

10th International Space Syntax Symposium
Workshop 2



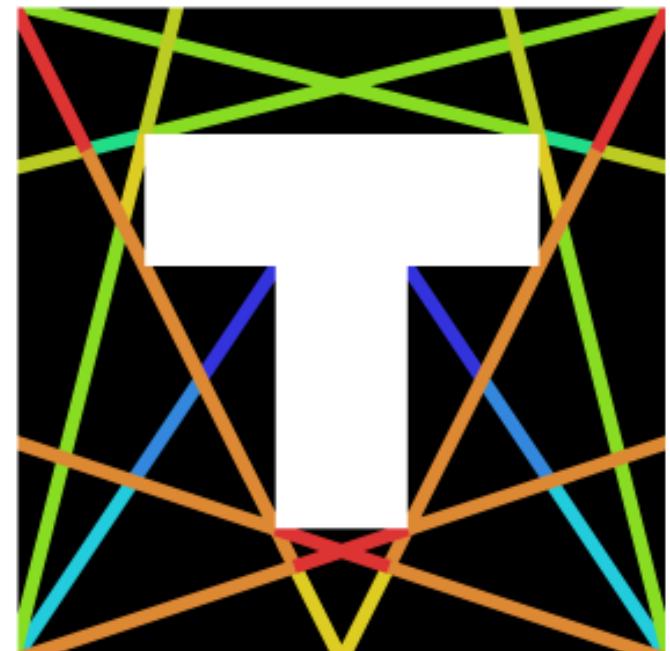
'Space Syntax Toolkit' for QGIS

Open source GIS and network analysis for space syntax research and practice

Jorge Gil

Space Syntax Laboratory
The Bartlett, UCL

13/07/2015 – 09:00 to 16:00
Levinsky Room, Institute of Child Health, UCL



- Instructor
- Participants
- Objectives
- Outline

- Author 'Space Syntax Toolkit' for QGIS (2013 -)
- Author 'Confeego' for MapInfo (2004 - 09)
- MSc Virtual Environments, The Bartlett, UCL
- PhD Researcher, Urbanism, TU Delft (2009 - 15)
- Work on assessing the sustainability of neighbourhoods in city-regions: focus on multi-modal mobility and accessibility
- Research on City Information Modelling
- Use and development of open source GIS and statistical analysis packages

	Yes / Some	No
space syntax	14	2
depthmapX	12	4
GIS	12	4
QGIS	5	11

Note: based on 16 participant's responses.

1. Demonstrate and learn how to use the 'Space Syntax Toolkit' (SST) for QGIS;
2. Explore ways in which QGIS (and GIS) can be used in space syntax research and practice;
3. Discuss how the SST can grow and evolve.

- Learn about space syntax theory and methods:
 - <http://www.spacesyntax.net/online-training-platform/>
- Learn about space syntax applications in research:
 - <http://www.spacesyntax.net/symposia/>
- Learn about depthmapX:
 - <https://varoudis.github.io/depthmapX/>
 - <https://github.com/SpaceGroupUCL/Depthmap/tree/master/docs>
- Learn about QGIS:
 - <http://docs.qgis.org/2.8/en/docs/index.html>

'Space Syntax Toolkit' for QGIS

09:15 – **Part 1** – Overview

10:30 – Break

10:45 – **Part 2** – Demonstration and Exercise

12:30 – Lunch Break

13:30 – **Part 3** – Exploration and Discussion

16:00 – Close

1. The SST project
2. Comprehensive description and explanation of the SST's features
3. Installation of the plugin
4. SST project repository

1. Before we begin: data formats
2. Exercise: complete SST workflow

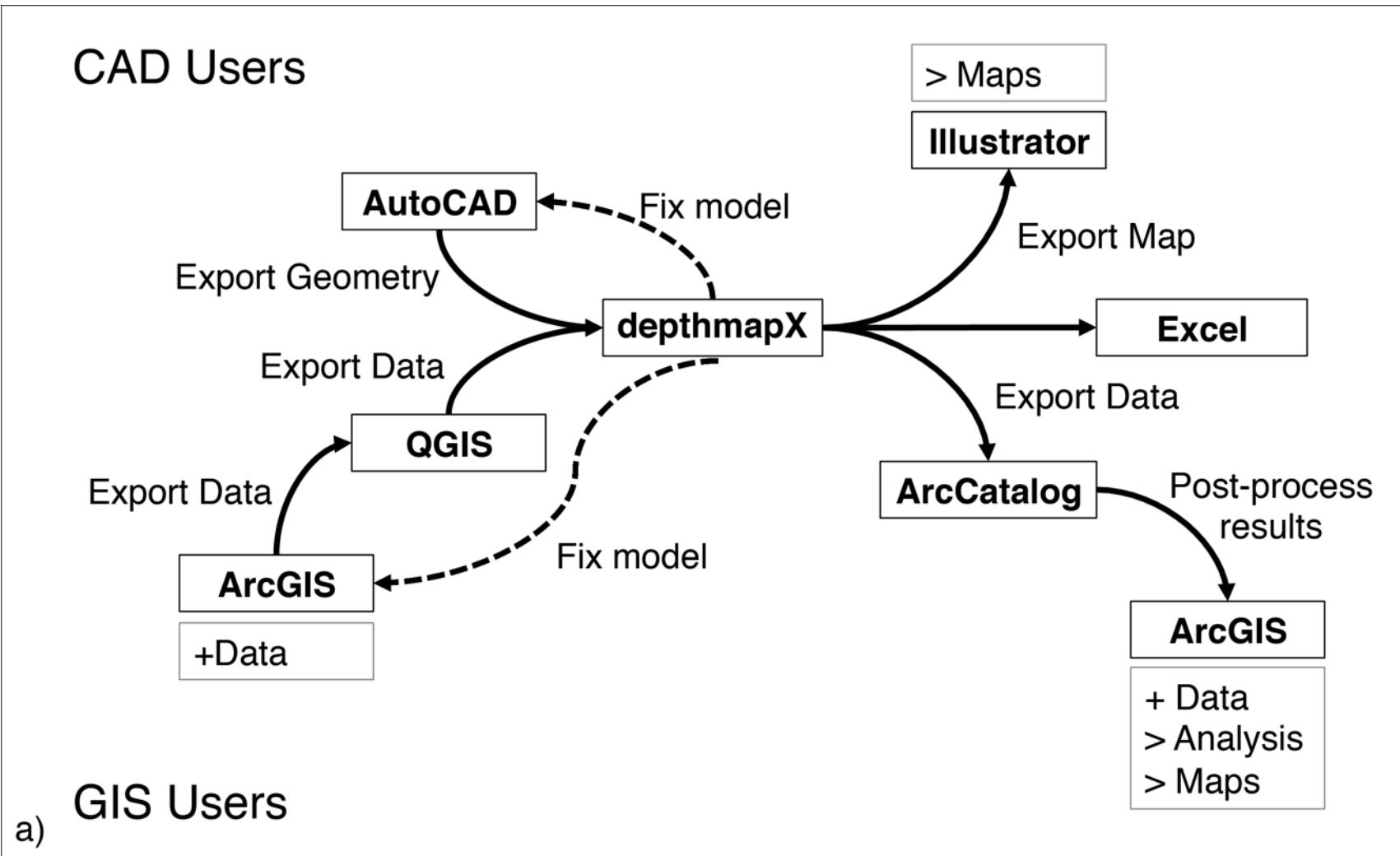
1. GIS stages and operations for space syntax
2. Useful QGIS plugins and tools
3. Examples of work
4. Exploration of space syntax QGIS workflows
5. Discussion on new workflows for the SST

