



Geographic Information System

Zonal Statistics & Map Layout Lab Practice

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Outline

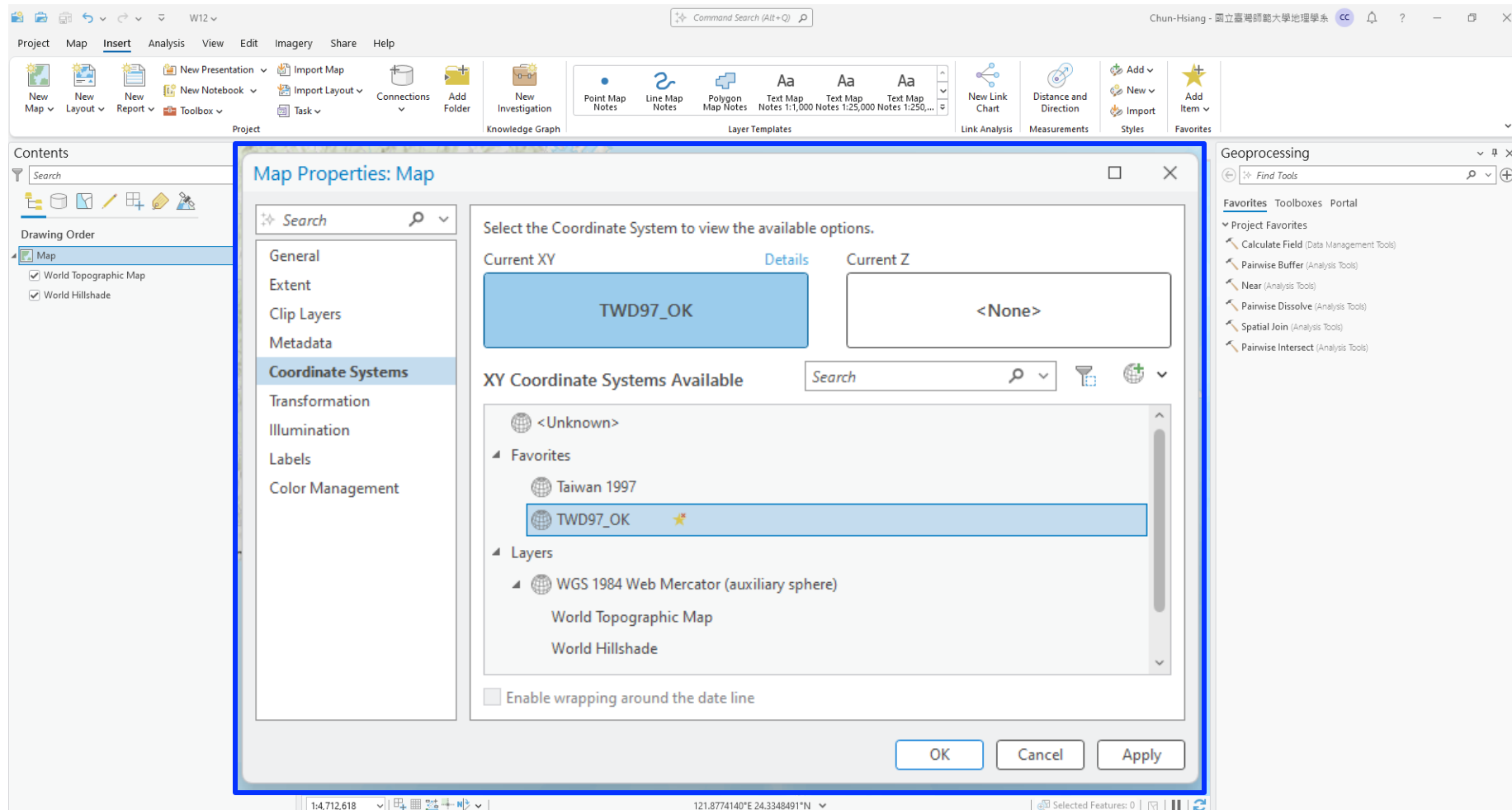
- DEM Data Processing
- Characterize the Geomorphology of Taipei City
- Plot a Map



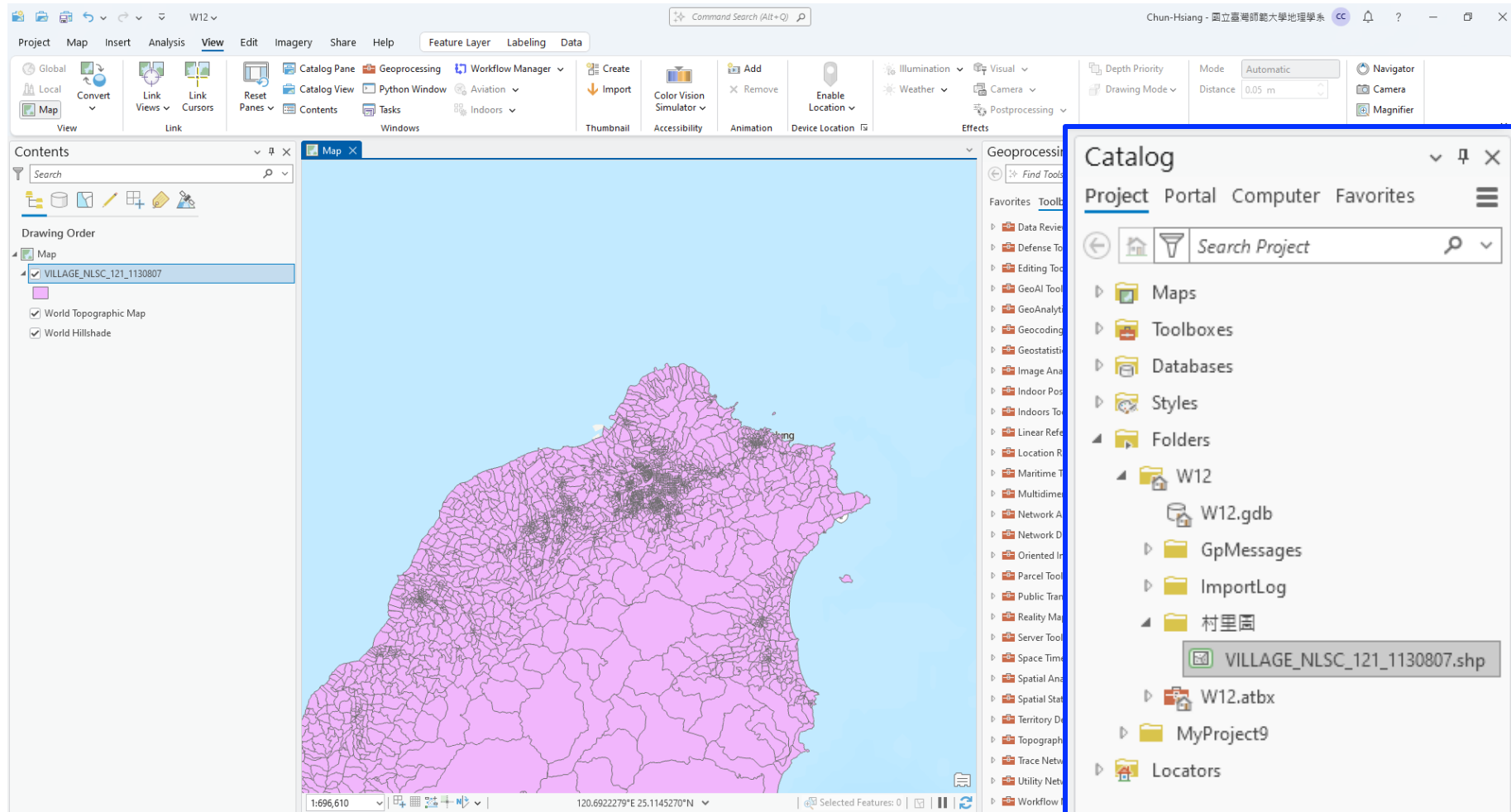
Initial Settings (...)

- 1) Set up the CRS of the map
- 2) Load Taiwan Village Data and Export Taipei Village Data
- 3) Mosaic To New Raster to combine all DEM data
- 4) Clip Raster with Taipei Village Boundary
- 5) Compute Contour
- 6) Compute Hillshade
- 7) Compute Slope
- 8) Feature To Point for Taipei Village Data
- 9) Compute Viewshed
- 10) Create Chart
- 11) Map Layout

