



110-2 地圖與地理資訊系統

LAB 02

助教：倪煒傑、楊宇翔、張曼蒨

今日實習

ArcGIS Pro軟體基礎
操作

1

2

3

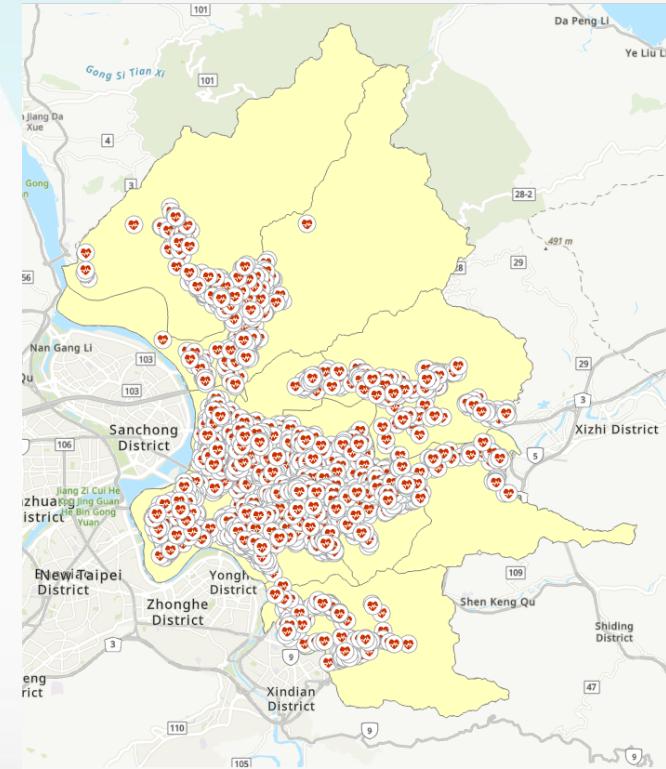
匯入資料

坐標系統設定與變化

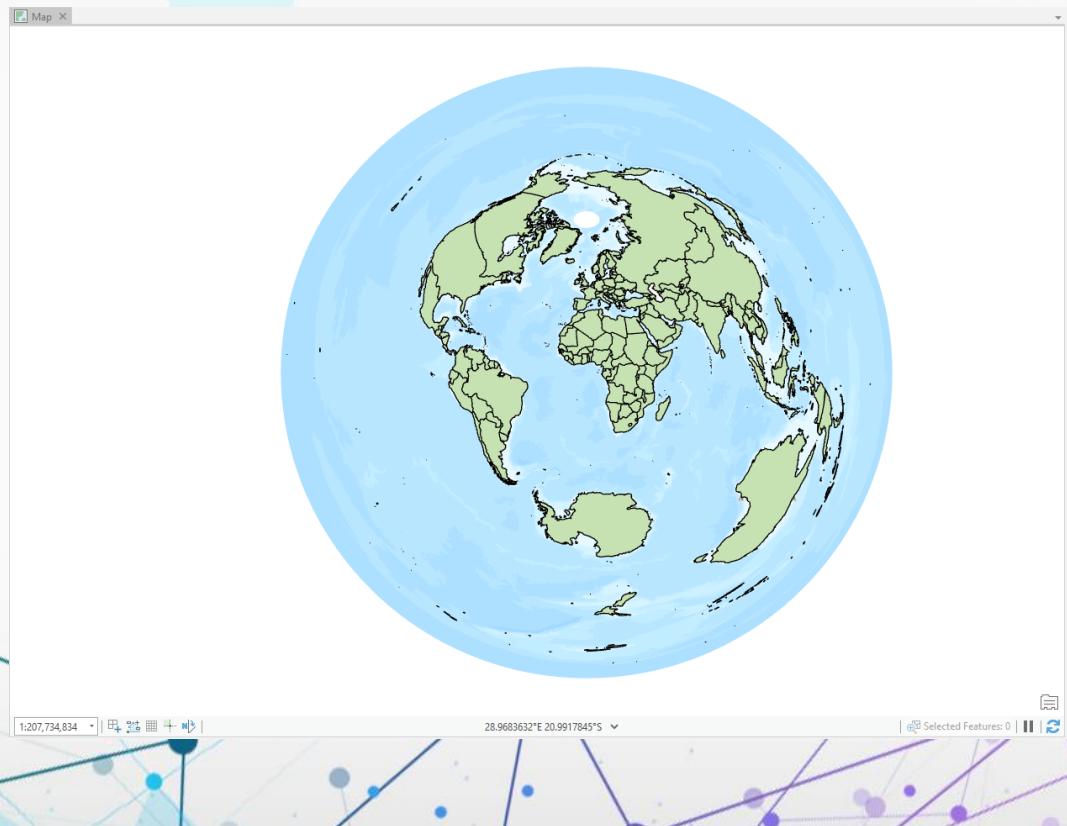
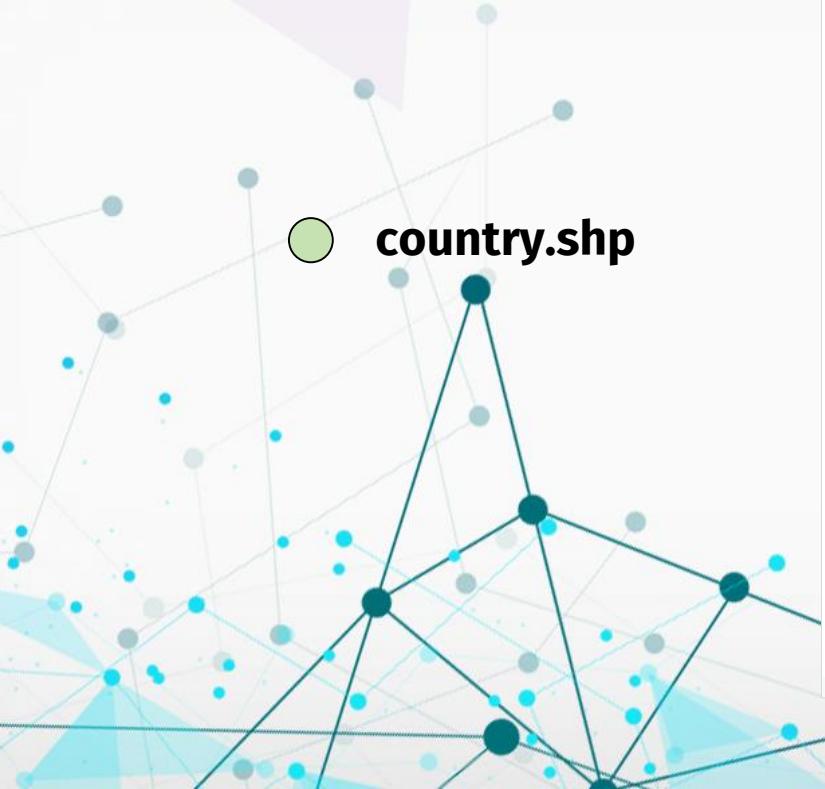
實習使用圖資

