Geographic Information System

Vector Data – Part II
Lab Practice

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Photo credit: ChatGPT

Outline

- **Extract** (Clip/ Select)
- **Overlay** (Union/ Intersect/ Identity/ Erase)
- **Proximity** (Buffer/ Near/ Create Thiessen Polygon)
- **Dissolve**
- **Density** (Point/ Kernel/ Line)
- **Polygon to Line/ Join Features/ Feature to Point**
- **Symbology**

Download Datasets

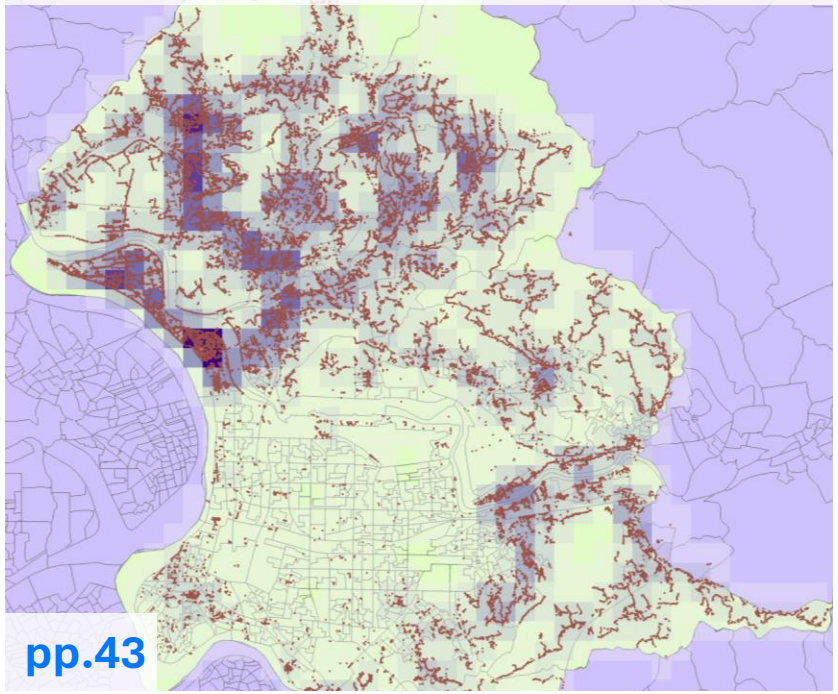
- **[zip]** 臺灣電力公司電桿座標及桿號 (utility pole location)
- 臺北市土石流潛勢溪流[**LINK**] (debris-flow potential rivers)
- 113年6月行政區人口統計_村里_臺北市[**LINK**] (population by village)
- 臺北市最小統計區圖[**LINK**] (CODEBASE Layer)
- [8mroadup] 8公尺寬以上的臺北市道路圖[**LINK**] (Taipei 8m-width road layer)
- 村(里)界(TWD97_121分帶)1130807[**LINK**] (village boundary)

Lab Practice Outcome

Today’s visualization Outcome

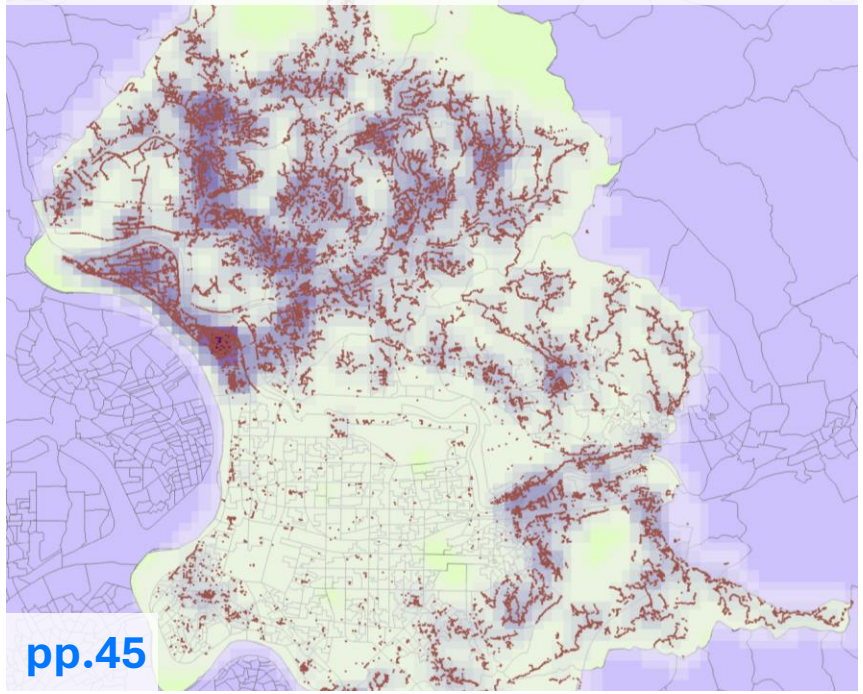
Lab Practice Outcome

Point Density



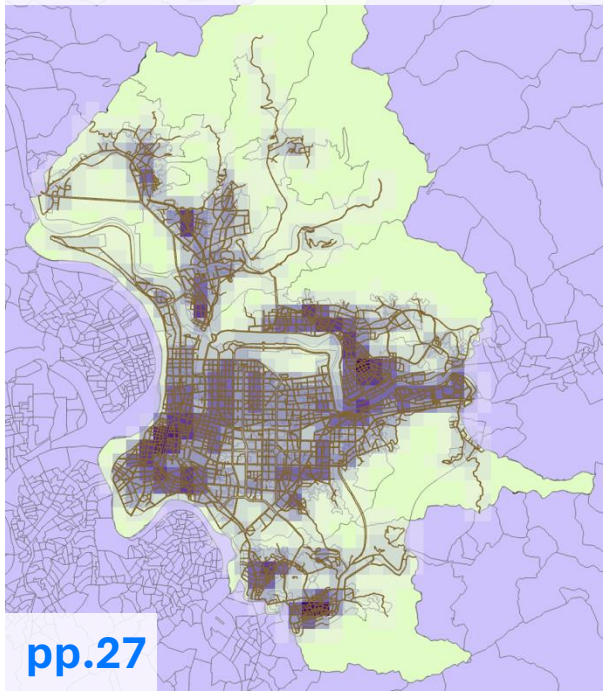
pp.43

Kernel Density



pp.45

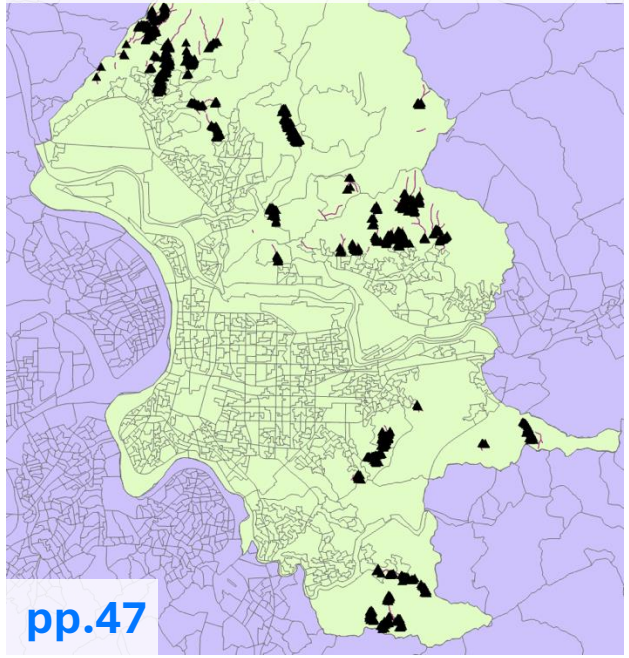
Line Density



pp.27

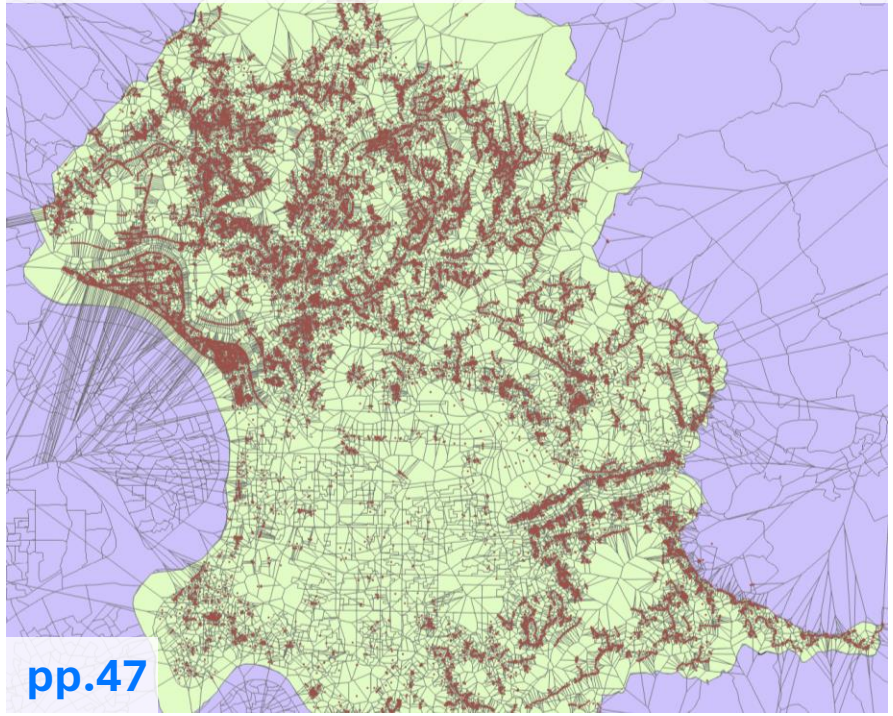
Lab Practice Outcome

Intersected DF Buffer with UPs Locations



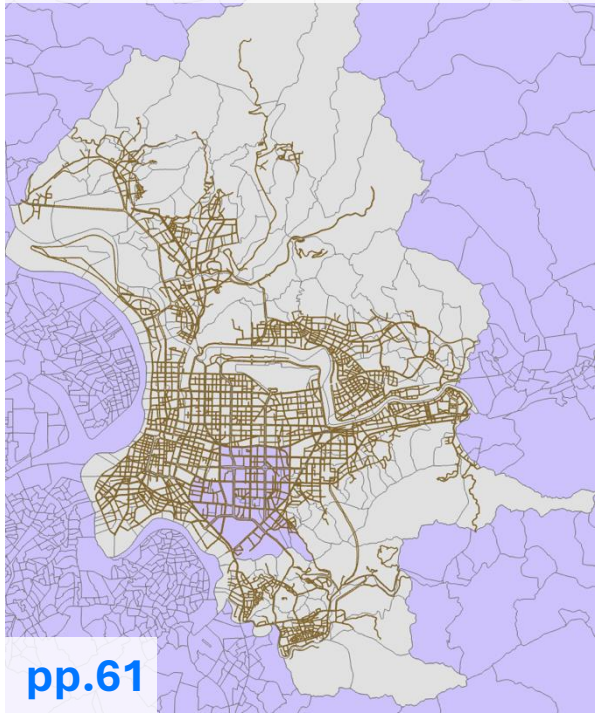
pp.47

Thiessen Polygon



pp.47

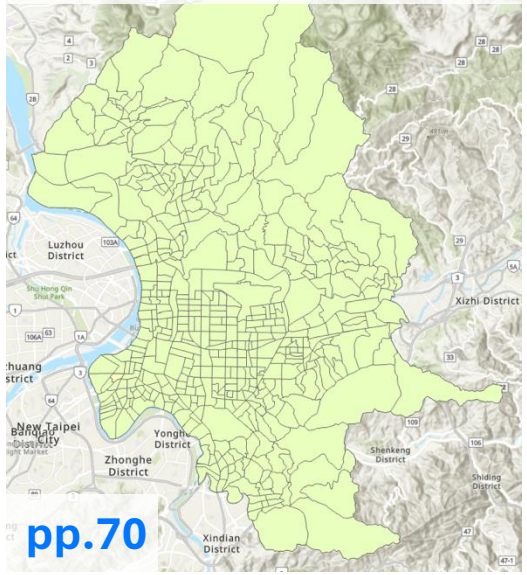
Erase Daan District



pp.61

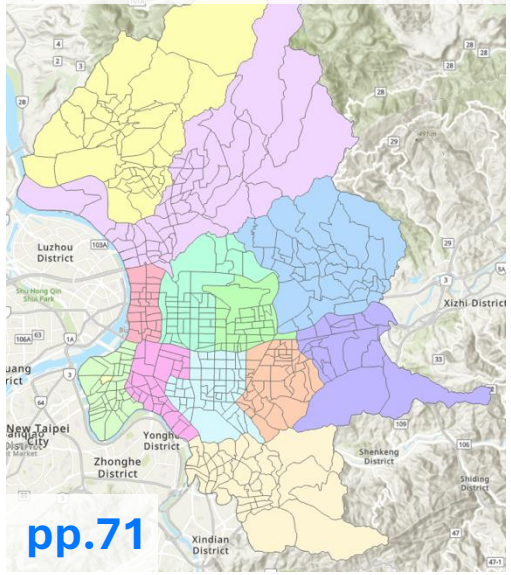
Lab Practice Outcome

Simple Symbol



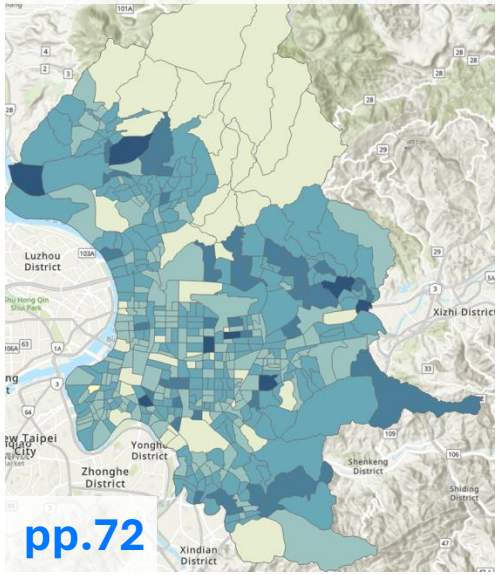
pp.70

Unique Colors



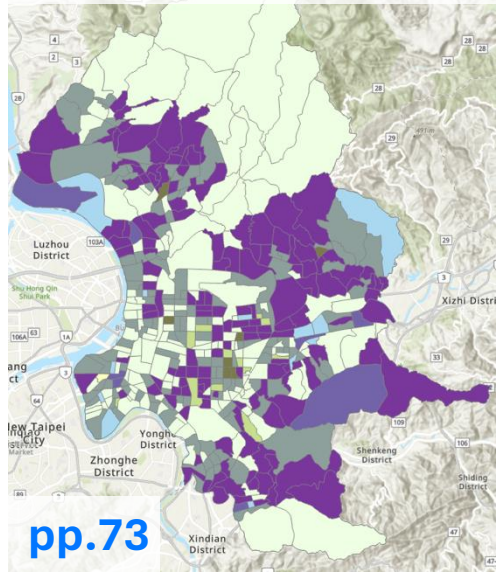
pp.71

Graduated Colors



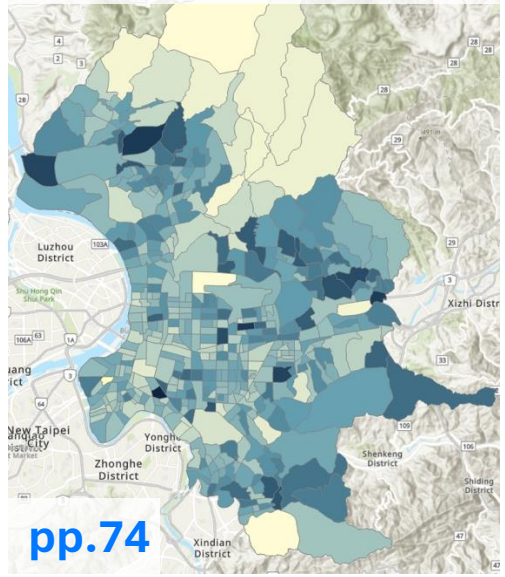
pp.72

Bivariate Colors



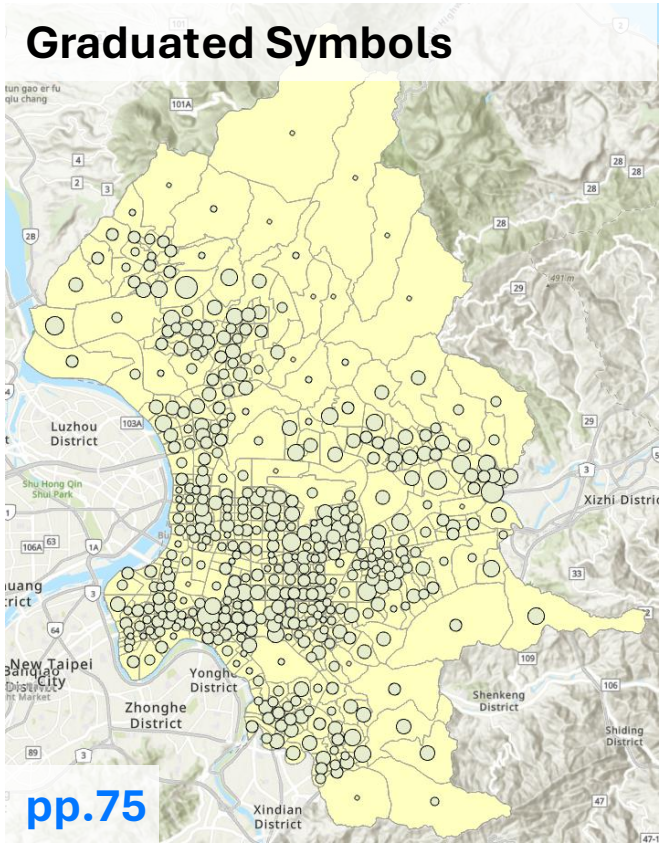
pp.73

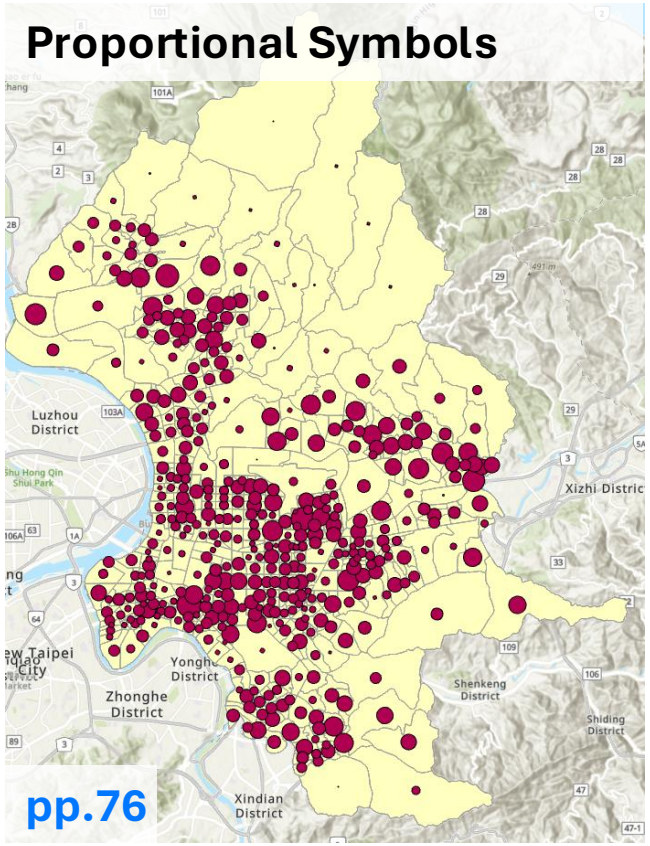
Unclassed Colors

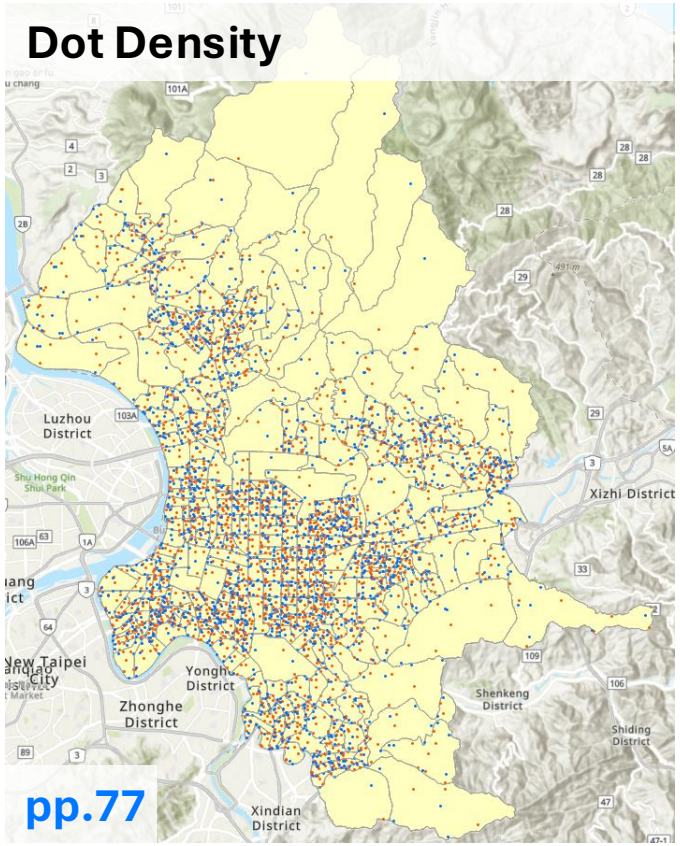


pp.74

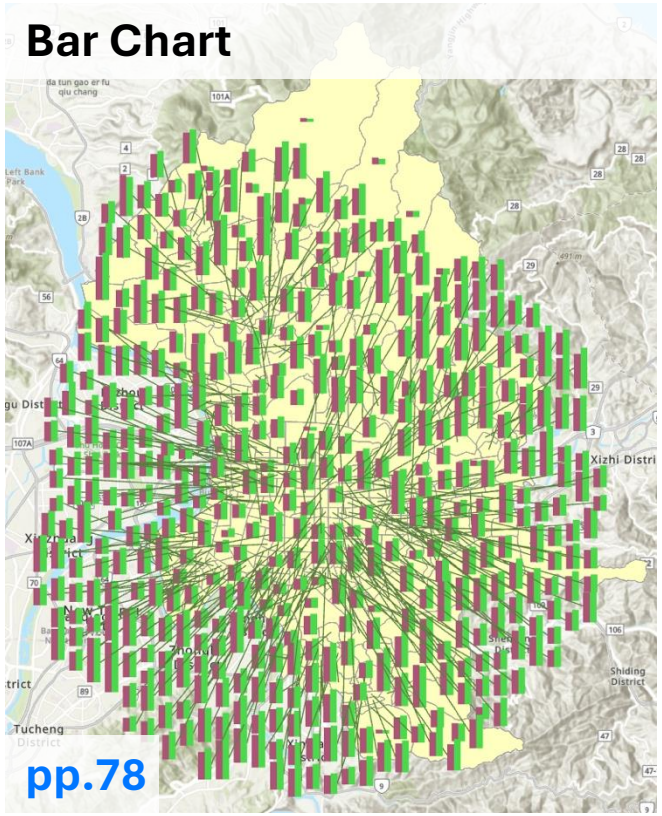
Lab Practice Outcome

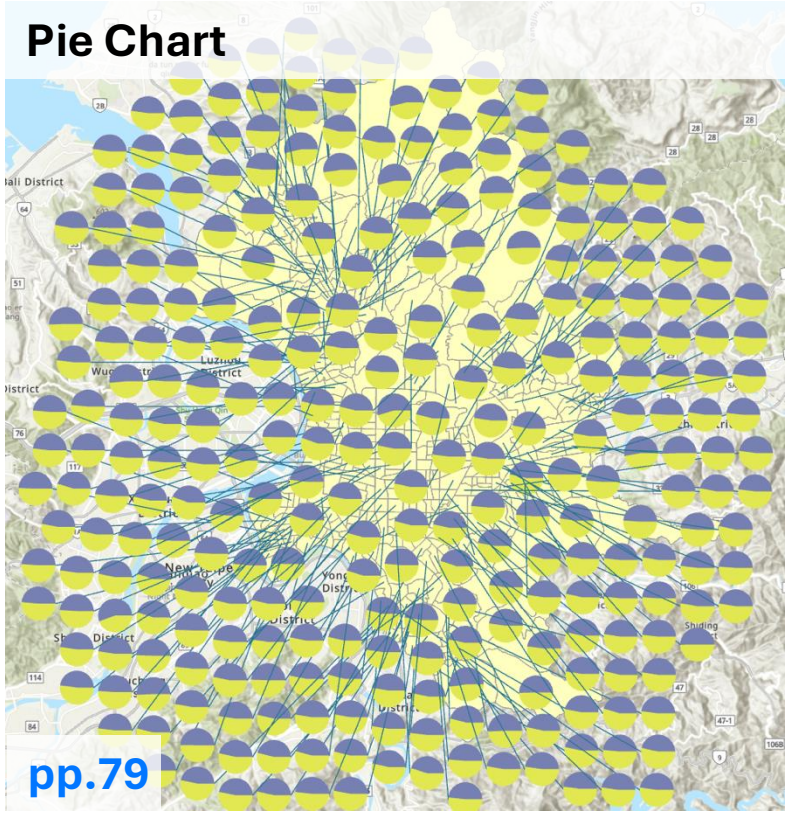


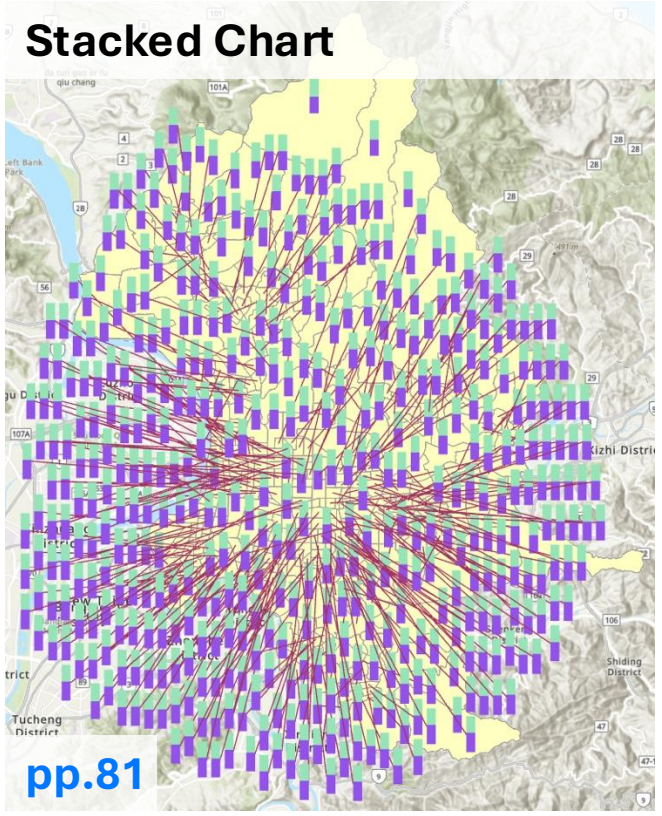




Lab Practice Outcome

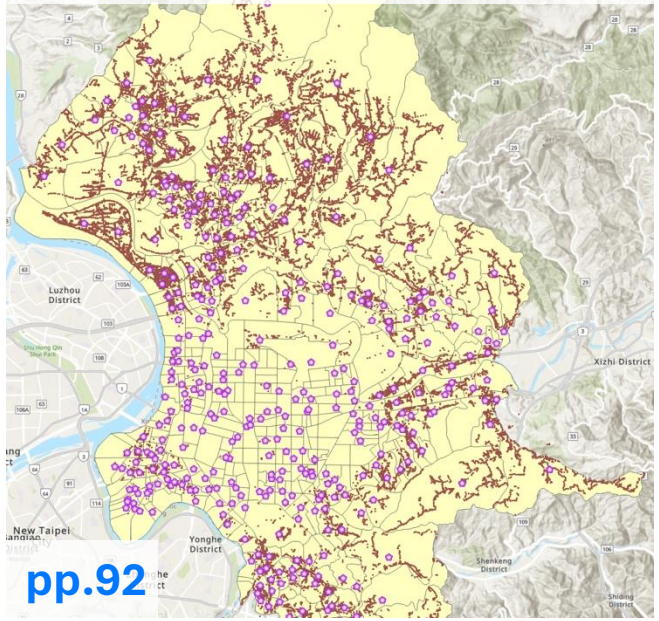






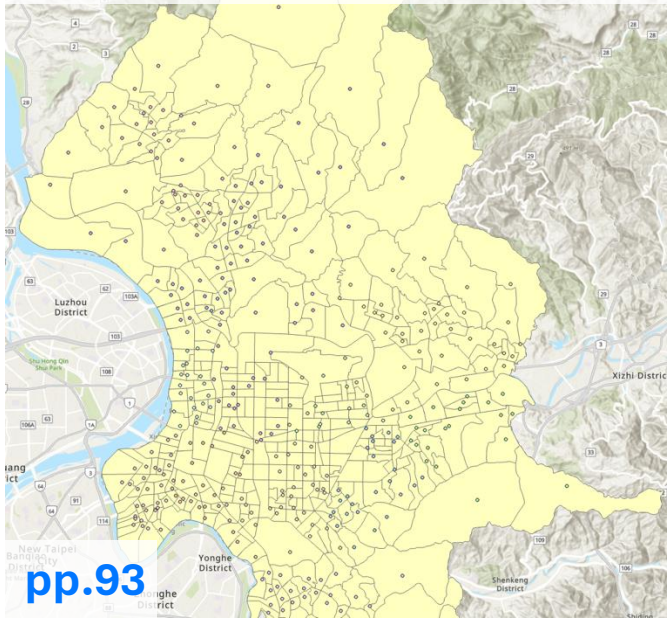
Lab Practice Outcome

Special Symbols



pp.92

Single Symbol



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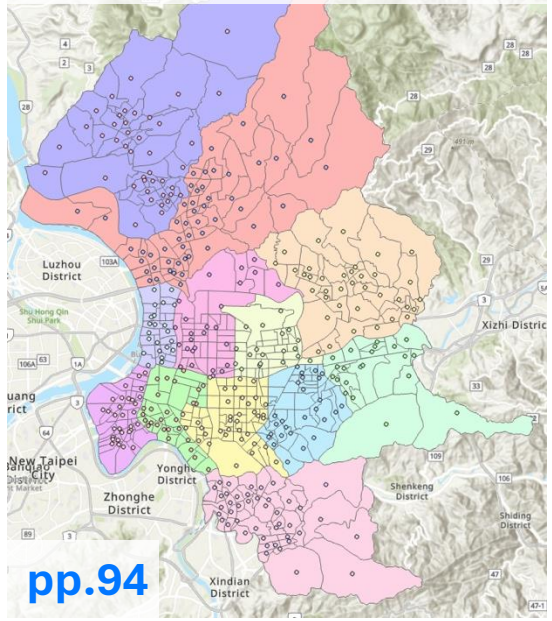
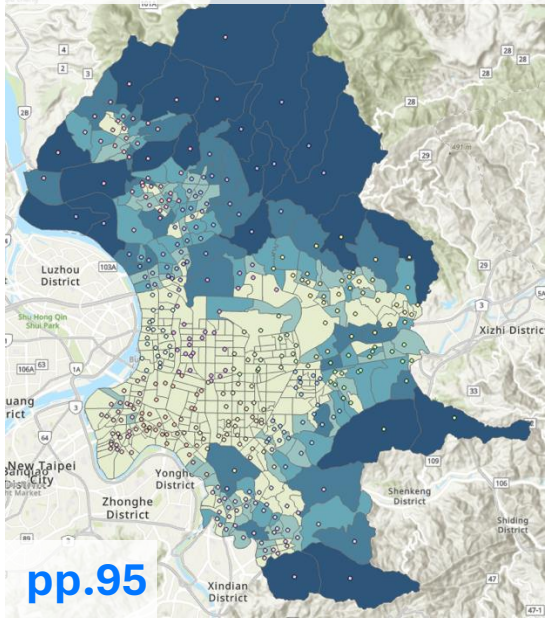
Unique Values



pp.94

Graduated Colors



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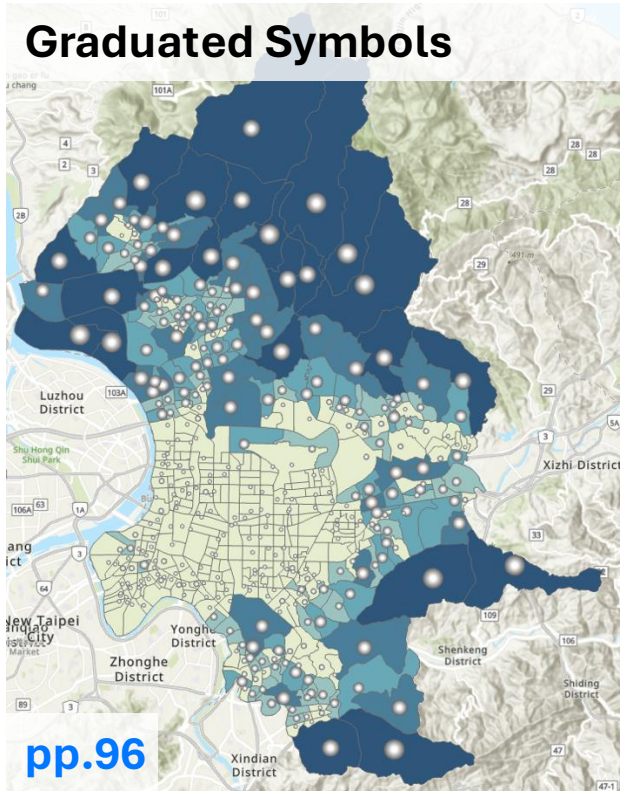
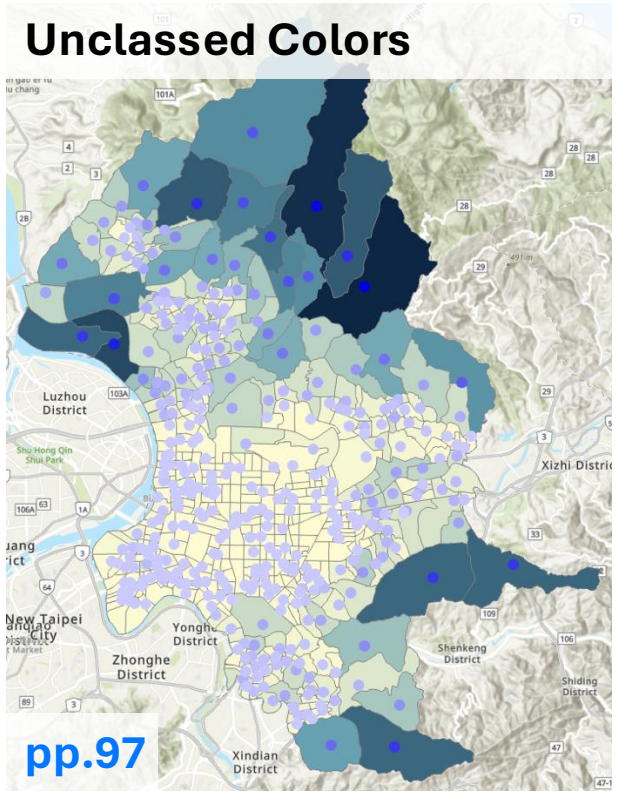
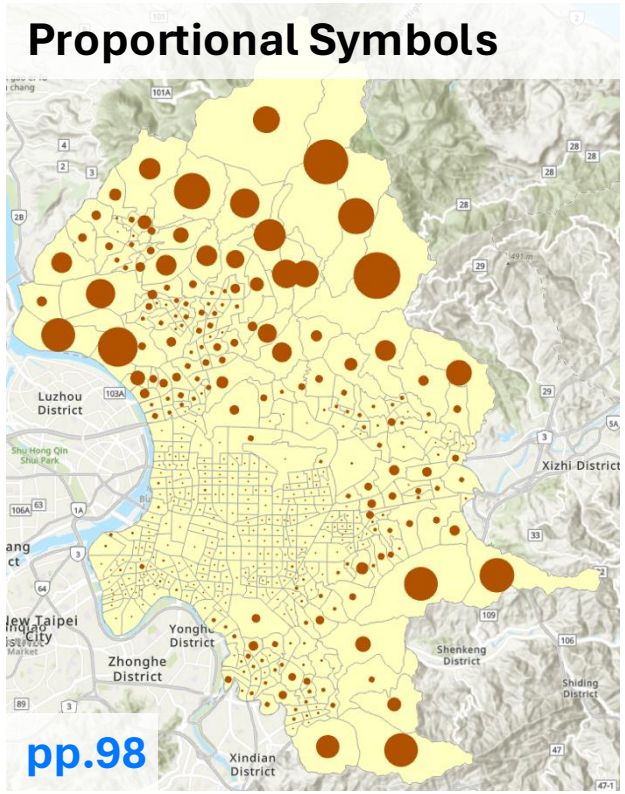
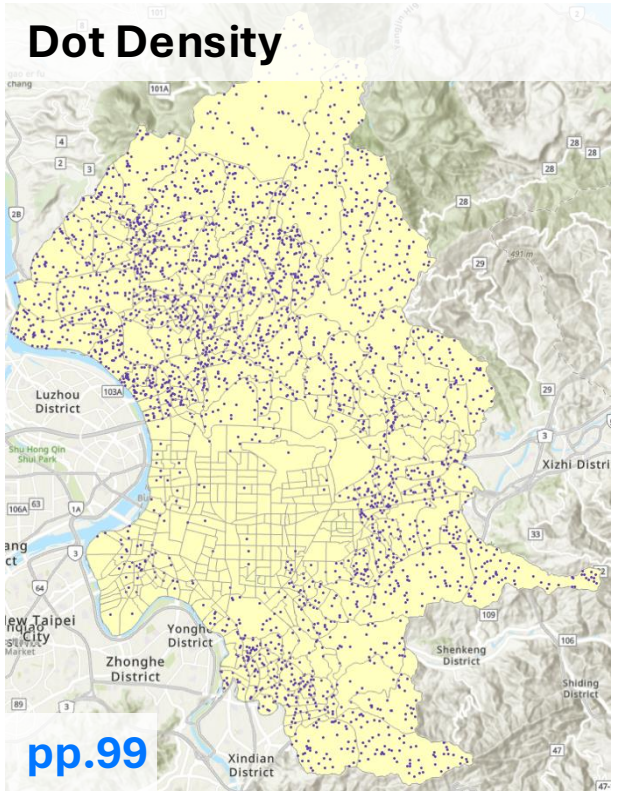
Lab Practice Outcome









Analysis Procedure

Extract/ Overlay/ Proximity/ Dissolve/ Density

Analysis Procedure

Abbreviation:
1. Debris-flow ➔ DF
2. Utility pole ➔ UP

1) **Set** Map CRS configurations
2) **KMZ to Shapefile** with online tools
3) **Load** all datasets
4) **Buffer** analysis for DF polylines with 100m
5) **Near** analysis for finding the nearest UP from DF polylines
6) **Near** analysis for finding the nearest UP from the 100m buffer area of DF polyline (abbrev. as 100m-DF-buffer)
7) **Intersect** analysis for selecting all UP within the 100m-DF-buffer
8) **Union** analysis for the 100m-DF-buffer
9) **Dissolve** the CODEBASE layer to a CODE2-resolution layer
10) **Clip** CODE2 layer by the 100m-DF-buffer
11) **Add Field** and **Calculate Geometry** for each DF-CODE2 area
12) **Join** the clipped layer (above) to CODE2 layer by CODE2 ID

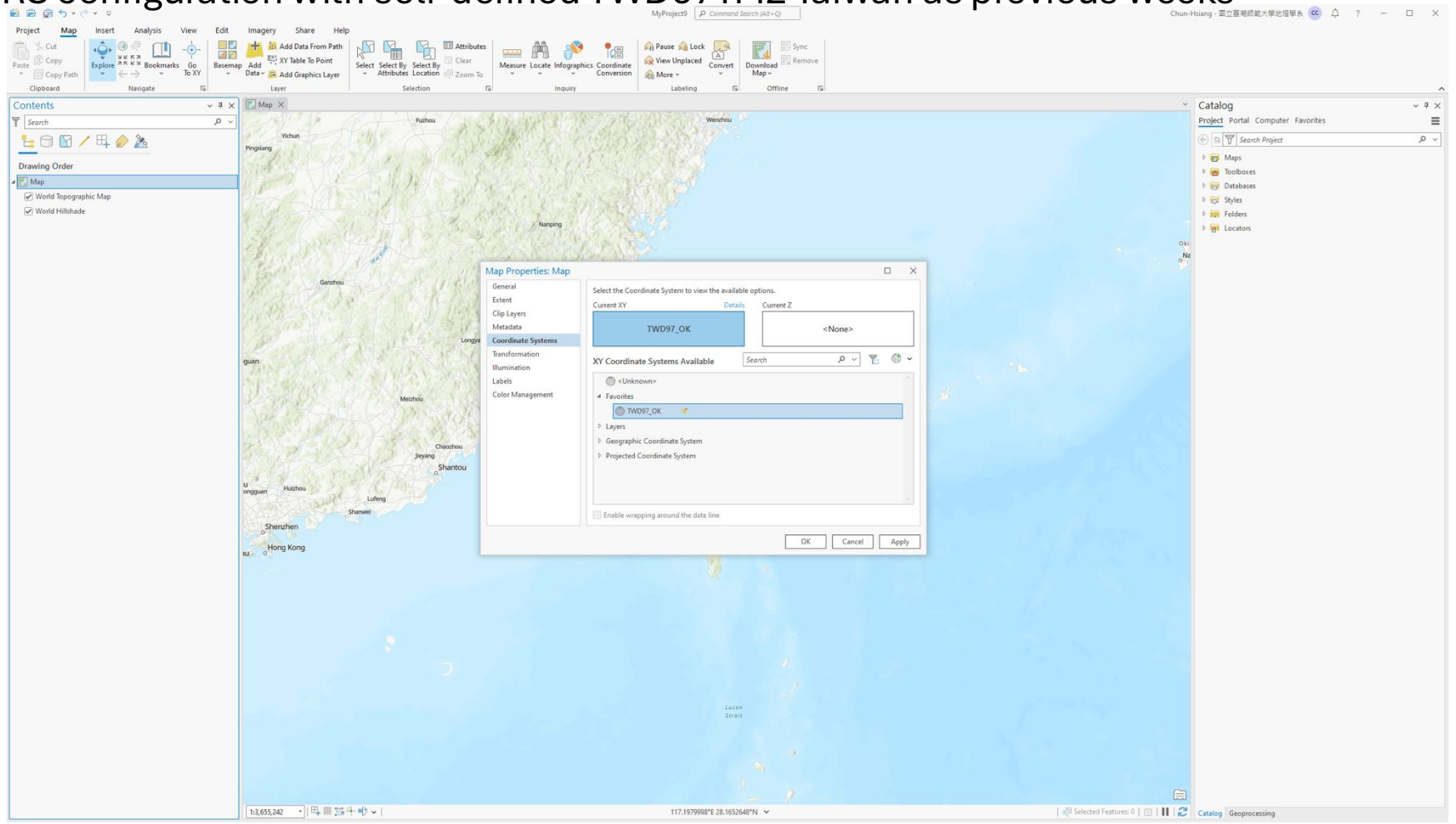
Analysis Procedure

Abbreviation:
1. Debris-flow ➔ DF
2. Utility pole ➔ UP

1) **Add field** and **calculate field** to compute the proportion of DF-buffer areas
2) **Find and Replace** all <Null> to zeros in the columns of “DFArea” and “Proportion”
3) **Dissolve** by CODE2 and Σ DF Area and proportion
4) **Point Density** for calculating UP density
5) **Kernel Density** for calculating UP density
6) **Create Thiessen Polygon** for UP
7) **Dissolve** road all together by “漏繪”
8) **Polygon To Line** for converting dissolved road into a polyline feature
9) **Line Density** for calculating road density
10) **Select by Attribute** and **Export Features** to export Daan from Taipei Village layer
11) **Select by Attribute** and **Export Features** to export Taipei City from Taipei Village layer
12) **Identify** dissolved road by Daan layer
13) **Erase** idnetified Daan layer by Taipei City layer

Set Map CRS configurations

Set map CRS configuration with self-defined TWD97TM2 Taiwan as previous weeks



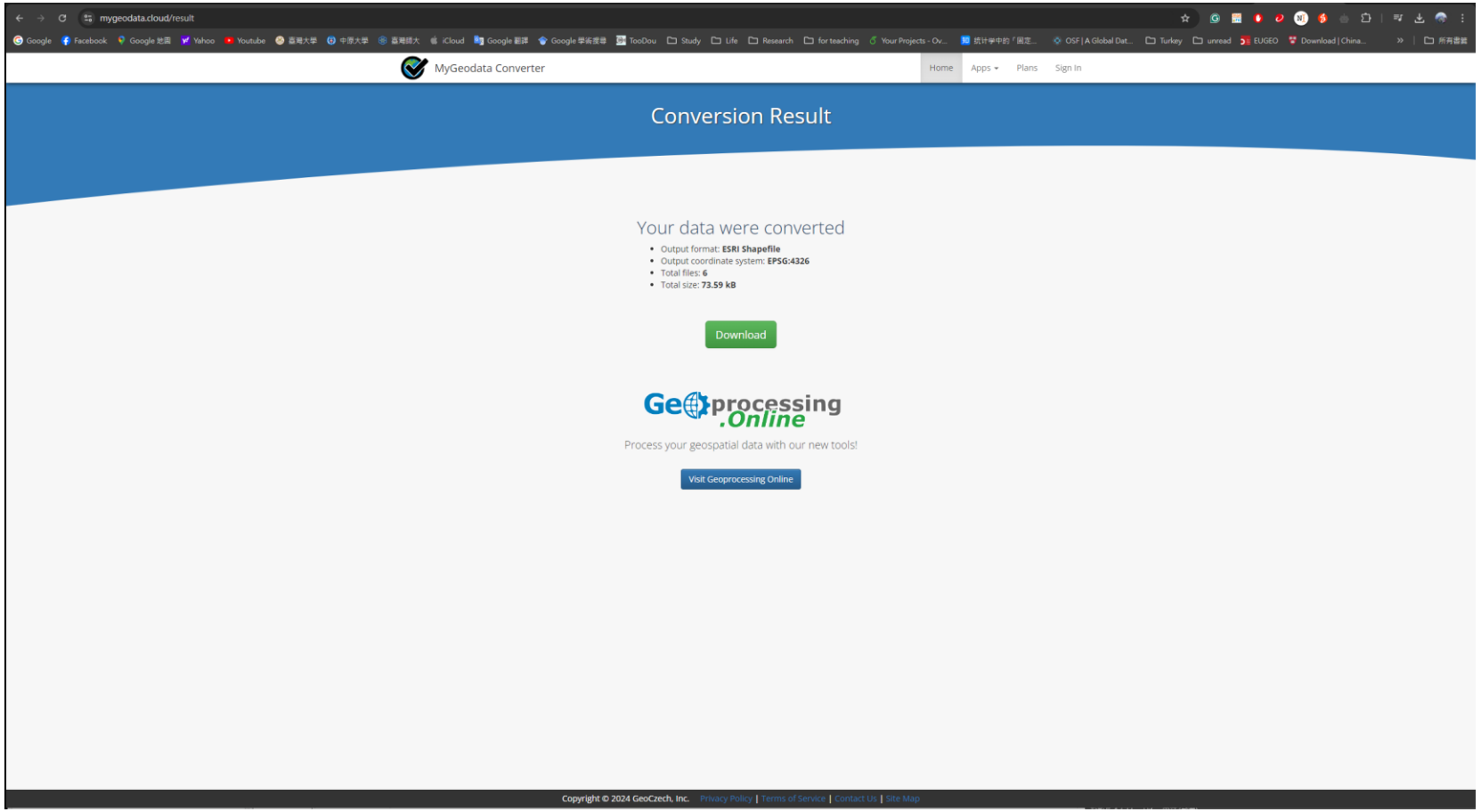
KMZ to Shapefile

Search :: https://mygeodata.cloud/converter/kml-to-shp

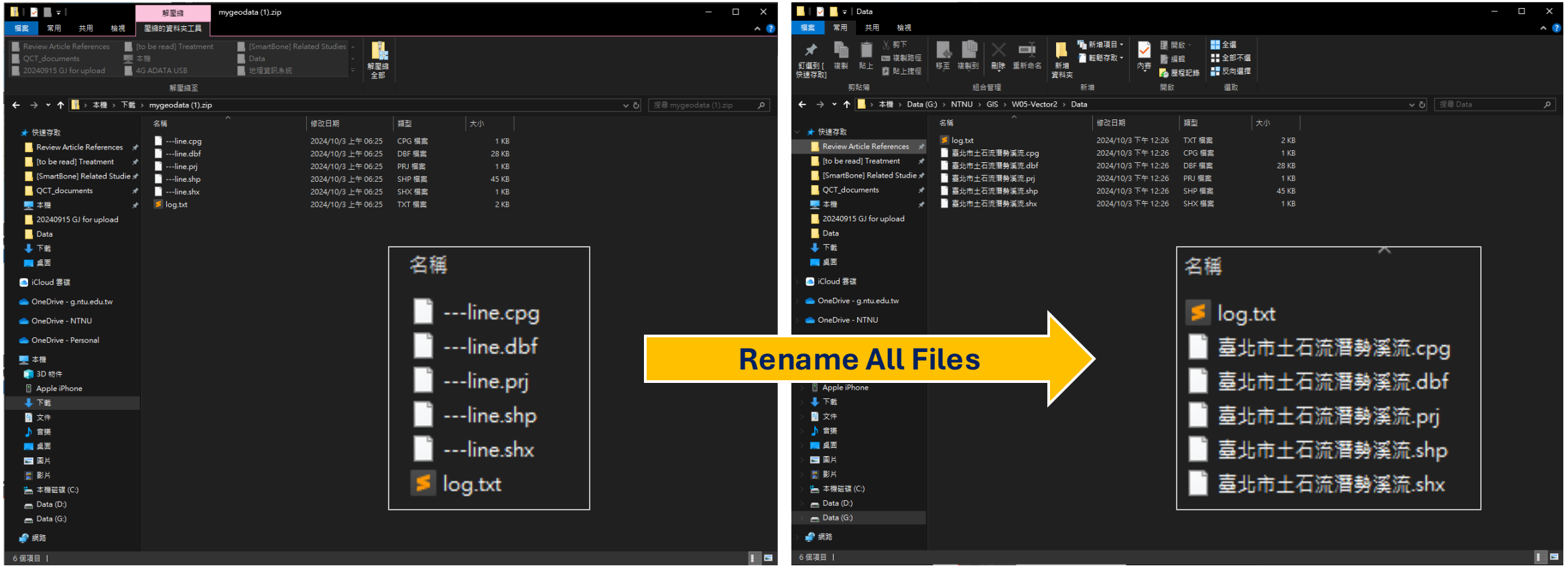
We convert our uploaded KML/KMZ to ESRI Shapefile