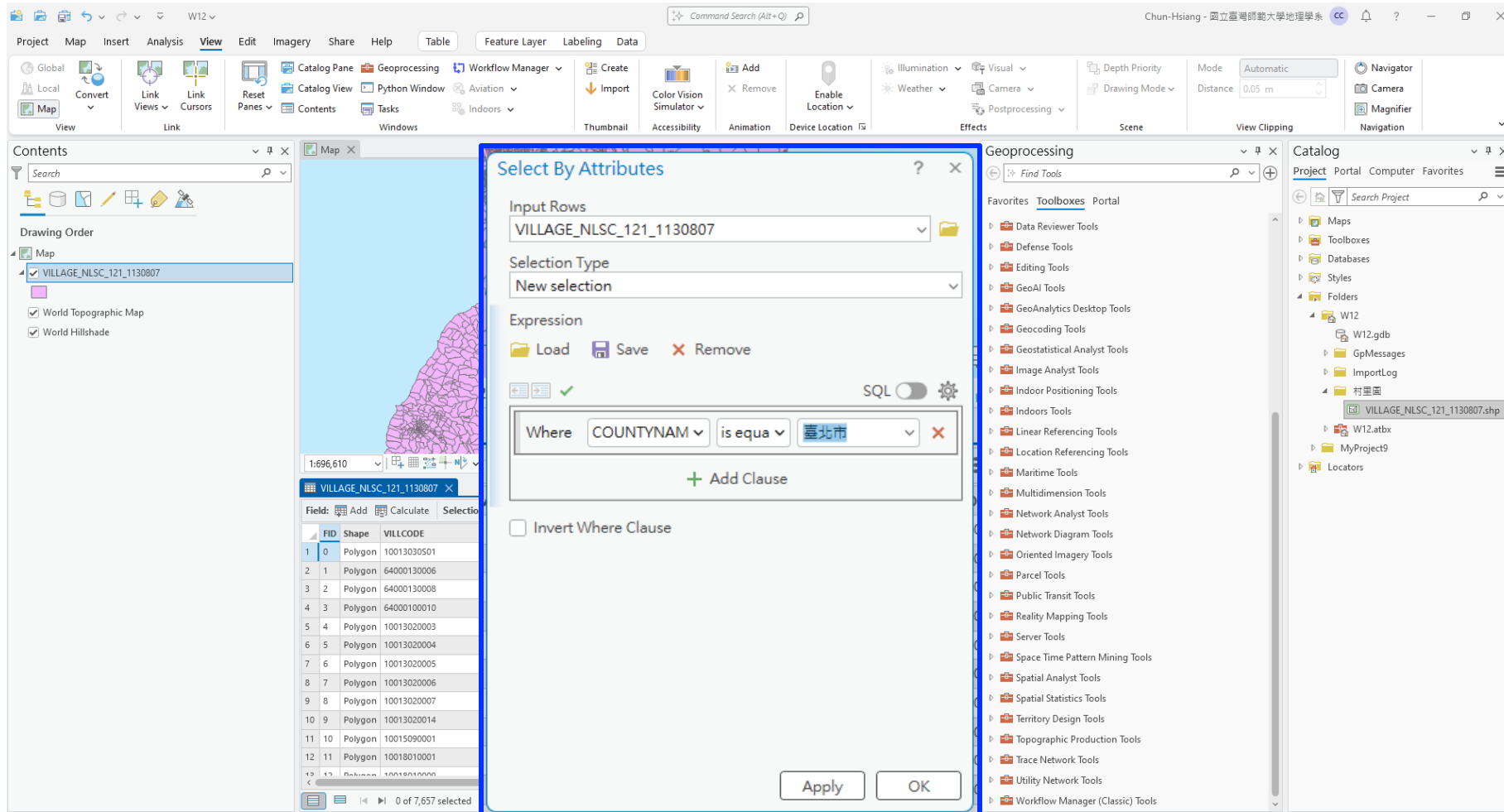
Map Settings



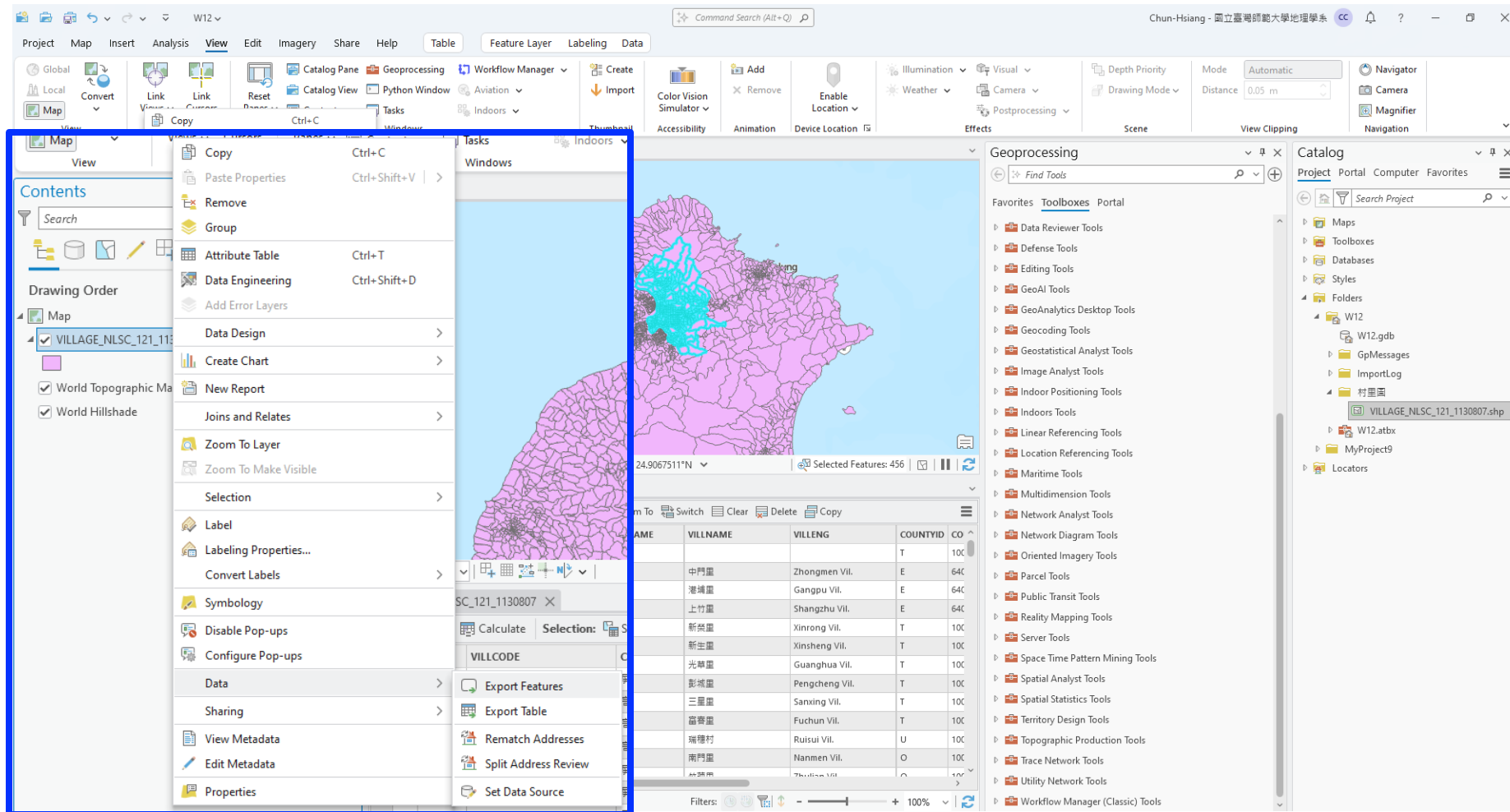
Import Taipei Village Data



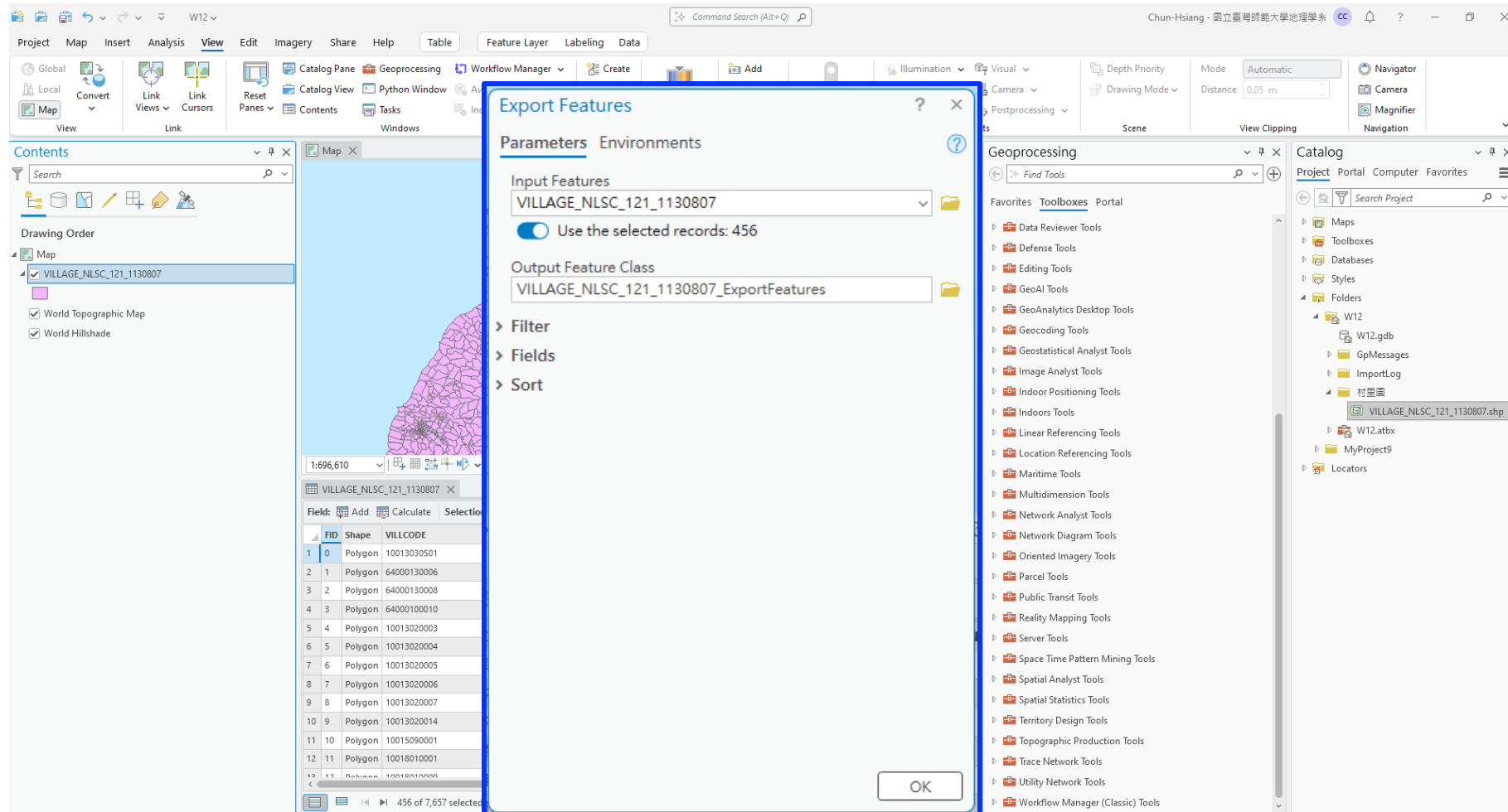
Select By Attribute :: Taipei



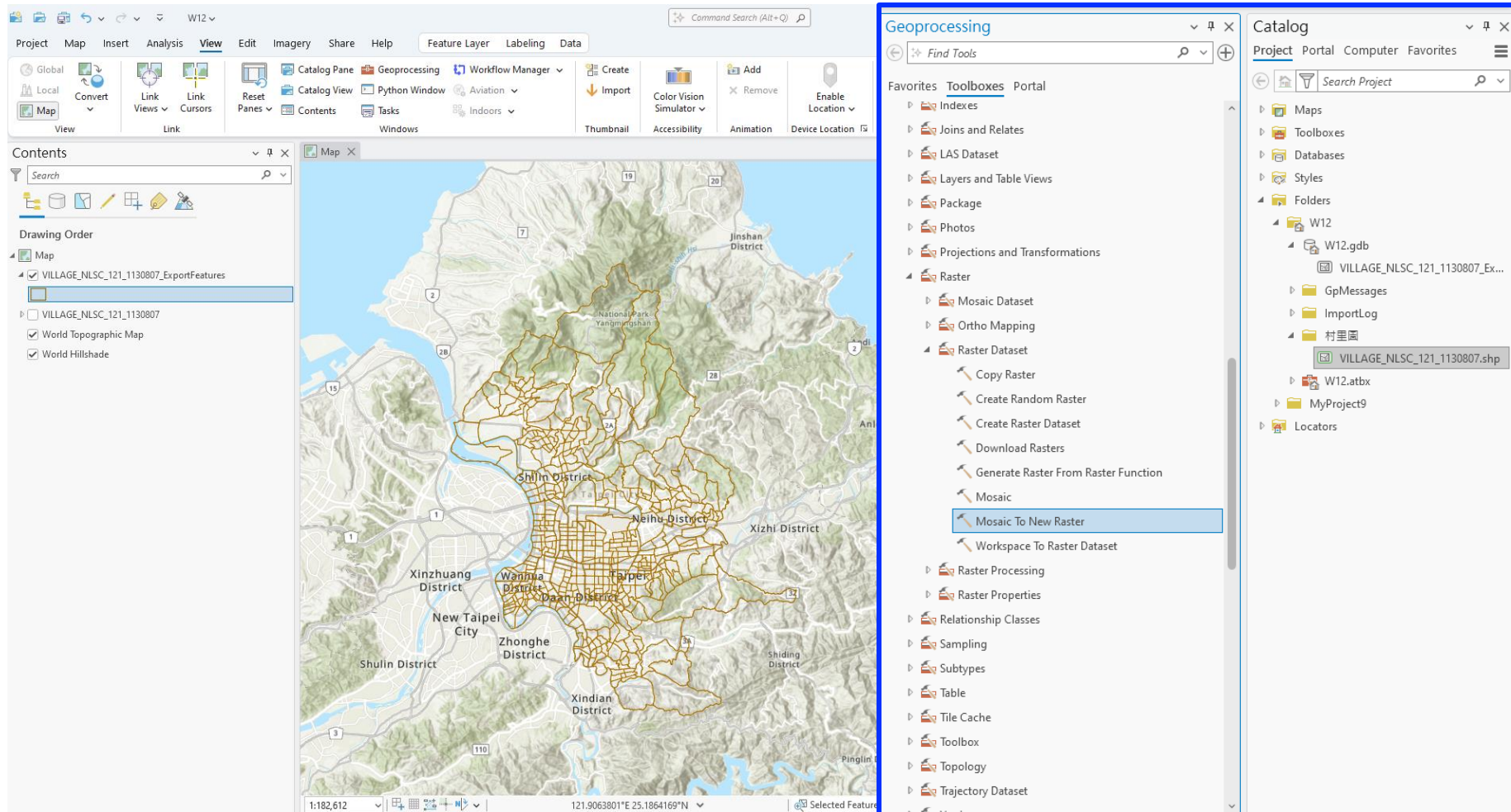
Export Features



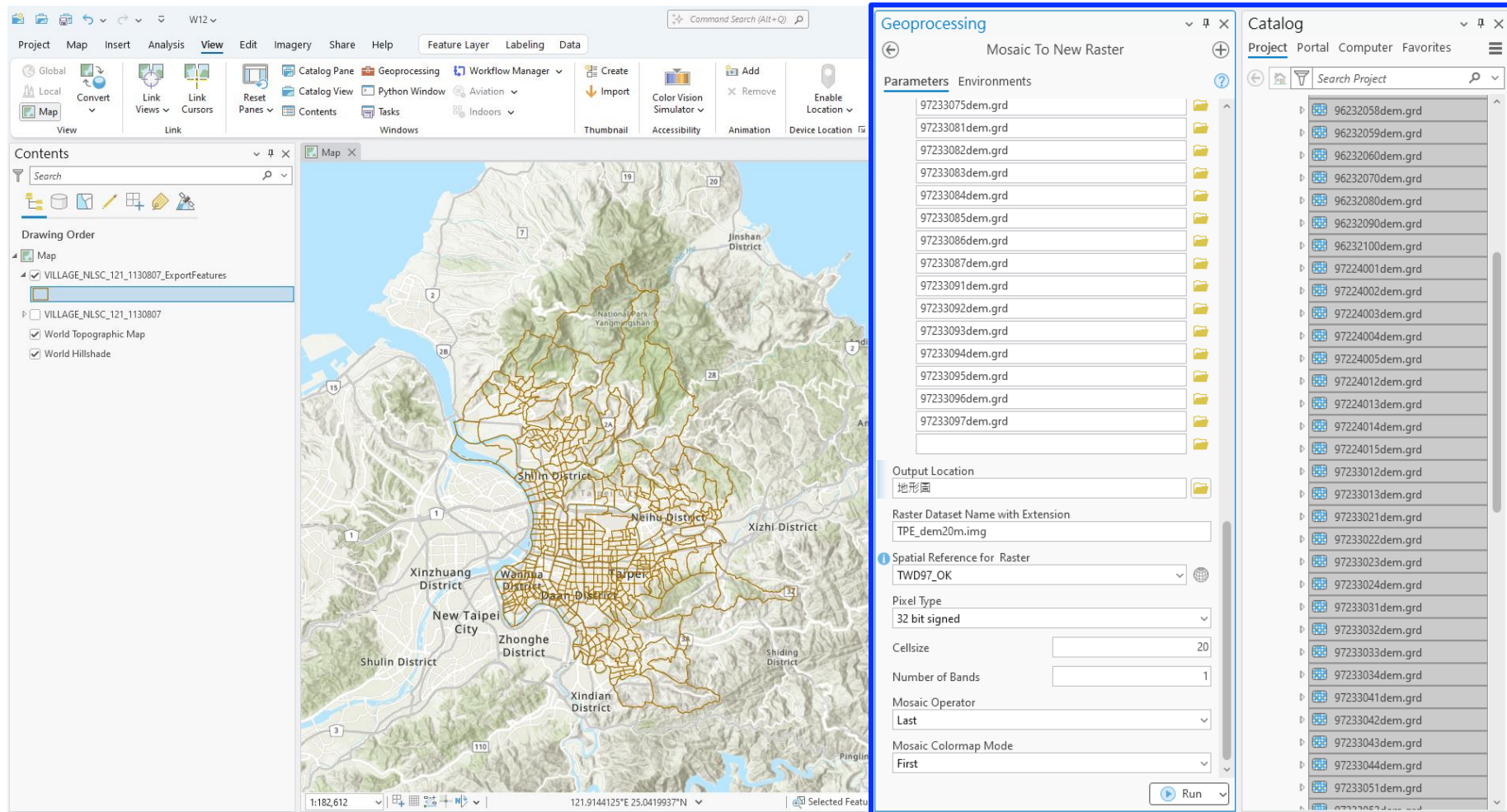
Export Features



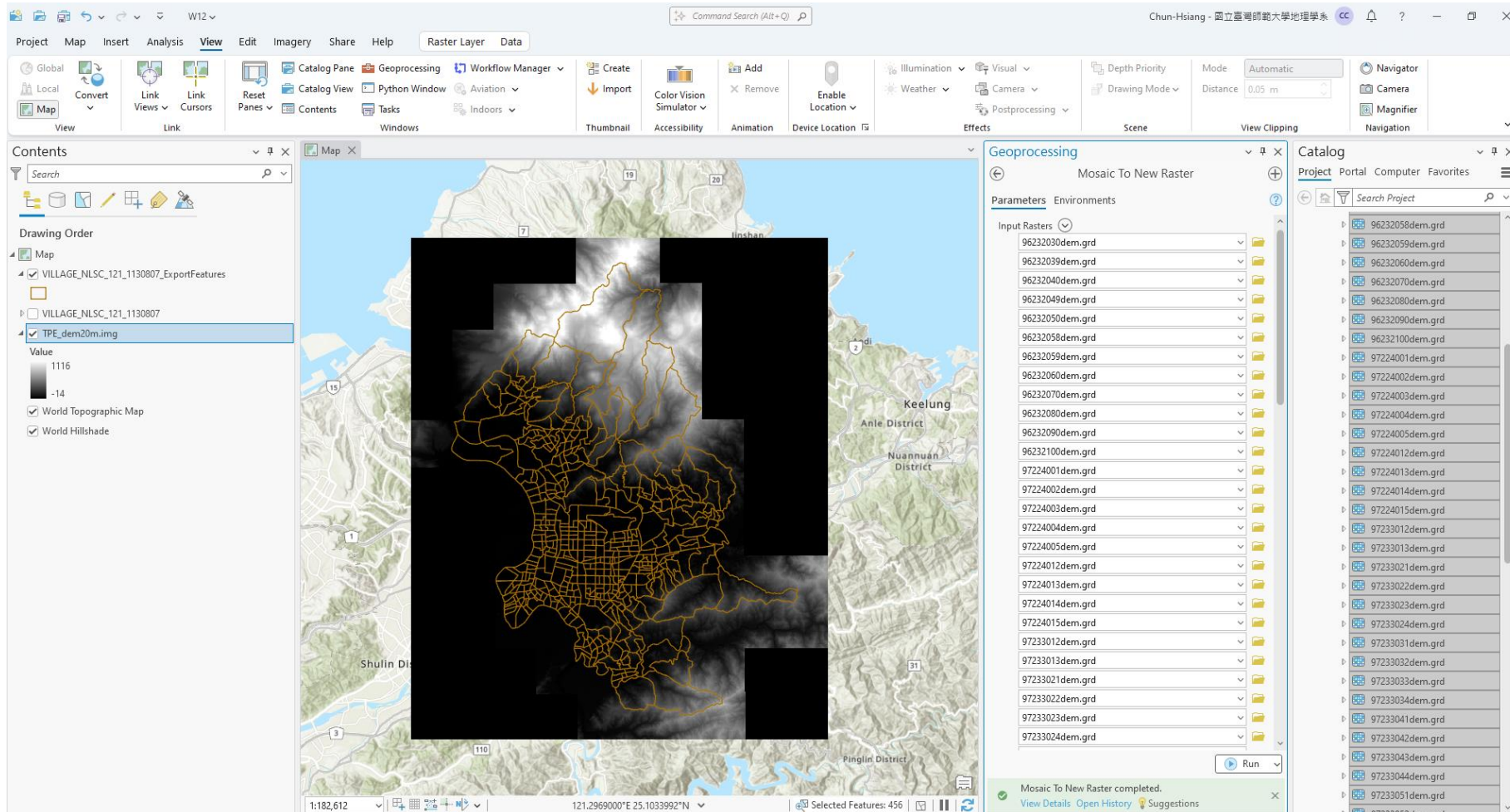
Mosaic To New Raster



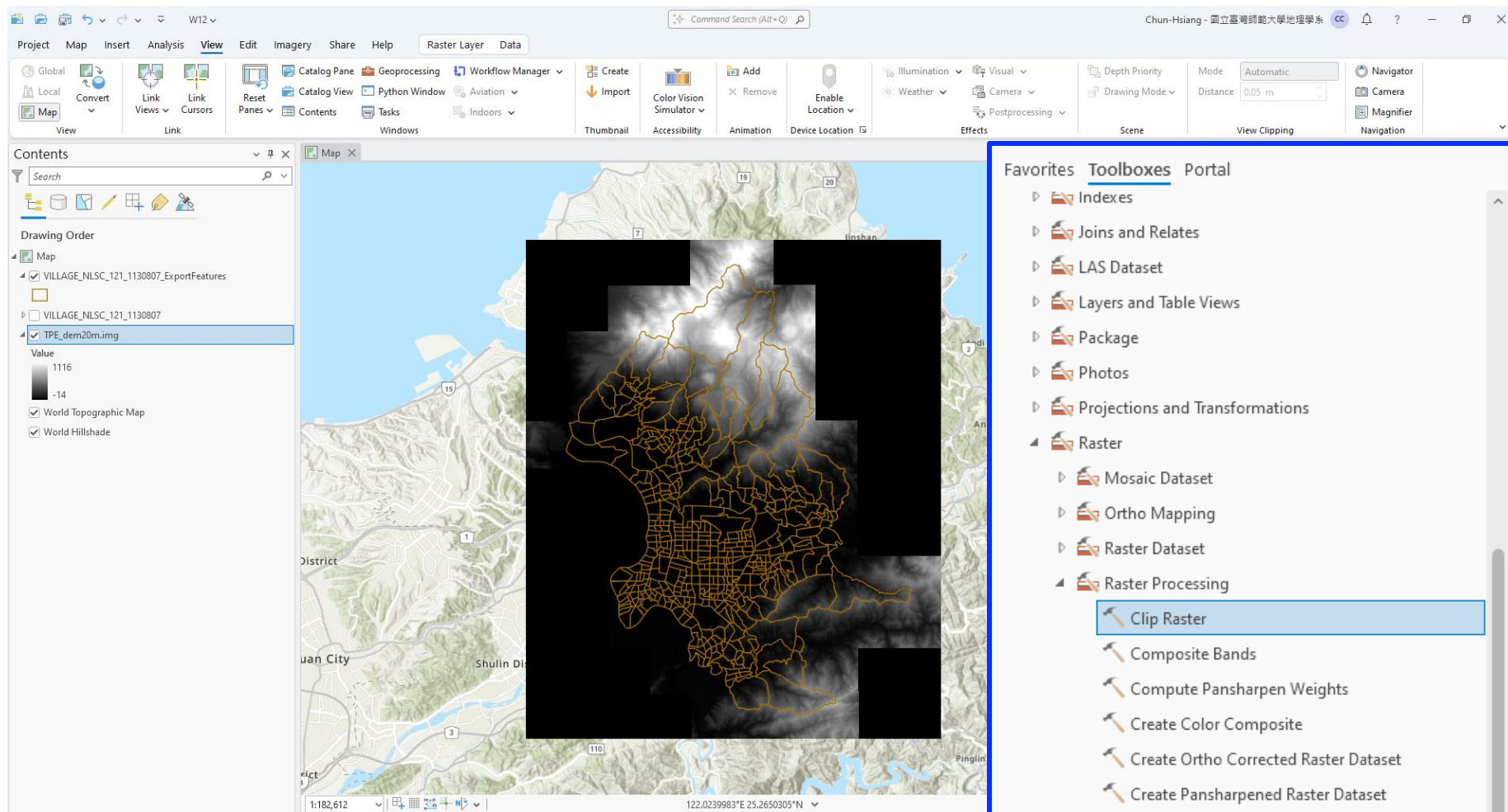
Mosaic To New Raster



Mosaic To New Raster



Clip Raster



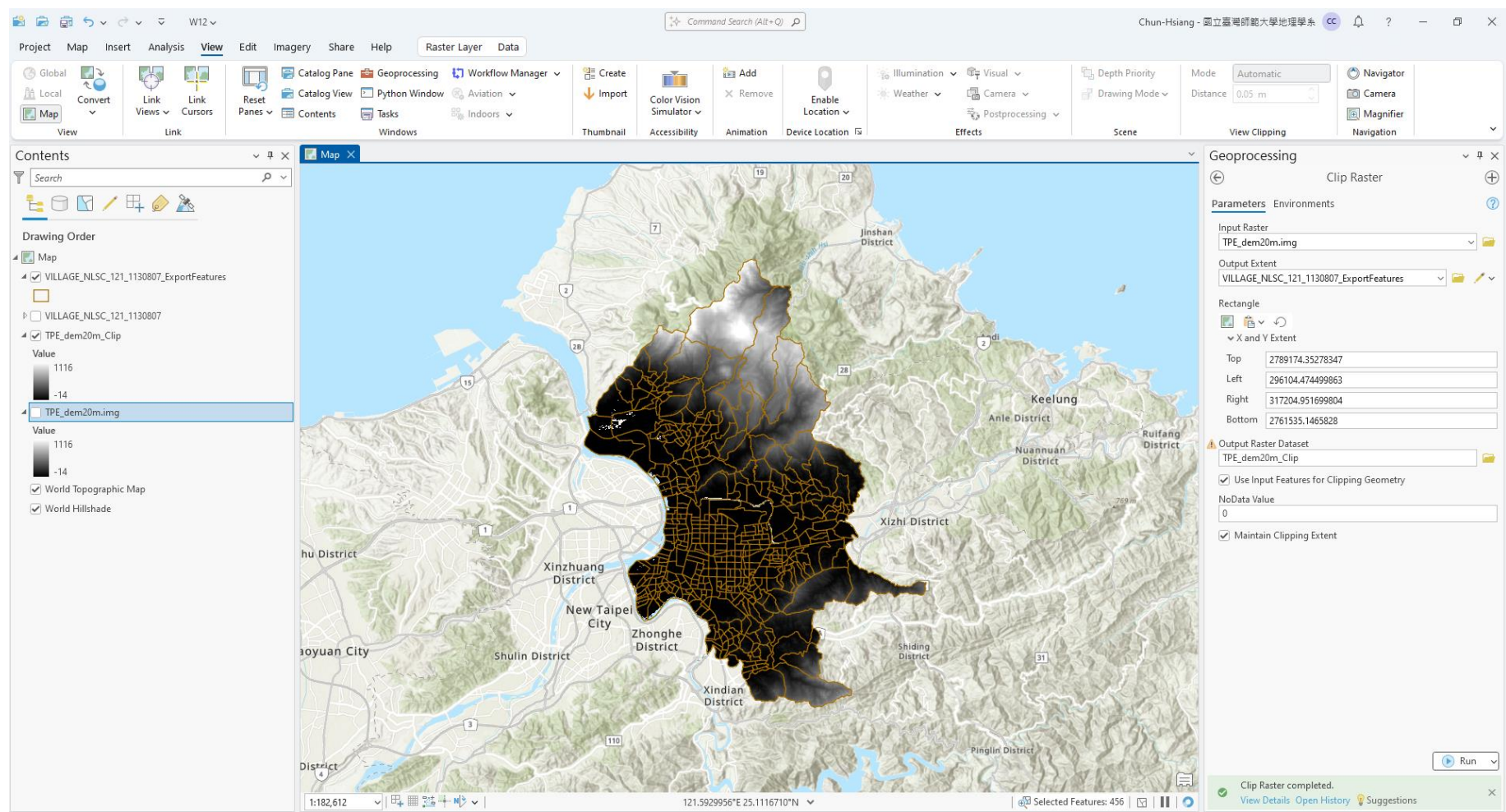
Clip Raster

The screenshot displays the ArcGIS Desktop interface with the **Clip Raster** tool open. The tool's parameters are as follows:

