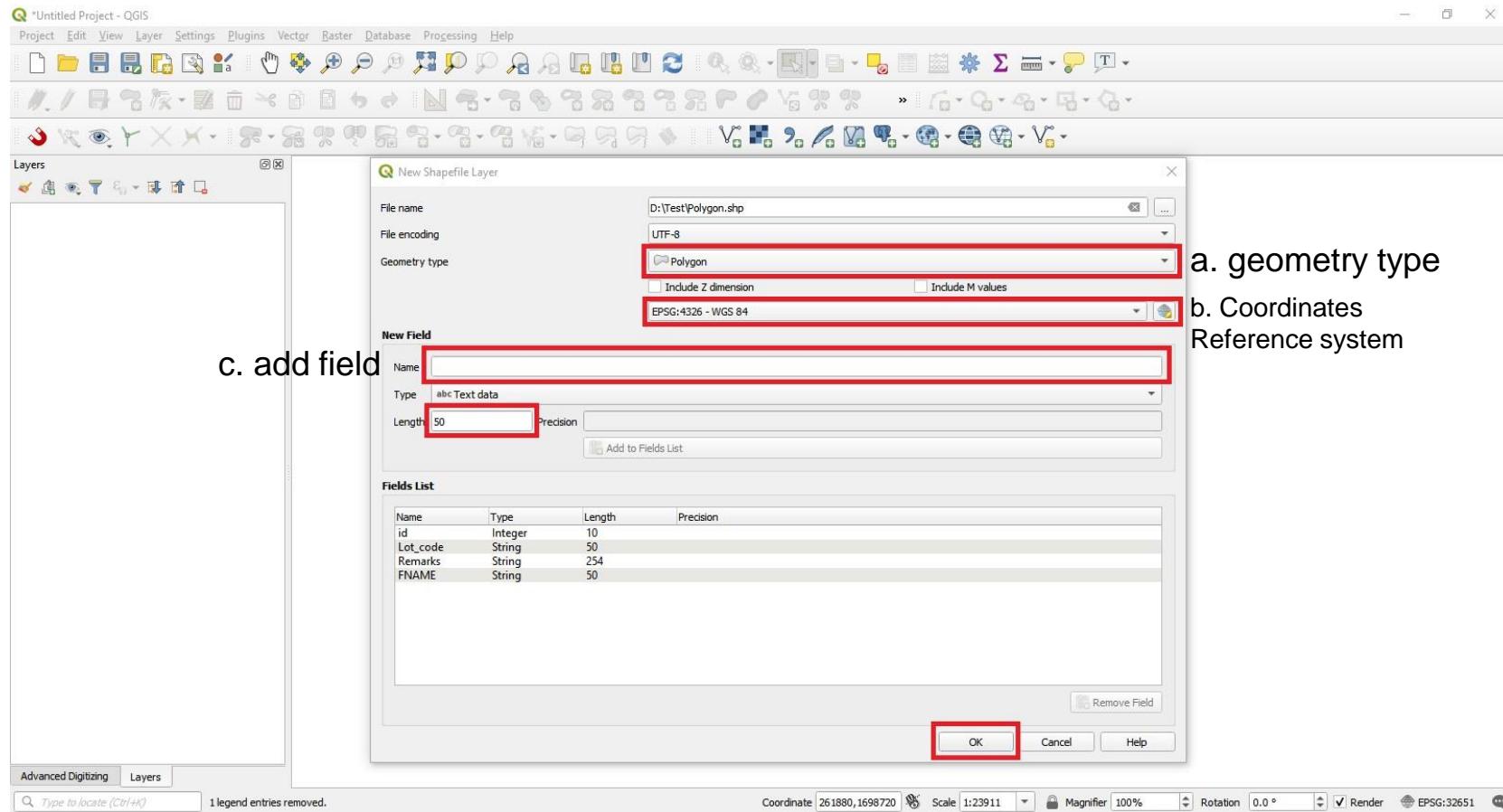
➤ A. Creation of Shapefile (.shp)

3. Set the File name and File type to be created



2.2.2 Input Process

- A. Creation of Shapefile (.shp)
4. Set all the remaining fields.



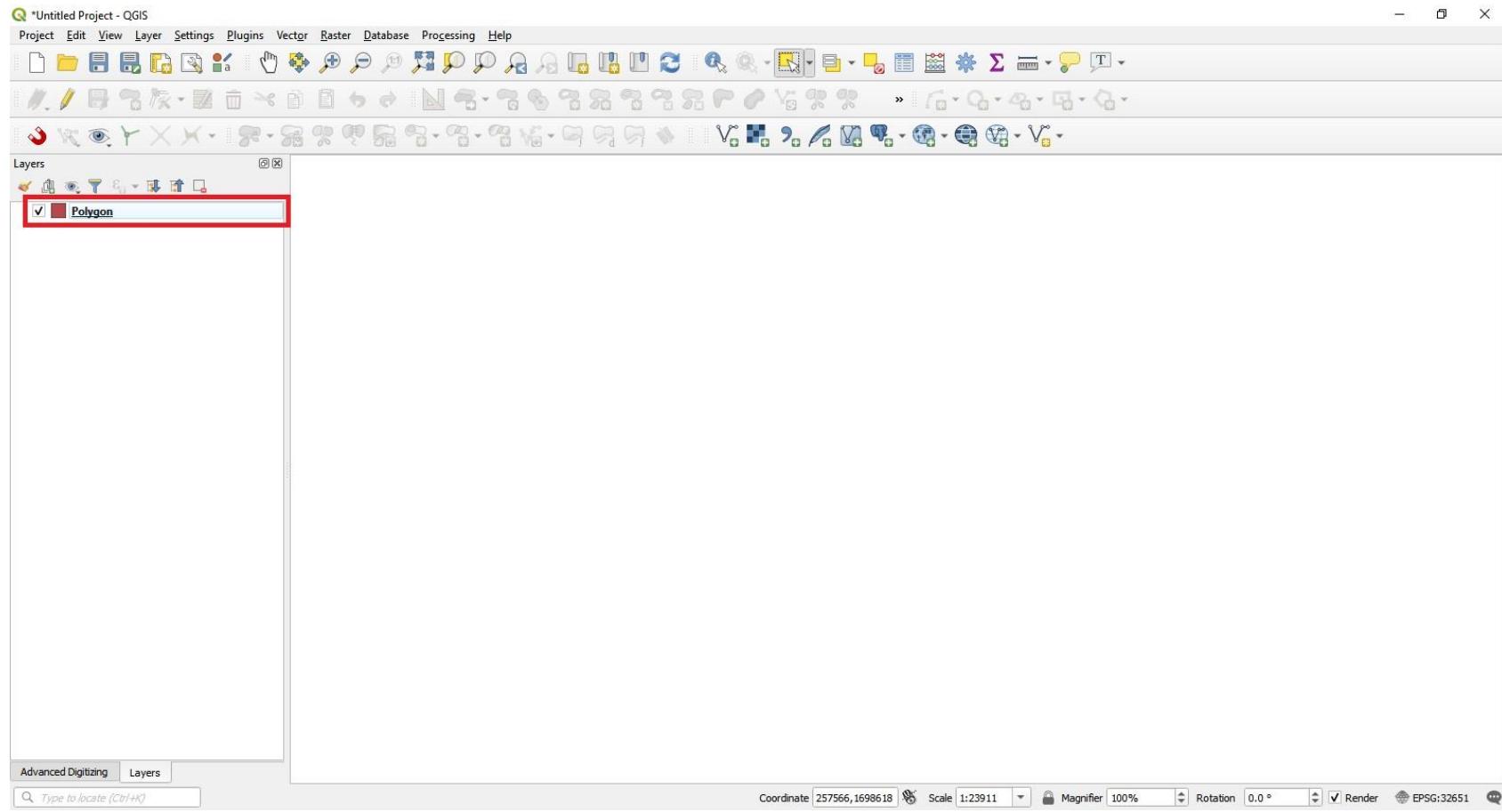
c. add field

- a. geometry type
b. Coordinates Reference system

2.2.2 Input Process

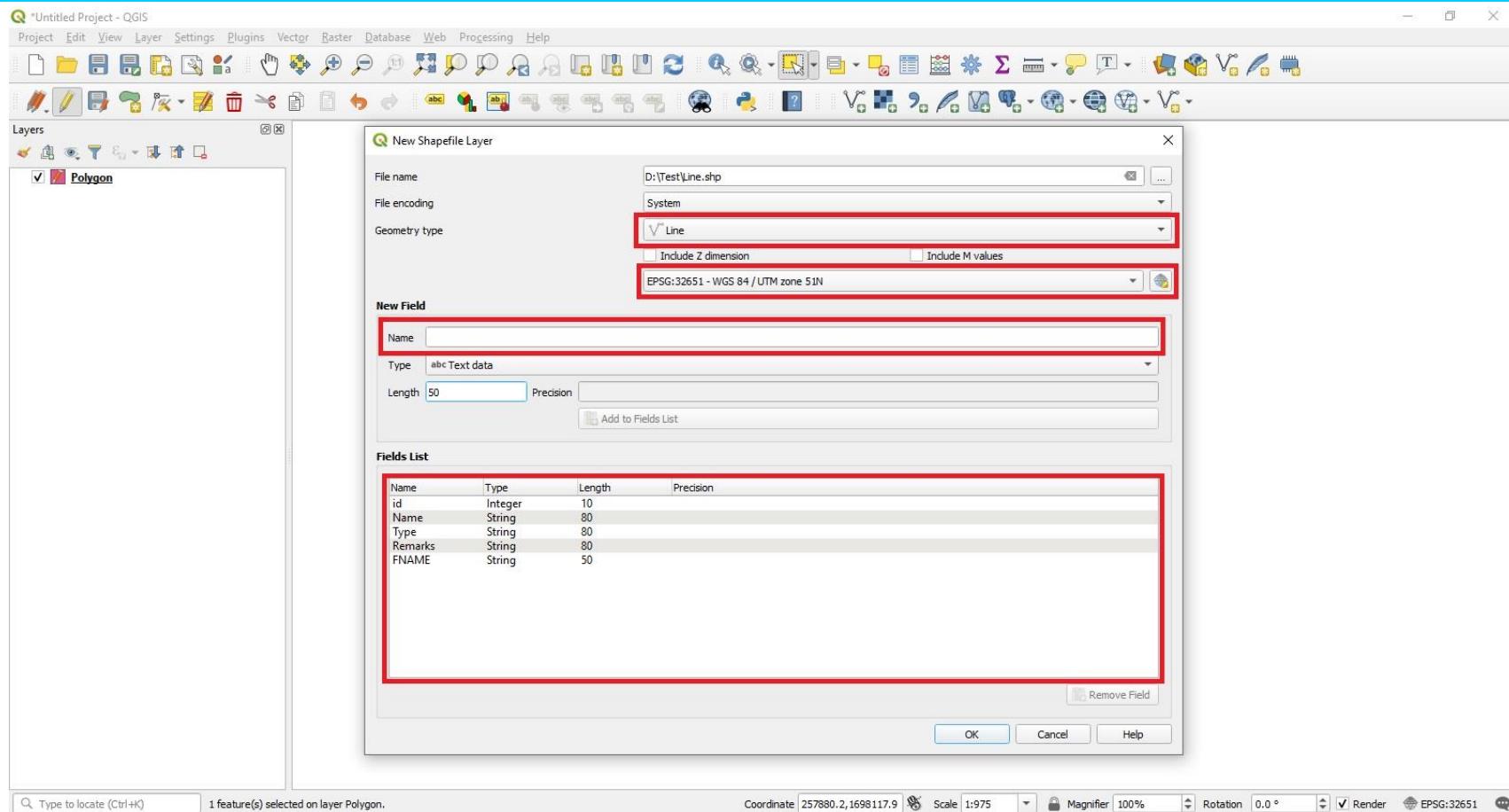
➤ A. Creation of Shapefile (.shp)

5. Once the shapefile was created, it will automatically load in QGIS.



2.2.2 Input Process

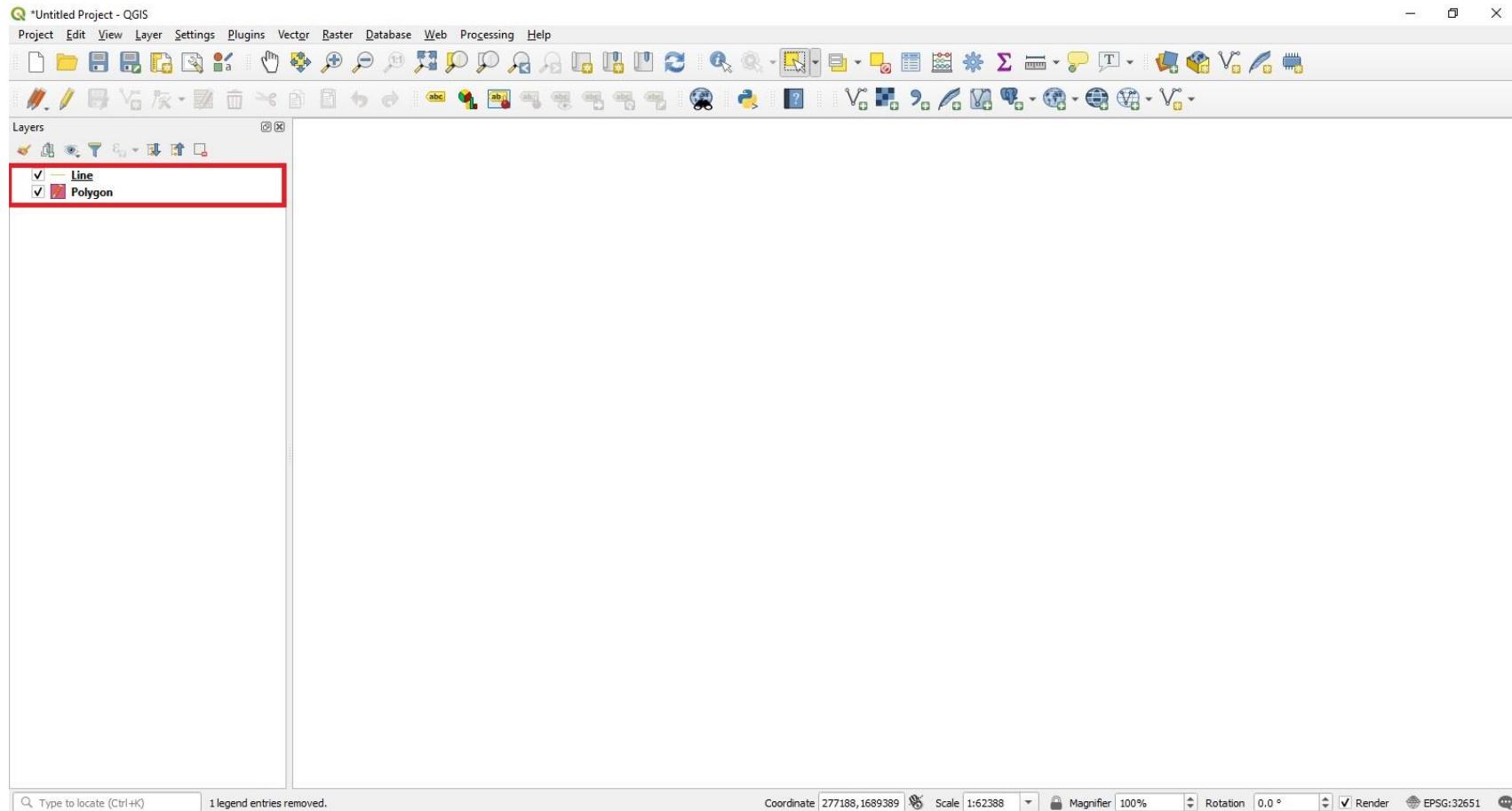
- A. Creation of Shapefile (.shp)
 - 6. Repeat procedure for Line type (.shp)



2.2.2 Input Process

➤ A. Creation of Shapefile (.shp)