○ 台北市鄉村市區界線.shp

● 台北市診所.txt



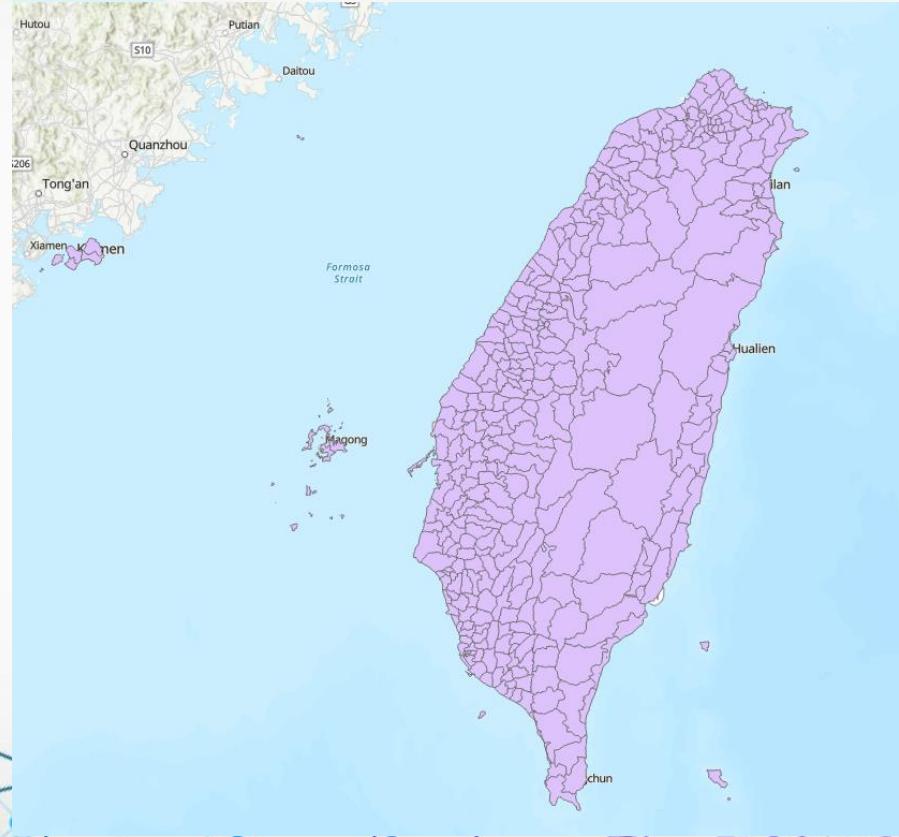
實習使用圖資



實習使用圖資



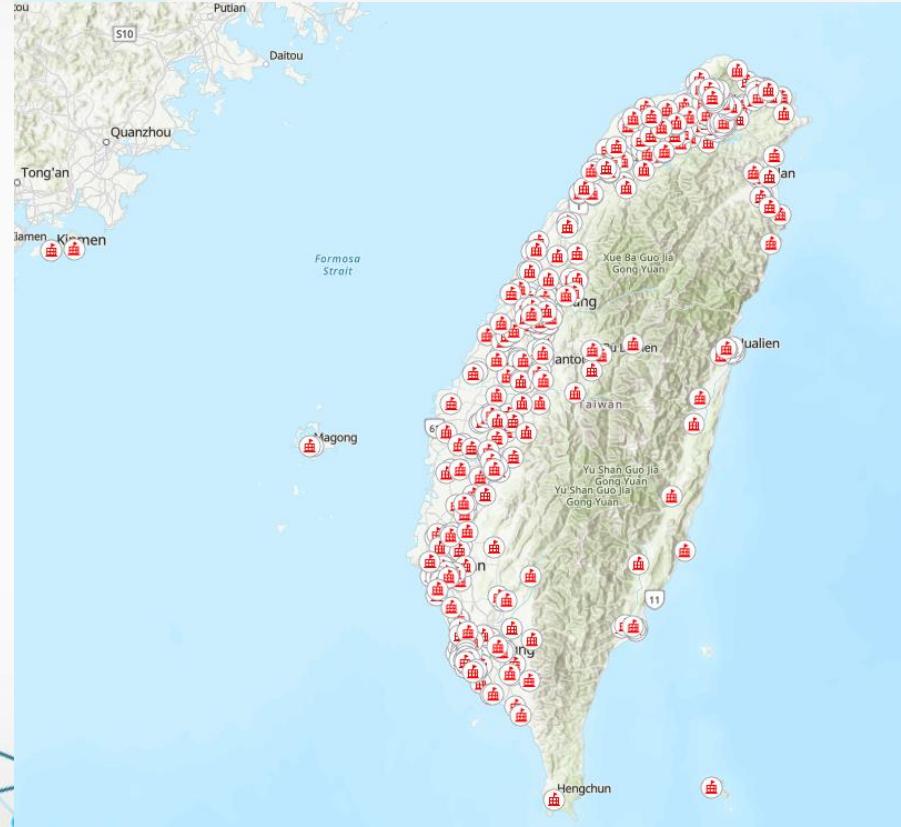
TOWN_MOI_1090324.shp



實習使用圖資



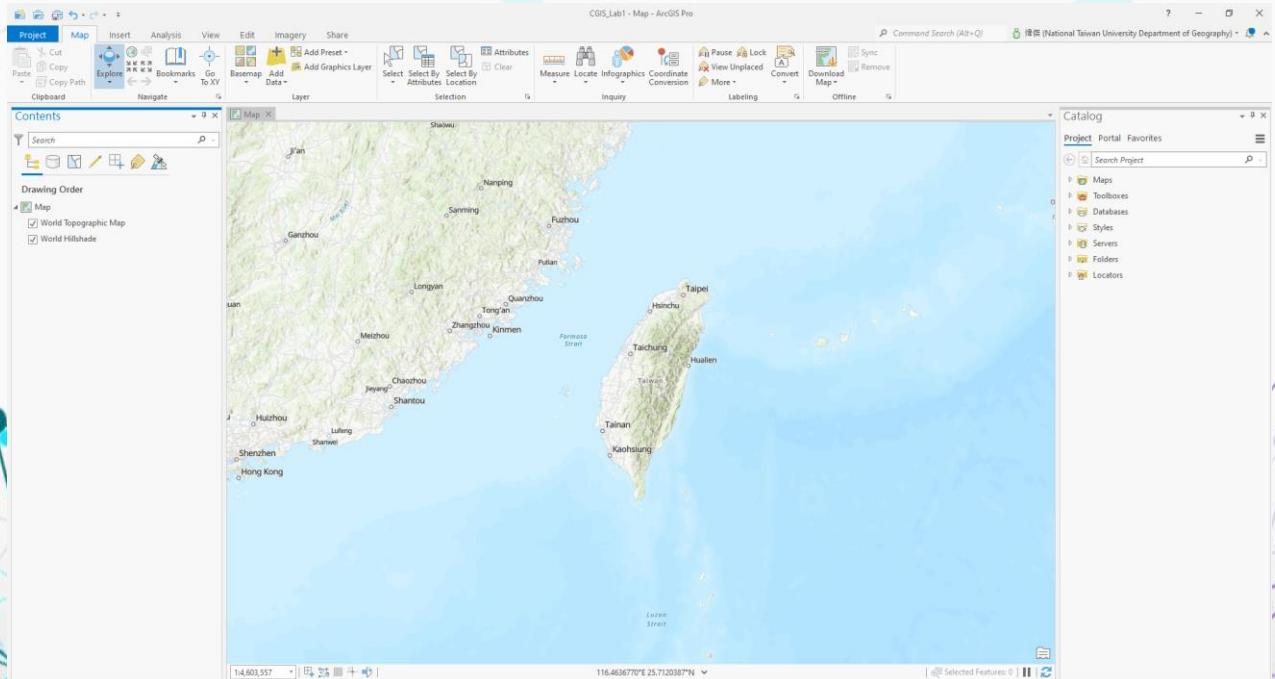
105年全台高中職學校位置.shp



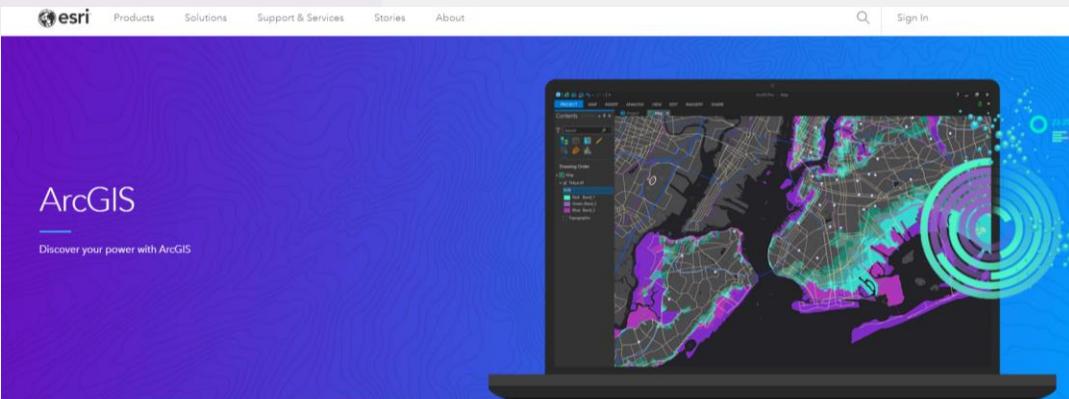
Part 1

ArcGIS Pro 軟體基礎操作

- 了解ESRI ArcGIS
- 建立專案
- ArcGIS Pro面板介紹 (



ESRI ArcGIS



Capabilities

ArcGIS offers unique capabilities and flexible licensing for applying location-based analytics to your business practices. Gain greater insights using contextual tools to visualize and analyze your data. Collaborate and share via maps, apps, dashboards and reports.

美國環境系統研究所公司（全名為Environmental Systems Research Institute, Inc.，簡稱Esri），該公司成立於1969年，最初註冊身分為土地利用顧問公司，目前為世界最大的地理資訊系統技術供應商，其總部設在美國加州雷德蘭茲，其地理資訊系統軟體目前的全球市場佔有率最高，公司最知名產品如ArcGIS。該公司在全美各地都設有辦事處，在其他國家均設有分公司或者代理。

該公司在美國被認為是繼微軟、甲骨文公司與IBM之後，美國聯邦政府最大的軟體供應商之一。

ArcGIS是由ESRI (1969-) 出品的地理資訊系統系列軟件的總稱

- 桌面版本：以功能等級而區分的套件：**ArcReader**、**ArcView**、**ArcEditor**和**ArcInfo**，而高級的套件是較低級套件加上其他進階功能。
- 伺服器版本：以功能等級（基本、標準、進階）而區分為**ArcIMS** (web mapping server), **ArcGIS Server**與**ArcGIS Image Server**。
- 移動版：**ArcGIS Mobile**與**ArcPad**

ESRI ArcGIS Pro



Spatial Analysis & Data Science

Field Operations

Mapping



3D GIS

Imagery & Remote Sensing

Data Collection & Management

ArcGIS Pro是Esri跨世代64位元桌上型GIS產品，在技術方面領先市場上所有地理資訊產品。同時也支援2D地圖和3D建模視覺化、內建AI機器學習與開發者環境，使空間分析領域提升至更高層次，嶄新流暢的操作介面，更適合所有技術與非技術人員快速上手，並且可以結合ArcGIS Online以及ArcGIS Enterprise在雲端上共享資料，在這地理資訊蓬勃發展的時代，ArcGIS Pro隨時隨地都在你我的身邊。

ArcGIS Pro 為帳號等入制軟件*

建立專案

建立 ArcGIS Pro Project (.aprx)

ArcGIS® Pro

Open

Recent Projects

- CGIS_Lab1
C:\Users\user\Documents\ArcGIS\Projects\CGIS_Lab1\CGIS_Lab1.aprx
- MyProject7
C:\Users\user\Documents\ArcGIS\Projects\MyProject7\MyProject7.aprx
- MyProject6
C:\Users\user\Documents\ArcGIS\Projects\MyProject6\MyProject6.aprx
- MyProject3
C:\Users\user\Documents\ArcGIS\Projects\MyProject3\MyProject3.aprx
- Geocoding
C:\Users\user\Documents\ArcGIS\Projects\Geocoding\Geocoding.aprx
- MyProject5
C:\Users\user\Documents\ArcGIS\Projects\MyProject5\MyProject5.aprx
- MyProject4
C:\Users\user\Documents\ArcGIS\Projects\MyProject4\MyProject4.aprx
- MyProject2
C:\Users\user\Documents\ArcGIS\Projects\MyProject2\MyProject2.aprx
- MyProject1
C:\Users\user\Documents\ArcGIS\Projects\MyProject1\MyProject1.aprx
- MyProject
C:\Users\user\Documents\ArcGIS\Projects\MyProject\MyProject.aprx

Open another project

Settings

New

Blank Templates



Start without a template
(you can save it later)

Recent Templates

Your recent templates will appear here.

Create a New Project

Name:

Location:

Create a new folder for this project

Select another project template

Learn about creating project templates

地圖
National Taiwan University Department of Geography
<http://www.arcgis.com/>
[Sign out](#)

Resources



Coming from ArcMap?

Getting started for ArcMap users
Import an ArcMap document
Migration Guide

Discovery Paths

Learn the basics
Begin with the essentials
Mapping and visualization
Create compelling data visualizations and beautiful maps.

Analysis and modeling
Use geoprocessing tools, build models, and explore geostatistical analysis and machine learning.
3D perspective
Explore, analyze, and symbolize your data in 3D.

CGIS_Lab1 - Map - ArcGIS Pro

功能區

功能面板 / 進入的圖層

專案導向

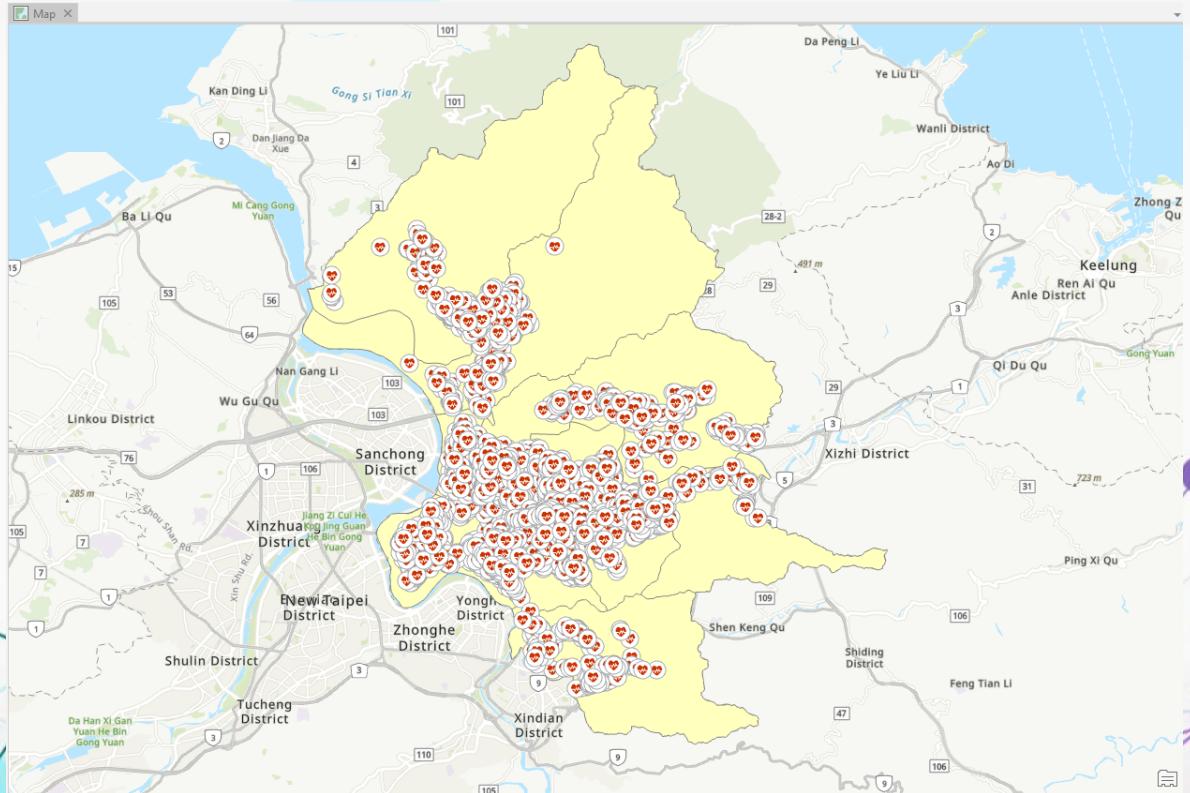
2D/3D 地圖視窗

The screenshot displays the ArcGIS Pro application window. At the top is the ribbon menu with tabs: Project, Map, Insert, Analysis, View, Edit, Imagery, and Share. Below the ribbon are various toolbars: Clipboard, Navigate, Layer, Selection, Inquiry, Labeling, and Offline. A red box highlights the '功能區' (Function Area) in the top right corner. The central area is the '2D/3D 地圖視窗' (Map Window), showing a map of East Asia and Taiwan with geographical features and place names like Shaoxing, Jilin, Nanjing, Fuzhou, Taipei, and Hong Kong. To the left is the 'Contents' panel, which includes a 'Search' bar and a 'Drawing Order' section with checkboxes for 'World Topographic Map' (checked) and 'World Hillshade'. A red box highlights the '功能面板 / 進入的圖層' (Function Panel / Entered Layers) in the bottom left corner. To the right is the 'Catalog' panel, containing sections for Project, Portal, Favorites, and a search bar. A red box highlights the '專案導向' (Project Orientation) in the bottom right corner. The bottom of the screen shows the ArcGIS Pro status bar with coordinates (118.7395550°E 27.5798285°N) and a selected features counter (0).