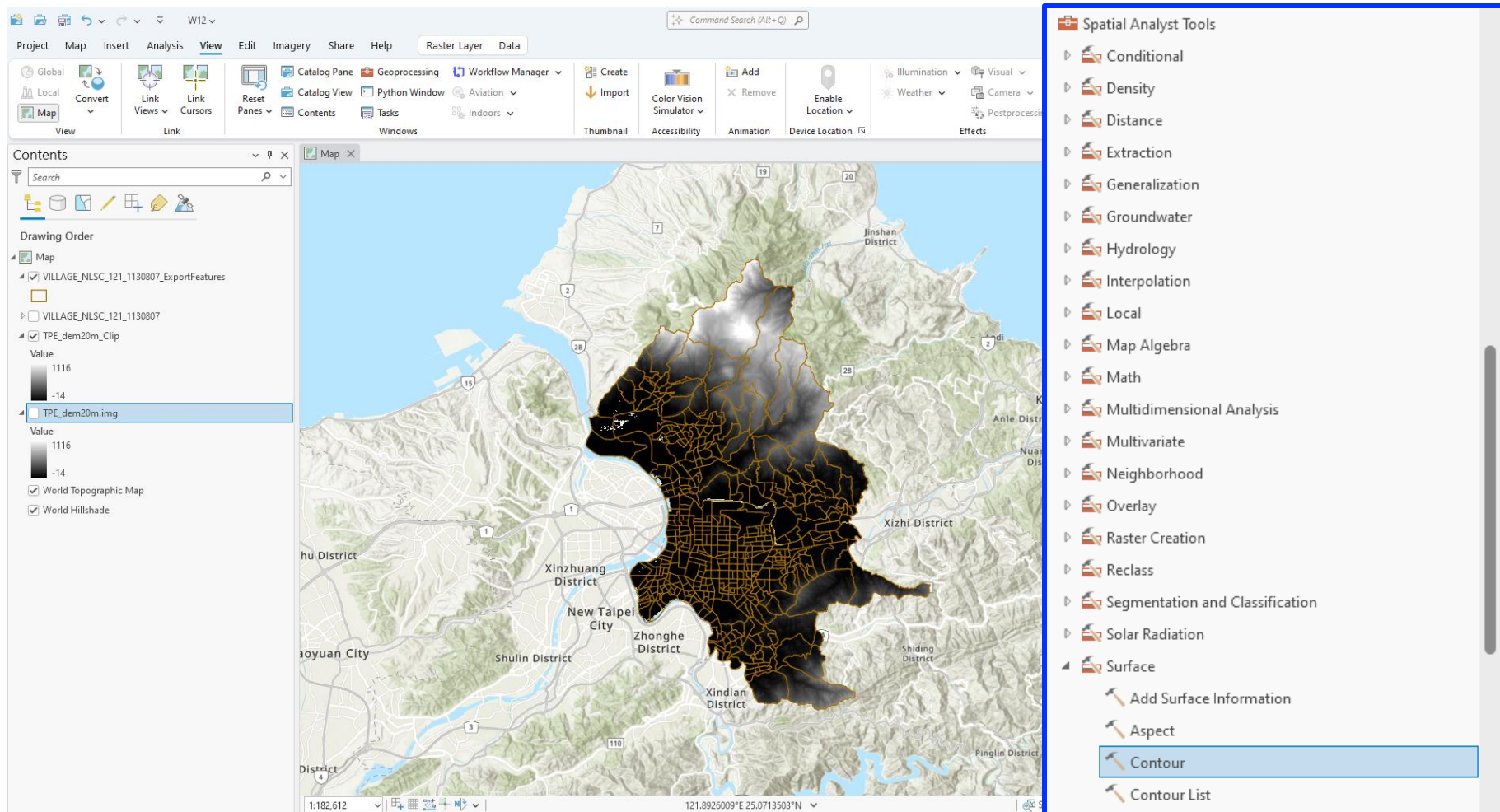
- Input Raster:** TPE_dem20m.img
- Output Extent:** VILLAGE_NLSC_121_1130807_ExportFeatures
- Rectangle:** X and Y Extent is checked, with the following values:
 - Top: 2789174.35278347
 - Left: 296104.474499863
 - Right: 317204.951699804
 - Bottom: 2761535.1465828
- Output Raster Dataset:** TPE_dem20m_Clip
- Use Input Features for Clipping Geometry:**
- NoData Value:** 0
- Maintain Clipping Extent:**

The map view shows a topographic map with a black polygon representing the village boundary. The DEM raster is clipped to this polygon, resulting in a black background outside the polygon and a grayscale DEM inside.