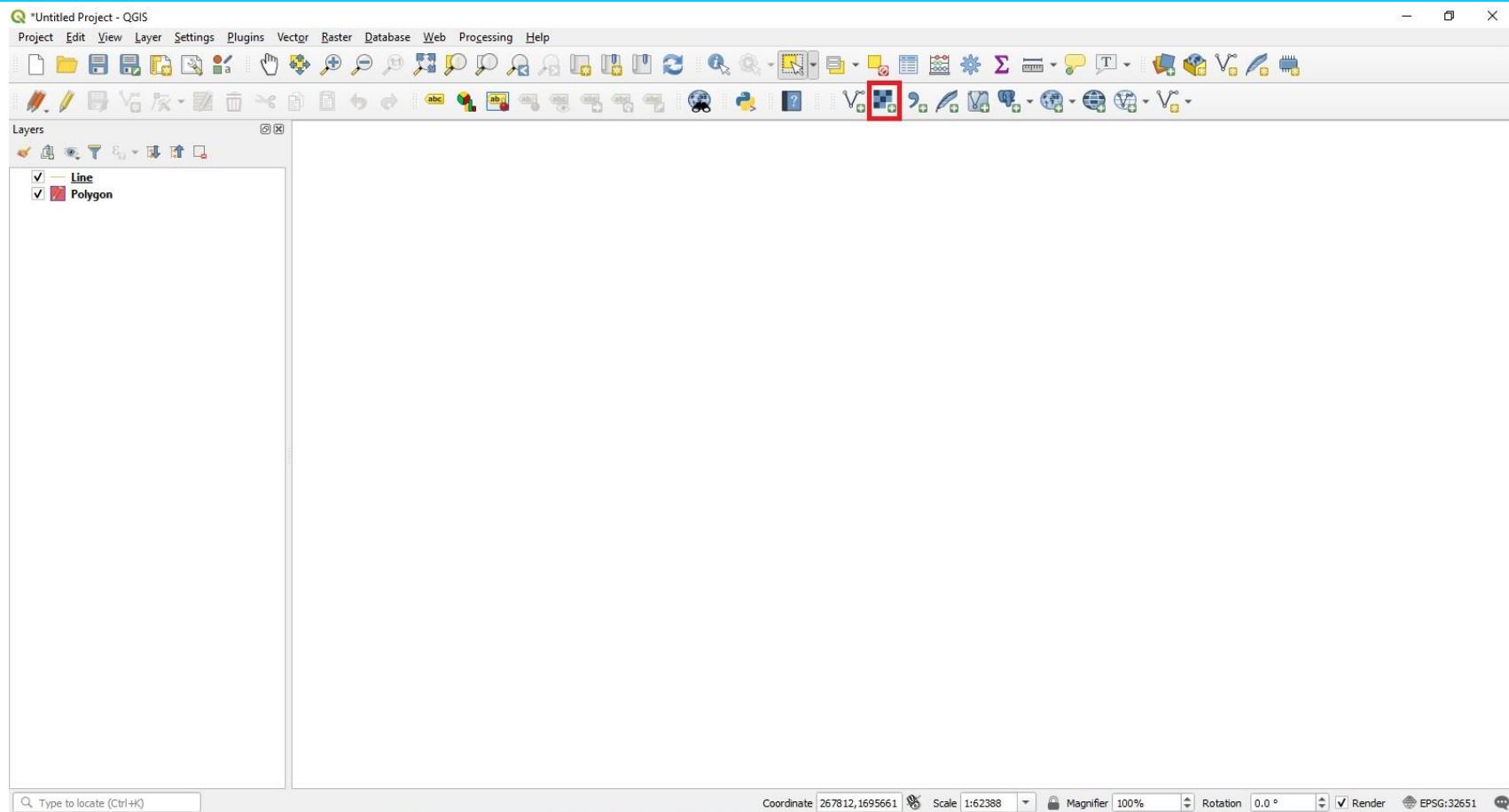
7. Created shapefile will appear on Layers window



2.2.2 Input Process

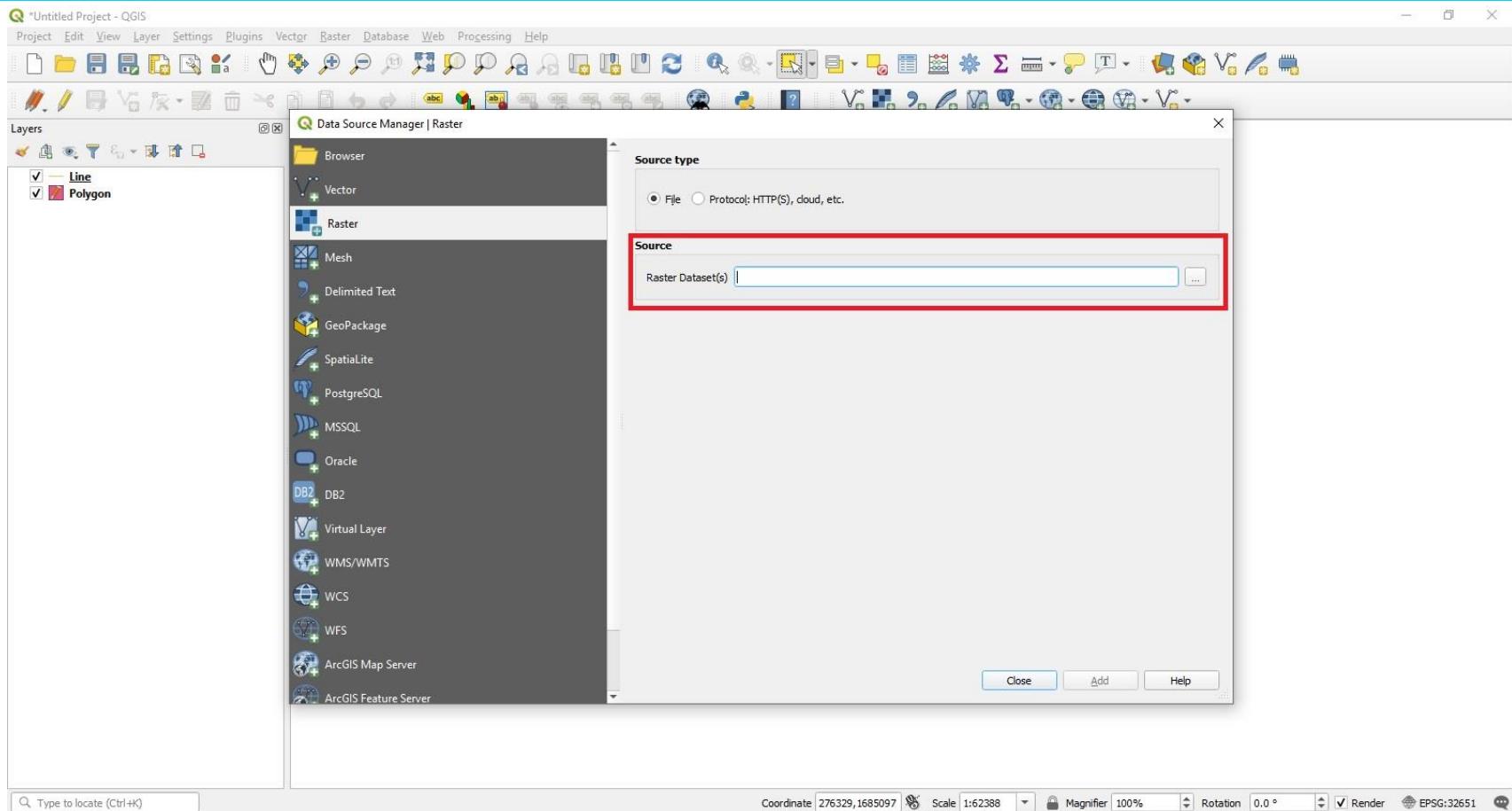
➤ B. Add Raster Layer or Image

1. Select “Add Raster Layer” in “Manage Layers Toolbar”



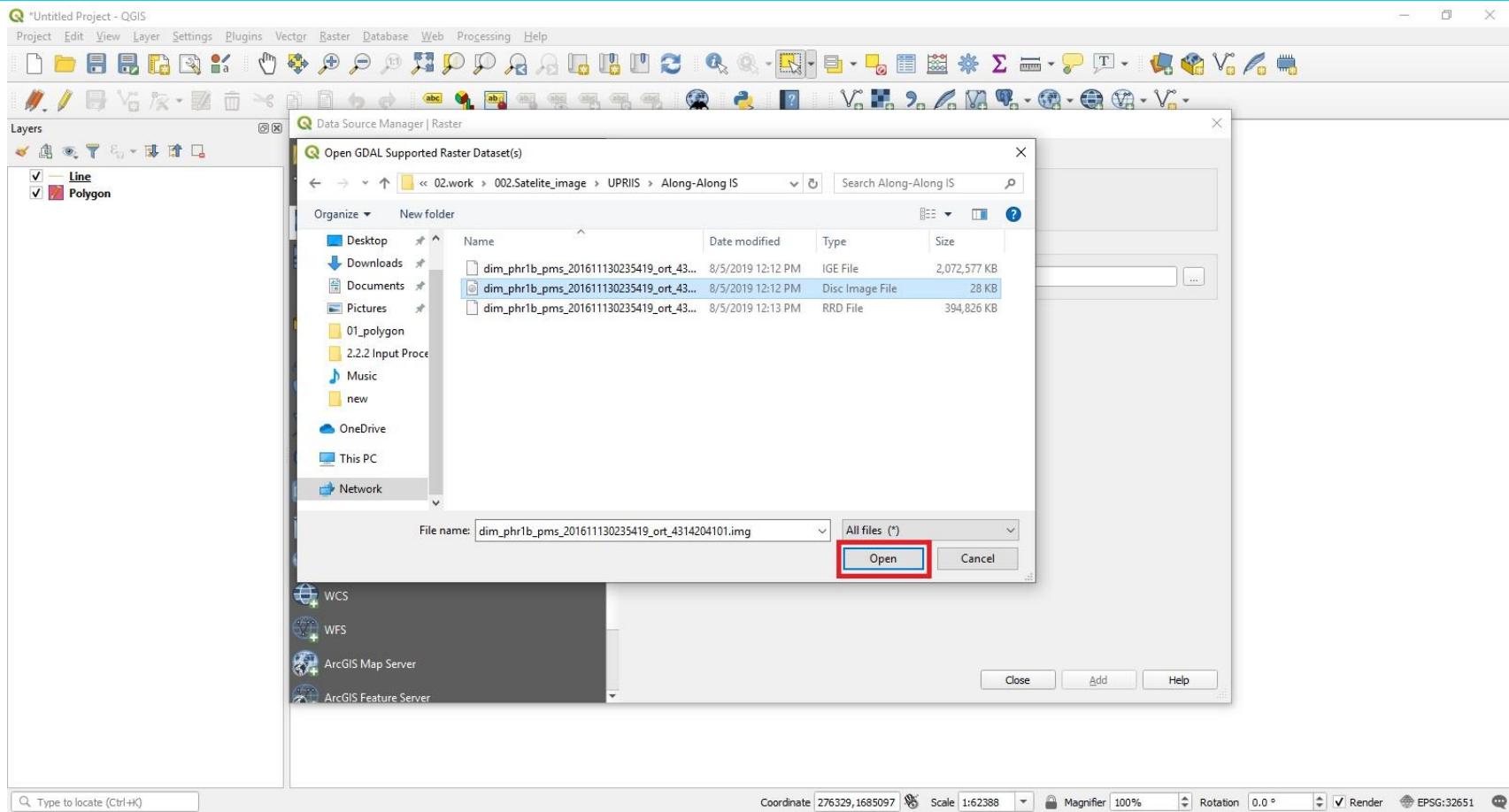
2.2.2 Input Process

- B. Add Raster Layer or Image
 - 2. Find the directory of the Image to be used



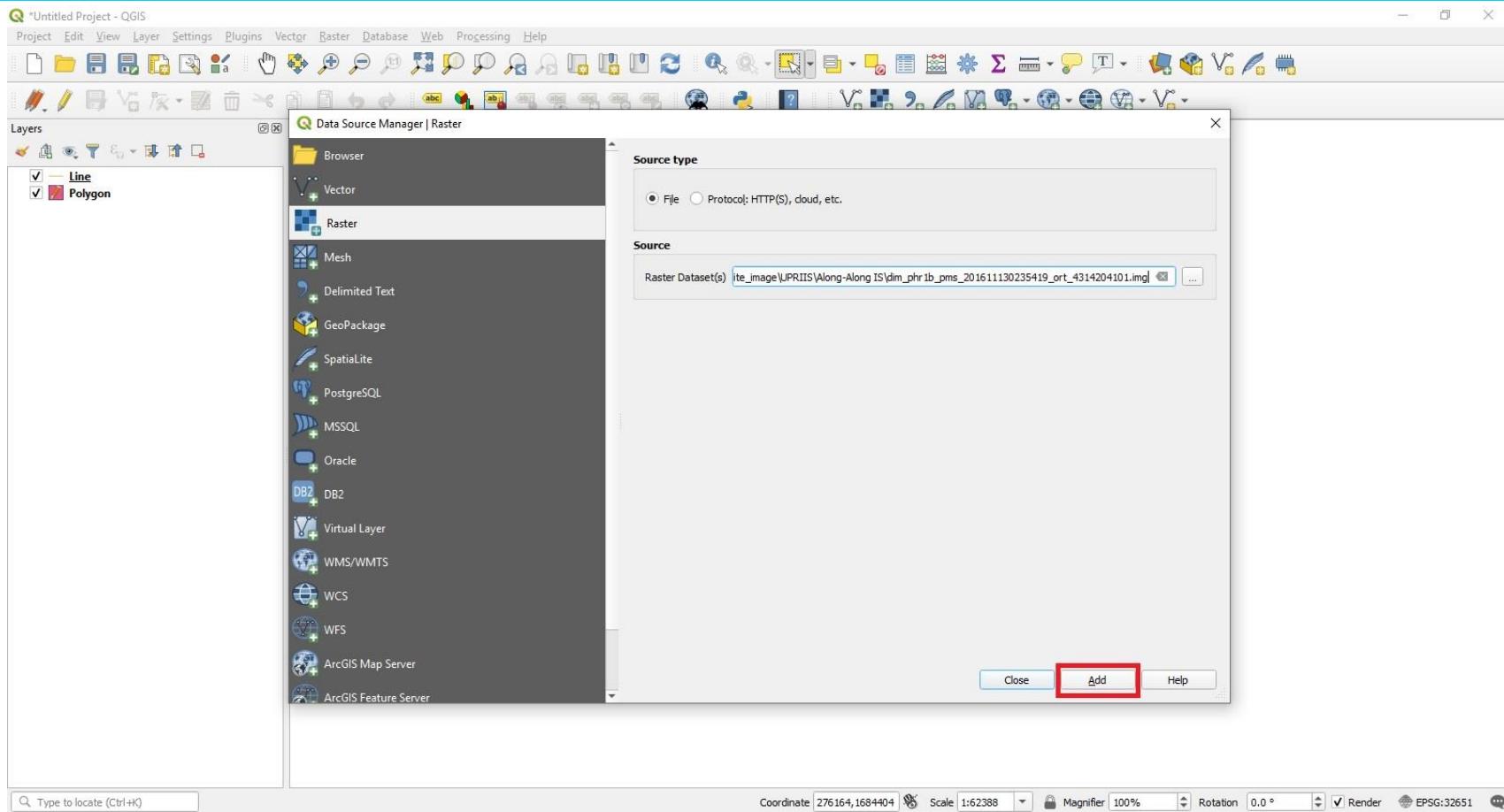
2.2.2 Input Process

- B. Add Raster Layer or Image
3. Select the Image then click “Open”