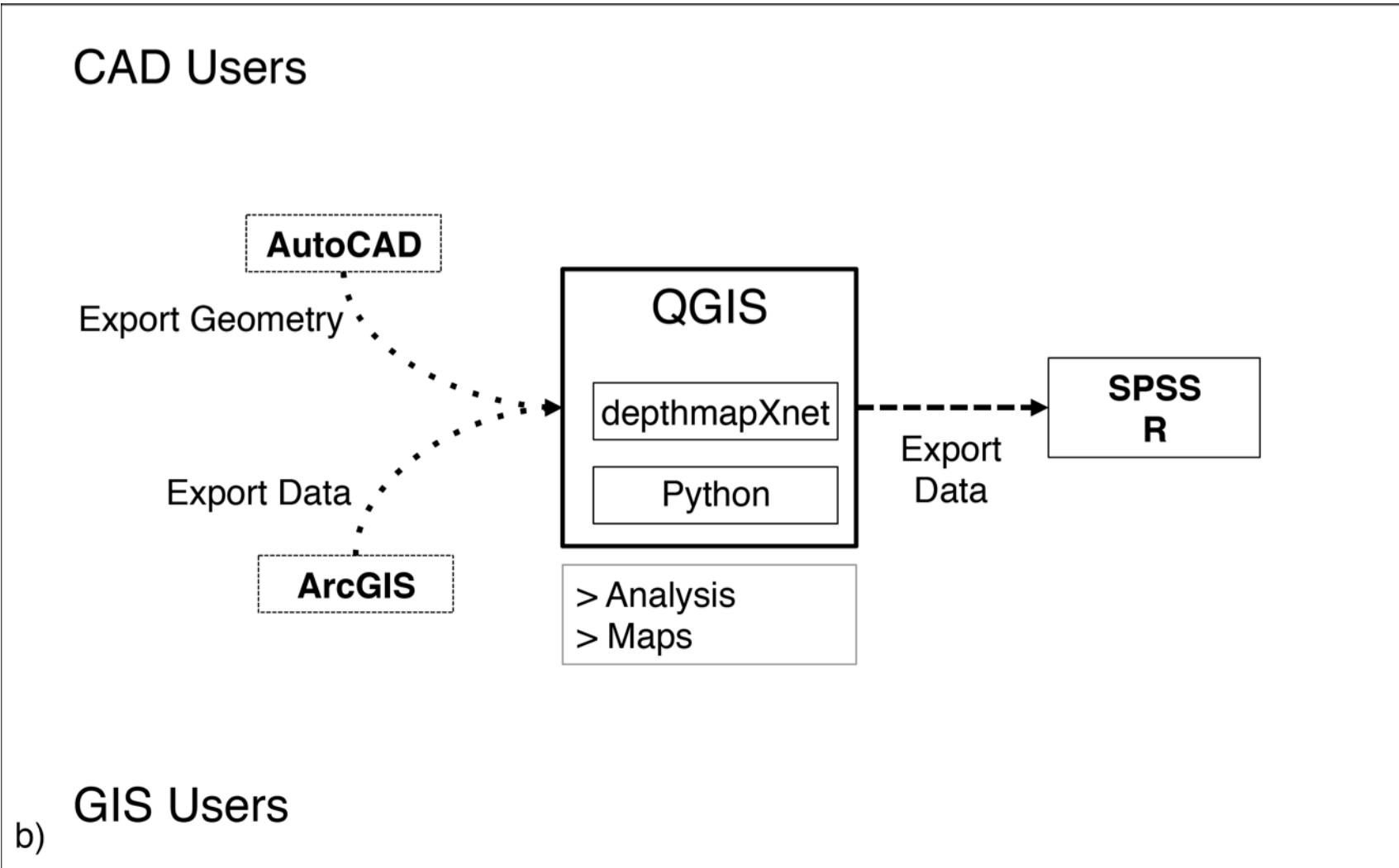
PART 1 – Overview

1. The SST project
2. Comprehensive description and explanation of the SST's features
3. Installation of the plugin
4. SST project repository

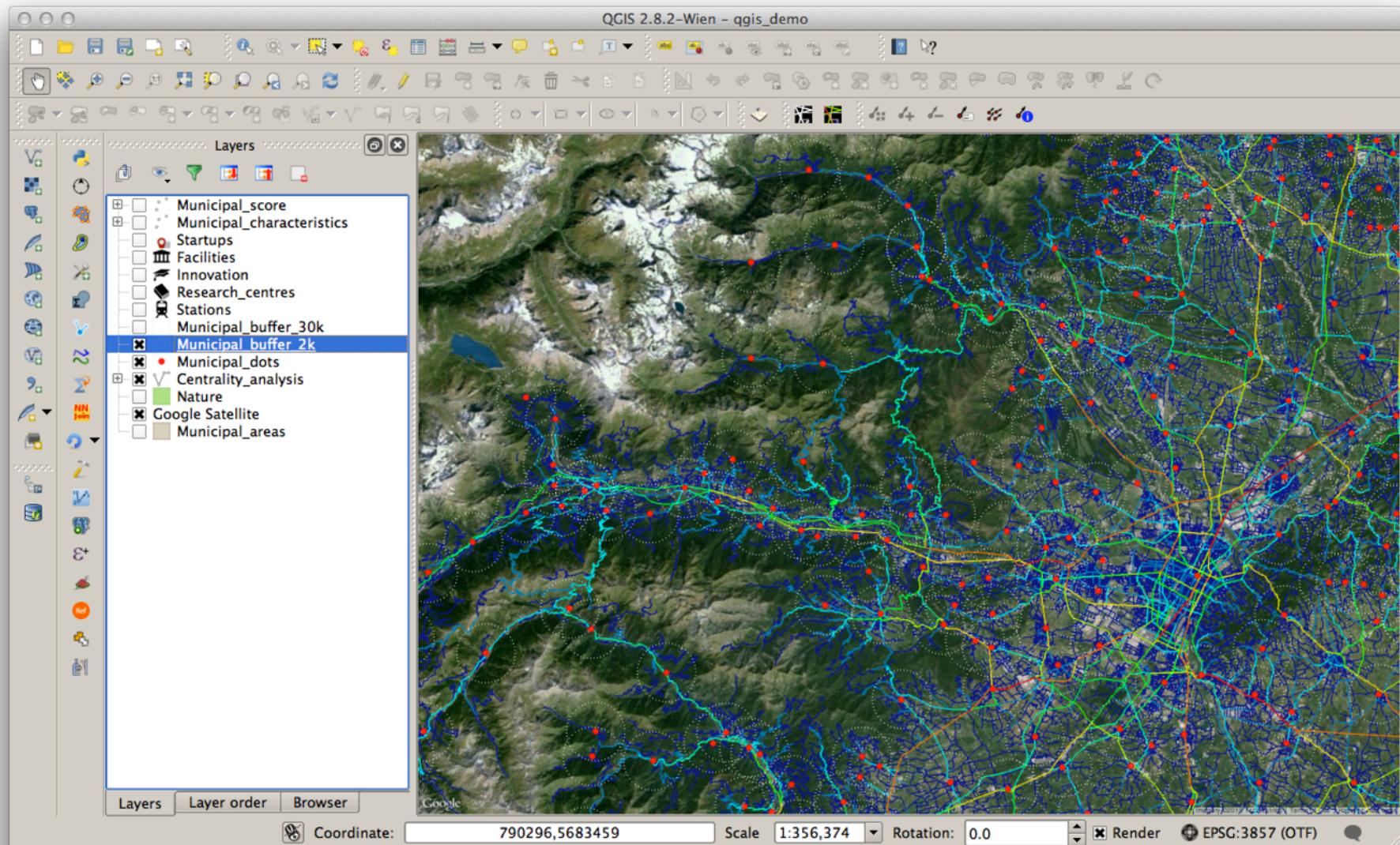
- An open source project for space syntax education, research and practice;
- Led by the Space Syntax Laboratory, UCL;
- Developed in connection with the depthmapX software project;
- For the space syntax community.

- **Integrate** space syntax spatial analysis (depthmapX) **with QGIS** for teaching and research
- **Expand** exploratory spatial and quantitative analysis features of **QGIS**
- **User friendly** tool for students: clear and linear workflows
- **Flexible** tool for researchers: analytic options and exploratory depth
- **Operational** tool for practice: robust, fast and optimised workflows



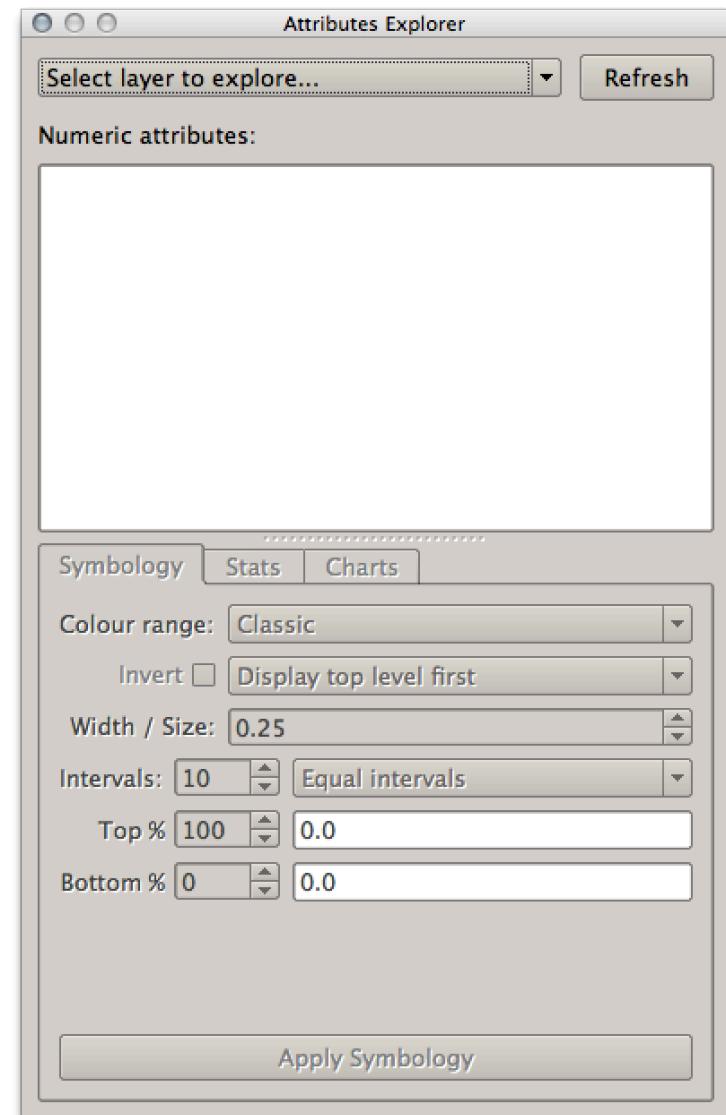


Why choose QGIS?