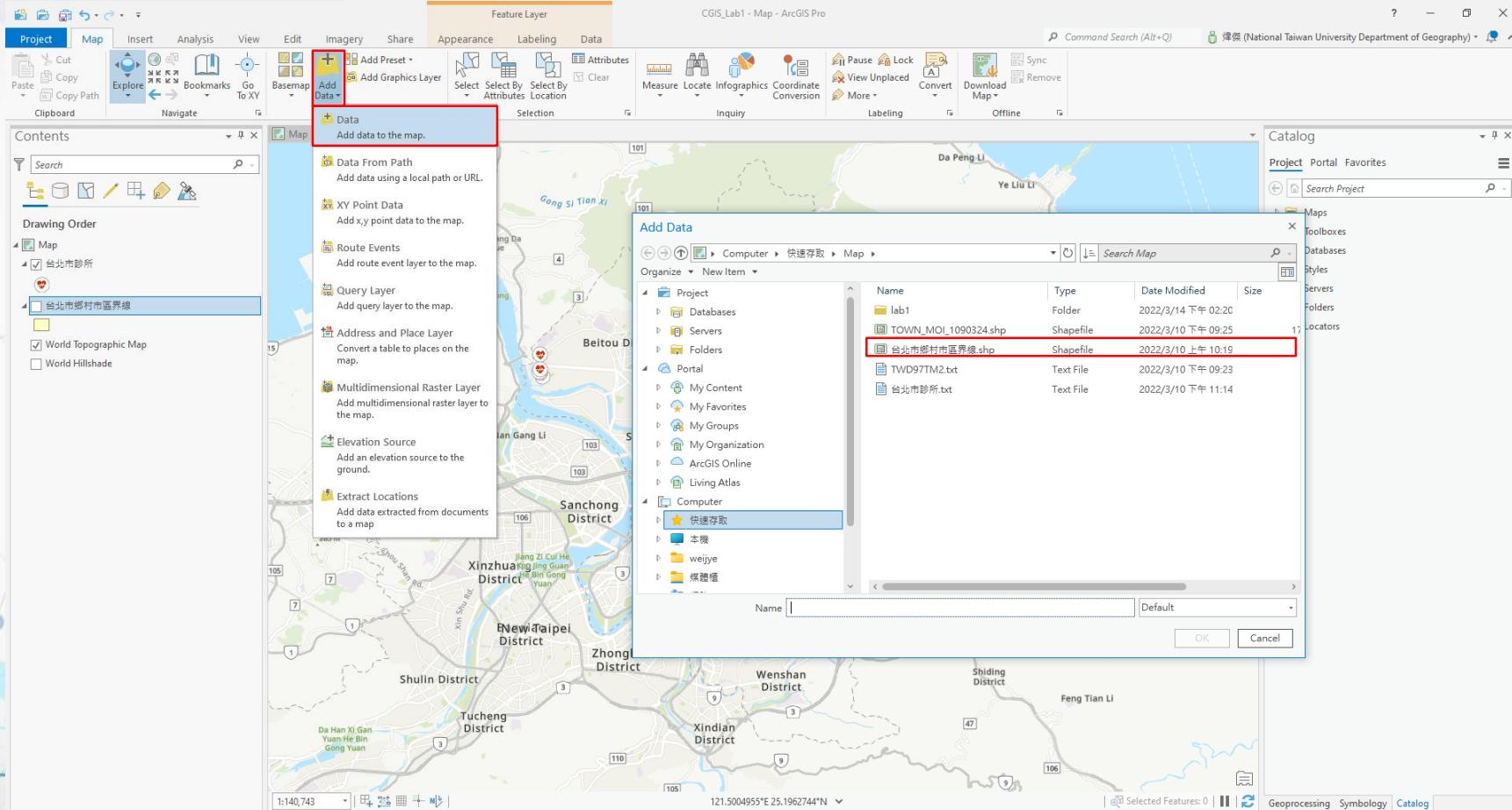
Part 2

匯入資料

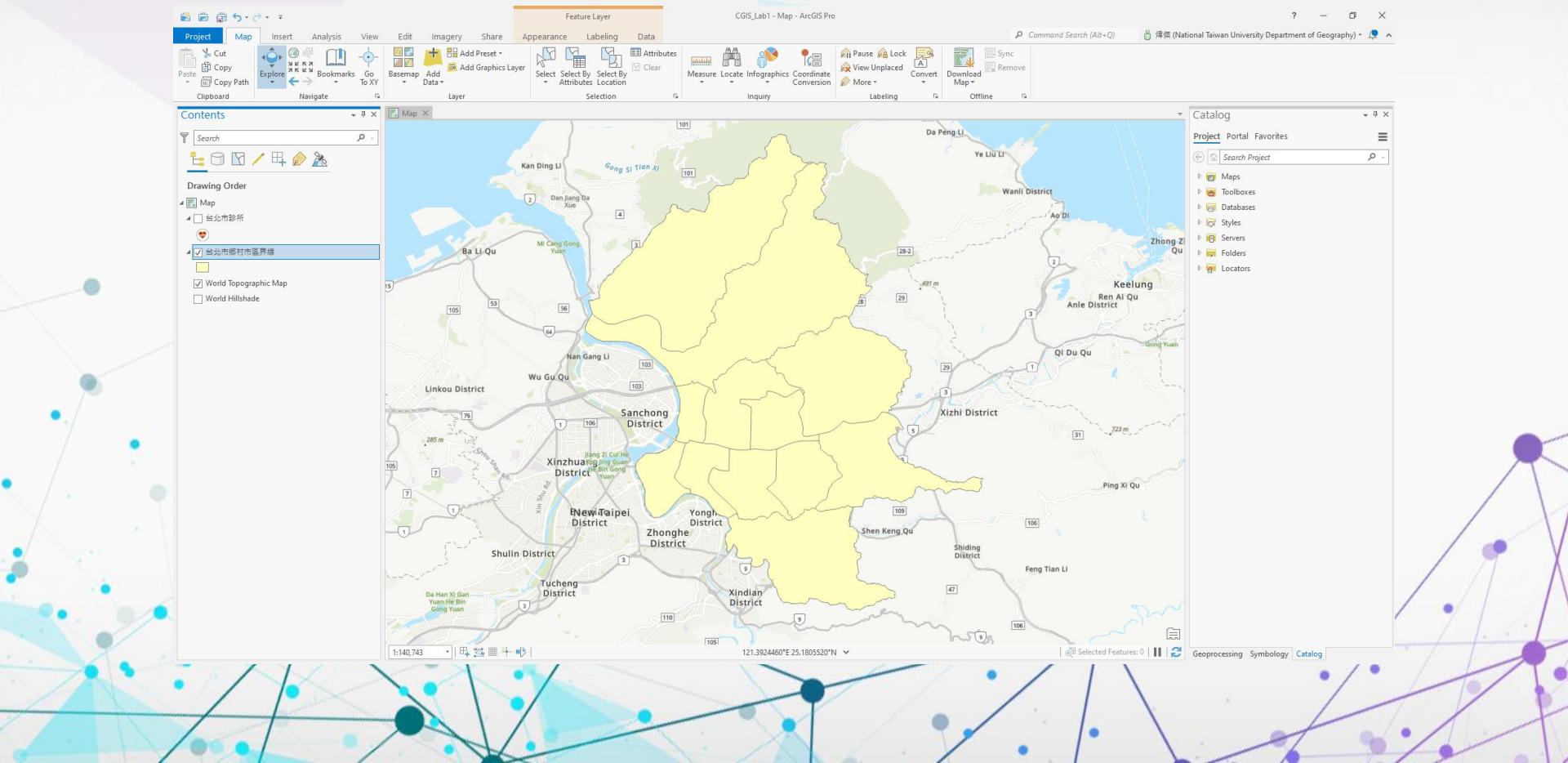
- 加入**台北鄉鎮市區界線.shp**
以及設定
- 加入**台北市診所.txt**
以及設定



ArcGIS Pro 加入台北鄉鎮市區界線 (WGS 84)