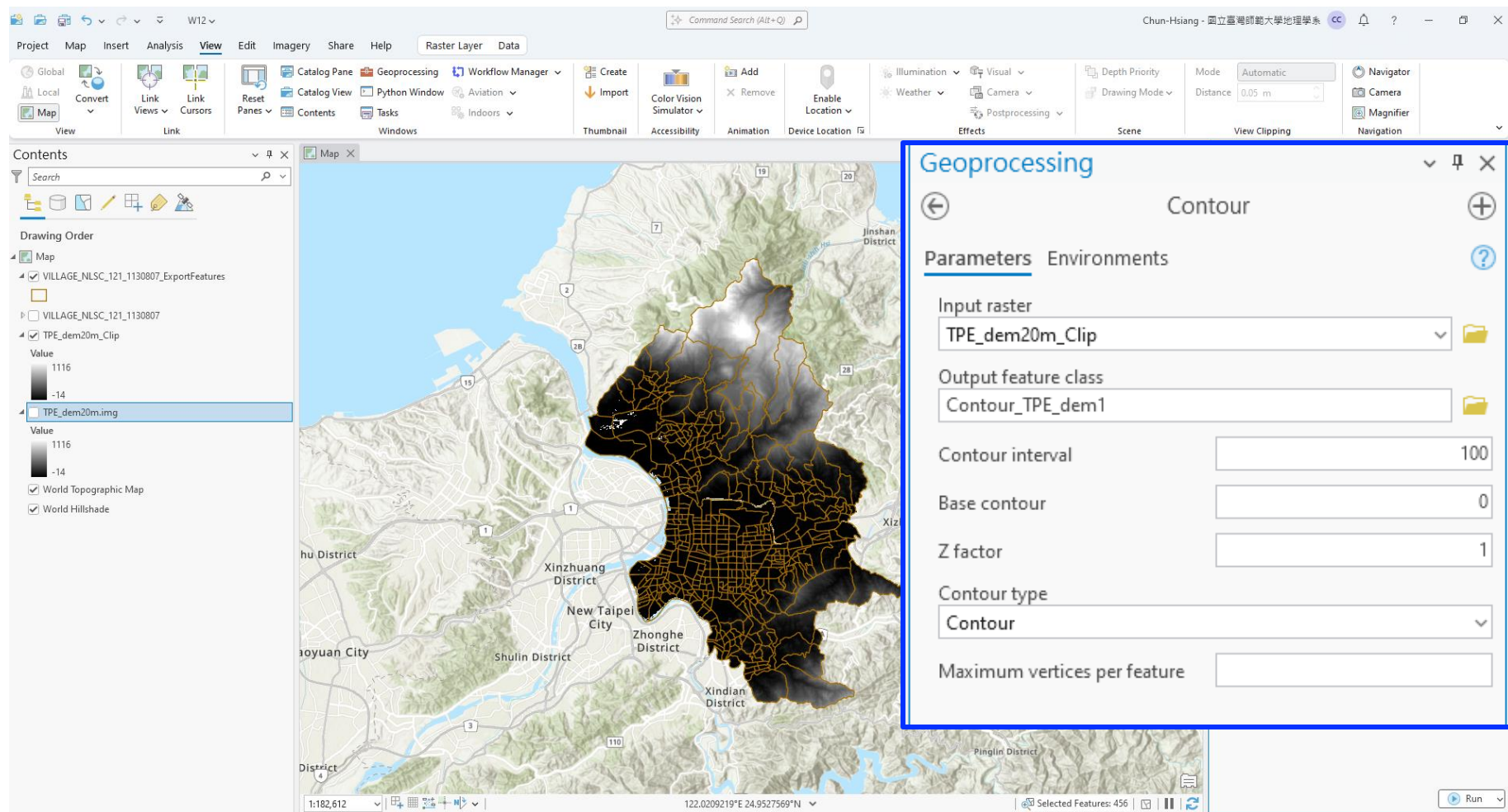
Clip Raster



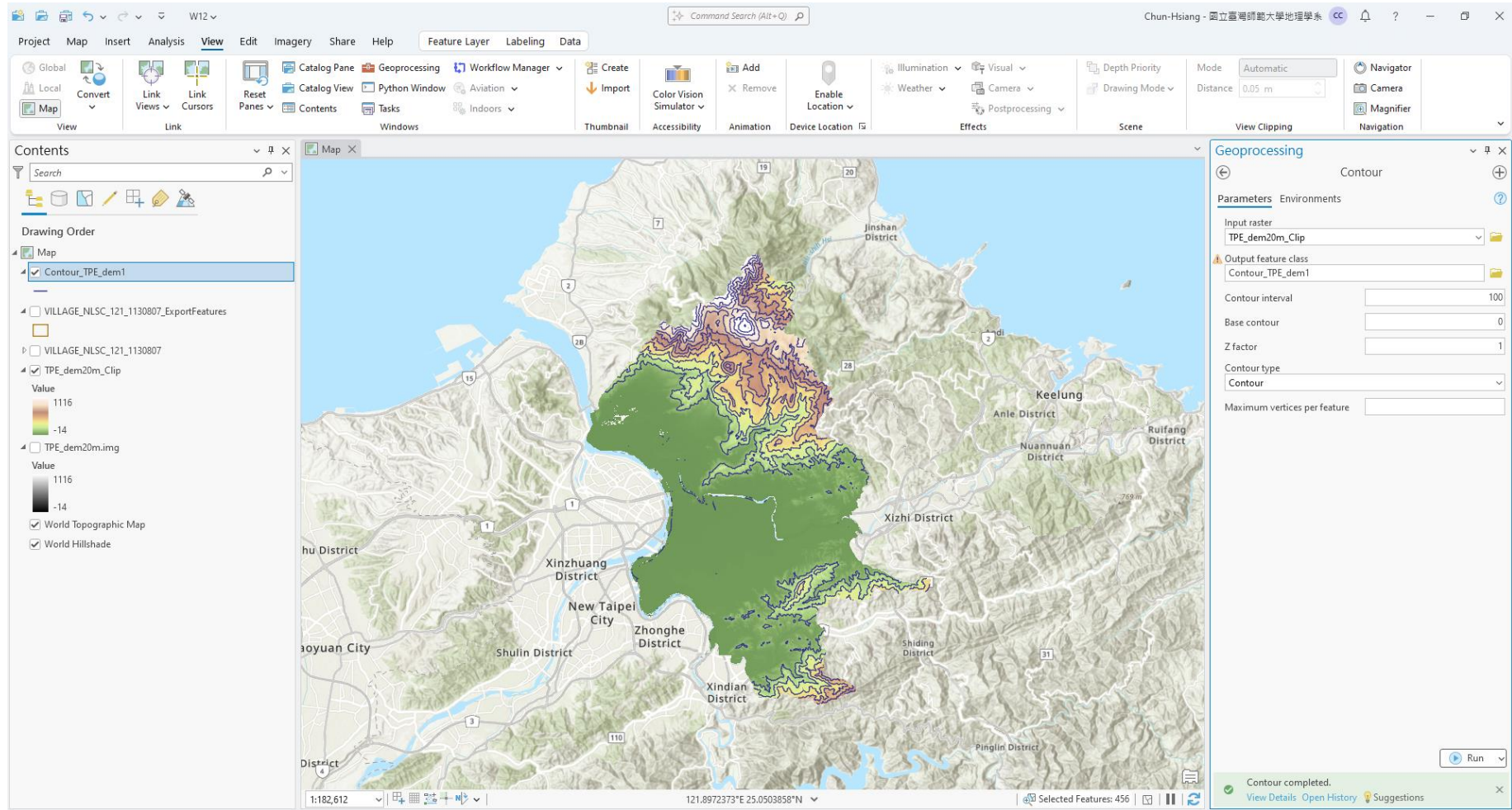
Contour



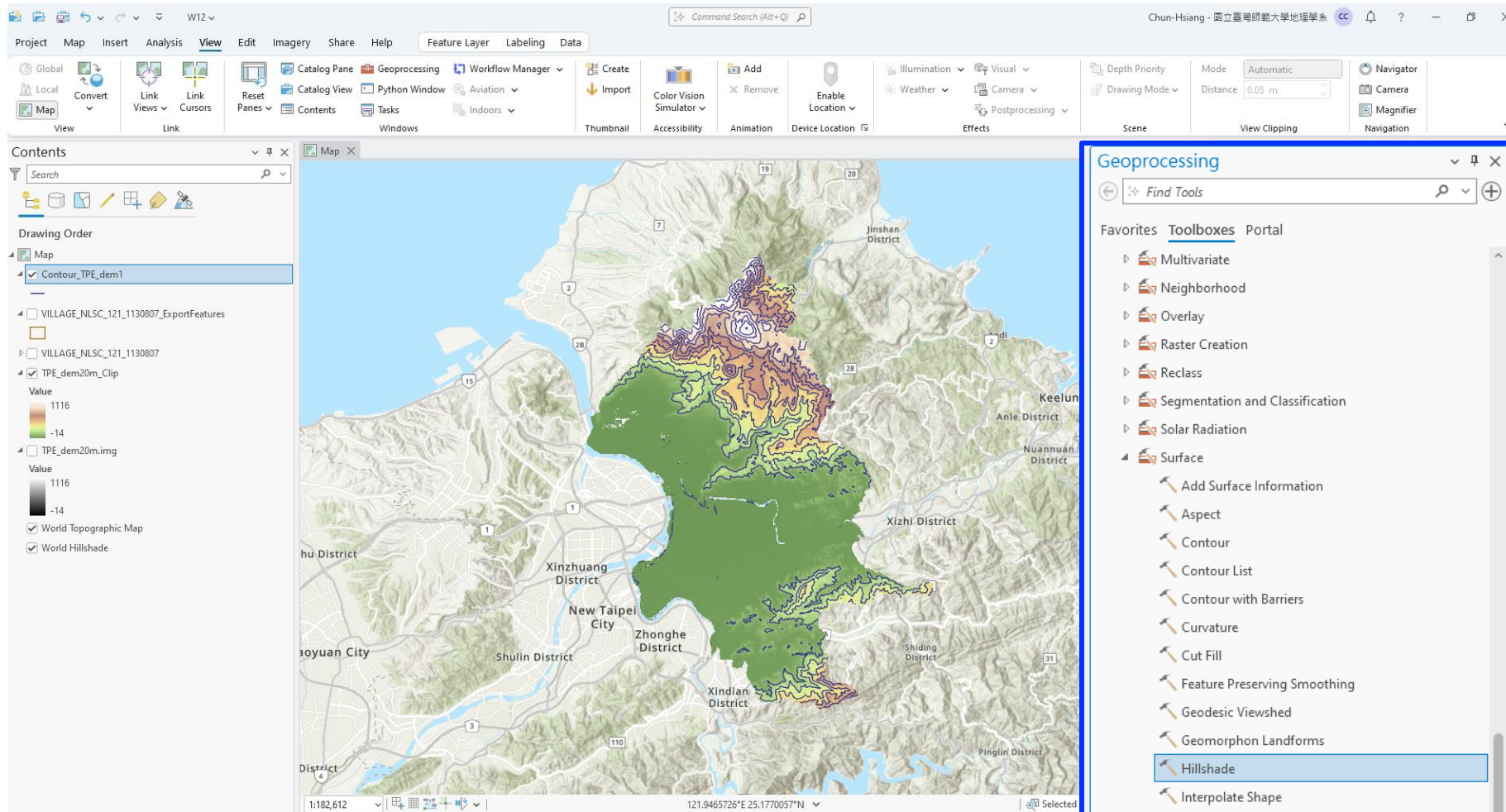
Contour



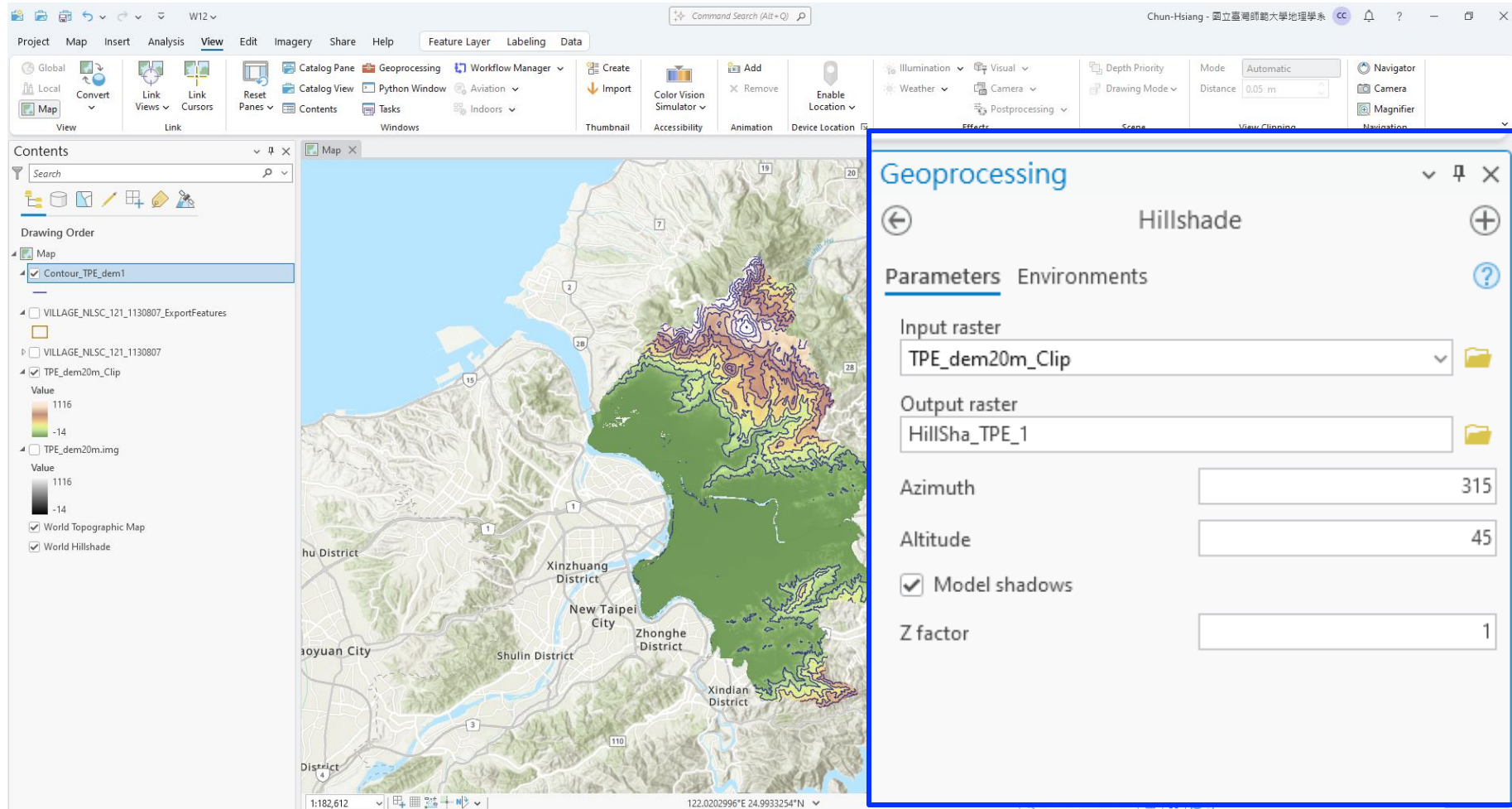
Contour



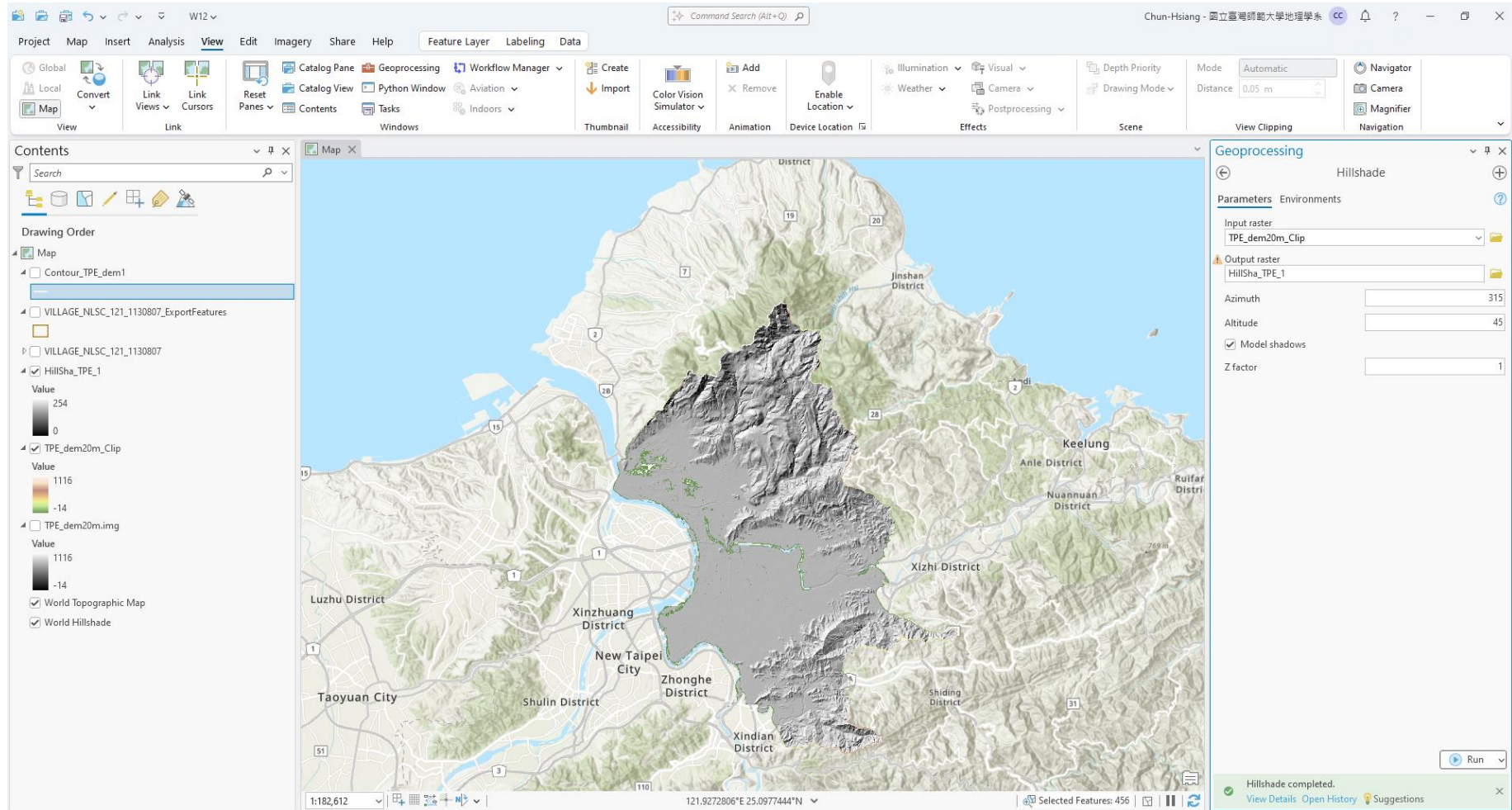
Hillshade



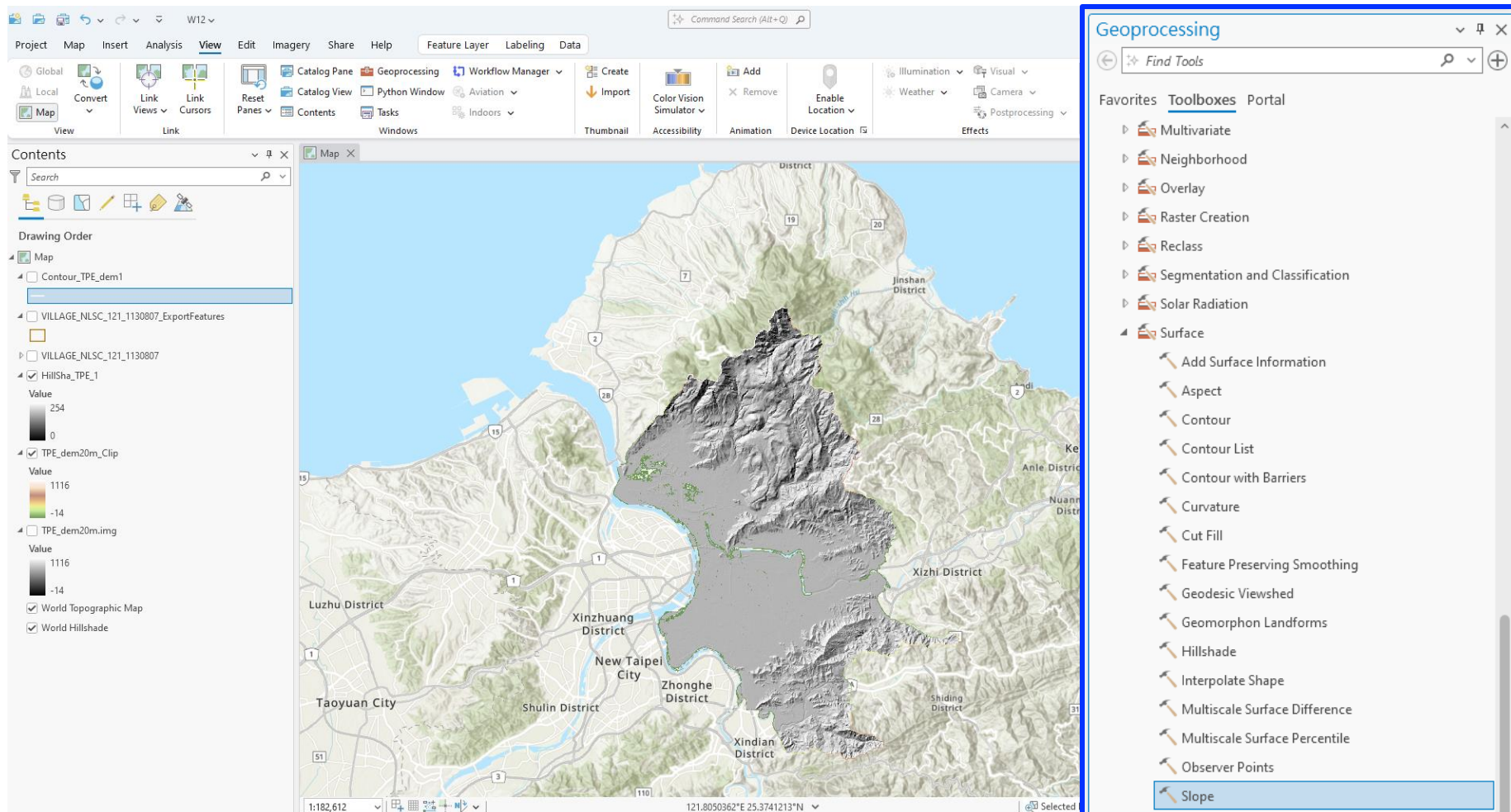
Hillshade



Hillshade



Slope



Slope

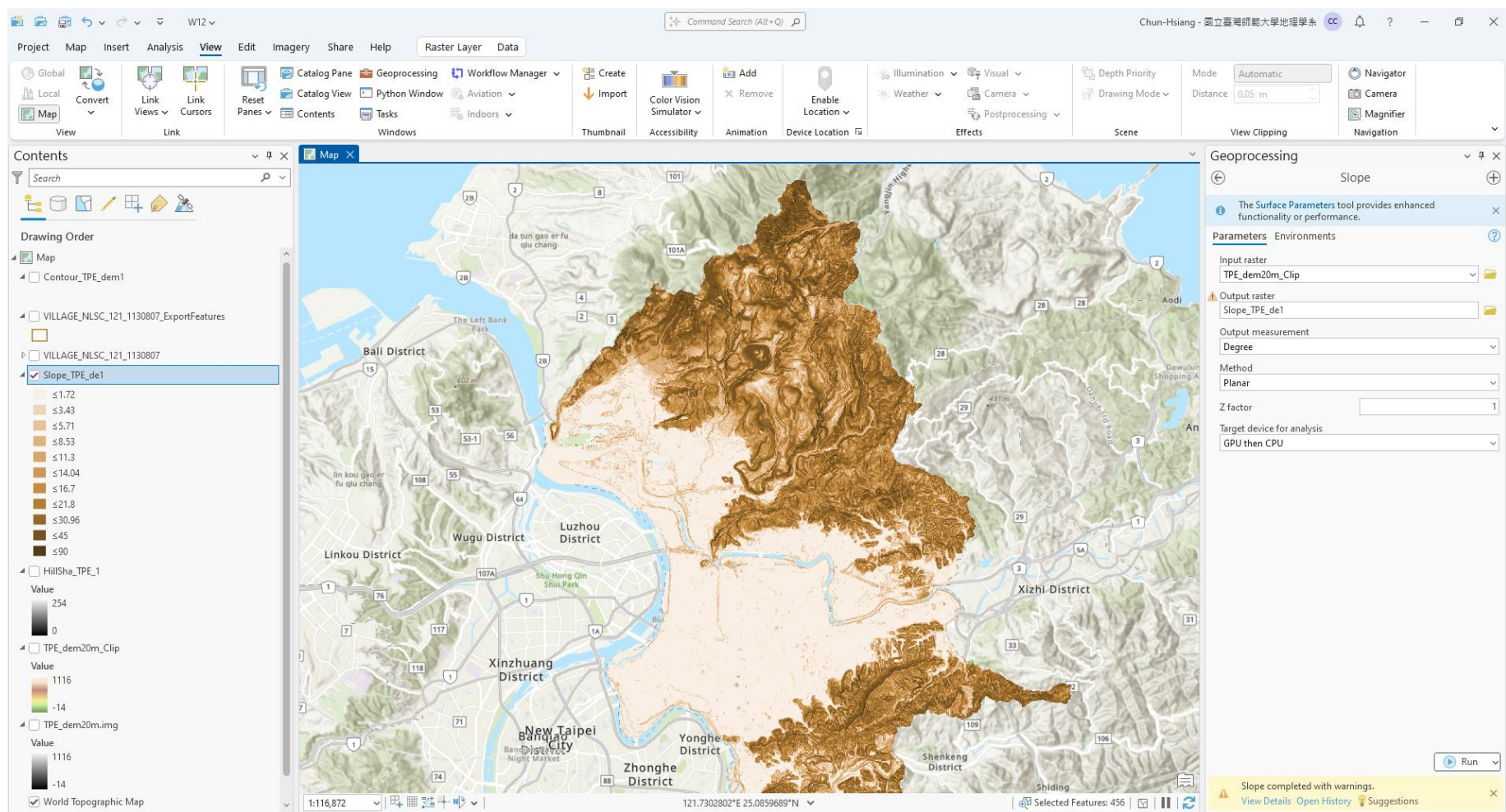
The screenshot displays the ArcGIS Desktop interface with the Geoprocessing pane open. The main map shows a topographic map of a region in Taiwan, including districts like Luzhu, Xinzhuang, New Taipei City, and Zhonghe. The Geoprocessing pane is titled "Slope" and shows the following configuration:

- Input raster:** TPE_dem20m_Clip
- Output raster:** Slope_TPE_de1
- Output measurement:** Degree
- Method:** Planar
- Z factor:** 1
- Target device for analysis:** GPU then CPU

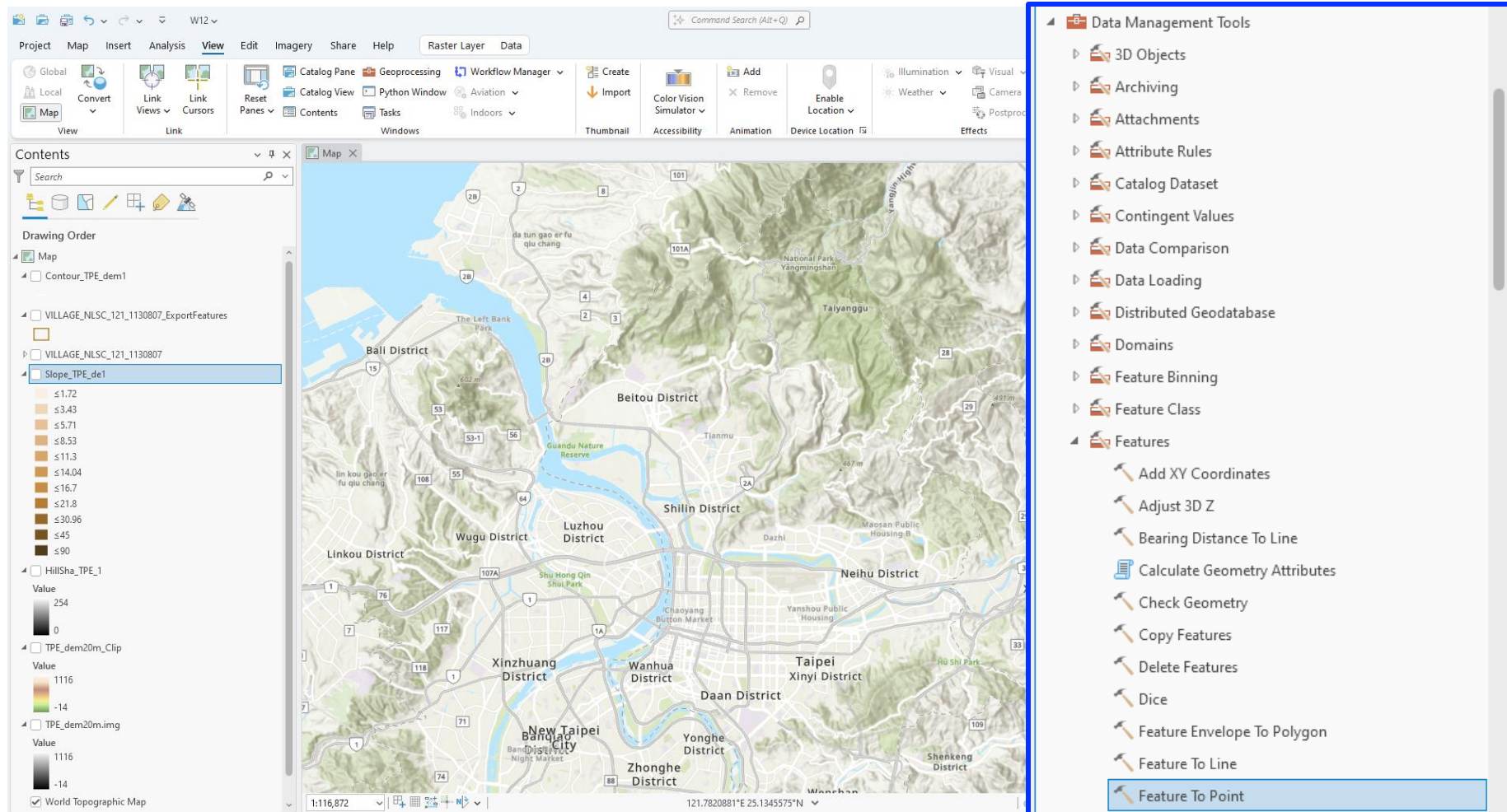
The Contents pane on the left shows the following layers:

- Contour_TPE_dem1
- VILLAGE_NLSC_121_1130807_ExportFeatures
- VILLAGE_NLSC_121_1130807
- HillSha_TPE_1 (Value: 254 to 0)
- TPE_dem20m_Clip (Value: 1116 to -14)
- TPE_dem20m.img (Value: 1116 to -14)
- World Topographic Map
- World Hillshade