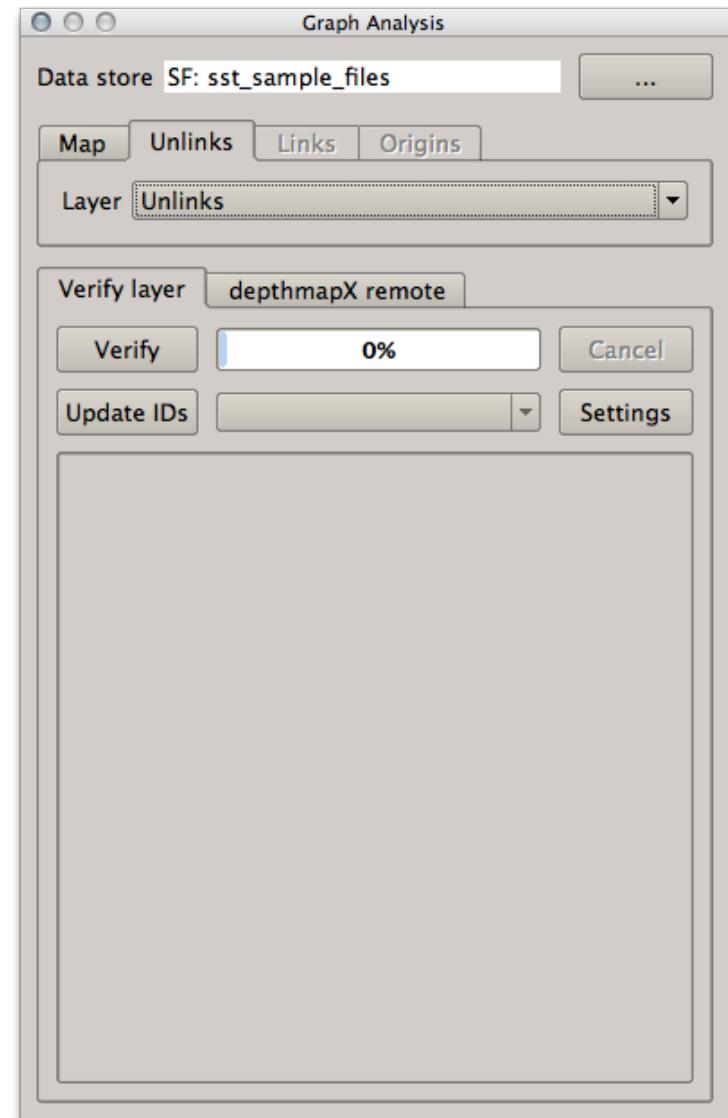
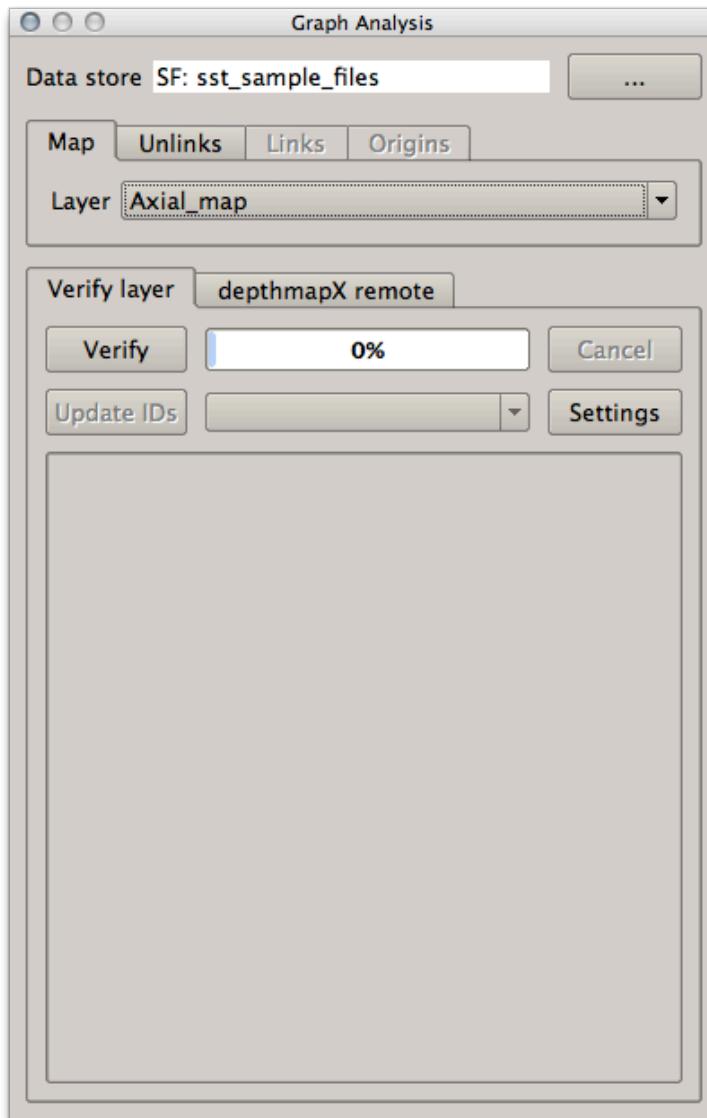
- Free and open source
- Cross-platform (Windows, Linux, Mac OSX)
- User friendly interface
- Well documented (in English and other languages)
- Growing user and developer community
- Extensive input/output data formats, tools and plugins
- Managed installation and maintenance of plug-ins
- Based on open standards and packages
- Automation tools and customisation with Python

Space Syntax Toolkit (SST)



- Integrated workflows for:
 - Axial model verification and analysis
 - Results post-processing and import
- Input data format agnostic
- Output to all QGIS native formats
- Alternative algorithms optimised for geodatabases
- Standard defaults, advanced settings hidden
- Multi-threaded

Model set-up



Model verification: Map

QGIS Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Window Help

QGIS 2.8.2-Wien - sample_data

Layers

- Underground_stations
- Pedestrian_counts
- Unlinks_errors
- Axial_map_errors
- Unlinks
- Axial_map
- Census_population



Graph Analysis

Data store SF: sst_sample_files

Map Unlinks Links Origins

Layer Axial_map_errors

Verify layer depthmapX remote

Verify 100% Cancel

Update IDs All problems (11) Settings

All problems (11)

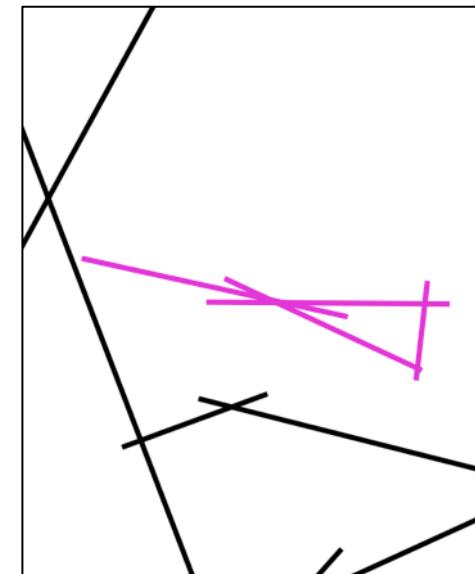
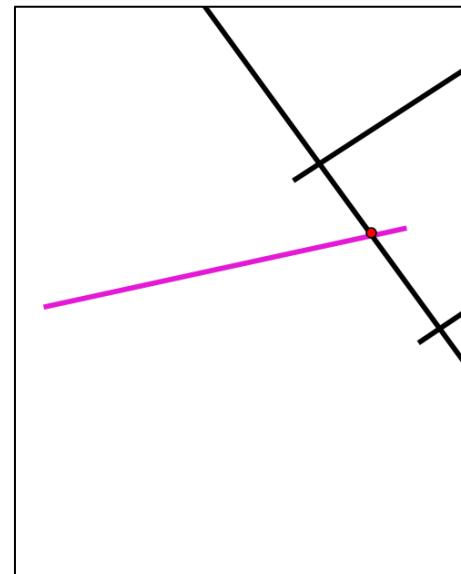
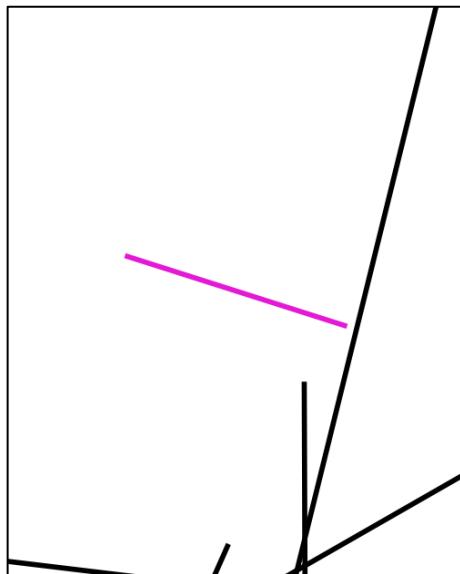
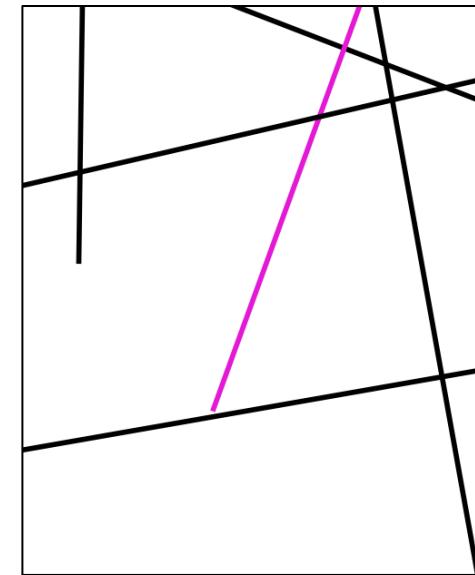
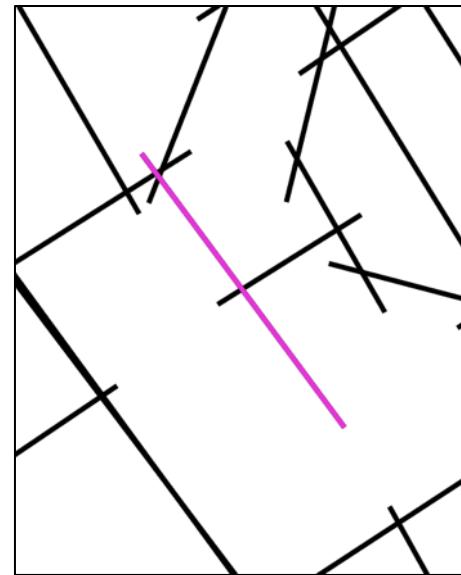
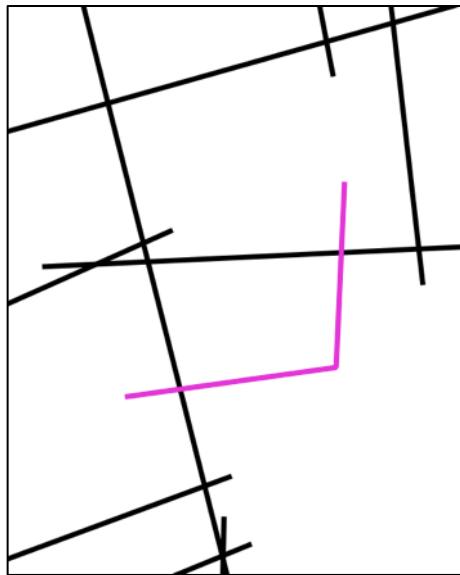
ID	Description
517	orphan
871	short
400	island
401	island
402	island
403	island
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry