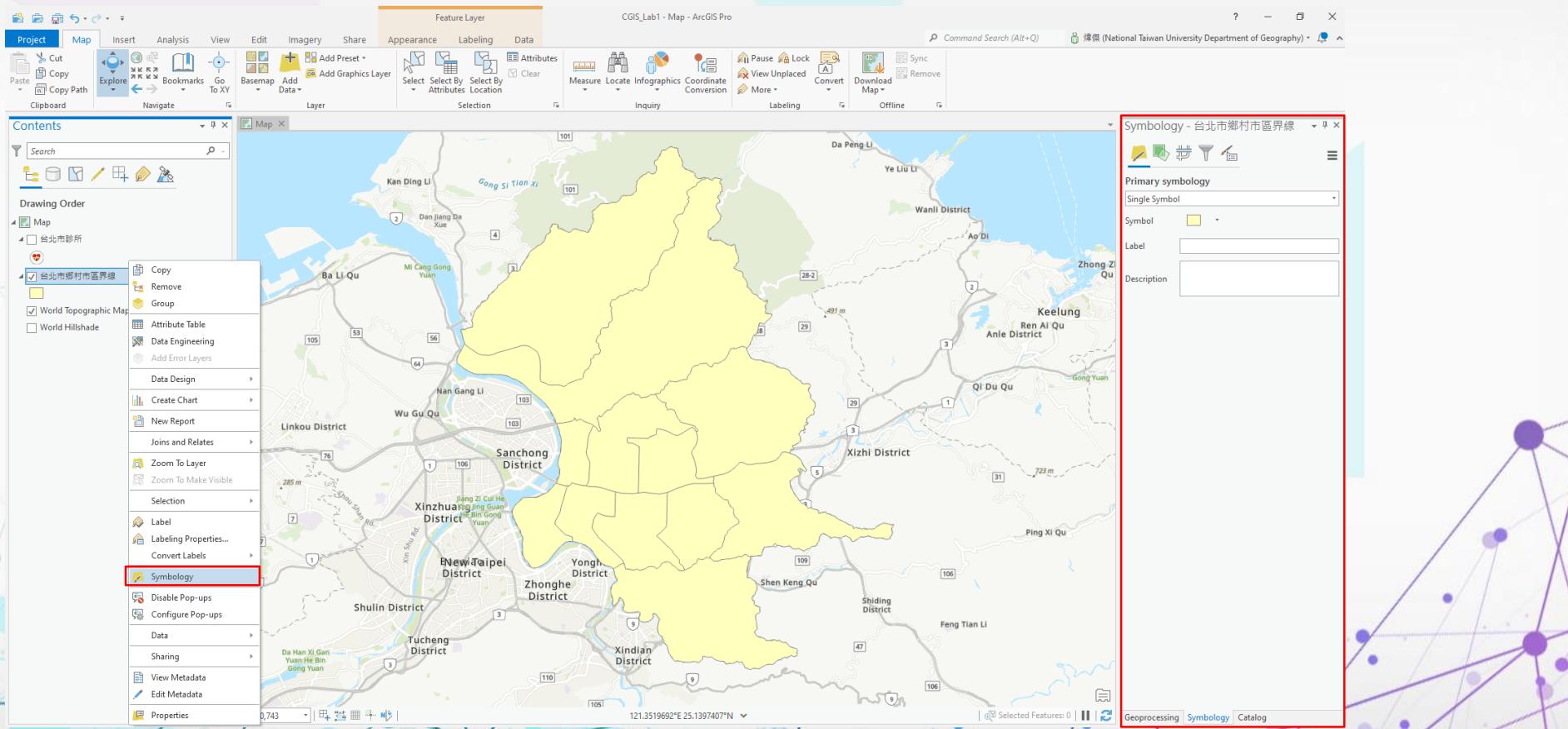


ArcGIS Pro 加入台北鄉鎮市區界線 (WGS 84)



Symbology & Attributes

A screenshot of ArcGIS Pro showing a map of Taipei city districts. The map displays various districts like Xinzhuang, Sanchong, Shulin, Tucheng, Xindian, Shilin, Zhonghe, Yonghe, Xizhi, Renai, and Keelung, each outlined in yellow. A legend on the right side titled "Symbol - 台北市鄉村市區界線" shows a single yellow square symbol under "Primary symbology". The "Symbology" button in the contents panel is highlighted with a red box. The bottom status bar shows coordinates 0.743, 121.351969°E 25.1397407°N, and selected features count 0.



Project Map Insert Analysis View

Feature Layer

CGIS_Lab1 - Map - ArcGIS Pro

?

Command Search (Alt+Q)

悔儀 (National Taiwan University Department of Geography)

Project Map Insert Analysis View

Cut Copy Copy Path Paste

Explore Bookmarks Go To XY

Basemap Add Data Add Preset Add Graphics Layer

Select By Attributes Select By Location

Measure Locate Infographics Coordinate Conversion

Pause Lock View Unplaced More

Sync Convert Download Map

More Labeling

Labeling

Offline

Contents

Search

Drawing Order

Map 台北市鄉村市區界線

Copy Remove Group Attribute Table Data Engineering Add Error Layers Data Design Create Chart New Report Joins and Relates Zoom To Layer Zoom To Make Visible Selection Label Labeling Properties... Convert Labels Symbology

World Topographic Map World Hillshade

Symbol

Label

Description

Symbol - 台北市鄉村市區界線

Primary symbology

Single Symbol

Symbol

Label

Description

Geoprocessing Symbology Catalog

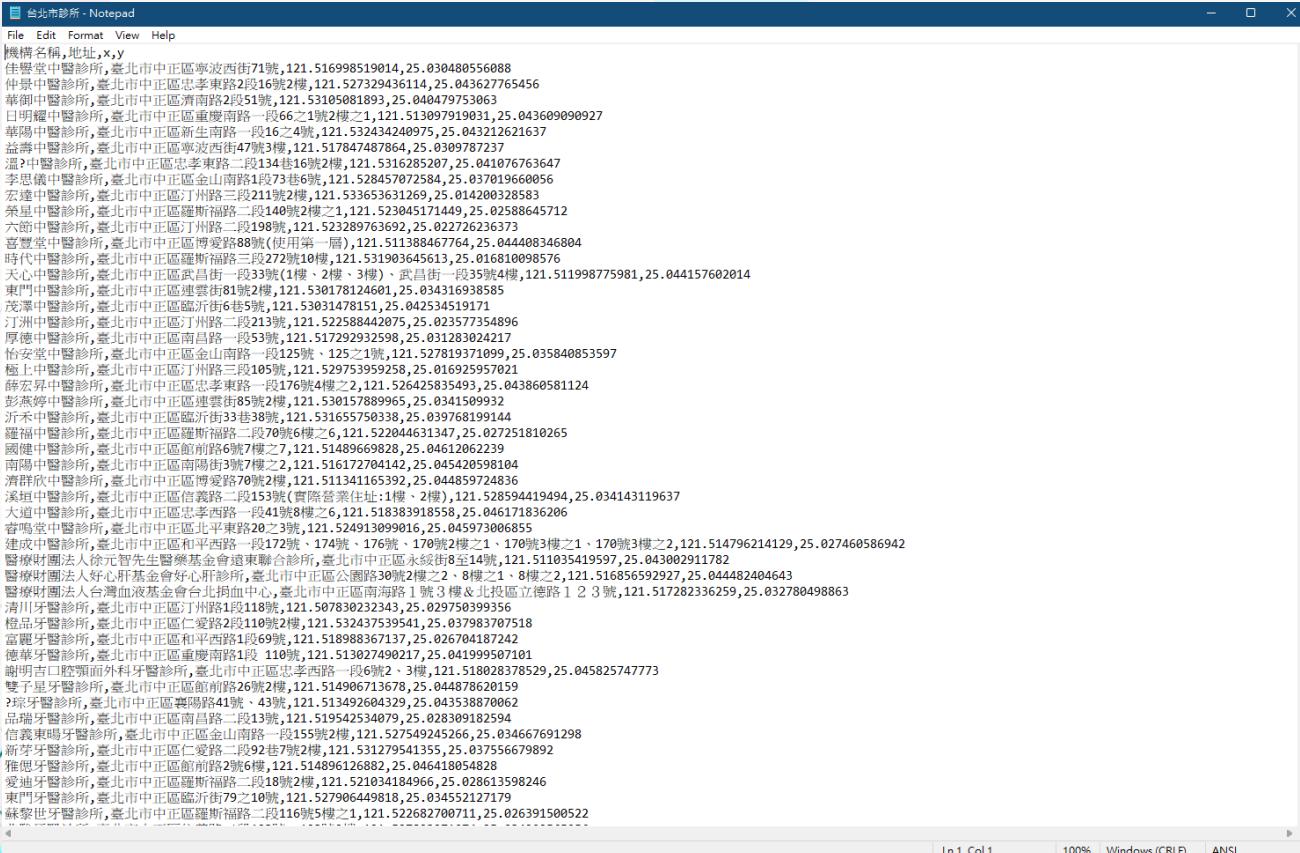
Symbology & Attributes

The screenshot shows the ArcGIS Pro interface with a map of Taipei districts. A red box highlights the 'Attribute Table' option in the context menu of the '台北市鄉村市區界線' layer in the Contents pane. Another red box highlights the 'Attributes' tab in the ribbon's 'Layer' section.

Attribute Table:

Shape	TOWNID	TOWNCODE	COUNTYNAME	TOWNNAME	TOWNENG	COUNTYID	COUNTYCODE
Polygon	A02	63000030	臺北市	大安區	Da'an District	A	63000
Polygon	A11	63000080	臺北市	文山區	Wenshan District	A	63000
Polygon	A17	63000020	臺北市	信義區	Xinyi District	A	63000
Polygon	A05	63000070	臺北市	萬華區	Wanhua District	A	63000
Polygon	A03	63000050	臺北市	中正區	Zhongzheng District	A	63000
Polygon	A13	63000090	臺北市	南港區	Nangang District	A	63000
Polygon	A01	63000010	臺北市	松山區	Songshan District	A	63000
Polygon	A09	63000060	臺北市	大同區	Datong District	A	63000
Polygon	A10	63000040	臺北市	中山區	Zhongshan District	A	63000
Polygon	A14	63000100	臺北市	內湖區	Neihu District	A	63000
Polygon	A15	63000110	臺北市	士林區	Shilin District	A	63000
Polygon	A16	63000120	臺北市	北投區	Beitou District	A	63000