KMZ to Shapefile

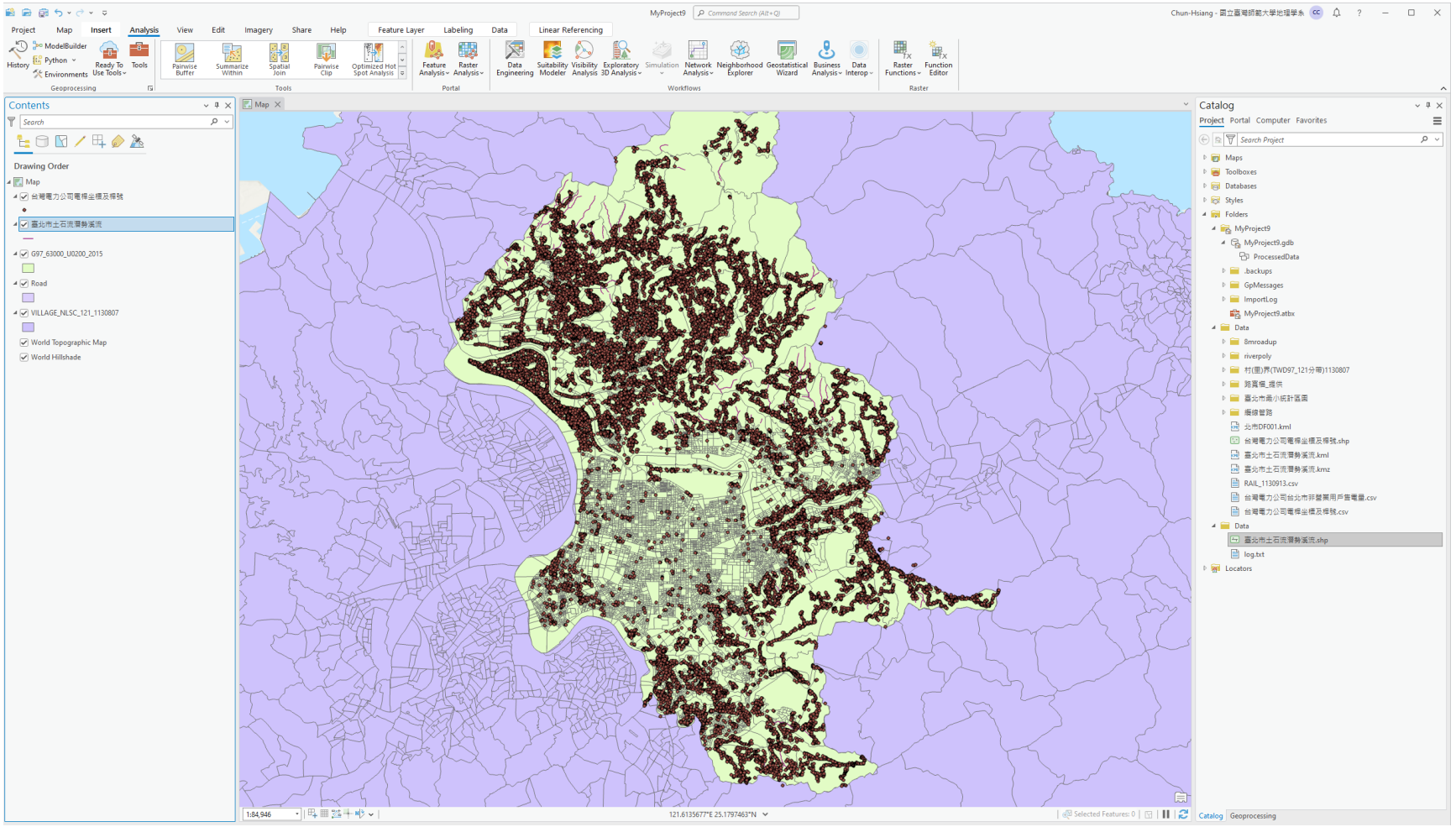
Download the converted ESRI Shapefile



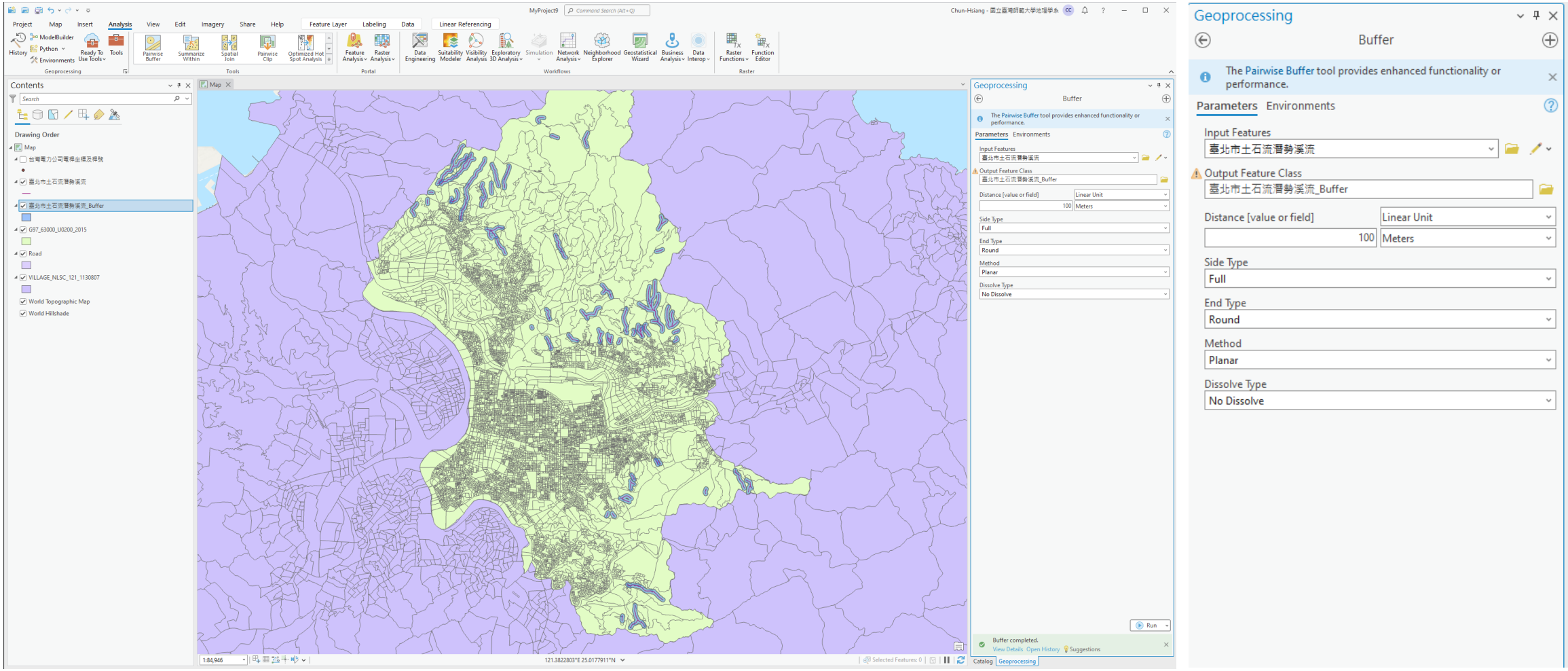
Open in Finder



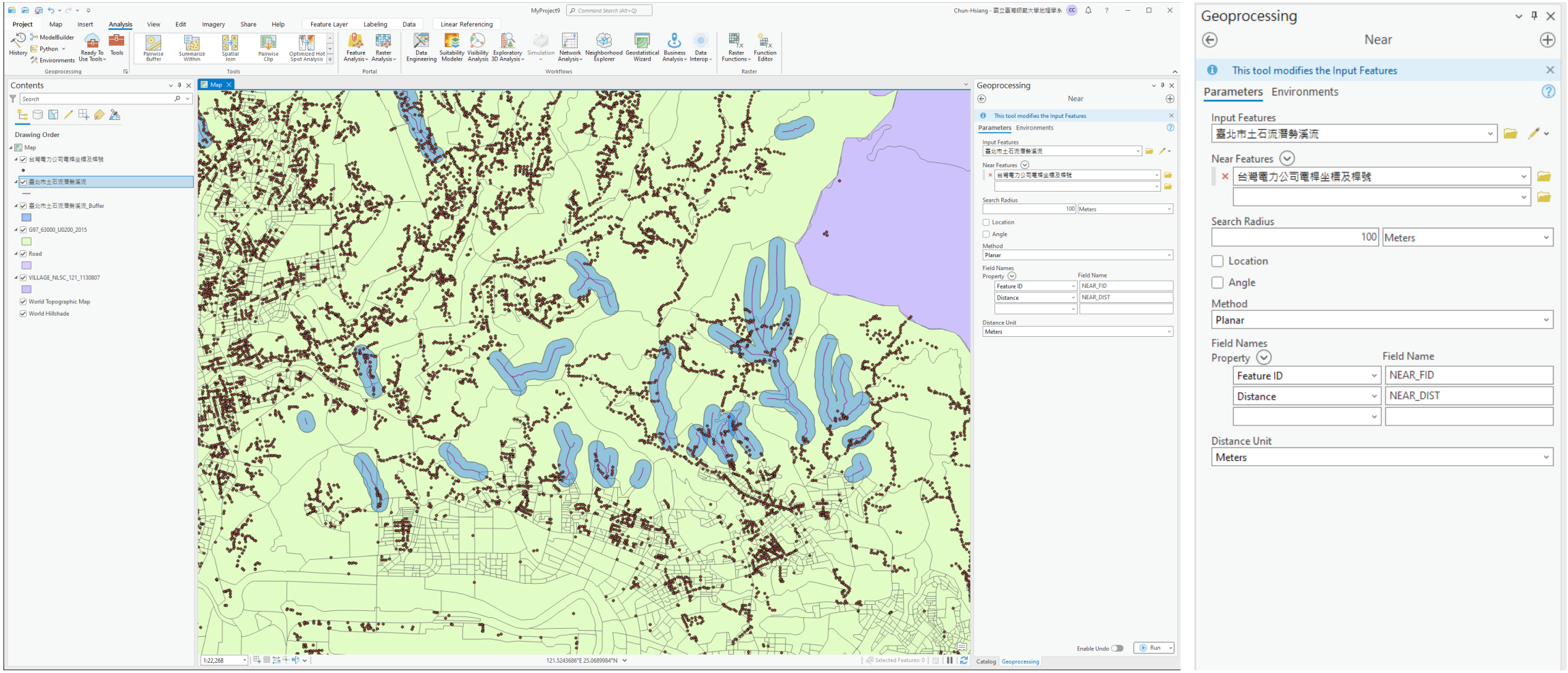
Load All Datasets



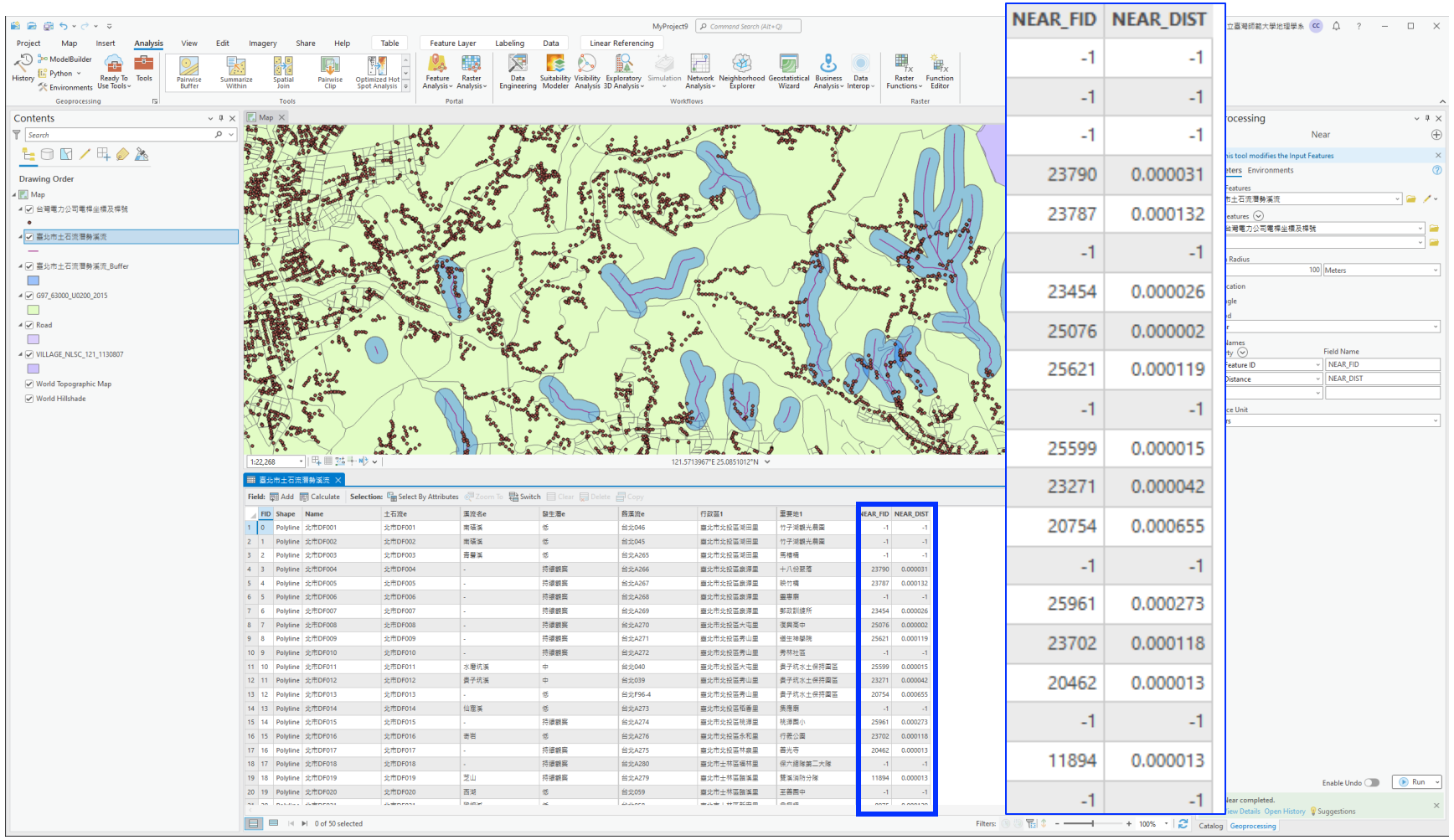
Buffer Analysis for DF Polylines with 100m



Near Analysis for Finding the Nearest UP from the DF polylines

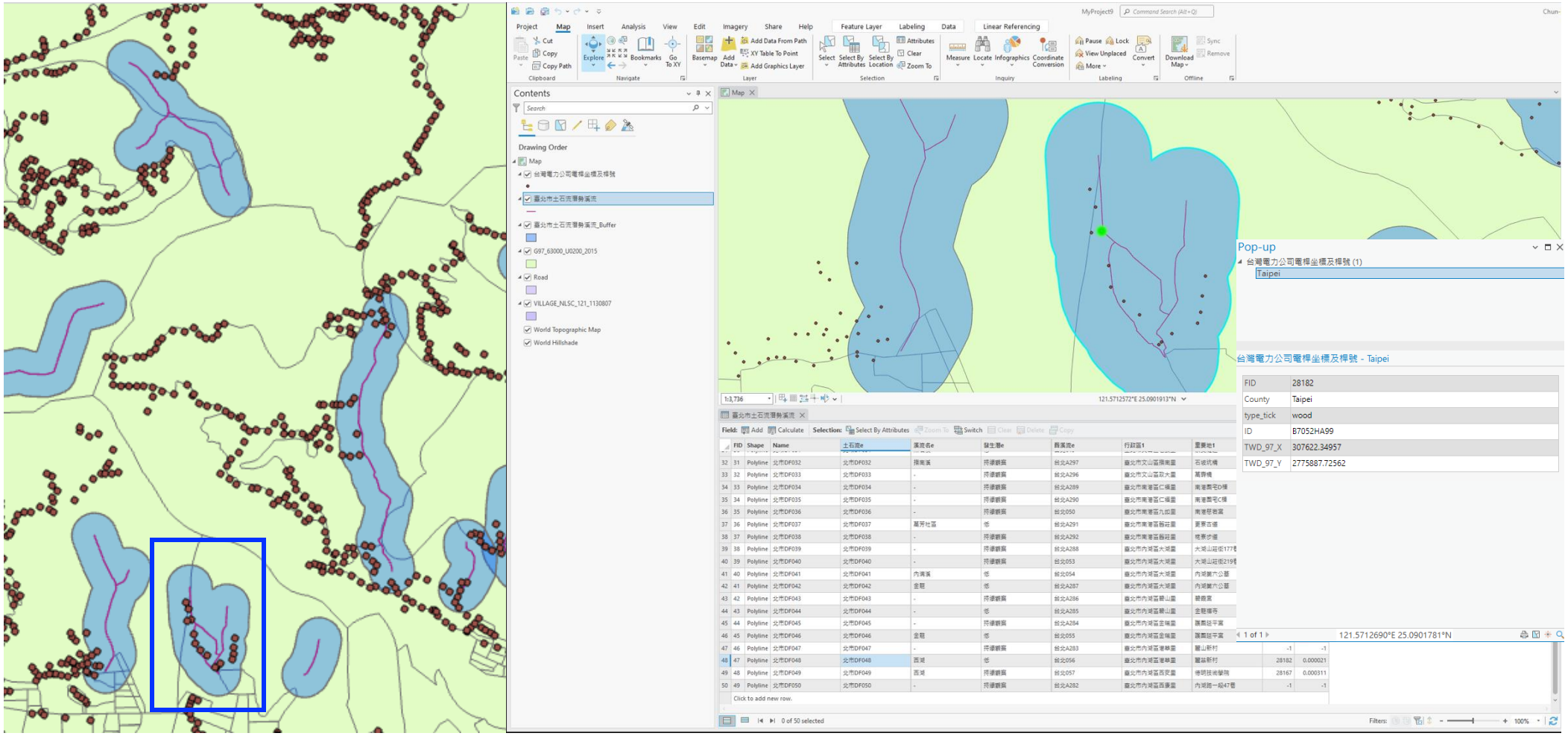


Near Analysis for Finding the Nearest UP from the DF polylines

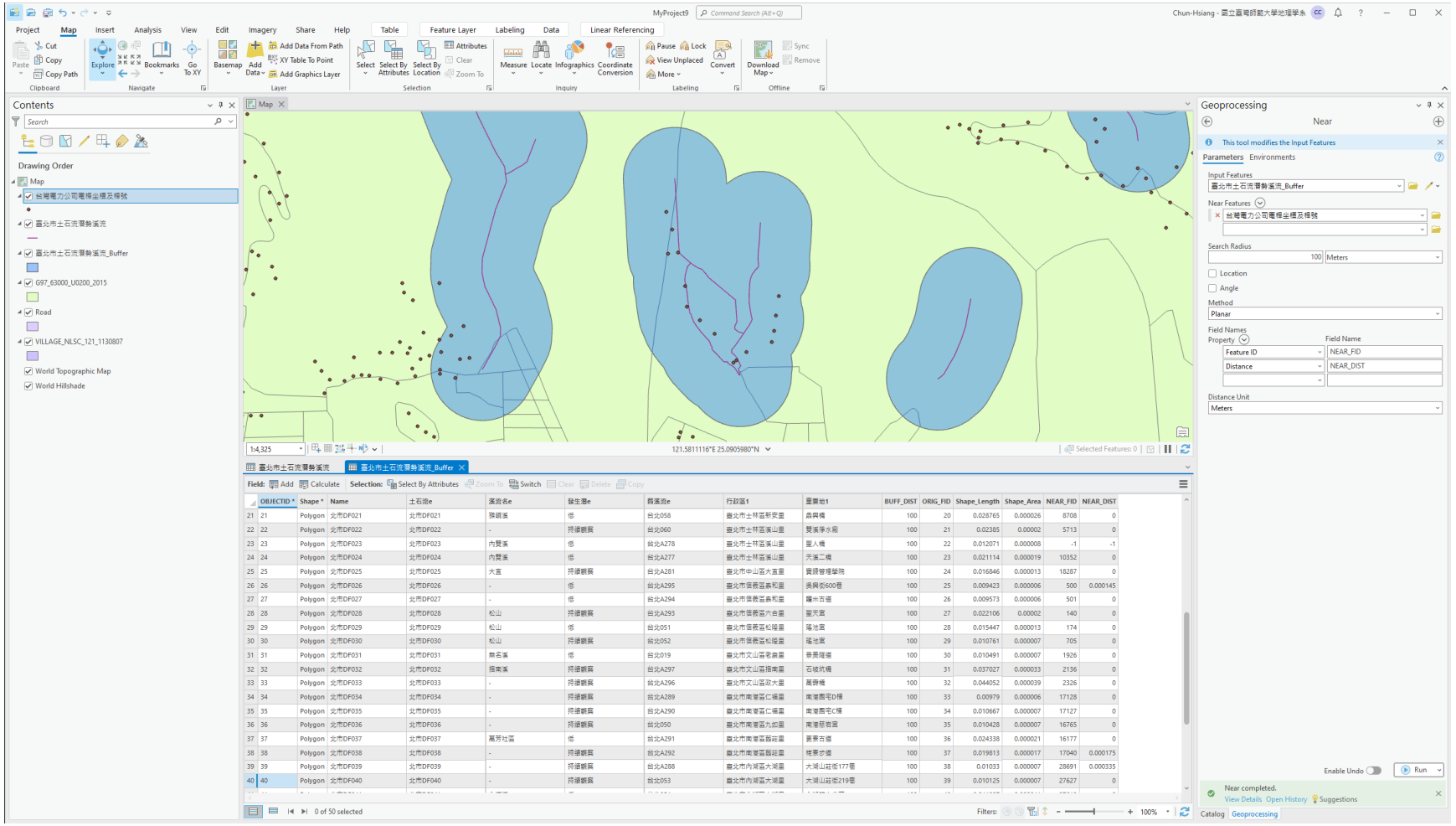


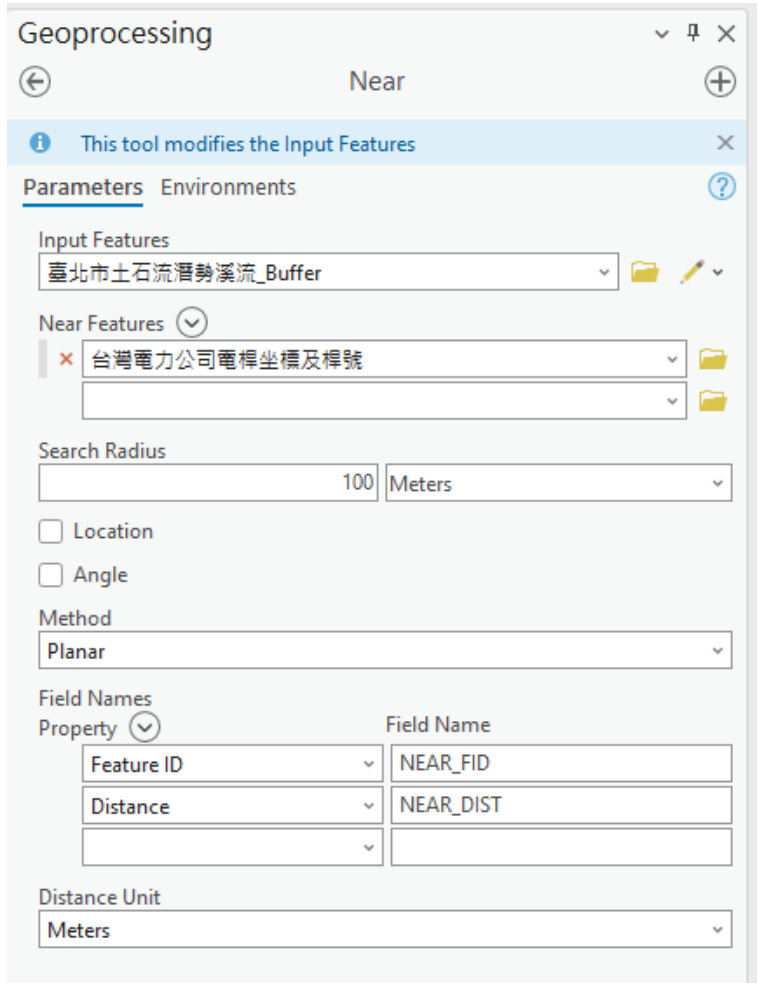
NEAR_FID	NEAR_DIST
-1	-1
-1	-1
-1	-1
23790	0.000031
23787	0.000132
-1	-1
23454	0.000026
25076	0.000002
25621	0.000119
-1	-1
25599	0.000015
23271	0.000042
20754	0.000655
-1	-1
25961	0.000273
23702	0.000118
20462	0.000013
-1	-1
11894	0.000013
-1	-1

[Polyline] Observation the Nearest Point

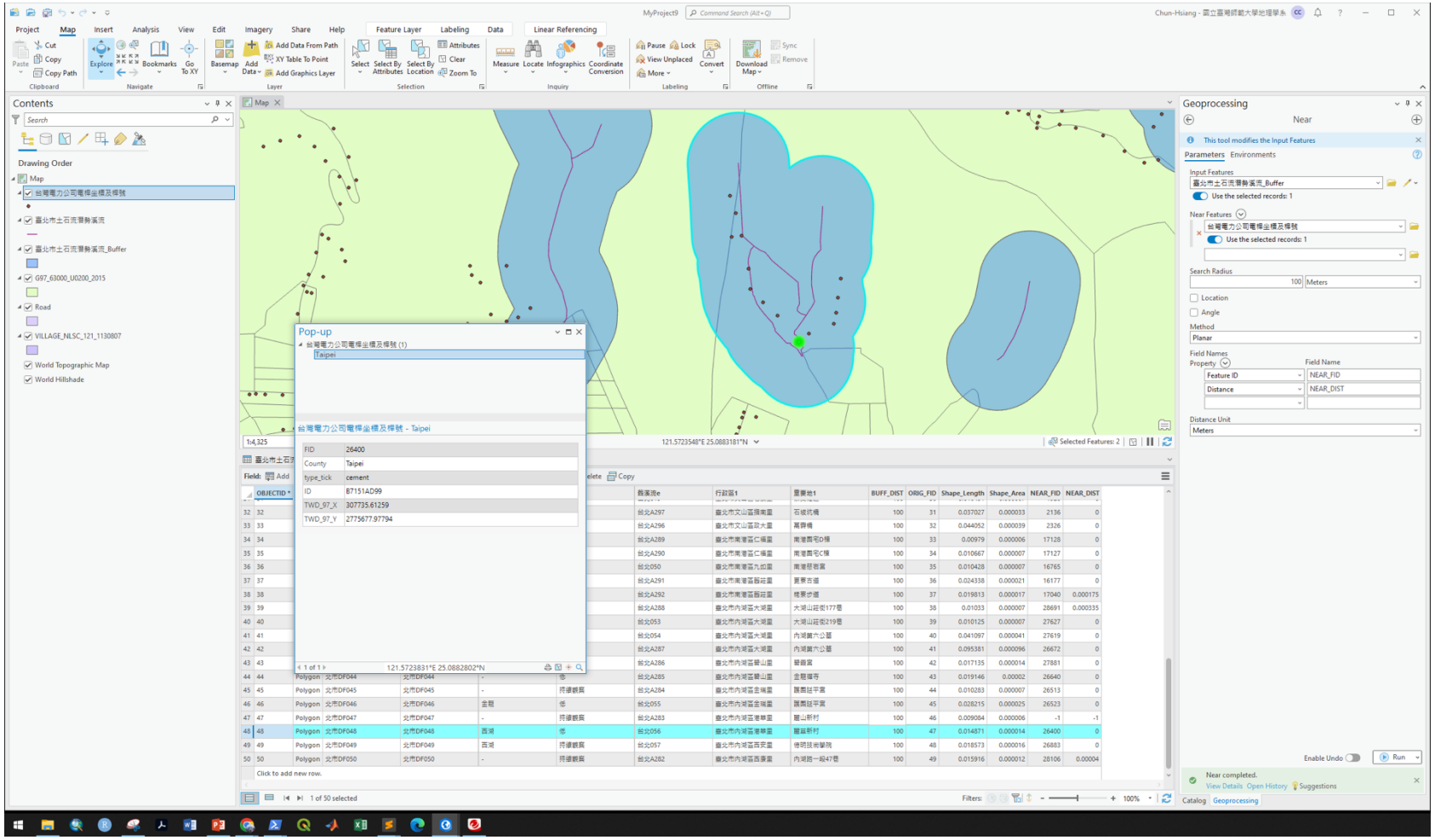


Near Analysis for Finding the Nearest UP from the 100m-DF-buffer

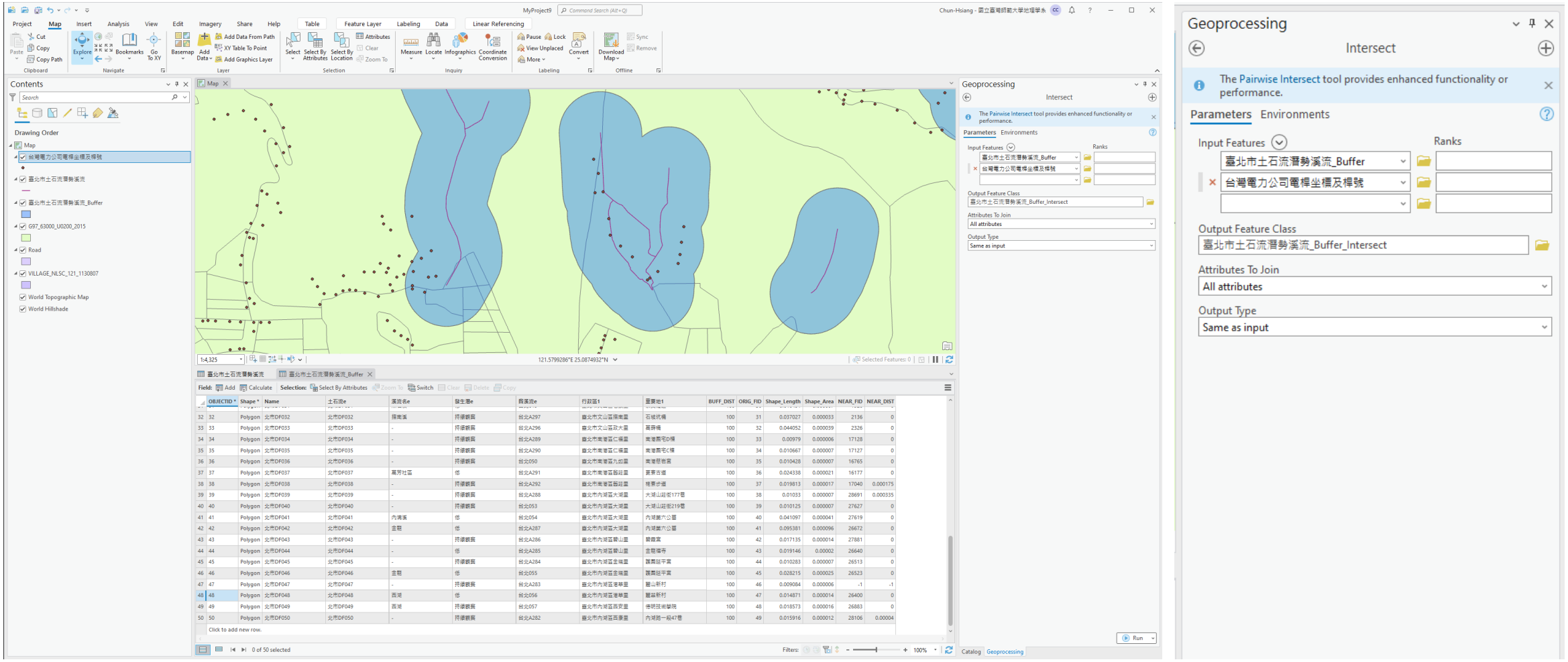




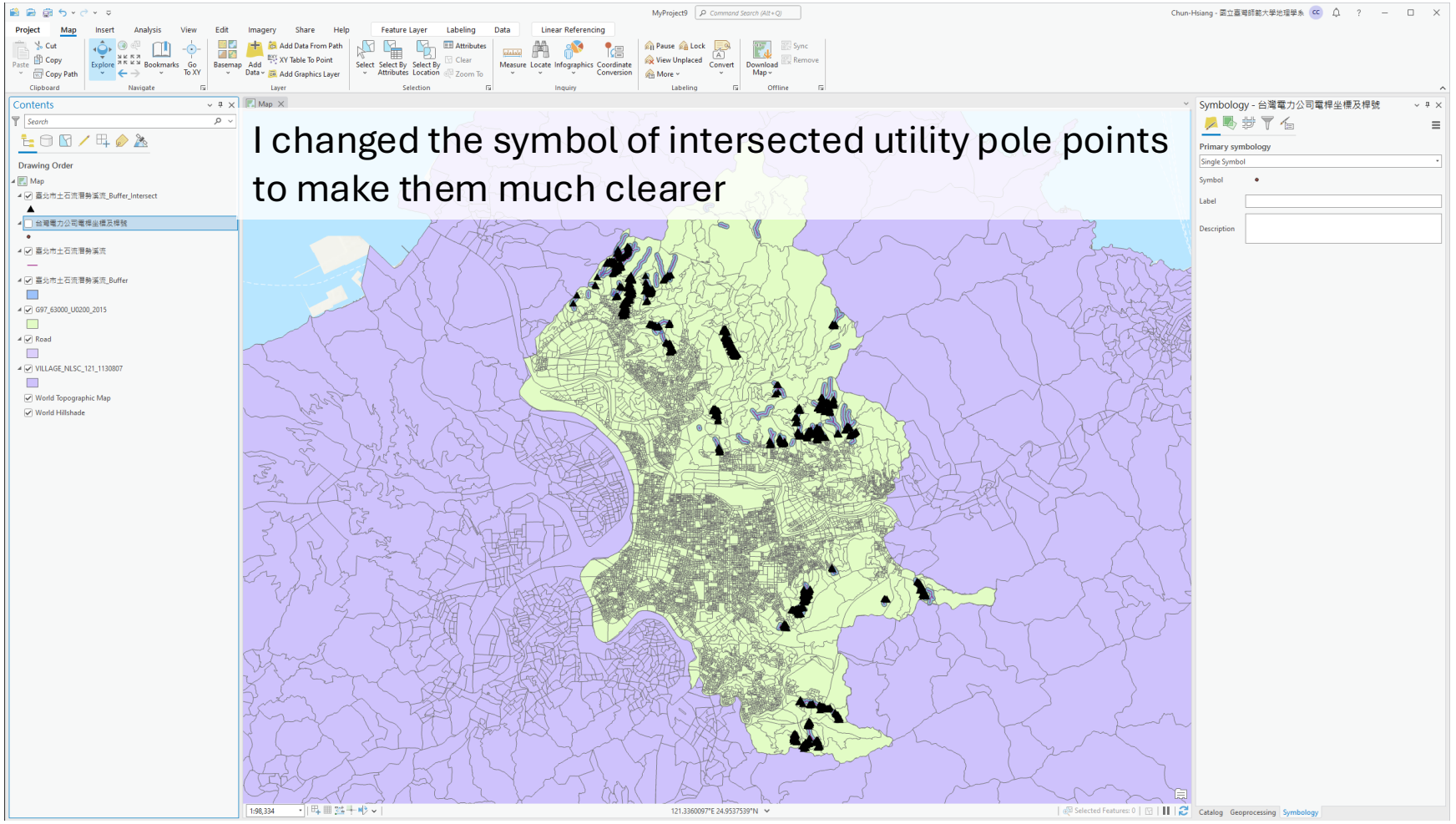
[Buffer] Observation the Nearest Point



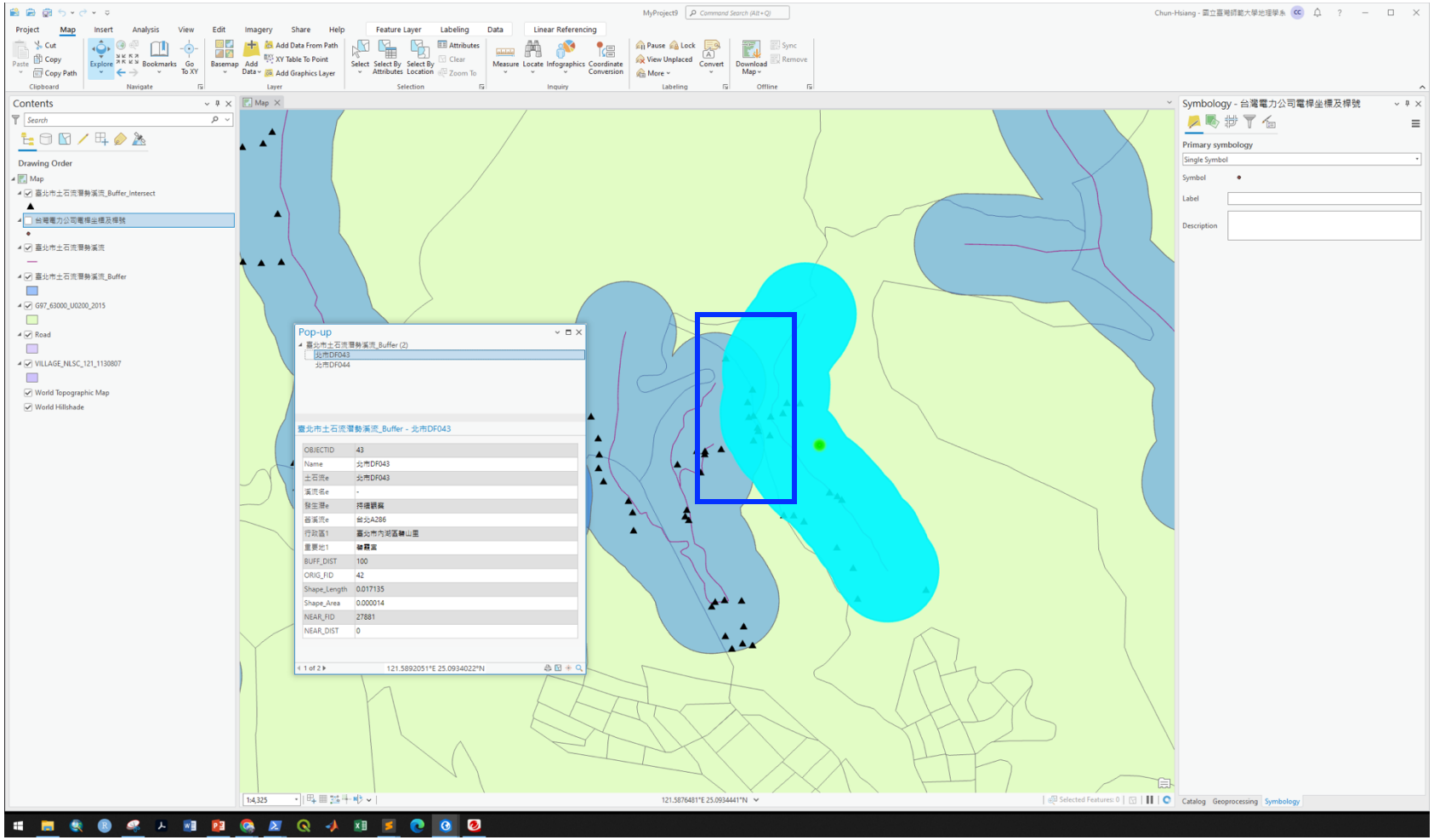
Intersect Analysis for Selecting All UP within the 100m-DF-buffer



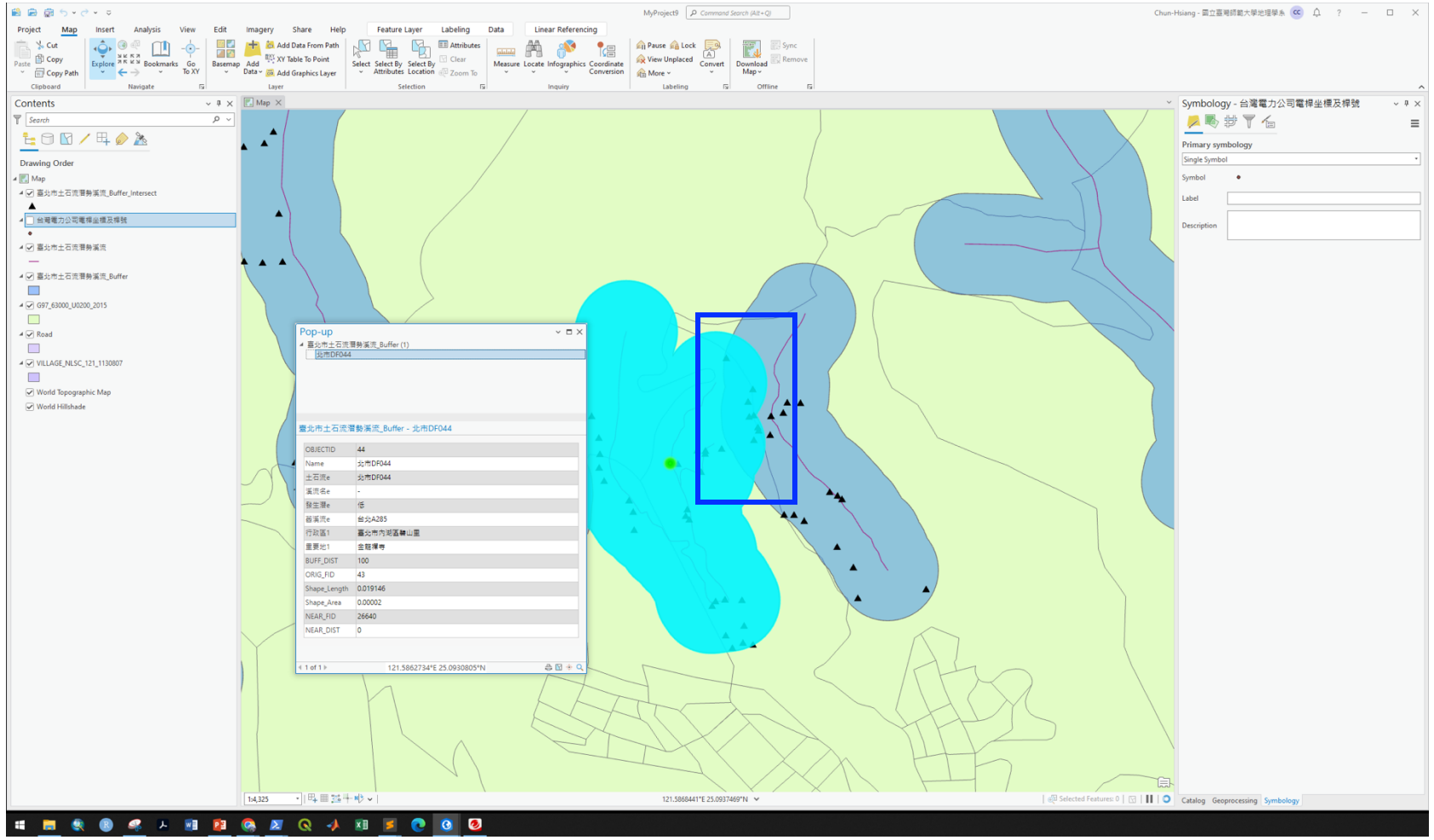
Intersect analysis for selecting all UP within the 100m-DF-buffer



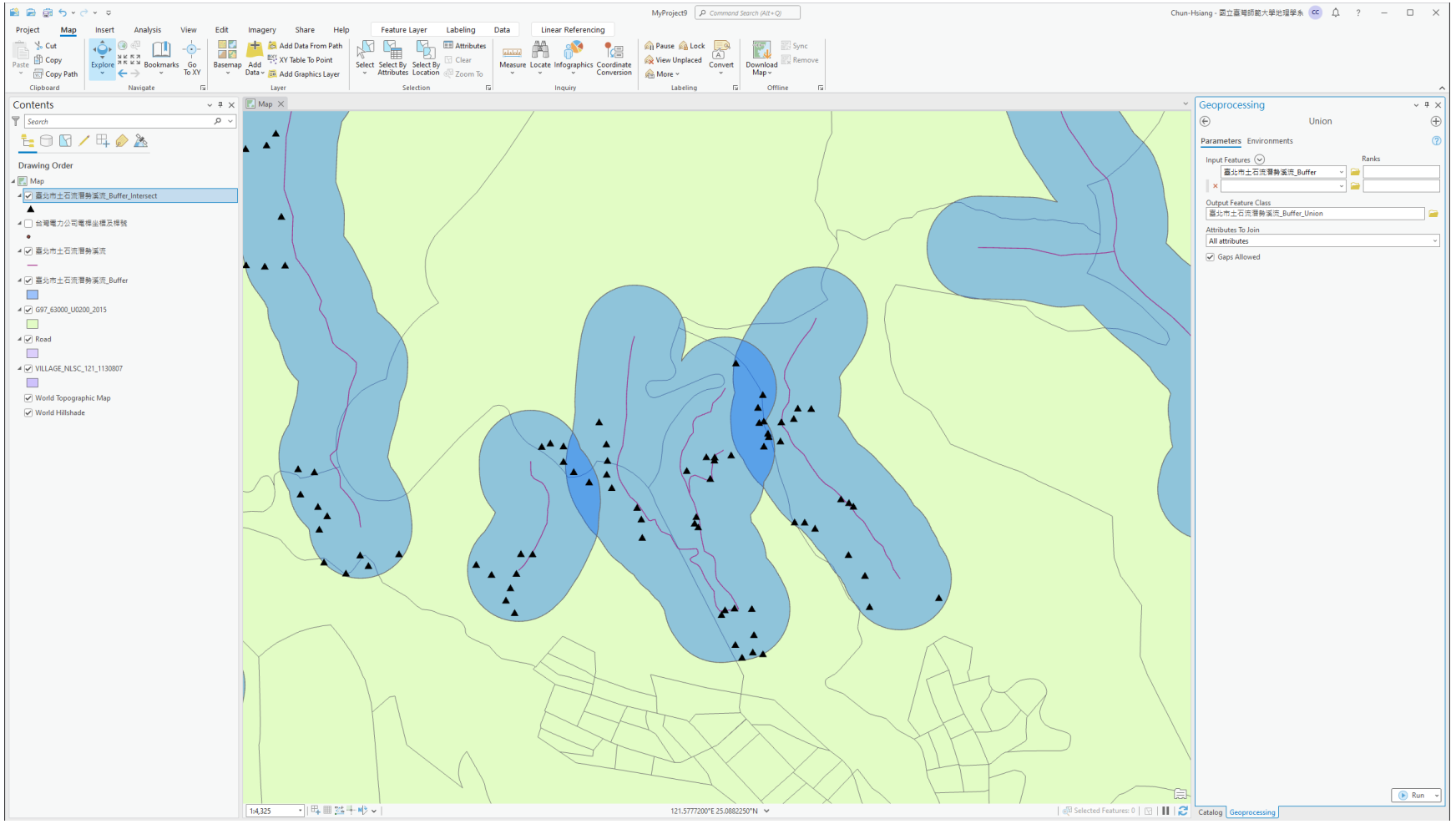
Observation :: The Overlap Areas



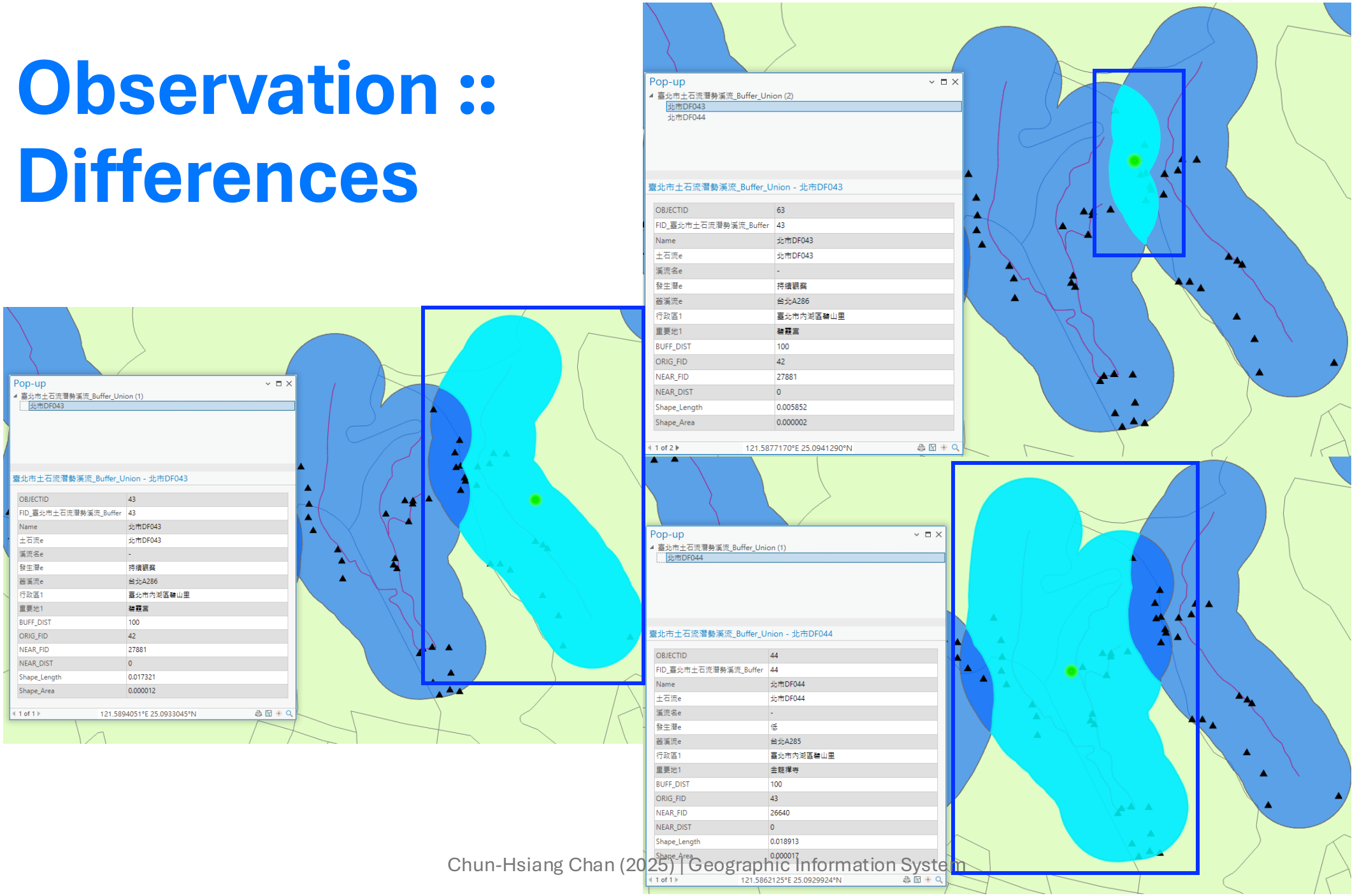
Observation :: The Overlap Areas



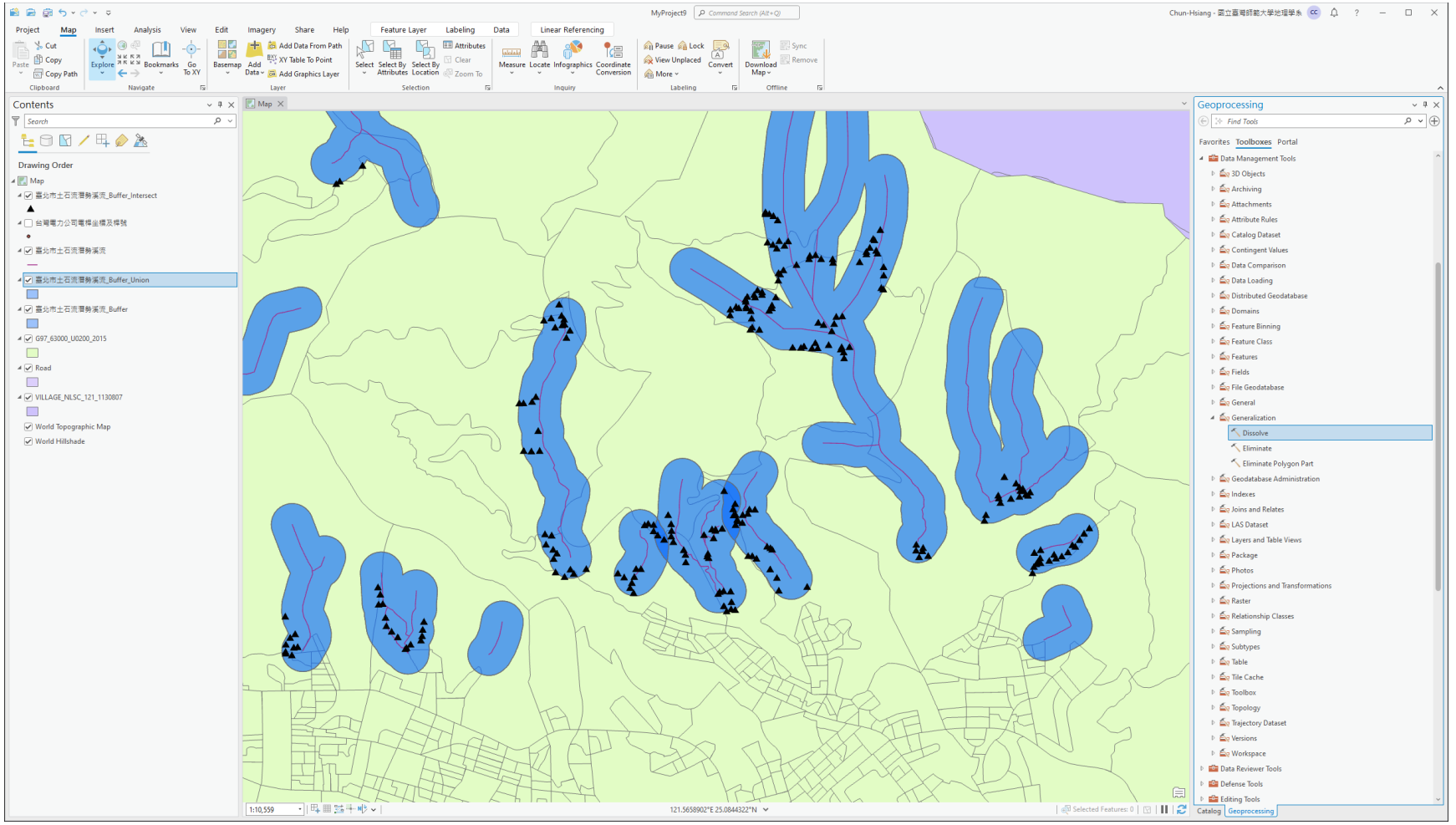
Union Analysis for the 100m-DF-buffer



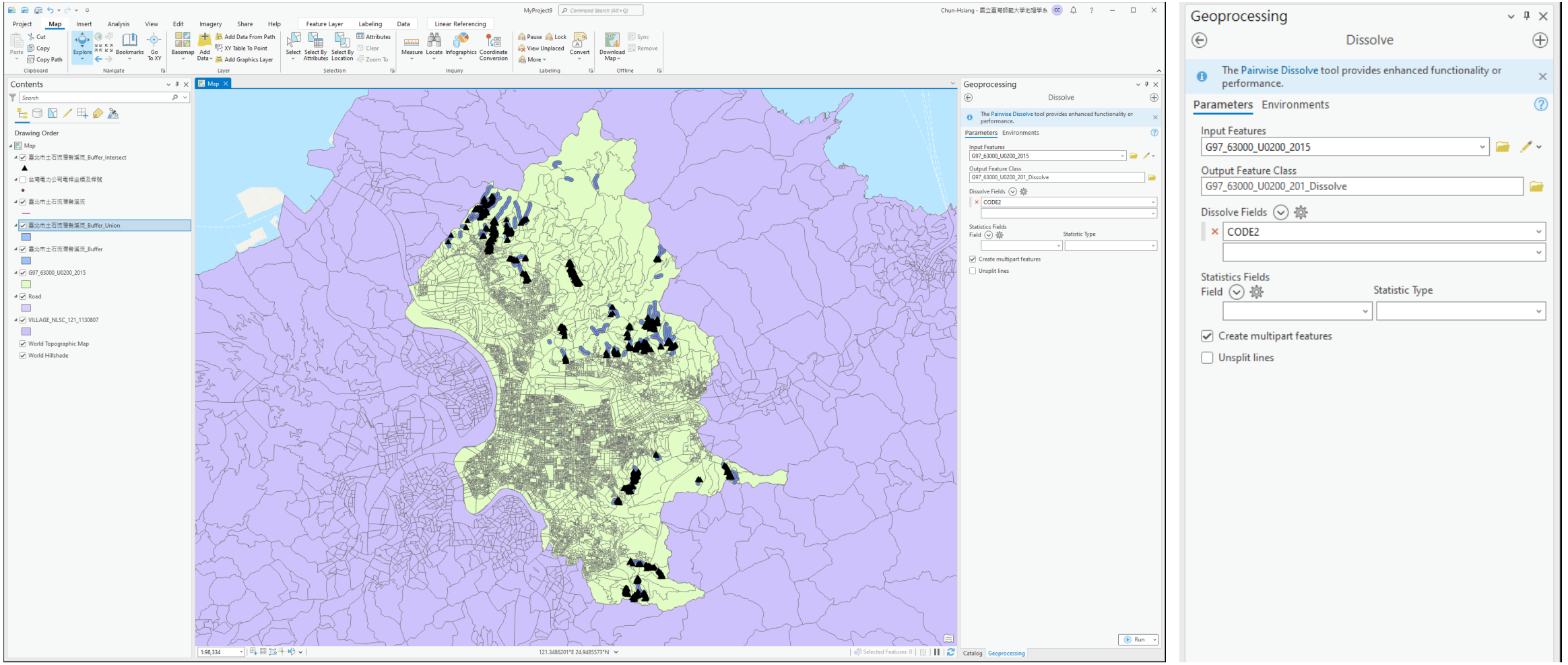
Observation :: Differences



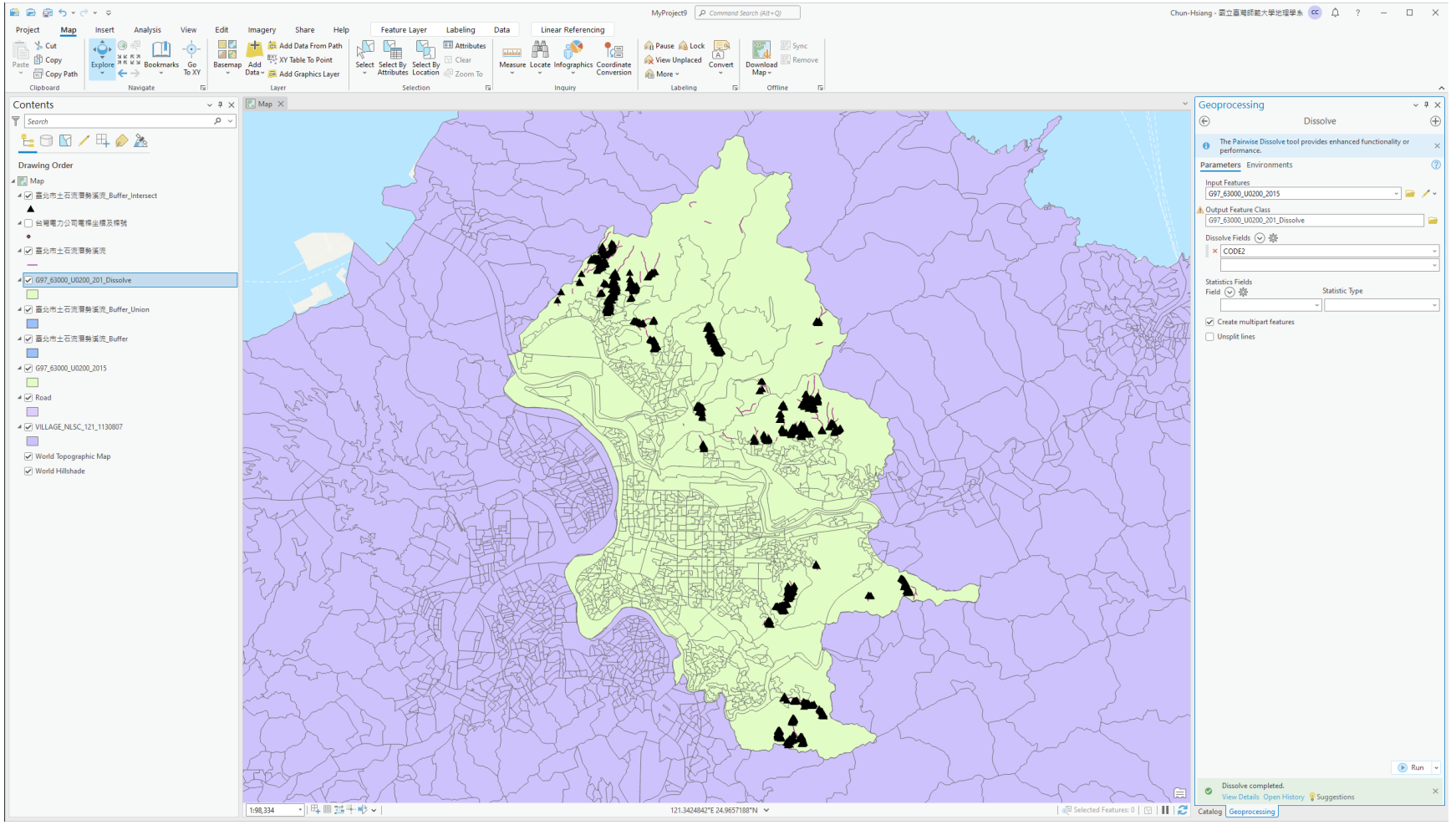
Dissolve the CODEBASE Layer to a CODE2-Resolution Layer