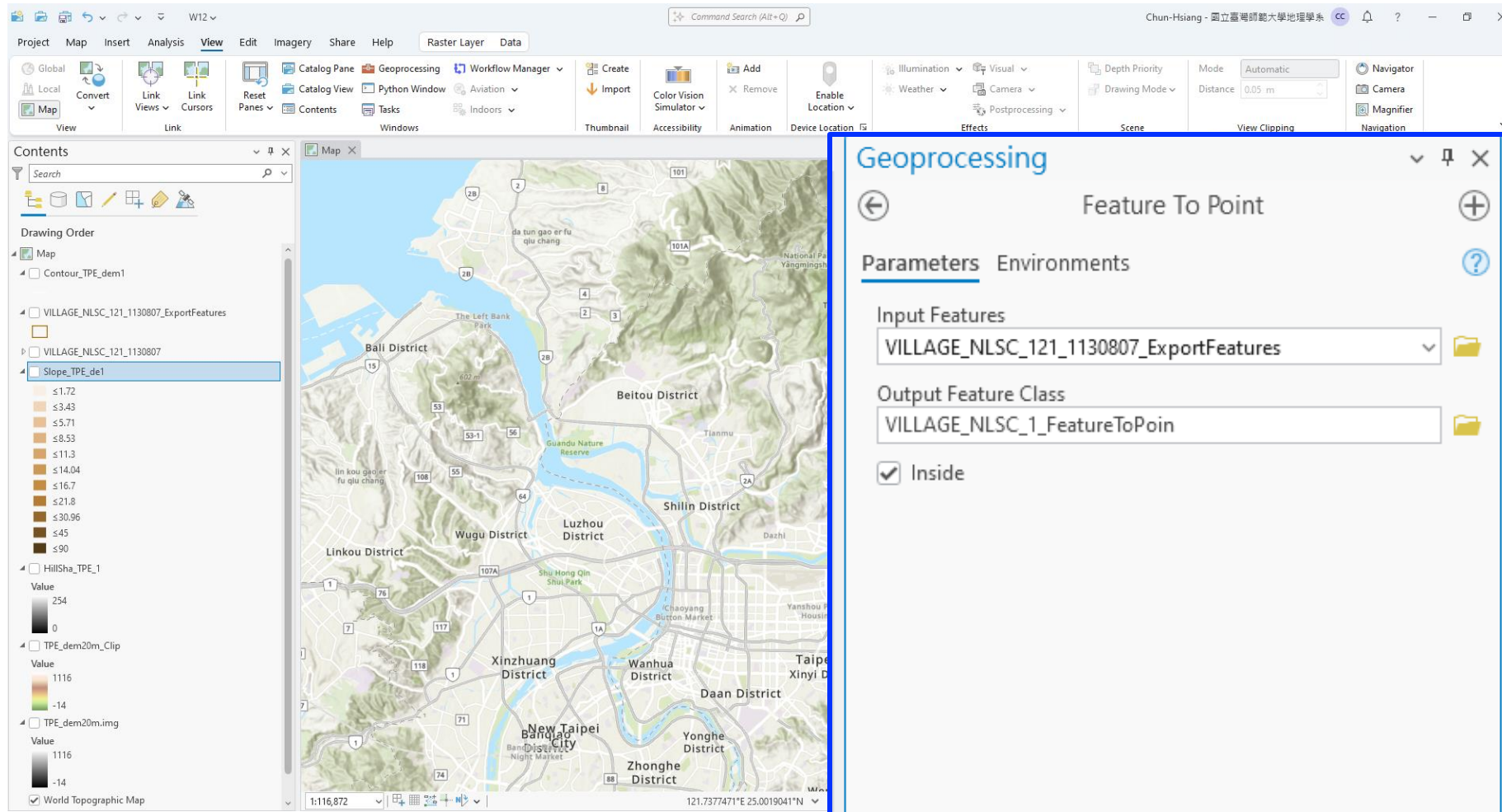
Slope



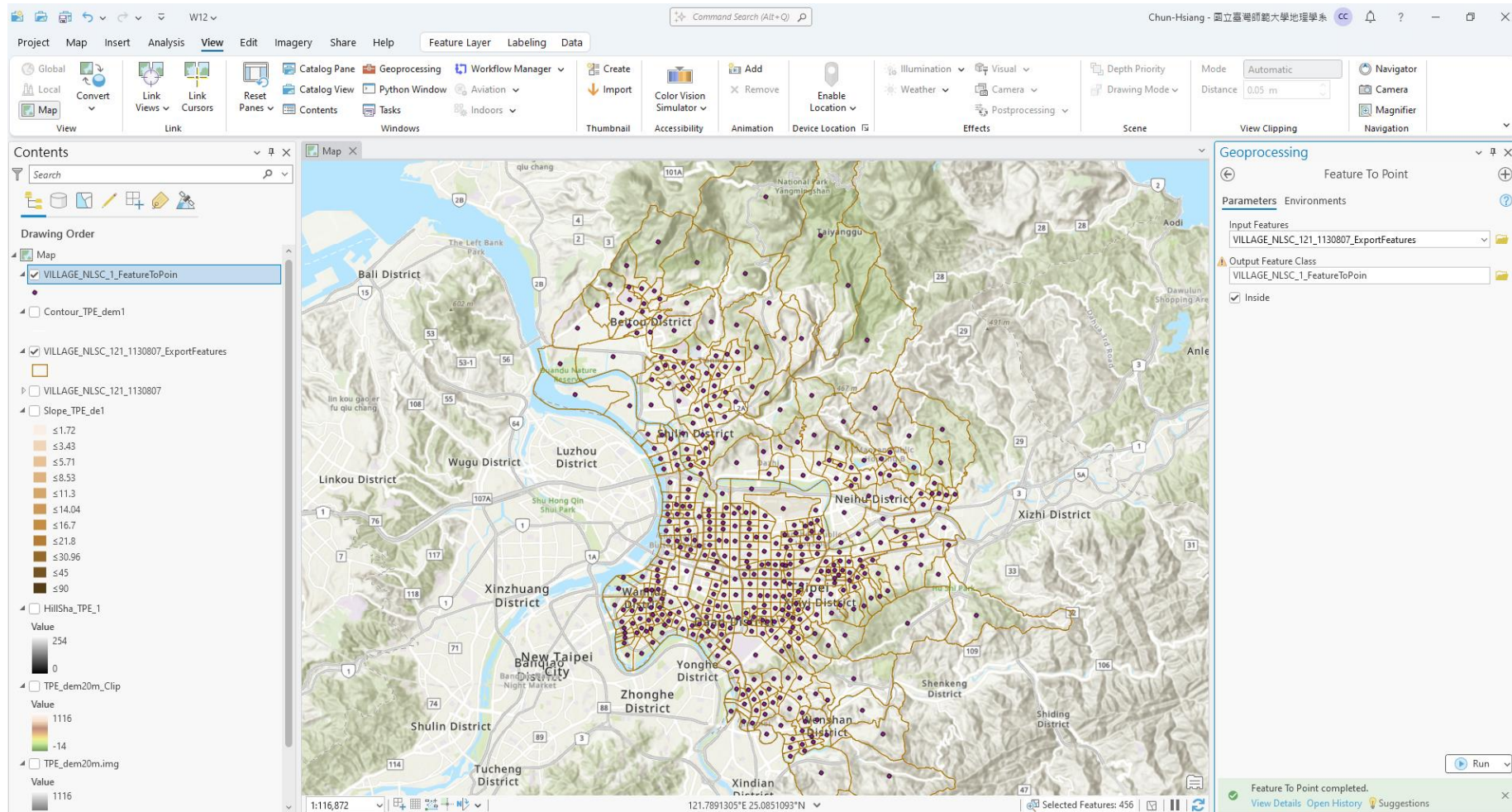
Feature To Point



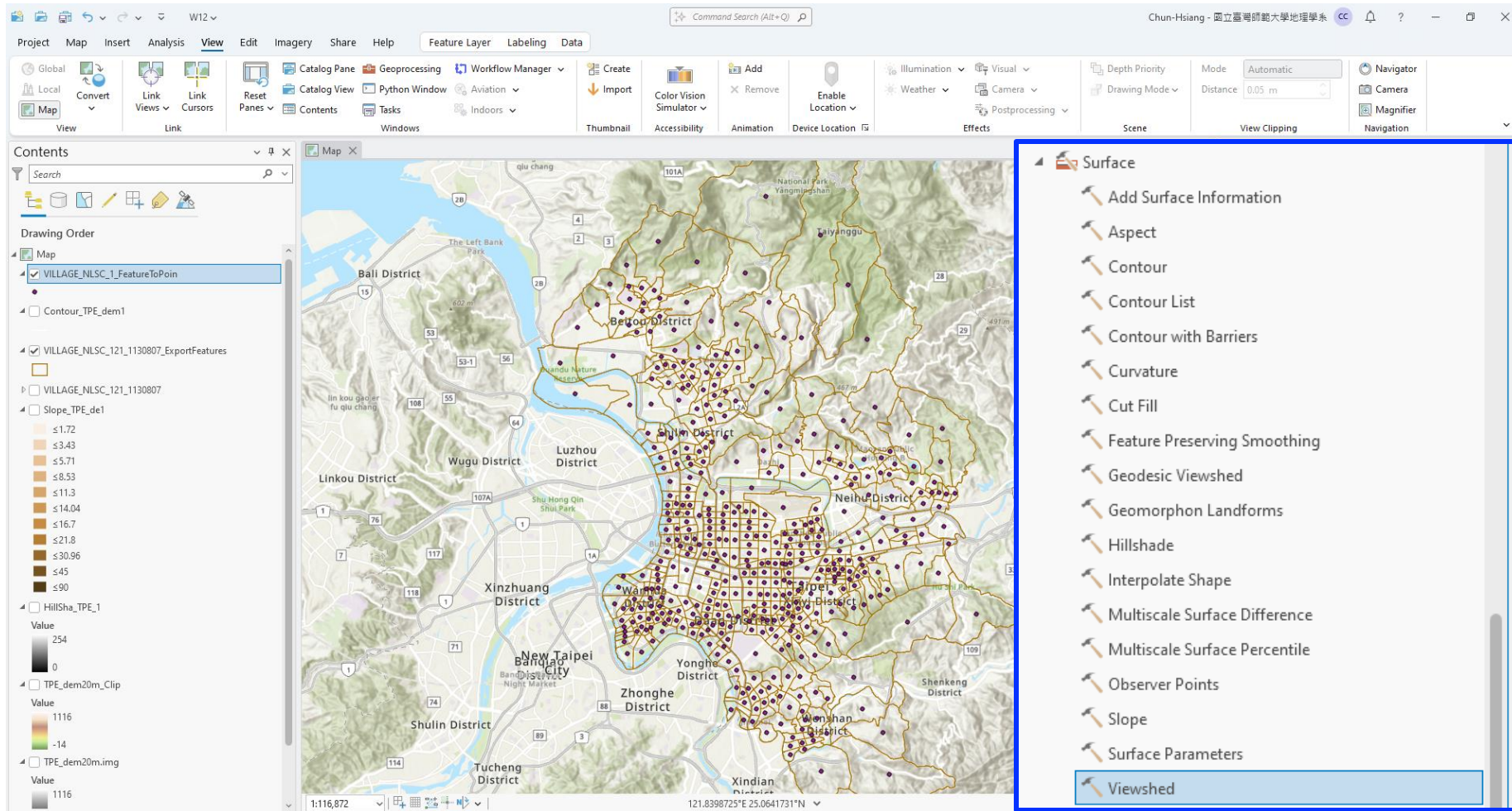
Feature To Point



Feature To Point



Viewshed



Viewshed

The screenshot shows the ArcGIS Desktop interface with the Viewshed tool active. The map displays a city area with a viewshed analysis overlaid. The Geoprocessing tool window is open, showing the Viewshed tool parameters.

Geoprocessing
Viewshed

The Geodesic Viewshed tool provides enhanced functionality or performance.

Parameters Environments

Input raster
TPE_dem20m_Clip

Input point or polyline observer features
VILLAGE_NLSC_1_FeatureToPoin

Output raster
Viewshe_TPE_1

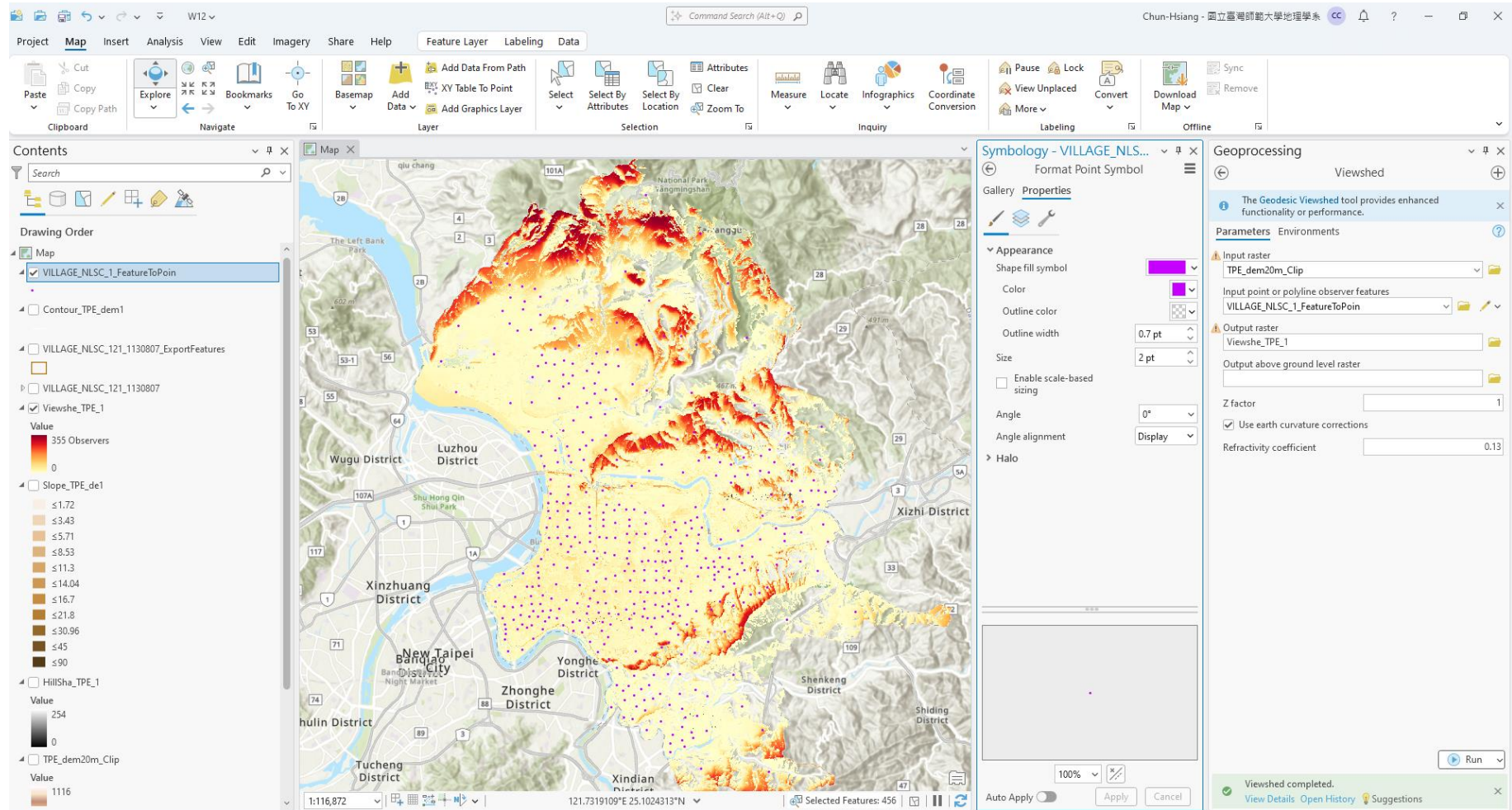
Output above ground level raster

Z factor 1

Use earth curvature corrections

Refractivity coefficient 0.13

Viewshed



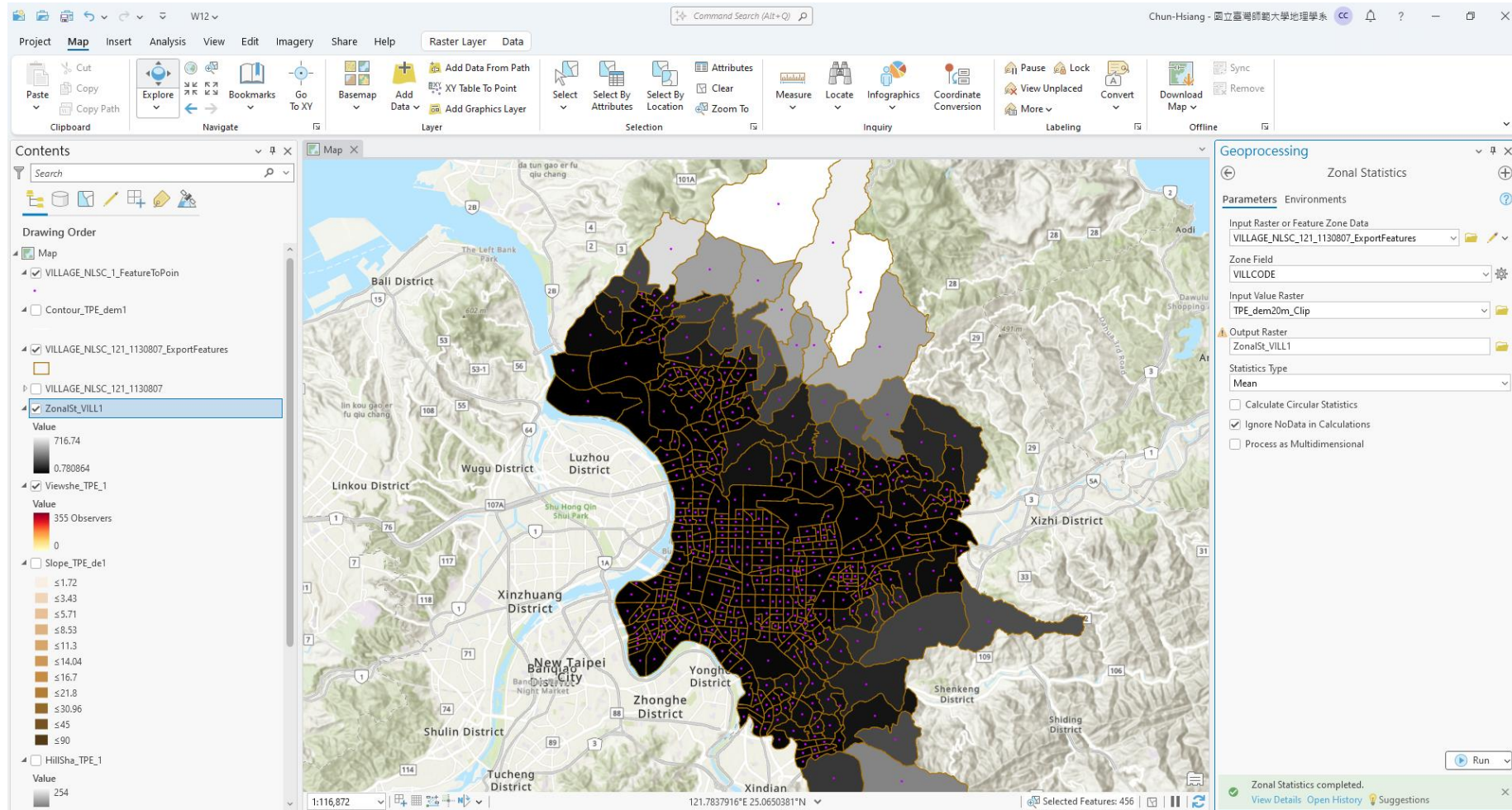
Zonal Statistics

The screenshot displays the ArcGIS Desktop interface with the Geoprocessing pane open to the Zonal Statistics tool. The tool is configured with the following parameters:

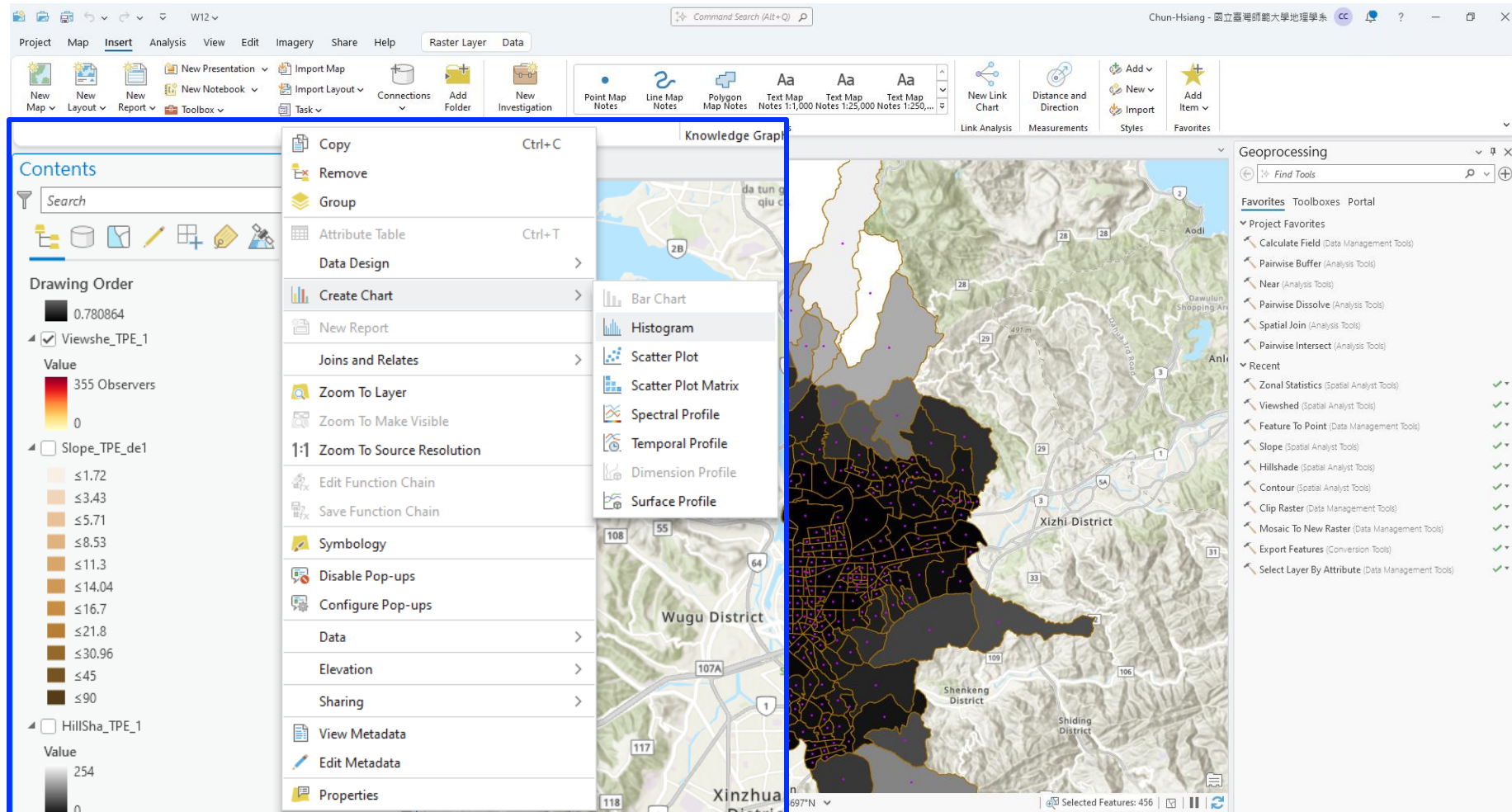
- Input Raster or Feature Zone Data:** VILLAGE_NLSC_121_1130807_ExportFeatures
- Zone Field:** VILLCODE
- Input Value Raster:** TPE_dem20m_Clip
- Output Raster:** ZonalSt_VILL1
- Statistics Type:** Mean
- Options:**
 - Calculate Circular Statistics
 - Ignore NoData in Calculations
 - Process as Multidimensional

The map in the background shows a topographic view of a region in New Taipei City, Taiwan, with various districts labeled and a color-coded elevation or slope overlay. The Geoprocessing pane is highlighted with a blue border.