Coordinate: 533656,187150 Scale 1:30,278 Rotation: 0.0 Render EPSG:27700

There is a plugin update available

Map error types

- Polyline
- Duplicate
- Short
- Orphan
- Unlinked orphan
- Island
- Small
- Coinciding points



Map verification results and settings

Graph Analysis

Data store SL: sst_sample_data.sqlite ...

Map Unlinks Links Origins

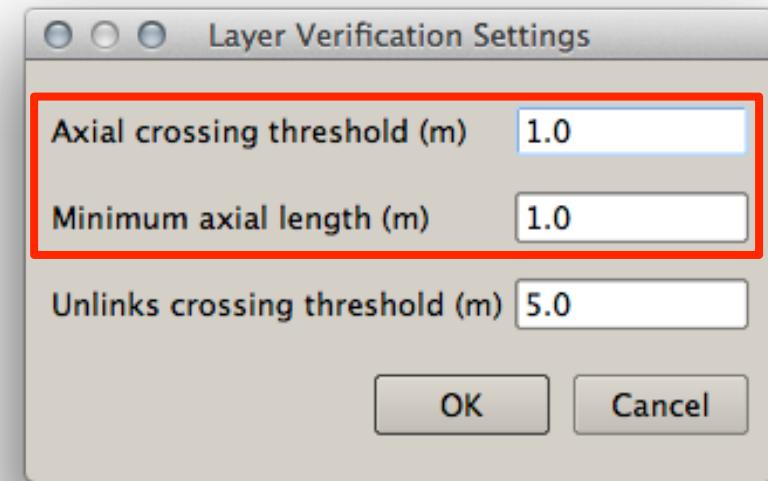
Layer Axial_map_errors

Verify layer depthmapX remote

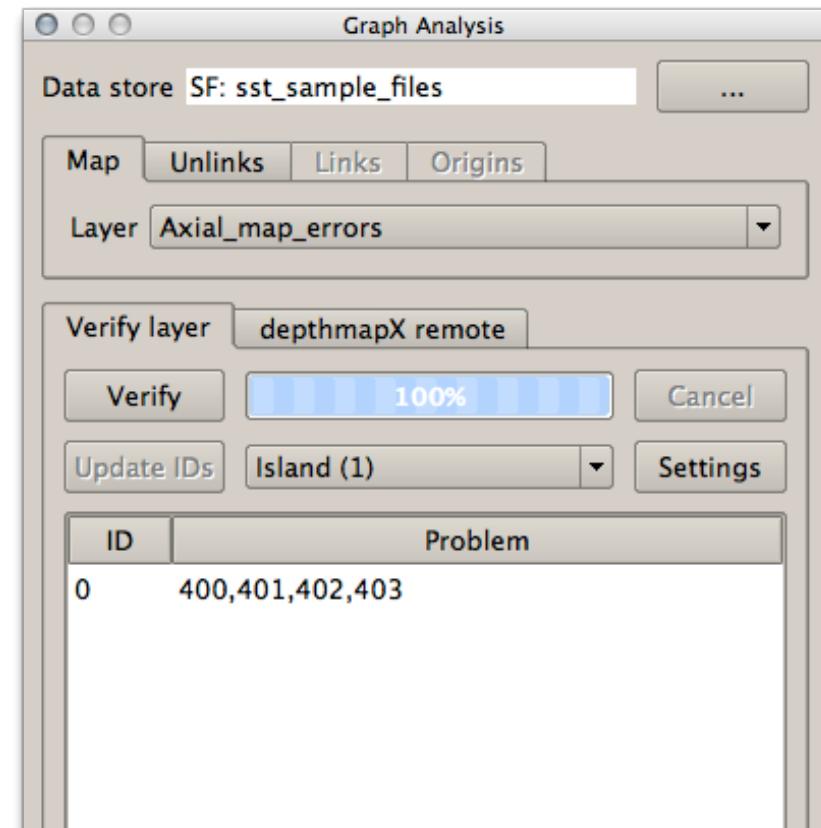
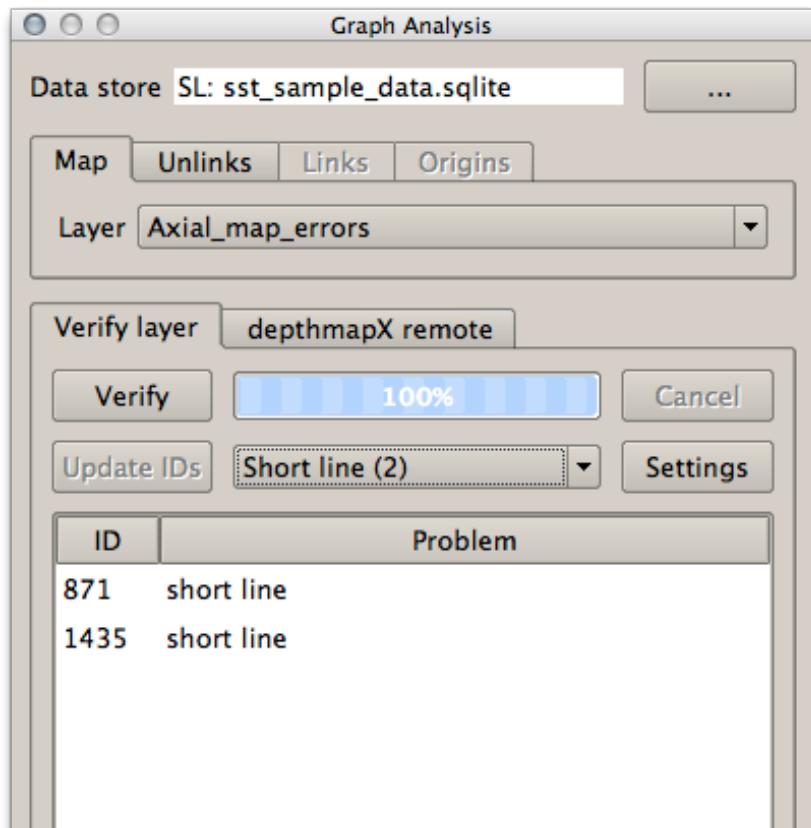
Verify 100% Cancel

Update IDs All problems (12) Settings

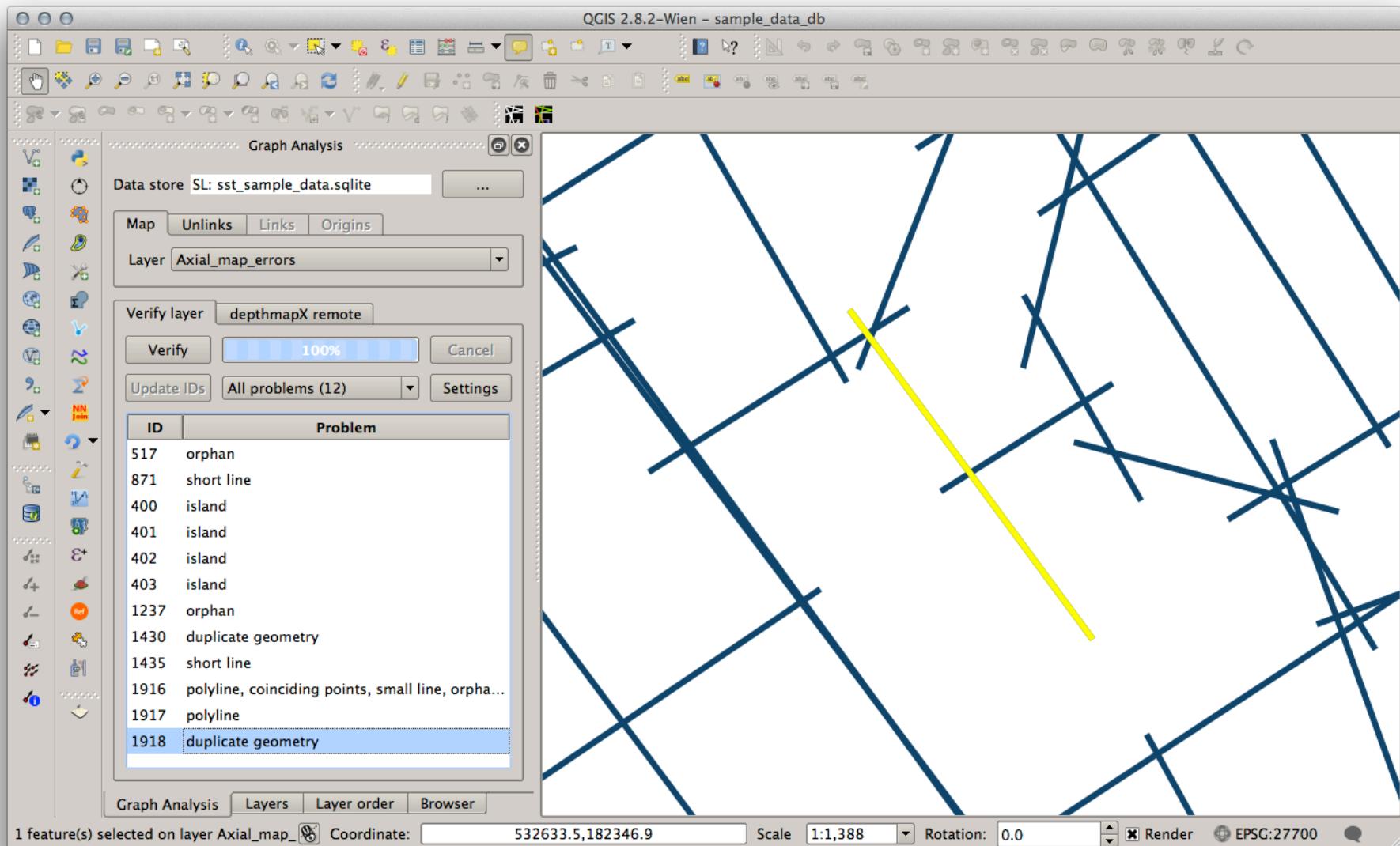
ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry