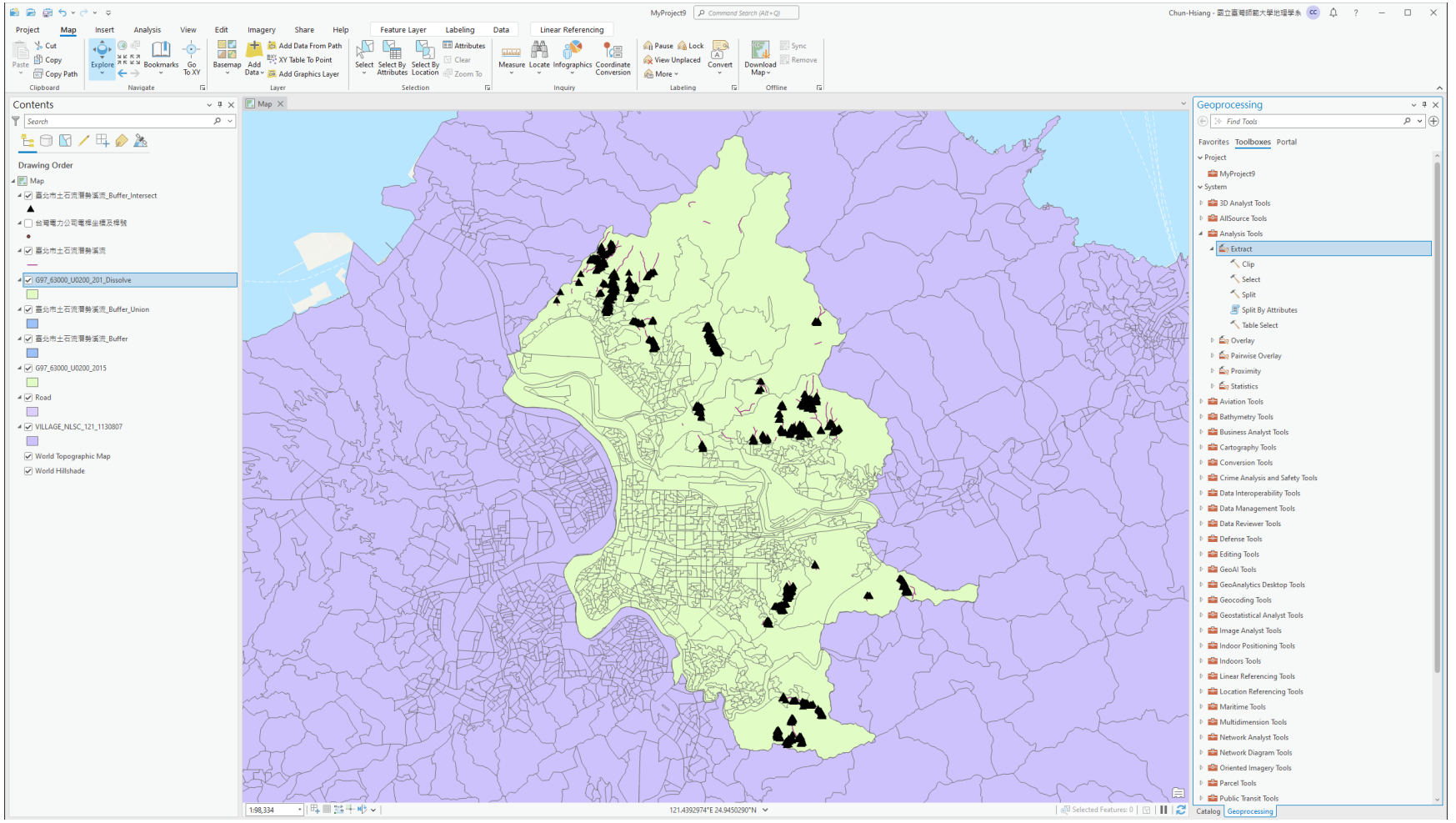
Dissolve the CODEBASE Layer to a CODE2-Resolution Layer



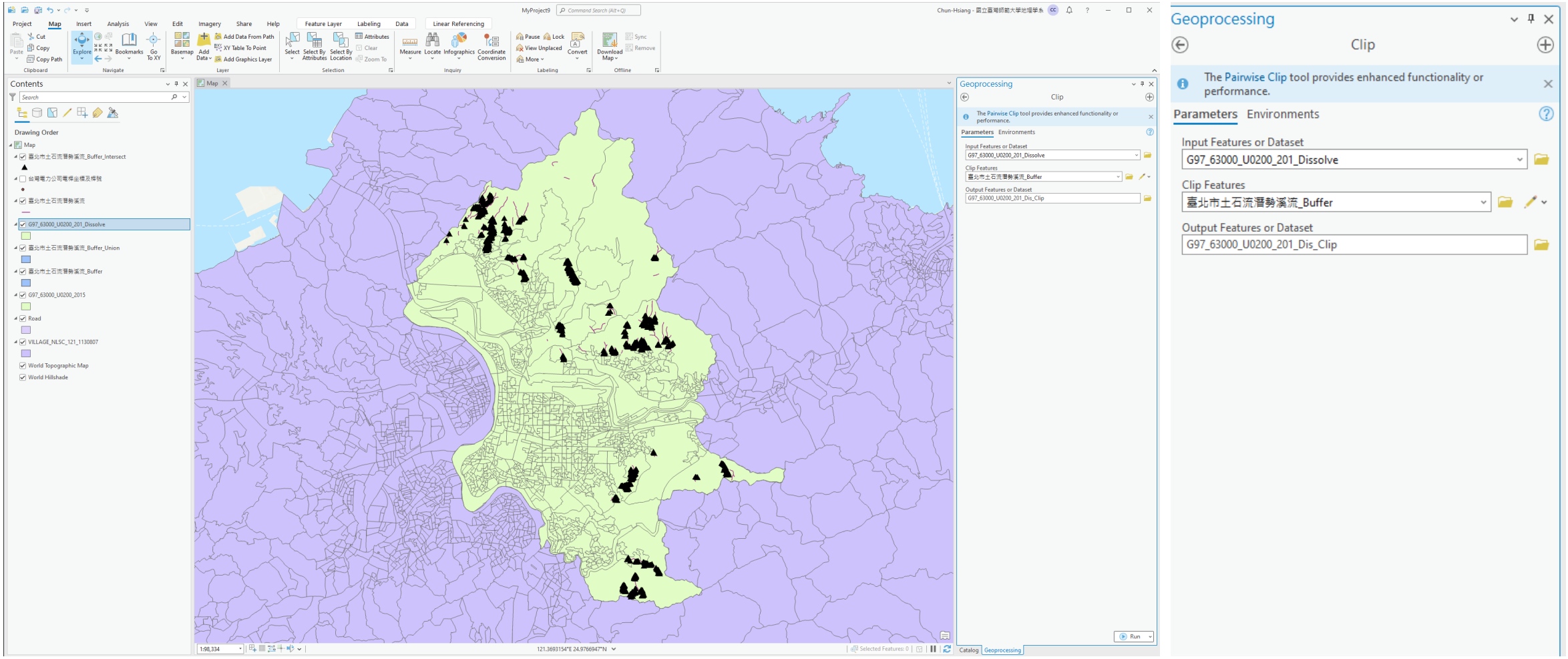
Dissolve the CODEBASE Layer to a CODE2-Resolution Layer



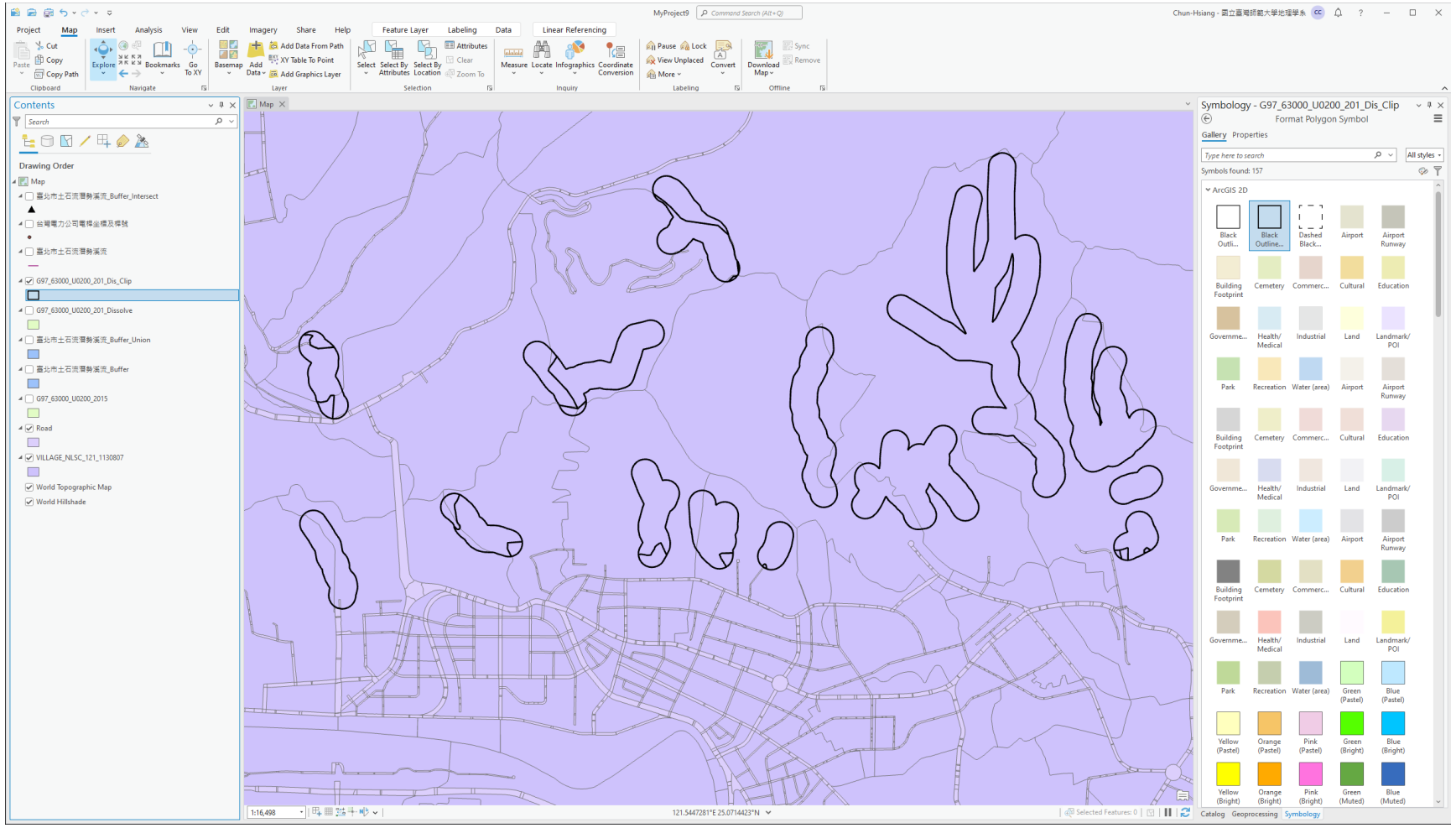
Clip CODE2 Layer by the 100m-DF-buffer



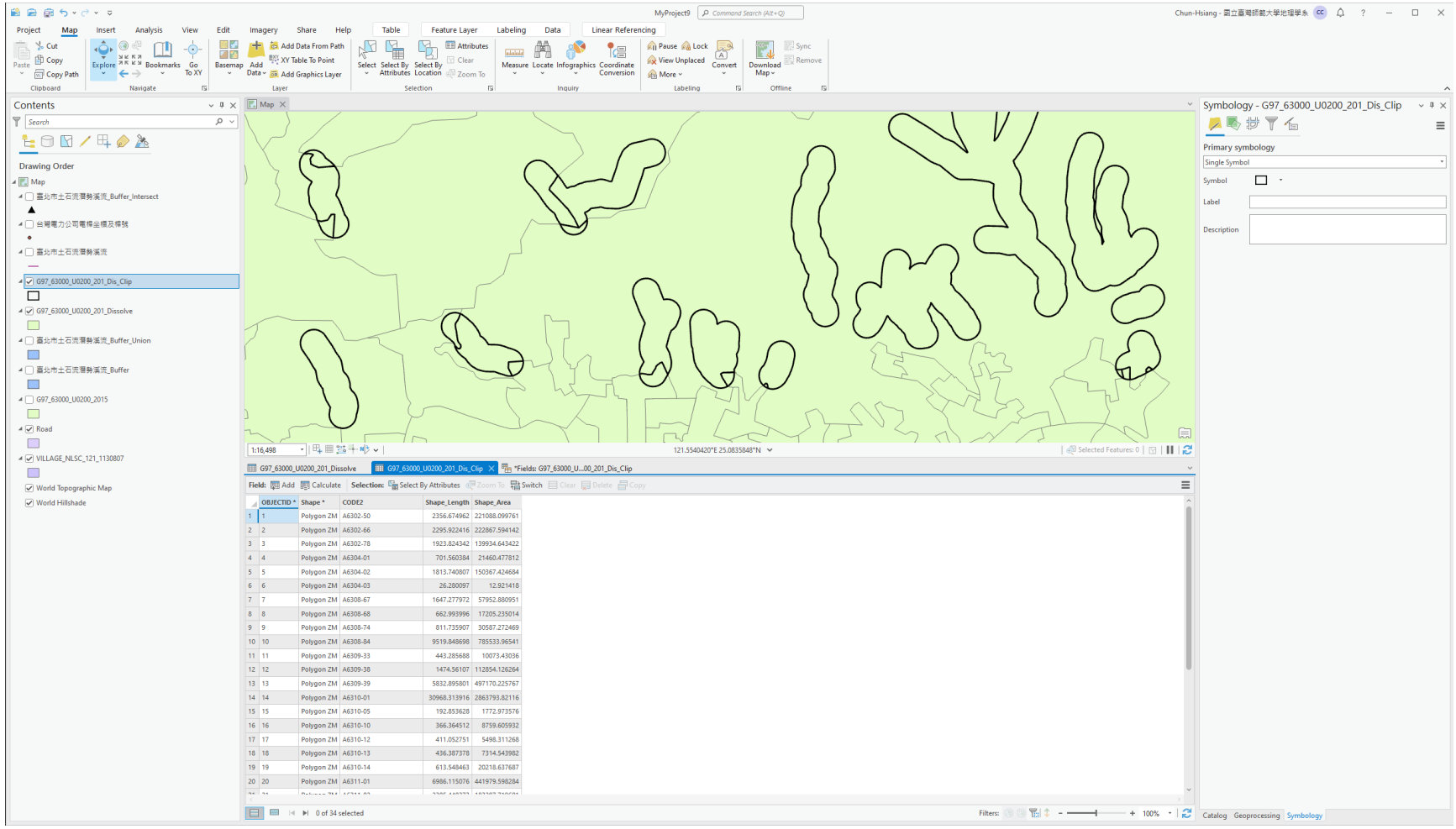
Clip CODE2 Layer by the 100m-DF-buffer



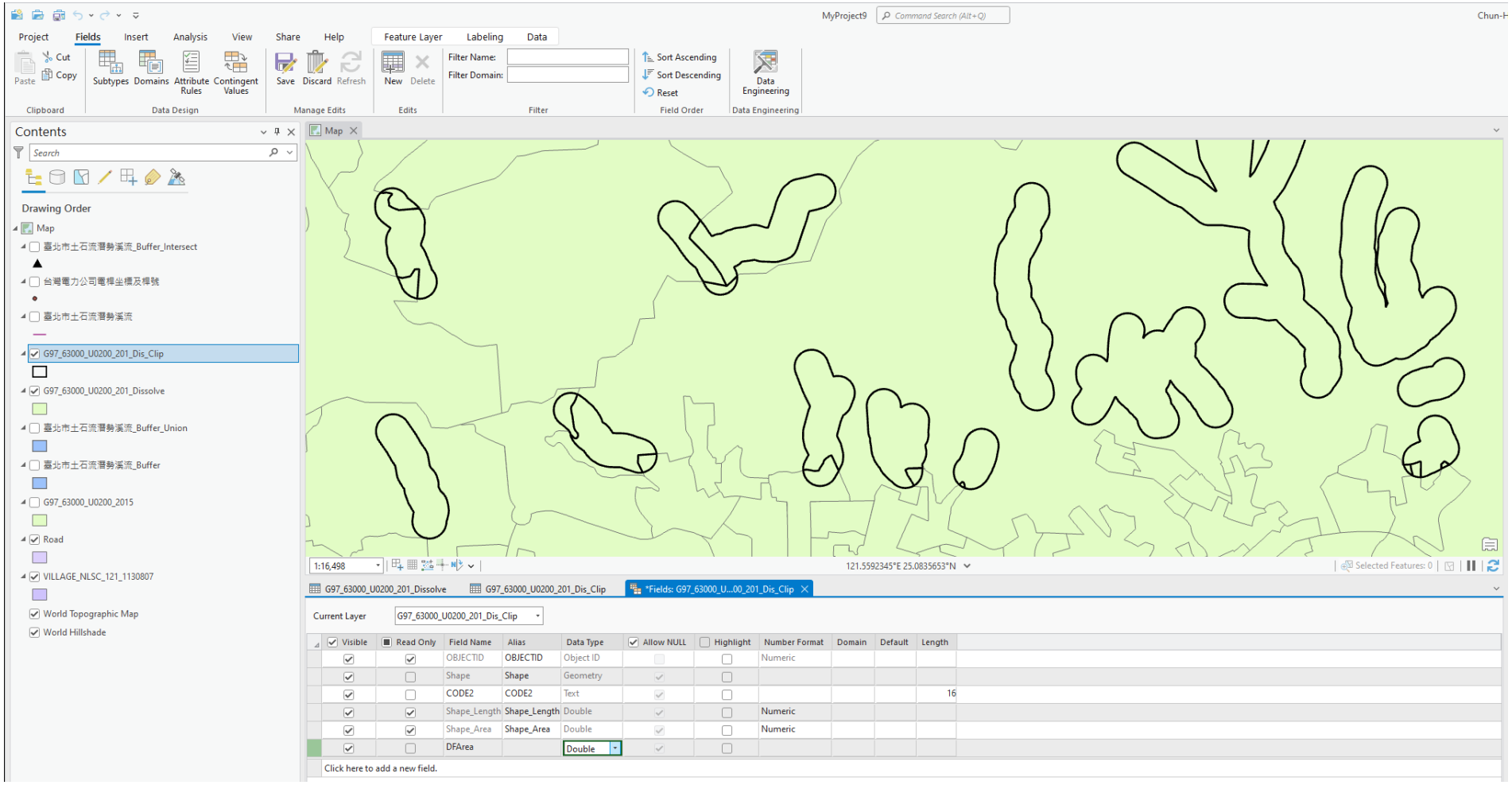
Clip CODE2 Layer by the 100m-DF-buffer



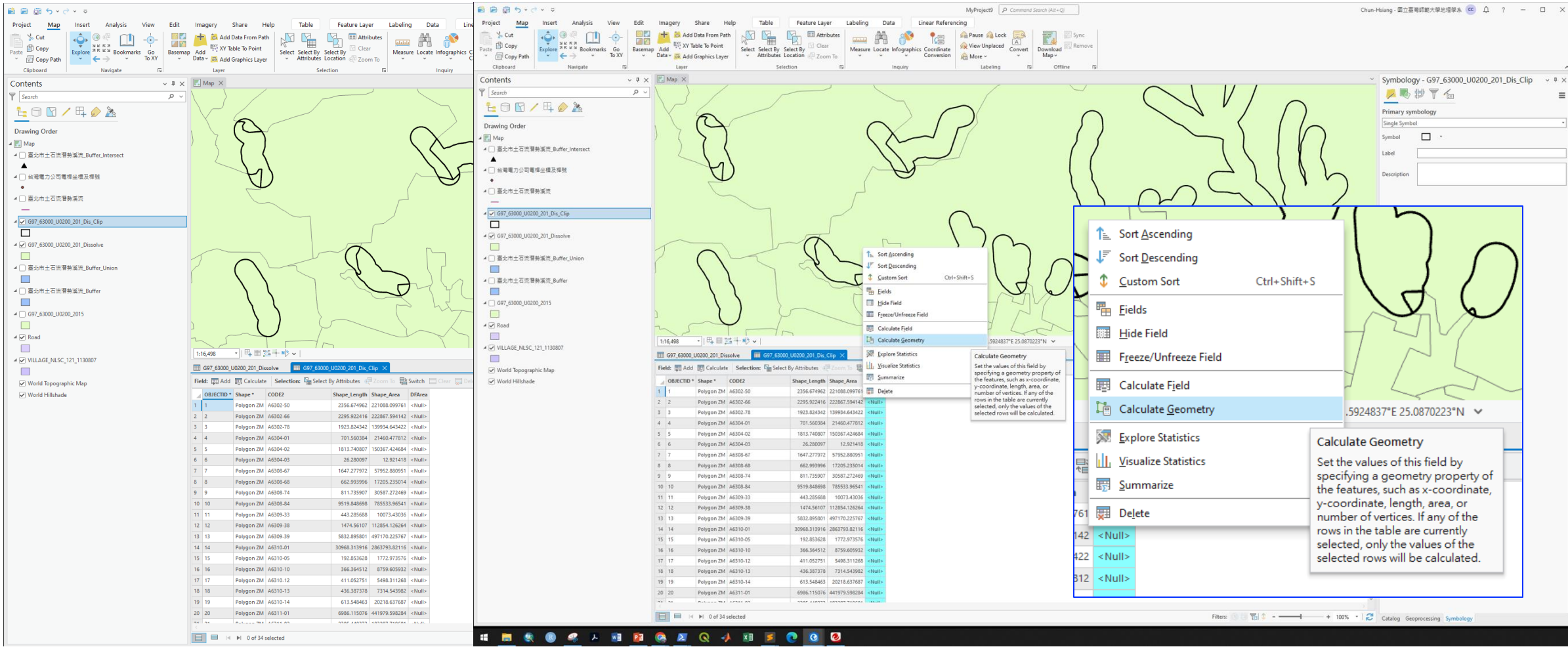
Add Field and Calculate Geometry for Each DF-CODE2 Area



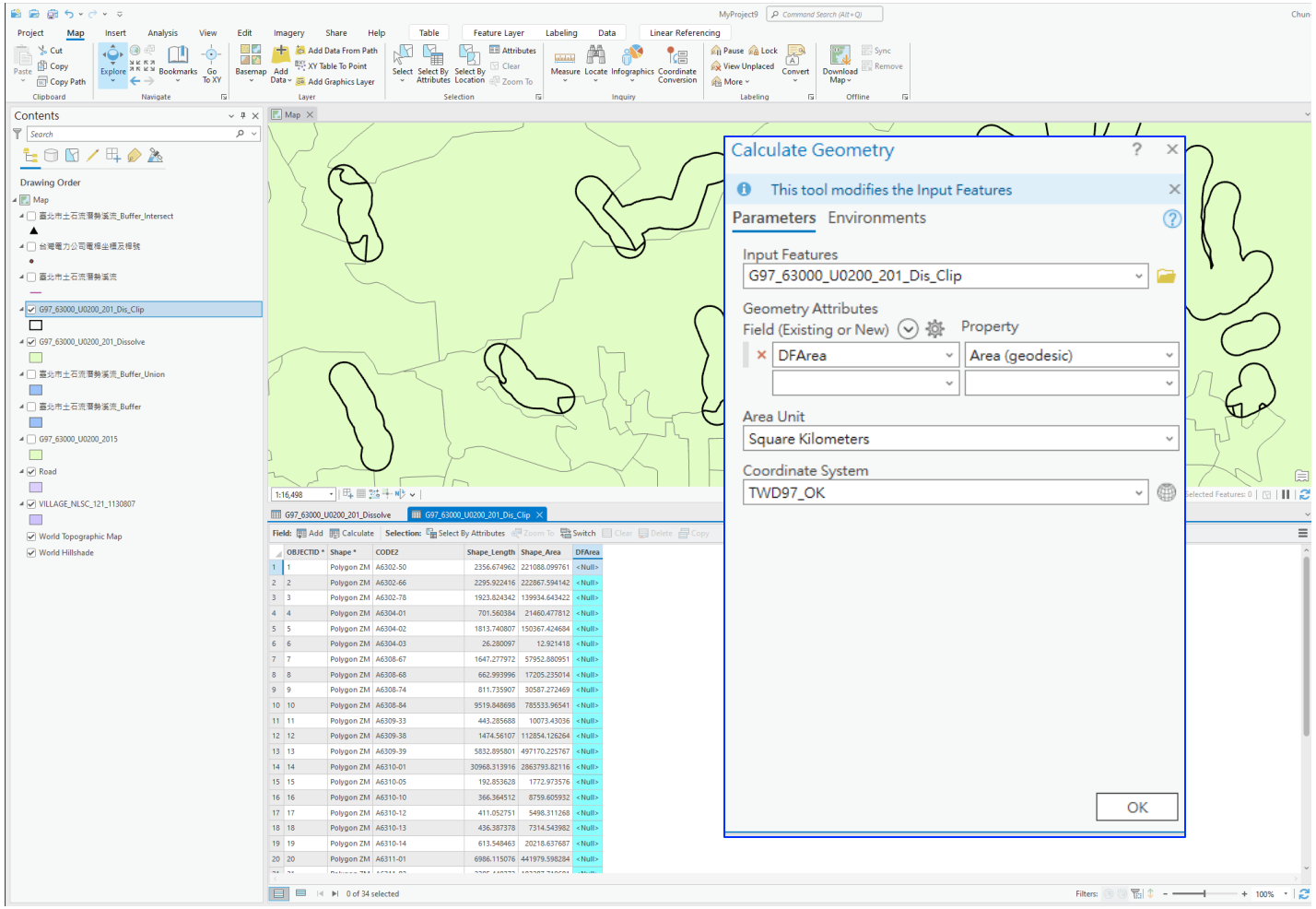
Add Field and Calculate Geometry for Each DF-CODE2 Area

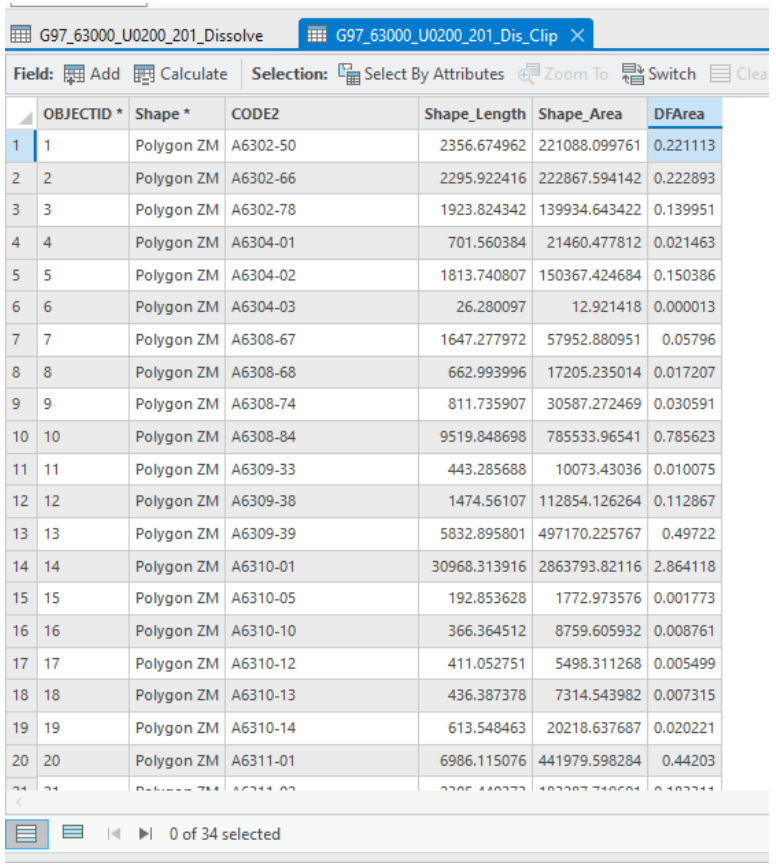


Add Field and Calculate Geometry for Each DF-CODE2 Area



Add Field and Calculate Geometry for Each DF-CODE2 Area





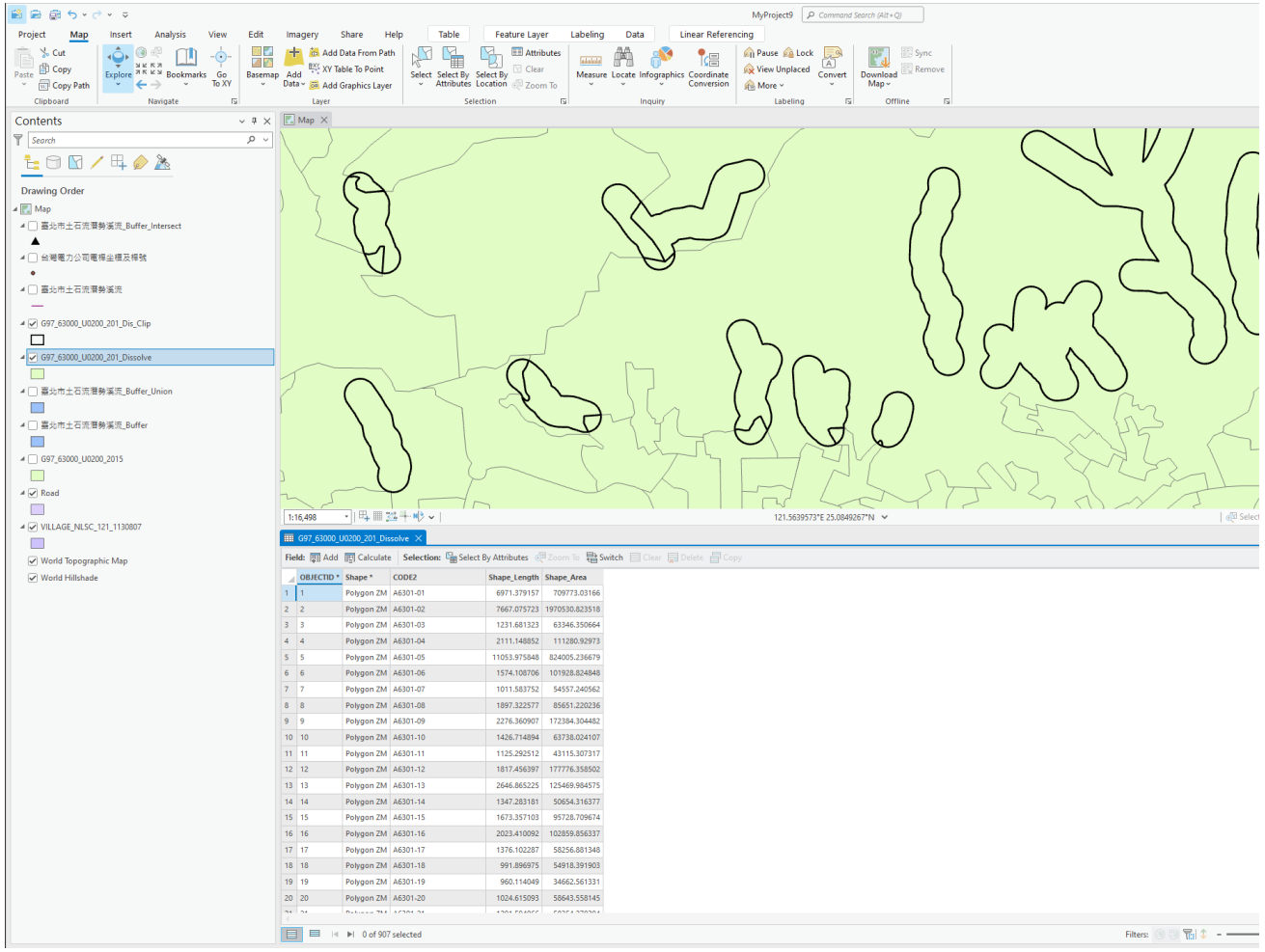
G97_63000_U0200_201_Dissolve | G97_63000_U0200_201_Dis_Clip

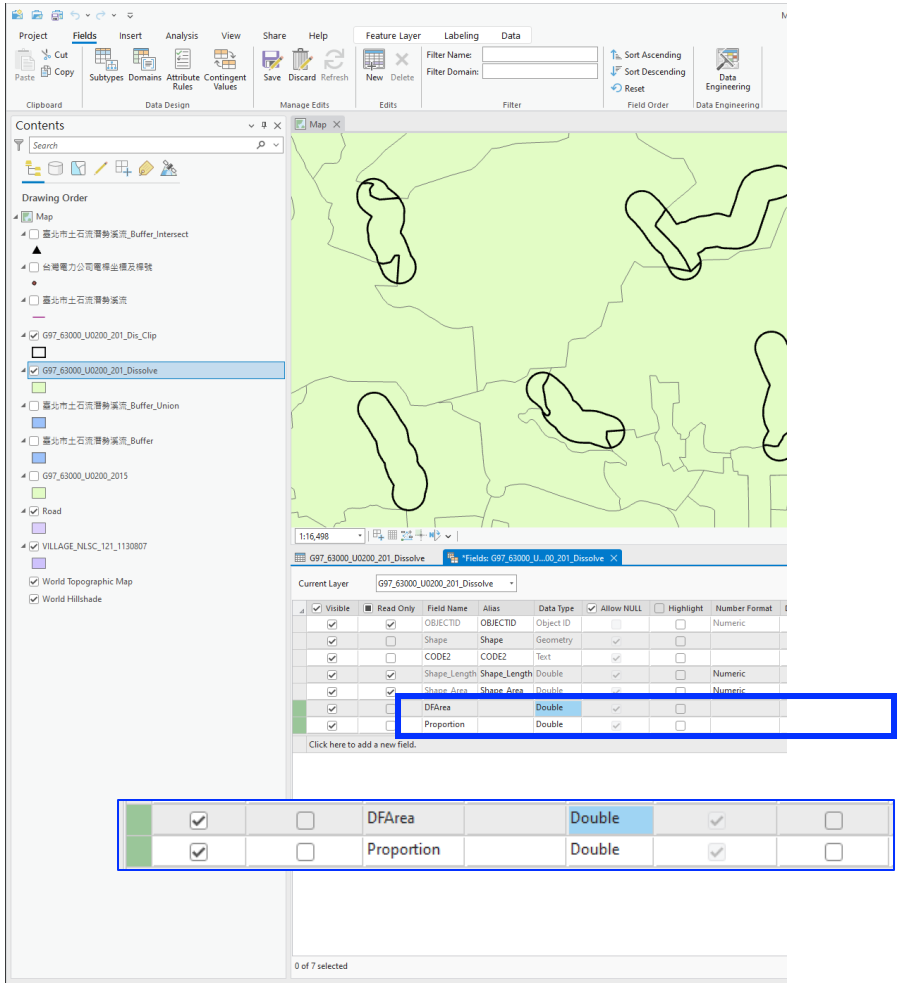
Field: Add | Calculate | Selection: Select By Attributes | Zoom To | Switch

	OBJECTID *	Shape *	CODE2	Shape_Length	Shape_Area	DFArea
1	1	Polygon ZM	A6302-50	2356.674962	221088.099761	0.221113
2	2	Polygon ZM	A6302-66	2295.922416	222867.594142	0.222893
3	3	Polygon ZM	A6302-78	1923.824342	139934.643422	0.139951
4	4	Polygon ZM	A6304-01	701.560384	21460.477812	0.021463
5	5	Polygon ZM	A6304-02	1813.740807	150367.424684	0.150386
6	6	Polygon ZM	A6304-03	26.280097	12.921418	0.000013
7	7	Polygon ZM	A6308-67	1647.277972	57952.880951	0.05796
8	8	Polygon ZM	A6308-68	662.993996	17205.235014	0.017207
9	9	Polygon ZM	A6308-74	811.735907	30587.272469	0.030591
10	10	Polygon ZM	A6308-84	9519.848698	785533.96541	0.785623
11	11	Polygon ZM	A6309-33	443.285688	10073.43036	0.010075
12	12	Polygon ZM	A6309-38	1474.56107	112854.126264	0.112867
13	13	Polygon ZM	A6309-39	5832.895801	497170.225767	0.49722
14	14	Polygon ZM	A6310-01	30968.313916	2863793.82116	2.864118
15	15	Polygon ZM	A6310-05	192.853628	1772.973576	0.001773
16	16	Polygon ZM	A6310-10	366.364512	8759.605932	0.008761
17	17	Polygon ZM	A6310-12	411.052751	5498.311268	0.005499
18	18	Polygon ZM	A6310-13	436.387378	7314.543982	0.007315
19	19	Polygon ZM	A6310-14	613.548463	20218.637687	0.020221
20	20	Polygon ZM	A6311-01	6986.115076	441979.598284	0.44203

0 of 34 selected

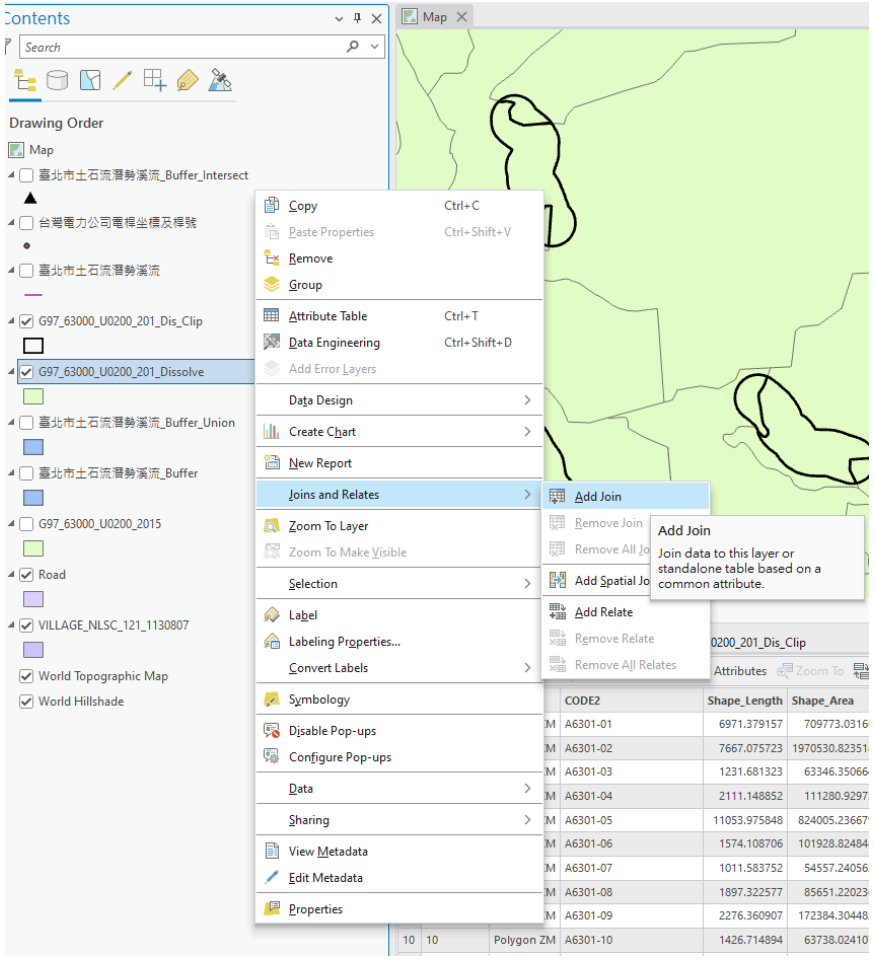
Add Field and Calculate Geometry for Each DF-CODE2 Area

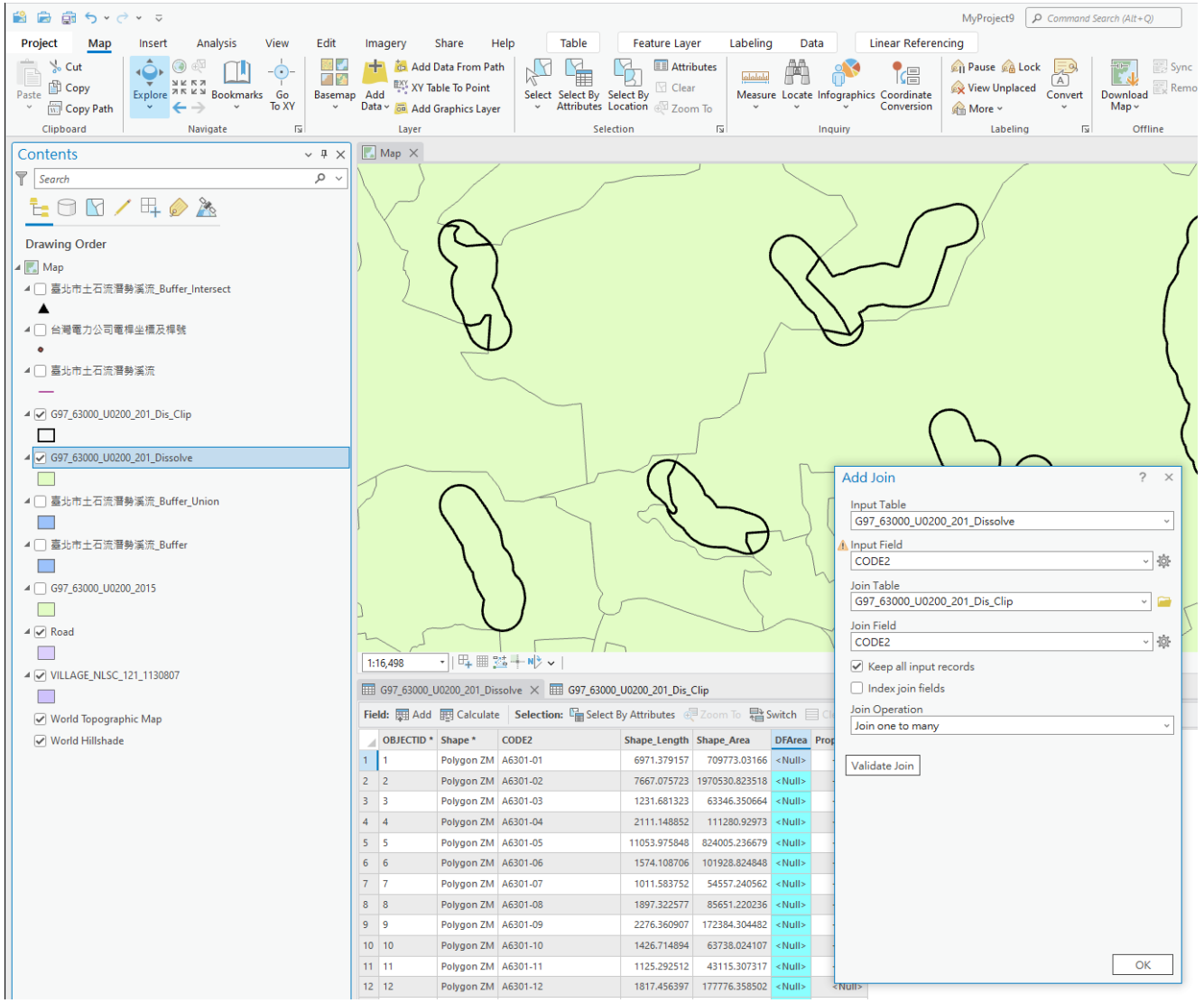




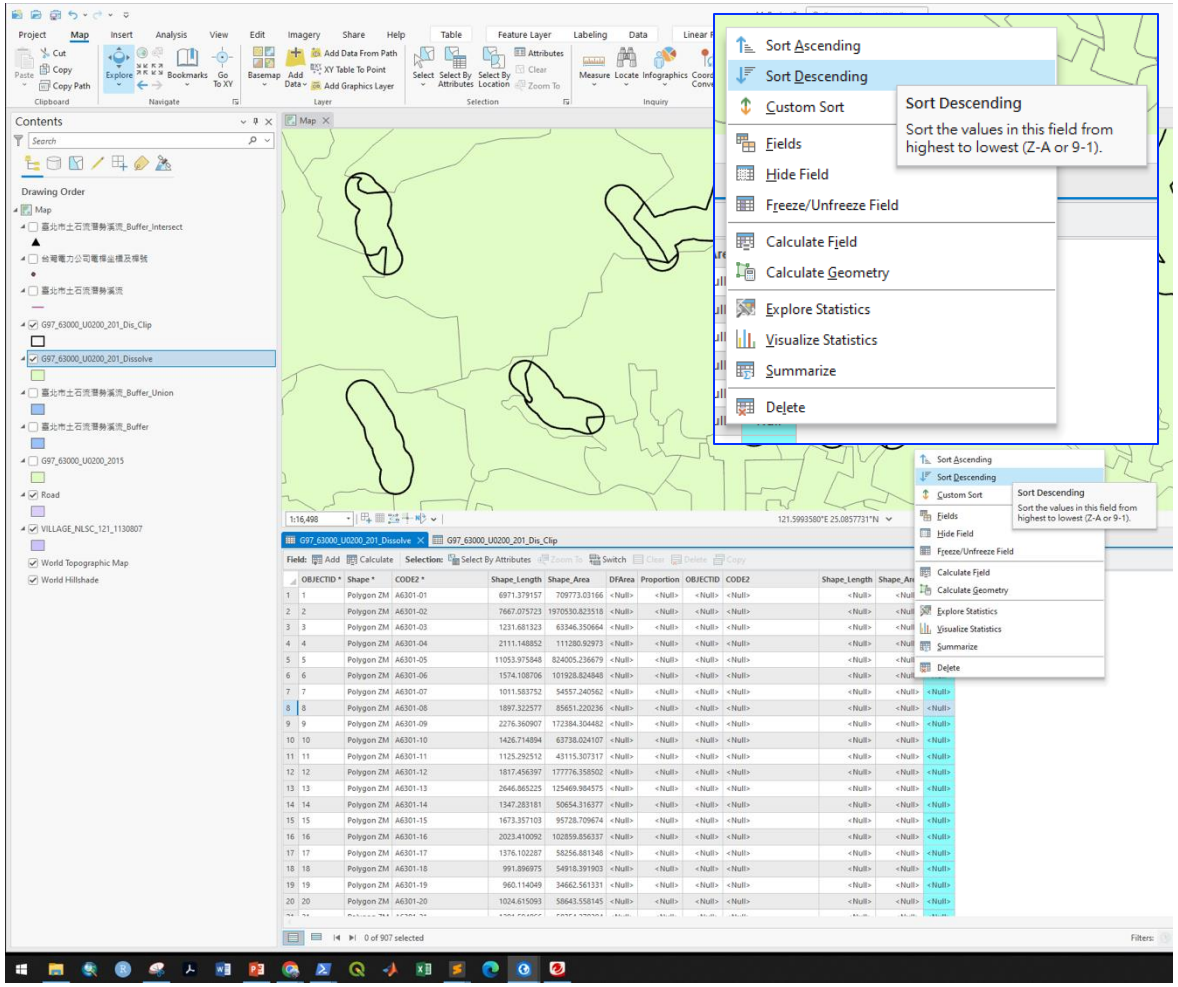
☑	☐	DFArea		Double	☑	☐
☑	☐	Proportion		Double	☑	☐

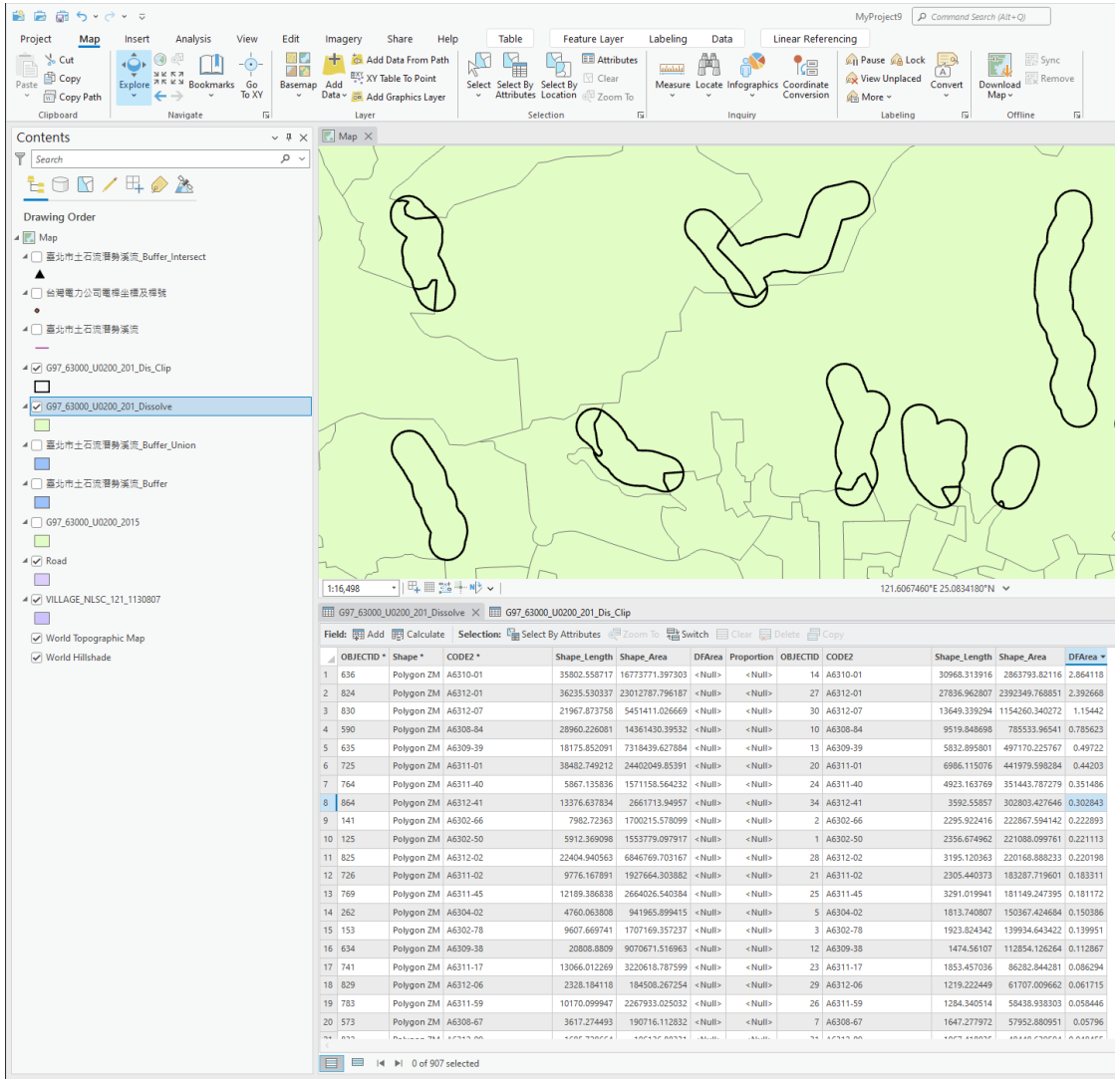
Join the Clipped Layer (Above) to CODE2 Layer by CODE2 ID