ArcGIS Pro加入台北市診所.txt



台北市診所 - Notepad

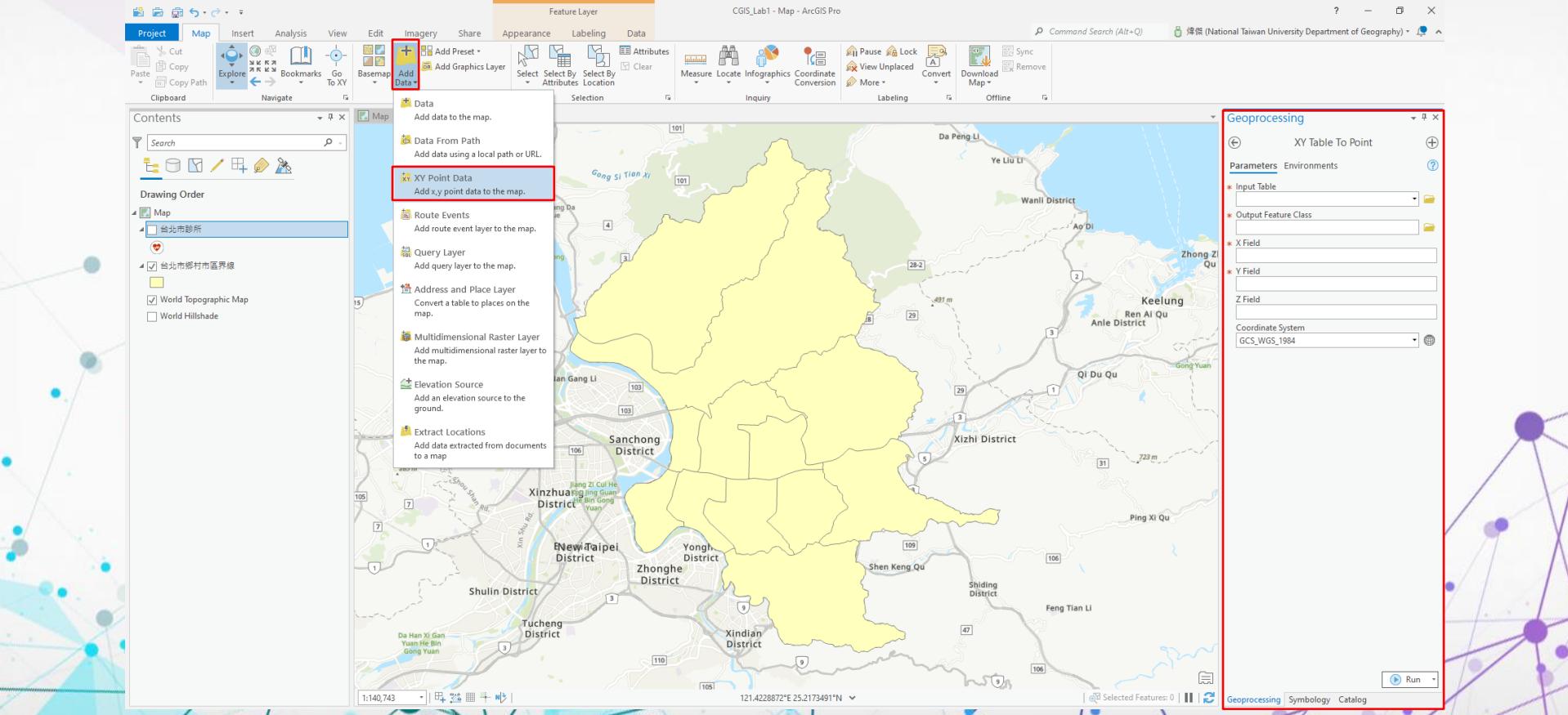
File Edit Format View Help

機構名稱,地址,x,y

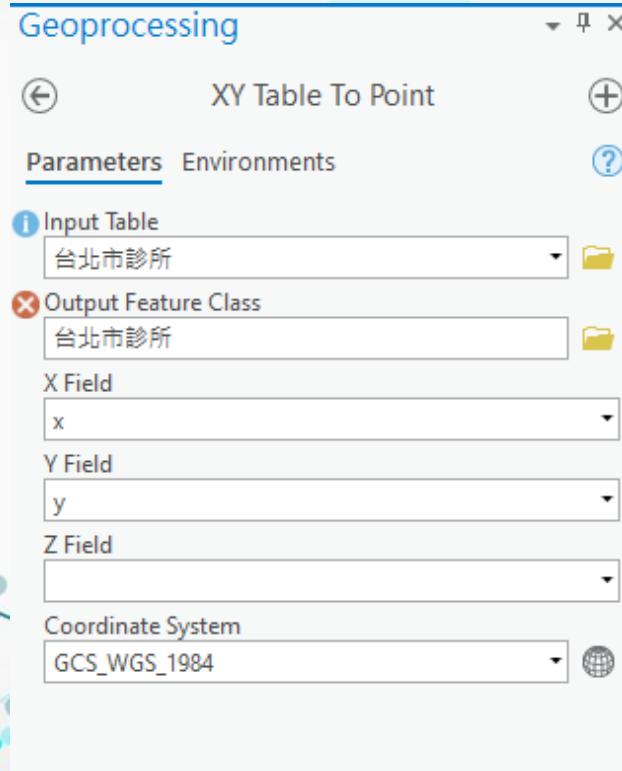
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益壽中醫診所,臺北市中正區寧波西街47號3樓,121.517847487864,25.0309787237
溫?中醫診所,臺北市中正區忠孝東路二段134巷16號2樓,121.5316285207,25.041076763647
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宏達中醫診所,臺北市中正區汀州路三段211號2樓,121.533653631269,25.014208328583
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喜豐堂中醫診所,臺北市中正區博愛路88號(使用第一層),121.51138467764,25.044408346804
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極上中醫診所,臺北市中正區汀州路三段105號,121.529753959258,25.016925957021
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彭燕婷中醫診所,臺北市中正區連雲街85號2樓,121.530157889965,25.0341599932
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羅福中醫診所,臺北市中正區羅斯福路二段70號6樓之6,121.5220464631347,25.027251810265
國健中醫診所,臺北市中正區館前路6號7樓之7,121.51489669828,25.04612062239
南陽中醫診所,臺北市中正區南陽街7號2樓之2,121.516172704412,25.045426598104
濟群欣中醫診所,臺北市中正區博愛路70號2樓,121.51341165392,25.044859724836
溪垣中醫診所,臺北市中正區信義路二段153號(實隸營業住址:1樓、2樓),121.528594419494,25.034143119637
大追中醫診所,臺北市中正區忠孝西路一段41號8樓之6,121.518383918558,25.046171836266
音鳴堂中醫診所,臺北市中正區北平東路20之3號,121.524913098016,25.045973006855
建成中醫診所,臺北市中正區和平西路一段172號：174號、176號、178號2樓之1、170號3樓之1、170號3樓之2,121.514796214129,25.027460586942
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清川牙醫診所,臺北市中正區汀州路118號,121.507830232343,25.029750399356
晶品牙醫診所,臺北市中正區仁愛路2段110號2樓,121.532437539541,25.037983707518
富麗牙醫診所,臺北市中正區和平西路1段69號,121.518988367137,25.026704187242
德華牙醫診所,臺北市中正區重慶南路1段110號,121.513027490217,25.041999507101
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雙子星牙醫診所,臺北市中正區館前路26號2樓,121.514906713678,25.044978620159
?棕牙醫診所,臺北市中正區襄陽路41號：43號,121.513492604329,25.043538870062
品瑞牙醫診所,臺北市中正區南昌路二段13號,121.519542534079,25.028389182594
信義東陽牙醫診所,臺北市中正區金山南路一段155號2樓,121.527549245266,25.034667691298
新芽牙醫診所,臺北市中正區仁愛路二段92巷7號2樓,121.513279541355,25.037556679892
雅健牙醫診所,臺北市中正區羅斯福路二段18號2樓,121.514896126882,25.046418054828
愛迪牙醫診所,臺北市中正區羅斯福路二段18號2樓,121.521034184966,25.02862713598246
東門牙醫診所,臺北市中正區臨沂街79之10號,121.527906449818,25.034552127179
蘇黎世牙醫診所,臺北市中正區羅斯福路二段116號5樓之1,121.522682780711,25.026391500522

Ln 1, Col 1 100% Windows (CRLF) ANSI

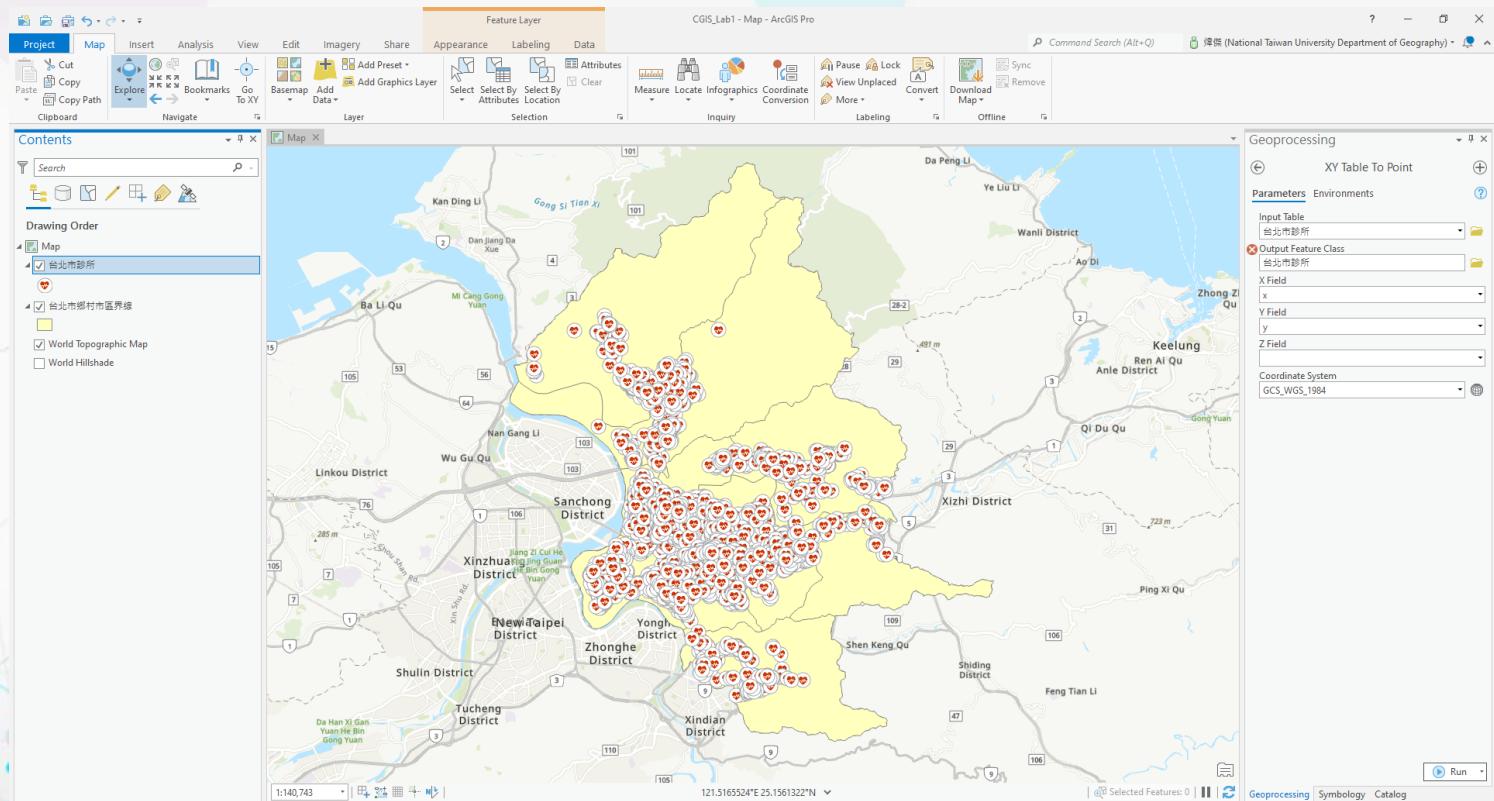
ArcGIS Pro加入台北市診所.txt



XY Table to Point



ArcGIS Pro加入台北市診所.txt



Symbology & Attributes

Symbology - 台北市診所

Format Point Symbol

Gallery Properties

Type here to search Project styles

Symbols found: 372

ArcGIS 2D

- Circle 1
- Circle 1 (40%)
- Circle 2
- Circle 3
- Circle 3 (40%)
- Circle 4
- Circle 5
- Circle 6
- Square 1
- Square 2
- Square 3

台北市診所

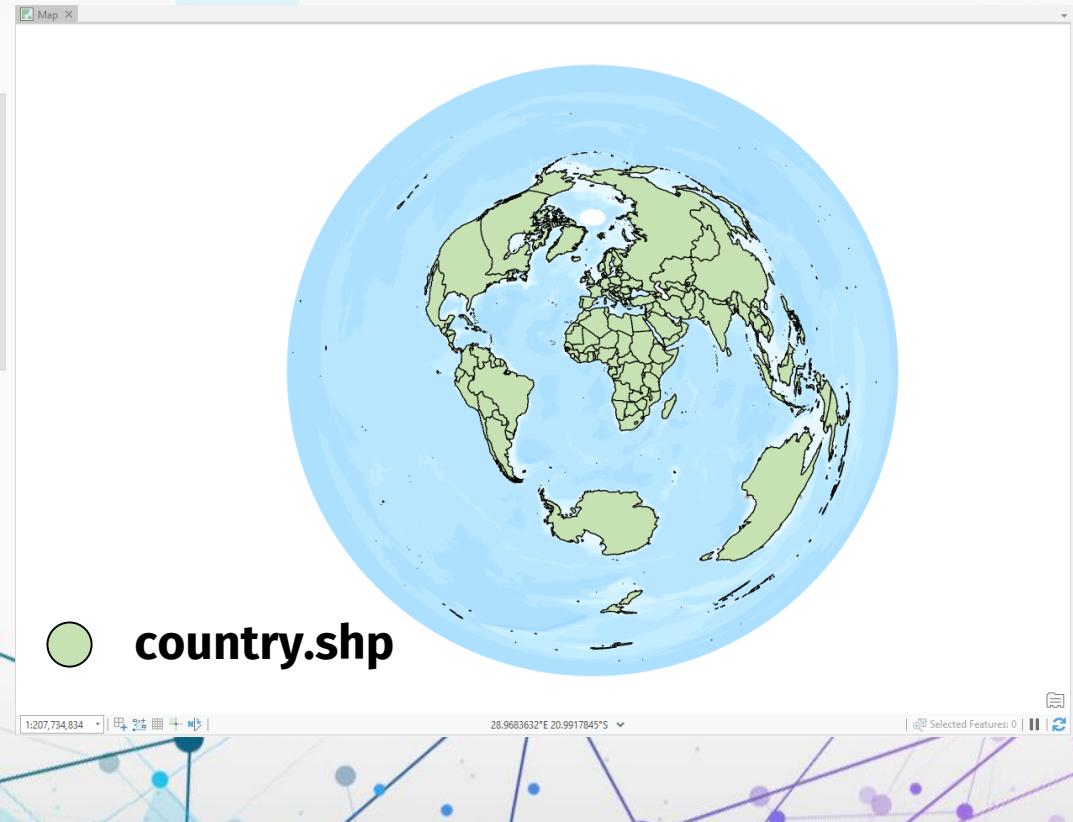
Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