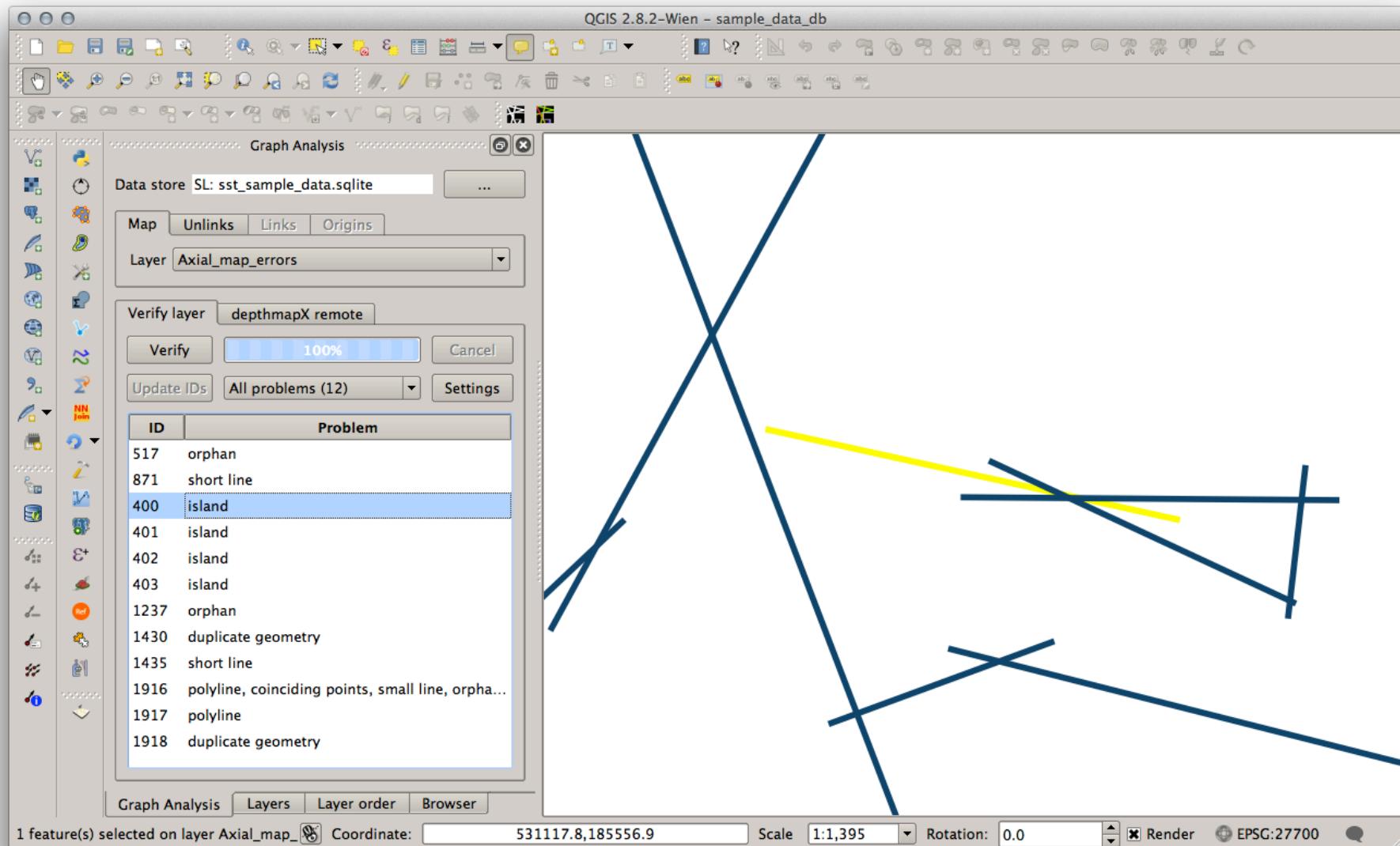
Filter map errors



Zoom to map errors



Zoom to map errors



Edit and fix map errors

QGIS 2.8.2-Wien – sample_data

The screenshot shows a QGIS interface with a map containing several blue lines and red 'X' marks. A legend on the left lists layers: Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors, Unlinks, Axial_map, and Census_population. The 'Axial_map_errors' layer is selected. On the right, a 'Graph Analysis' dialog is open with a data store 'SF: sst_sample_files'. The 'Map' tab is selected, showing the 'Axial_map_errors' layer. A progress bar indicates 'Verify' at 100% for 'depthmapX remote'. A table lists 12 errors:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry

Validation finished (0 error(s) found). Coordinate: 531159.4,185533.1 Scale 1:2,026 Rotation: 0.0 Render EPSG:27700

Edit and fix map errors

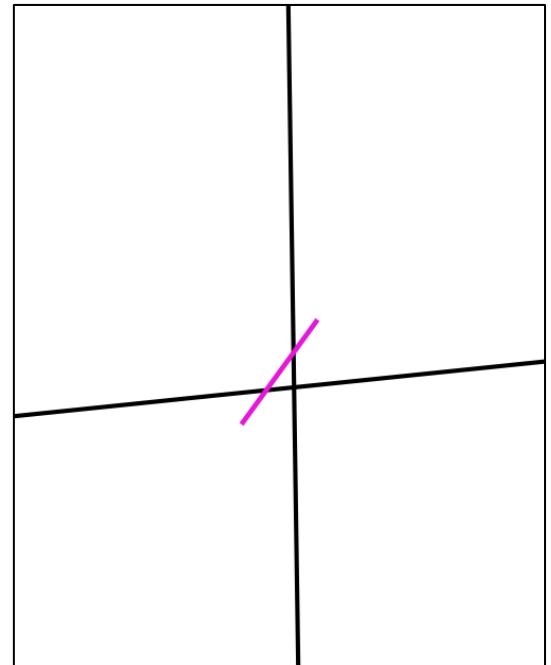
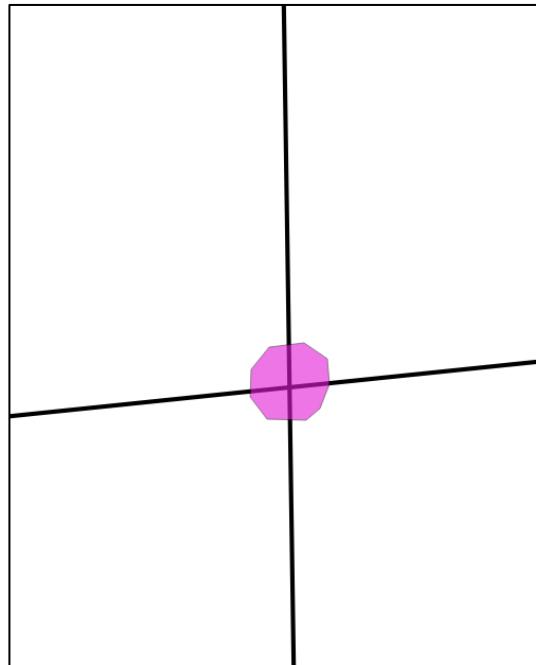
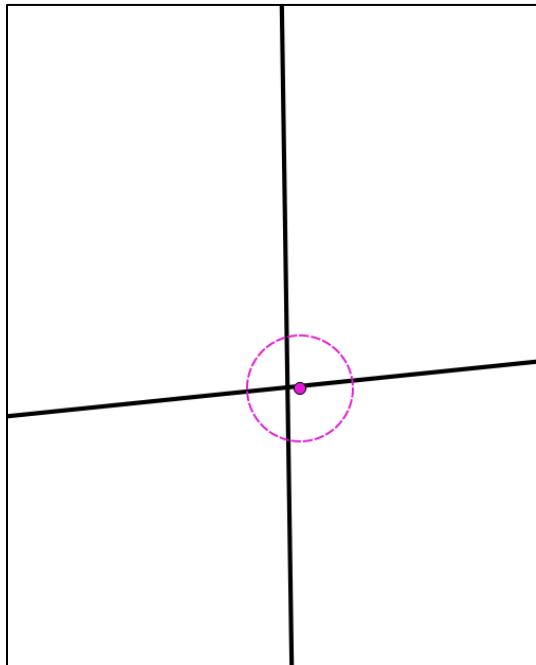
QGIS 2.8.2-Wien – sample_data