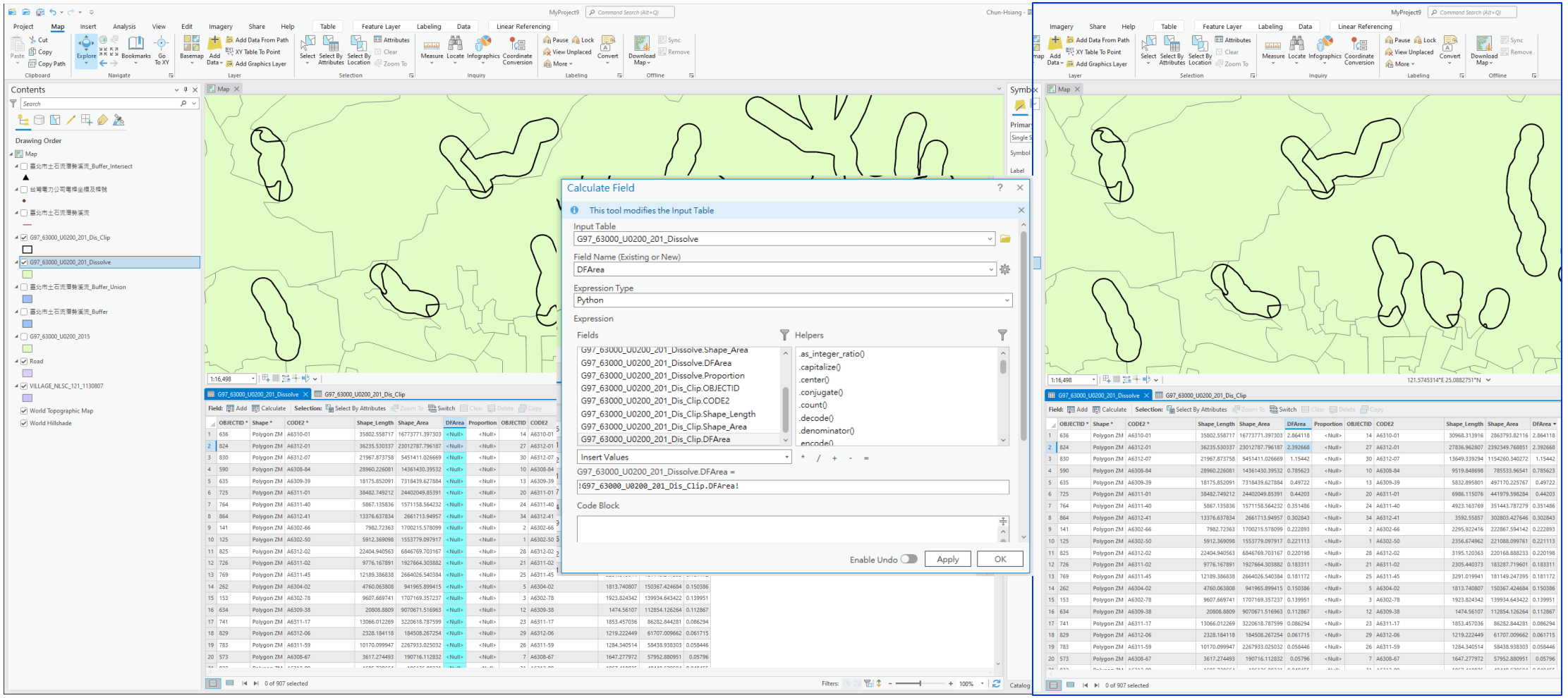


Add Field and Calculate Geometry for Each DF-CODE2 Area

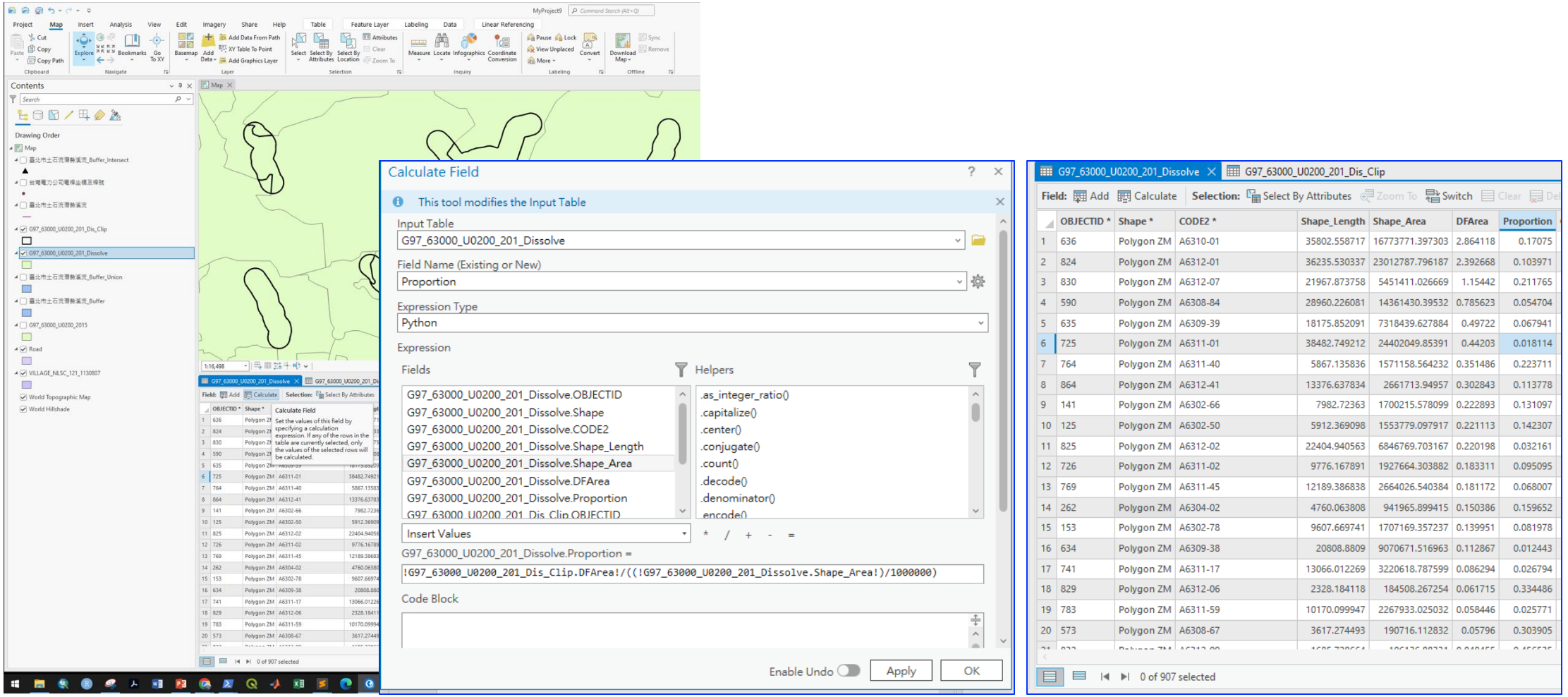




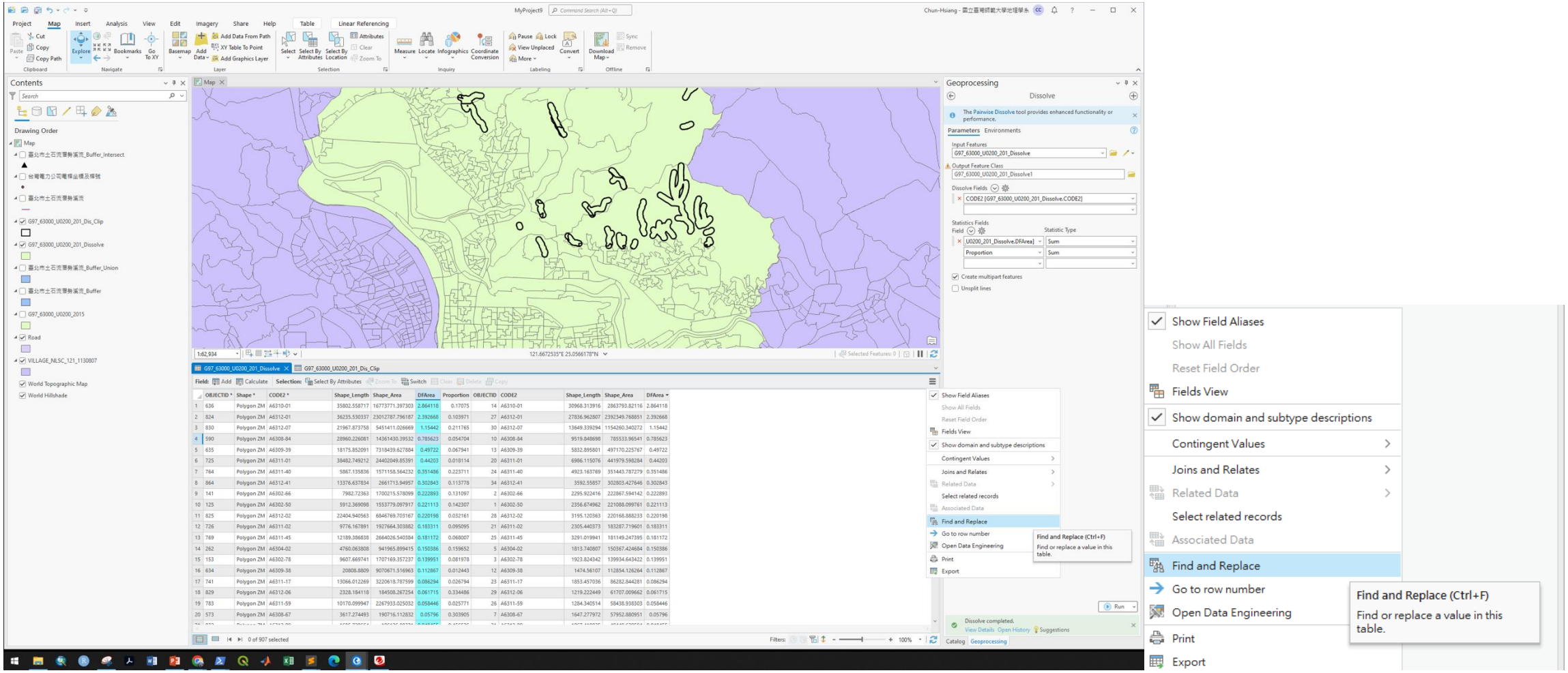
Add Field and Calculate Field to Compute the Proportion of DF-buffer Areas



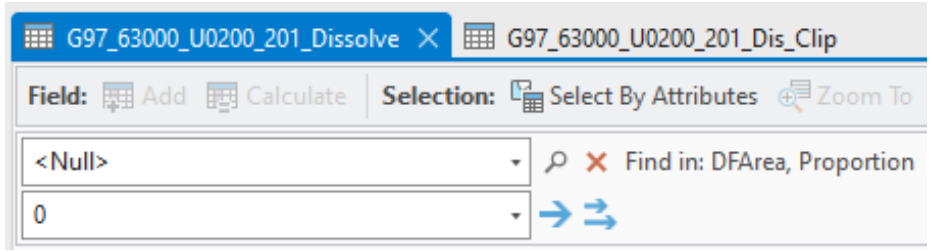
Add Field and Calculate Field to Compute the Proportion of DF-buffer Areas

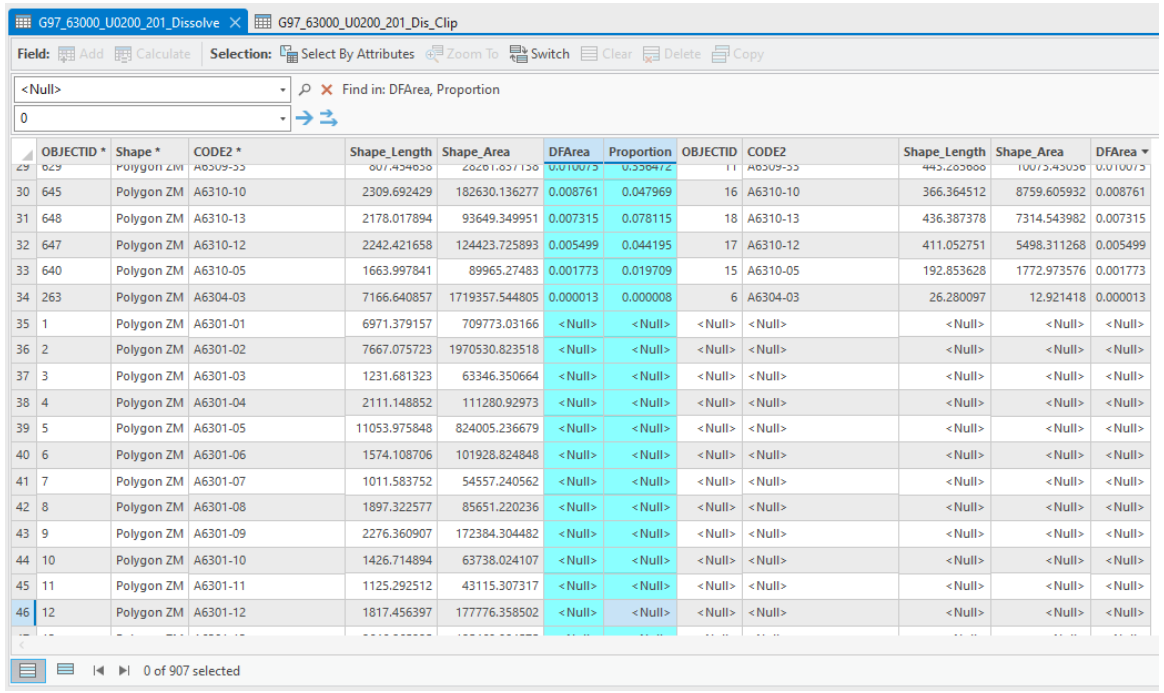


Find and Replace all <Null> to Zeros in the Columns of “DFArea” and “Proportion”



Find and Replace all <Null> to Zeros in the Columns of "DFArea" and "Proportion"





	OBJECTID *	Shape *	CODE2 *	Shape_Length	Shape_Area	DFArea	Proportion	OBJECTID	CODE2	Shape_Length	Shape_Area	DFArea
30	645	Polygon ZM	A6310-10	2309.692429	182630.136277	0.008761	0.047969	16	A6310-10	366.364512	8759.605932	0.008761
31	648	Polygon ZM	A6310-13	2178.017894	93649.349951	0.007315	0.078115	18	A6310-13	436.387378	7314.543982	0.007315
32	647	Polygon ZM	A6310-12	2242.421658	124423.725893	0.005499	0.044195	17	A6310-12	411.052751	5498.311268	0.005499
33	640	Polygon ZM	A6310-05	1663.997841	89965.27483	0.001773	0.019709	15	A6310-05	192.853628	1772.973576	0.001773
34	263	Polygon ZM	A6304-03	7166.640857	1719357.544805	0.000013	0.000008	6	A6304-03	26.280097	12.921418	0.000013
35	1	Polygon ZM	A6301-01	6971.379157	709773.03166	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
36	2	Polygon ZM	A6301-02	7667.075723	1970530.823518	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
37	3	Polygon ZM	A6301-03	1231.681323	63346.350664	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
38	4	Polygon ZM	A6301-04	2111.148852	111280.92973	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
39	5	Polygon ZM	A6301-05	11053.975848	824005.236679	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
40	6	Polygon ZM	A6301-06	1574.108706	101928.824848	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
41	7	Polygon ZM	A6301-07	1011.583752	54557.240562	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
42	8	Polygon ZM	A6301-08	1897.322577	85651.220236	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
43	9	Polygon ZM	A6301-09	2276.360907	172384.304482	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
44	10	Polygon ZM	A6301-10	1426.714894	63738.024107	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
45	11	Polygon ZM	A6301-11	1125.292512	43115.307317	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
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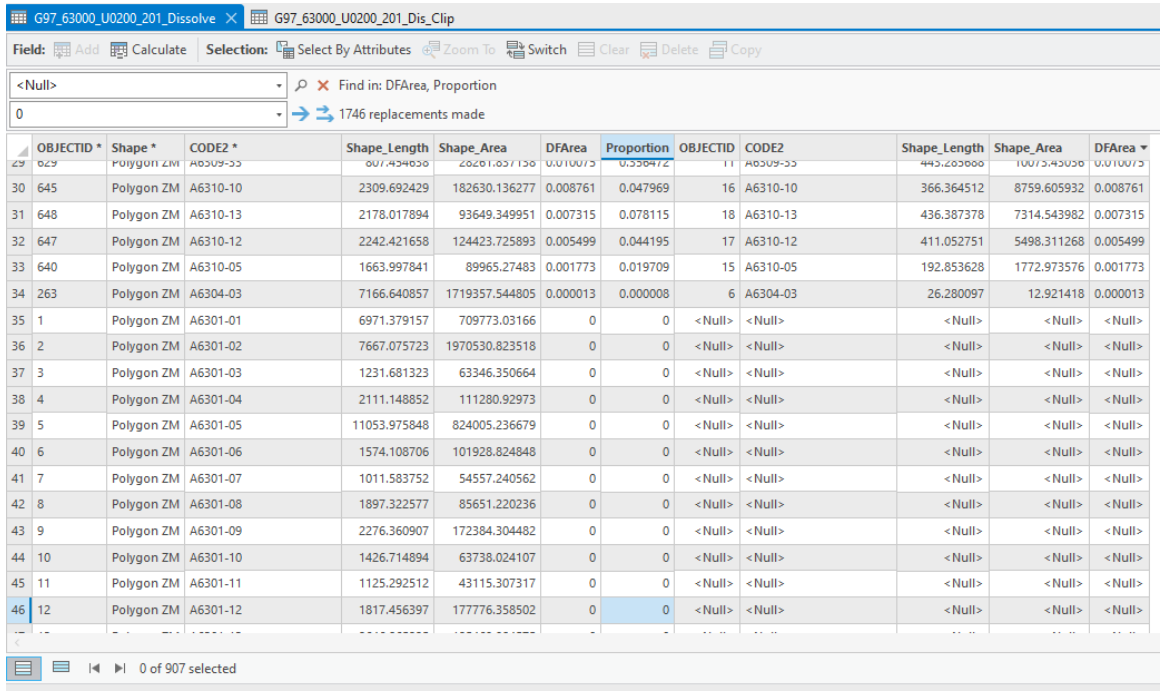

	OBJECTID *	Shape *	CODE2 *	Shape_Length	Shape_Area	DFArea	Proportion	OBJECTID	CODE2	Shape_Length	Shape_Area	DFArea
30	645	Polygon ZM	A6310-10	2309.692429	182630.136277	0.008761	0.047969	16	A6310-10	366.364512	8759.605932	0.008761
31	648	Polygon ZM	A6310-13	2178.017894	93649.349951	0.007315	0.078115	18	A6310-13	436.387378	7314.543982	0.007315
32	647	Polygon ZM	A6310-12	2242.421658	124423.725893	0.005499	0.044195	17	A6310-12	411.052751	5498.311268	0.005499
33	640	Polygon ZM	A6310-05	1663.997841	89965.27483	0.001773	0.019709	15	A6310-05	192.853628	1772.973576	0.001773
34	263	Polygon ZM	A6304-03	7166.640857	1719357.544805	0.000013	0.000008	6	A6304-03	26.280097	12.921418	0.000013
35	1	Polygon ZM	A6301-01	6971.379157	709773.03166	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
36	2	Polygon ZM	A6301-02	7667.075723	1970530.823518	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
37	3	Polygon ZM	A6301-03	1231.681323	63346.350664	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
38	4	Polygon ZM	A6301-04	2111.148852	111280.92973	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
39	5	Polygon ZM	A6301-05	11053.975848	824005.236679	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
40	6	Polygon ZM	A6301-06	1574.108706	101928.824848	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
41	7	Polygon ZM	A6301-07	1011.583752	54557.240562	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
42	8	Polygon ZM	A6301-08	1897.322577	85651.220236	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
43	9	Polygon ZM	A6301-09	2276.360907	172384.304482	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
44	10	Polygon ZM	A6301-10	1426.714894	63738.024107	0	0	<Null>	<Null>	<Null>	<Null>	<Null>
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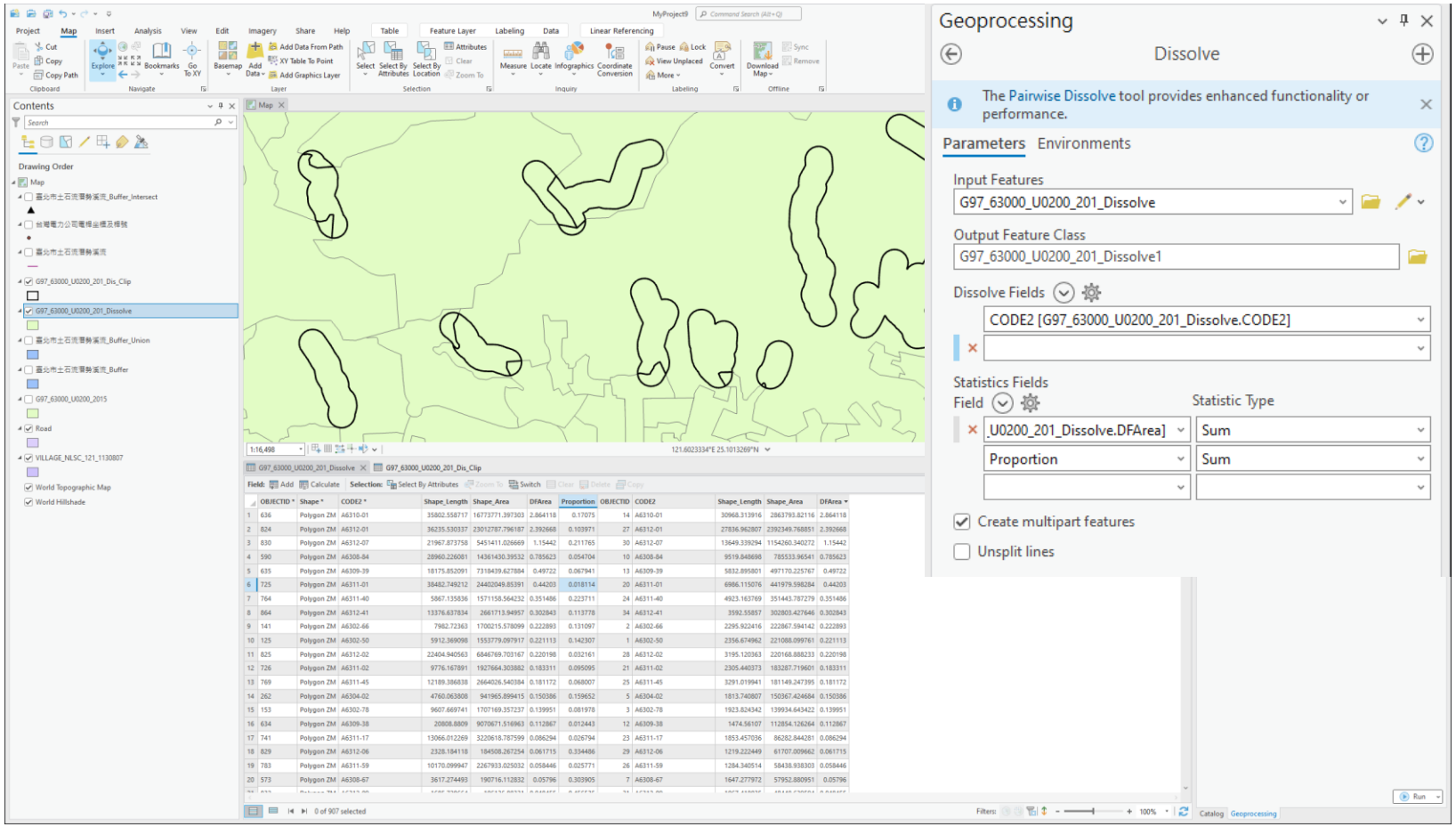
46	12	Polygon ZM	A6301-12	1817.456397	177776.358502	0	0	<Null>	<Null>	<Null>	<Null>	<Null>

Dissolve by CODE2 and Σ DF Area and Proportion



	OBJECTID *	Shape *	CODE2 *	Shape_Length	Shape_Area	DFArea	Proportion
30	645	Polygon ZM	A6310-10	2309.692429	182630.136277	0.008761	0.047969
31	648	Polygon ZM	A6310-13	2178.017894	93649.349951	0.007315	0.078115
32	647	Polygon ZM	A6310-12	2242.421658	124423.725893	0.005499	0.044195
33	640	Polygon ZM	A6310-05	1663.997841	89965.27483	0.001773	0.019709
34	263	Polygon ZM	A6304-03	7166.640857	1719357.544805	0.000013	0.000008
35	1	Polygon ZM	A6301-01	6971.379157	709773.03166	0	0
36	2	Polygon ZM	A6301-02	7667.075723	1970530.823518	0	0
37	3	Polygon ZM	A6301-03	1231.681323	63346.350664	0	0
38	4	Polygon ZM	A6301-04	2111.148852	111280.92973	0	0
39	5	Polygon ZM	A6301-05	11053.975848	824005.236679	0	0
40	6	Polygon ZM	A6301-06	1574.108706	101928.824848	0	0
41	7	Polygon ZM	A6301-07	1011.583752	54557.240562	0	0
42	8	Polygon ZM	A6301-08	1897.322577	85651.220236	0	0
43	9	Polygon ZM	A6301-09	2276.360907	172384.304482	0	0
44	10	Polygon ZM	A6301-10	1426.714894	63738.024107	0	0
45	11	Polygon ZM	A6301-11	1125.292512	43115.307317	0	0
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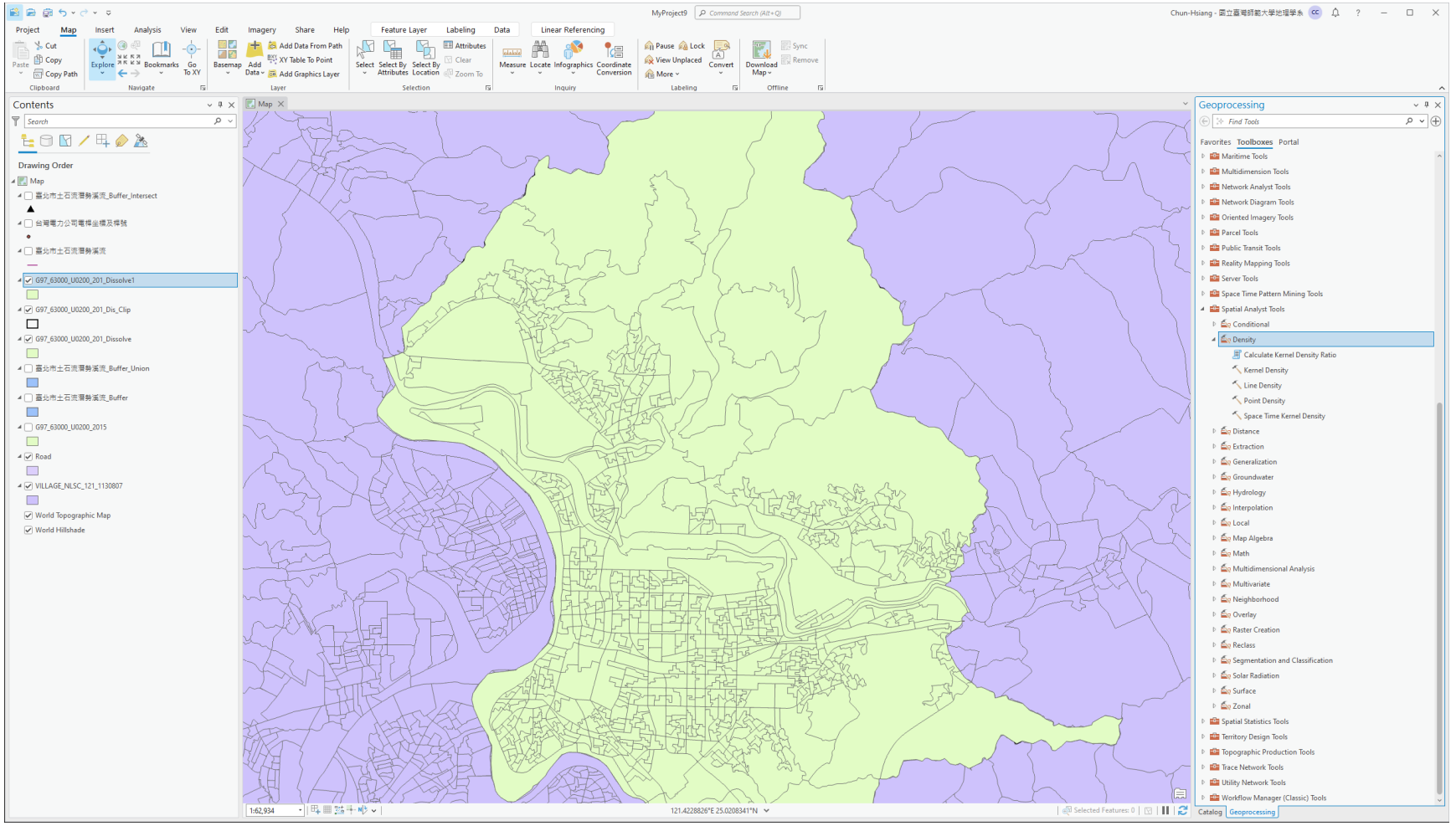
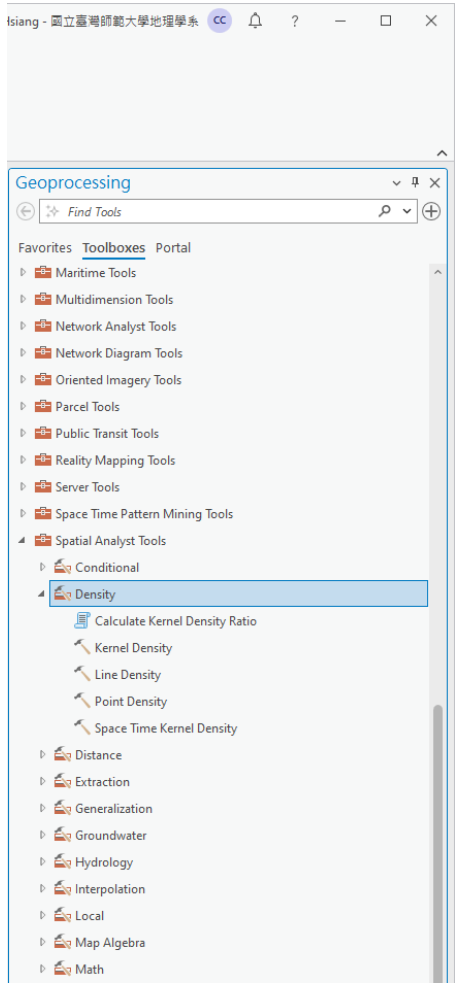
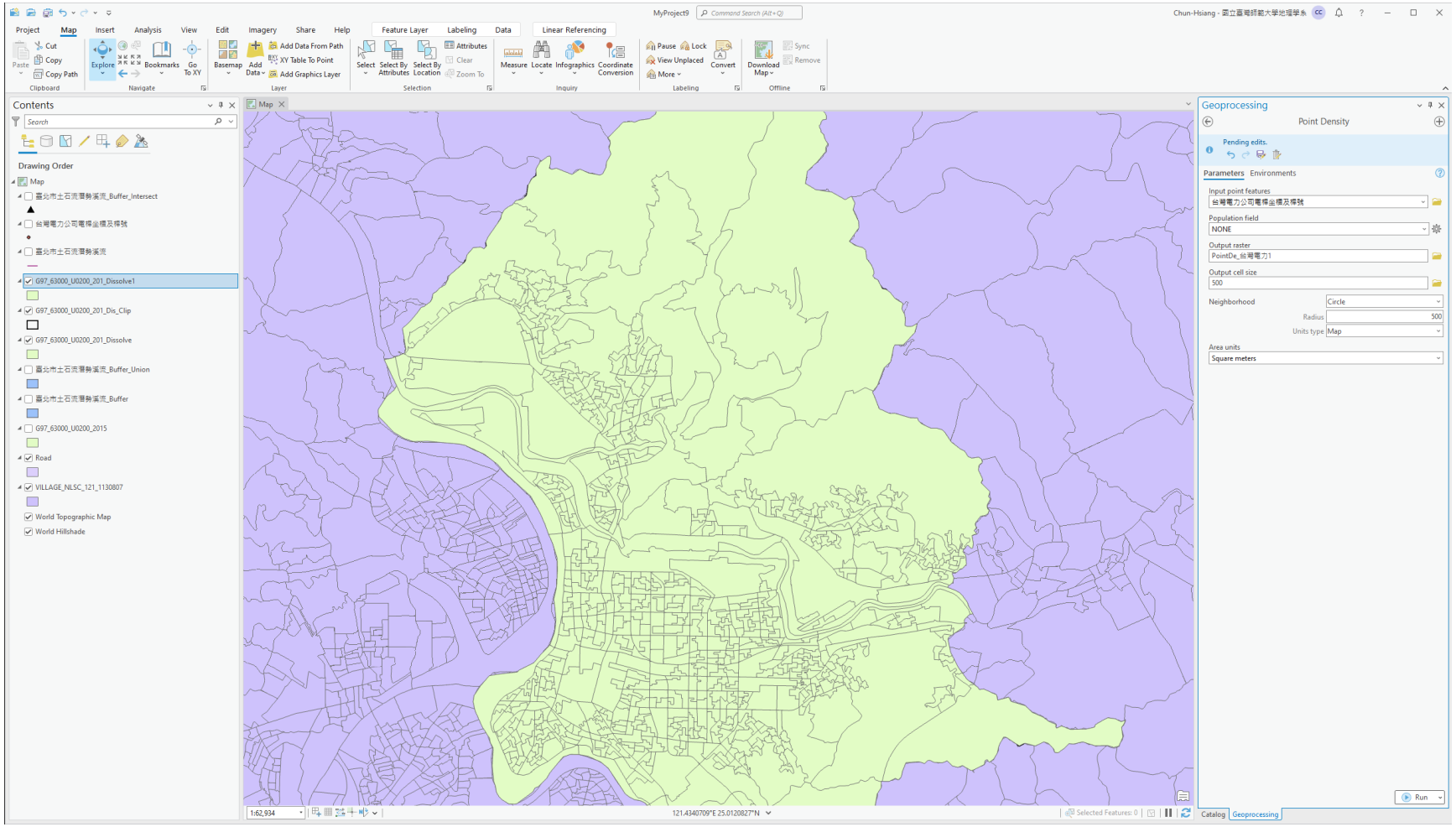
0 of 907 selected

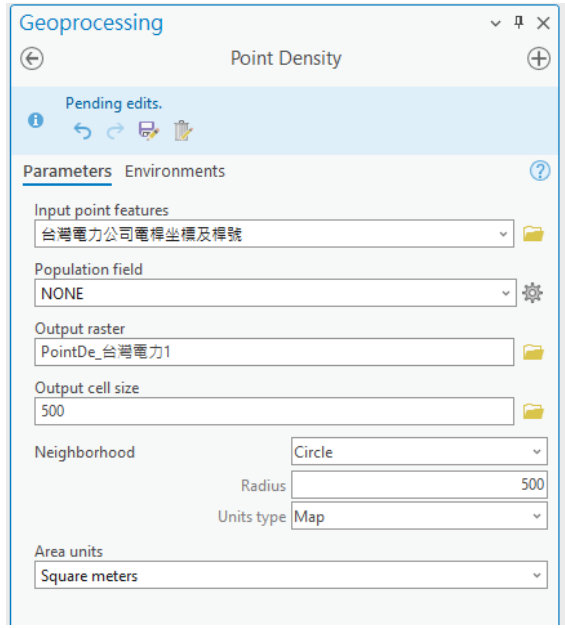
Point Density for Calculating UP Density



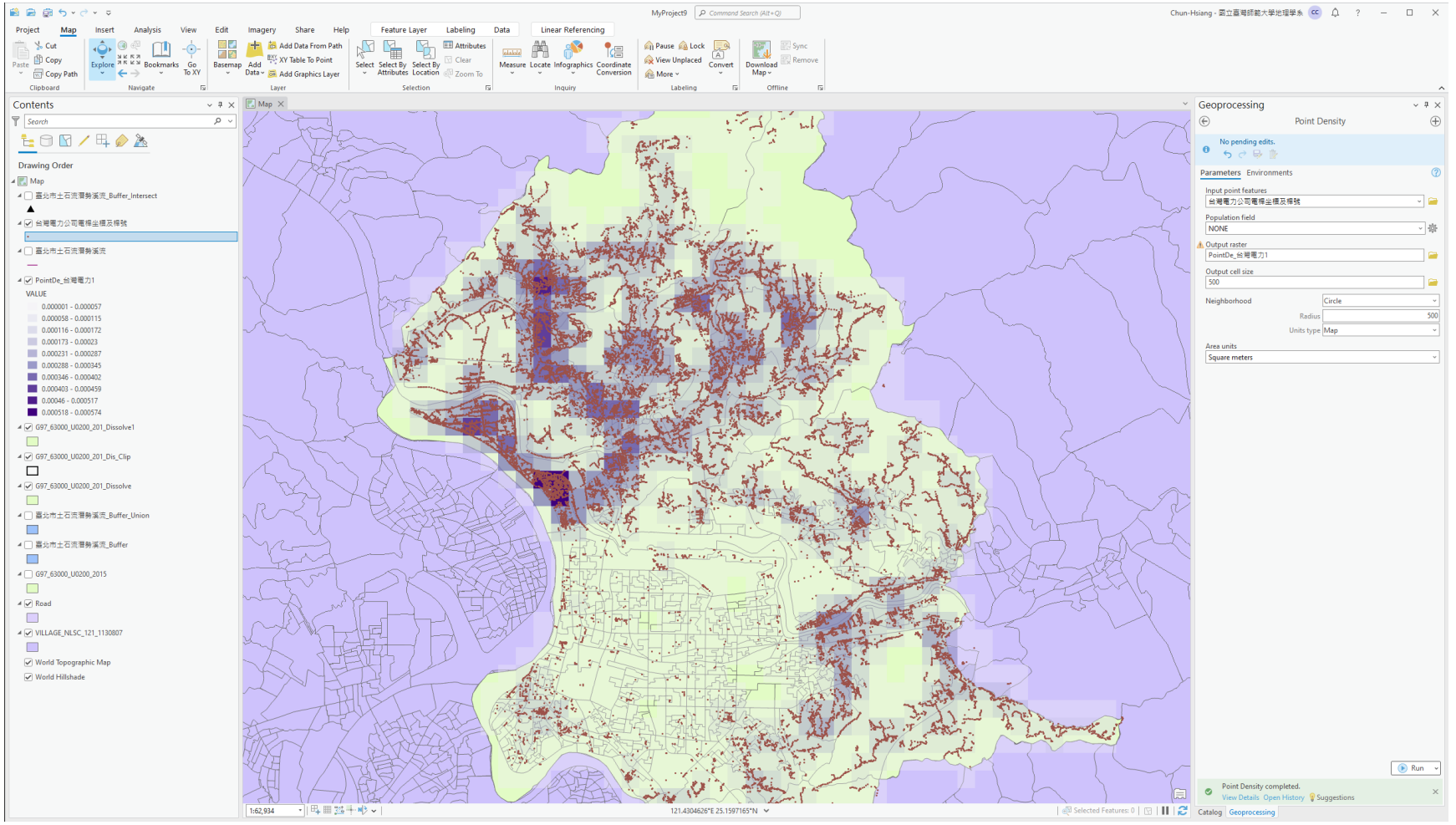


Point Density for Calculating UP Density

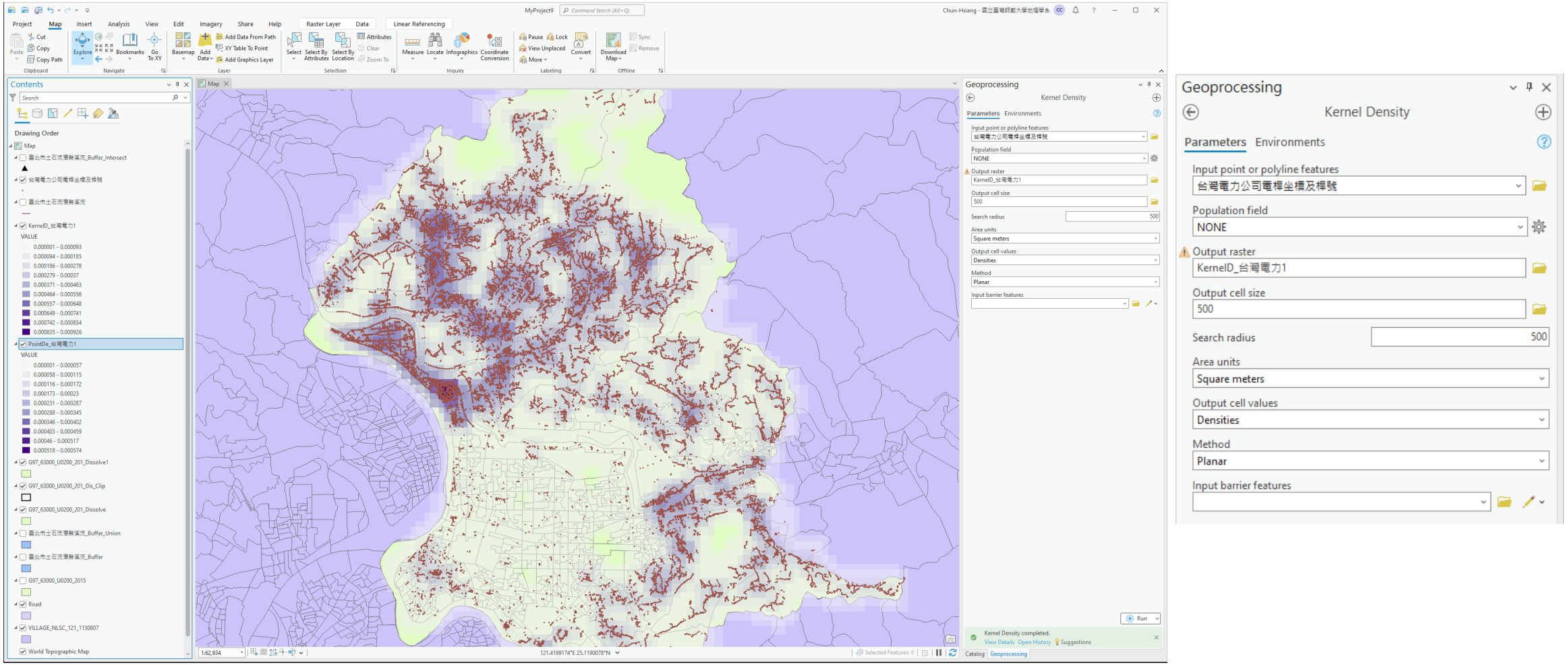




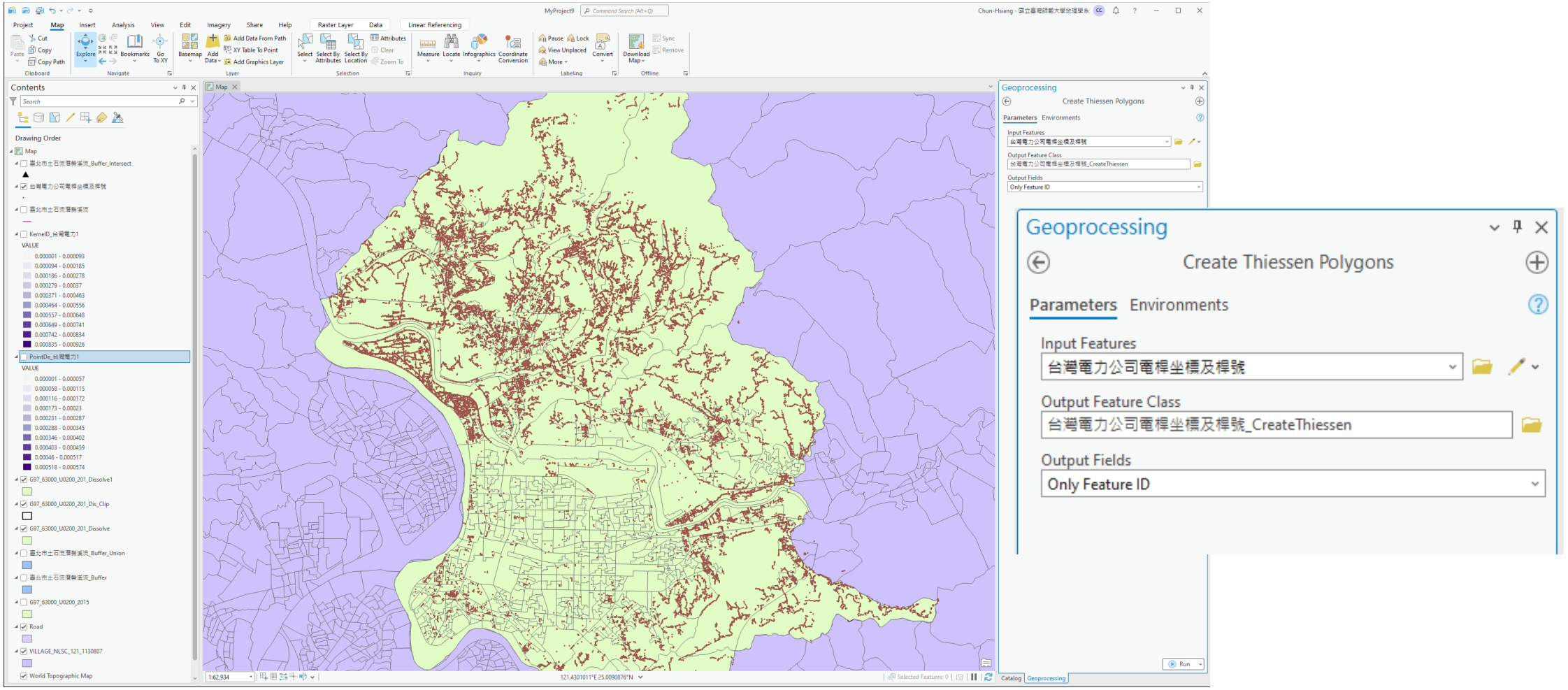
Point Density for Calculating UP Density



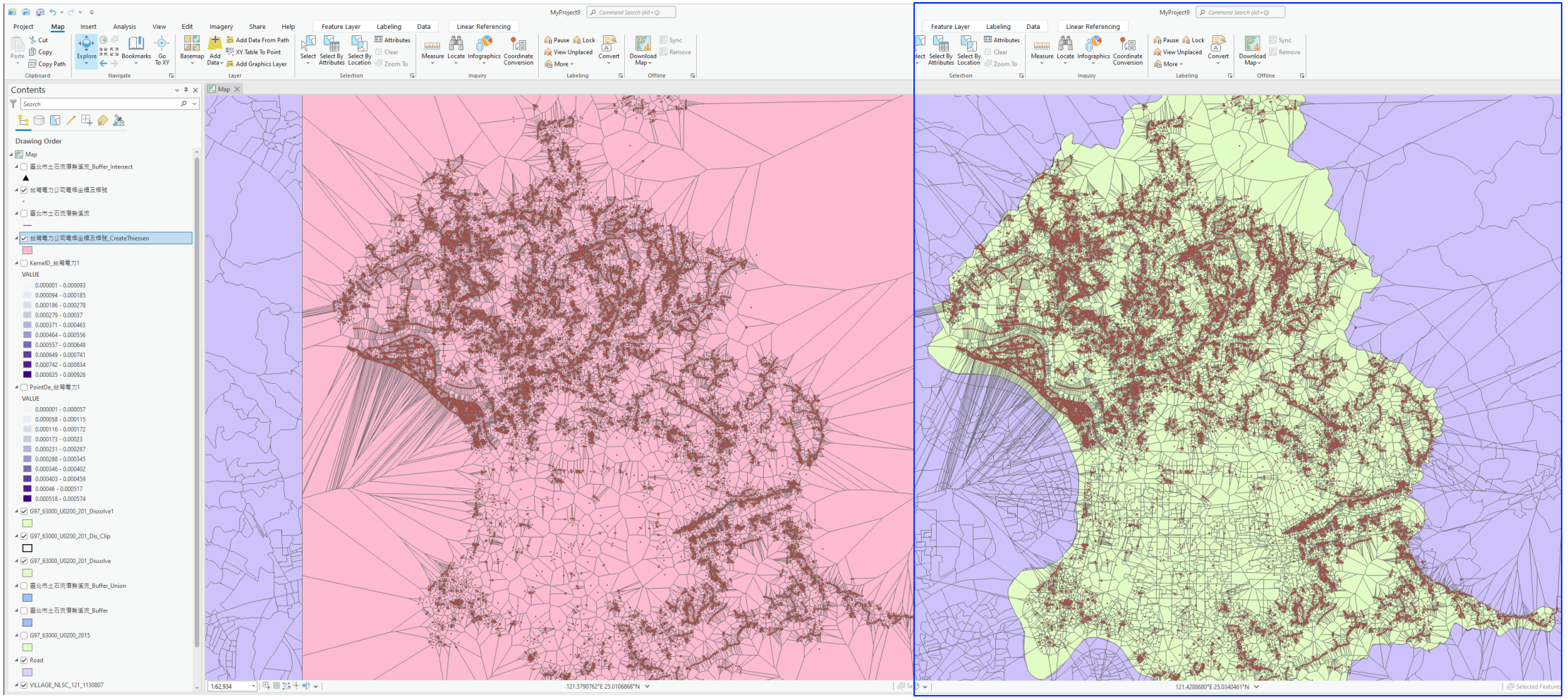
Kernel Density for Calculating UP Density