2.2.2 Input Process

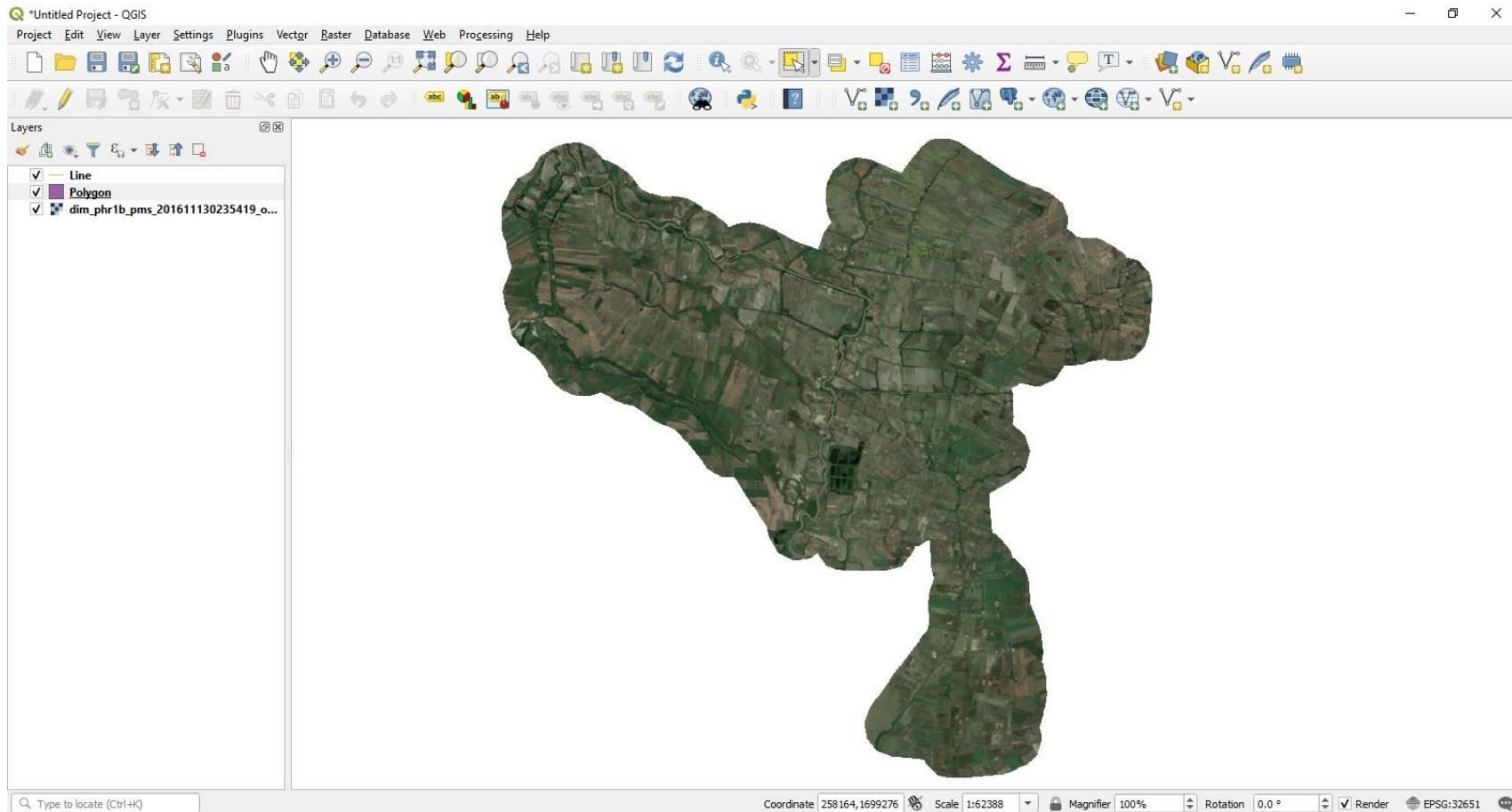
- B. Add Raster Layer or Image
 - 4. Click "Add"



2.2.2 Input Process

➤ B. Add Raster Layer or Image

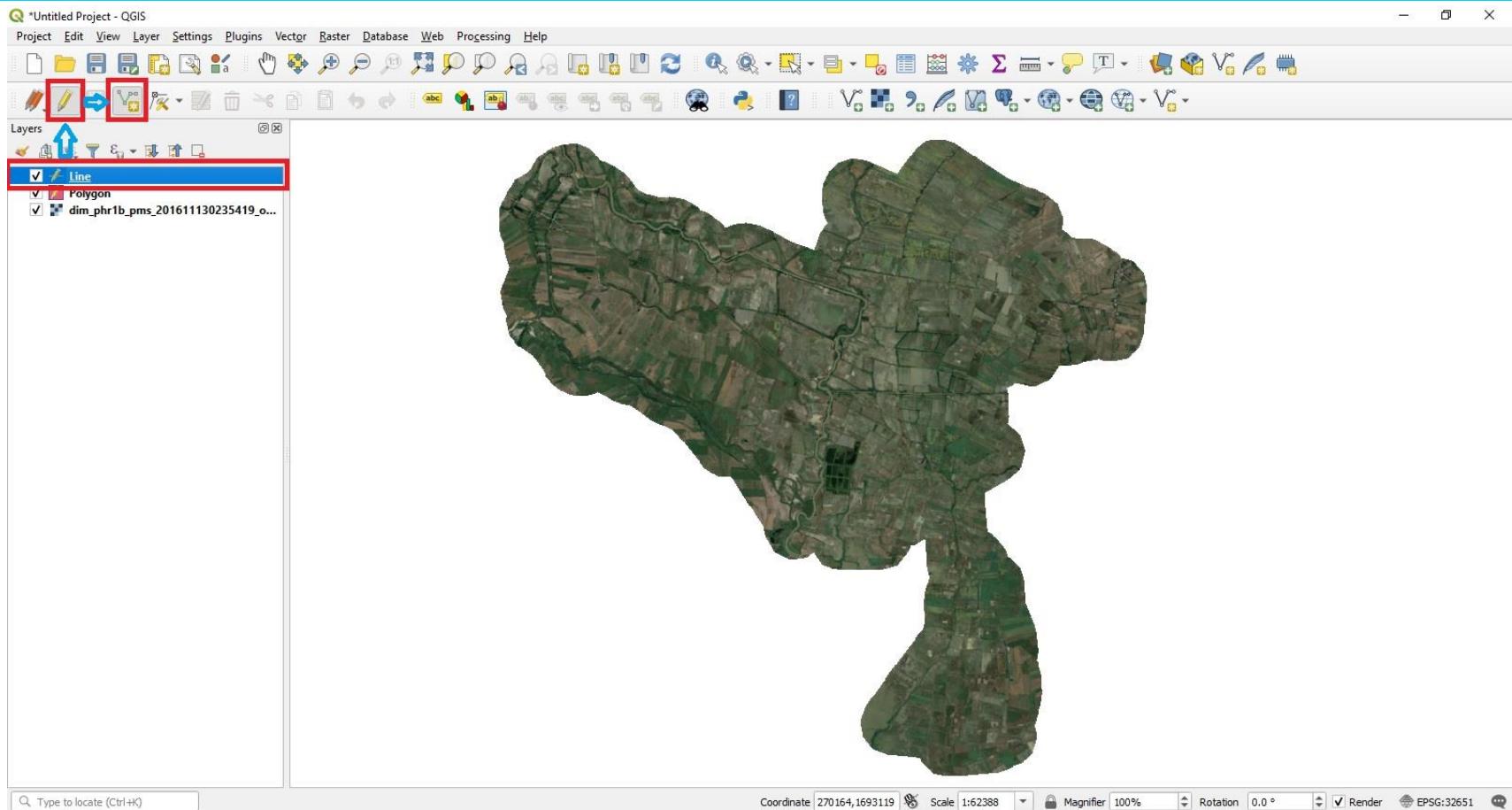
5. Image will appear on the “[Layers Window](#)” already



2.2.2 Input Process

➤ C. Digitizing

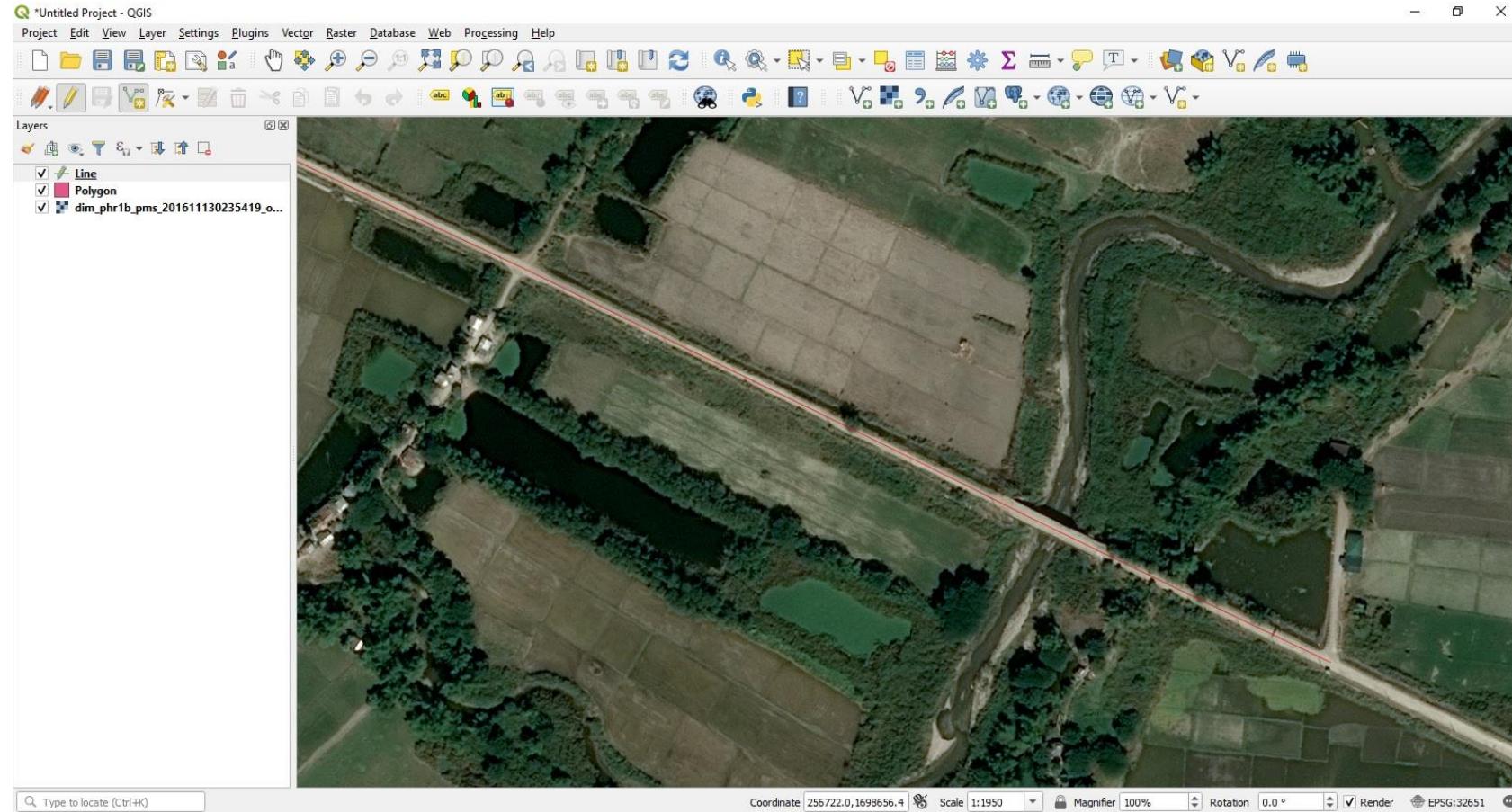
1. To start digitizing, make sure that you select the layer to edit, enable start editing, and then select “Add Line Feature”



2.2.2 Input Process

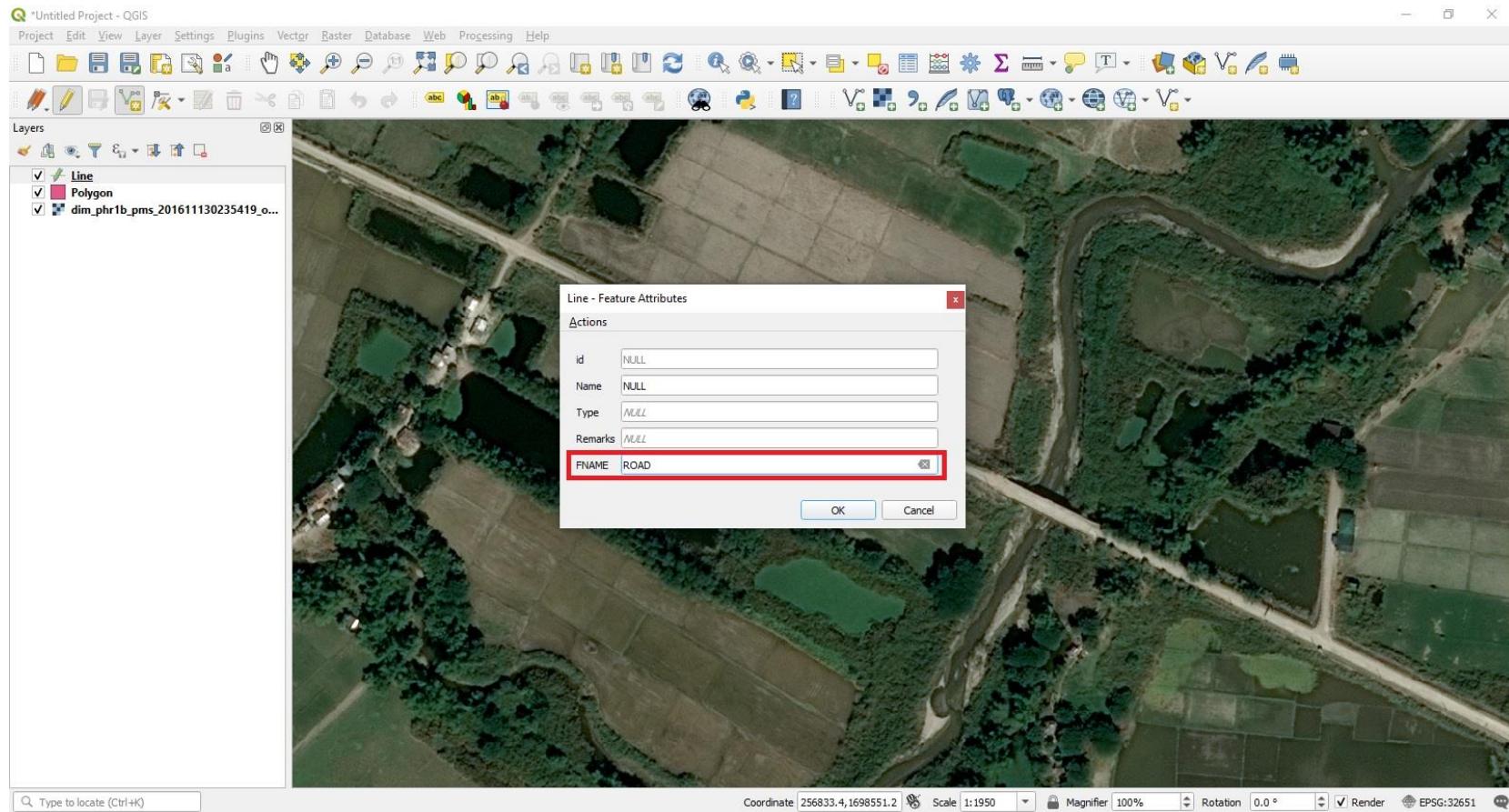
➤ C. Digitizing

2. Start tracing features as per Image.



2.2.2 Input Process

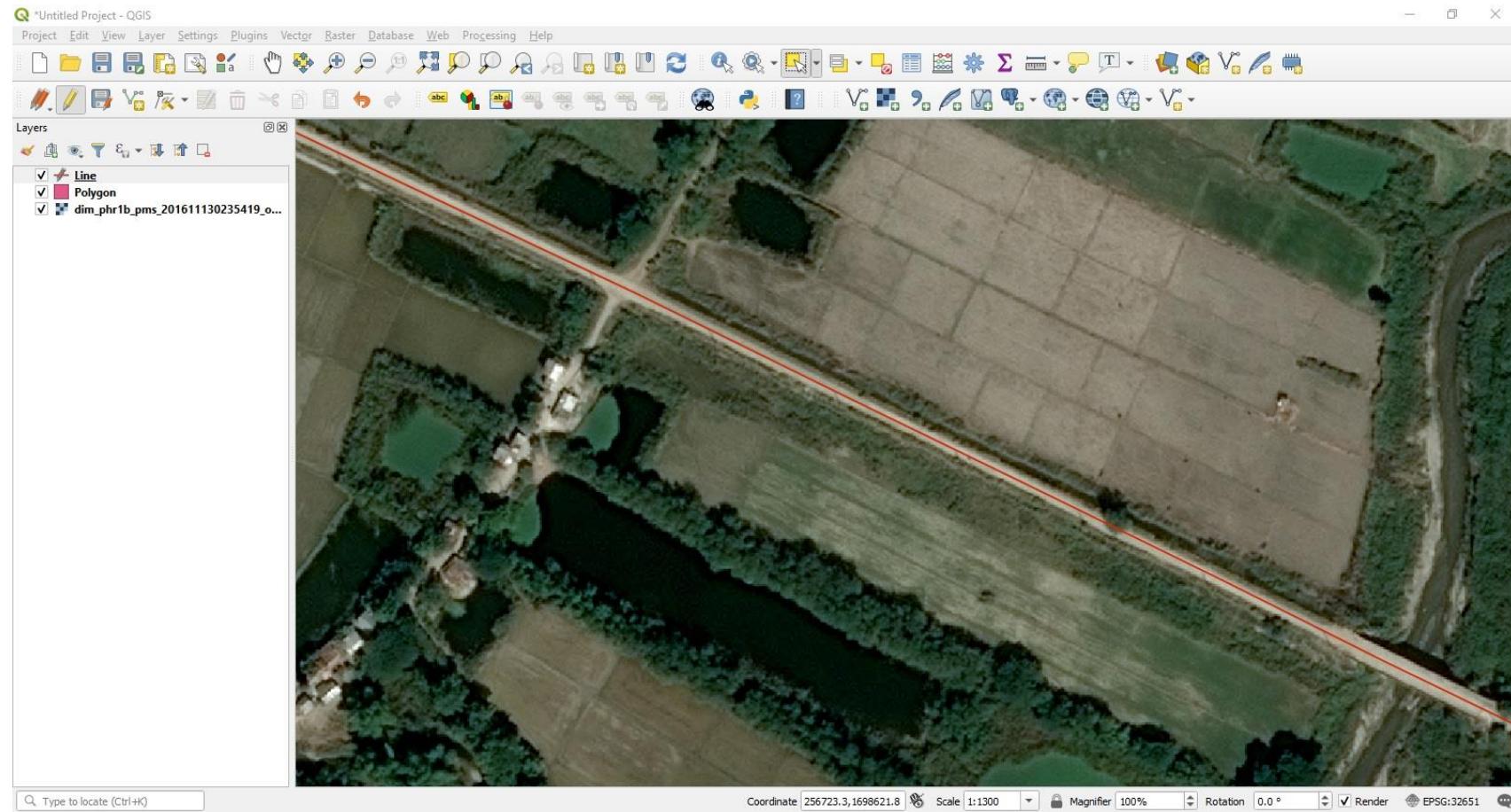
- C. Digitizing
 - 3. Encode attributes.