The screenshot shows the QGIS interface with a map containing several blue lines and red 'X' marks. A legend on the left lists layers: Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors, Unlinks, Axial_map, and Census_population. The 'Axial_map_errors' layer is selected. On the right, the 'Graph Analysis' tool is open with 'Data store SF: sst_sample_files'. The 'Map' tab is selected, showing the 'Layer Axial_map_errors'. The 'Verify layer' dropdown is set to 'depthmapX remote'. A progress bar indicates '100%' completion. Below it, 'Update IDs' is set to 'All problems (12)'. A table lists the errors:

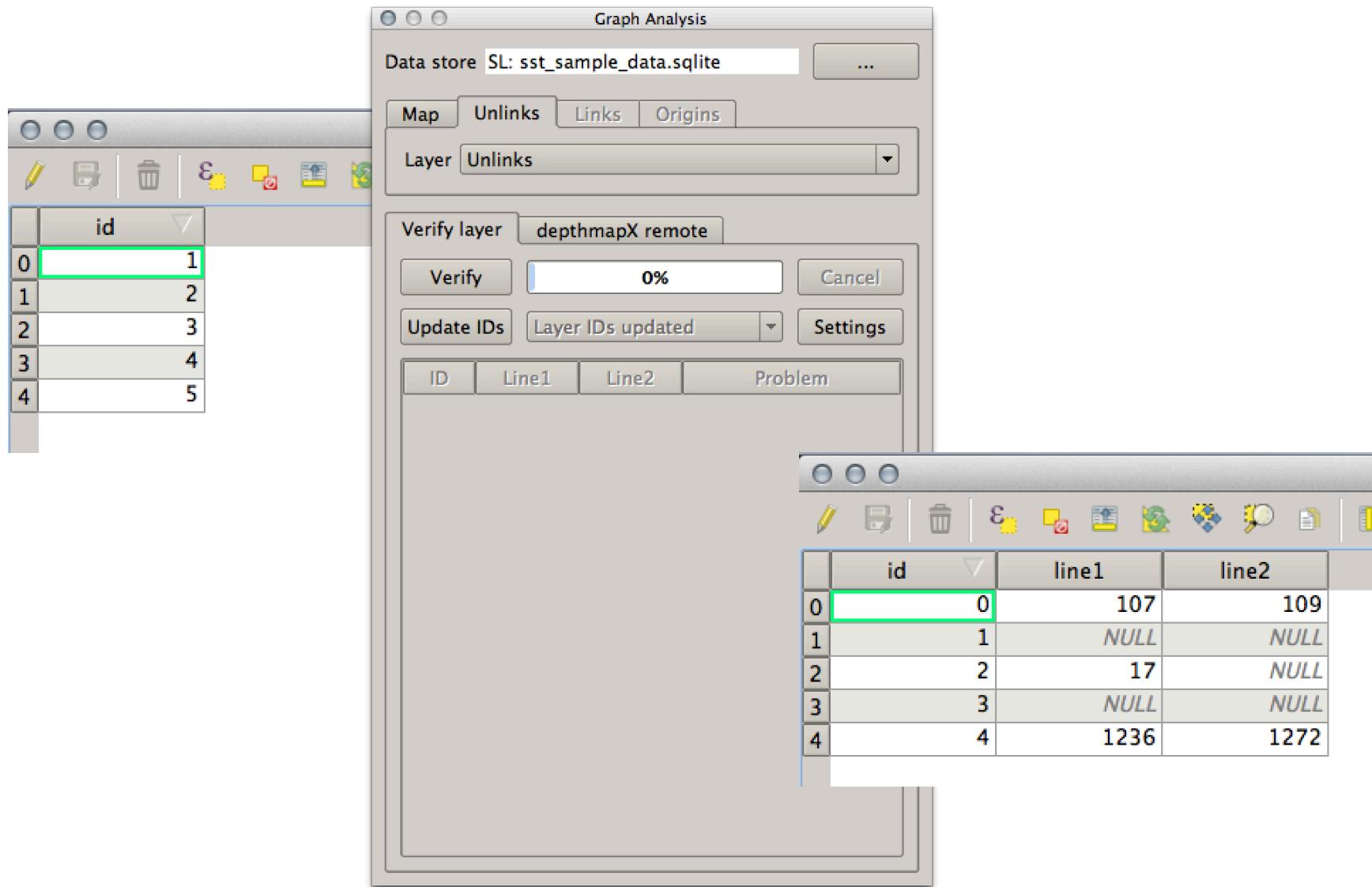
ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orphan...
1917	polyline
1918	duplicate geometry

Validation finished (0 error(s) found). Coordinate: 531122.9,185572.4 Scale 1:2,026 Rotation: 0.0 Render EPSG:27700

Model verification: Unlinks



Update line id attributes



The screenshot shows the QGIS Graph Analysis tool interface. The main window title is "Graph Analysis". The "Data store" dropdown shows "SL: sst_sample_data.sqlite". The tabs at the top are "Map", "Unlinks" (selected), "Links", and "Origins". The "Layer" dropdown shows "Unlinks". A progress bar indicates "0%" completion for a task named "Verify layer depthmapX remote". Below the progress bar are buttons for "Verify", "Cancel", "Update IDs", and "Settings". The "Update IDs" button is set to "Layer IDs updated". A table below the buttons has columns "ID", "Line1", "Line2", and "Problem".

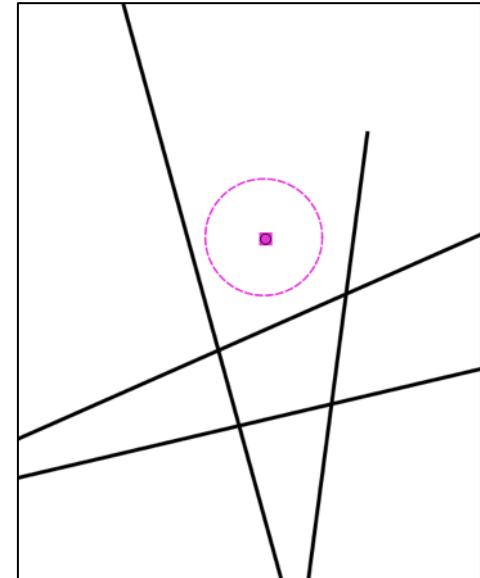
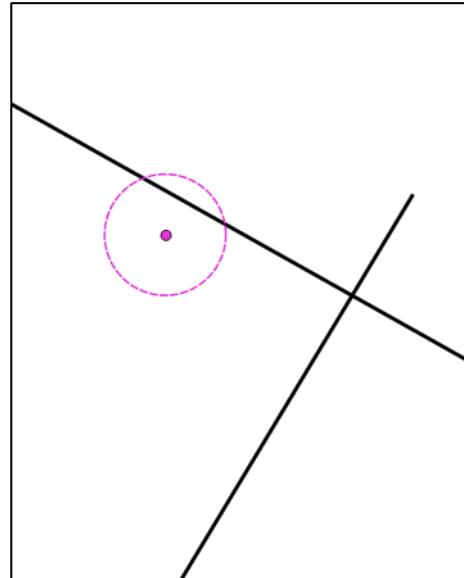
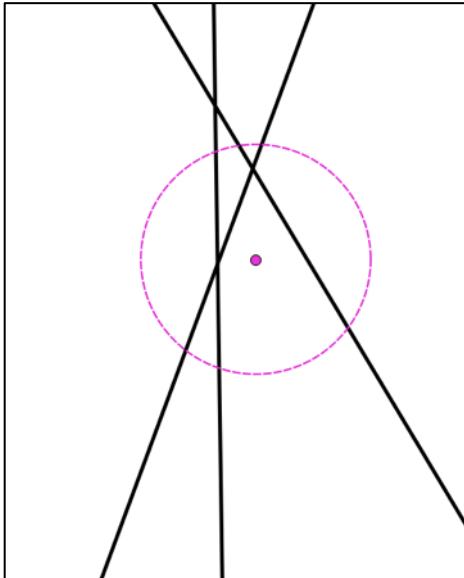
On the left, there is a smaller window or panel showing a table with an "id" column containing values 0 through 4.