OBJECTID *	Shape *	機構名稱	地址	x	y
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2	Point	仲景堂中醫診所	臺北市中正區忠孝東...	121.527329	25.043628
3	Point	華御中醫診所	臺北市中正區濱南路2...	121.531051	25.04048
4	Point	日明耀中醫診所	臺北市中正區重慶南...	121.53098	25.043609
5	Point	華陽中醫診所	臺北市中正區新生南...	121.532434	25.043213
6	Point	益壽中醫診所	臺北市中正區寧波西...	121.517847	25.030979
7	Point	溫中醫診所	臺北市中正區忠孝東...	121.531629	25.041077
8	Point	李思儀中醫診所	臺北市中正區金山南...	121.528457	25.03702
9	Point	宏達中醫診所	臺北市中正區汀州路...	121.533654	25.0142
10	Point	榮星中醫診所	臺北市中正區羅斯福...	121.523045	25.025886
11	Point	六節中醫診所	臺北市中正區汀州路...	121.52329	25.022726
12	Point	喜豐堂中醫診所	臺北市中正區博愛路8...	121.511388	25.044408
13	Point	時代中醫診所	臺北市中正區羅斯福...	121.531904	25.01681
14	Point	天心中醫診所	臺北市中正區武昌街...	121.511999	25.044158
15	Point	東門中醫診所	臺北市中正區連善街8...	121.530178	25.034317
16	Point	茂澤中醫診所	臺北市中正區臨沂街6...	121.530315	25.042535
17	Point	汀洲中醫診所	臺北市中正區汀州路...	121.522588	25.023577
18	Point	厚德中醫診所	臺北市中正區南昌路...	121.517293	25.031283
19	Point	怡安堂中醫診所	臺北市中正區金山南...	121.527819	25.035841
20	Point	極上中醫診所	臺北市中正區汀州路...	121.529754	25.016926
21	Point	薛宏昇中醫診所	臺北市中正區忠孝東...	121.526426	25.043861
22	Point	彭燕婷中醫診所	臺北市中正區連善街8...	121.530158	25.034151
23	Point	沂禾中醫診所	臺北市中正區臨沂街3...	121.531656	25.039768
24	Point	羅福中醫診所	臺北市中正區羅斯福...	121.522045	25.027252
25	Point	國健中醫診所	臺北市中正區館前路6...	121.514897	25.046121

Part 3

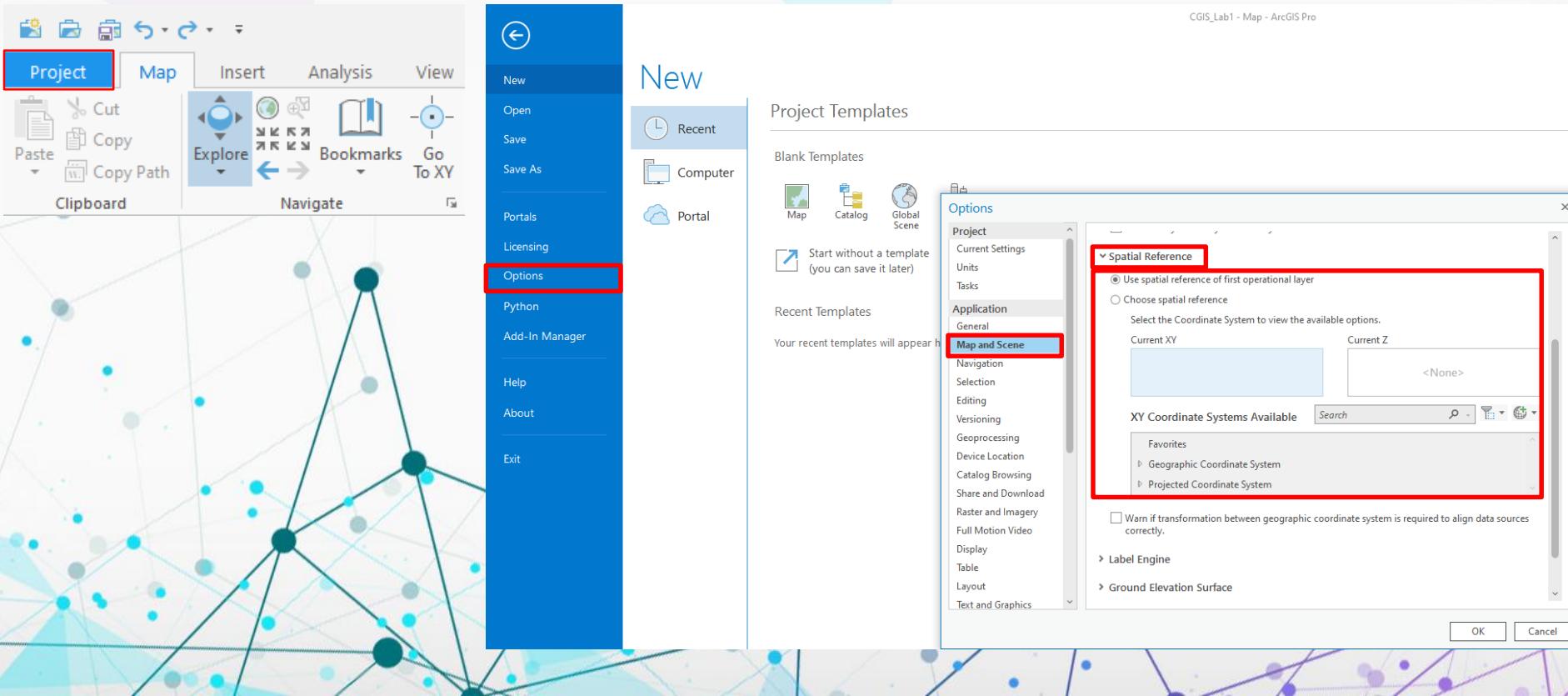
坐標系統設定與變化

- 設定投影系統（從專案）
- 自訂投影參數
- 自定義投影+坐標系統
- 加入不同坐標系統圖層



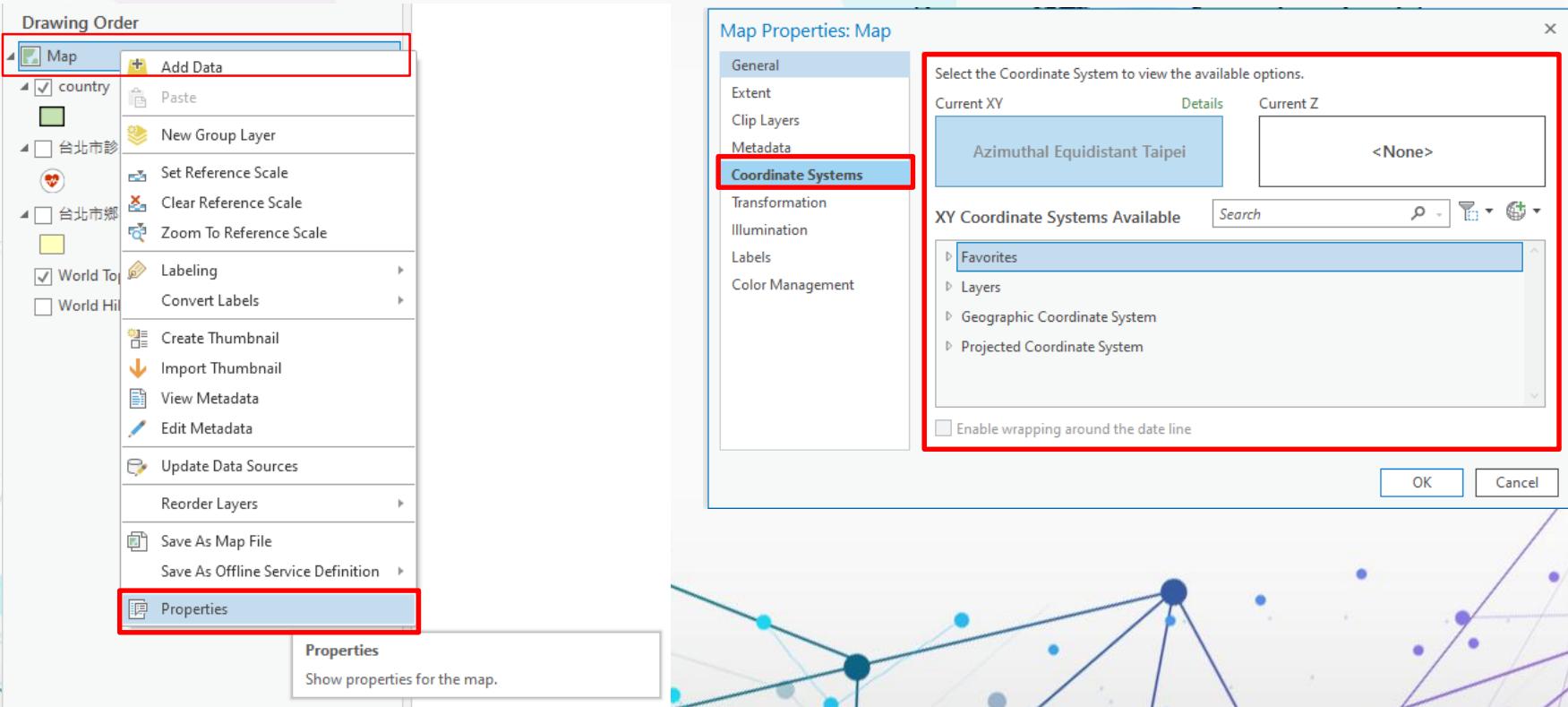
設定投影系統（從專案）

Project→Options→Map and Scene → Spatial Reference



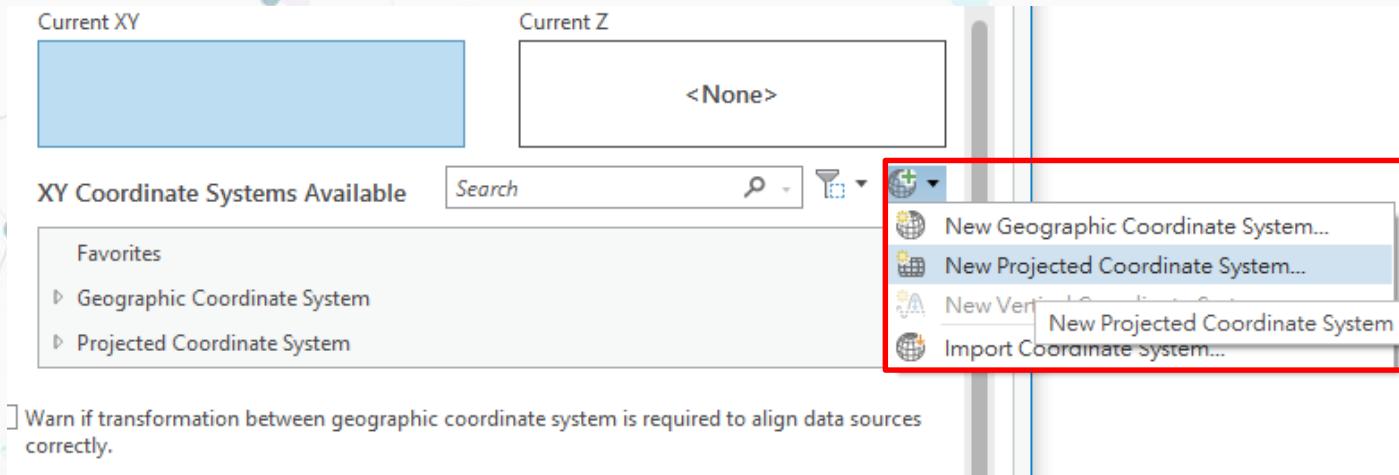
設定投影系統 (從Map)