2.2.2 Input Process

➤ C. Digitizing

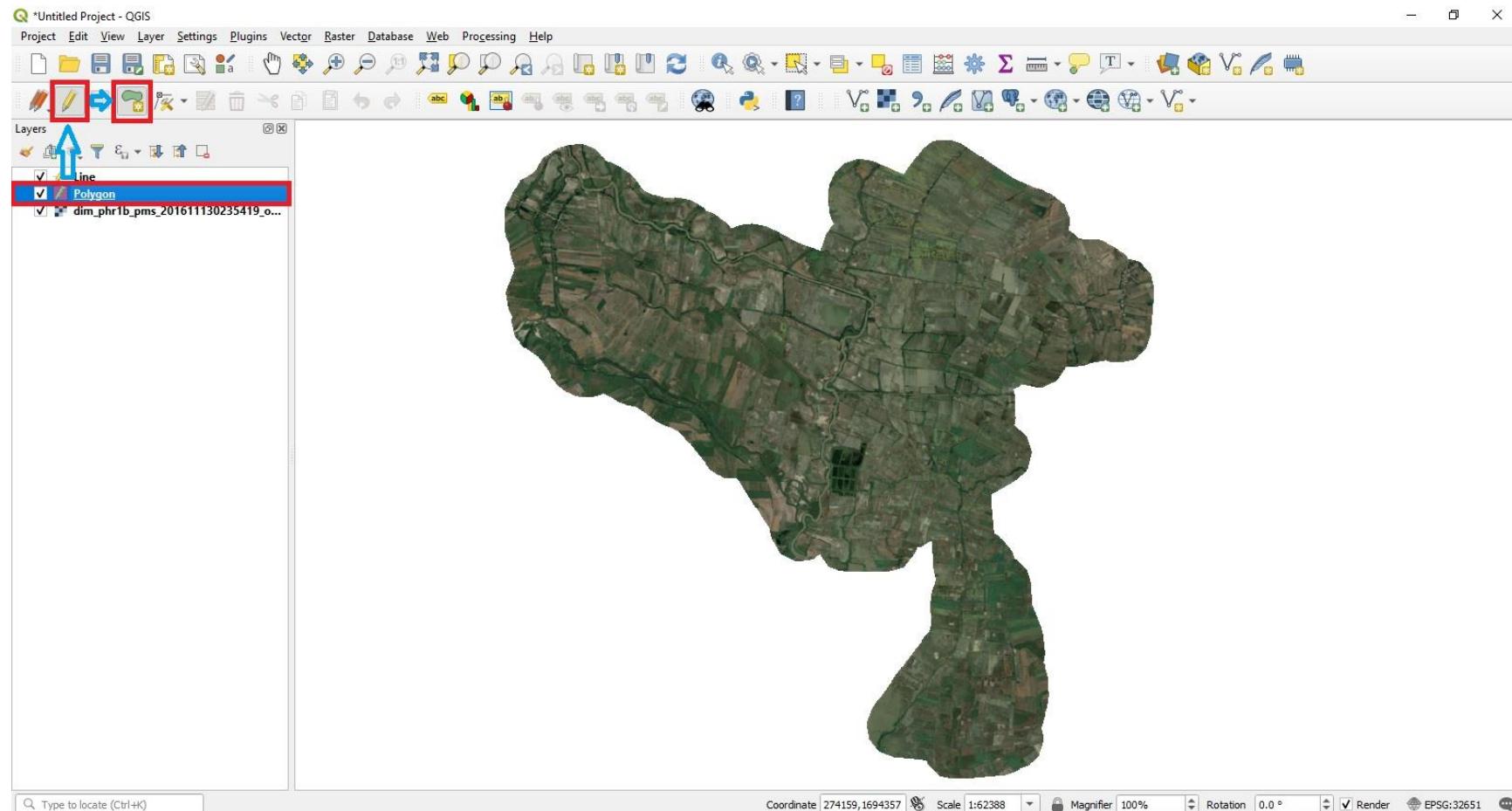
4. Feature finished input will appear.



2.2.2 Input Process

➤ C. Digitizing

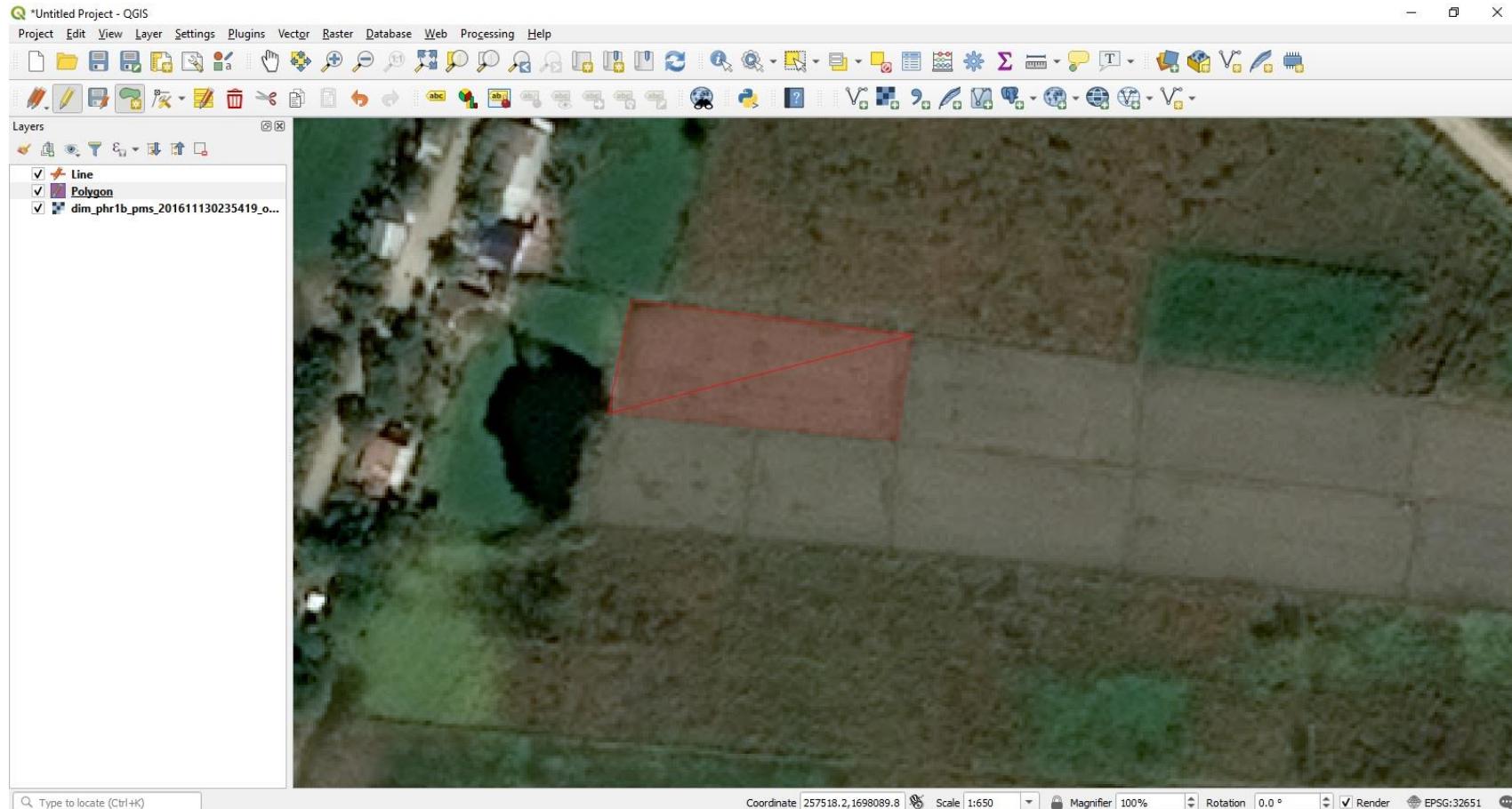
5. Repeat procedure. select the layer to edit, enable start editing, and then select “Add Polygon Feature”



2.2.2 Input Process

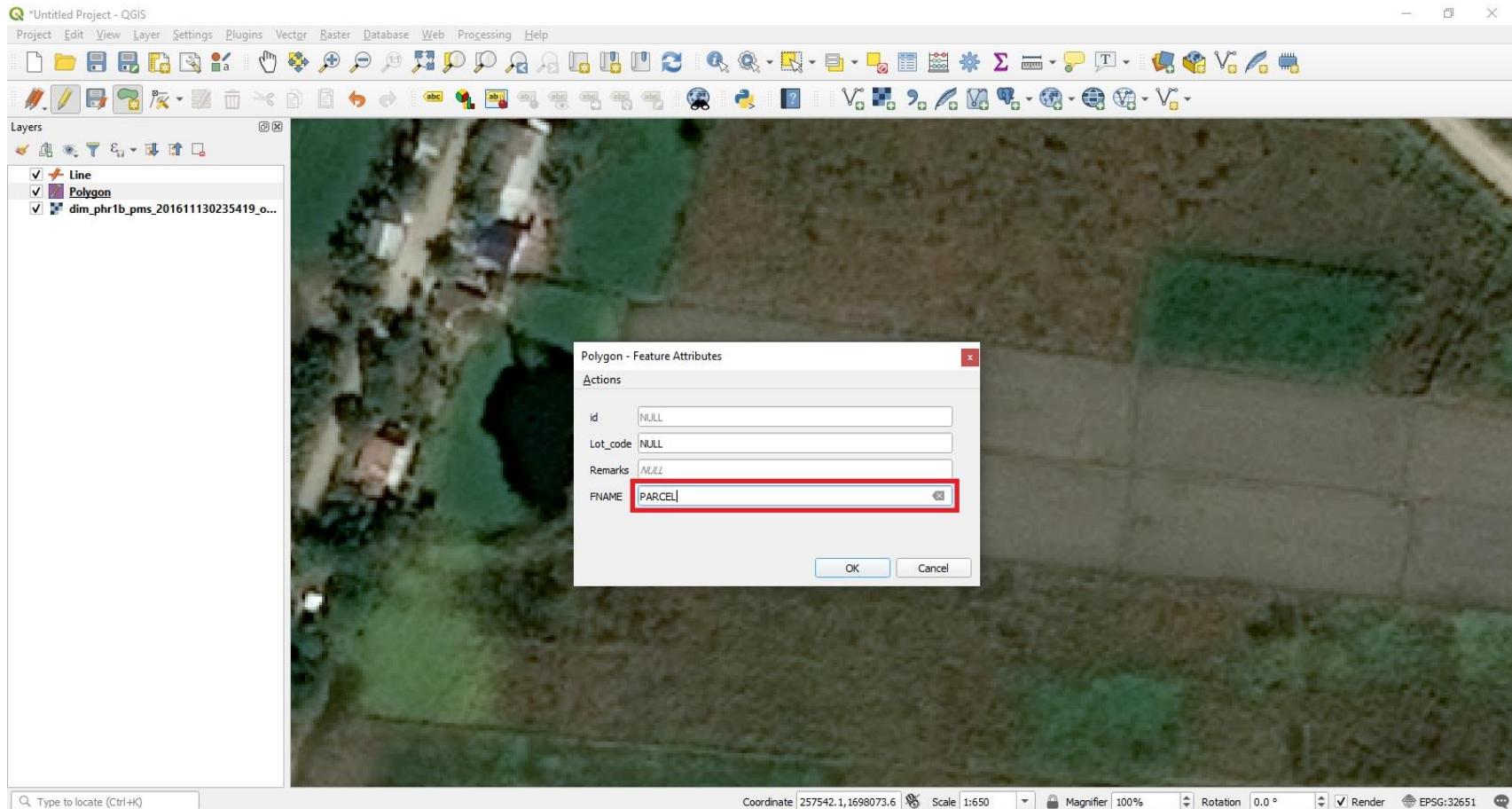
➤ C. Digitizing

6. Trace feature as per Image.



2.2.2 Input Process

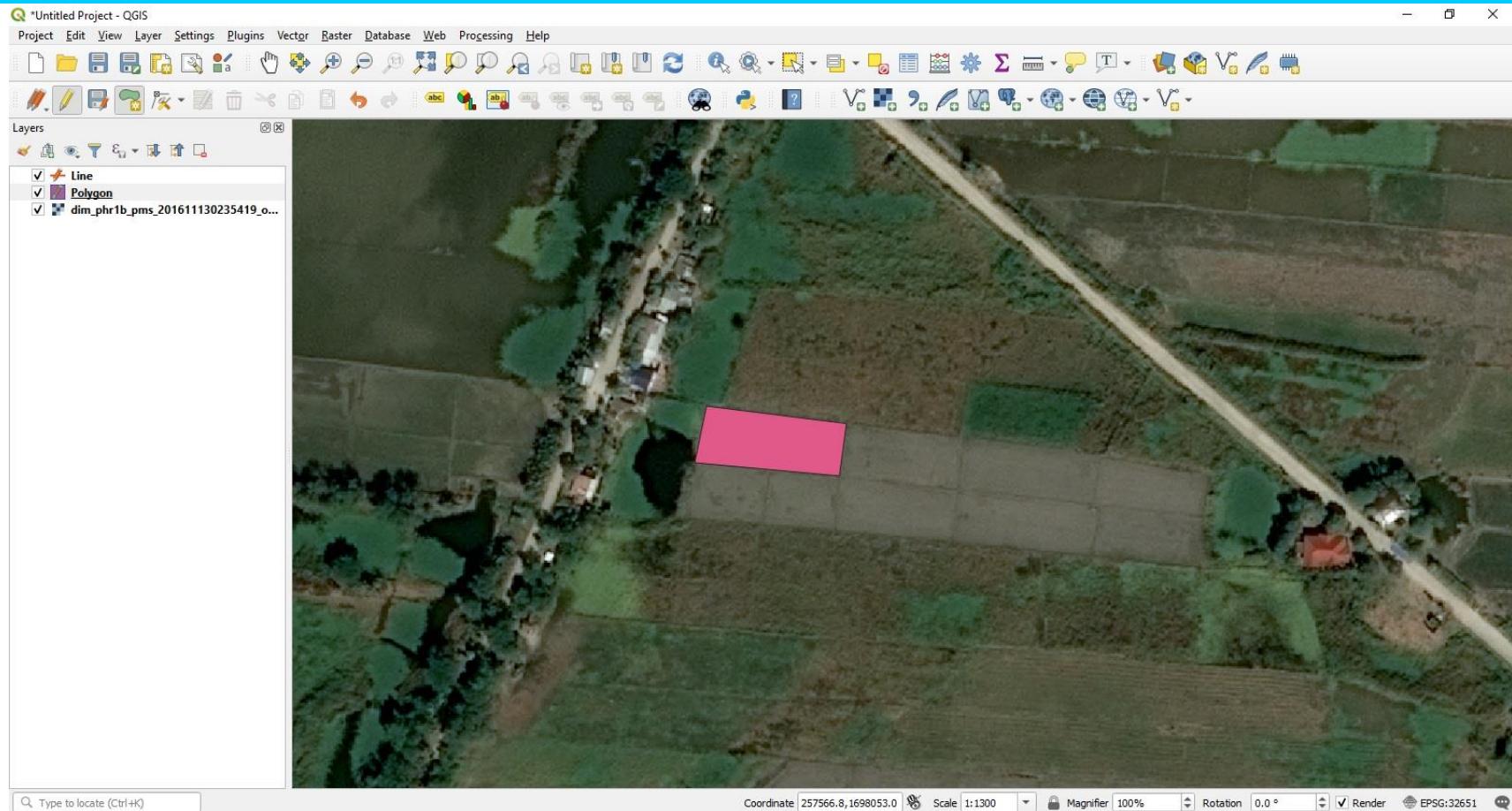
- C. Digitizing
 - 7. Encode attributes.