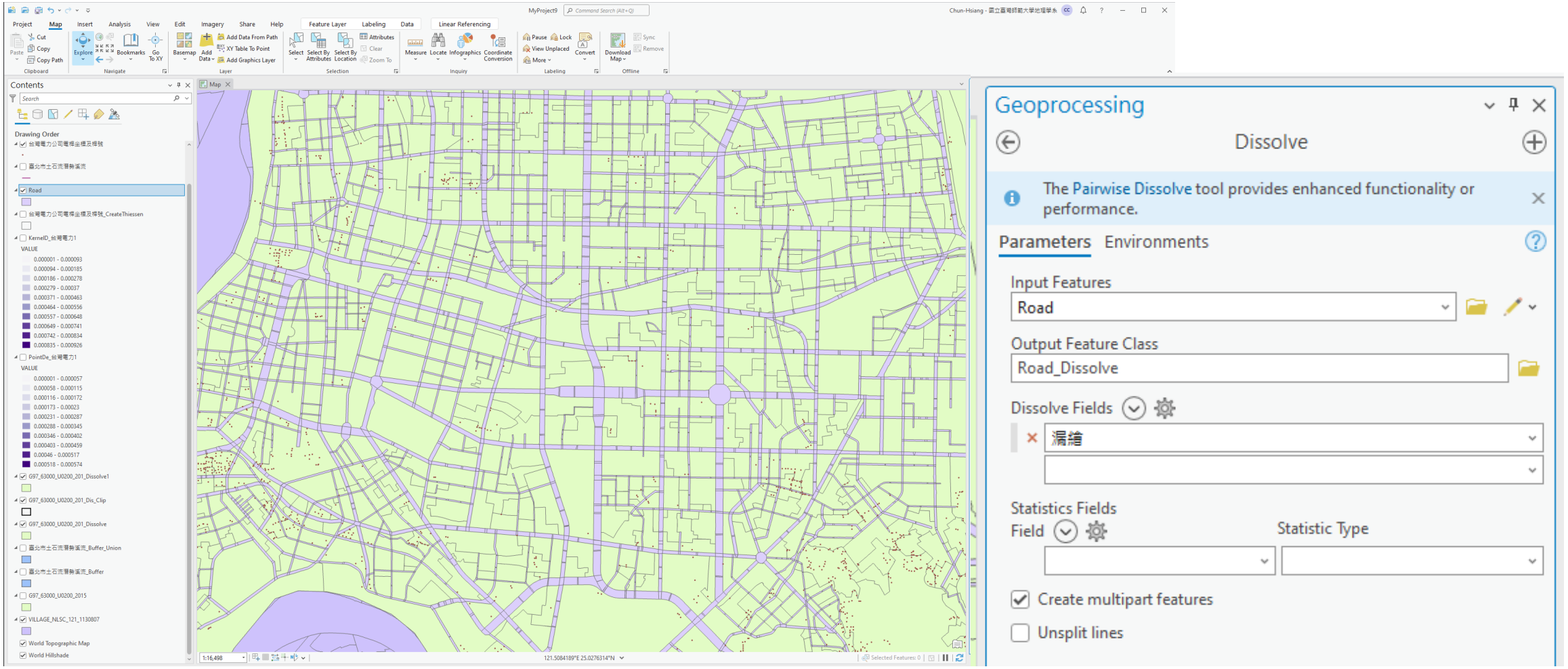
Create Thiessen Polygon for UP



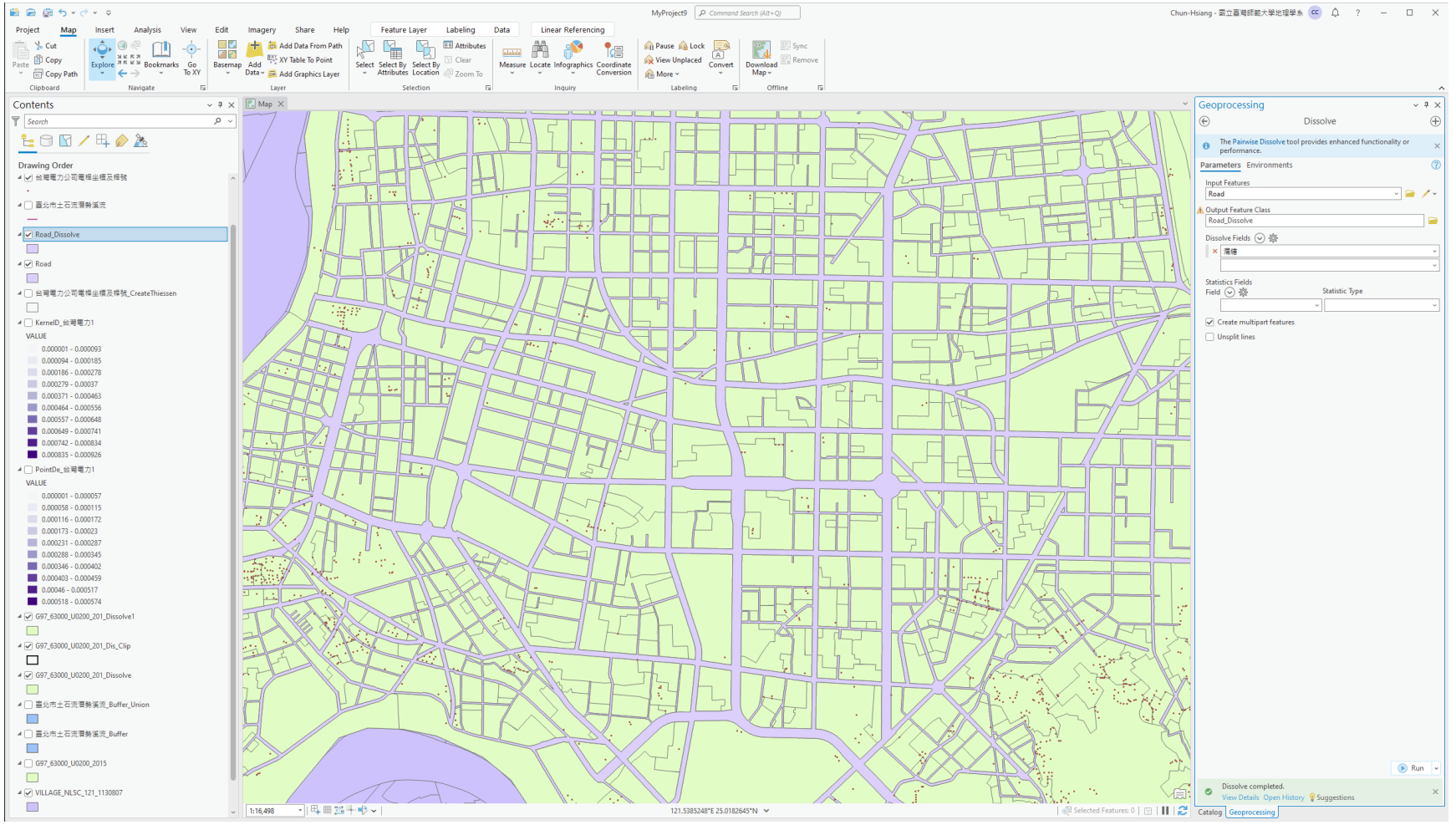
Create Thiessen Polygon for UP



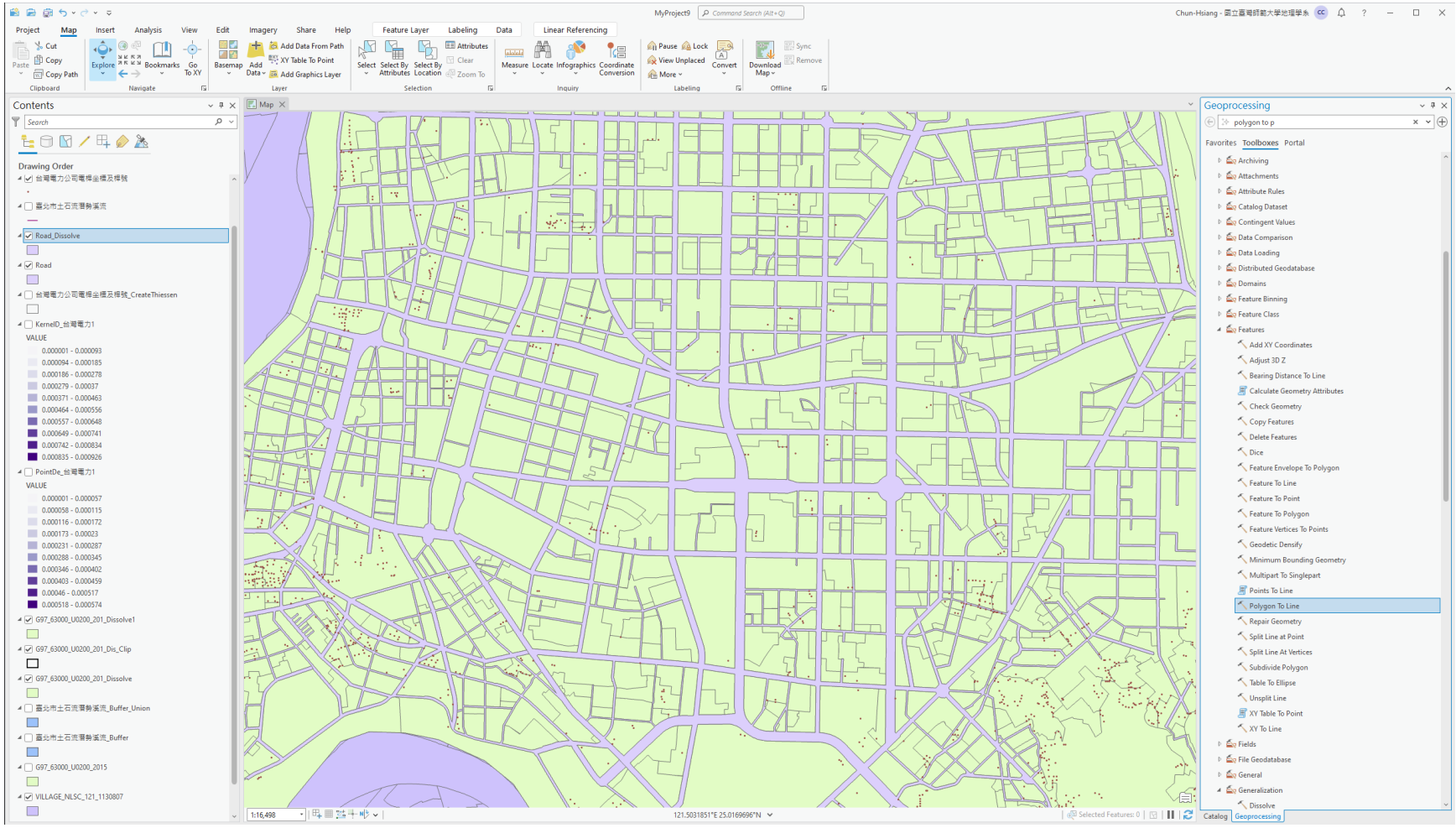
Dissolve Road All Together by “漏繪”



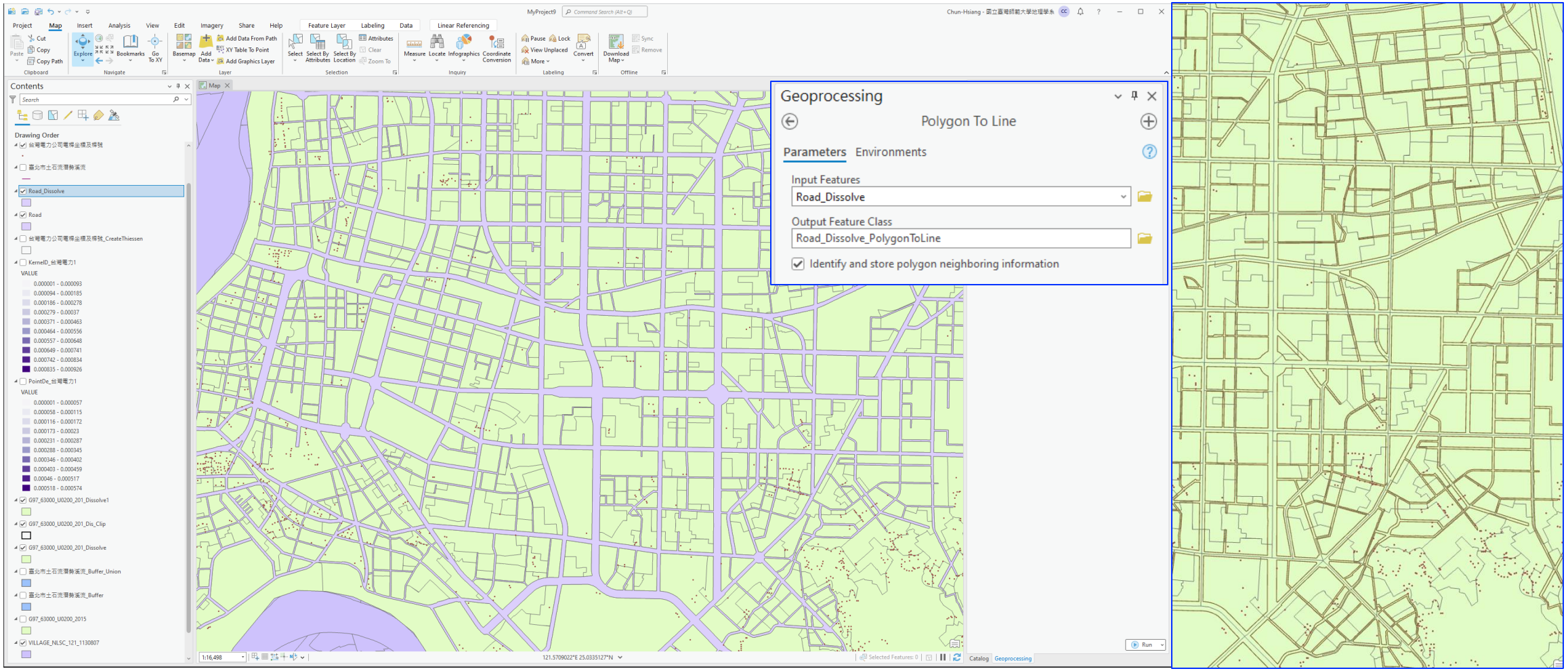
Dissolve Road All Together by “漏繪”



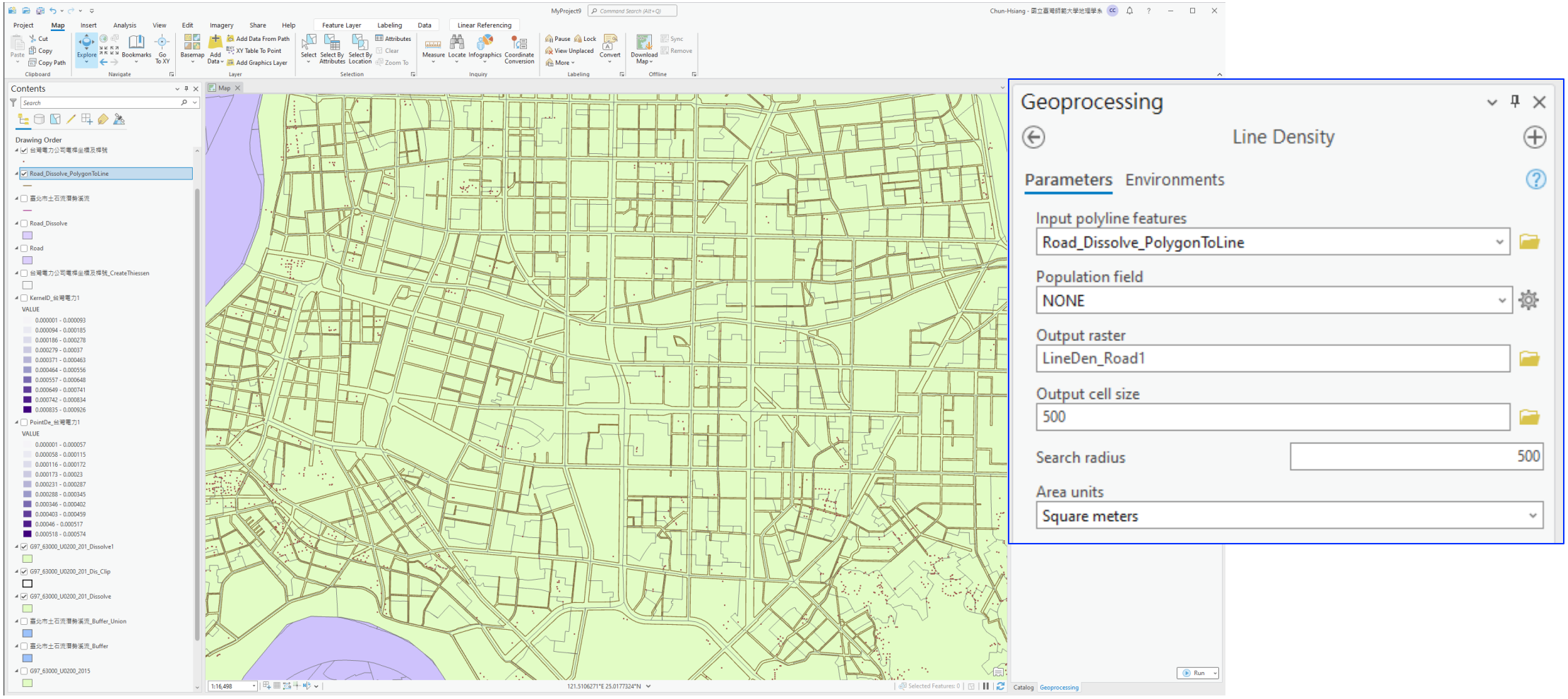
Polygon To Line for Converting Dissolved Road into a Polyline Feature



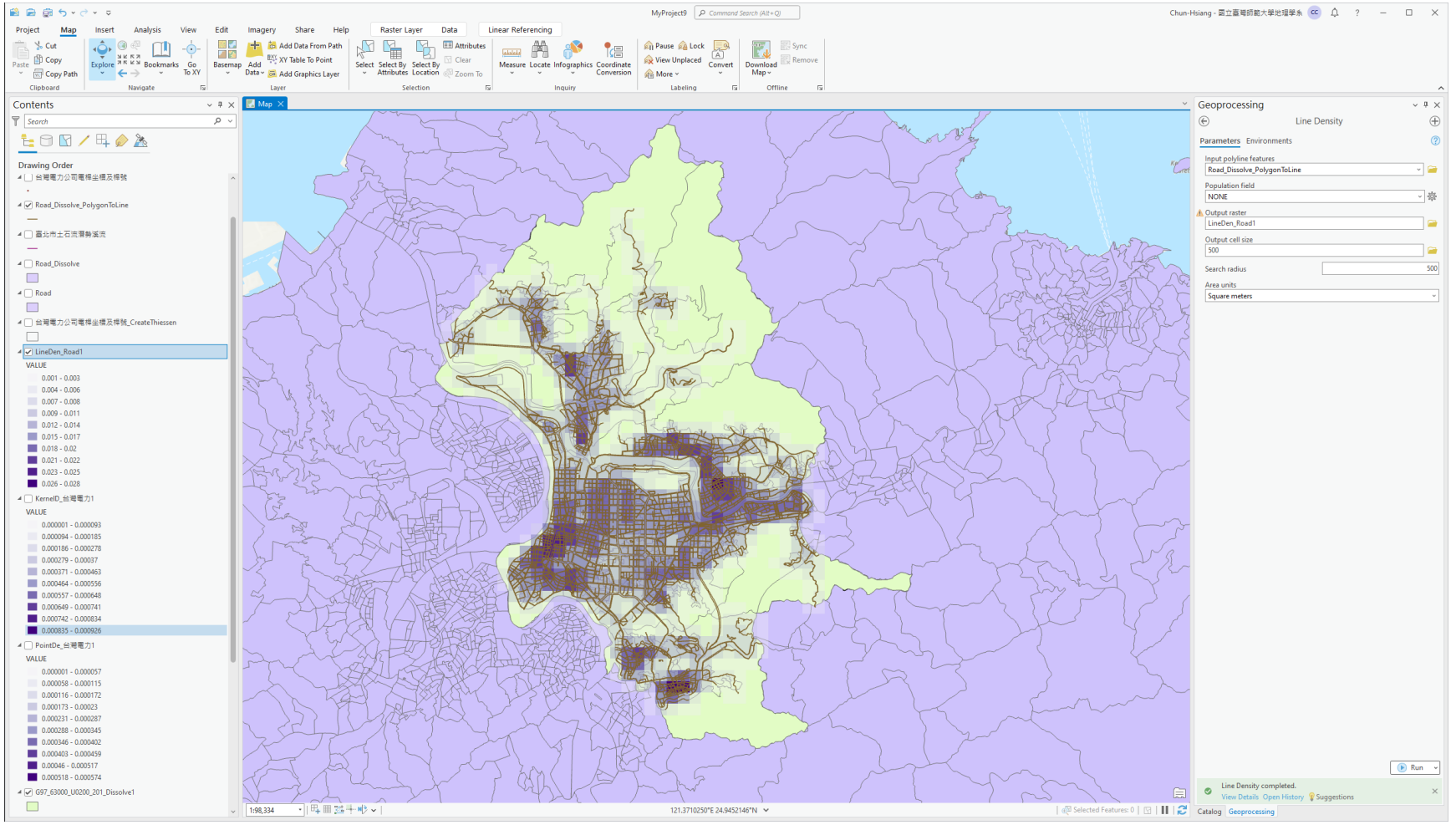
Polygon To Line for Converting Dissolved Road into a Polyline Feature



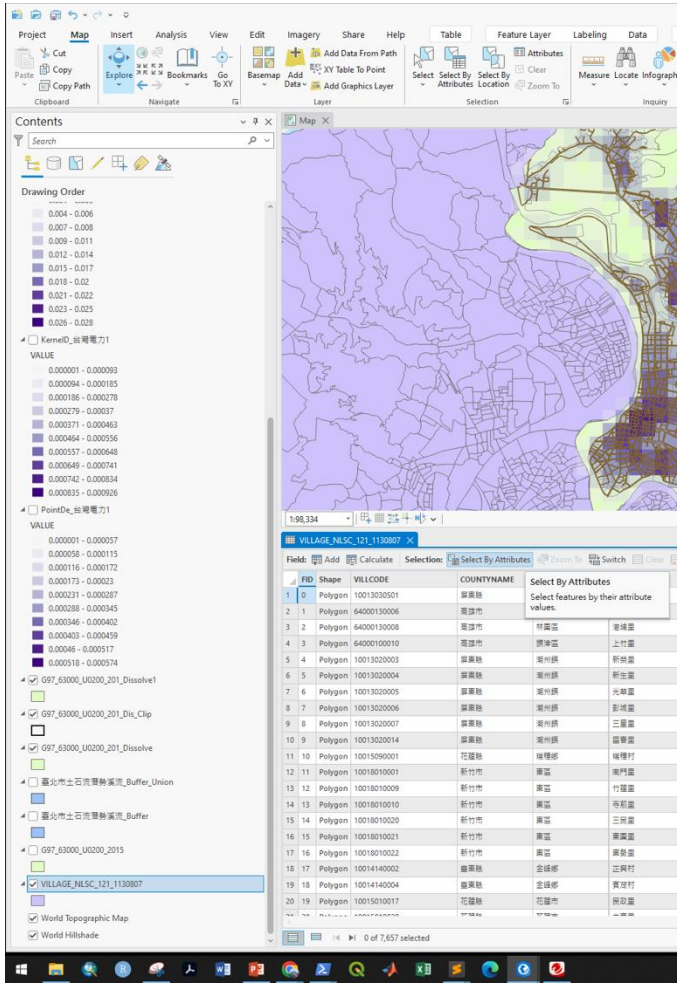
Line Density for Calculating Road Density

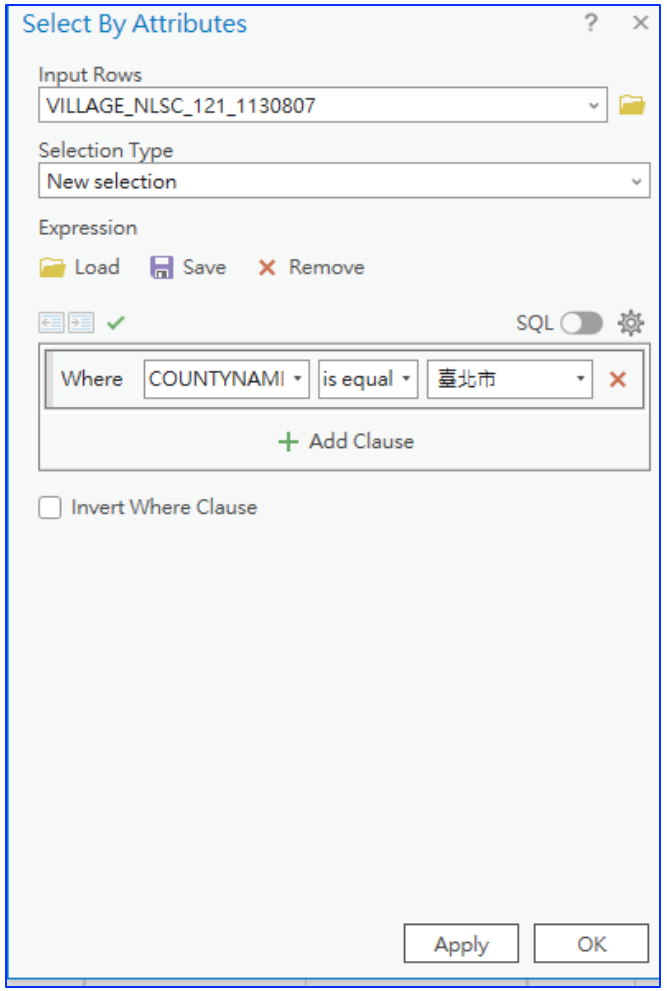


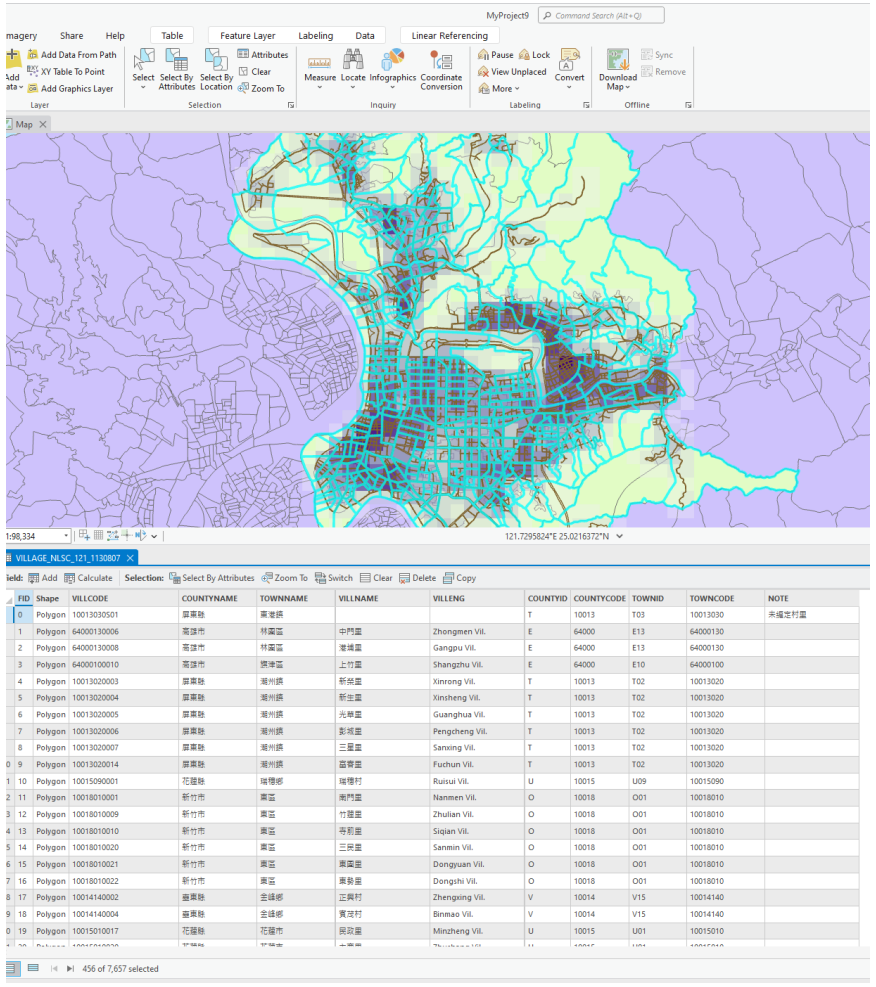
Line Density for Calculating Road Density



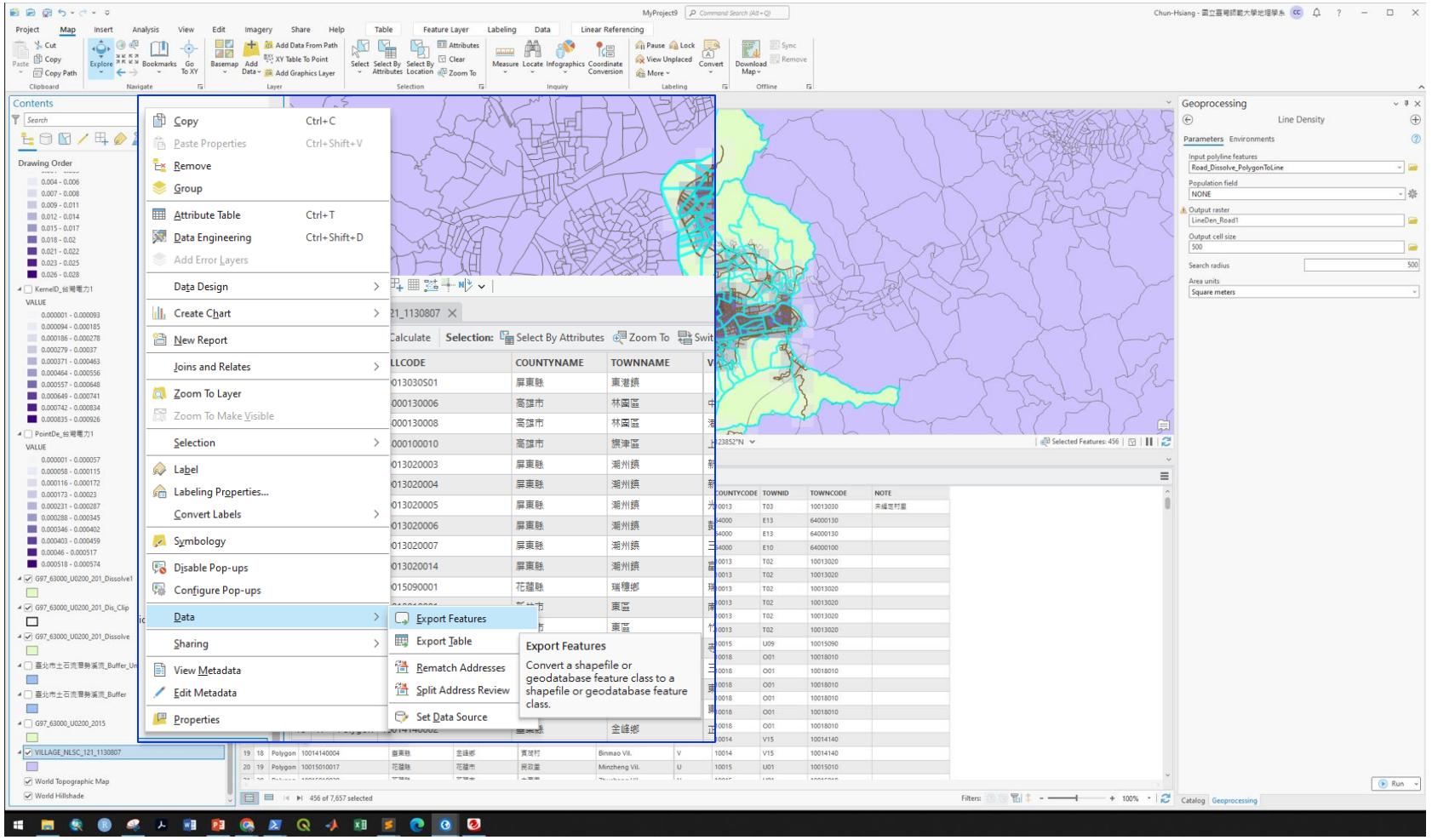
Select by Attribute and Export Features to Export Daan from Taipei Village Layer

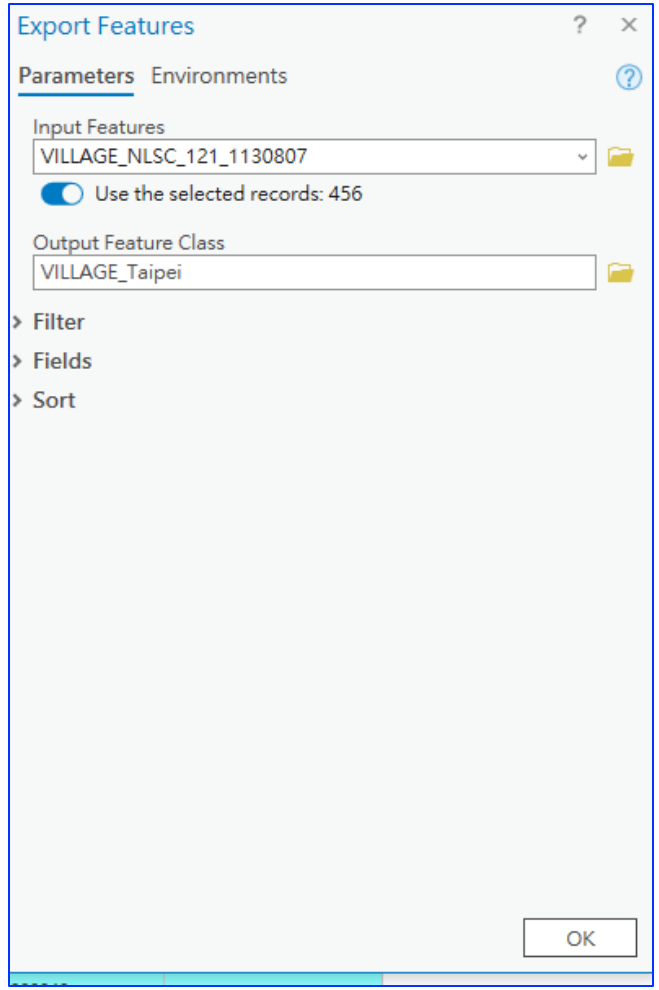




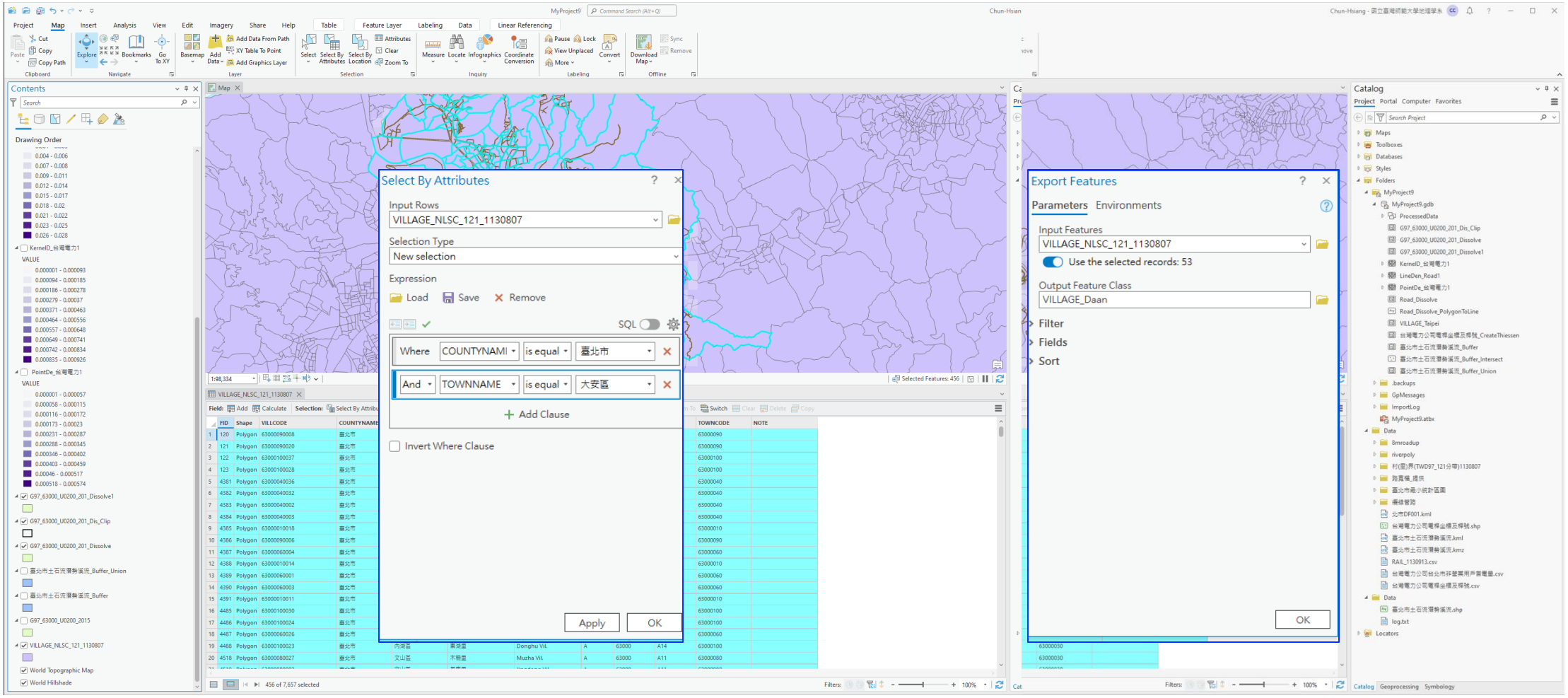


Select by Attribute and Export Features to Export Daan from Taipei Village Layer

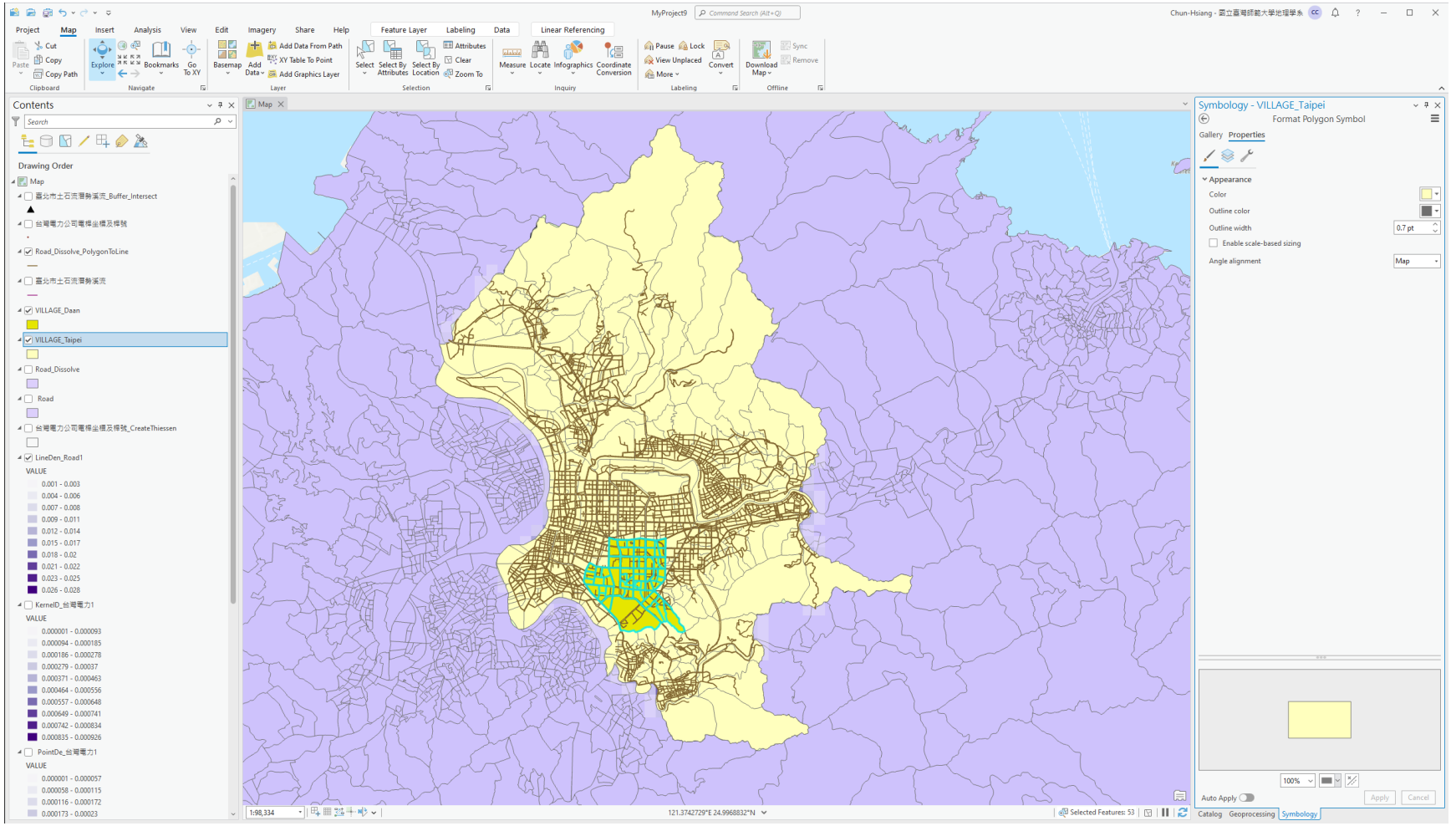




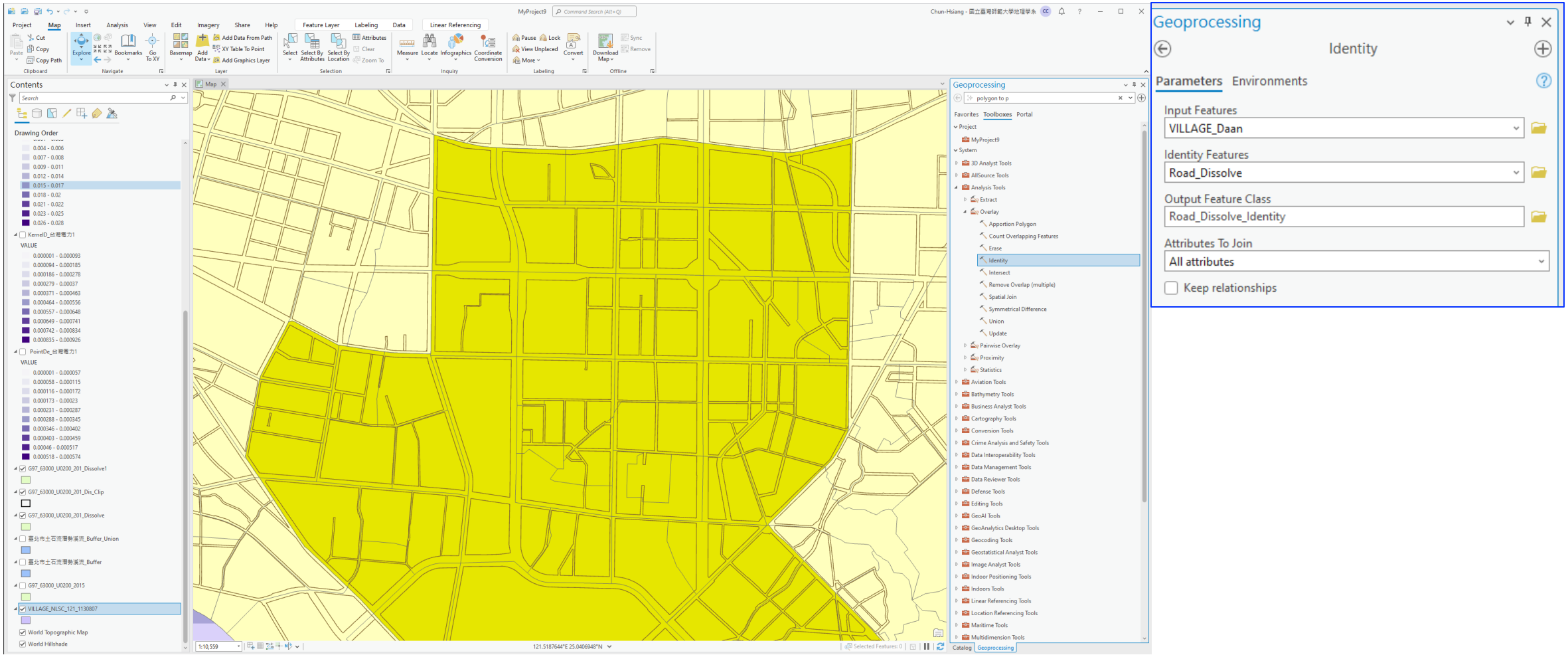
Select by Attribute and Export Features to Export Taipei City from Taipei Village Layer



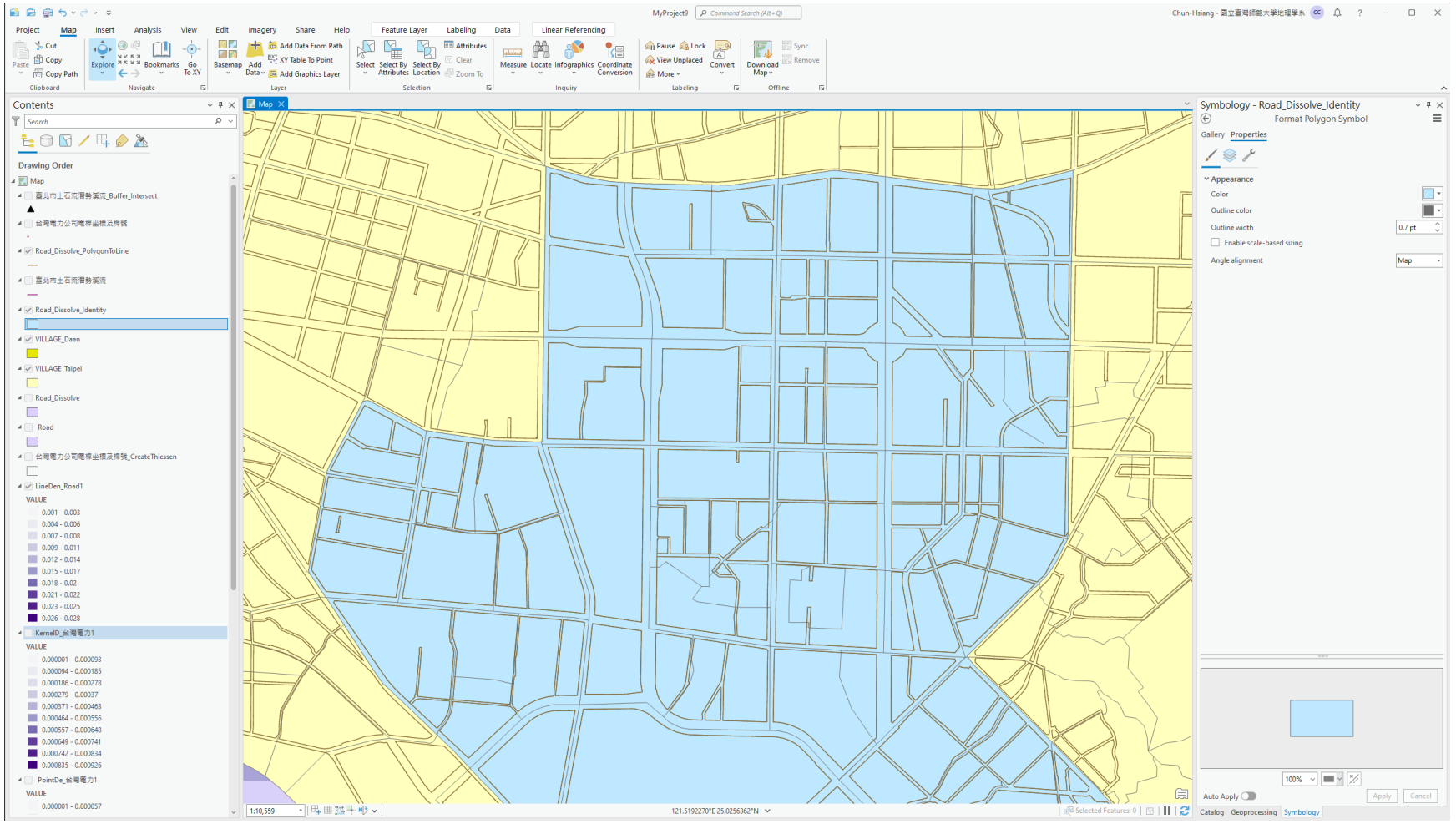
Select by Attribute and Export Features to Export Taipei City from Taipei Village Layer



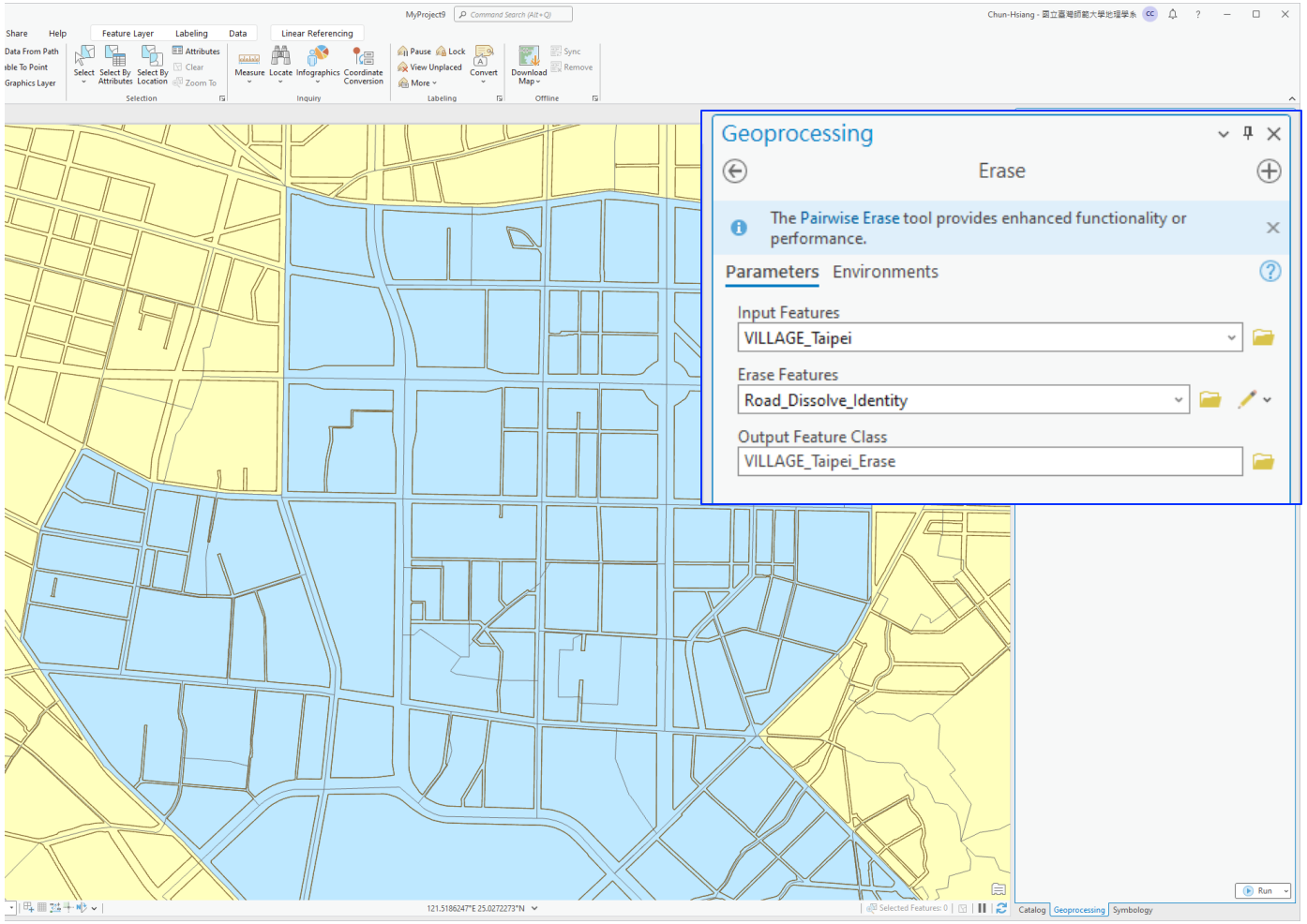
Identify Dissolved Road by Daan Layer

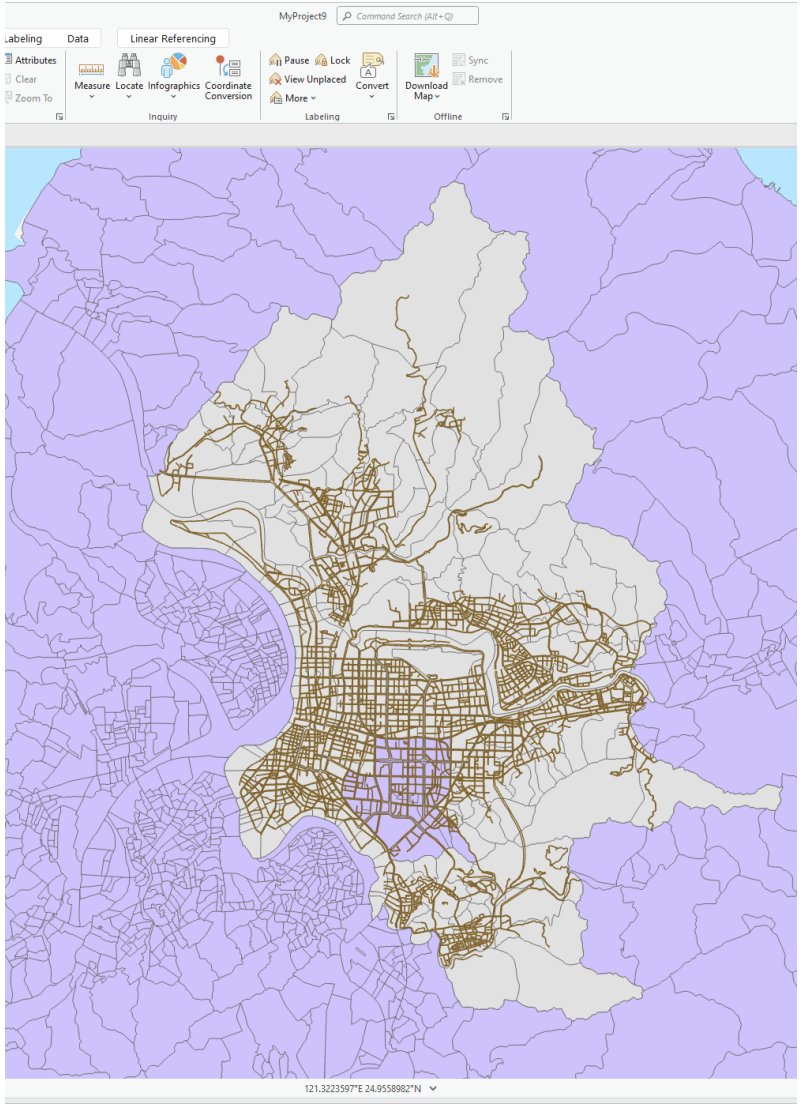


Identify Dissolved Road by Daan Layer



Erase Idnetified Daan Layer by Taipei City Layer





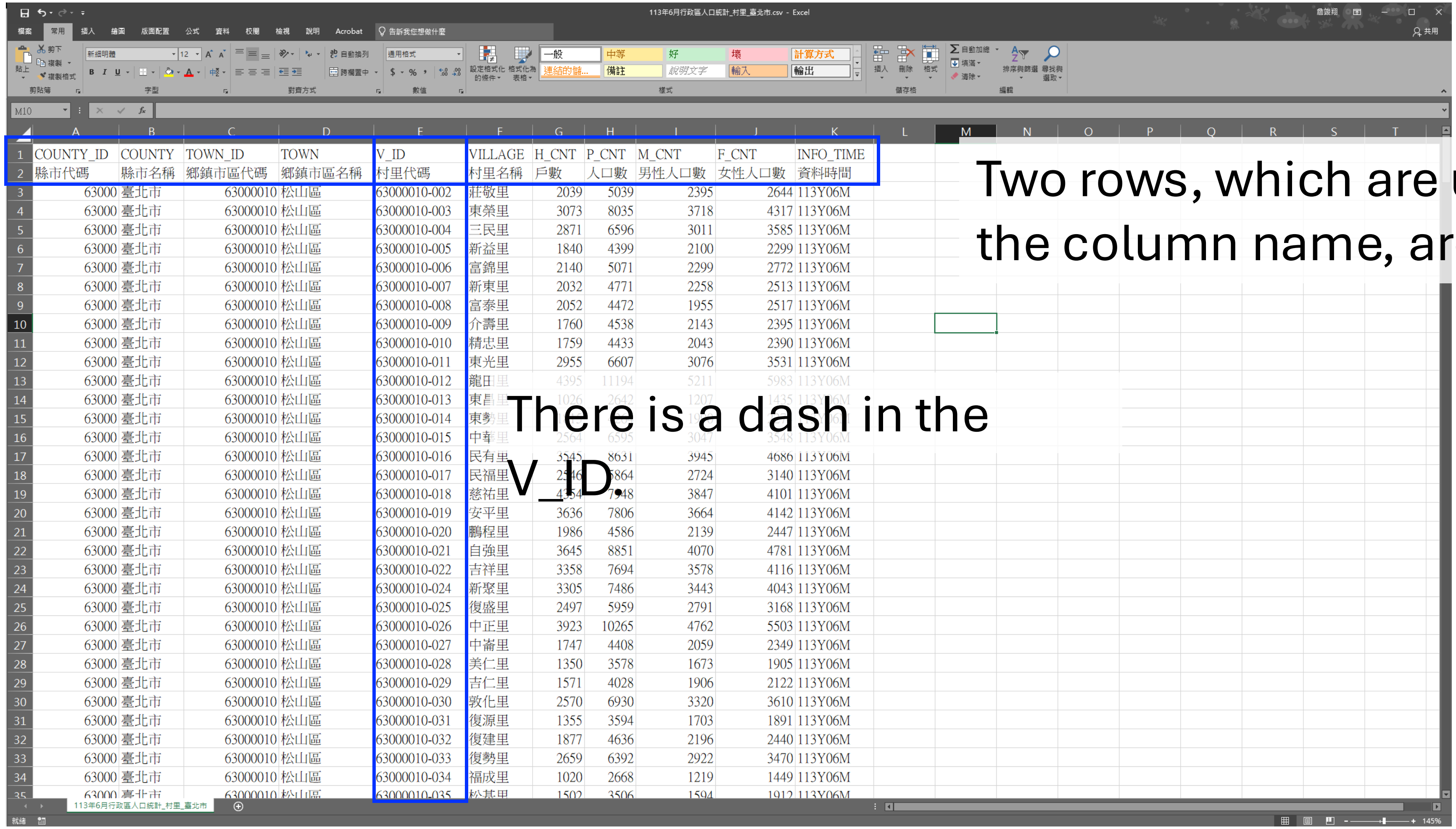
Symbology :: Polygon

Excel/ Join Features/ Single Symbol/ Unique Values/ Graduated Colors/ Bivariate Colors/ Unclassed Colors/ Proportional Symbols/ Graduated Symbols/ Dot Density/ Bar Chart/ Pie Chart/ Stacked Chart