On the right, there is a larger table with columns "id", "line1", and "line2". The data is as follows:

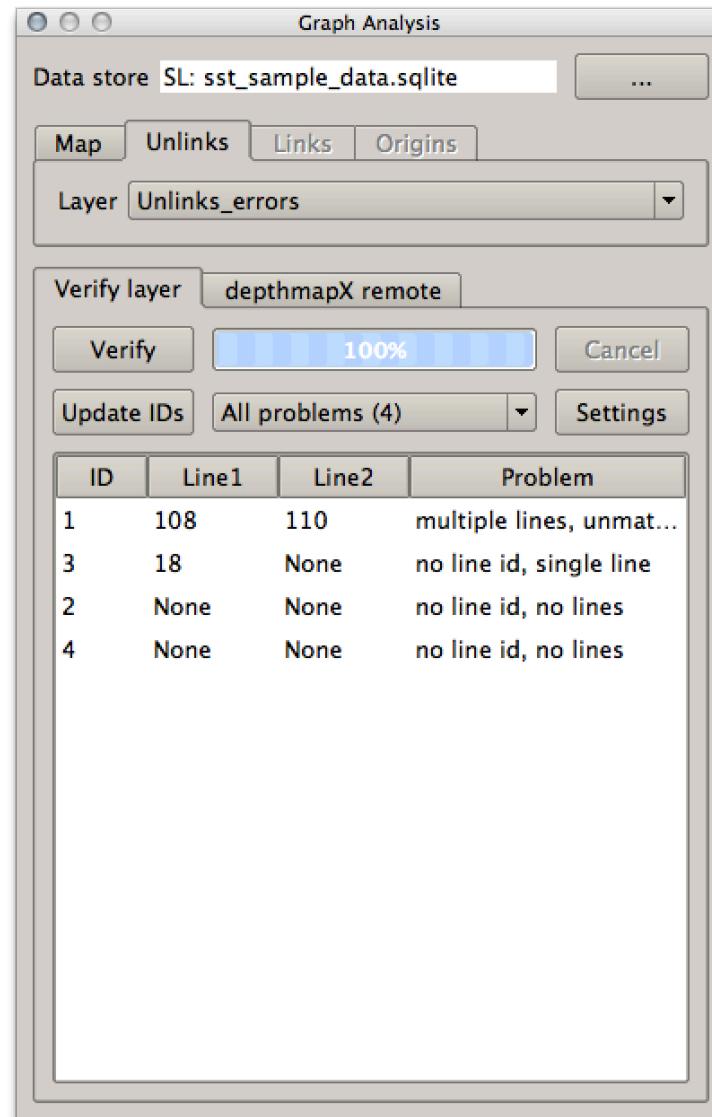
id	line1	line2
0	0	107
1	1	NULL
2	2	17
3	3	NULL
4	4	1236
		1272

Unlinks error types

- Multiple lines
- Single line
- No lines
- No line id
- Same line id
- Unmatched line id



Unlinks verification results



QGIS 2.8.2-Wien – sample_data_db

Graph Analysis

Data store SL: sst_sample_data.sqlite

Map Unlinks Links Origins

Layer Unlinks_errors

Verify layer depthmapX remote

Verify 100% Cancel

Update IDs All problems (4) Settings

ID	Line1	Line2	Problem
3	18	18	same line id, single li...
2	None	None	no line id, no lines
1	108	154	multiple lines, unmat...
4	None	None	no line id, no lines

Graph Analysis Layers Layer order Browser

1 feature(s) selected on layer Unlinks_err

Coordinate: 531932.3,183653.6

Scale: 1:1,395

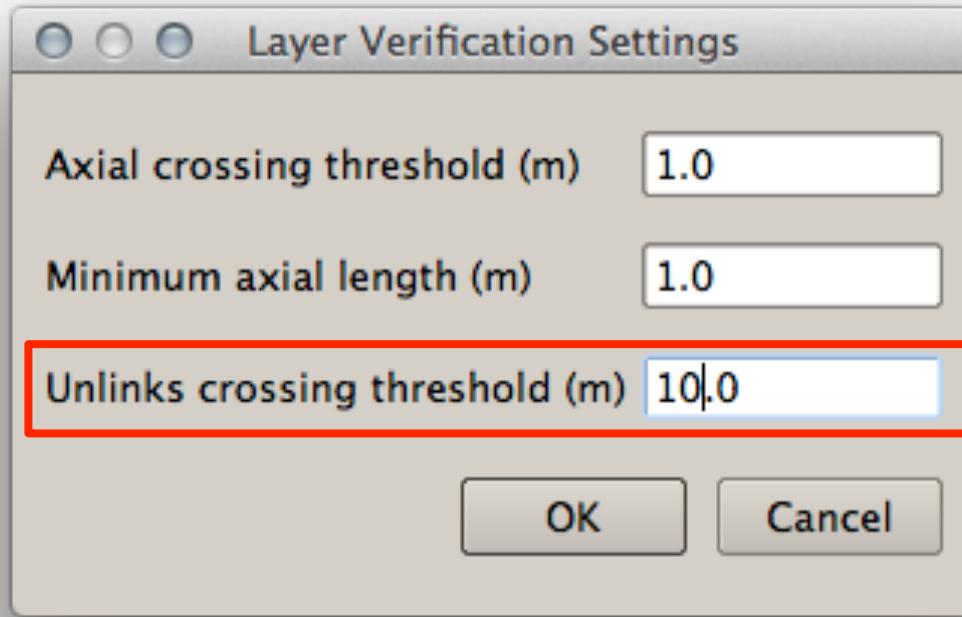
Rotation: 0.0

Render

EPSG:27700

ID	Line1	Line2	Problem
3	18	18	same line id, single li...
2	None	None	no line id, no lines
1	108	154	multiple lines, unmat...
4	None	None	no line id, no lines

Unlinks verification settings



QGIS 2.8.2-Wien – sample_data_db

Graph Analysis

Data store SL: sst_sample_data.sqlite

Map Unlinks Links Origins

Layer Unlinks_errors

Verify layer depthmapX remote

Verify 100% Cancel

Update IDs All problems (4) Settings

ID	Line1	Line2	Problem
3	18	18	same line id, single li...
2	4	38	multiple lines, unmat...
1	108	154	multiple lines, unmat...
4	None	None	no line id, no lines