2.2.2 Input Process

➤ C. Digitizing

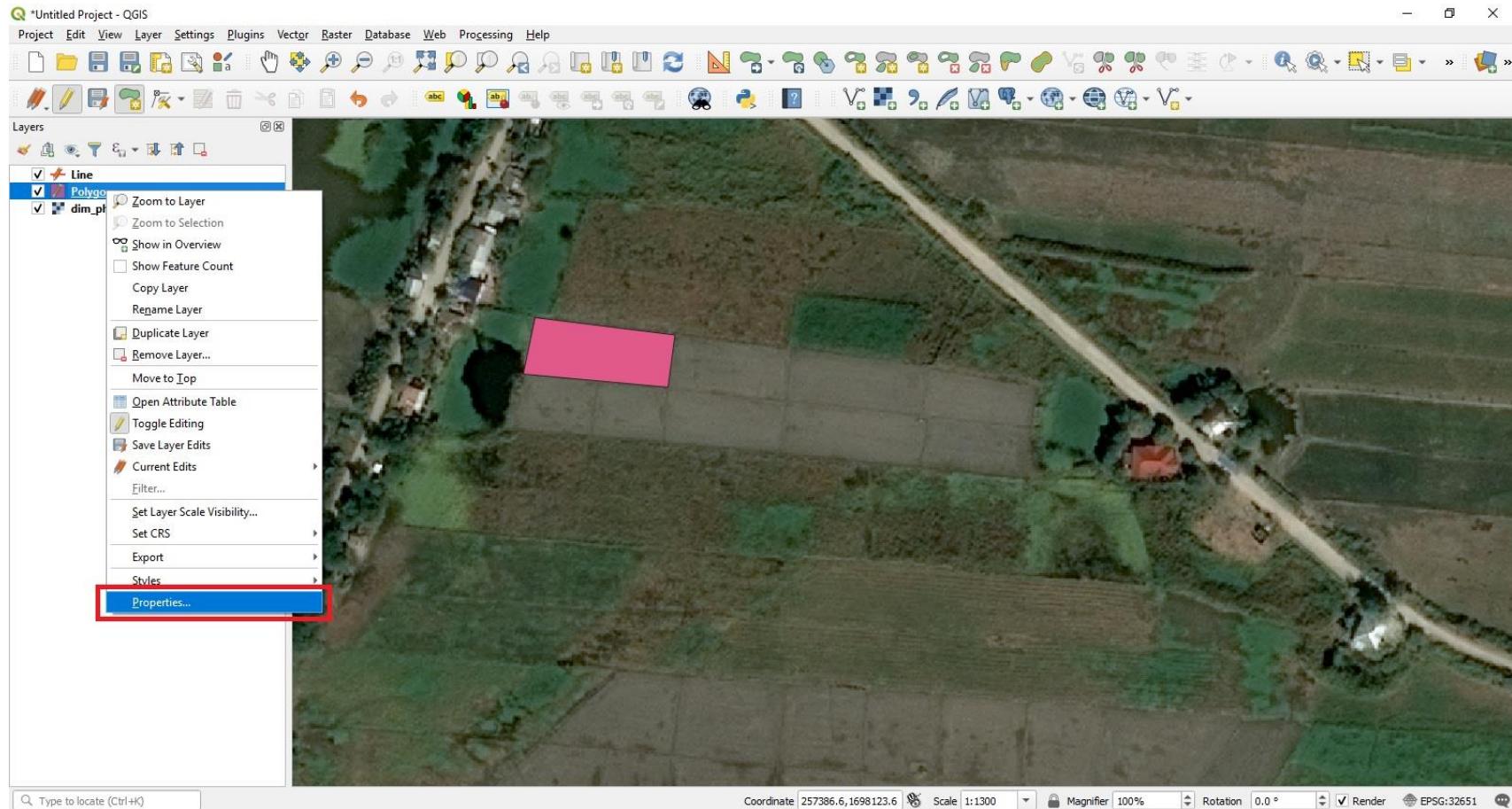
8. Finished feature will appear.



2.2.2 Input Process

➤ C. Digitizing

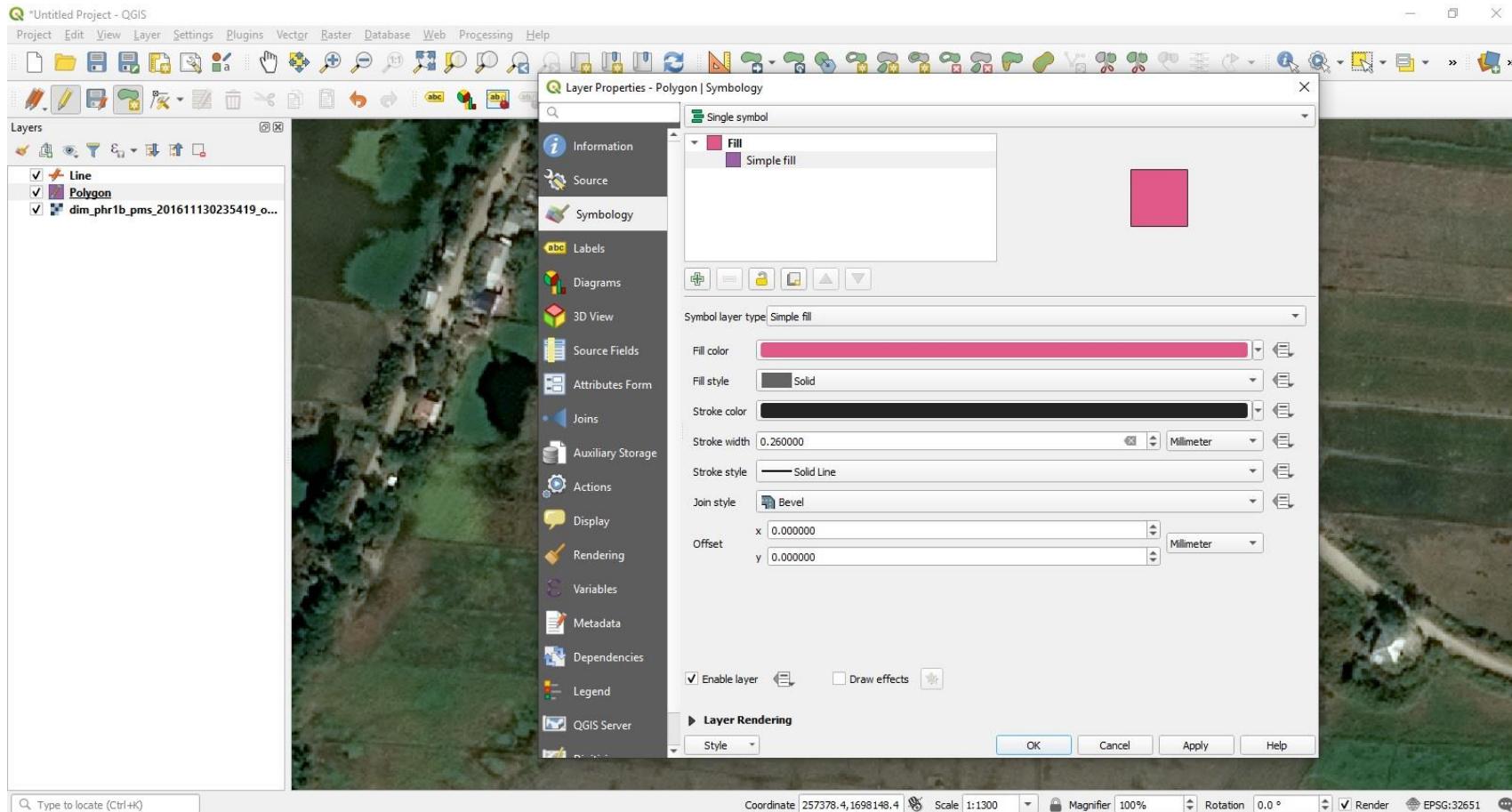
9. Setting feature style.



2.2.2 Input Process

➤ C. Digitizing

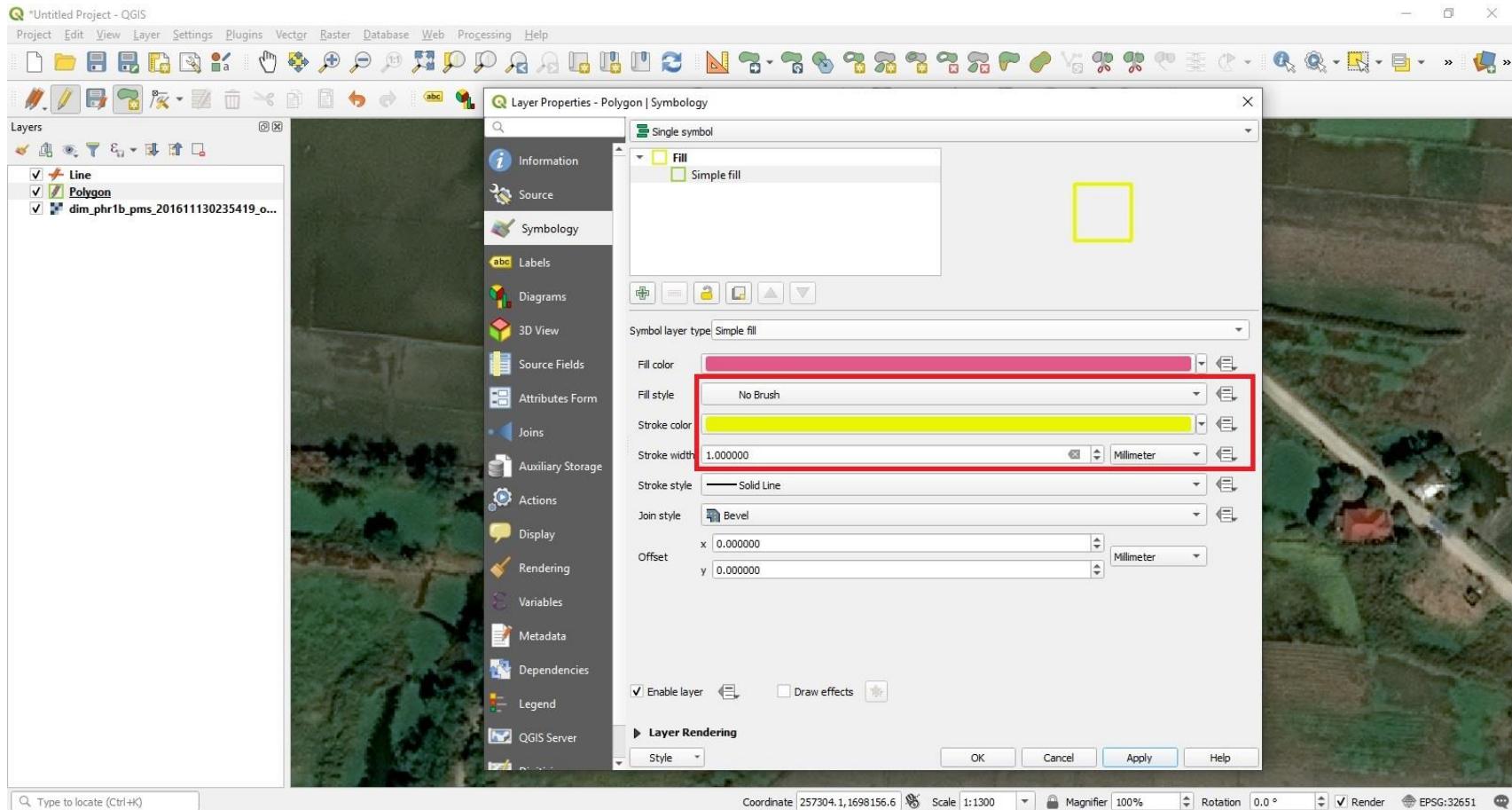
10. Change the width, color, and fill of the feature.



2.2.2 Input Process

➤ C. Digitizing

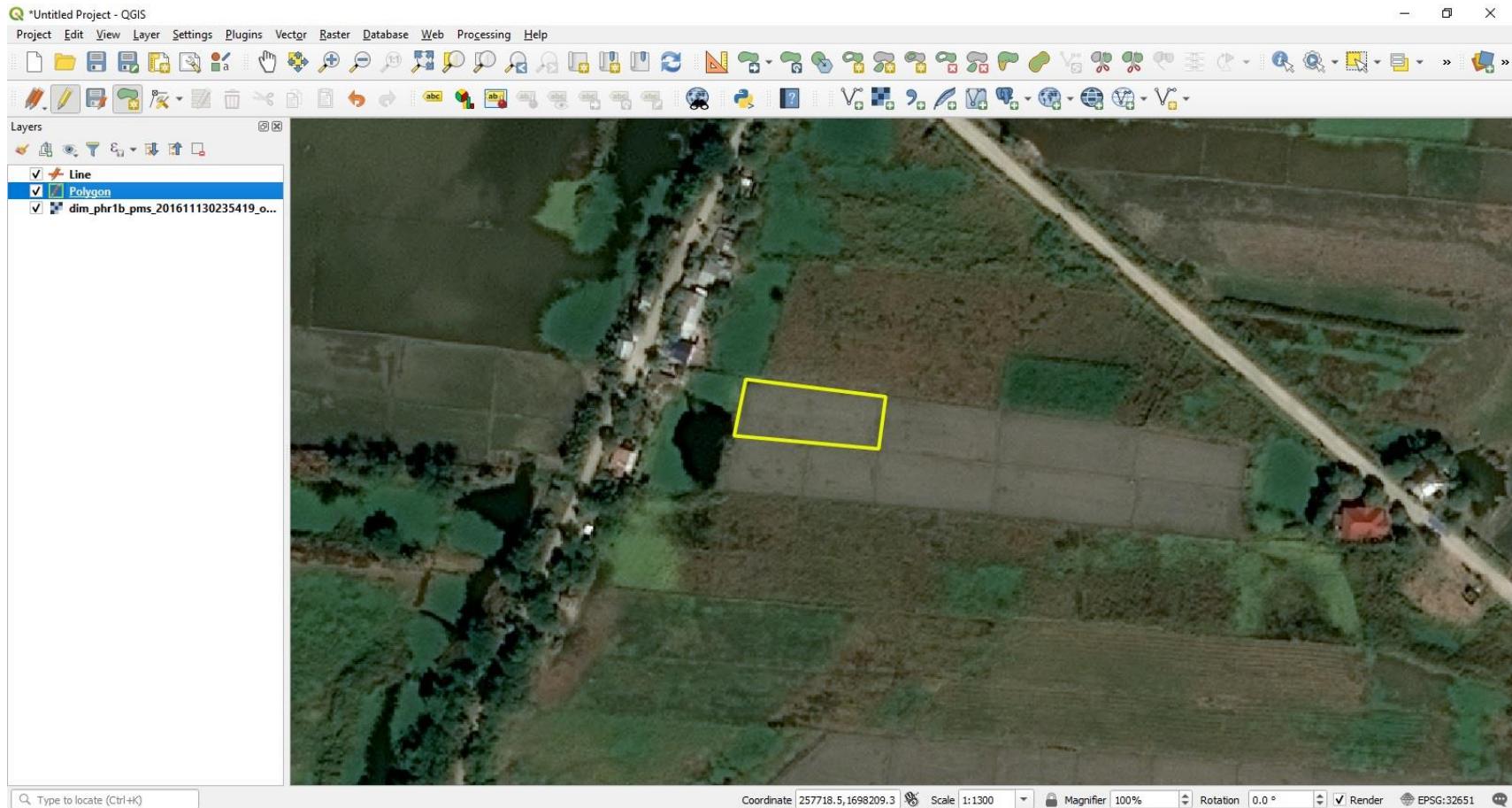
11. Change the width, color and fill of the feature.