Procedure for Symbology

1) **Excel** :: Data Preprocessing for Population Data
2) **GeoAnalystics Desktop Tools/Join Features** from POP data to Taipei Village Layer
3) **Symbology :: Single Symbol**
4) **Symbology :: Unique Values** with District
5) **Symbology :: Graduated Colors** with P_CNT
6) **Symbology :: Bivariate Colors** with P_CNT
7) **Symbology :: Unclassed Colors** with P_CNT
8) **Symbology :: Proportional Symbols** for Polygon with P_CNT
9) **Symbology :: Dot Density** for Polygon (M/F)
10) **Symbology :: Bar Chart** for Polygon (M/F)
11) **Symbology :: Pie Chart** for Polygon (M/F)
12) **Symbology :: Stacked Chart** for Polygon (M/F)

Excel :: Data Preprocessing for Population Data

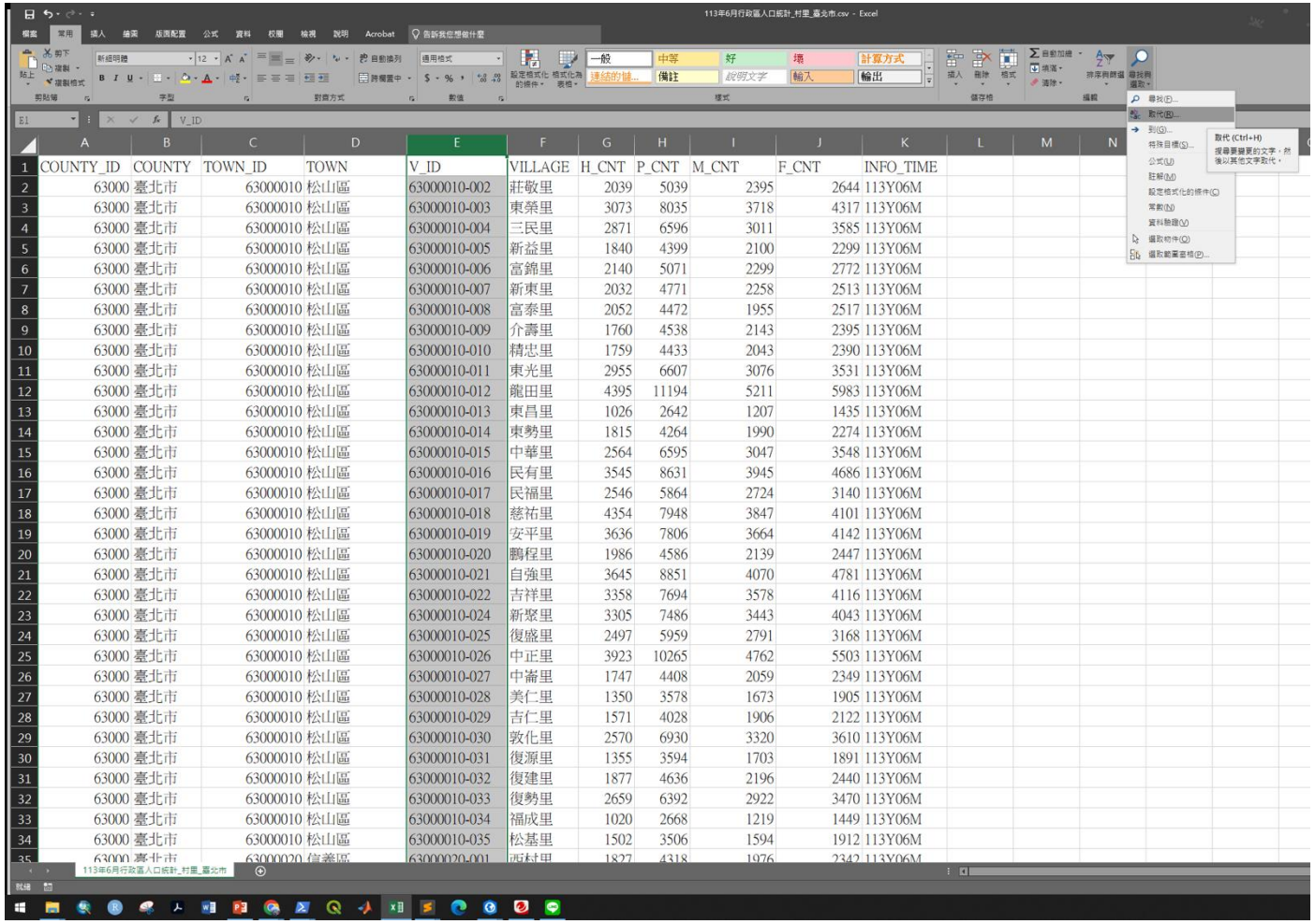


	A	B	C	D	E	F	G	H	I	J	K
1	COUNTY_ID	COUNTY	TOWN_ID	TOWN	V_ID	VILLAGE	H_CNT	P_CNT	M_CNT	F_CNT	INFO_TIME
2	縣市代碼	縣市名稱	鄉鎮市區代碼	鄉鎮市區名稱	村里代碼	村里名稱	戶數	人口數	男性人口數	女性人口數	資料時間
3	63000	臺北市	63000010	松山區	63000010-002	莊敬里	2039	5039	2395	2644	113Y06M
4	63000	臺北市	63000010	松山區	63000010-003	東榮里	3073	8035	3718	4317	113Y06M
5	63000	臺北市	63000010	松山區	63000010-004	三民里	2871	6596	3011	3585	113Y06M
6	63000	臺北市	63000010	松山區	63000010-005	新益里	1840	4399	2100	2299	113Y06M
7	63000	臺北市	63000010	松山區	63000010-006	富錦里	2140	5071	2299	2772	113Y06M
8	63000	臺北市	63000010	松山區	63000010-007	新東里	2032	4771	2258	2513	113Y06M
9	63000	臺北市	63000010	松山區	63000010-008	富泰里	2052	4472	1955	2517	113Y06M
10	63000	臺北市	63000010	松山區	63000010-009	介壽里	1760	4538	2143	2395	113Y06M
11	63000	臺北市	63000010	松山區	63000010-010	精忠里	1759	4433	2043	2390	113Y06M
12	63000	臺北市	63000010	松山區	63000010-011	東光里	2955	6607	3076	3531	113Y06M
13	63000	臺北市	63000010	松山區	63000010-012	龍田里	4395	11194	5211	5983	113Y06M
14	63000	臺北市	63000010	松山區	63000010-013	東昌里	1026	2642	1207	1435	113Y06M
15	63000	臺北市	63000010	松山區	63000010-014	東勢里	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	63000	臺北市	63000010	松山區	63000010-015	中華里	2564	6595	3047	3548	113Y06M
17	63000	臺北市	63000010	松山區	63000010-016	民有里	3545	8631	3945	4686	113Y06M
18	63000	臺北市	63000010	松山區	63000010-017	民福里	[illegible]	[illegible]	2724	3140	113Y06M
19	63000	臺北市	63000010	松山區	63000010-018	慈祐里	[illegible]	[illegible]	3847	4101	113Y06M
20	63000	臺北市	63000010	松山區	63000010-019	安平里	3636	7806	3664	4142	113Y06M
21	63000	臺北市	63000010	松山區	63000010-020	鵬程里	1986	4586	2139	2447	113Y06M
22	63000	臺北市	63000010	松山區	63000010-021	自強里	3645	8851	4070	4781	113Y06M
23	63000	臺北市	63000010	松山區	63000010-022	吉祥里	3358	7694	3578	4116	113Y06M
24	63000	臺北市	63000010	松山區	63000010-024	新聚里	3305	7486	3443	4043	113Y06M
25	63000	臺北市	63000010	松山區	63000010-025	復盛里	2497	5959	2791	3168	113Y06M
26	63000	臺北市	63000010	松山區	63000010-026	中正里	3923	10265	4762	5503	113Y06M
27	63000	臺北市	63000010	松山區	63000010-027	中崙里	1747	4408	2059	2349	113Y06M
28	63000	臺北市	63000010	松山區	63000010-028	美仁里	1350	3578	1673	1905	113Y06M
29	63000	臺北市	63000010	松山區	63000010-029	吉仁里	1571	4028	1906	2122	113Y06M
30	63000	臺北市	63000010	松山區	63000010-030	敦化里	2570	6930	3320	3610	113Y06M
31	63000	臺北市	63000010	松山區	63000010-031	復源里	1355	3594	1703	1891	113Y06M
32	63000	臺北市	63000010	松山區	63000010-032	復建里	1877	4636	2196	2440	113Y06M
33	63000	臺北市	63000010	松山區	63000010-033	復勢里	2659	6392	2922	3470	113Y06M
34	63000	臺北市	63000010	松山區	63000010-034	福成里	1020	2668	1219	1449	113Y06M
35	63000	臺北市	63000010	松山區	63000010-035	松基里	1502	3506	1594	1912	113Y06M

Two rows, which are used to show the column name, are redundant.

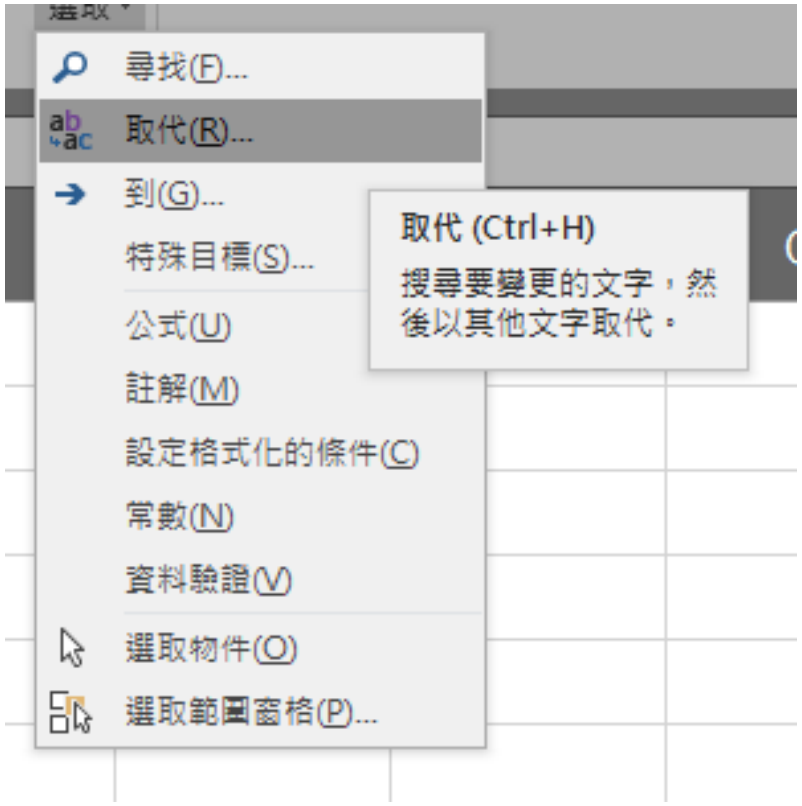
There is a dash in the V_ID.

Excel :: Data Preprocessing for Population Data

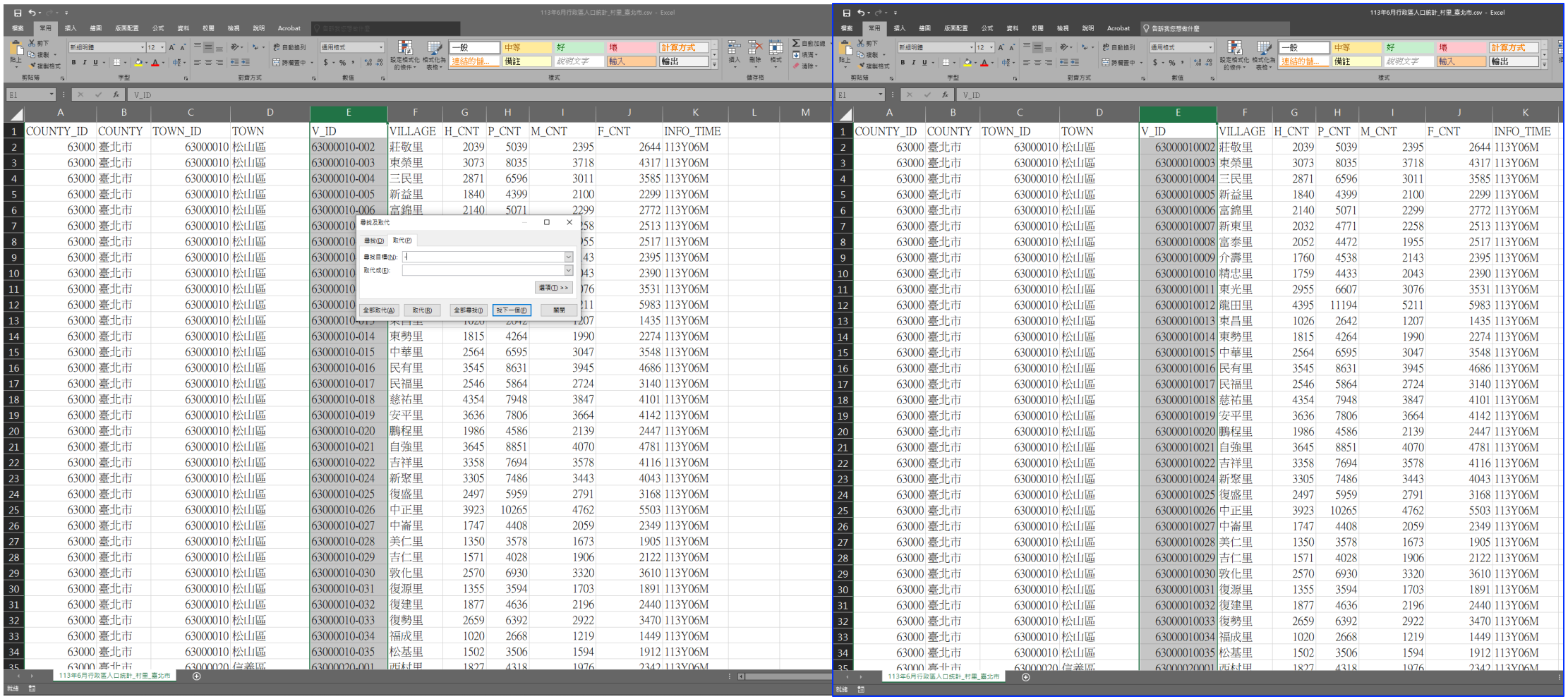


	A	B	C	D	E	F	G	H	I	J	K
1	COUNTY_ID	COUNTY	TOWN_ID	TOWN	V_ID	VILLAGE	H_CNT	P_CNT	M_CNT	F_CNT	INFO_TIME
2	63000	臺北市	63000010	松山區	63000010-002	莊敬里	2039	5039	2395	2644	113Y06M
3	63000	臺北市	63000010	松山區	63000010-003	東榮里	3073	8035	3718	4317	113Y06M
4	63000	臺北市	63000010	松山區	63000010-004	三民里	2871	6596	3011	3585	113Y06M
5	63000	臺北市	63000010	松山區	63000010-005	新益里	1840	4399	2100	2299	113Y06M
6	63000	臺北市	63000010	松山區	63000010-006	富錦里	2140	5071	2299	2772	113Y06M
7	63000	臺北市	63000010	松山區	63000010-007	新東里	2032	4771	2258	2513	113Y06M
8	63000	臺北市	63000010	松山區	63000010-008	富泰里	2052	4472	1955	2517	113Y06M
9	63000	臺北市	63000010	松山區	63000010-009	介壽里	1760	4538	2143	2395	113Y06M
10	63000	臺北市	63000010	松山區	63000010-010	精忠里	1759	4433	2043	2390	113Y06M
11	63000	臺北市	63000010	松山區	63000010-011	東光里	2955	6607	3076	3531	113Y06M
12	63000	臺北市	63000010	松山區	63000010-012	龍田里	4395	11194	5211	5983	113Y06M
13	63000	臺北市	63000010	松山區	63000010-013	東昌里	1026	2642	1207	1435	113Y06M
14	63000	臺北市	63000010	松山區	63000010-014	東勢里	1815	4264	1990	2274	113Y06M
15	63000	臺北市	63000010	松山區	63000010-015	中華里	2564	6595	3047	3548	113Y06M
16	63000	臺北市	63000010	松山區	63000010-016	民有里	3545	8631	3945	4686	113Y06M
17	63000	臺北市	63000010	松山區	63000010-017	民福里	2546	5864	2724	3140	113Y06M
18	63000	臺北市	63000010	松山區	63000010-018	慈祐里	4354	7948	3847	4101	113Y06M
19	63000	臺北市	63000010	松山區	63000010-019	安平里	3636	7806	3664	4142	113Y06M
20	63000	臺北市	63000010	松山區	63000010-020	鵬程里	1986	4586	2139	2447	113Y06M
21	63000	臺北市	63000010	松山區	63000010-021	自強里	3645	8851	4070	4781	113Y06M
22	63000	臺北市	63000010	松山區	63000010-022	吉祥里	3358	7694	3578	4116	113Y06M
23	63000	臺北市	63000010	松山區	63000010-024	新聚里	3305	7486	3443	4043	113Y06M
24	63000	臺北市	63000010	松山區	63000010-025	復盛里	2497	5959	2791	3168	113Y06M
25	63000	臺北市	63000010	松山區	63000010-026	中正里	3923	10265	4762	5503	113Y06M
26	63000	臺北市	63000010	松山區	63000010-027	中崙里	1747	4408	2059	2349	113Y06M
27	63000	臺北市	63000010	松山區	63000010-028	美仁里	1350	3578	1673	1905	113Y06M
28	63000	臺北市	63000010	松山區	63000010-029	吉仁里	1571	4028	1906	2122	113Y06M
29	63000	臺北市	63000010	松山區	63000010-030	敦化里	2570	6930	3320	3610	113Y06M
30	63000	臺北市	63000010	松山區	63000010-031	復源里	1355	3594	1703	1891	113Y06M
31	63000	臺北市	63000010	松山區	63000010-032	復建里	1877	4636	2196	2440	113Y06M
32	63000	臺北市	63000010	松山區	63000010-033	復勢里	2659	6392	2922	3470	113Y06M
33	63000	臺北市	63000010	松山區	63000010-034	福成里	1020	2668	1219	1449	113Y06M
34	63000	臺北市	63000010	松山區	63000010-035	松基里	1502	3506	1594	1912	113Y06M
35	63000	臺北市	63000020	信義區	63000020-001	西村里	1827	4318	1976	2342	113Y06M

Find all “dash” and replace by blank “”.

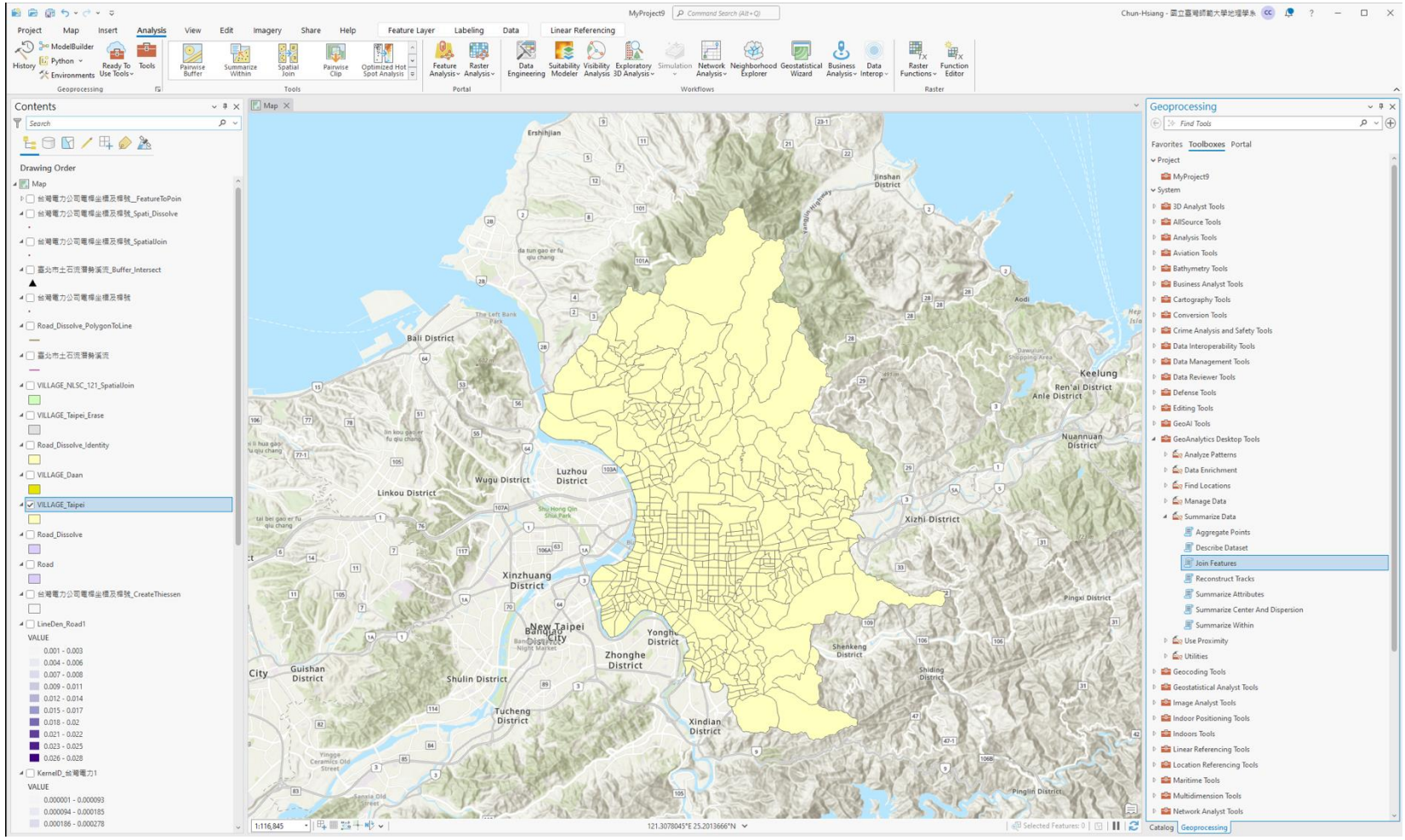


Excel :: Data Preprocessing for Population Data

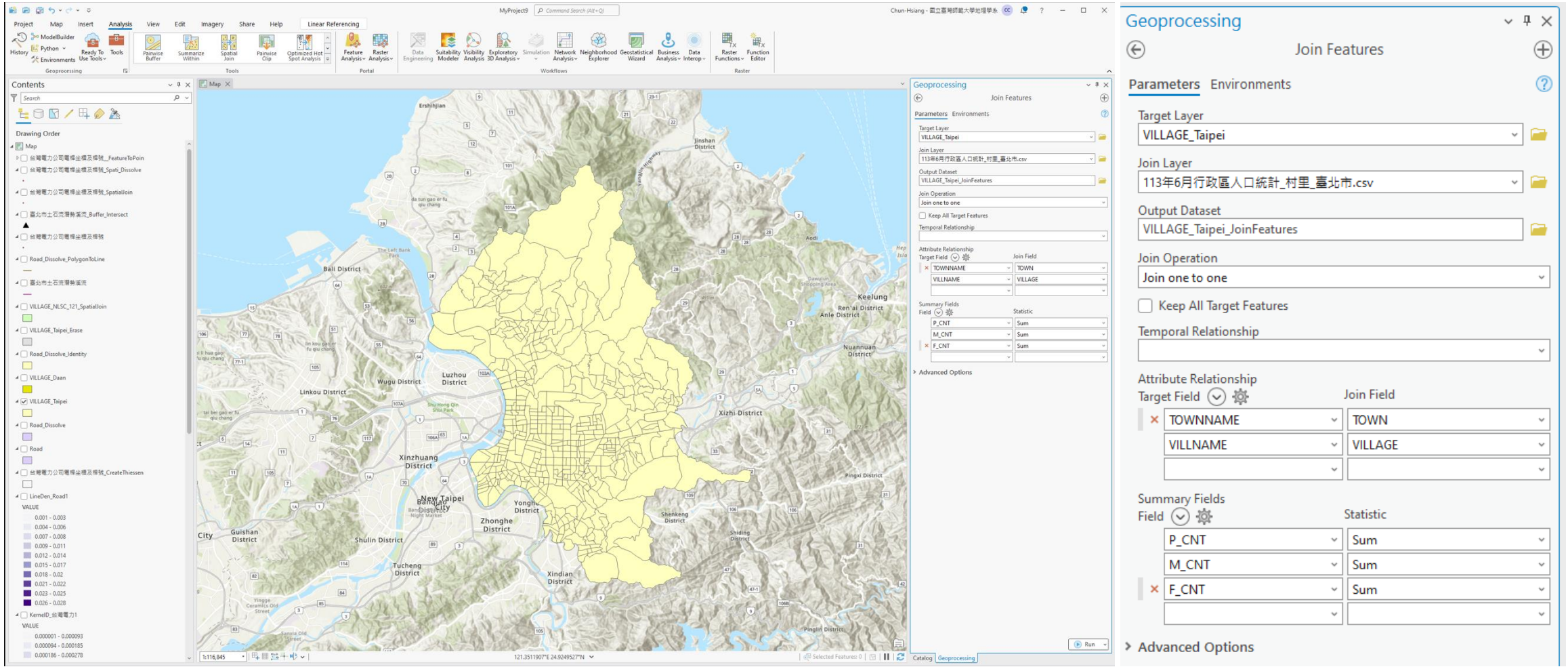


	A	B	C	D	E	F	G	H	I	J	K
1	COUNTY_ID	COUNTY	TOWN_ID	TOWN	V_ID	VILLAGE	H_CNT	P_CNT	M_CNT	F_CNT	INFO_TIME
2	63000	臺北市	63000010	松山區	63000010-002	莊敬里	2039	5039	2395	2644	113Y06M
3	63000	臺北市	63000010	松山區	63000010-003	東榮里	3073	8035	3718	4317	113Y06M
4	63000	臺北市	63000010	松山區	63000010-004	三民里	2871	6596	3011	3585	113Y06M
5	63000	臺北市	63000010	松山區	63000010-005	新益里	1840	4399	2100	2299	113Y06M
6	63000	臺北市	63000010	松山區	63000010-006	富錦里	2140	5071	2299	2772	113Y06M
7	63000	臺北市	63000010	松山區	63000010				258	2513	113Y06M
8	63000	臺北市	63000010	松山區	63000010				955	2517	113Y06M
9	63000	臺北市	63000010	松山區	63000010				43	2395	113Y06M
10	63000	臺北市	63000010	松山區	63000010				043	2390	113Y06M
11	63000	臺北市	63000010	松山區	63000010				076	3531	113Y06M
12	63000	臺北市	63000010	松山區	63000010				211	5983	113Y06M
13	63000	臺北市	63000010	松山區	63000010-013	東昌里	1026	2642	1207	1435	113Y06M
14	63000	臺北市	63000010	松山區	63000010-014	東勢里	1815	4264	1990	2274	113Y06M
15	63000	臺北市	63000010	松山區	63000010-015	中華里	2564	6595	3047	3548	113Y06M
16	63000	臺北市	63000010	松山區	63000010-016	民有里	3545	8631	3945	4686	113Y06M
17	63000	臺北市	63000010	松山區	63000010-017	民福里	2546	5864	2724	3140	113Y06M
18	63000	臺北市	63000010	松山區	63000010-018	慈祐里	4354	7948	3847	4101	113Y06M
19	63000	臺北市	63000010	松山區	63000010-019	安平里	3636	7806	3664	4142	113Y06M
20	63000	臺北市	63000010	松山區	63000010-020	鵬程里	1986	4586	2139	2447	113Y06M
21	63000	臺北市	63000010	松山區	63000010-021	自強里	3645	8851	4070	4781	113Y06M
22	63000	臺北市	63000010	松山區	63000010-022	吉祥里	3358	7694	3578	4116	113Y06M
23	63000	臺北市	63000010	松山區	63000010-024	新聚里	3305	7486	3443	4043	113Y06M
24	63000	臺北市	63000010	松山區	63000010-025	復盛里	2497	5959	2791	3168	113Y06M
25	63000	臺北市	63000010	松山區	63000010-026	中正里	3923	10265	4762	5503	113Y06M
26	63000	臺北市	63000010	松山區	63000010-027	中崙里	1747	4408	2059	2349	113Y06M
27	63000	臺北市	63000010	松山區	63000010-028	美仁里	1350	3578	1673	1905	113Y06M
28	63000	臺北市	63000010	松山區	63000010-029	吉仁里	1571	4028	1906	2122	113Y06M
29	63000	臺北市	63000010	松山區	63000010-030	敦化里	2570	6930	3320	3610	113Y06M
30	63000	臺北市	63000010	松山區	63000010-031	復源里	1355	3594	1703	1891	113Y06M
31	63000	臺北市	63000010	松山區	63000010-032	復建里	1877	4636	2196	2440	113Y06M
32	63000	臺北市	63000010	松山區	63000010-033	復勢里	2659	6392	2922	3470	113Y06M
33	63000	臺北市	63000010	松山區	63000010-034	福成里	1020	2668	1219	1449	113Y06M
34	63000	臺北市	63000010	松山區	63000010-035	松基里	1502	3506	1594	1912	113Y06M
35	63000	臺北市	63000020	信義區	63000020-001	西村里	1827	4318	1976	2342	113Y06M

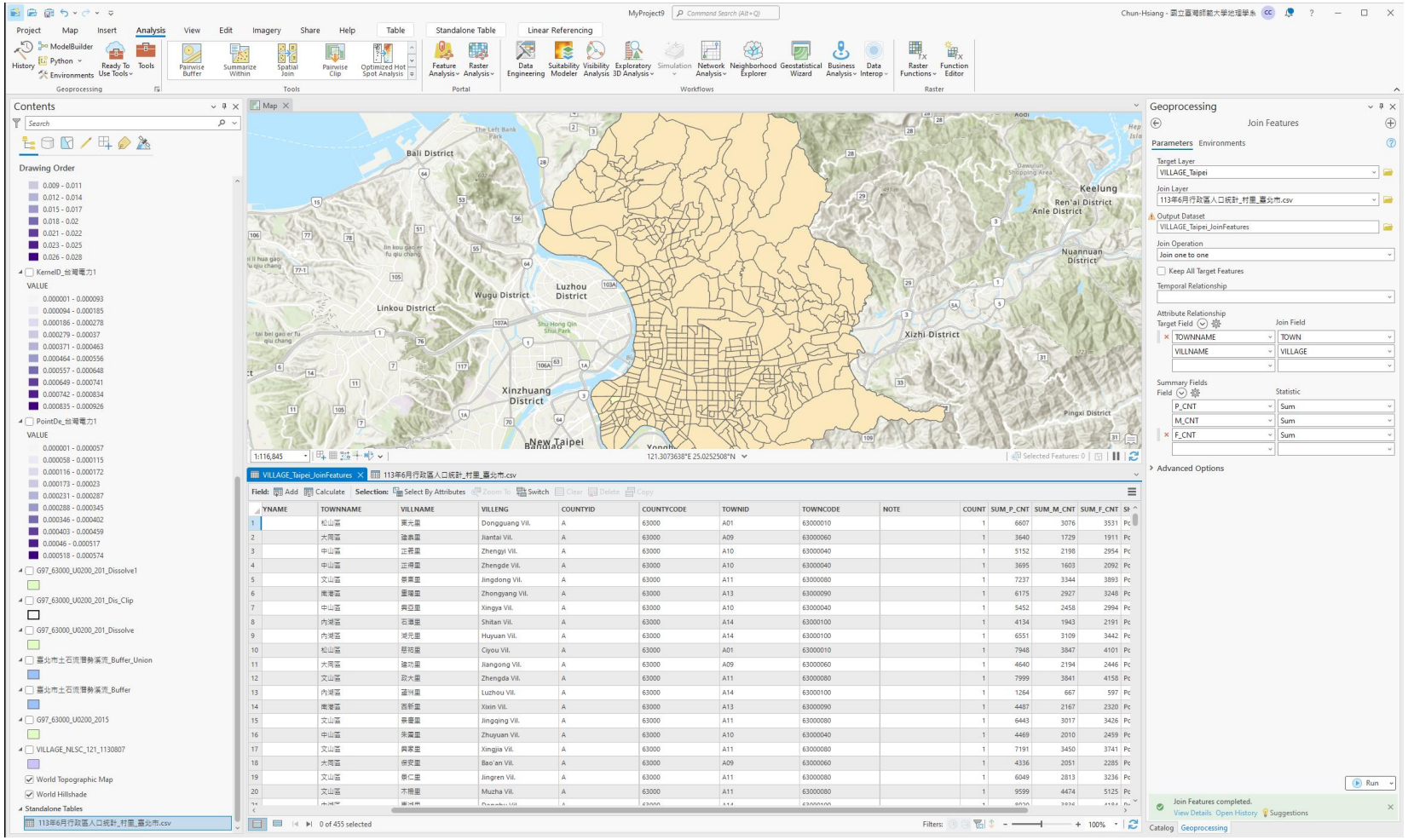
GeoAnalystics Desktop Tools/Join Features from POP Data to Taipei Village Layer



GeoAnalystics Desktop Tools/Join Features from POP Data to Taipei Village Layer

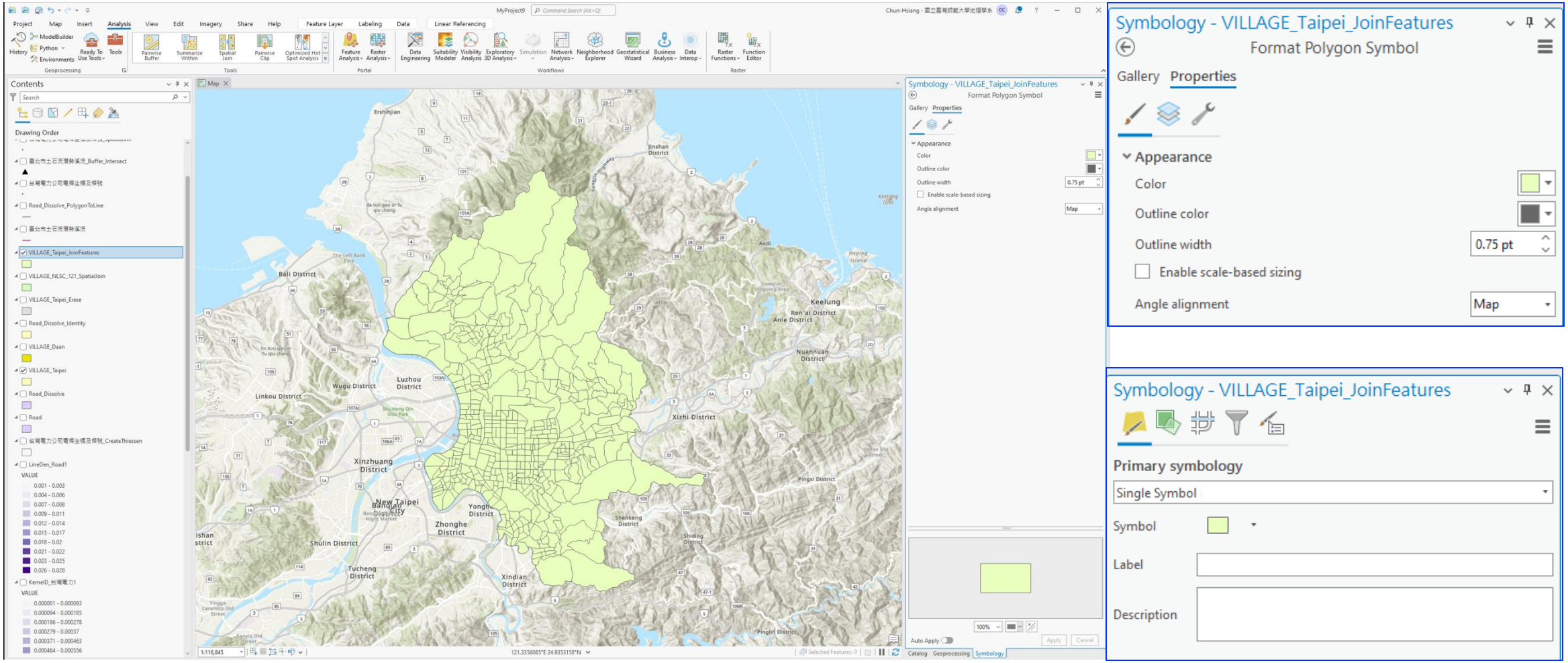


GeoAnalystics Desktop Tools/Join Features from POP Data to Taipei Village Layer

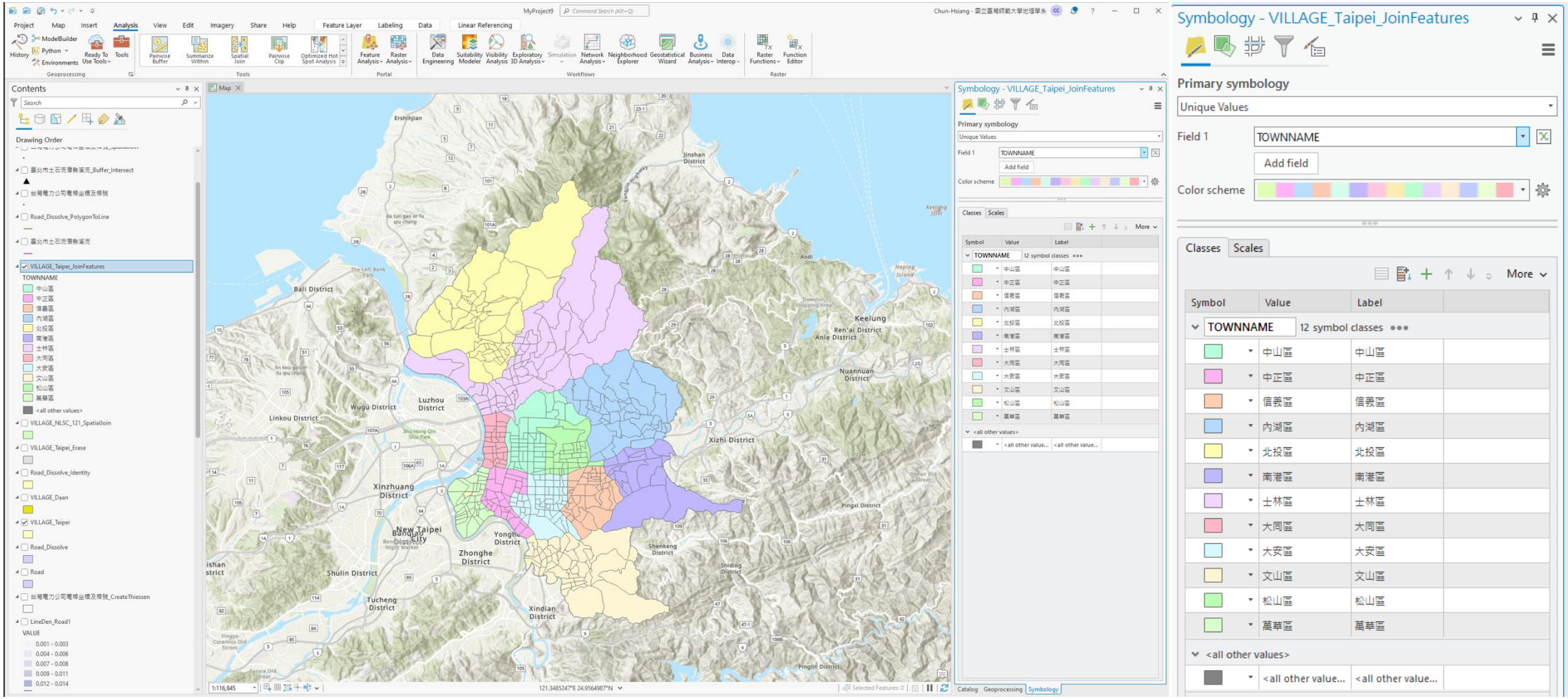


COUNT	SUM_P_CNT	SUM_M_CNT	SUM_F_CNT	SH
1	6607	3076	3531	Pc
1	3640	1729	1911	Pc
1	5152	2198	2954	Pc
1	3695	1603	2092	Pc
1	7237	3344	3893	Pc
1	6175	2927	3248	Pc
1	5452	2458	2994	Pc
1	4134	1943	2191	Pc
1	6551	3109	3442	Pc
1	7948	3847	4101	Pc
1	4640	2194	2446	Pc
1	7999	3841	4158	Pc
1	1264	667	597	Pc
1	4487	2167	2320	Pc
1	6443	3017	3426	Pc
1	4469	2010	2459	Pc
1	7191	3450	3741	Pc
1	4336	2051	2285	Pc
1	6049	2813	3236	Pc
1	9599	4474	5125	Pc

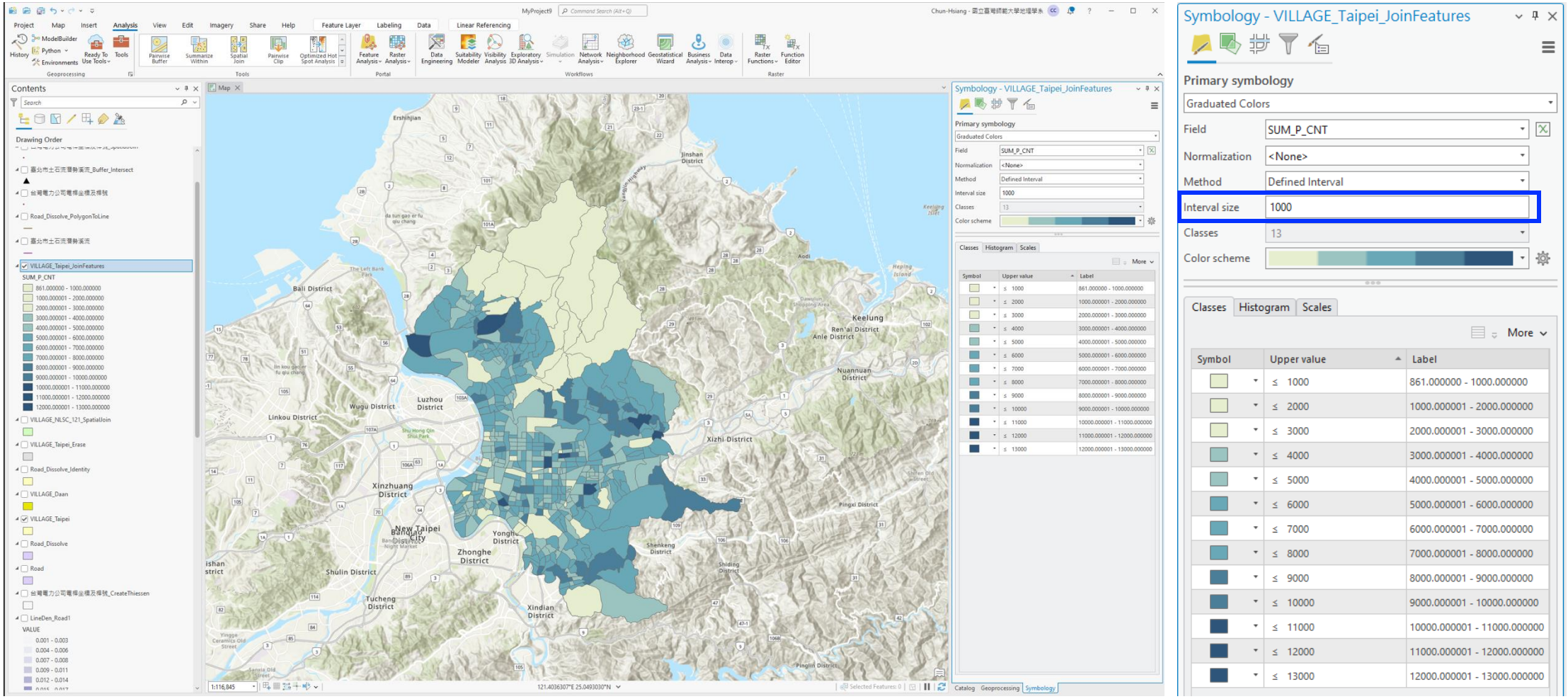
Symbology :: Single Symbol



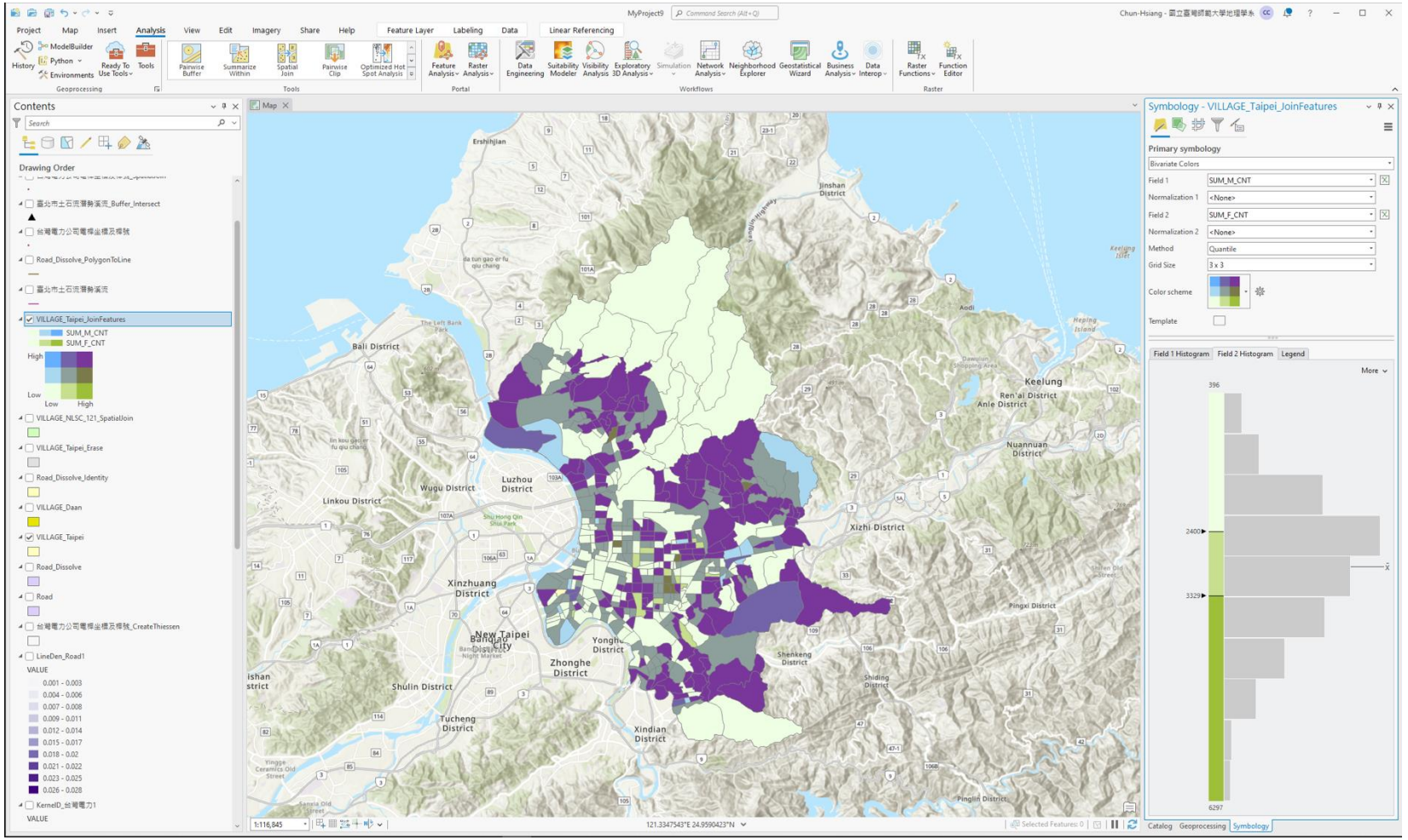
Symbology :: Unique Values with District

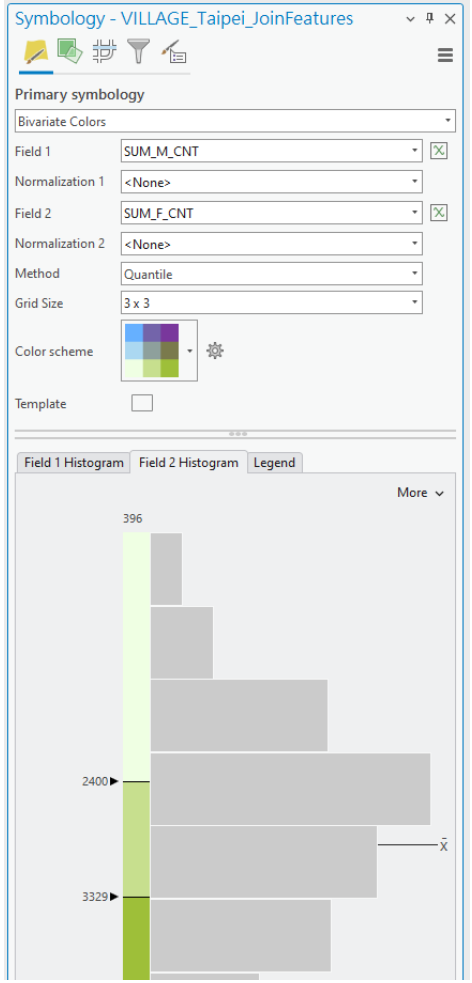


Symbology :: Graduated Colors with P_CNT

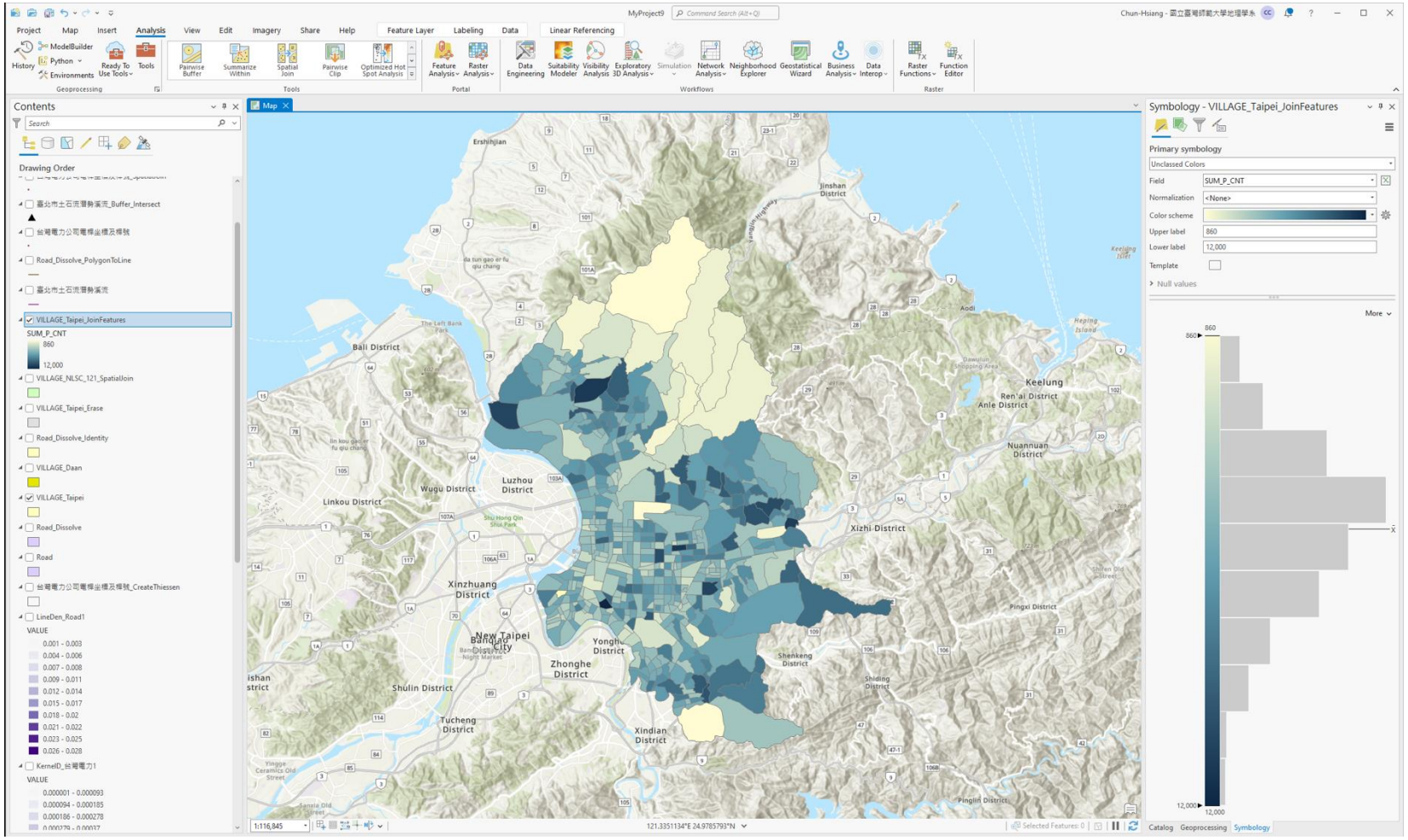


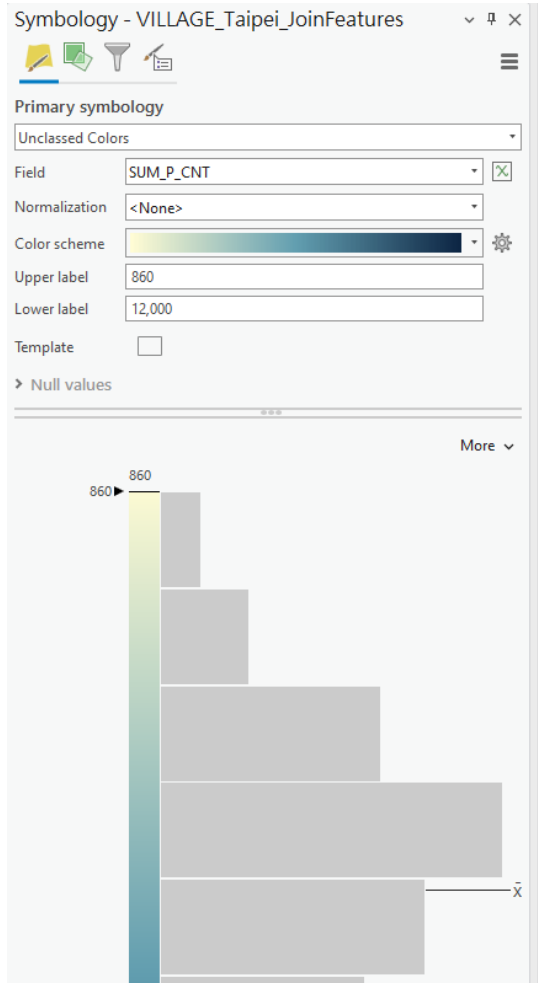
Symbology :: Bivariate Colors with P_CNT