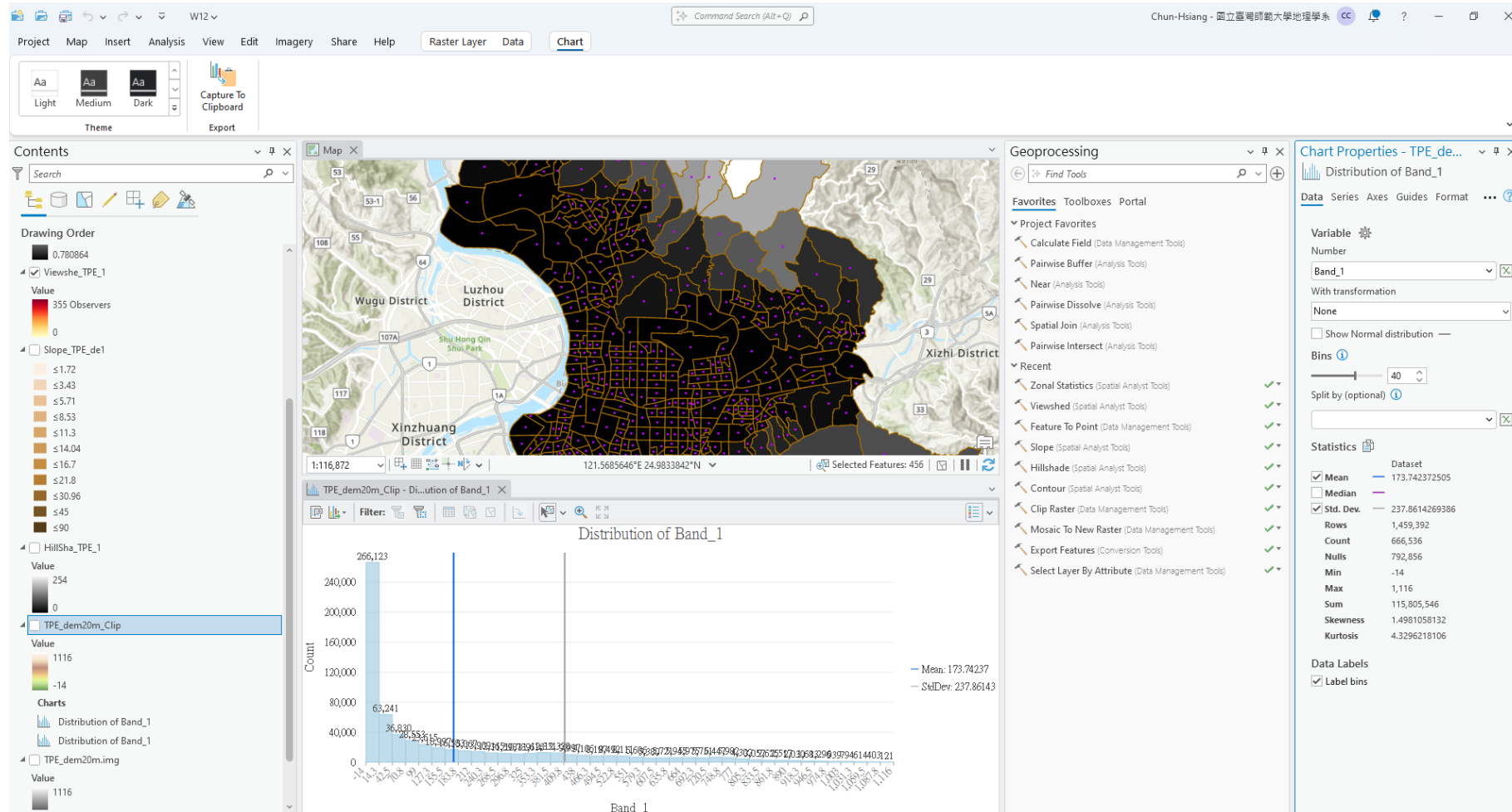
Zonal Statistics



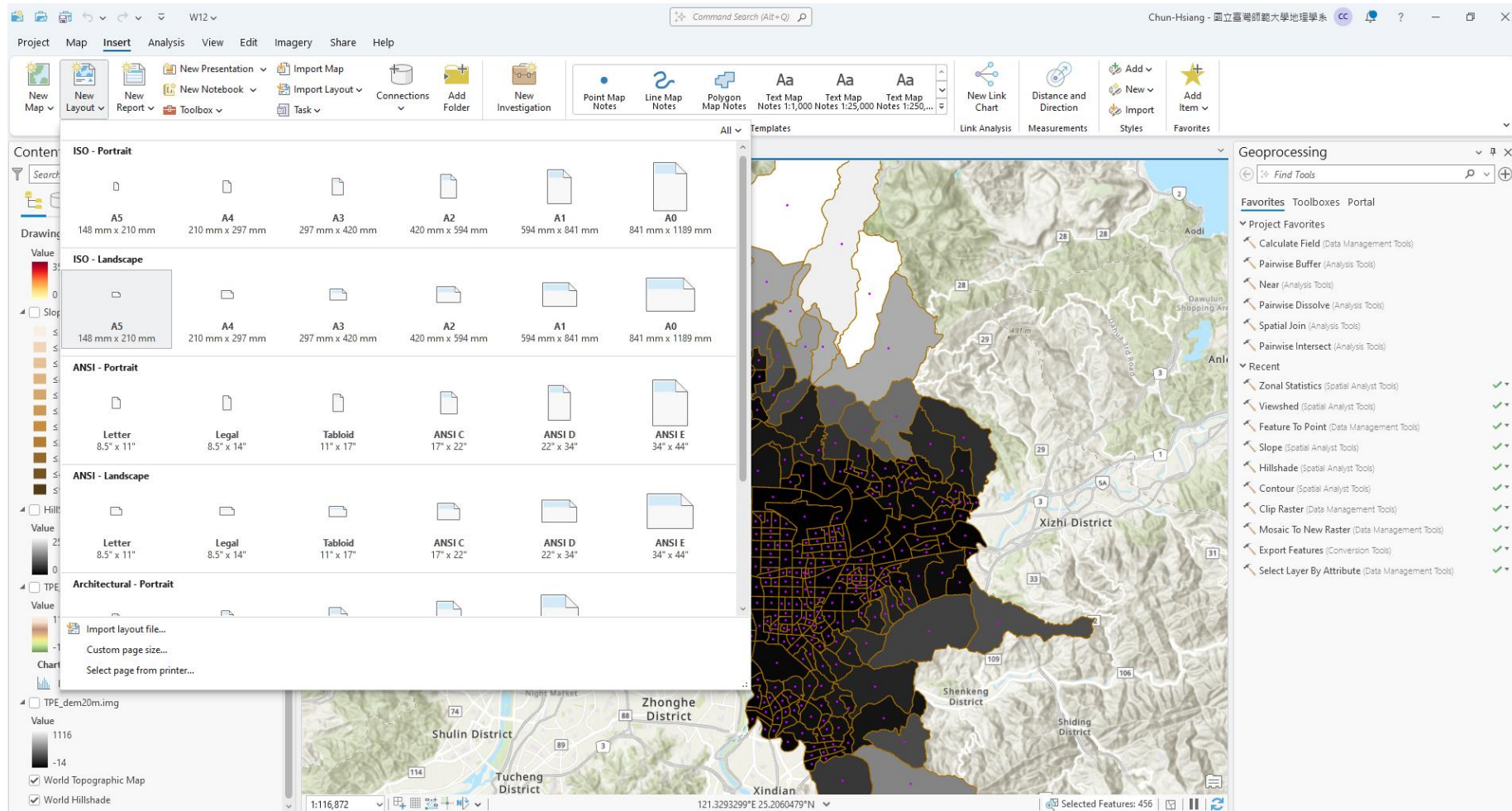
Create Chart | Histogram



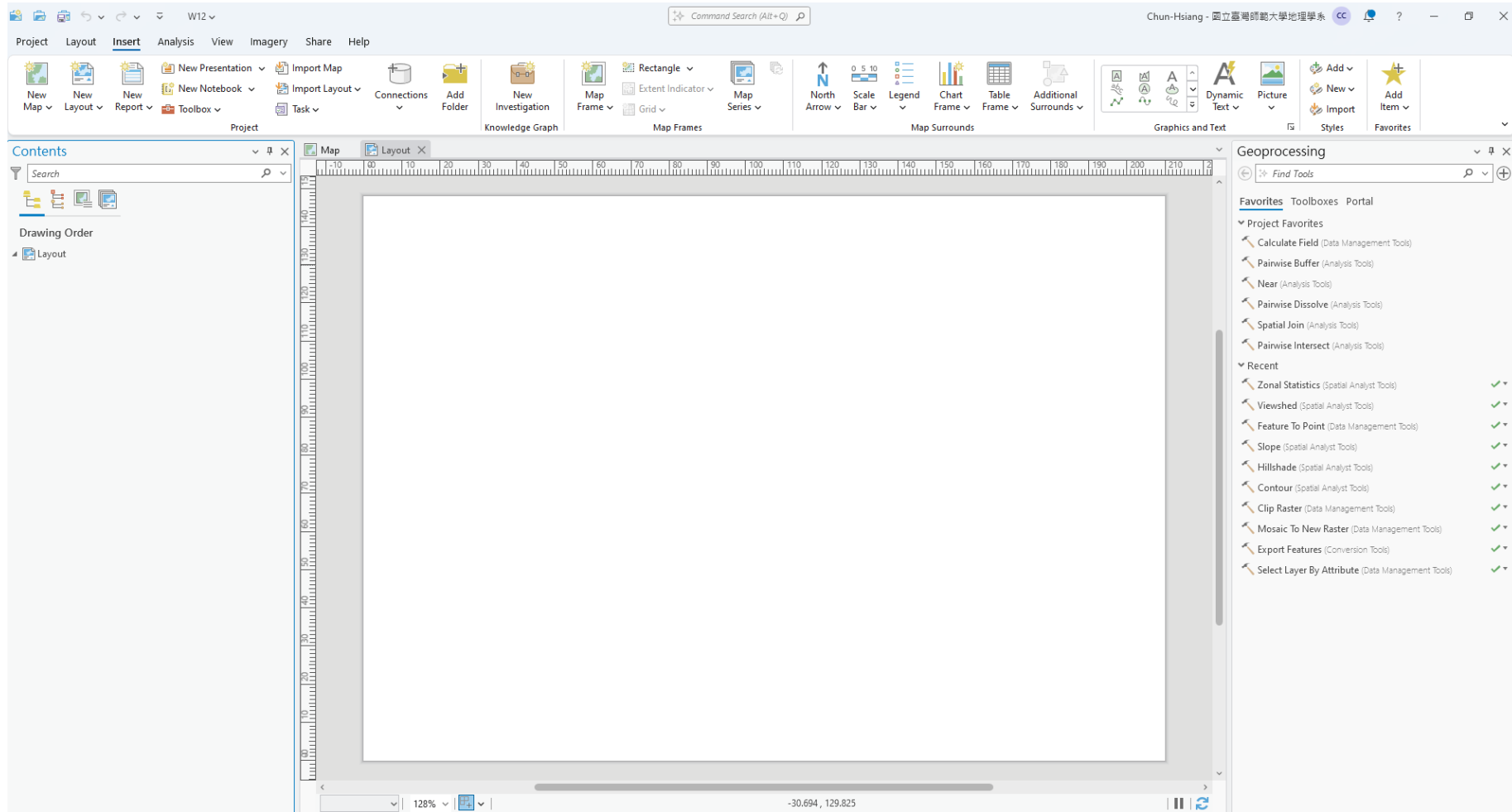
Create Chart | Histogram



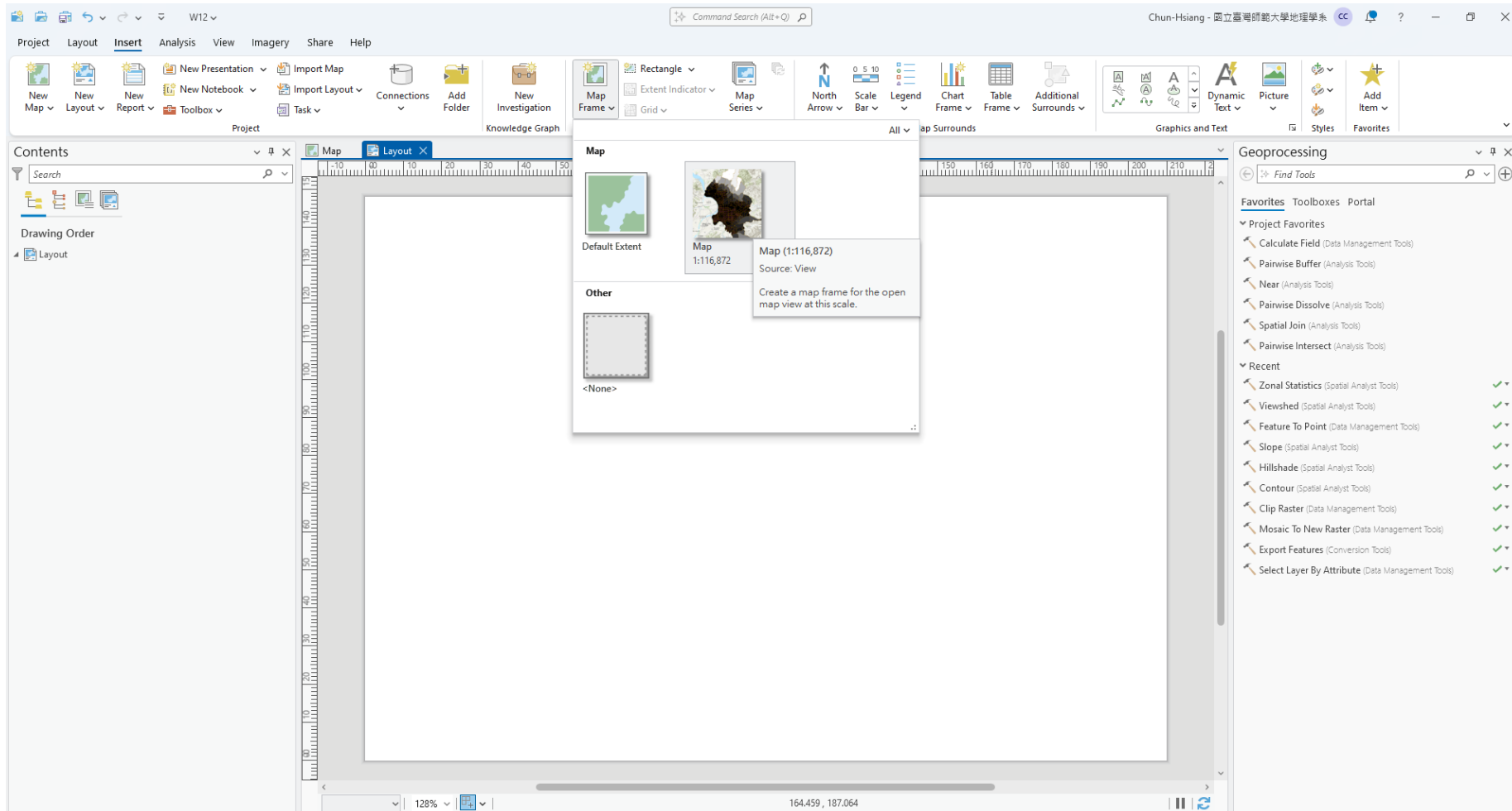
Map Layout



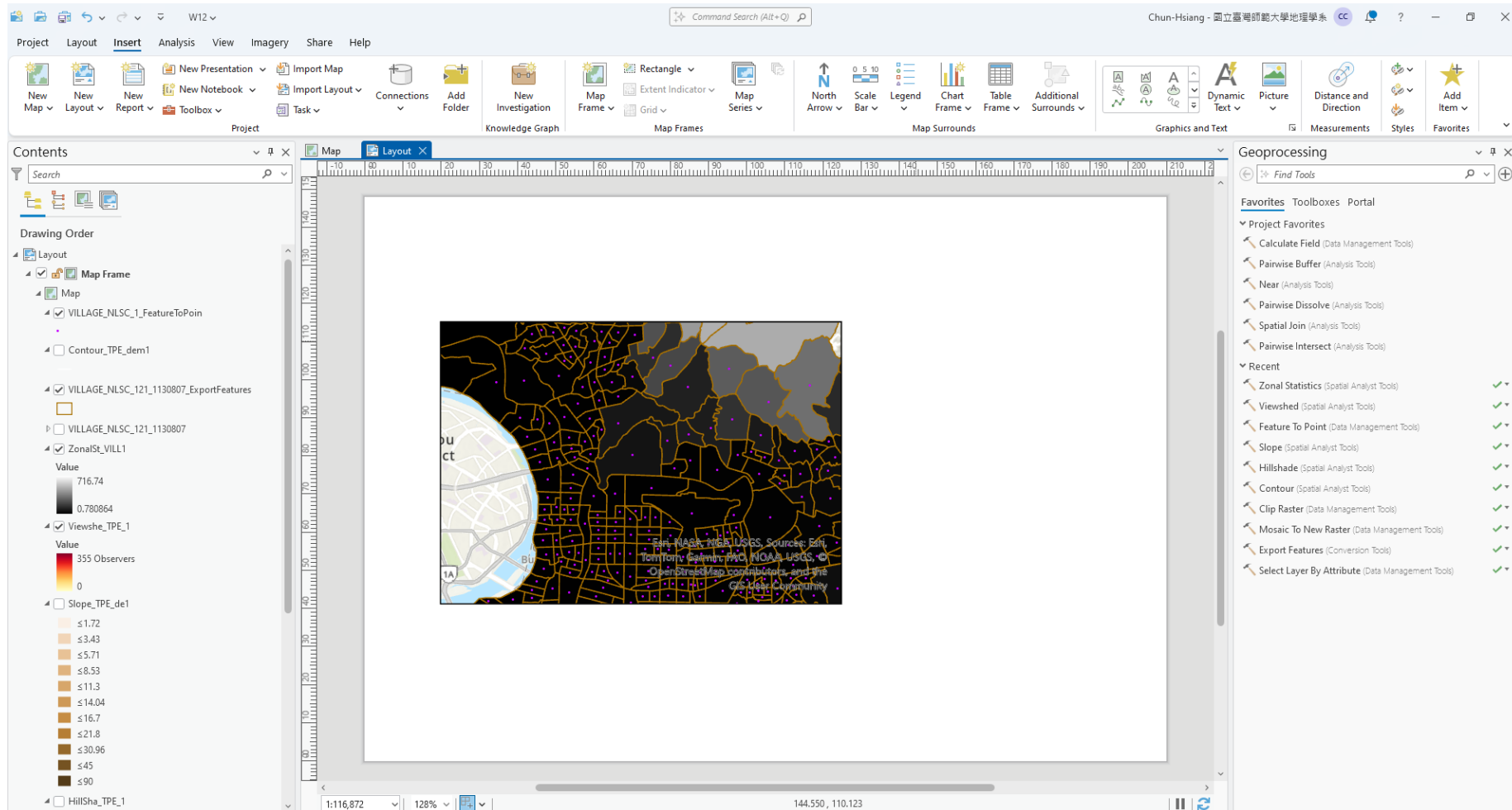
Map Layout



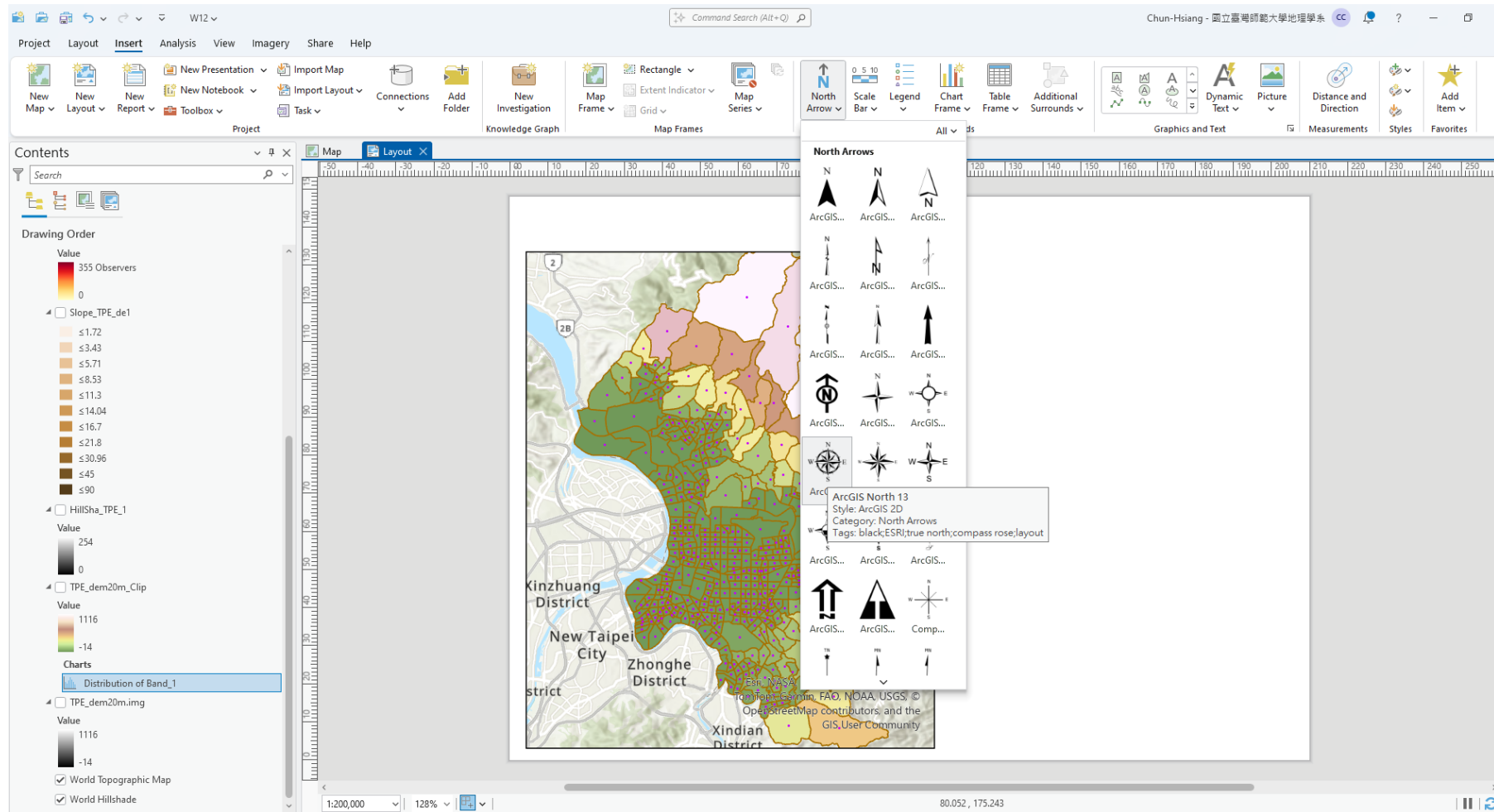
Map Layout



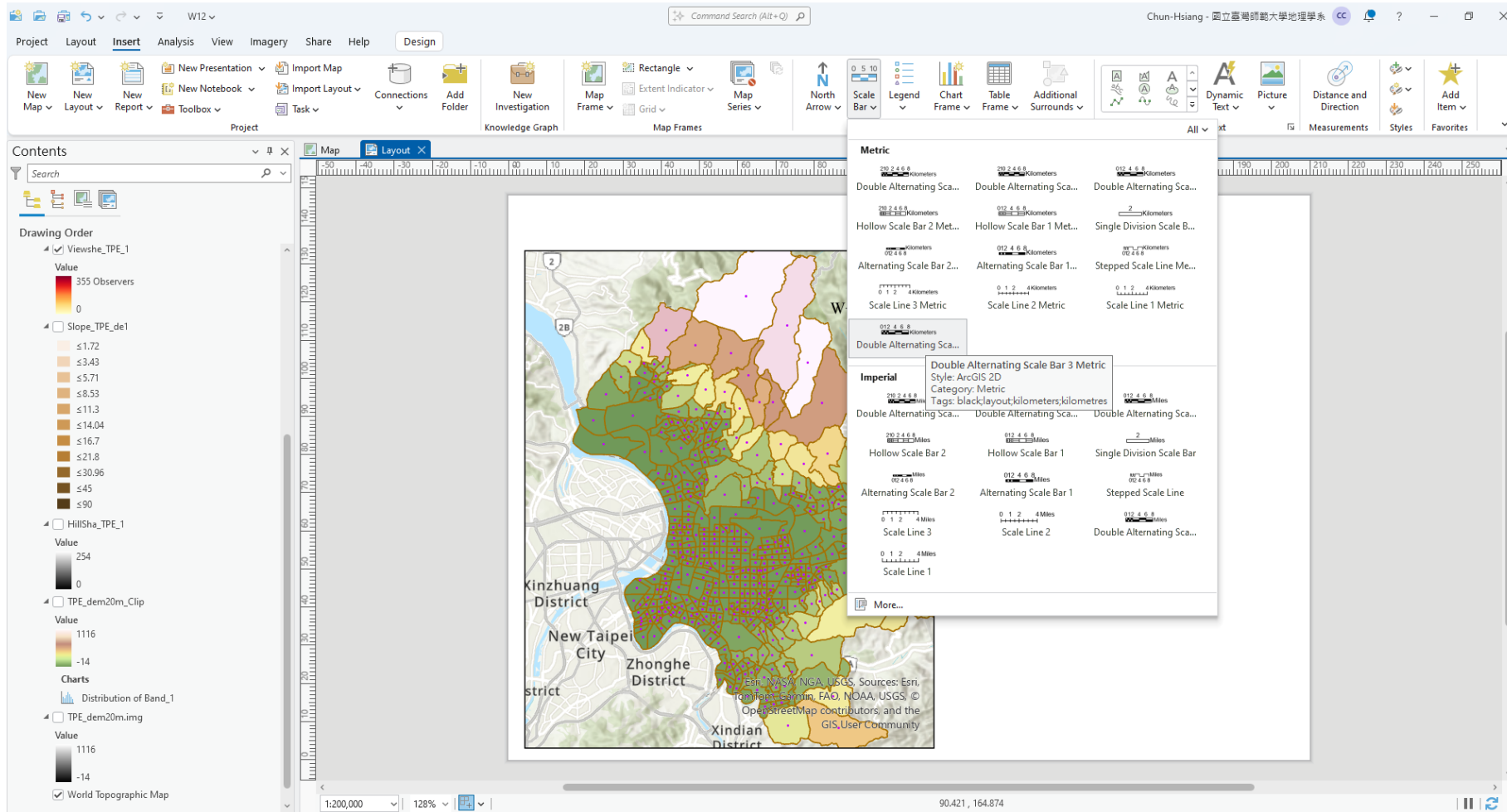
Map Layout



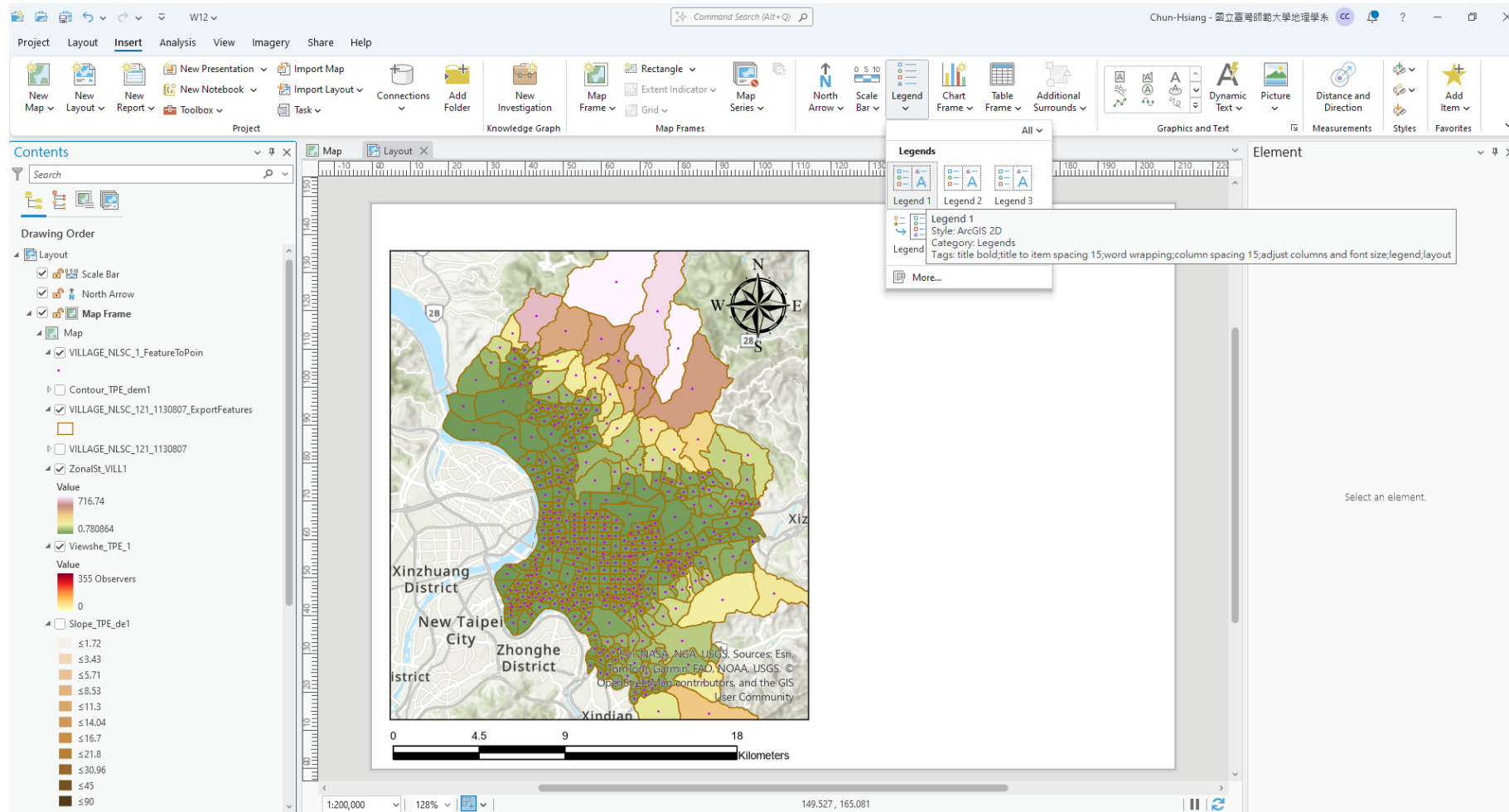
North Arrow



Scale Bar



Legend



Legend

The screenshot displays the ArcGIS Pro interface with a map layout. The main map area shows a geographic area with various districts labeled: Xinzhuang District, New Taipei City, Zhonghe District, and Xindian. A legend is overlaid on the map, titled "LEGEND", and shows a color scale for "ZONALST_VILL1" with values ranging from 0.780864 (green) to 716.74 (red). The legend also includes a scale bar in kilometers (0, 4.5, 9, 18) and a north arrow.

The right-hand panel shows the "Element" properties for the legend. The "Legend" section is expanded, showing the following options:

- General**
 - Name: Legend
 - Visible
 - Locked
- Visibility range**
 - Maximum Scale: <None>
 - Minimum Scale: <None>
 - Display only when populated
- Legend**
 - Map frame: Map Frame
 - Title: Show
 - Legend: Legend
- Legend Items**
 - Show properties...
 - Sync fonts when adding items
- Synchronize with map**
 - Layer visibility
 - Layer order
 - New layer
 - Reference scale

Legend

The screenshot displays the ArcGIS interface with a map layout. The main map shows a geographic area with various districts labeled: Xinzhuang District, New Taipei City, Zhonghe District, and Xindian. A legend box in the bottom right corner of the map area is titled "LEGEND" and shows a color scale for "ZONALST_VILL1" with values 716.74 and 0.780864. The interface includes a top menu bar with options like Project, Layout, Insert, Analysis, View, Imagery, Share, and Help. Below the menu is a toolbar with various tools. On the left, the "Contents" pane shows a list of layers and their drawing order. On the right, the "Element" pane is open to the "Text Symbol" settings, showing options for font name (Algerian), font style (Regular), size (8 pt), color, and other text formatting options. The status bar at the bottom indicates a scale of 1:200,000, a zoom level of 128%, and coordinates 270,849, 35,463.