2.2.2 Input Process

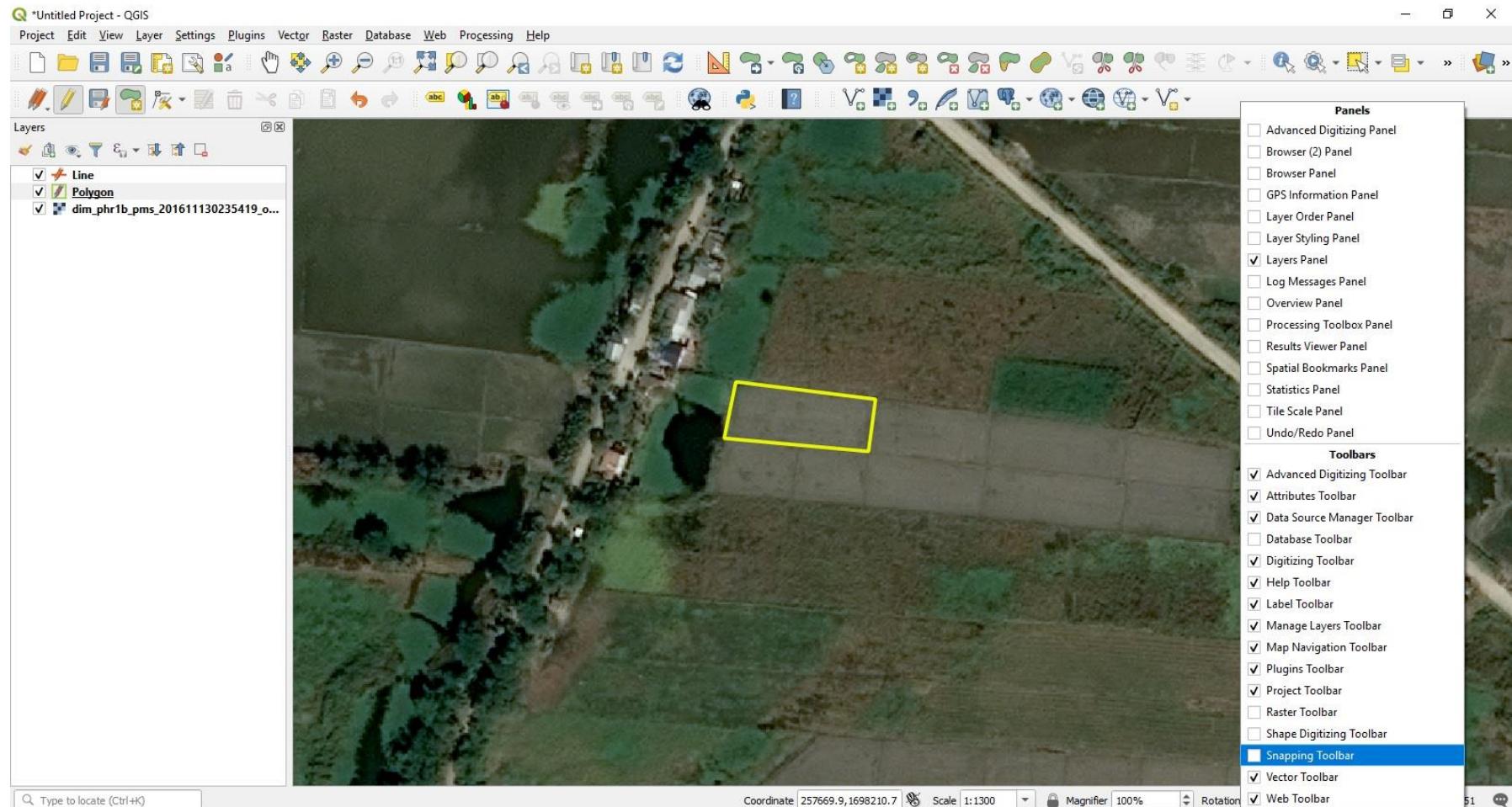
➤ C. Digitizing

The inside of the polygon is visible as well.



2.2.2 Input Process

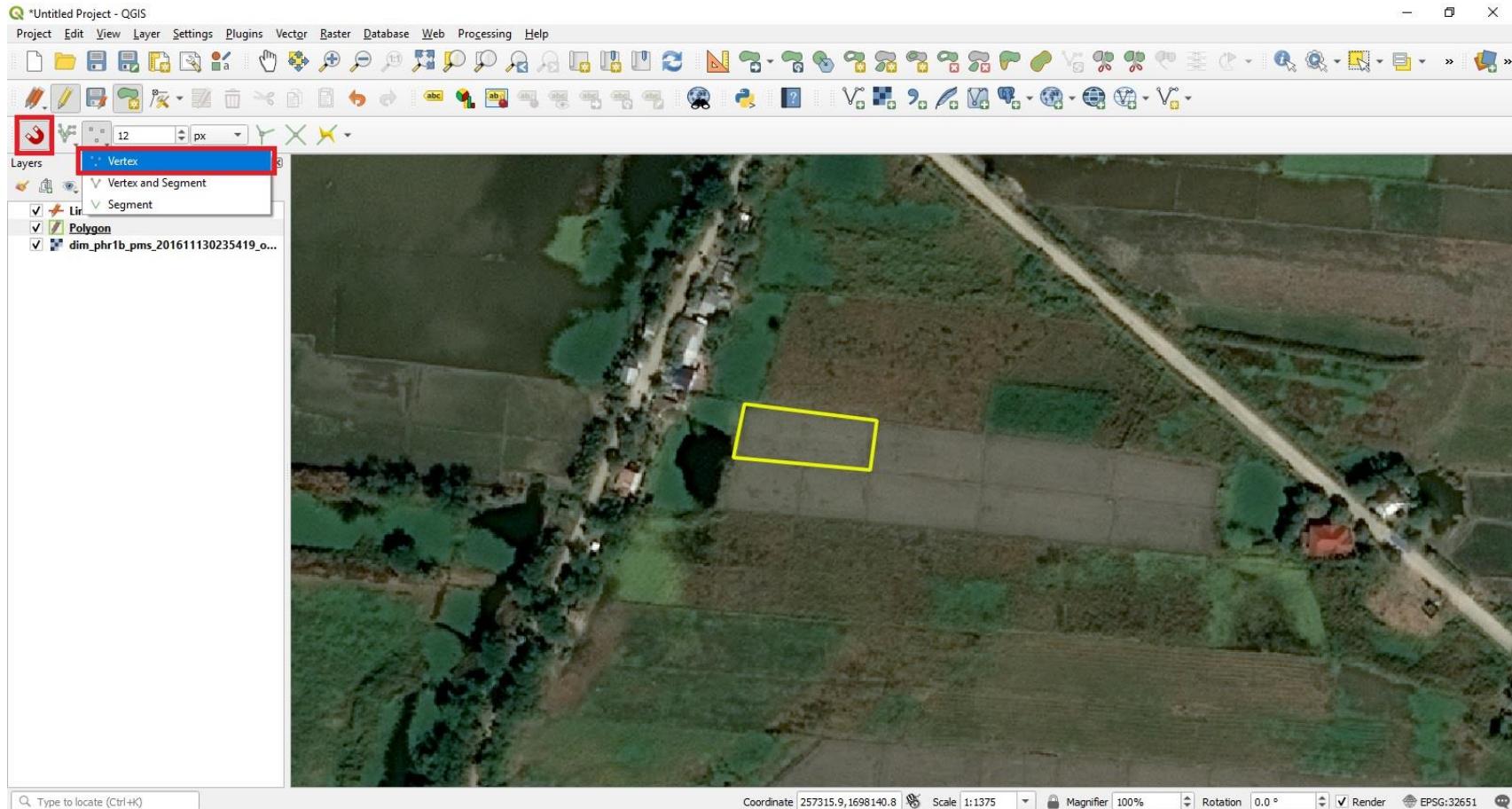
Snapping Toolbar



2.2.2 Input Process

➤ Snapping Toolbar

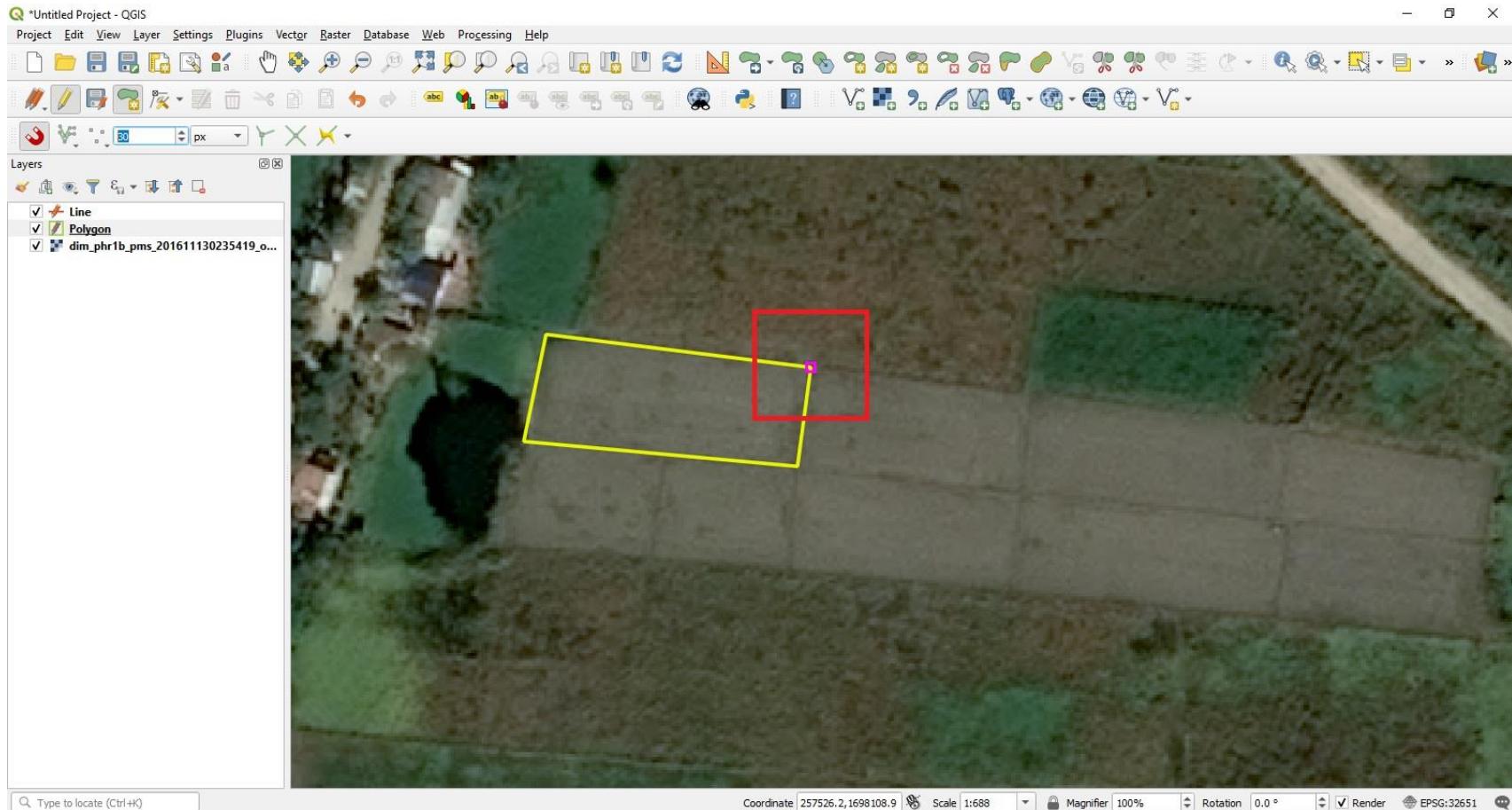
Enable snapping first then choose whether to use vertex, segment or use both.



2.2.2 Input Process

➤ Snapping Toolbar

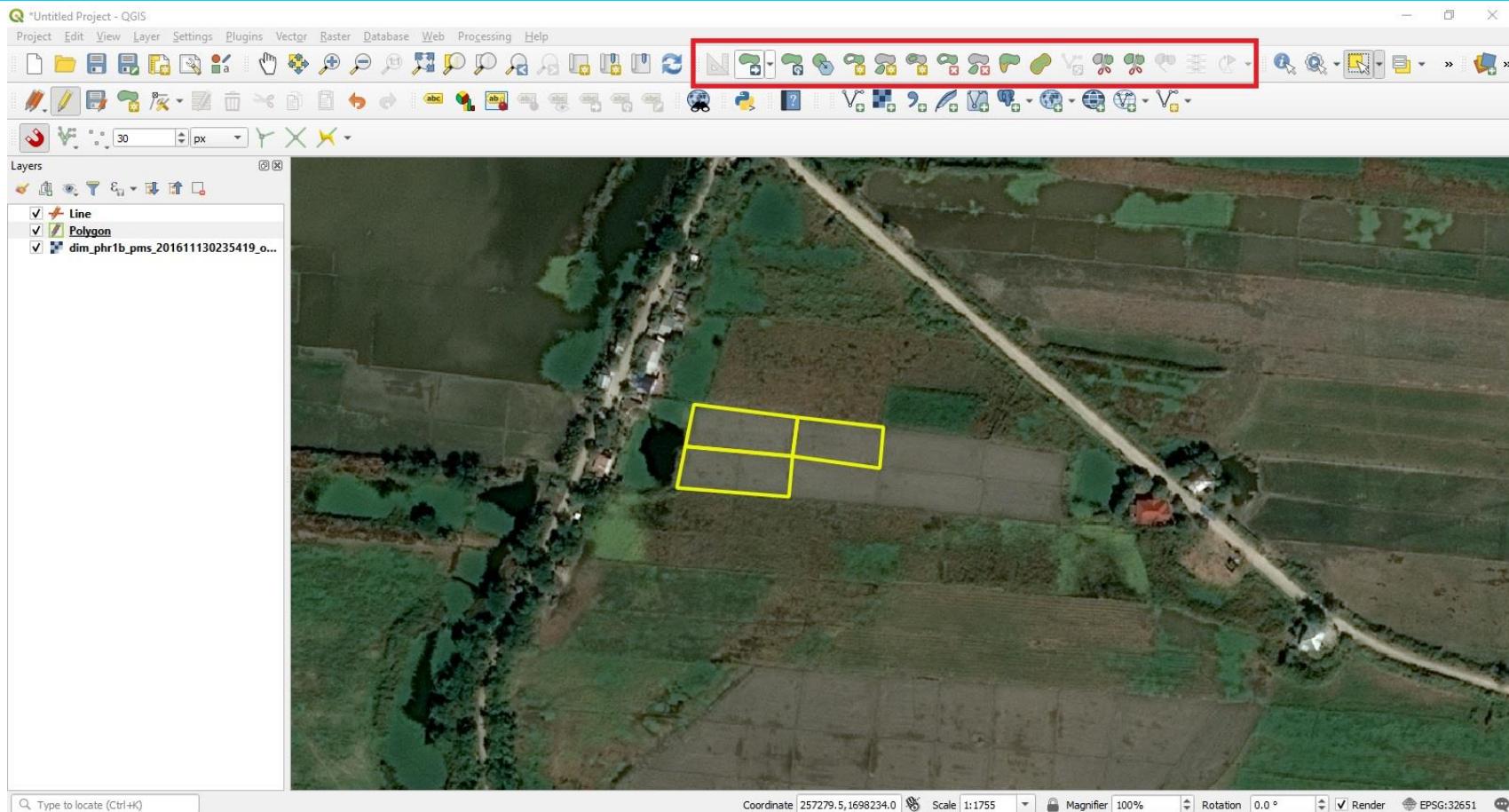
Set the tolerance where the pointer will snap or match exactly with another feature.



2.2.2 Input Process

➤ Advance Editing Toolbar

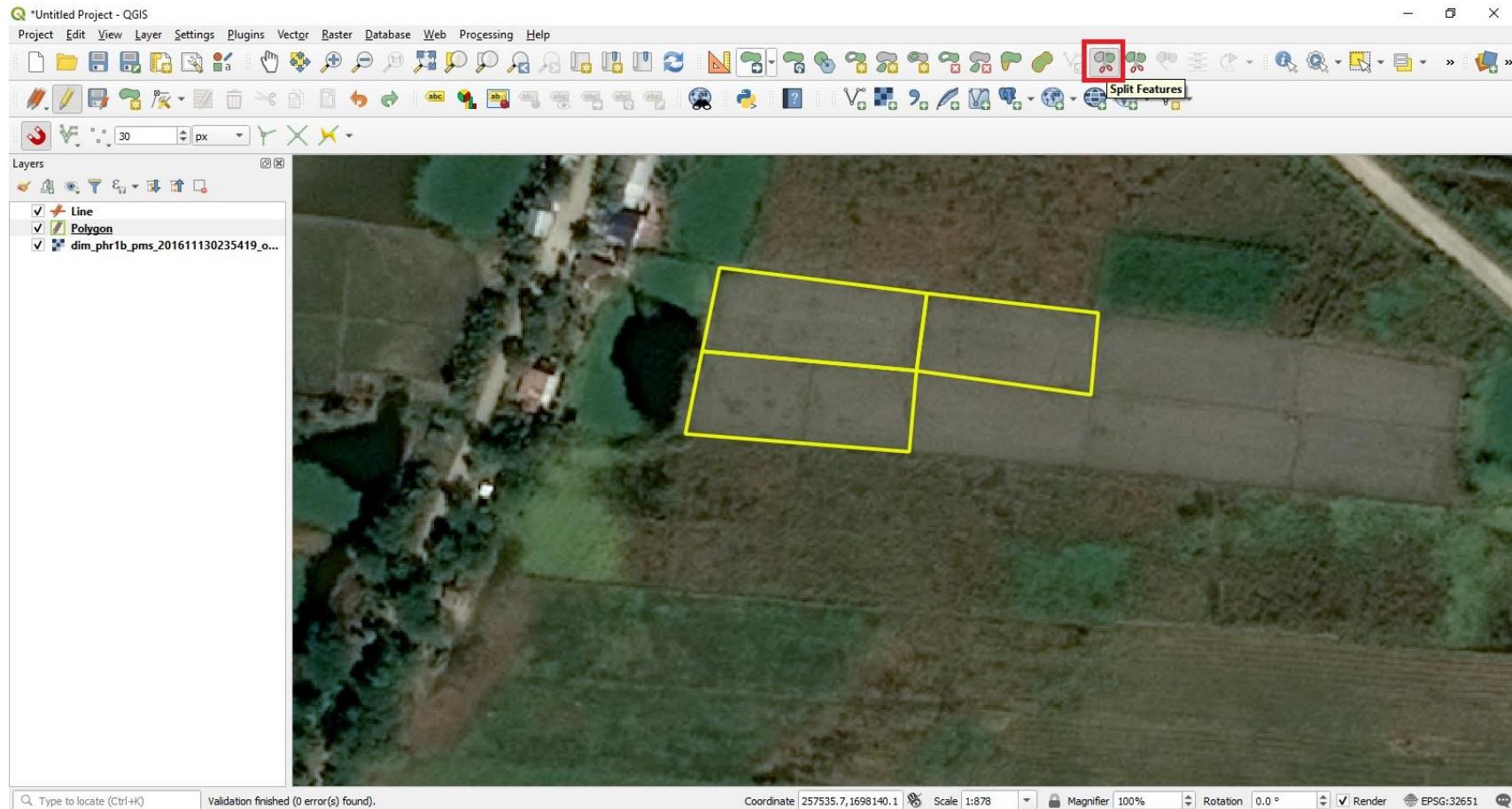
Includes some editing tools such as reshape, split, or merging tool.