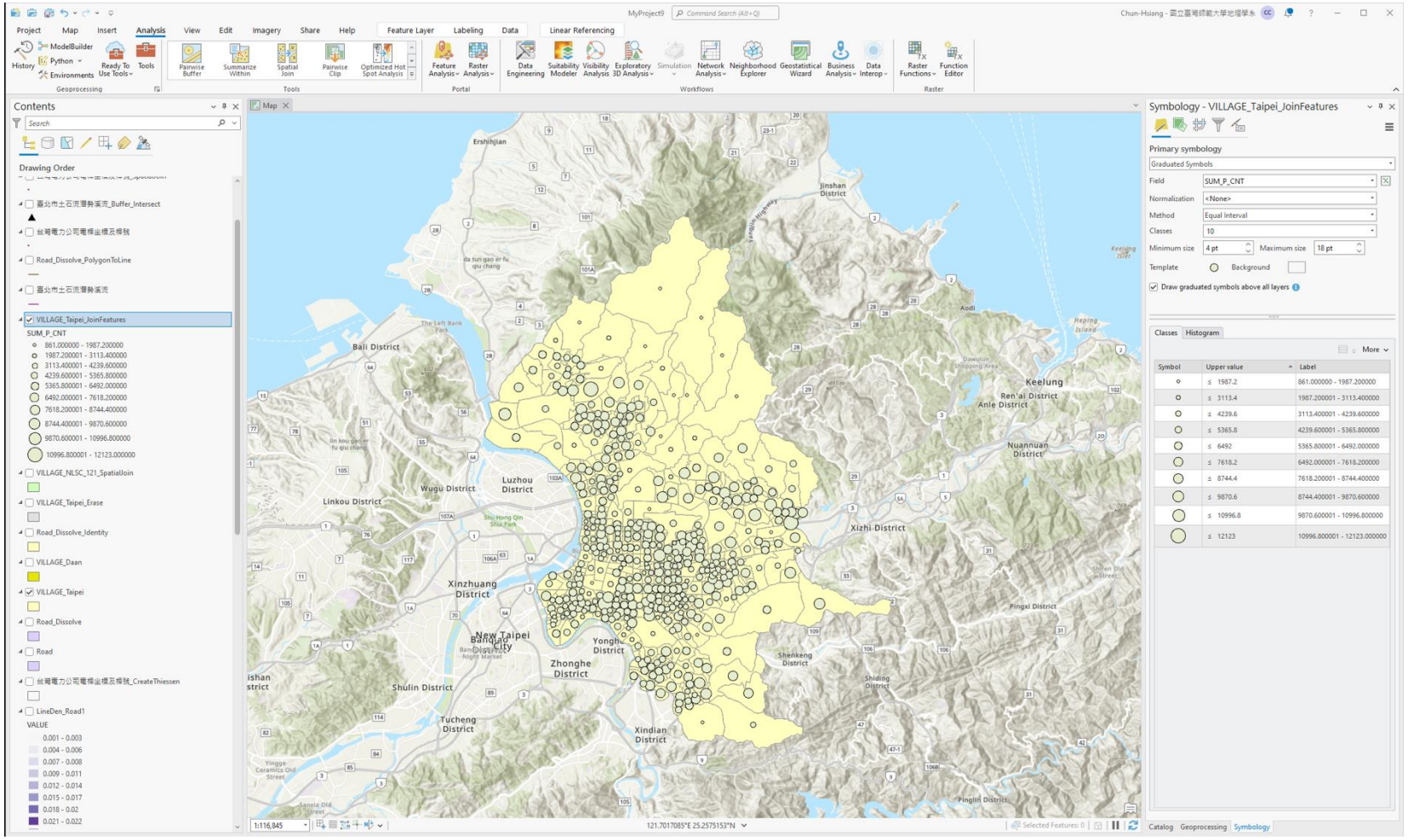


Symbology :: Unclassed Colors with P_CNT

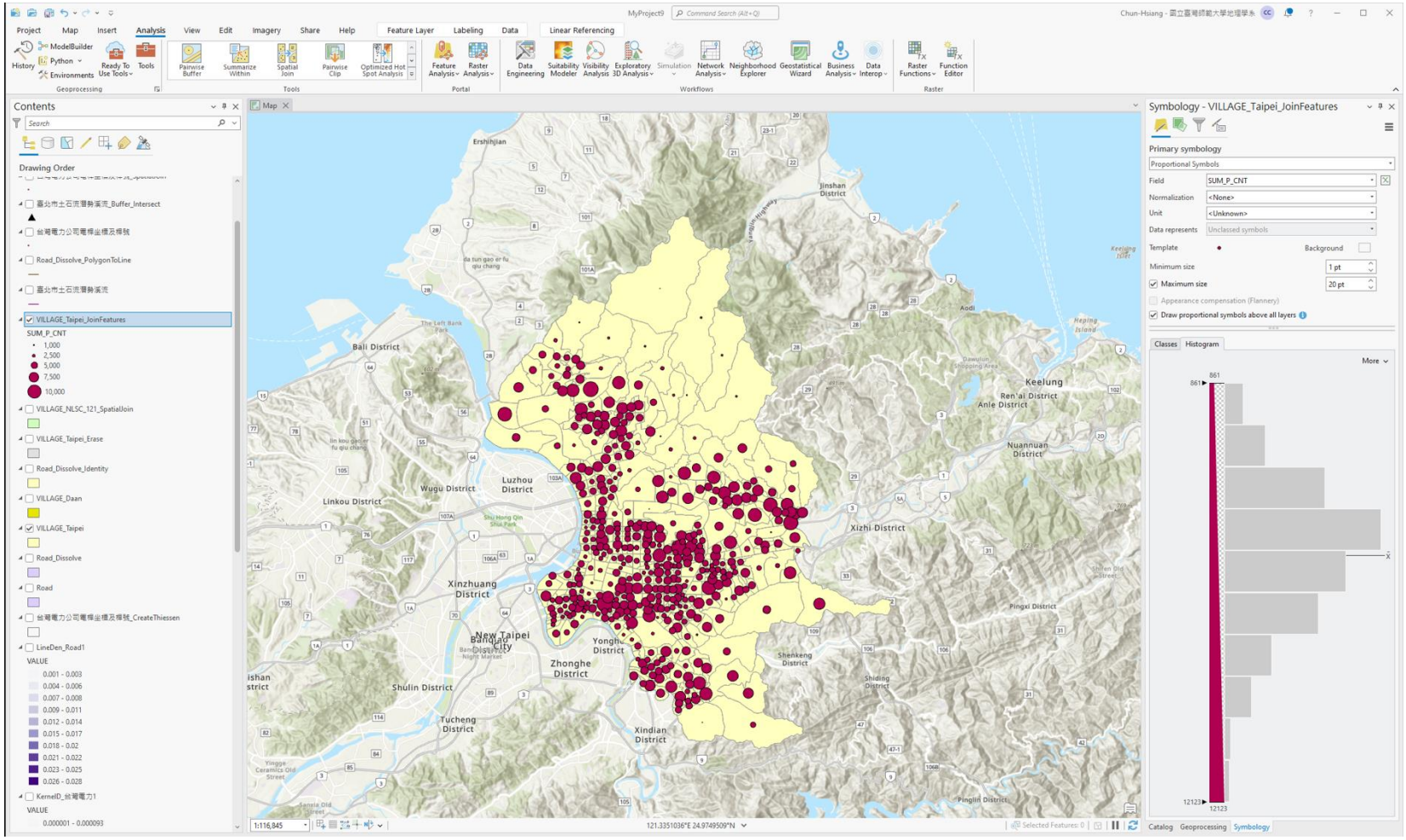


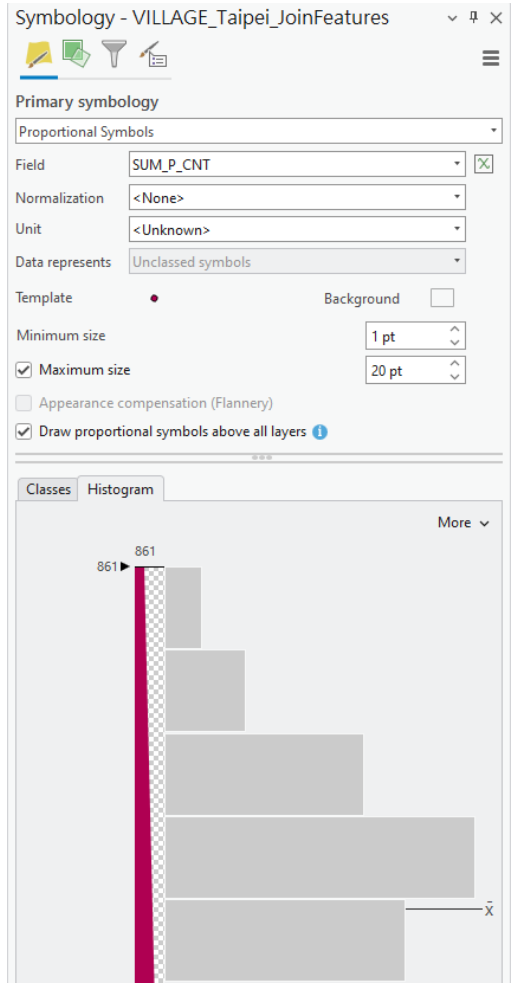


Symbology :: Graduated Symbols for Polygon with P_CNT

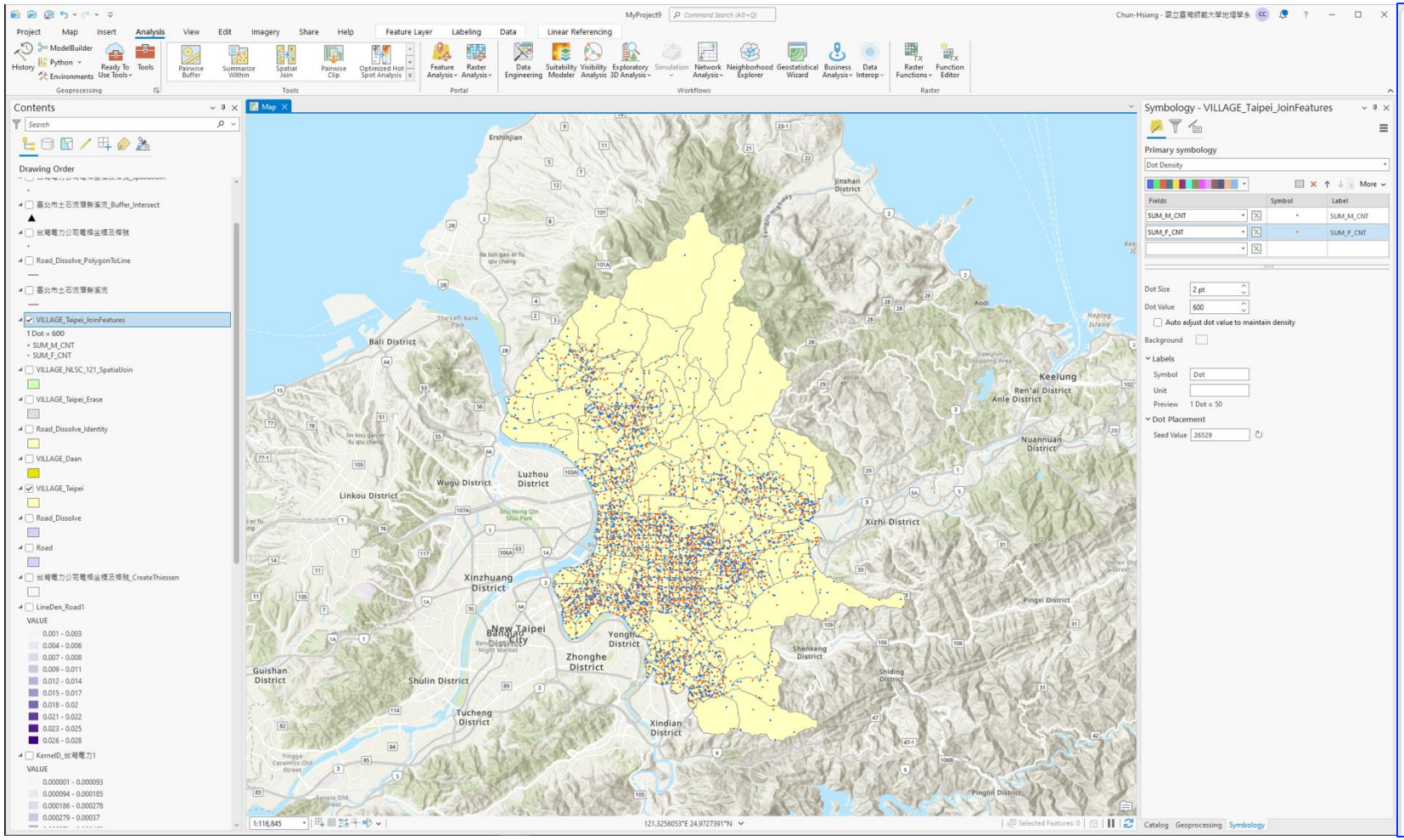


Symbology :: Proportional Symbols for Polygon with P_CNT

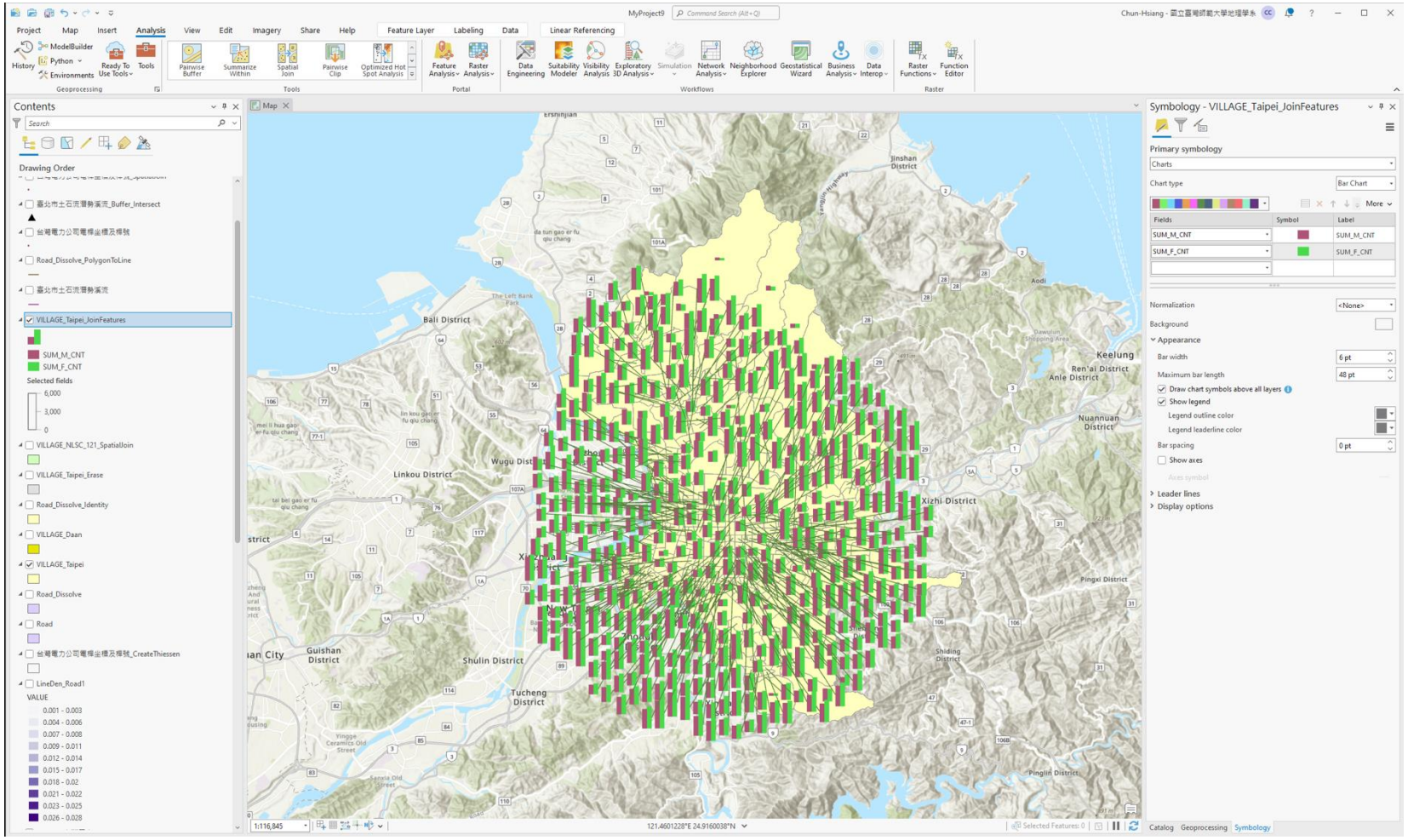


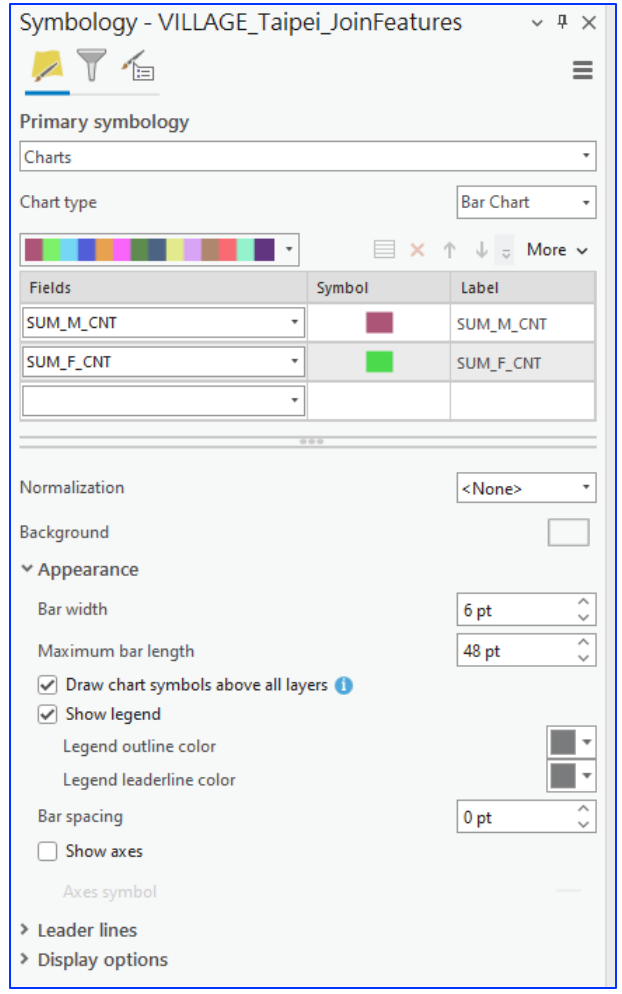


Symbology :: Dot Density for Polygon (M/F)

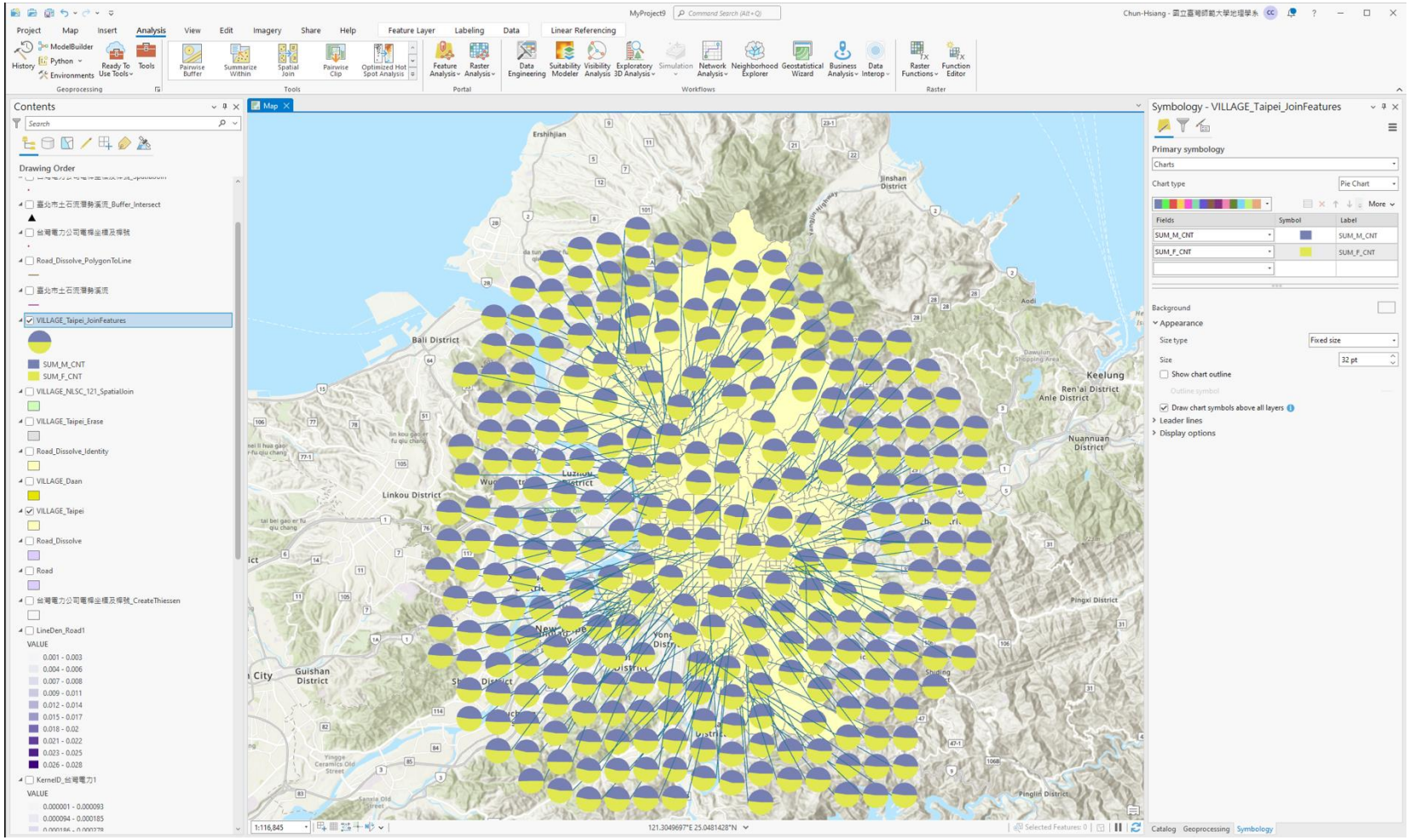


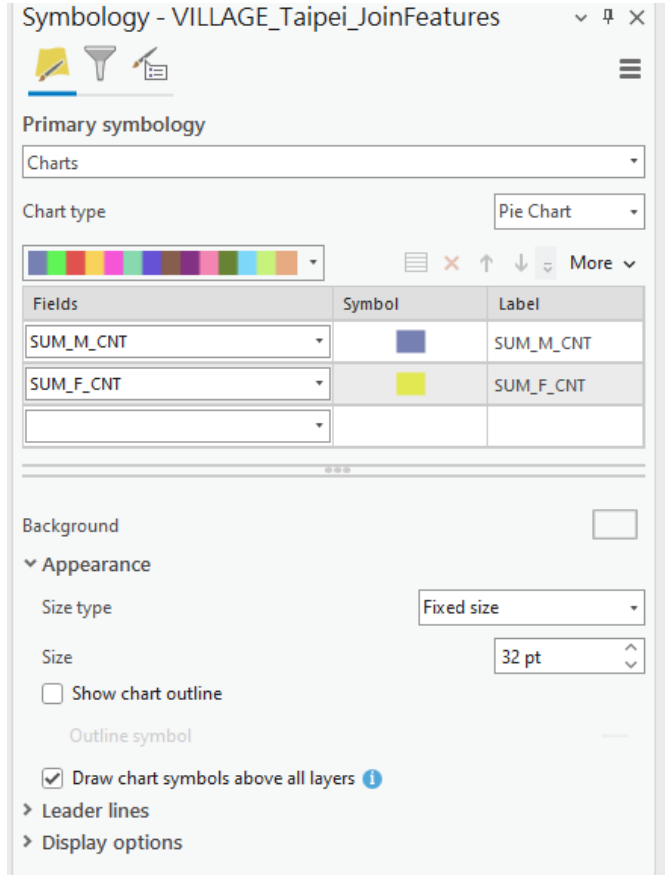
Symbology :: Bar Chart for Polygon (M/F)



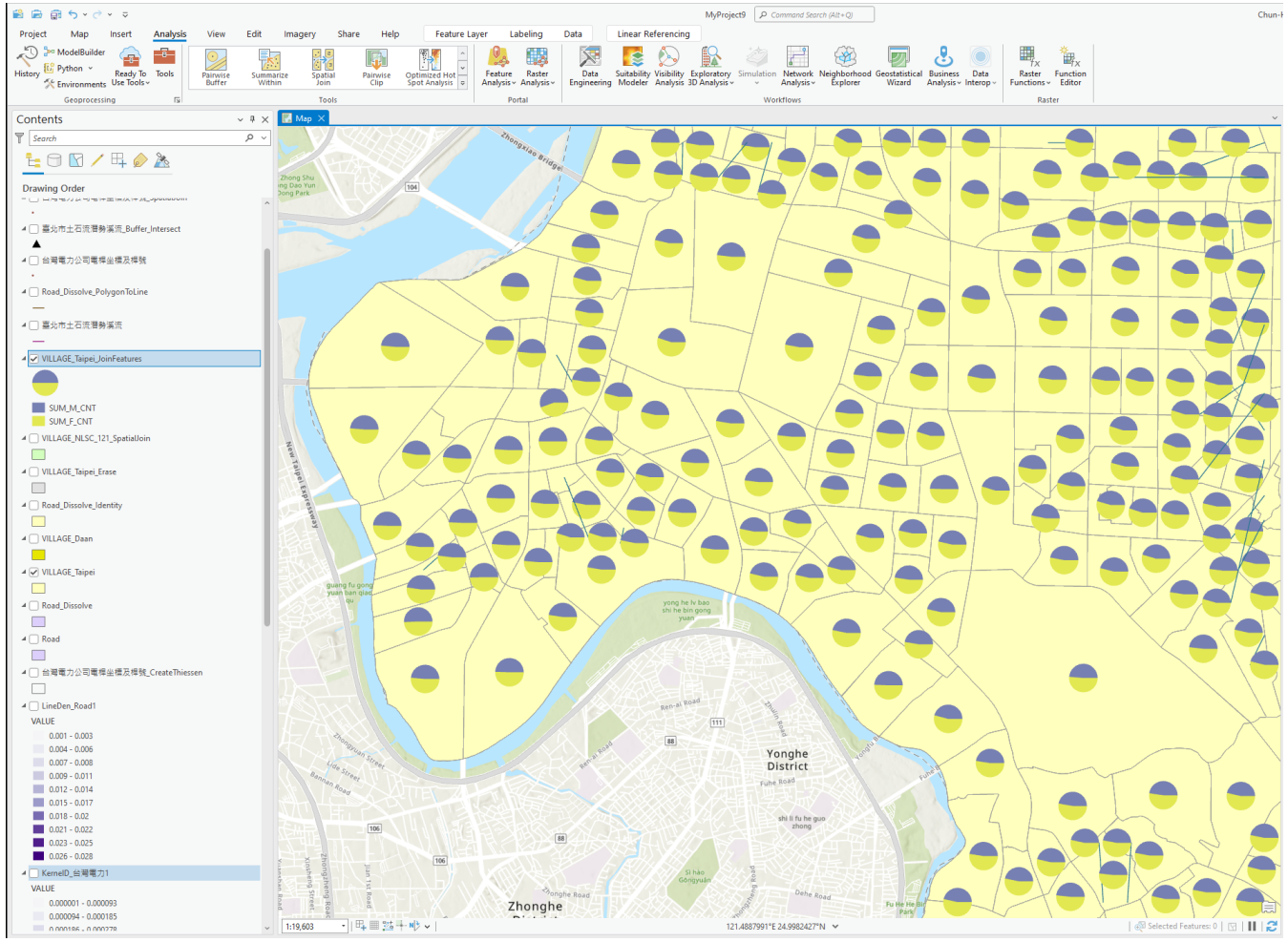


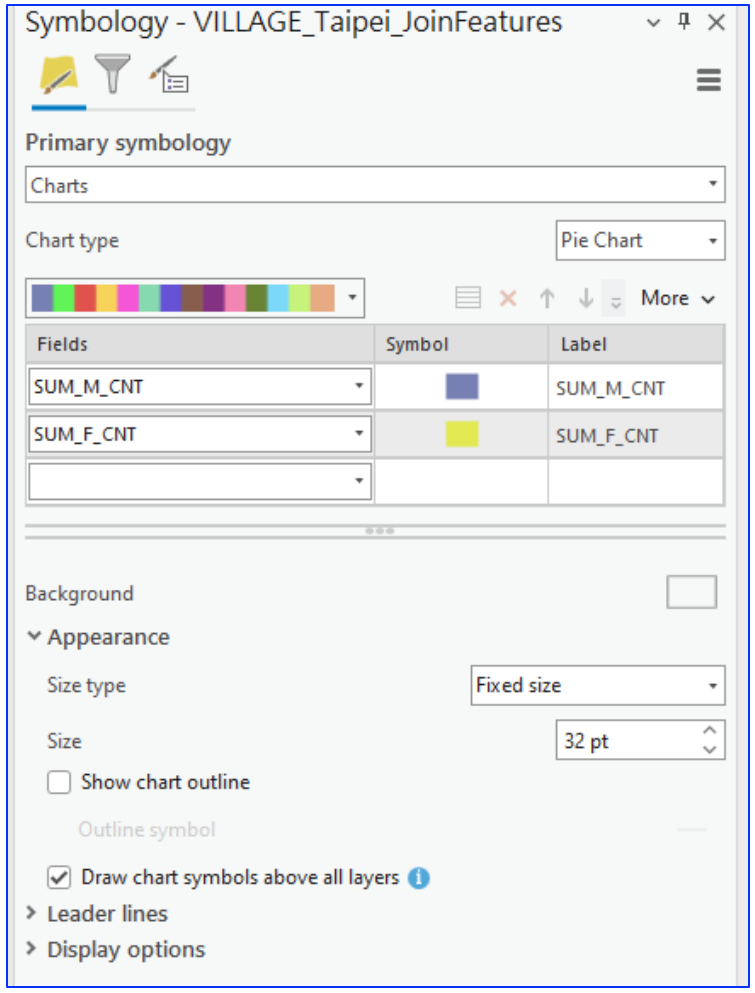
Symbology :: Pie Chart for Polygon (M/F)



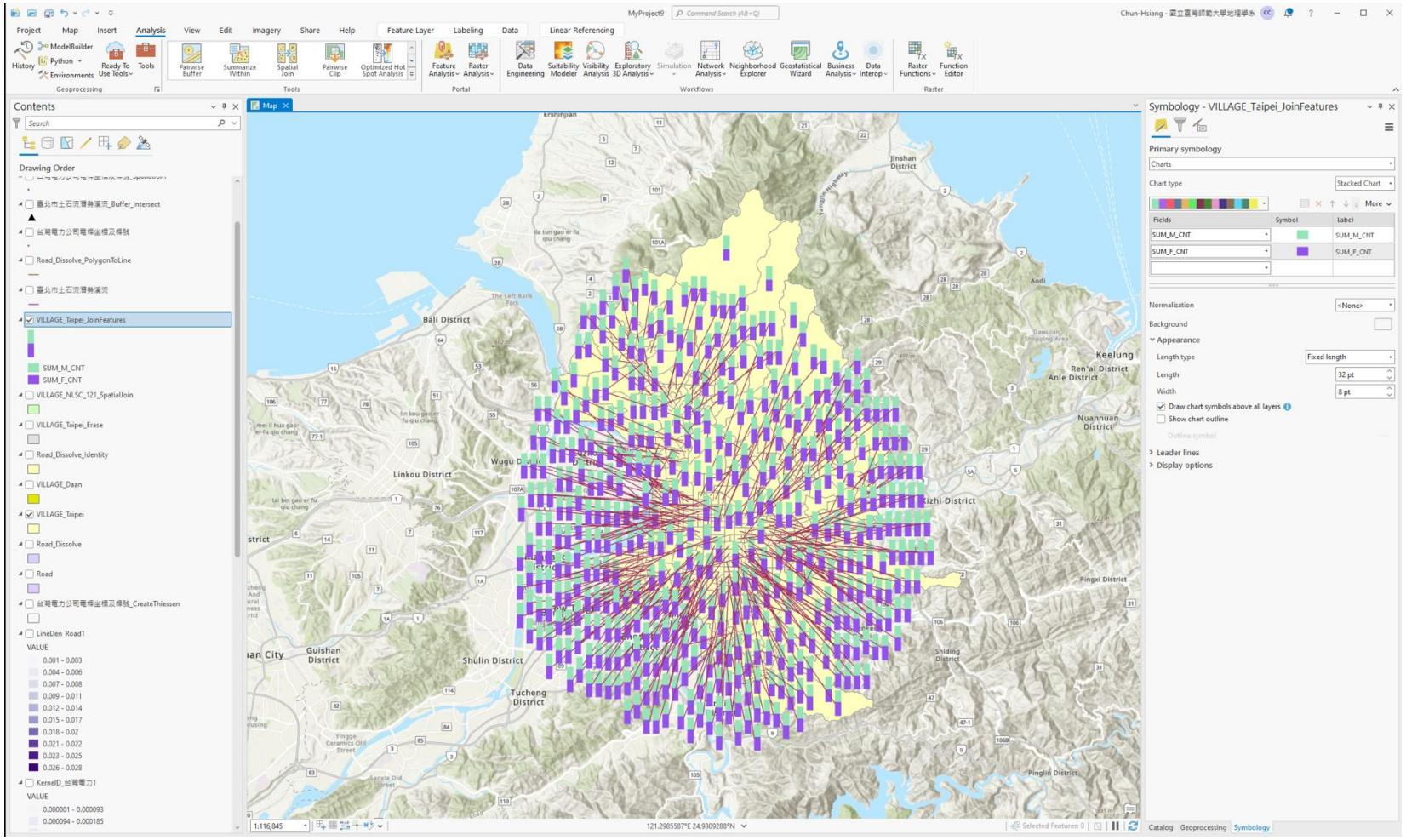


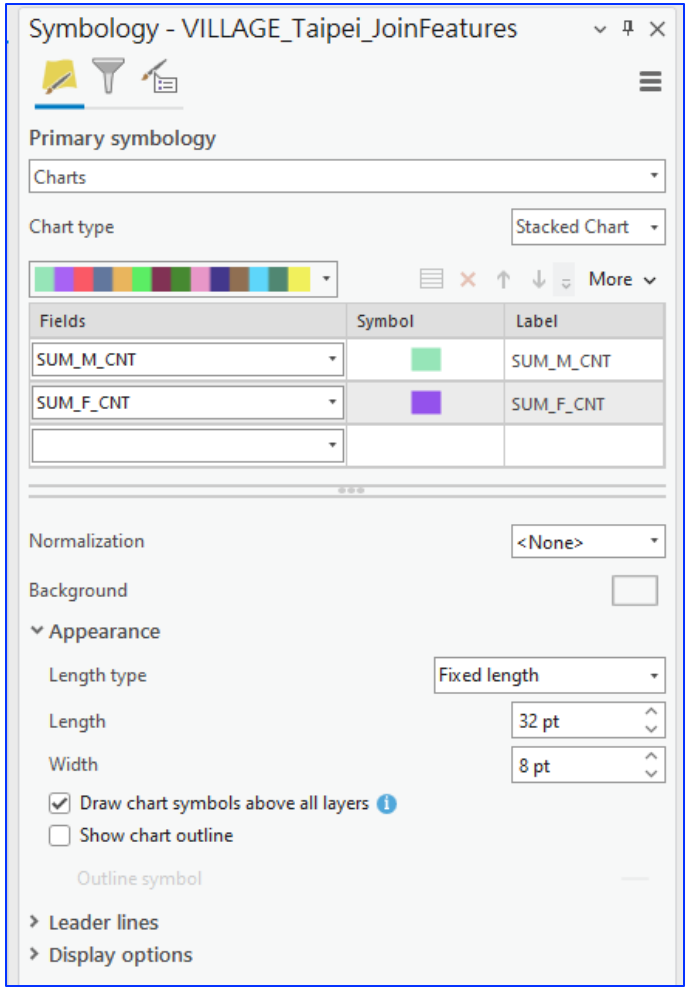
Symbology :: Pie Chart for Polygon (M/F)



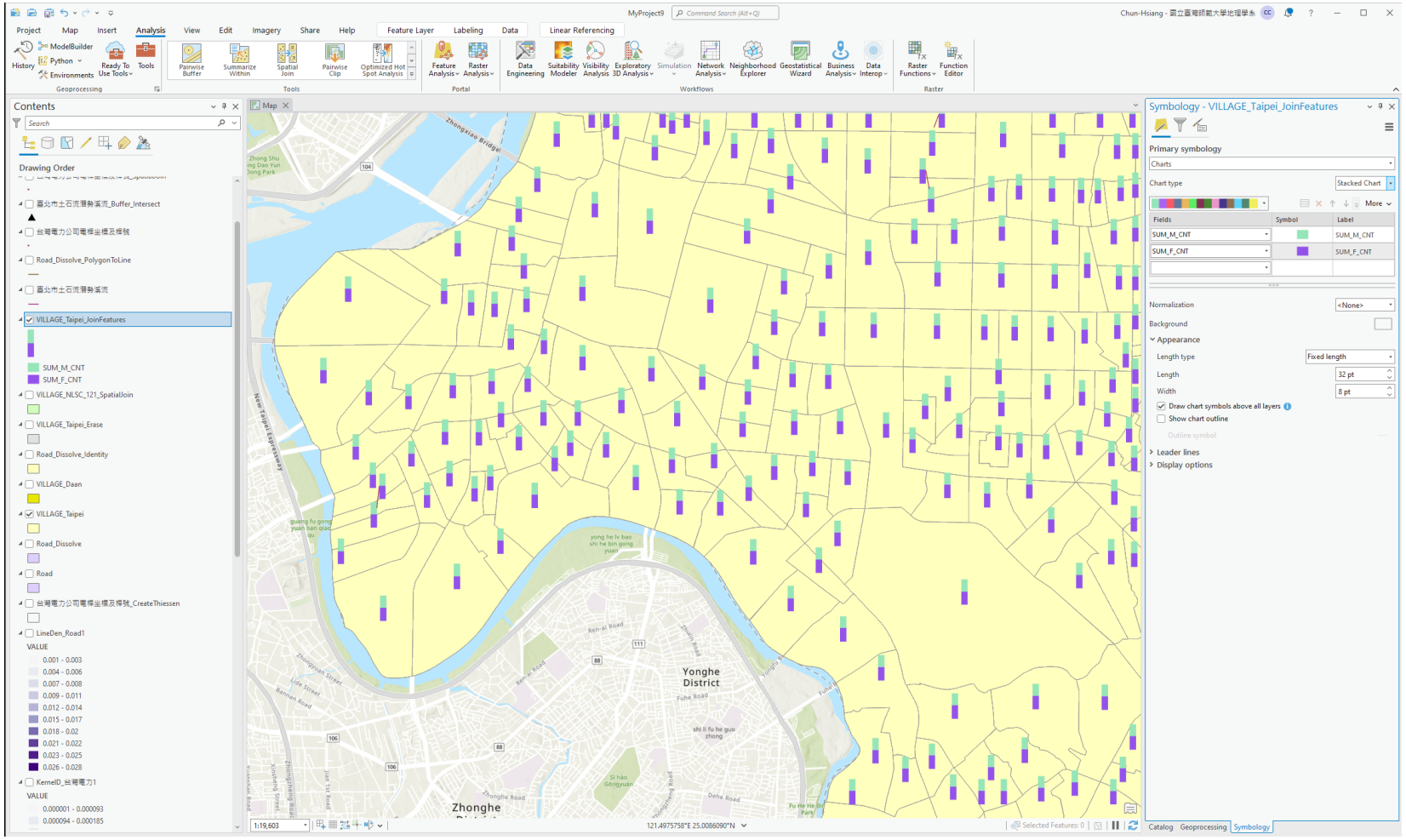


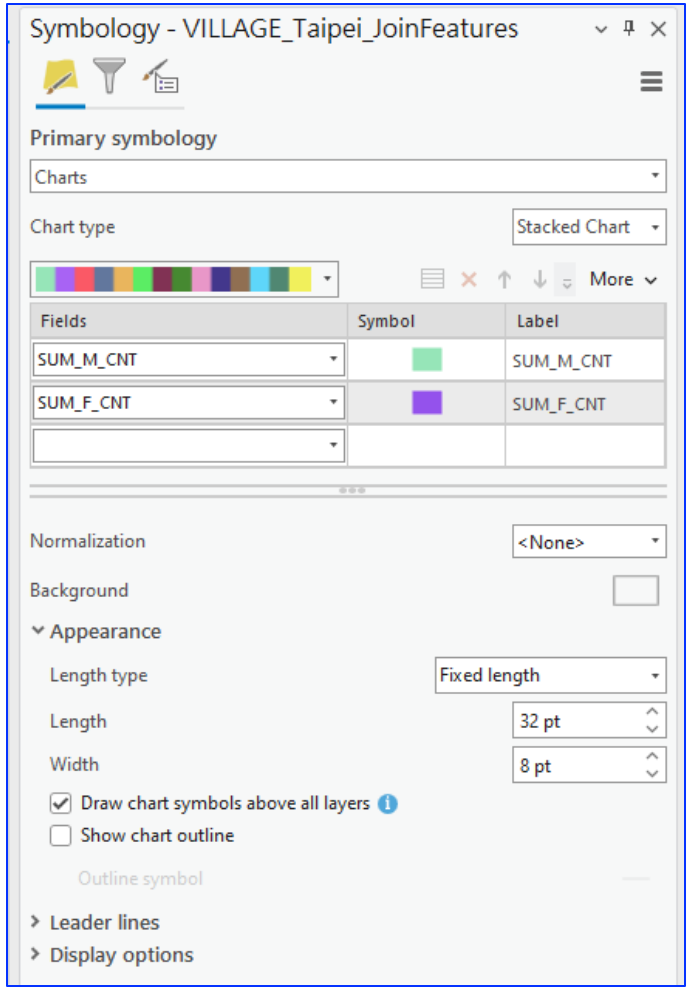
Symbology :: Stacked Chart for Polygon (M/F)





Symbology :: Stacked Chart for Polygon (M/F)





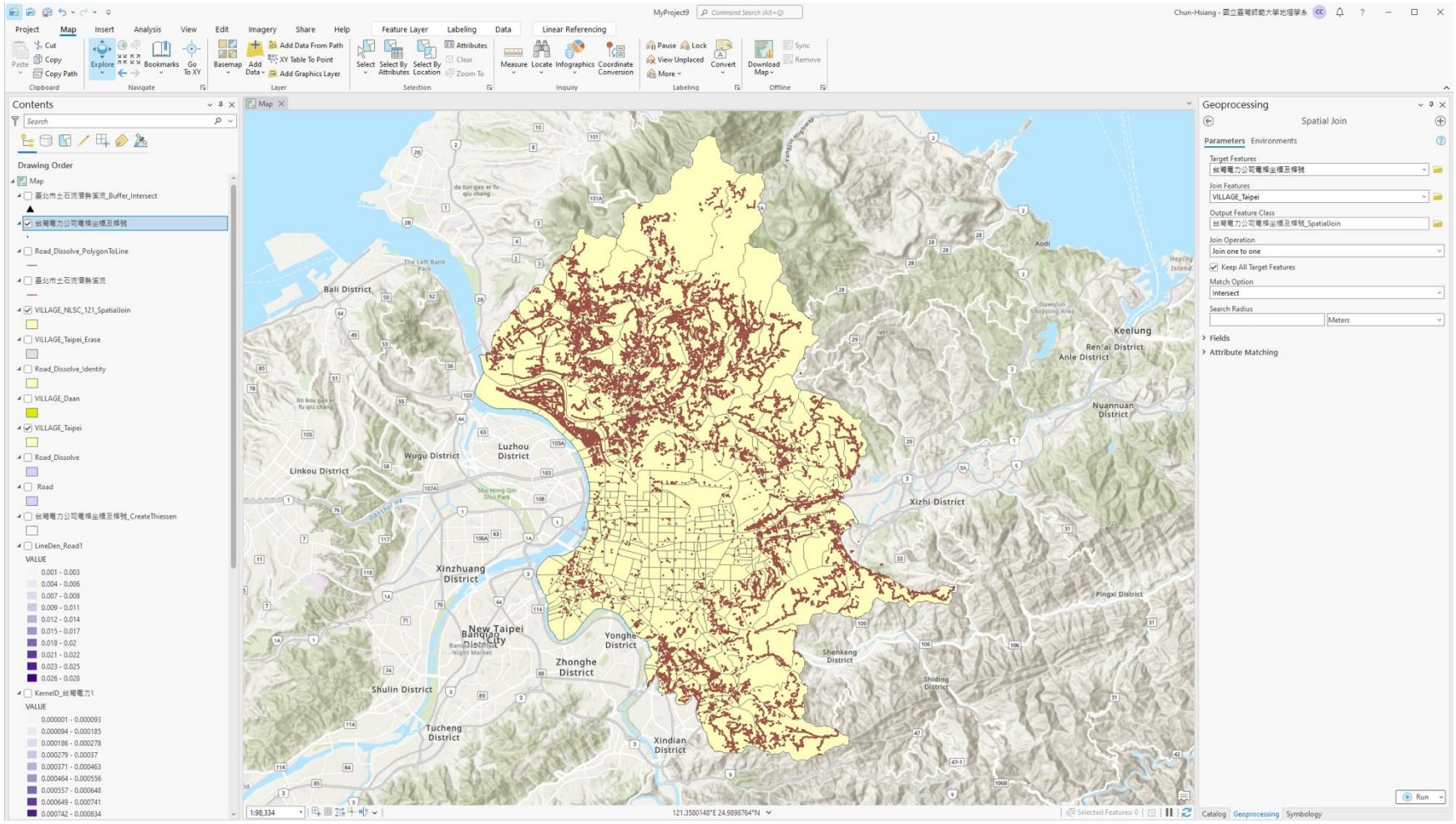
Symbology :: Point

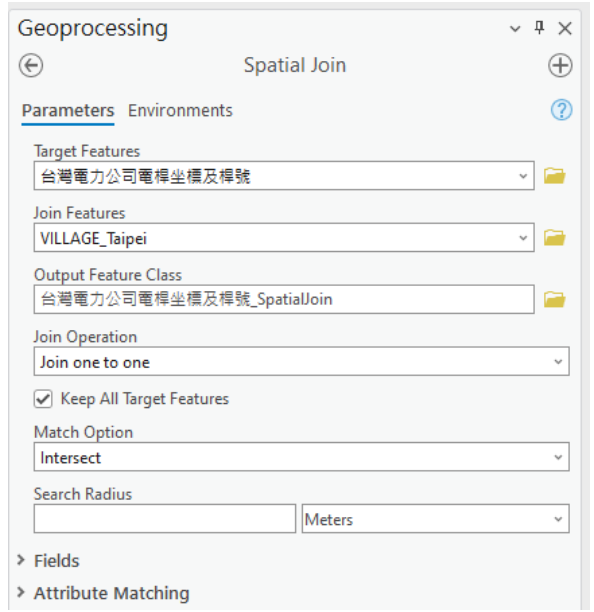
Feature to Point/ Single Symbol/ Unique Values/ Graduated Colors/ Bivariate Colors/ Unclassed Colors/ Proportional Symbols/ Graduated Symbols/ Dot Density

Procedure for Aggregated Features

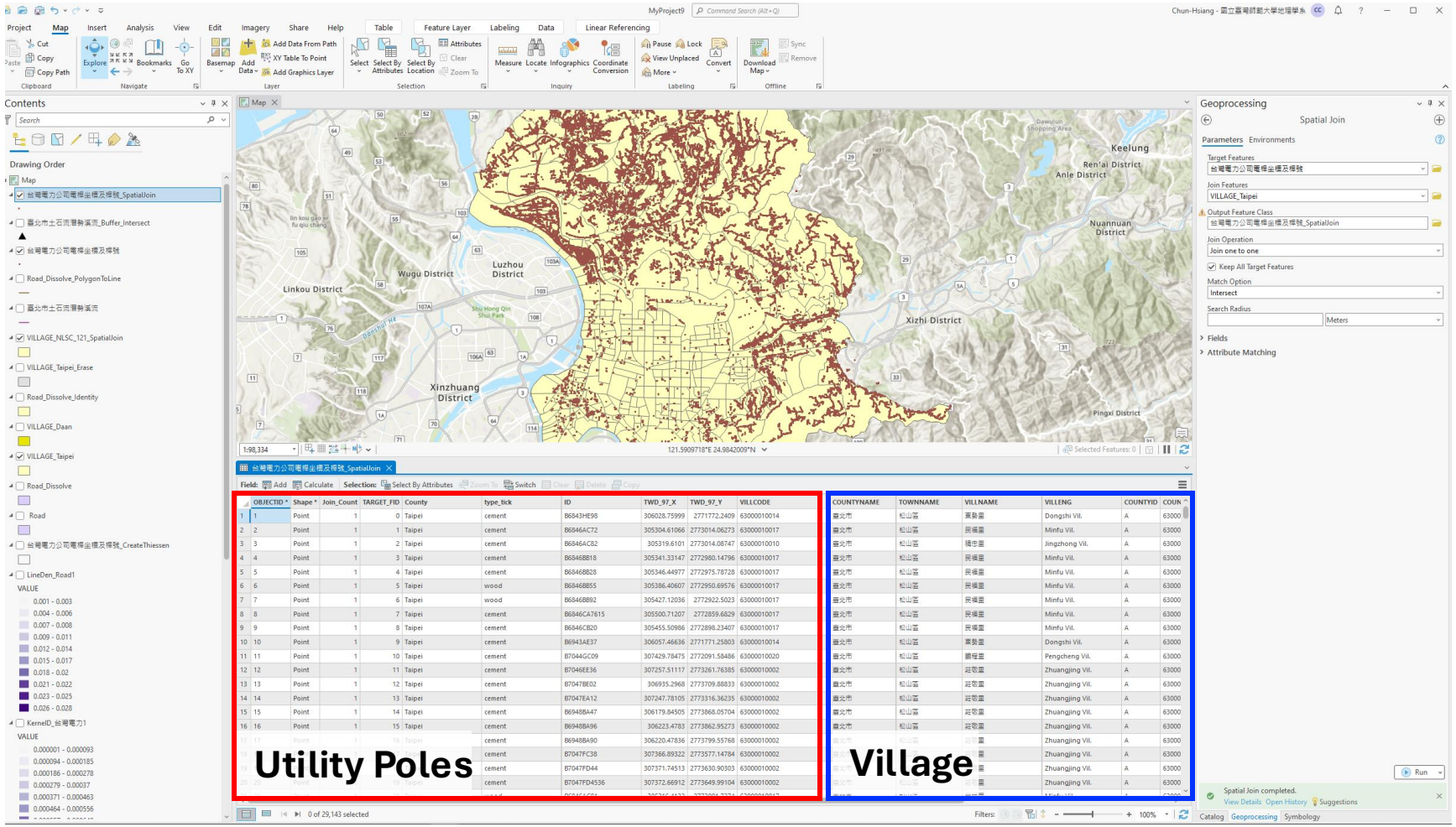
1) **Spatial Join** for Adding Village into Each Ups
2) **Spatial Join** for Counting UPs of Each Village
3) **Dissolve** the Spatial Joined UP Layer into Village Resolution
4) **Feature To Point** for Converting Dissolved and Spatial Joined UP Layer to Single Point
5) **Symbology :: Single Symbols** :: Types of Symbols
6) **Symbology :: Single Symbols** :: Symbols and Properties
7) **Symbology :: Single Symbol**
8) **Symbology :: Unique Values** by District
9) **Symbology :: Graduated Colors** by UP_CNT
10) **Symbology :: Unclassed Colors** with UP_CNT
11) **Symbology :: Proportional Symbols** with UP_CNT
12) **Symbology :: Dot Density** with UP_CNT