Chart Frame

The screenshot displays the ArcGIS Pro interface with a map of New Taipei City. A chart frame titled 'TPE_dem20m_Clip' is overlaid on the map, showing a distribution of values for 'ZONALST_VILL1'. The chart frame includes a legend with a color scale ranging from 0.780864 (green) to 716.74 (red). The map also features a north arrow, a scale bar (0 to 18 Kilometers), and labels for Xinzhuang District, New Taipei City, Zhonghe District, and Xindian. The software interface includes a ribbon with various tools, a contents pane on the left, and a properties pane on the right.

Chart | Text and Font

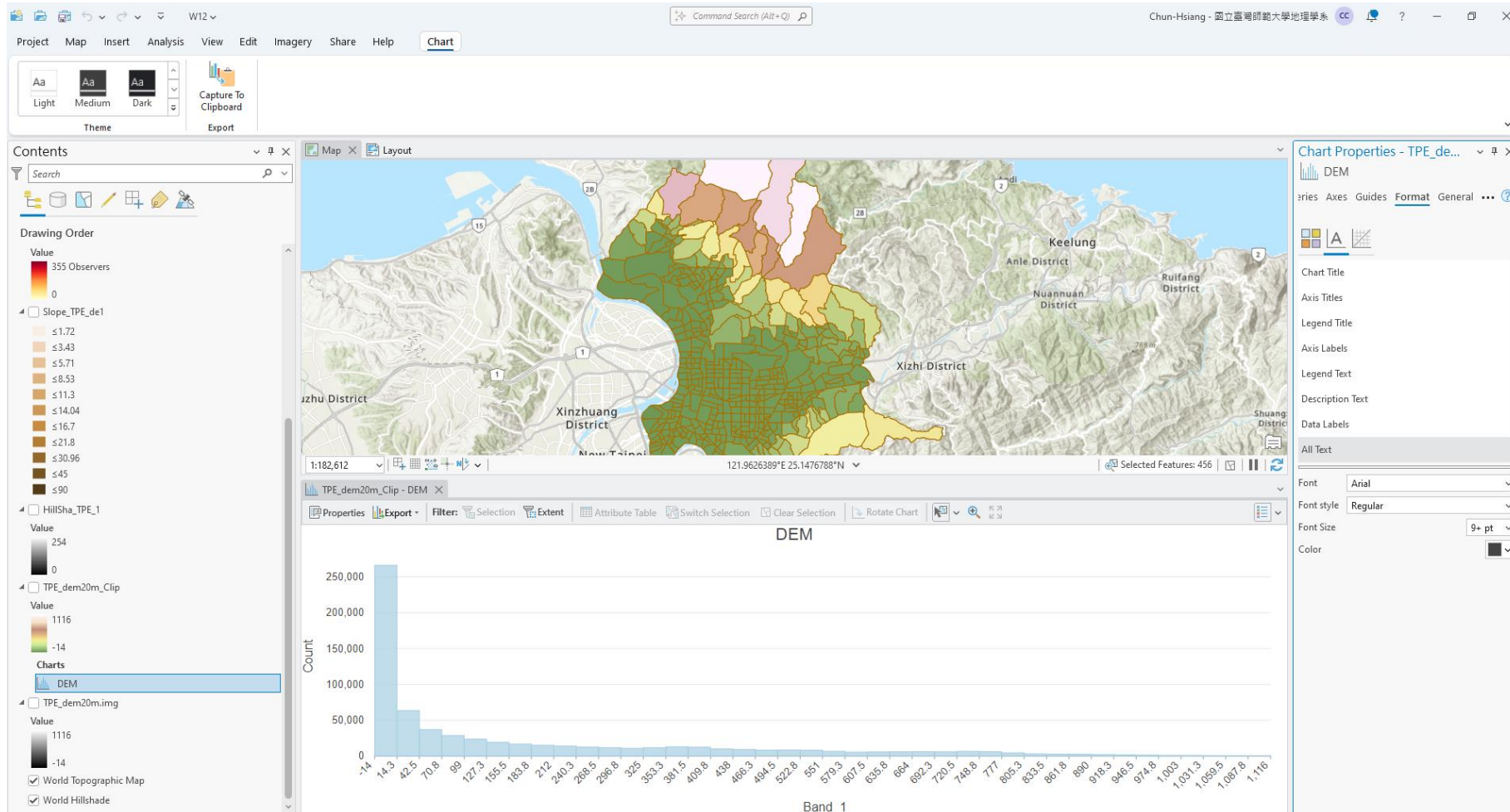


Chart Properties

The screenshot displays the ArcGIS Desktop interface. The main map shows a Digital Elevation Model (DEM) of New Taipei City, with a histogram chart overlaid. The chart is titled 'DEM' and shows the distribution of elevation values. The x-axis is labeled 'Band_1' and the y-axis is labeled 'Count'. The histogram shows a high frequency of values between 0 and 100, with a long tail extending to the right. The map includes a legend for 'ZONALST_VILL1' with values 716.74 and 0.780864. The 'Chart Properties' panel is open on the right, showing the 'General' tab with the following settings:

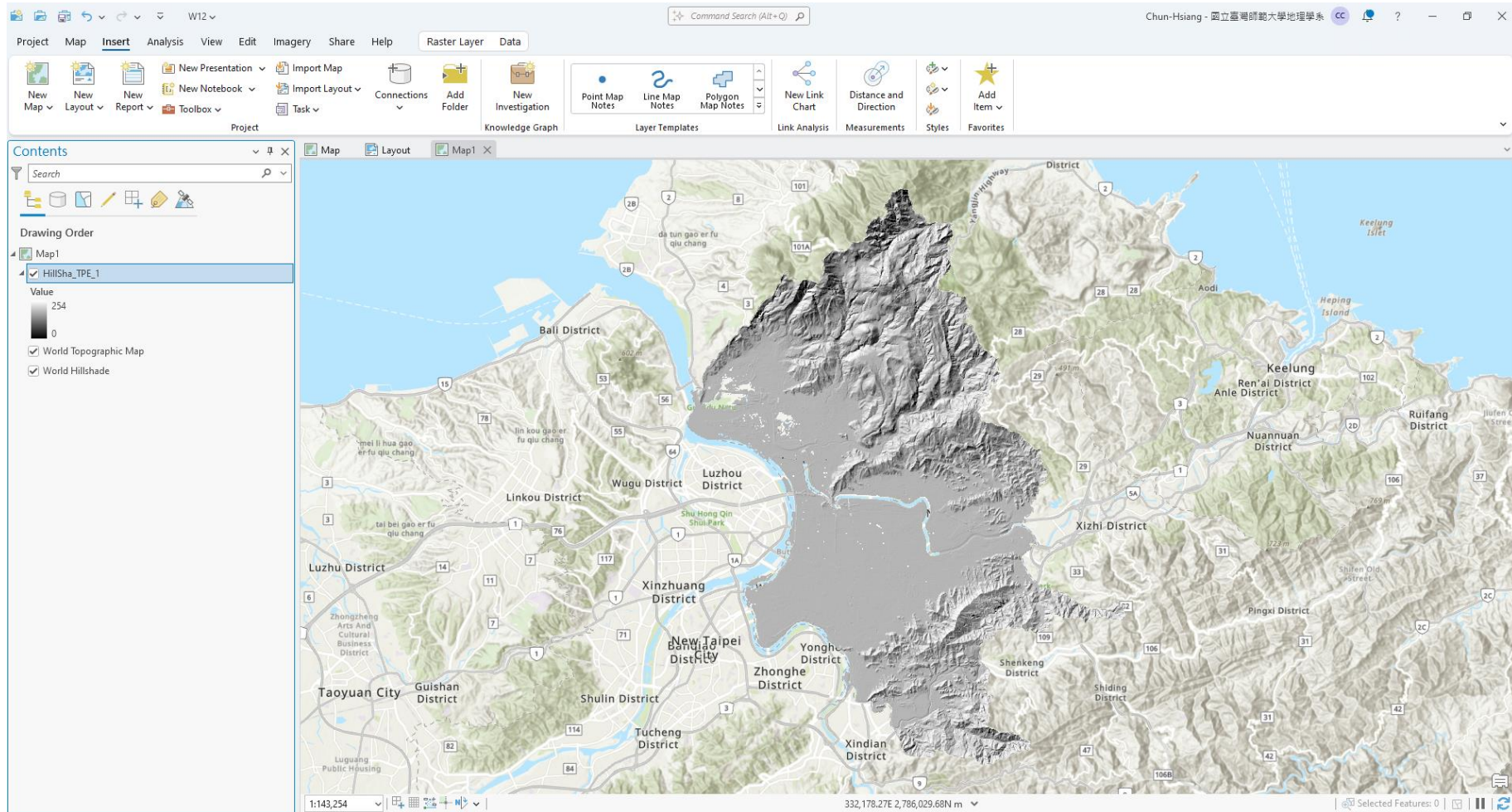
- Chart title: DEM
- X axis title: Band_1
- Y axis title: Count
- Legend title: (empty)
- Description: (empty)

Chart Properties | Title

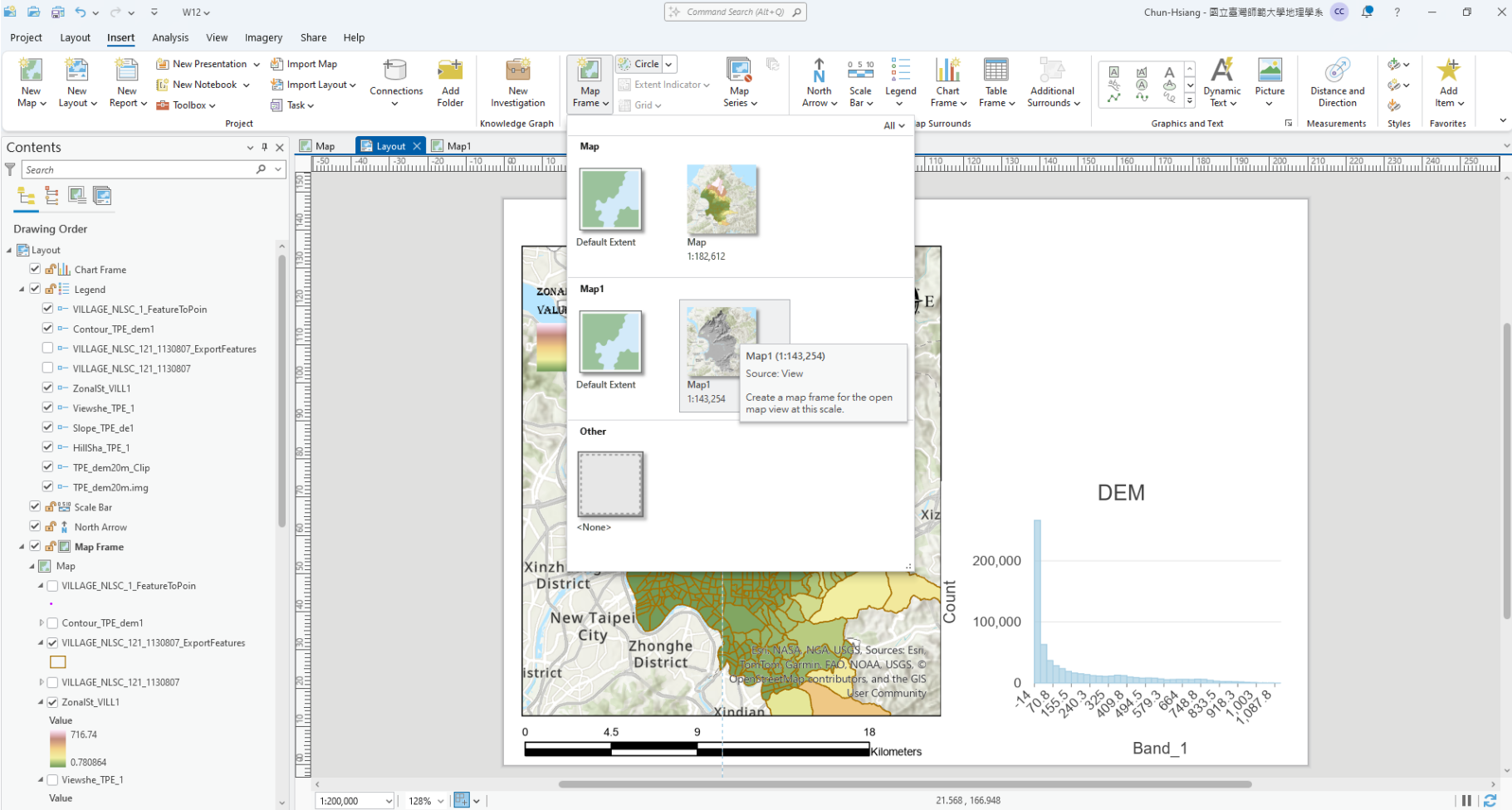
The screenshot displays the ArcGIS interface with a map of New Taipei City and its surrounding districts (Xinzhuan, New Taipei City, Zhonghe, Xindian). A Digital Elevation Model (DEM) chart is overlaid on the map, showing the distribution of elevation values. The chart is titled 'DEM' and has a Y-axis labeled 'Count' and an X-axis labeled 'Band_1'. The chart shows a high frequency of values between 0 and 100,000, with a sharp decline as values increase. The map includes a legend, a scale bar (0 to 18 Kilometers), and a north arrow. The 'Chart Properties' panel on the right shows the 'General' tab with the following settings:

- Chart title: DEM
- X axis title: Band_1
- Y axis title: Count
- Legend title: [Empty]
- Description: [Empty]