2.2.2 Input Process

➤ Split Features

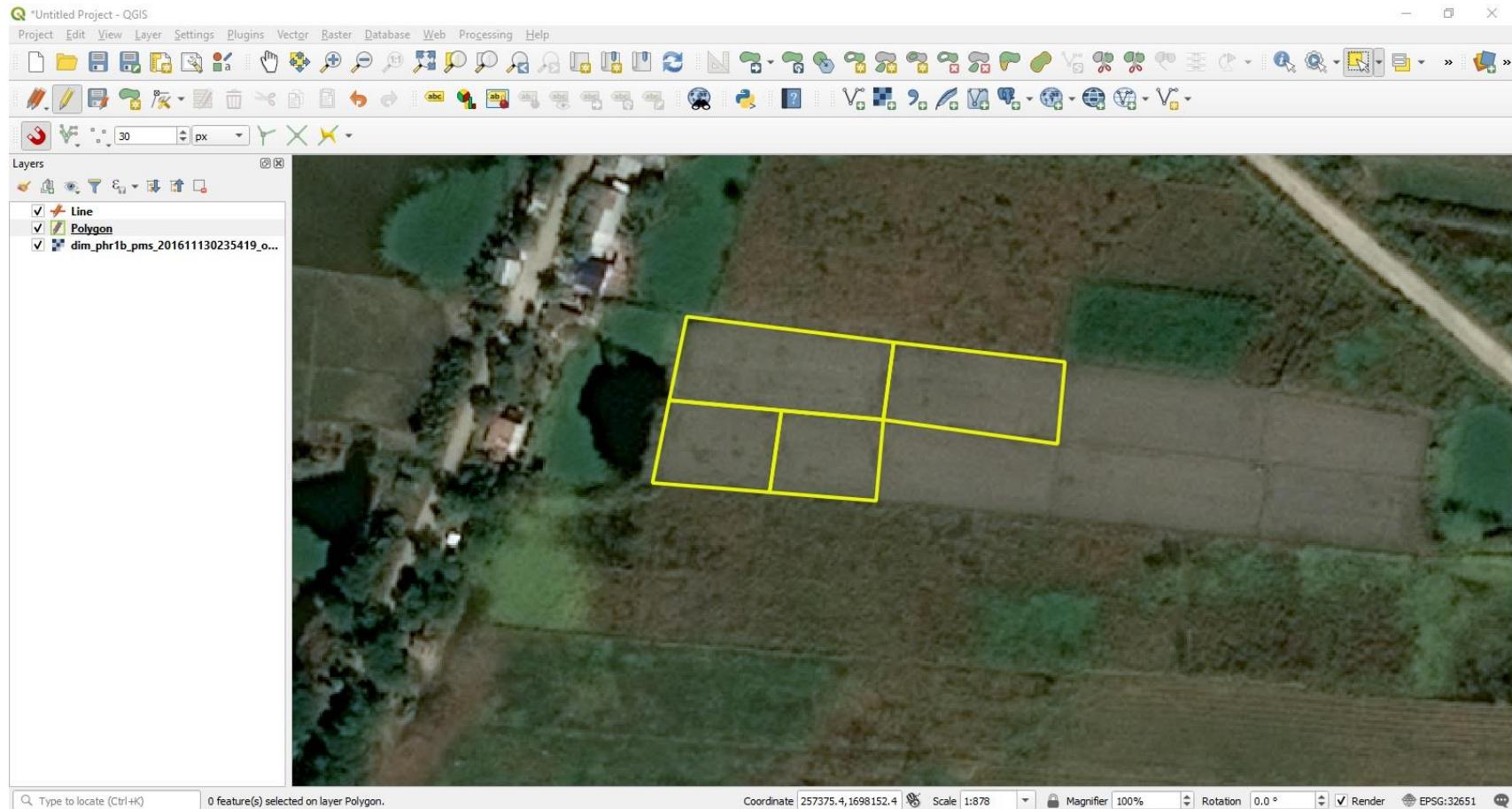
Select the “Split features” tool then cut the feature that you want to split.



2.2.2 Input Process

➤ Split Features

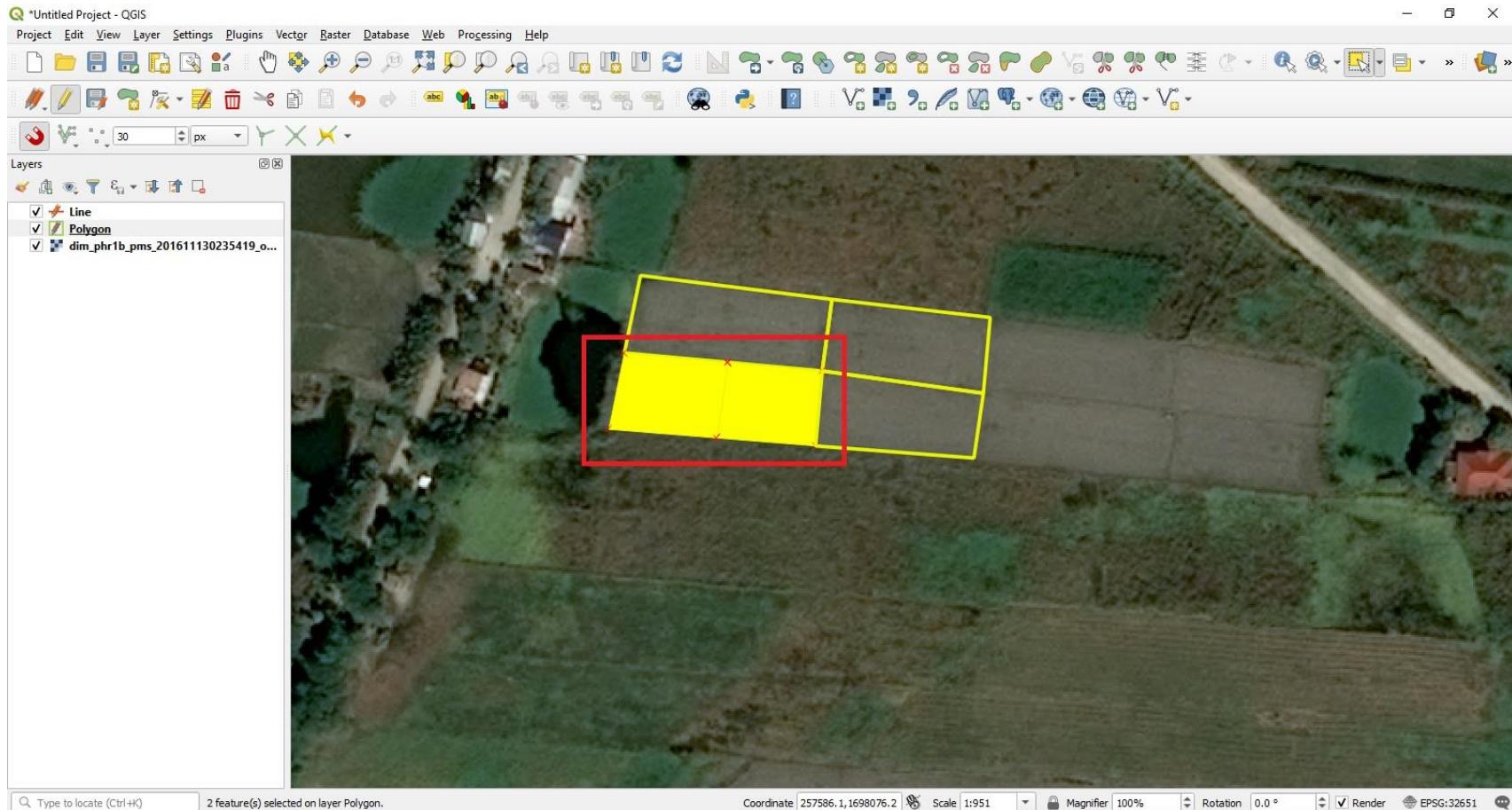
The feature we have split is now divided into two parts.



2.2.2 Input Process

➤ Merge Features

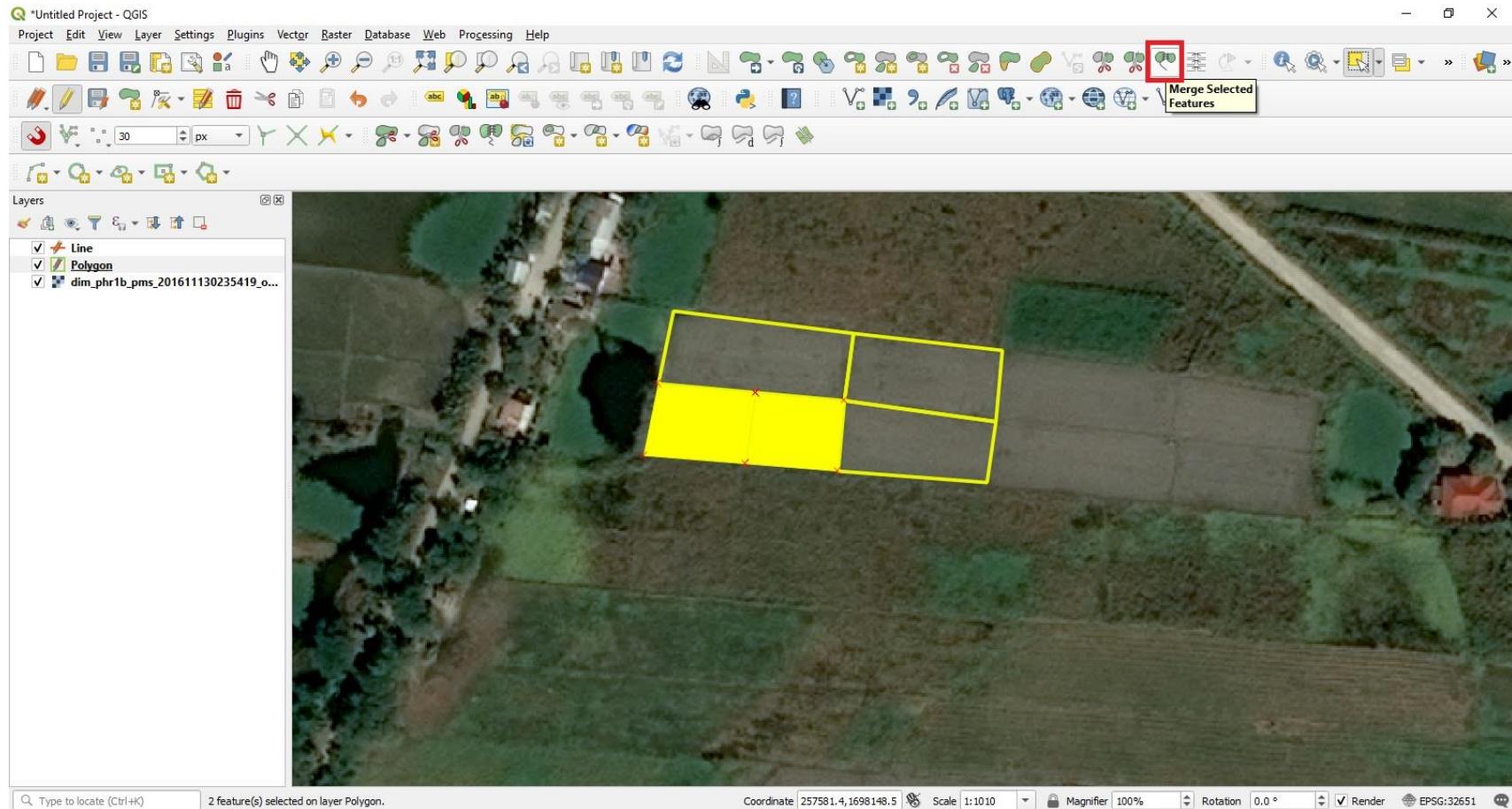
Select the features to merge.



2.2.2 Input Process

➤ Merge Features

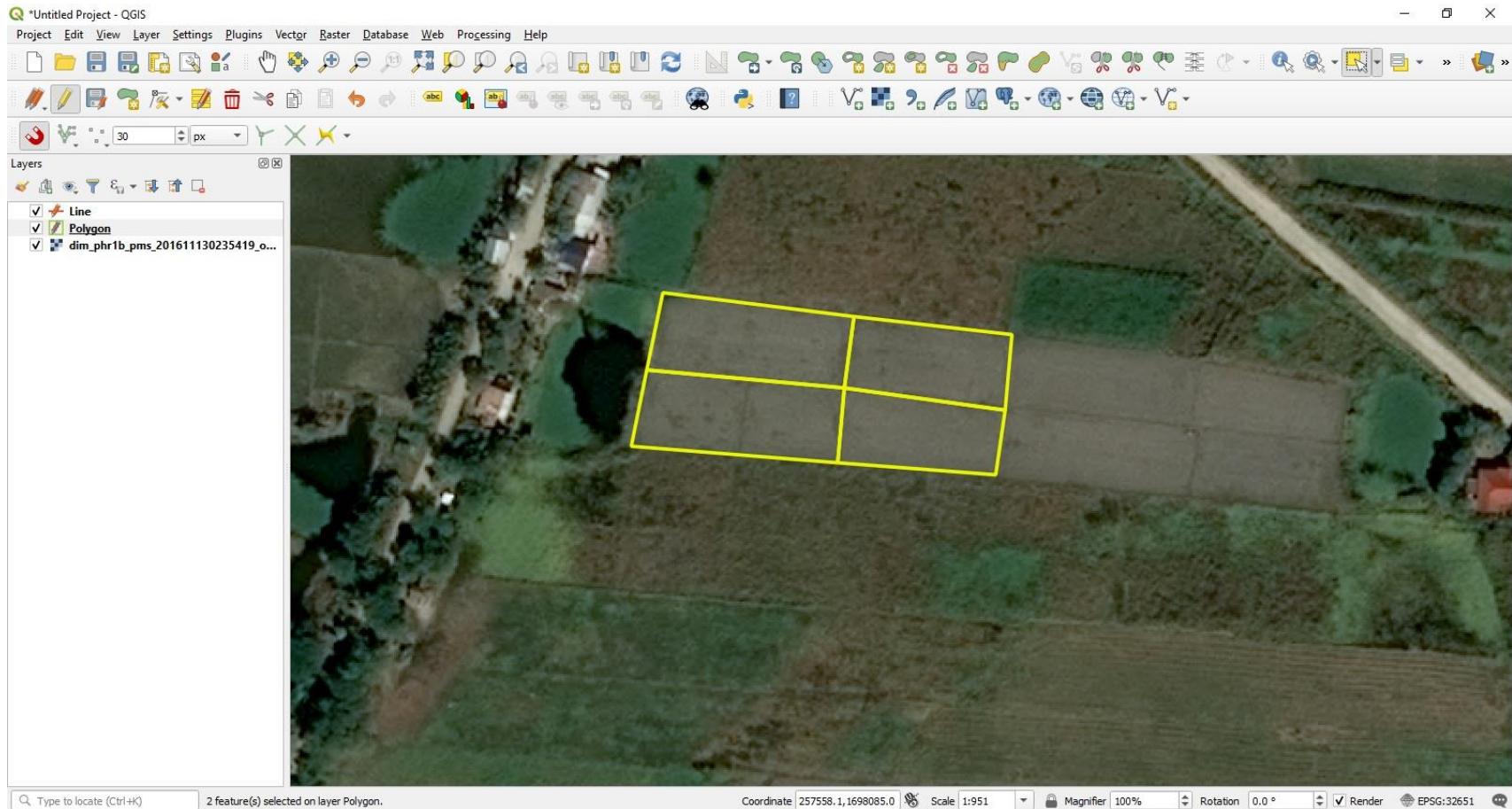
Select the “Merge Selected Features” tool.