Map→Properties→Map and Scene → Coordinate Systems



自訂投影參數

- 等方位等距投影 : Azimuthal Equidistant
沒有適用台灣的投影
- 以台北（北緯25度，東經121.5度）為投影中心



自訂投影參數

New Projected Coordinate System

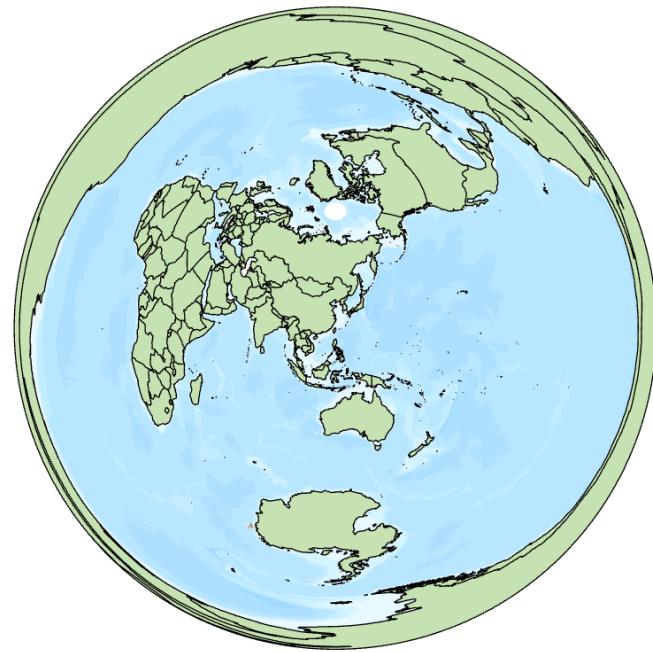
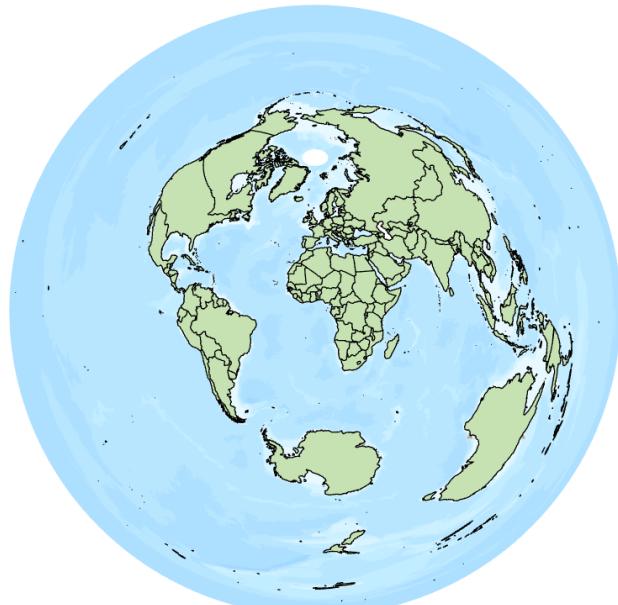
Name	Azimuthal Equidistant Taipei
Linear Unit	Meters
Meters per unit	1
Projection	Azimuthal Equidistant
False Easting	0.0
False Northing	0.0
Central Meridian	121.5
Latitude Of Origin	25
Geographic Coordinate System	GCS TWD 1997
Name	GCS TWD 1997
Angular Unit	Degree
Radians per unit	0.0174532925199433
Prime Meridian	Greenwich
Longitude relative to Greenwich	0°

*Central Meridian 中央經線

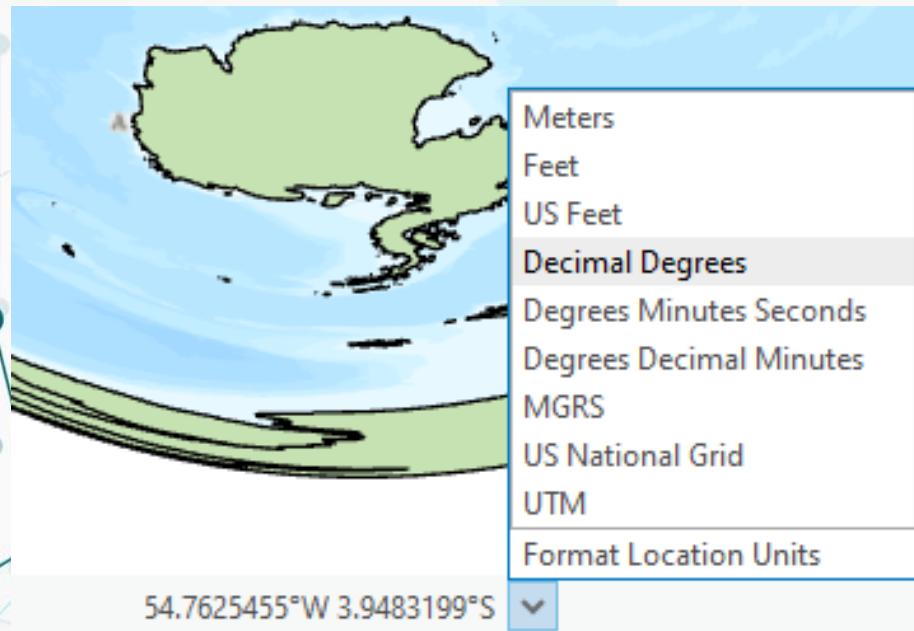
*Latitude of Origin 起始緯度

以台北（北緯25度，東經121.5度）
為投影中心

自訂投影參數

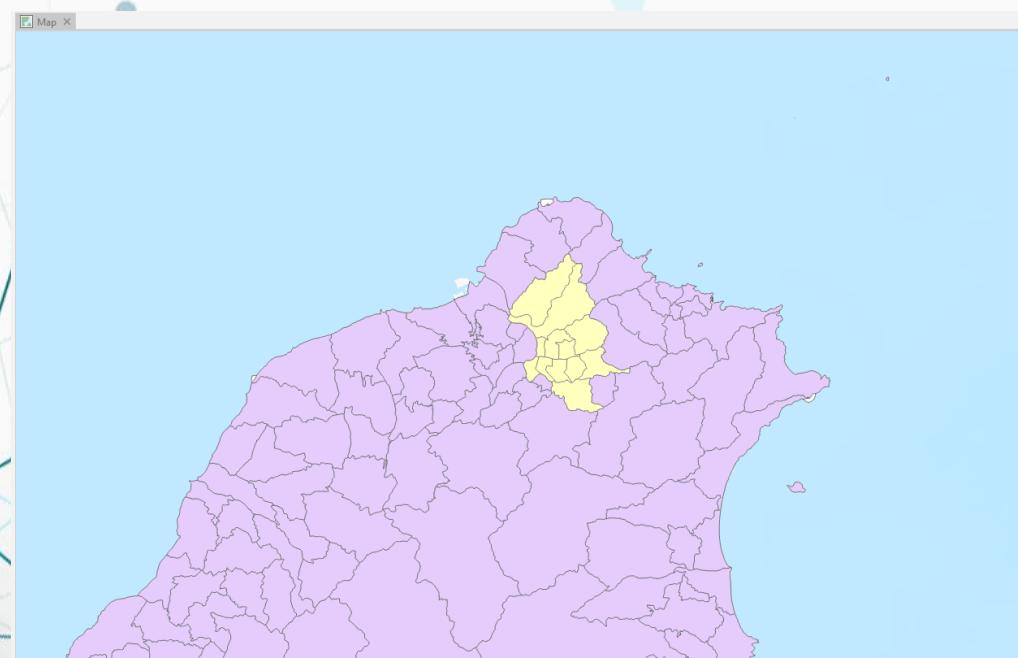


坐標格式選擇



加入不同坐標系統圖層

- 台灣鄉村市區界線.shp (WGS84)
- TOWN_MOI_1090324.shp (TWD97) (台灣鄉村市區界線)



加入不同坐標系統圖層

TOWN_MOI_1090324 - Notepad

```
File Edit Format View Help
GEOGCS["GCS_TWD_1997",DATUM["D_TWD_1997",SPHEROID["GRS_1980",6378137.0,298.25722101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]]
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8

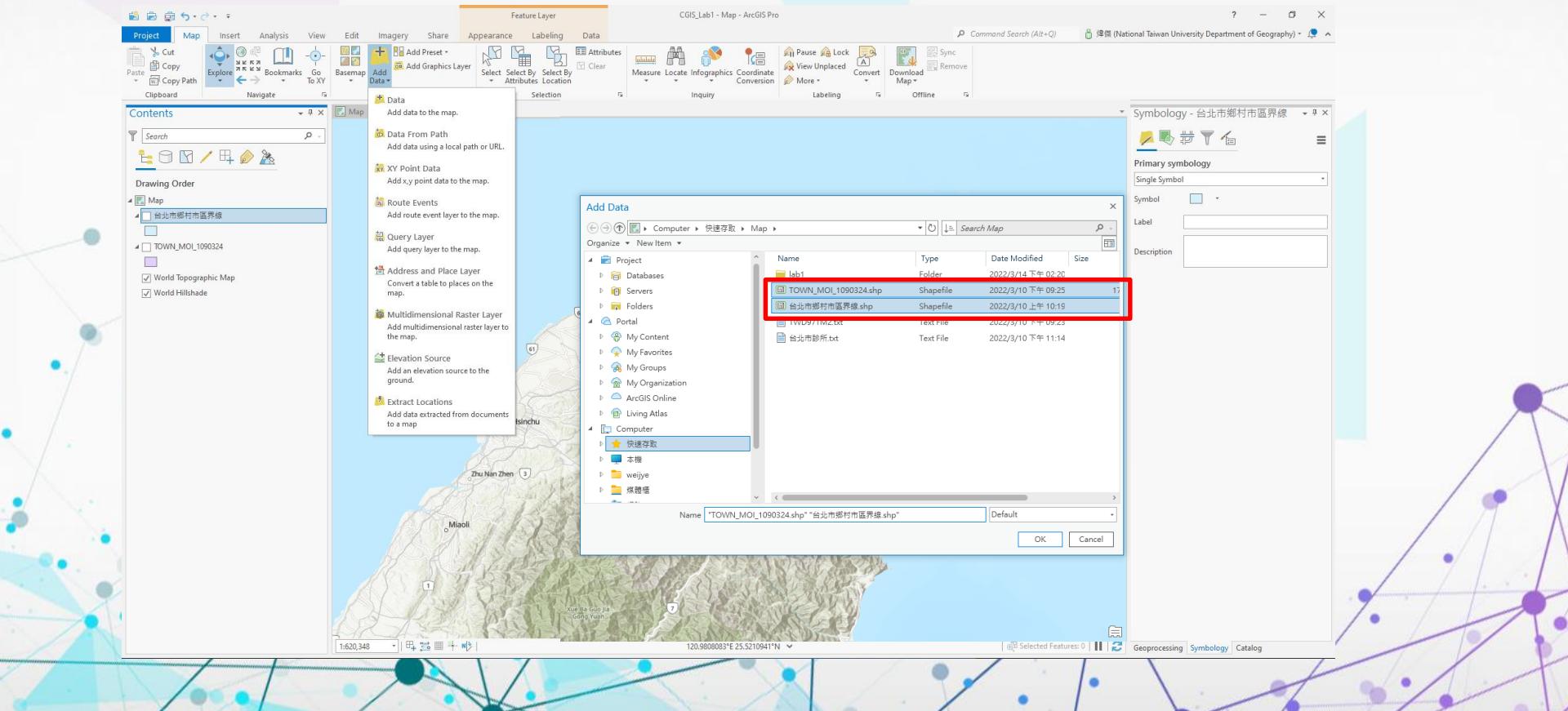
台北市鄉村市區界線 - Notepad