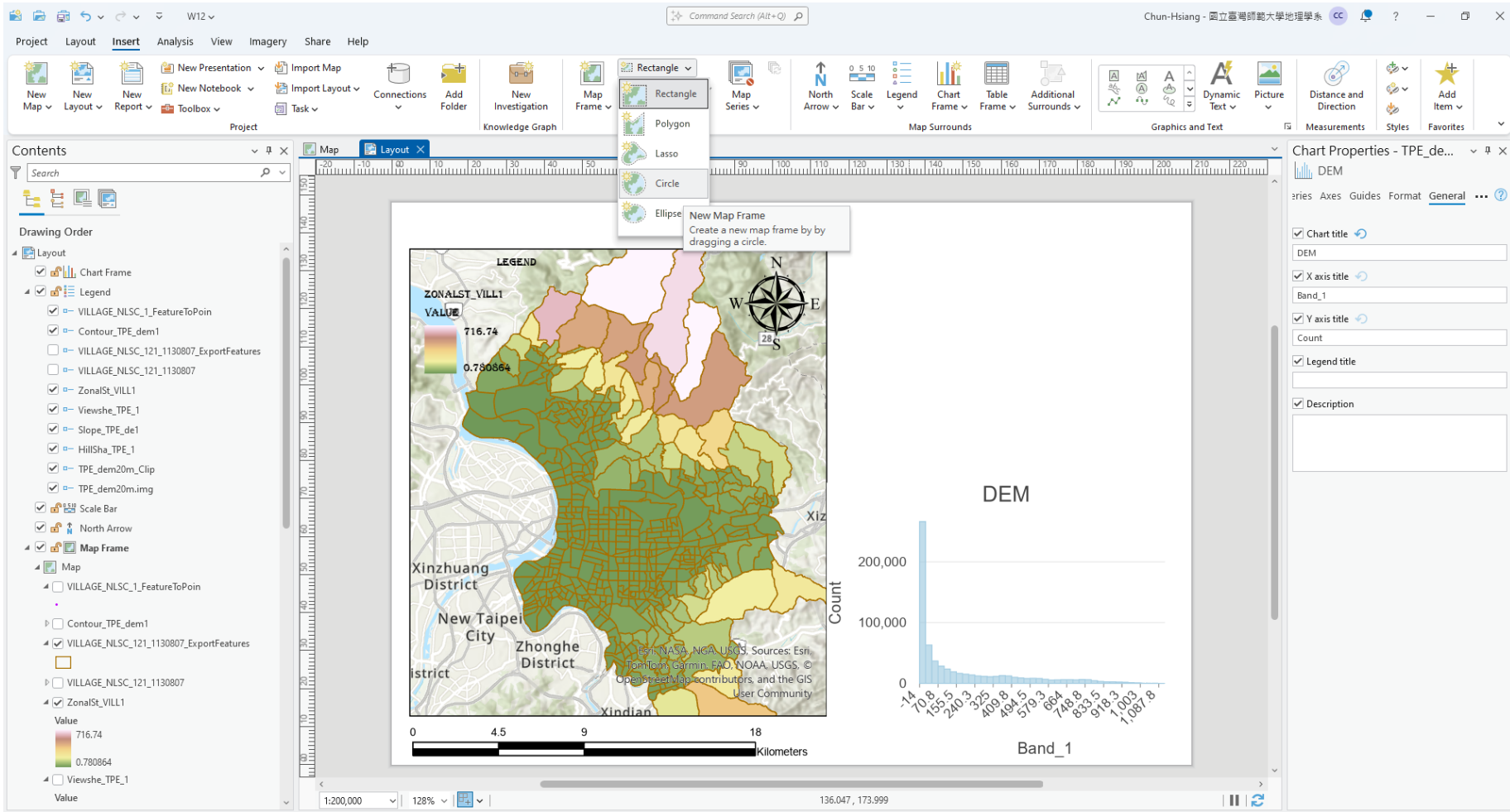
New Map | Add Hillshade



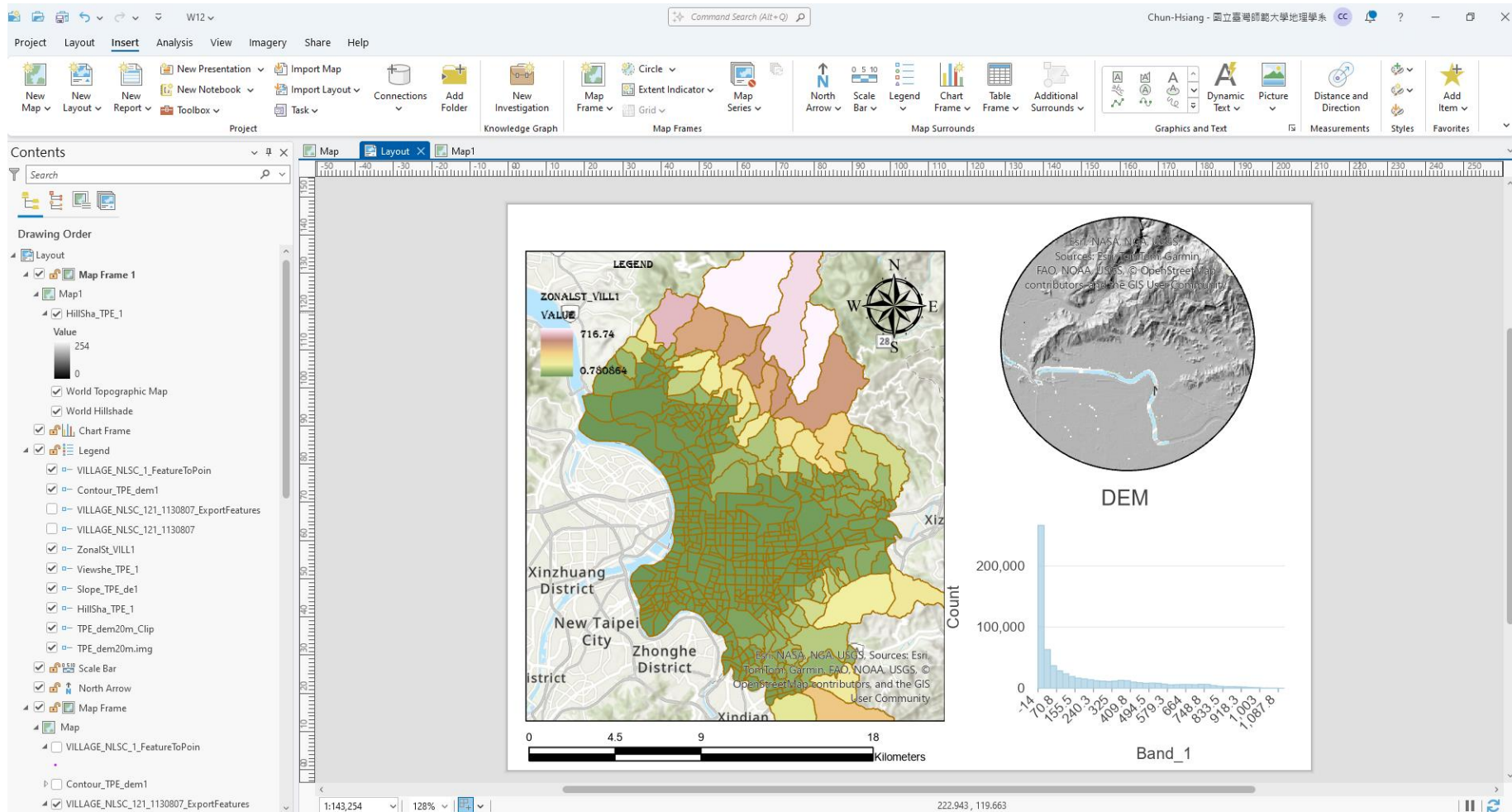
Add Map Frame



Add Map Frame | Circle



Map Layout



Add Text

The screenshot displays the ArcGIS Pro interface with a map layout titled "Map Layout". The layout includes a legend for "ZONALST_VILL1 VALUE" with a color scale from 0 to 716.74, a DEM map, and a histogram for "Band_1" showing a distribution of values from -14 to 1,087.8. The "Text" tool is active in the ribbon, and the "Text" element is selected in the "Element" pane. The "Text" element properties are visible in the "Options" pane, including "Name: Text", "Visible" checked, and "Locked" unchecked. The "Text" element is currently empty.

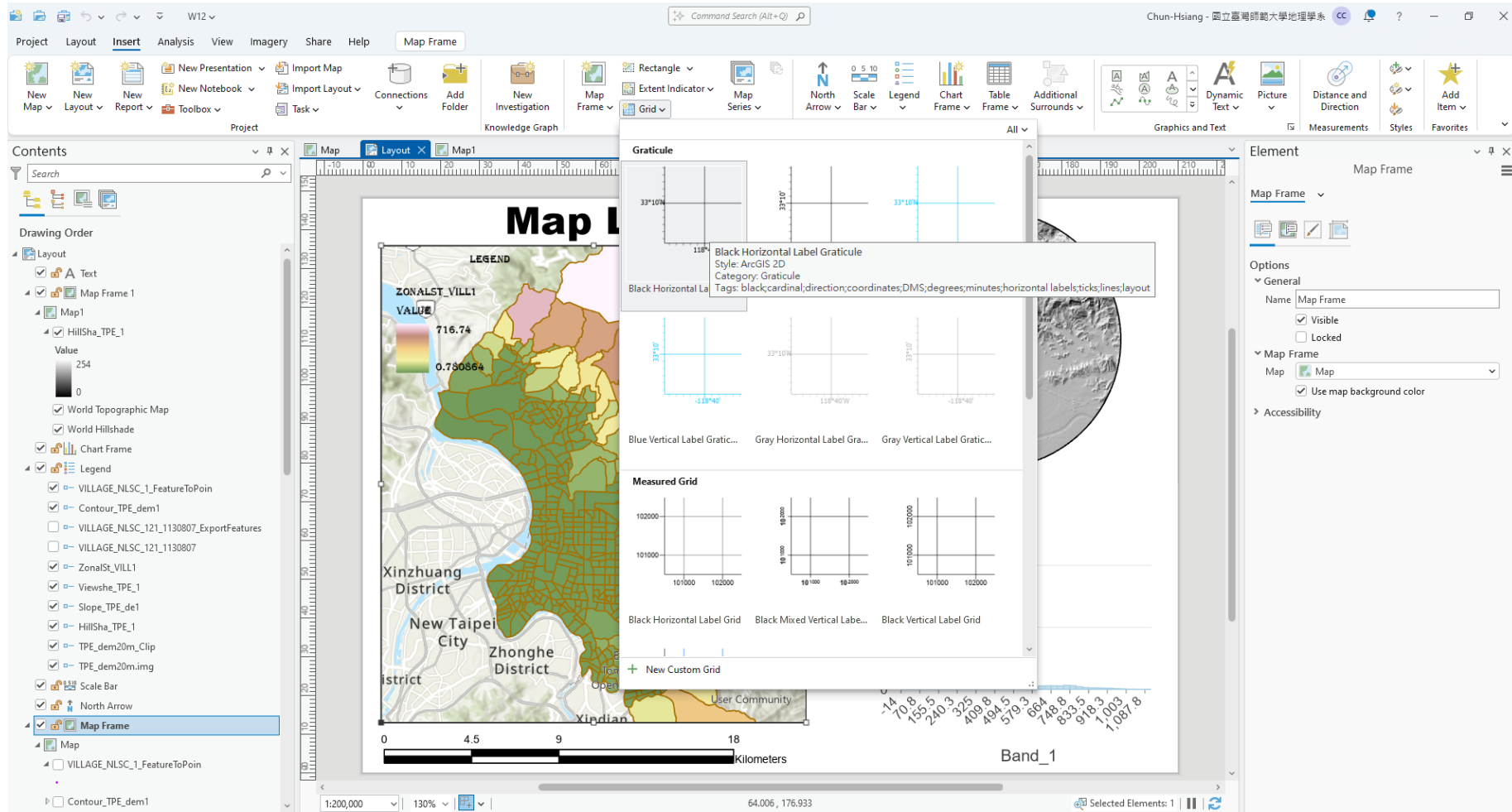
Add Text

The screenshot displays the ArcGIS Pro interface with a map layout titled "Map Layout". The layout includes a legend, a map frame, a DEM (Digital Elevation Model) map, and a histogram. The histogram shows the distribution of values for "Band_1", with a peak count of approximately 200,000 for values between 14 and 100. The map frame shows a legend for "ZONALST_VILL1 VALUE" with a color scale ranging from 0 to 716.74. The map frame also includes a north arrow, a scale bar, and a scale of 1:143,254. The histogram shows a distribution of values for "Band_1" with a peak count of approximately 200,000 for values between 14 and 100. The map frame shows a legend for "ZONALST_VILL1 VALUE" with a color scale ranging from 0 to 716.74. The map frame also includes a north arrow, a scale bar, and a scale of 1:143,254.

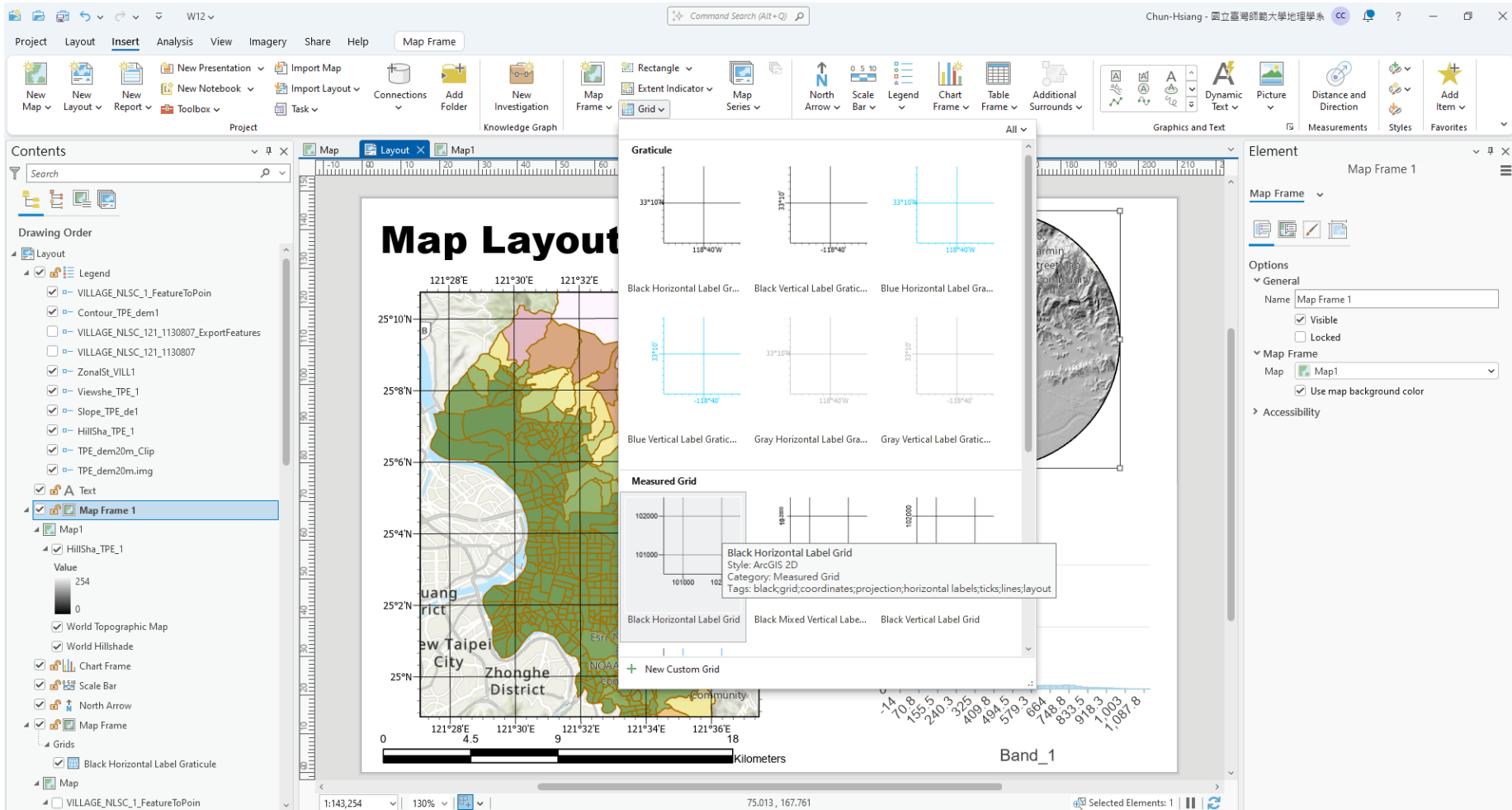
The "Element" panel on the right shows the "Text" element being edited. The text is "AaBbCc" and is styled with the following properties:

- Font name: Arial
- Font style: Black
- Size: 28 pt
- Text fill symbol: Black
- Color: Black
- Outline color: Black
- Outline width: 0 pt
- Underline:
- Strikethrough:
- Text case: Normal
- Position adjustment: Normal
- Horizontal alignment: Left
- Vertical alignment: Middle
- Offset X: 0 pt
- Offset Y: 0 pt

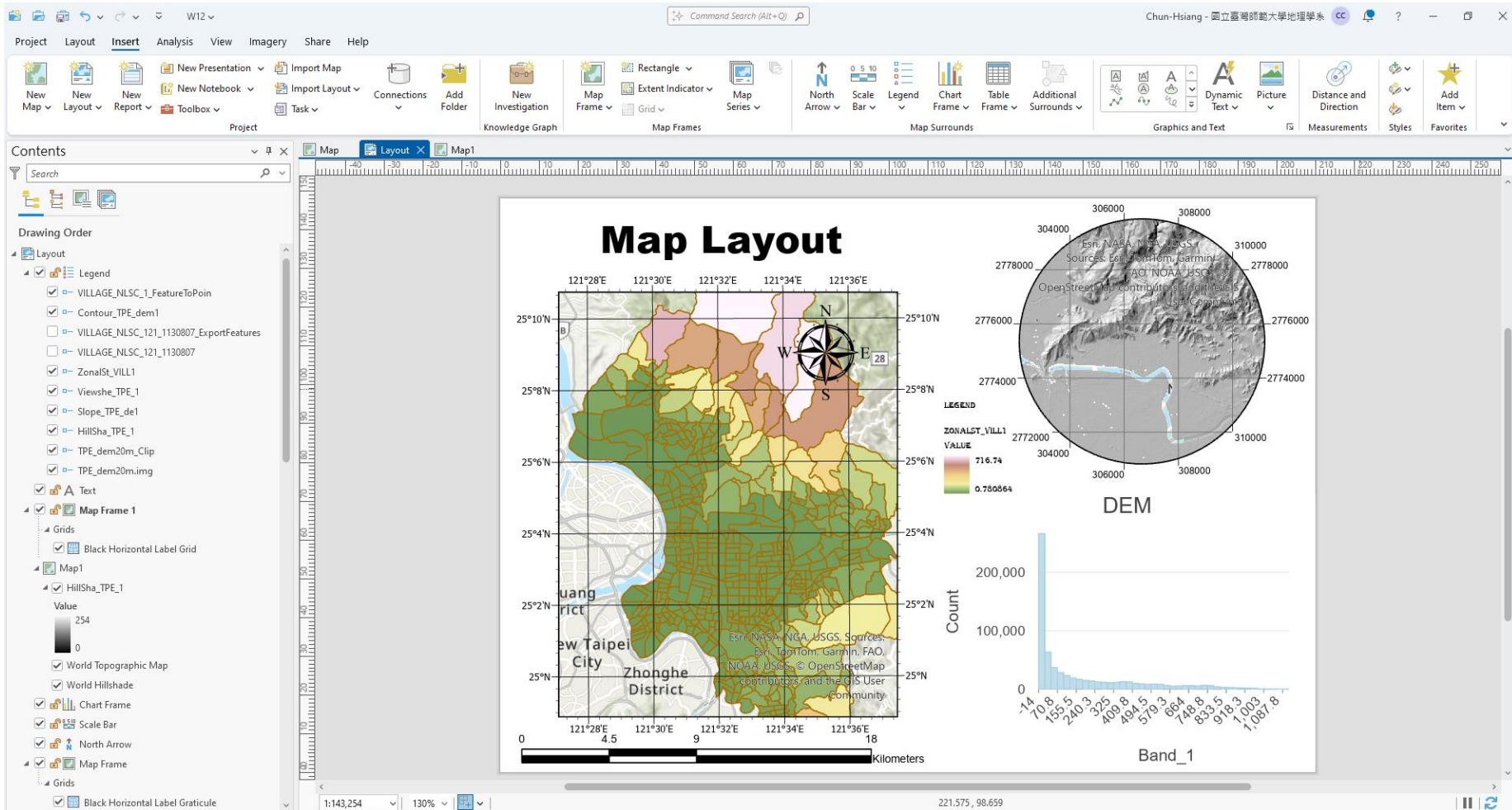
Add Graticule



Add Measured Grid



Final





The End

Thank you for your attention!

| Email: chchan@ntnu.edu.tw
Web: toodou.github.io