2.2.2 Input Process

➤ Merge Features

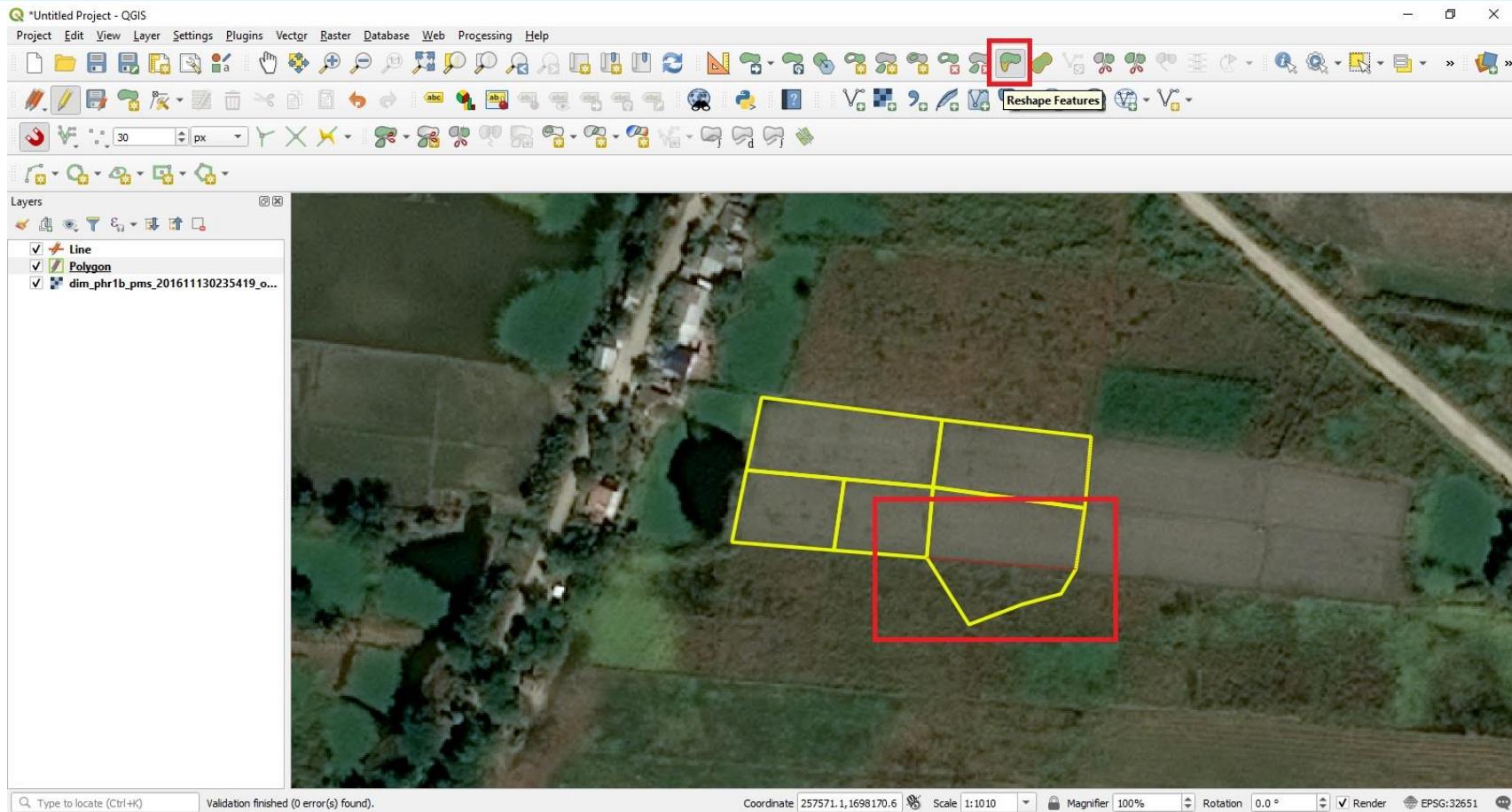
Multipart feature is now merged to one feature.



2.2.2 Input Process

➤ Reshape Features

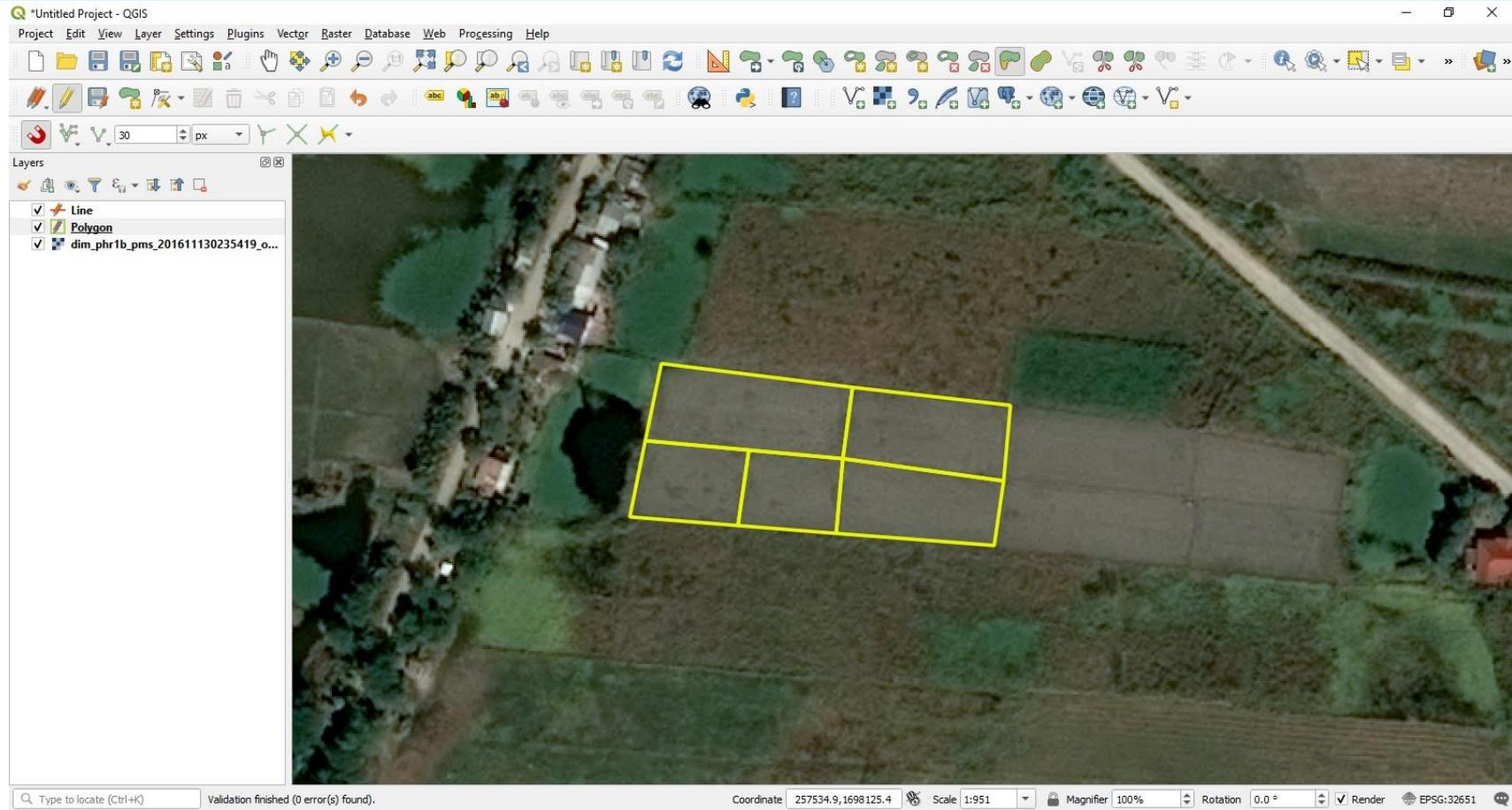
To reshape the feature, select “Reshape Features” tool and start with snapping into the vertex or edge of the feature and end with the other segment or vertex also.



2.2.2 Input Process

➤ Reshape Features

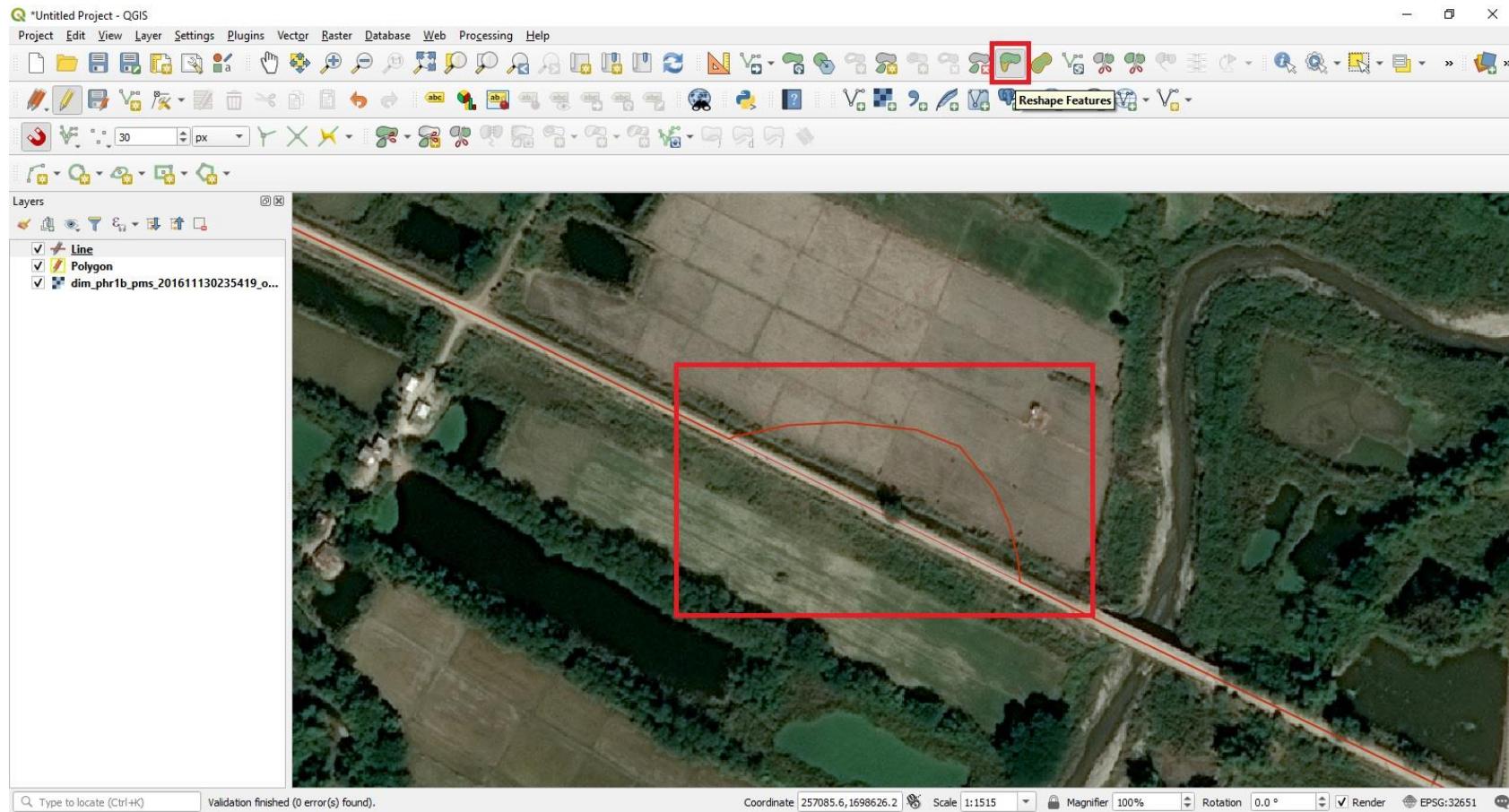
Output of reshaped feature after editing.



2.2.2 Input Process

➤ Reshape Features

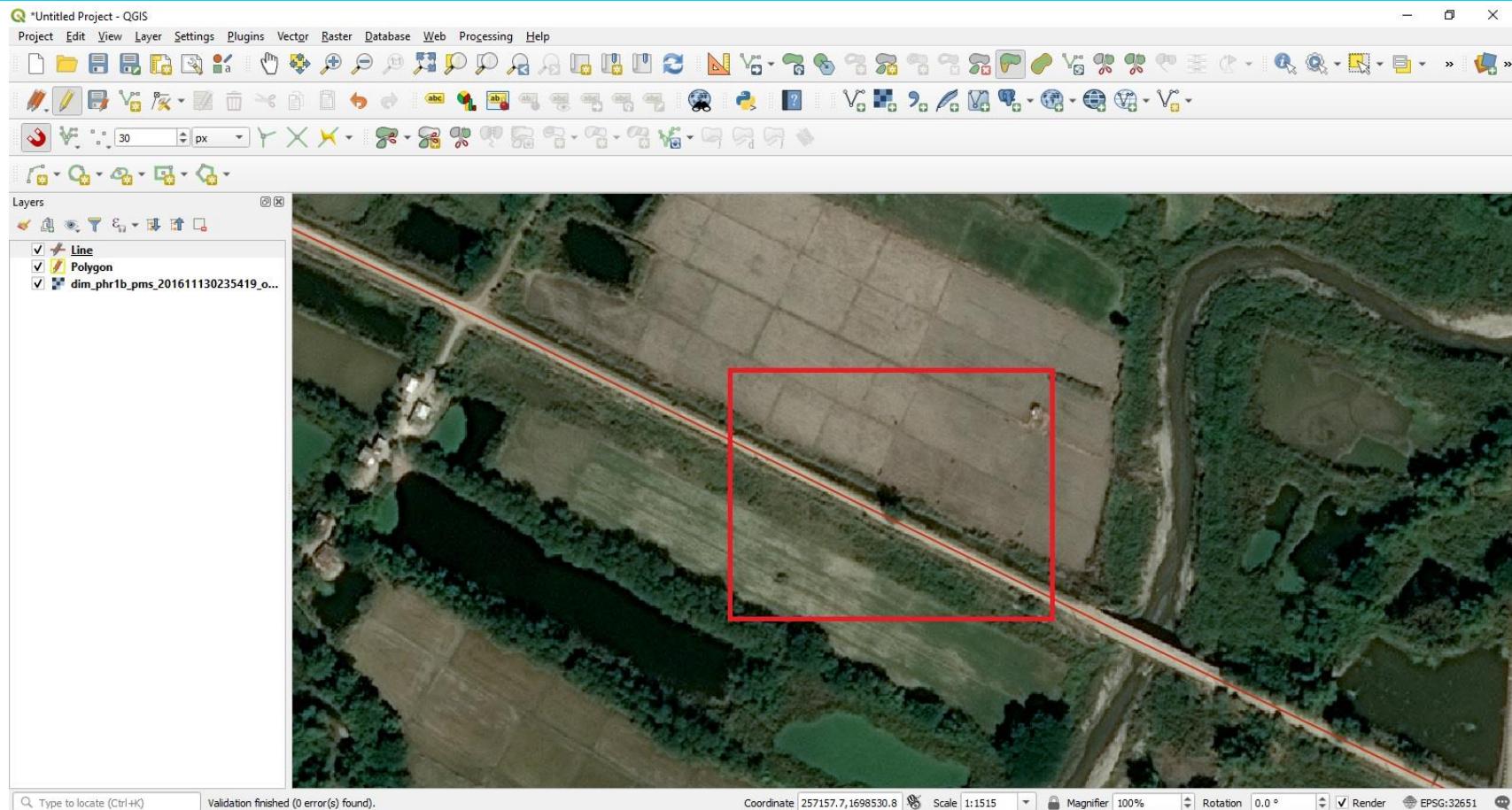
To reshape the feature, select “Reshape Features” tool and start with snapping into the vertex or edge of the feature and end with the other segment or vertex also.



2.2.2 Input Process

➤ Reshape Features

Output of reshaped feature after editing.



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