Spatial Join for Adding Village into Each Ups

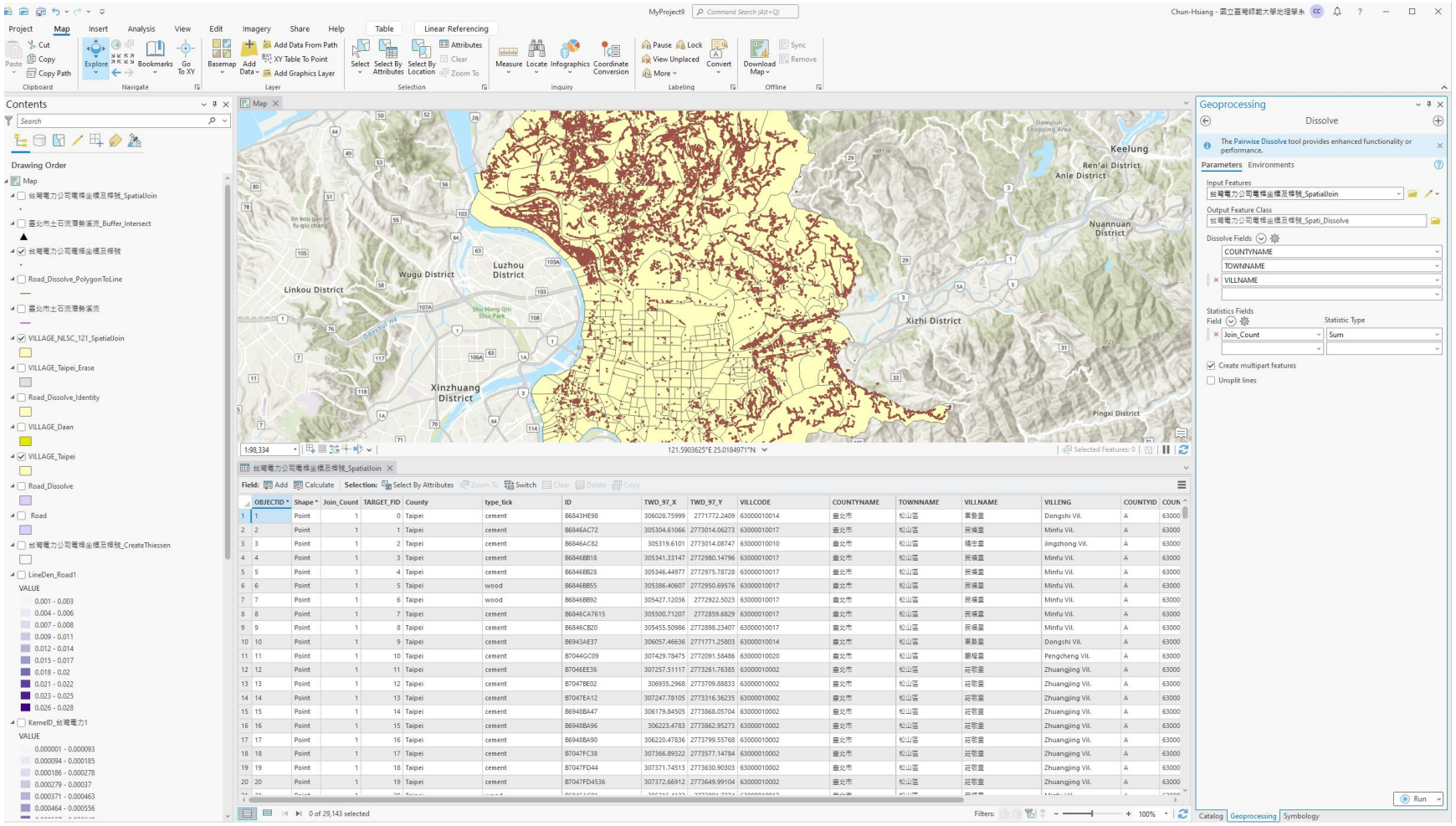


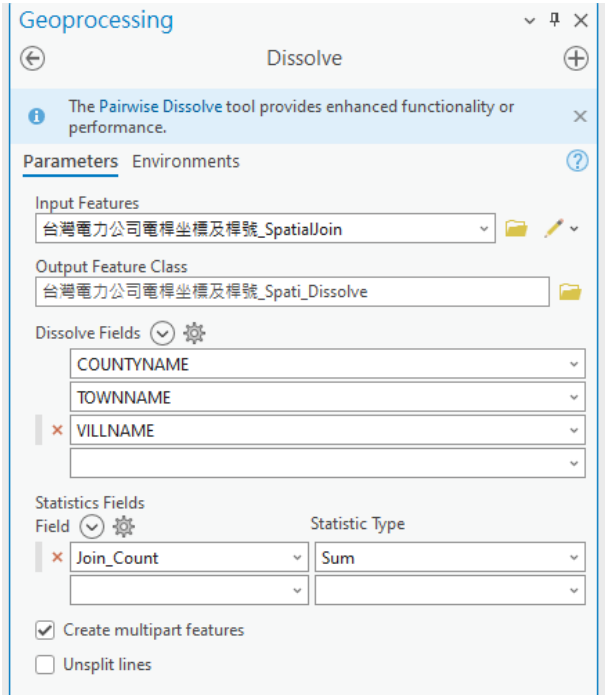


Spatial Join for Counting UPs of Each Village

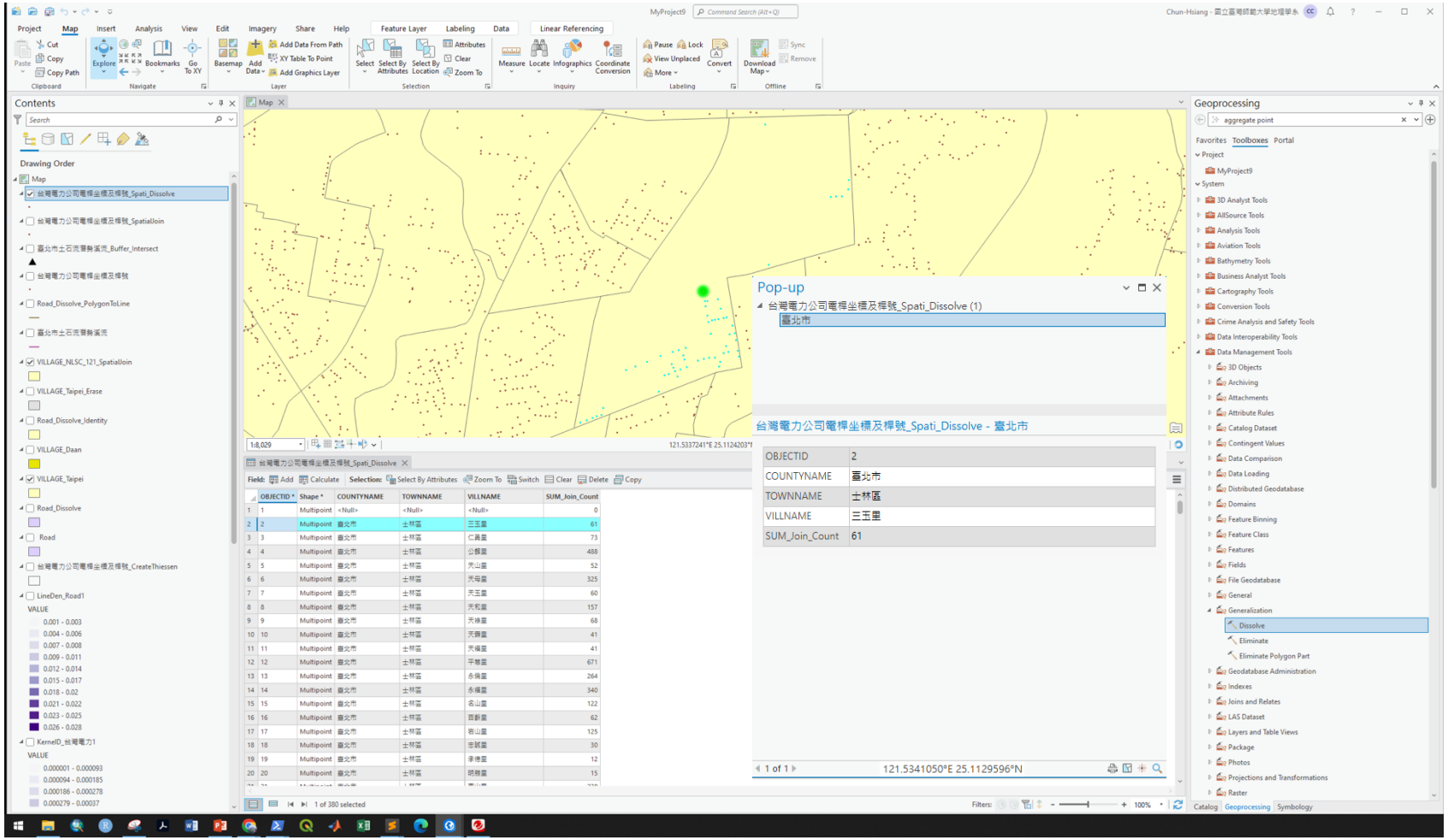


Dissolve the Spatial Joined UP Layer into Village Resolution





Dissolve the Spatial Joined UP Layer into Village Resolution



Every row is Multipoint!!!

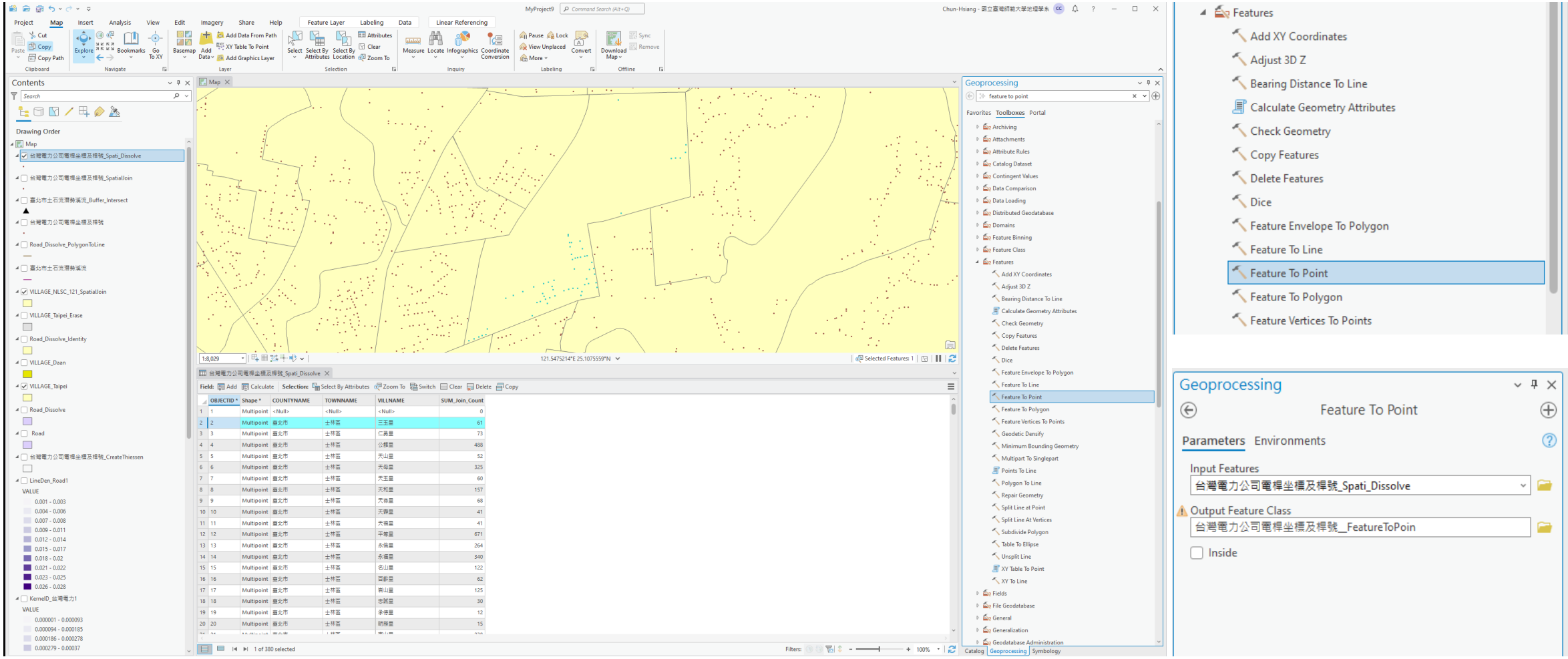
So, our target is to merge all points within the same village into a single point.

台灣電力公司電桿坐標及桿號_Spati_Dissolve

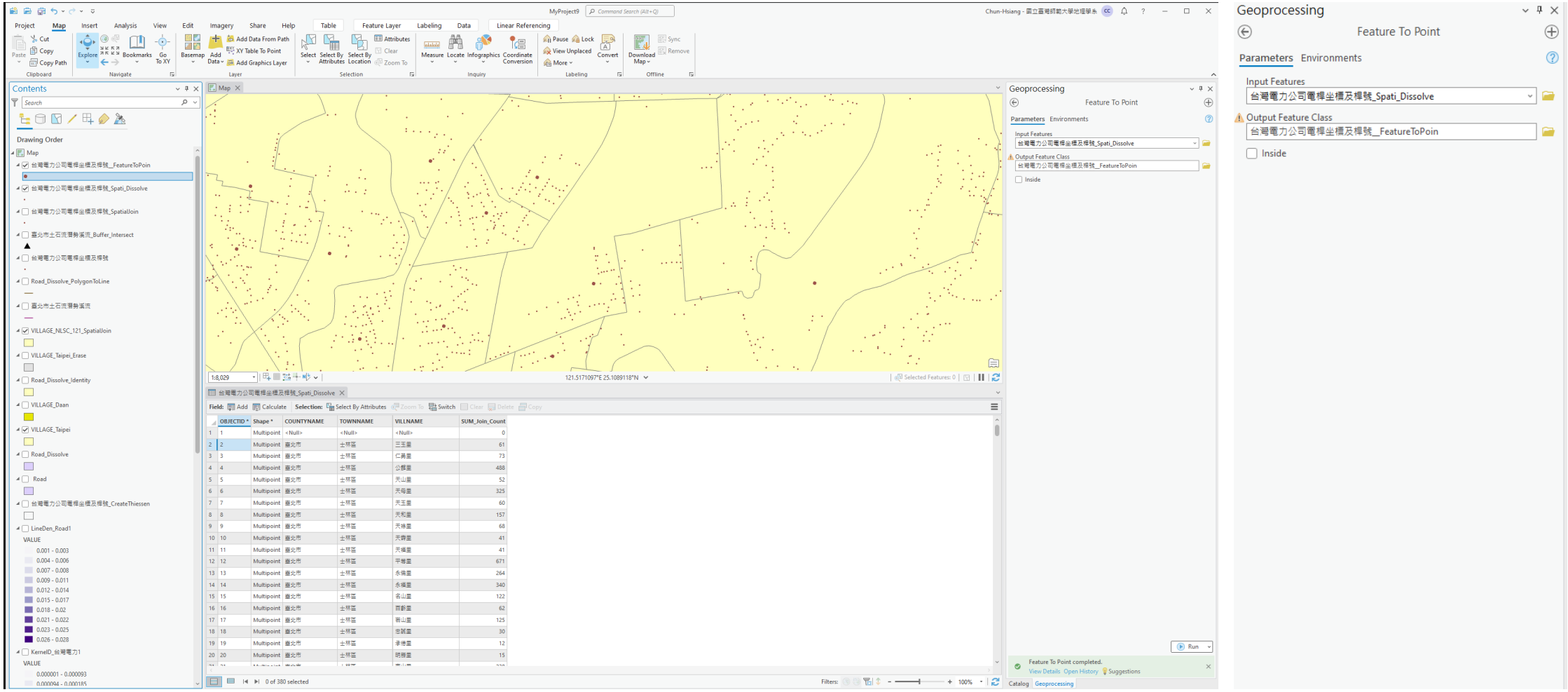
	OBJECTID *	Shape *	COUNTYNAME	TOWNNAME	VILLNAME	SUM_Join_Count
1	1	Multipoint	<Null>	<Null>	<Null>	0
2	2	Multipoint	臺北市	士林區	三玉里	61
3	3	Multipoint	臺北市	士林區	仁勇里	73
4	4	Multipoint	臺北市	士林區	公館里	488
5	5	Multipoint	臺北市	士林區	天山里	52
6	6	Multipoint	臺北市	士林區	天母里	325
7	7	Multipoint	臺北市	士林區	天玉里	60
8	8	Multipoint	臺北市	士林區	天和里	157
9	9	Multipoint	臺北市	士林區	天祿里	68
10	10	Multipoint	臺北市	士林區	天壽里	41
11	11	Multipoint	臺北市	士林區	天福里	41
12	12	Multipoint	臺北市	士林區	平等里	671
13	13	Multipoint	臺北市	士林區	永倫里	264
14	14	Multipoint	臺北市	士林區	永福里	340
15	15	Multipoint	臺北市	士林區	名山里	122
16	16	Multipoint	臺北市	士林區	百齡里	62
17	17	Multipoint	臺北市	士林區	岩山里	125
18	18	Multipoint	臺北市	士林區	忠誠里	30
19	19	Multipoint	臺北市	士林區	承德里	12
20	20	Multipoint	臺北市	士林區	明勝里	15

1 of 380 selected

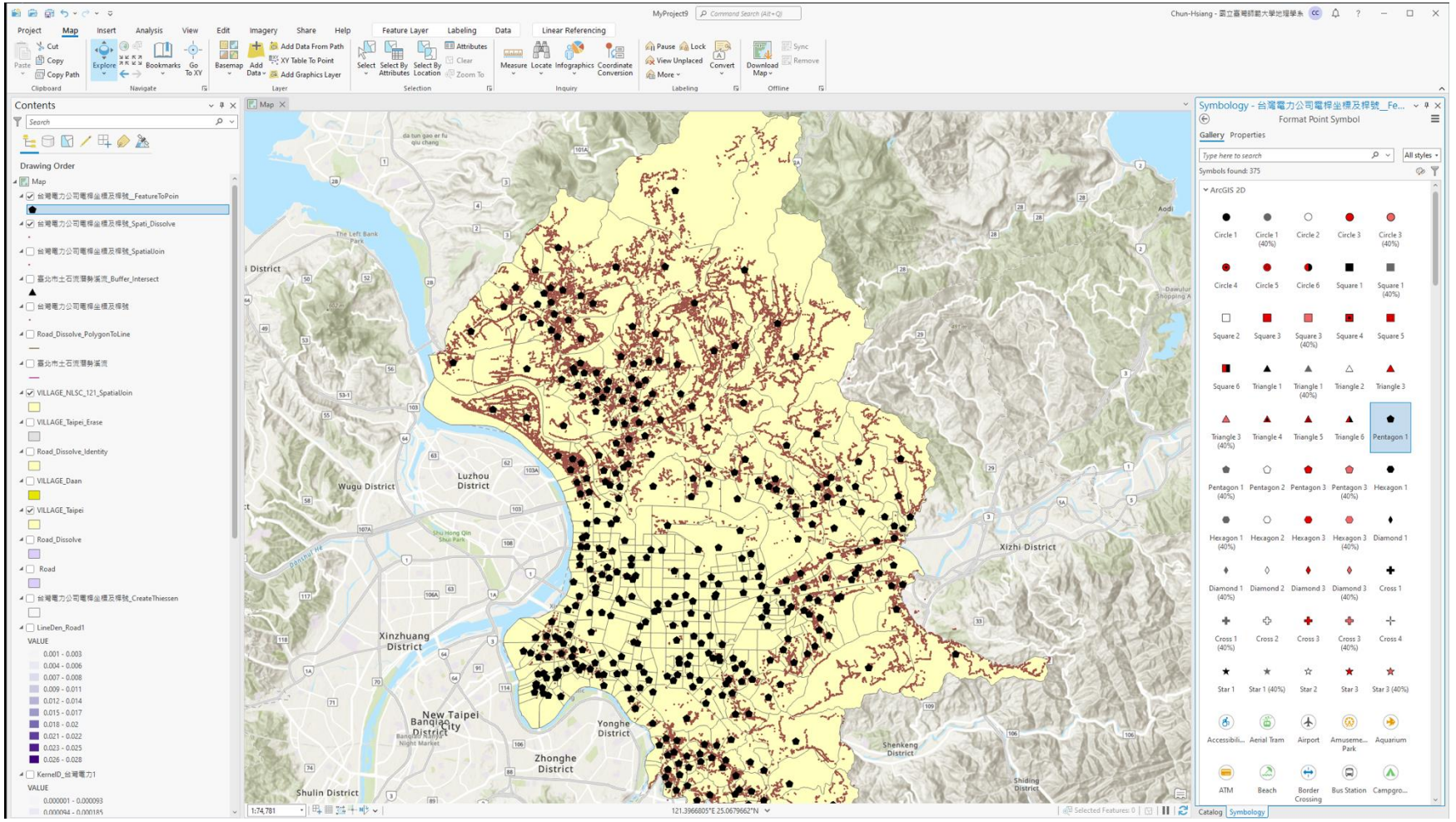
Feature To Point for Converting Dissolved and Spatial Joined UP Layer to Single Point



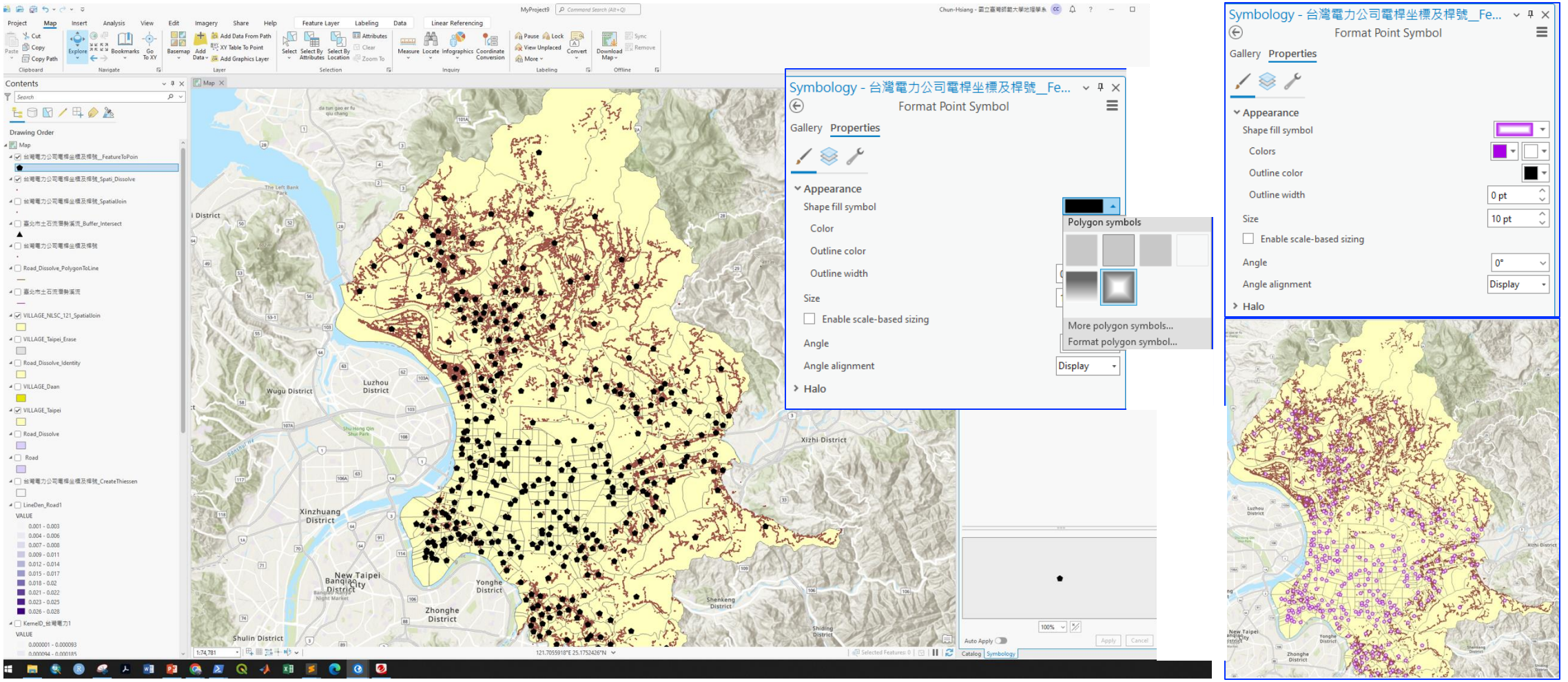
Feature To Point for Converting Dissolved and Spatial Joined UP Layer to Single Point



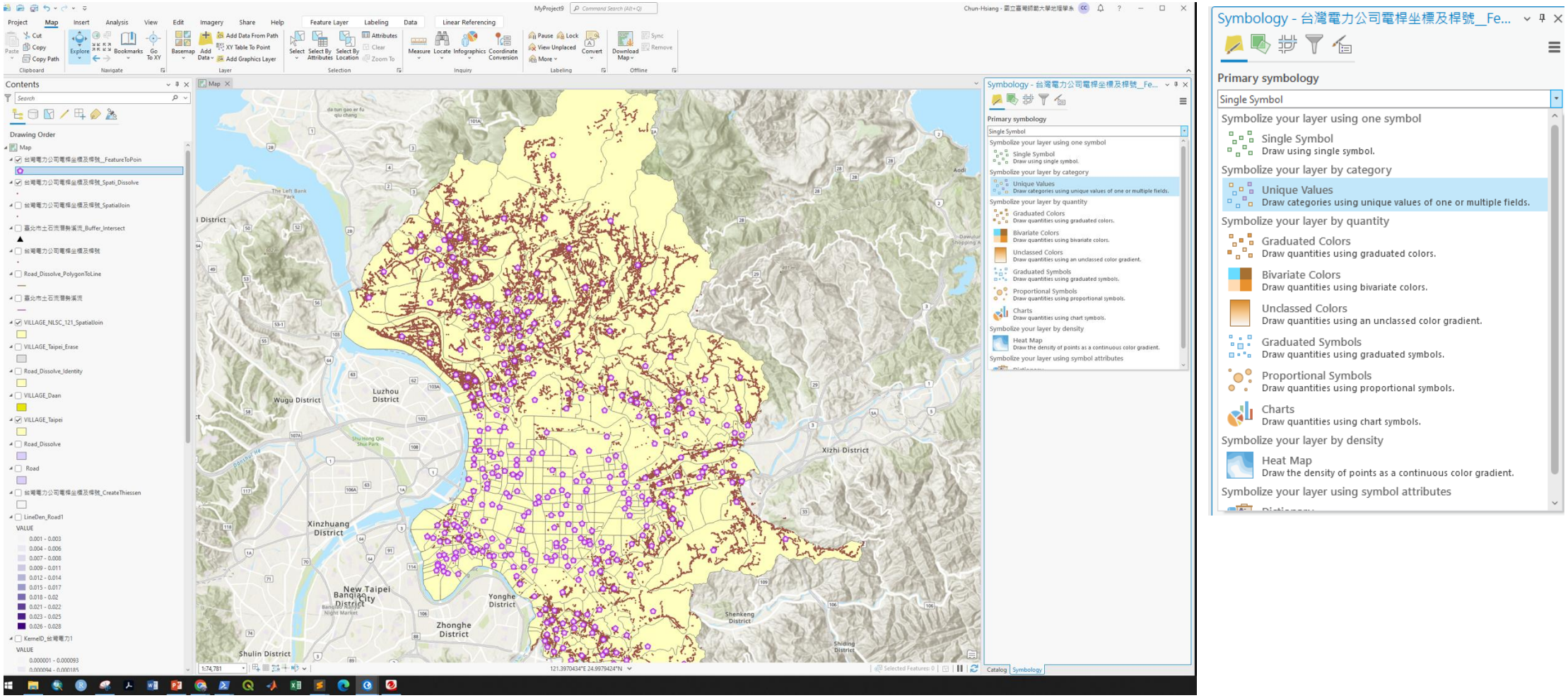
Symbology :: Single Symbols :: Types of Symbols



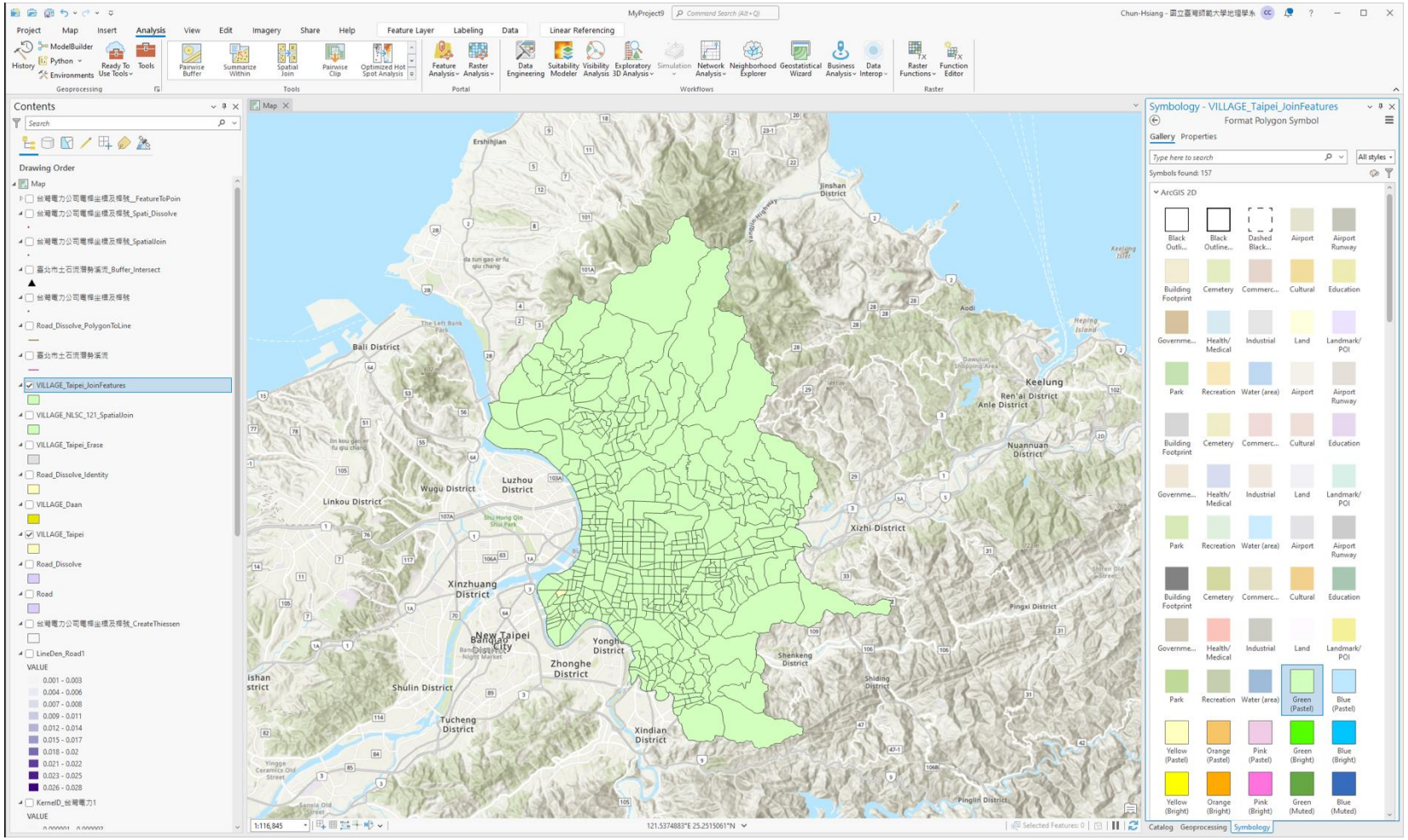
Symbology :: Single Symbols :: Symbols and Properties

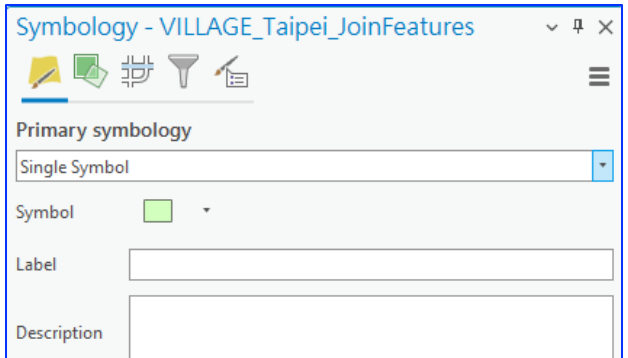


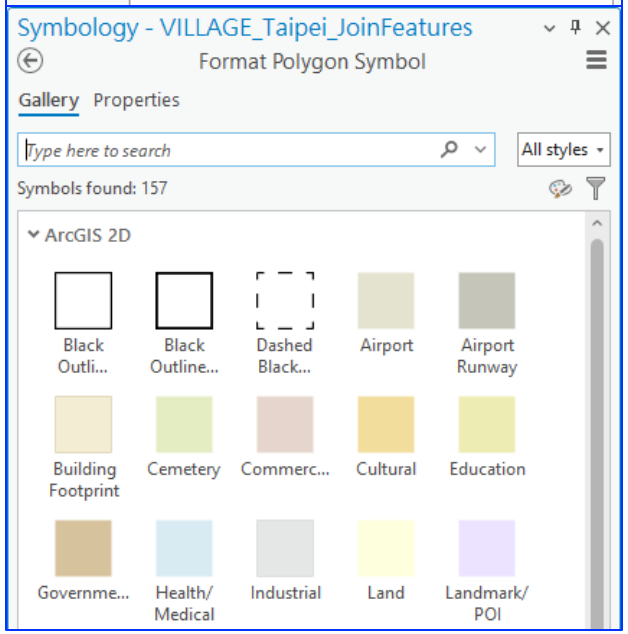
Symbology :: Single Symbol



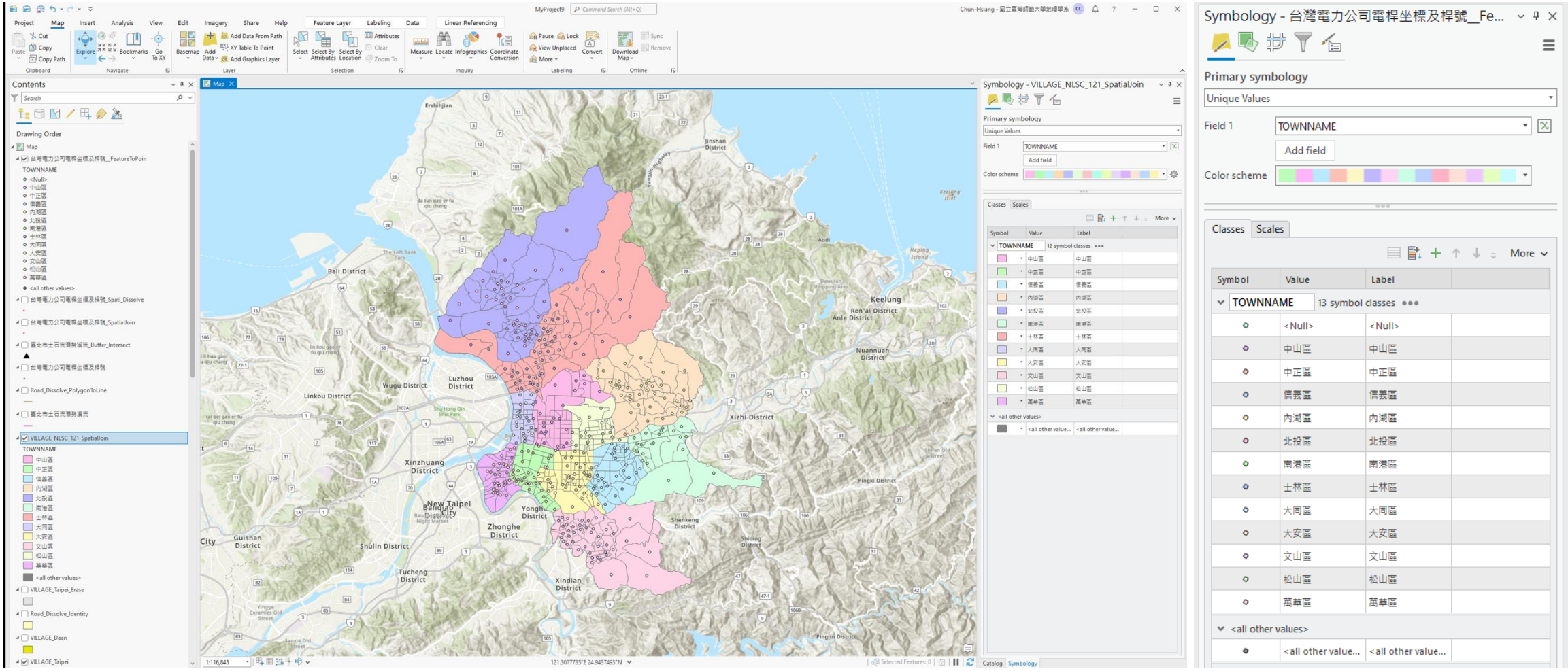
Symbology :: Single Symbol by District



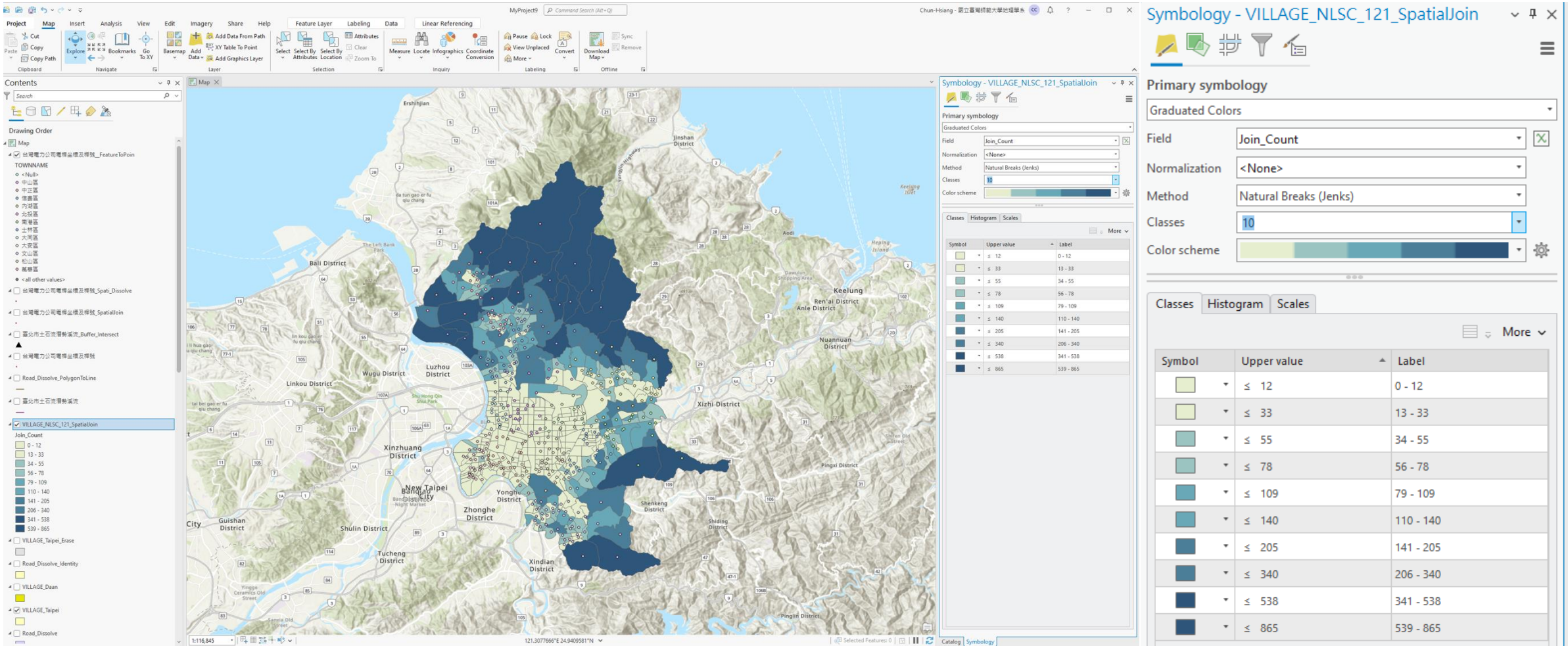




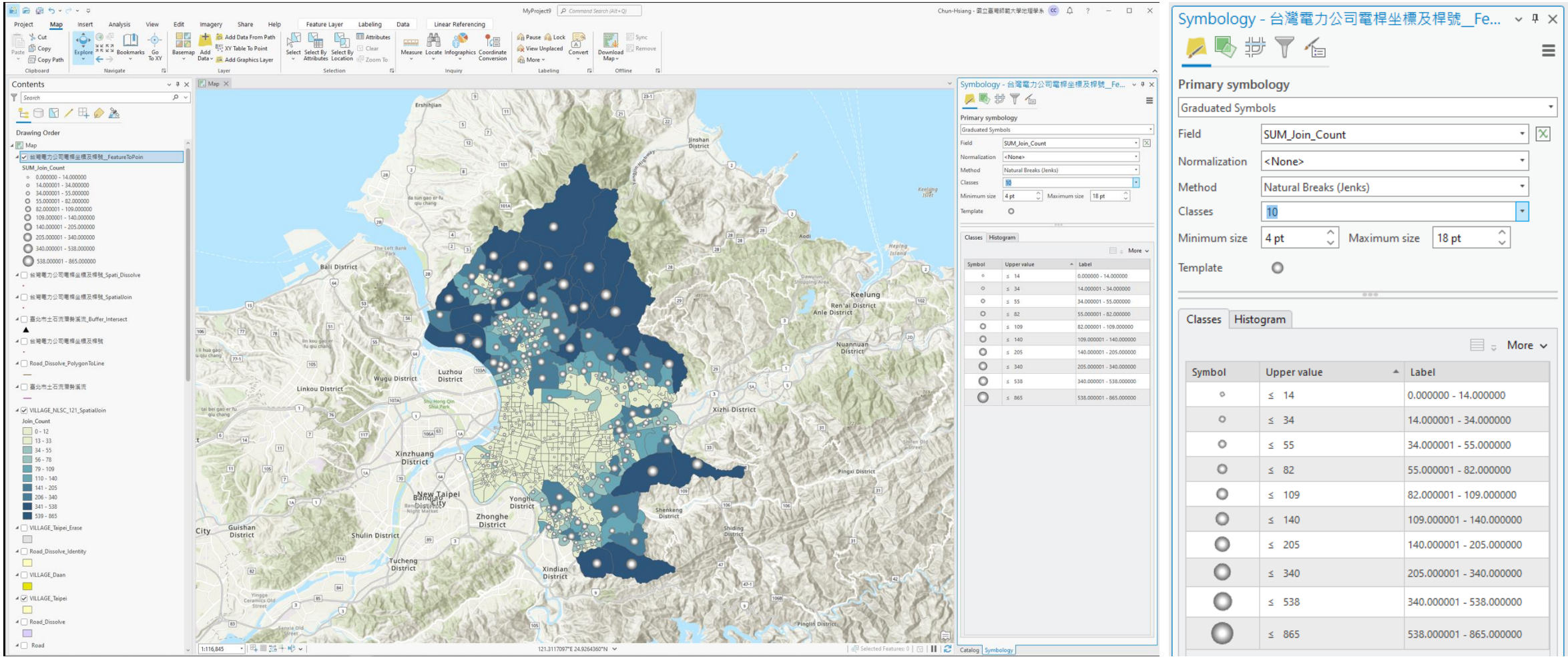
Symbology :: Unique Values by District



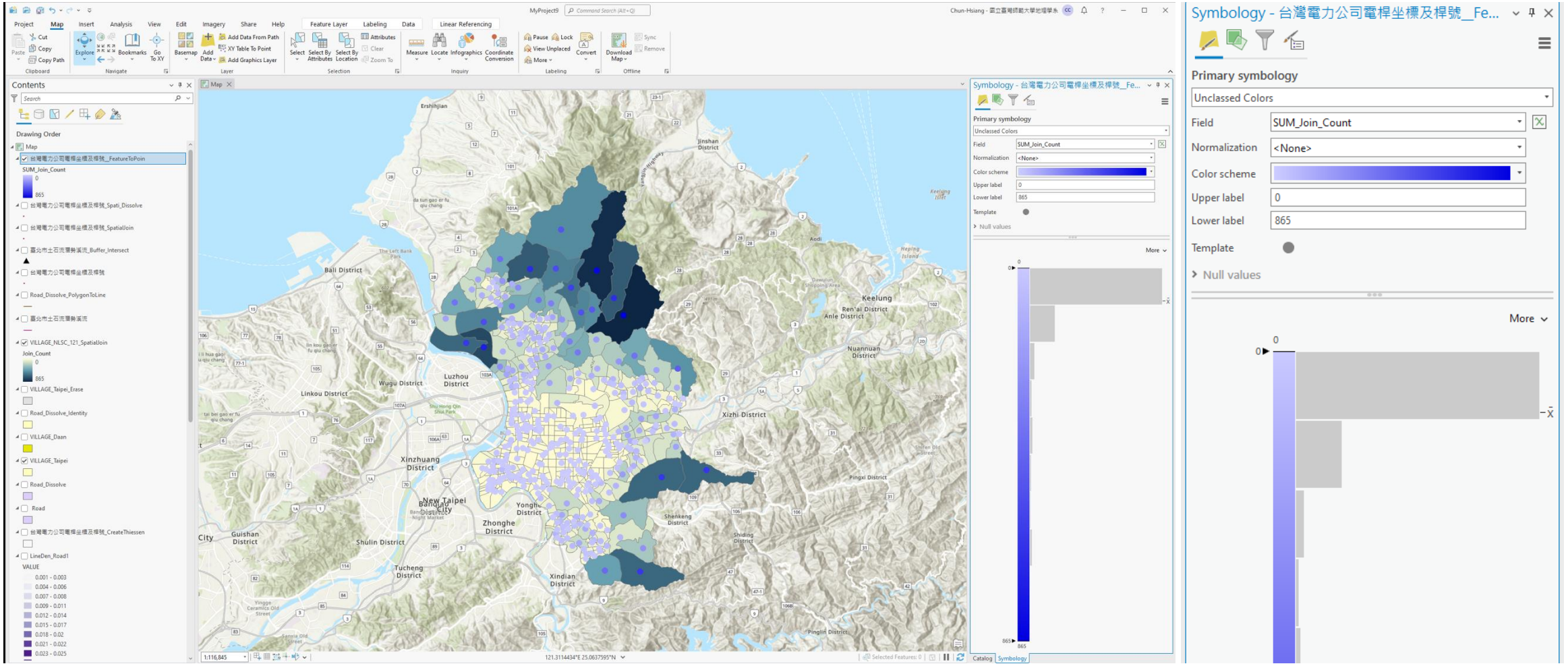
Symbology :: Graduated Colors by UP_CNT



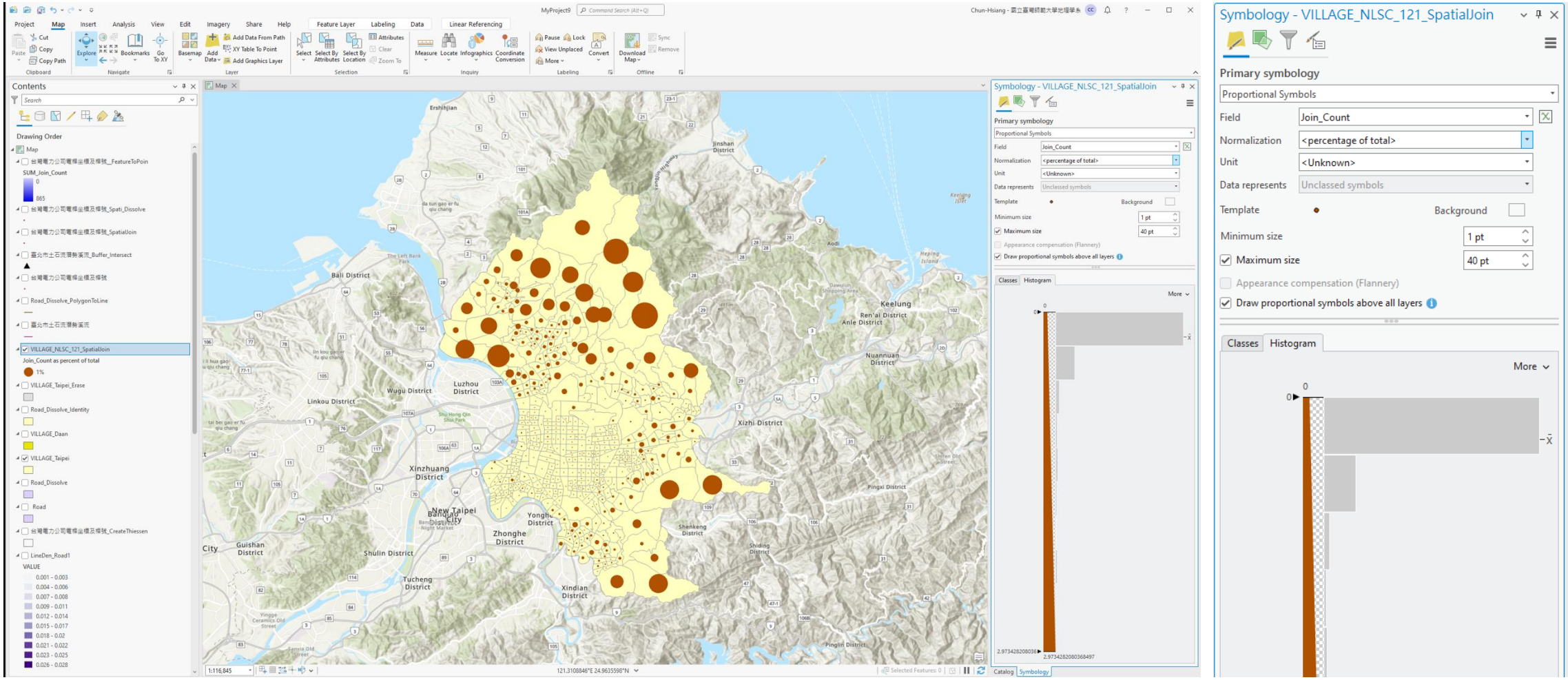
Symbology :: Graduated Symbols by UP_CNT



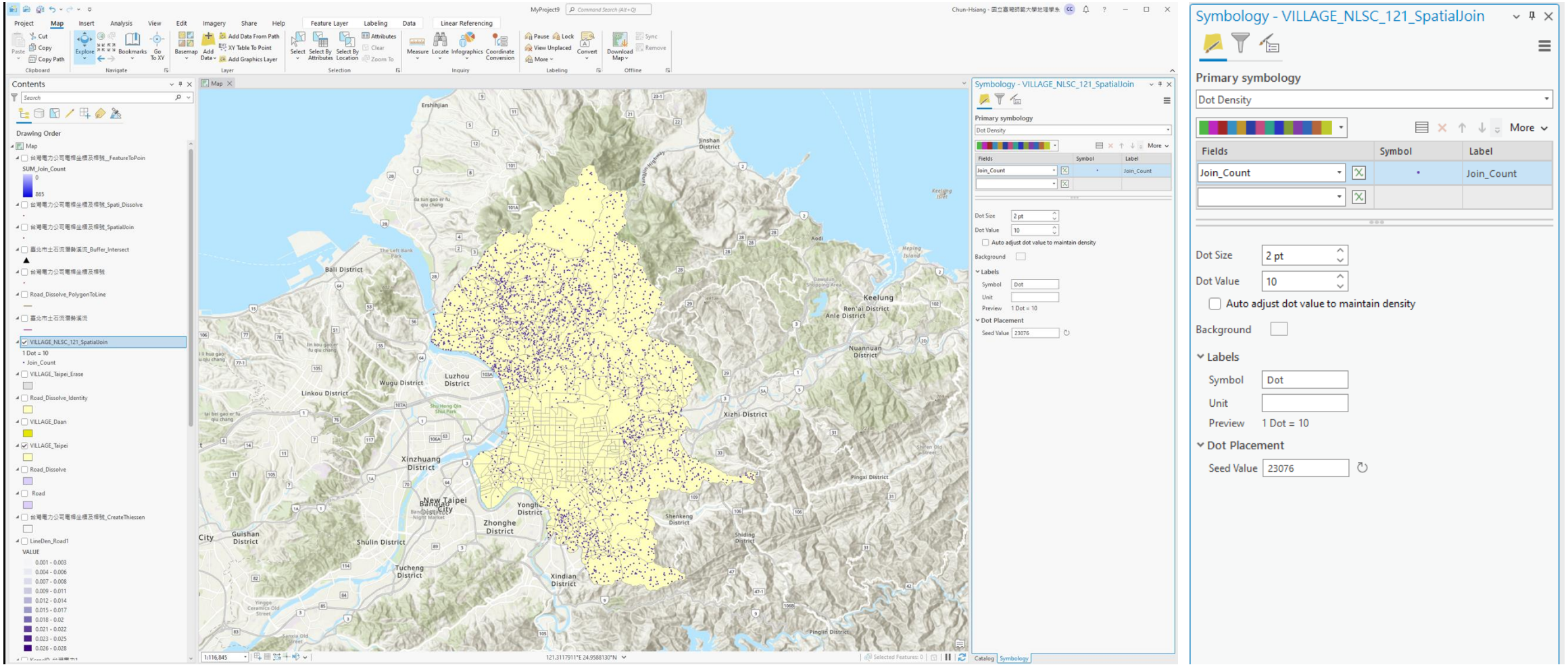
Symbology :: Unclassed Colors with UP_CNT



Symbology :: Proportional Symbols with UP_CNT



Symbology :: Dot Density with UP_CNT



The End

Thank you for your attention!

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Web: toodou.github.io