```
File Edit Format View Help
GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID["WGS_1984",6378137.0,298.257223563]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]]
```

Ln 1, Col 1 100%



加入不同坐標系統圖層



CGIS_Lab1 - Map - ArcGIS Pro

Project Map Insert Analysis View Edit Imagery Share Appearance Labeling Data

Clipboard Paste Cut Copy Copy Path

Explore Bookmarks Go To XY Basemap Add Graphics Layer Add Preset Add Data Select By Attributes Select By Location Measure Locate Infographics Coordinate Conversion View Unplaced Lock More Pause Sync Download Map Convert Remove

Contents Search Map

Drawing Order

- Map 台北市鄉村市區界線
- TOWN_MOI_1090324
- World Topographic Map
- World Hillshade

Feature Layer

Map Properties: Map

Coordinate Systems

Select the Coordinate System to view the available options.

Current XY Taiwan 1997 Current Z <None>

XY Coordinate Systems Available

- Favorites
- Layers
 - Taiwan 1997
 - TOWN_MOI_1090324

Enable wrapping around the dateline

OK Cancel

Symbology - 台北市鄉村市區界線

Primary symbology

Single Symbol

Symbol

Label

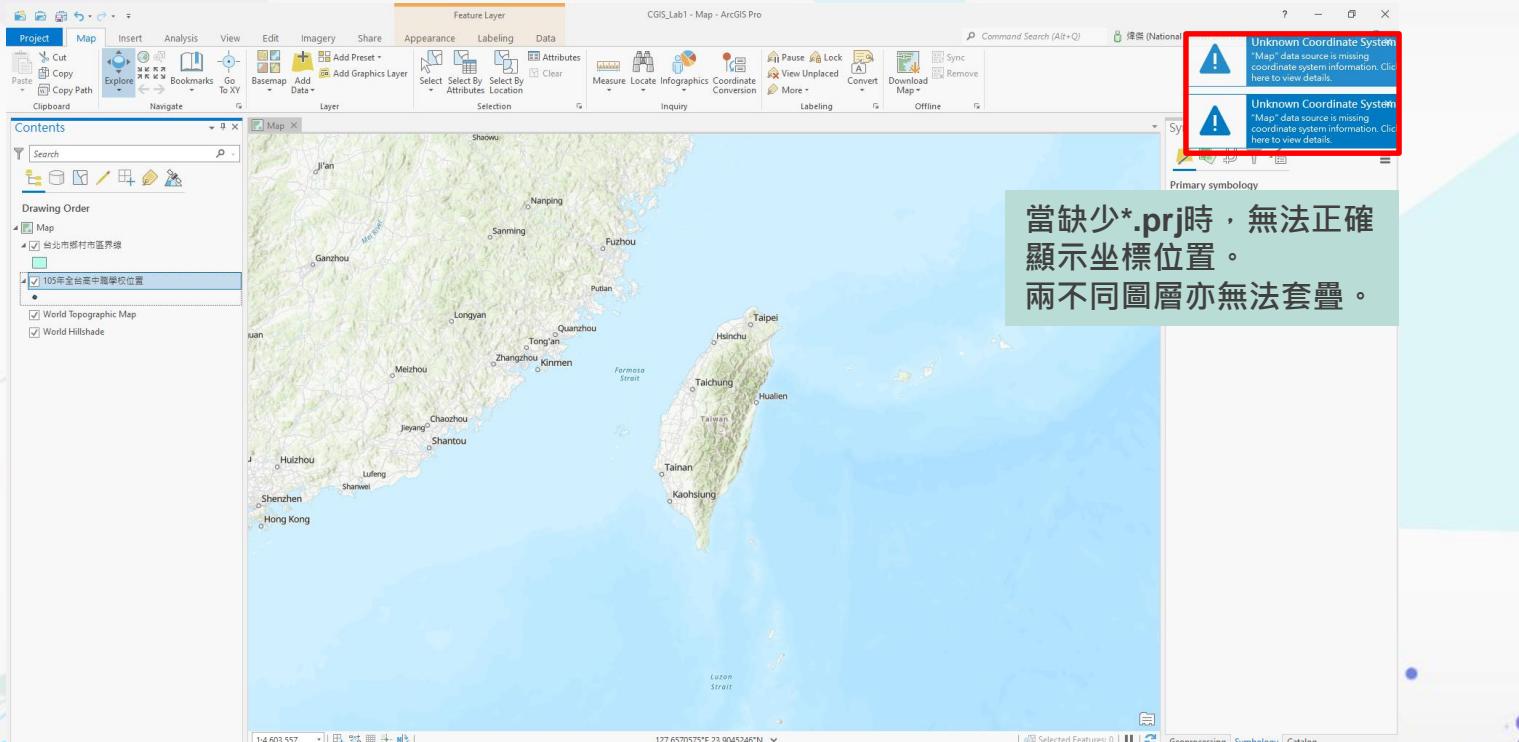
Description

第一個加入圖層的坐標系統

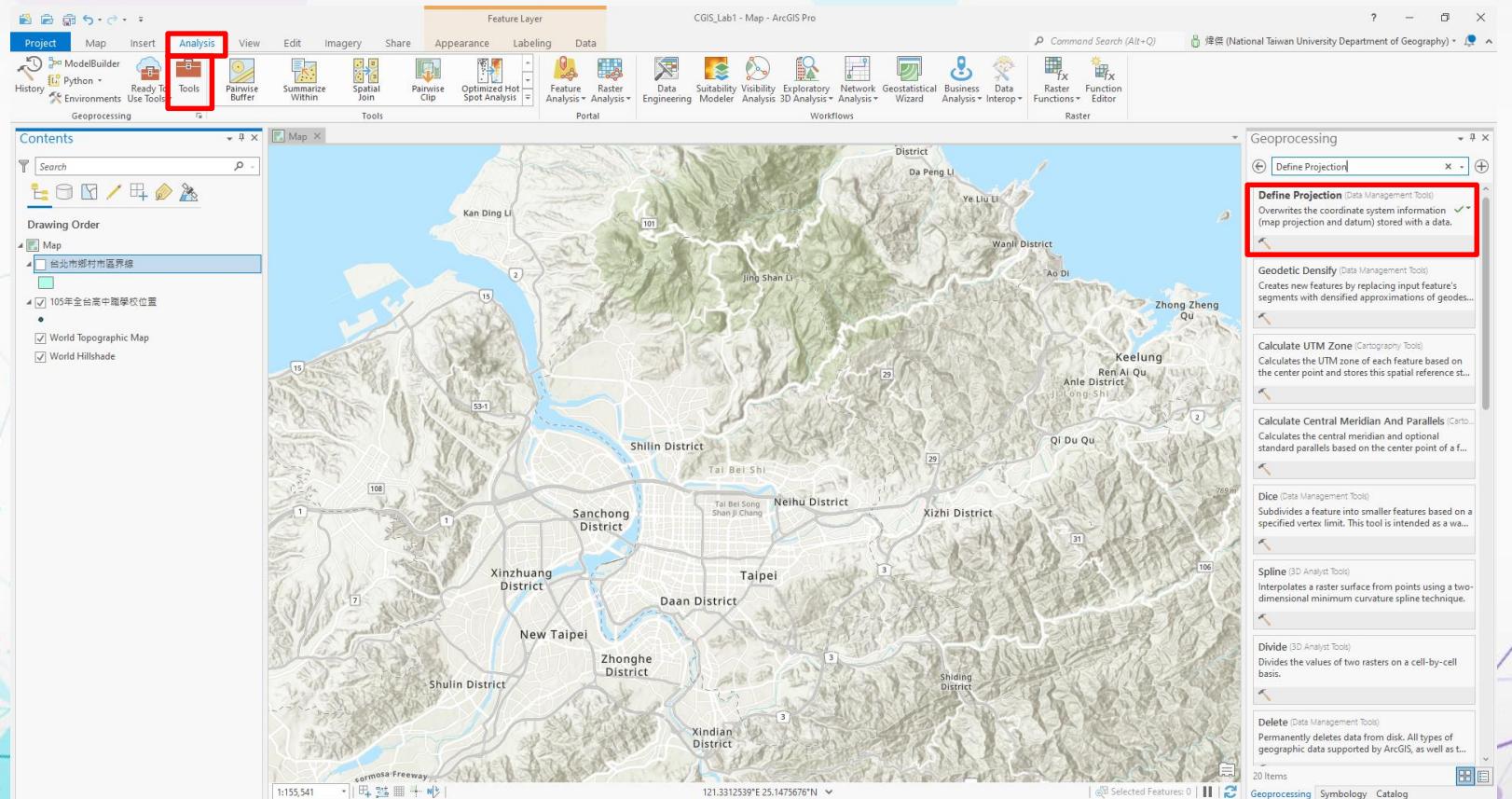
1:620,348 120.6004026°E 25.4178832°N

Selected Features: 0 Geoprocessing Symbology Catalog

加入不同坐標系統圖層（當缺少*.prj時）



加入不同坐標系統圖層（當缺少*.prj時）



加入不同坐標系統圖層（當缺少*.prj時）

The screenshot illustrates the workflow for defining a new geographic coordinate system in ArcGIS Pro.

Left Panel: A floating "Coordinate System" dialog box is open over a map of Keelung, Taiwan. The dialog shows the current XY coordinate system as "New Geographic Coordinate System" and the current Z coordinate system as "<None>". A red box highlights the "New Geographic Coordinate System" button in the "XY Coordinate Systems Available" section. The "Layers" section lists "New Geographic Coordinate System" and "Unknown".

Middle Panel: A "New Geographic Coordinate System" configuration dialog is open. It displays the following parameters:

Name	New Geographic Coordinate System_1
Angular Unit	Degree
Radians per unit	0.0174532925199433
Prime Meridian	Greenwich
Longitude relative to Greenwich	0°
Datum	WGS 1984
Spheroid	WGS 1984
Semimajor Axis	6378137
Seminor Axis	6356752.31424518
Inverse Flattening	298.257223563

Right Panel: The "Geoprocessing" pane shows a "Define Projection" tool. The "Input Dataset or Feature Class" dropdown is set to "台北市鄉村市區界線". The "Coordinate System" dropdown is set to "New Geographic Coordinate System". A red box highlights these two dropdowns.

Bottom Right: Another "Geoprocessing" pane shows the same "Define Projection" tool, but with a different input dataset: "105年全台高中職學校位置". The "Coordinate System" dropdown is set to "TWD_1997_TM_Taiwan". A red box highlights these two dropdowns.

加入不同坐標系統圖層（當缺少*.prj時）