Graph Analysis Layers Layer order Browser

1 feature(s) selected on layer Unlinks_err

Coordinate: 531292.6,184199.6

Scale 1:1,395

Rotation: 0.0

Render

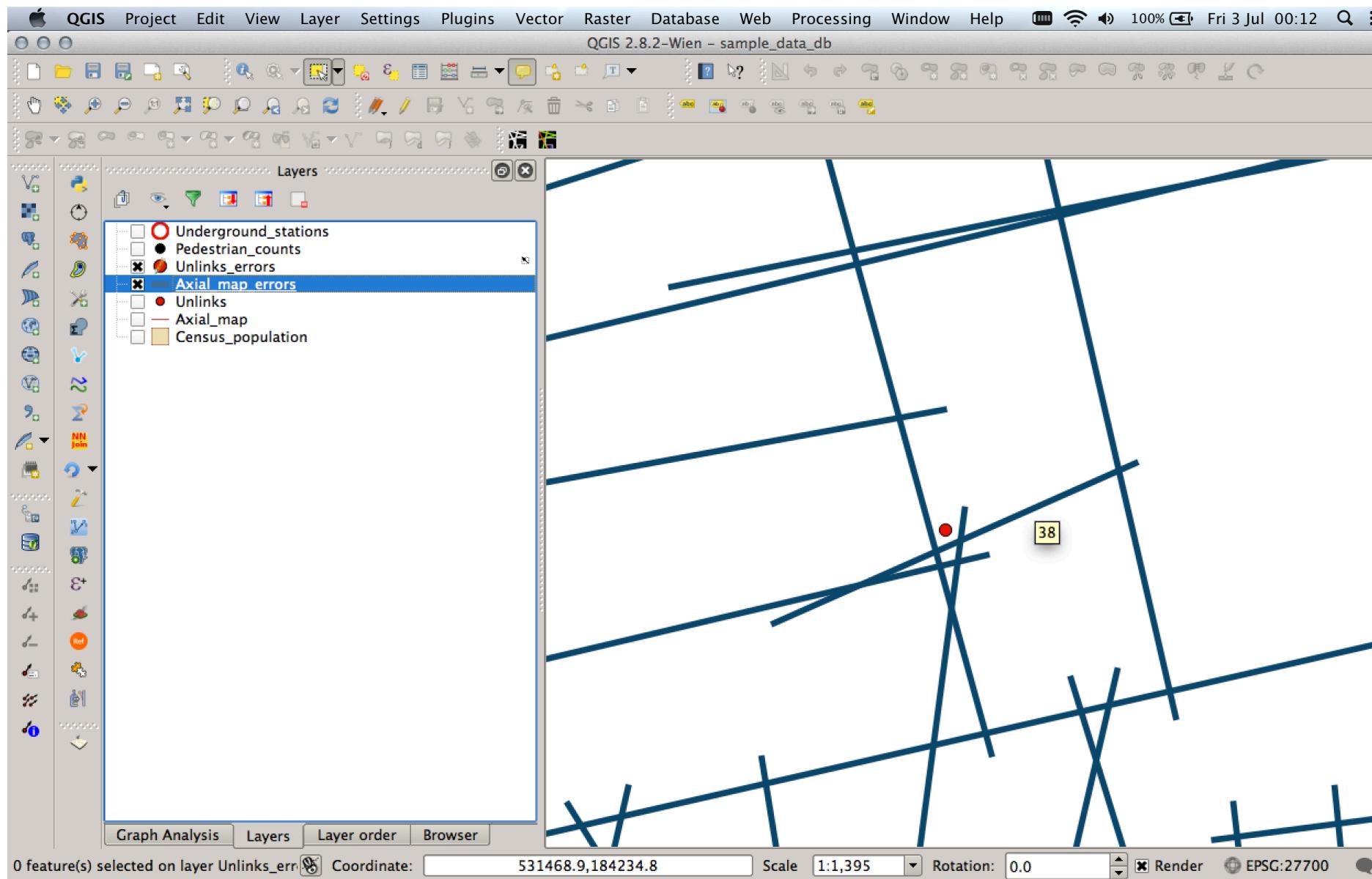
EPSG:27700

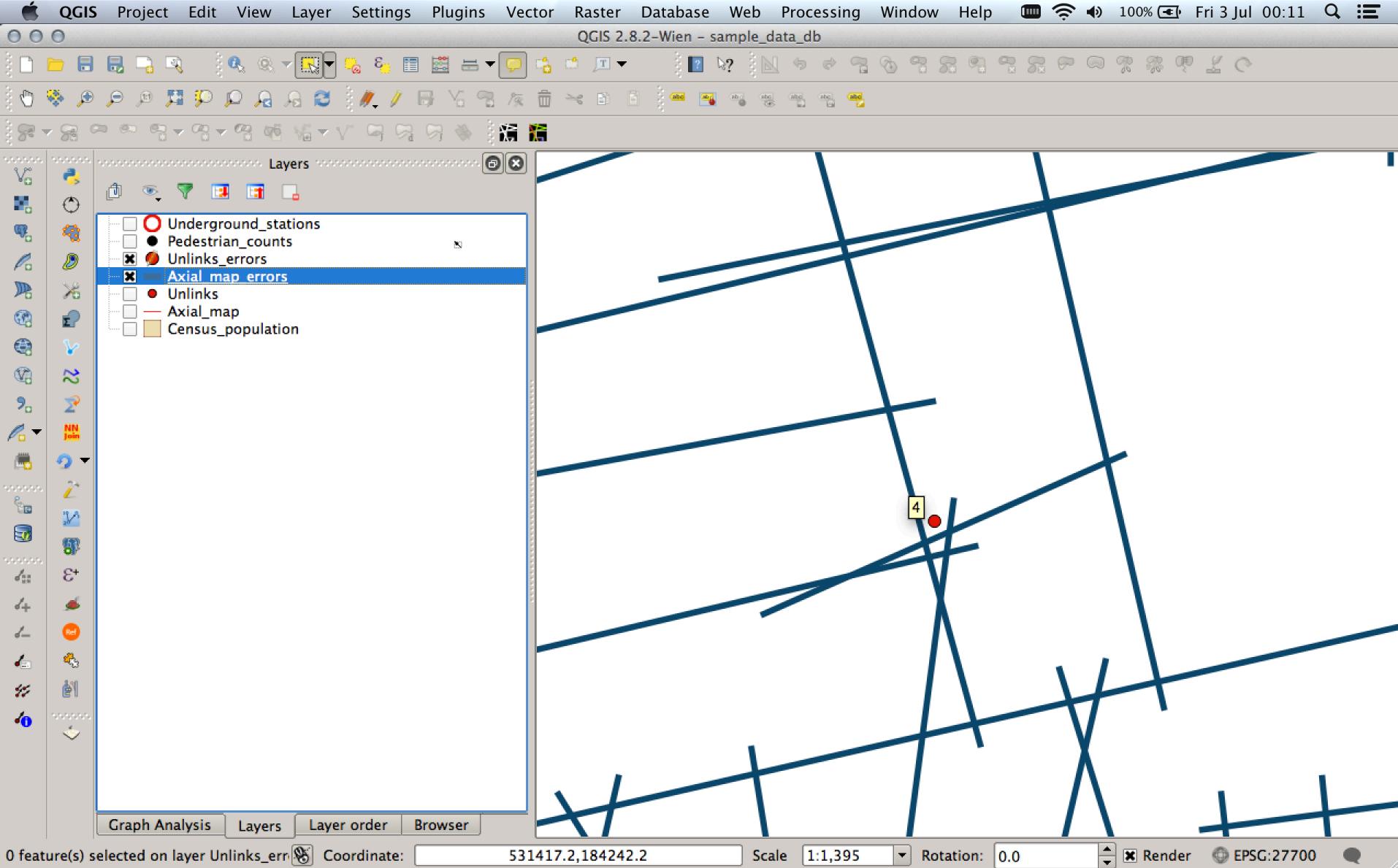
The screenshot shows the QGIS 2.8.2-Wien interface with the 'sample_data_db' project open. The 'Graph Analysis' plugin is active, specifically the 'Unlinks' tab. A data store 'SL: sst_sample_data.sqlite' is selected. The 'Layer' dropdown shows 'Unlinks_errors'. The 'Verify layer' button is highlighted, showing a progress of 100%. The 'Update IDs' button is available, with 'All problems (4)' listed. A table details the errors found:

ID	Line1	Line2	Problem
3	18	18	same line id, single li...
2	4	38	multiple lines, unmat...
1	108	154	multiple lines, unmat...
4	None	None	no line id, no lines

The map view displays a network of dark blue line segments. A yellow dot is placed on one of the lines. The bottom status bar shows '1 feature(s) selected on layer Unlinks_err' at coordinates '531292.6,184199.6'. The scale is set to '1:1,395' and rotation to '0.0'. The coordinate system is 'EPSG:27700'.

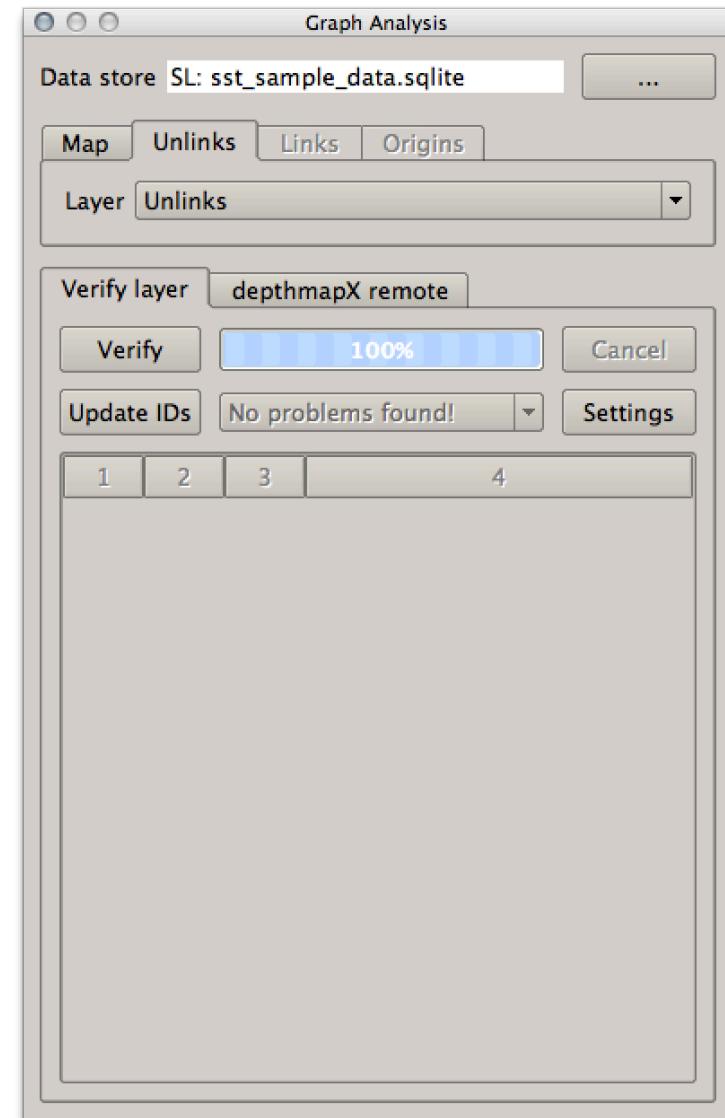
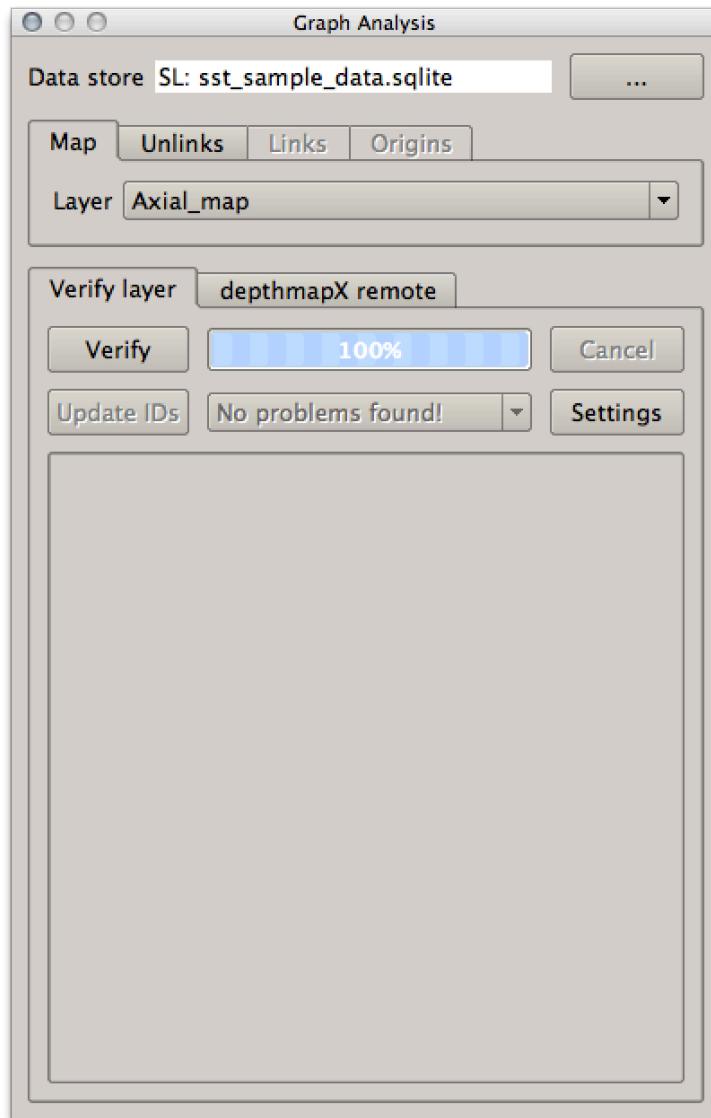
Zoom to and edit unlinks



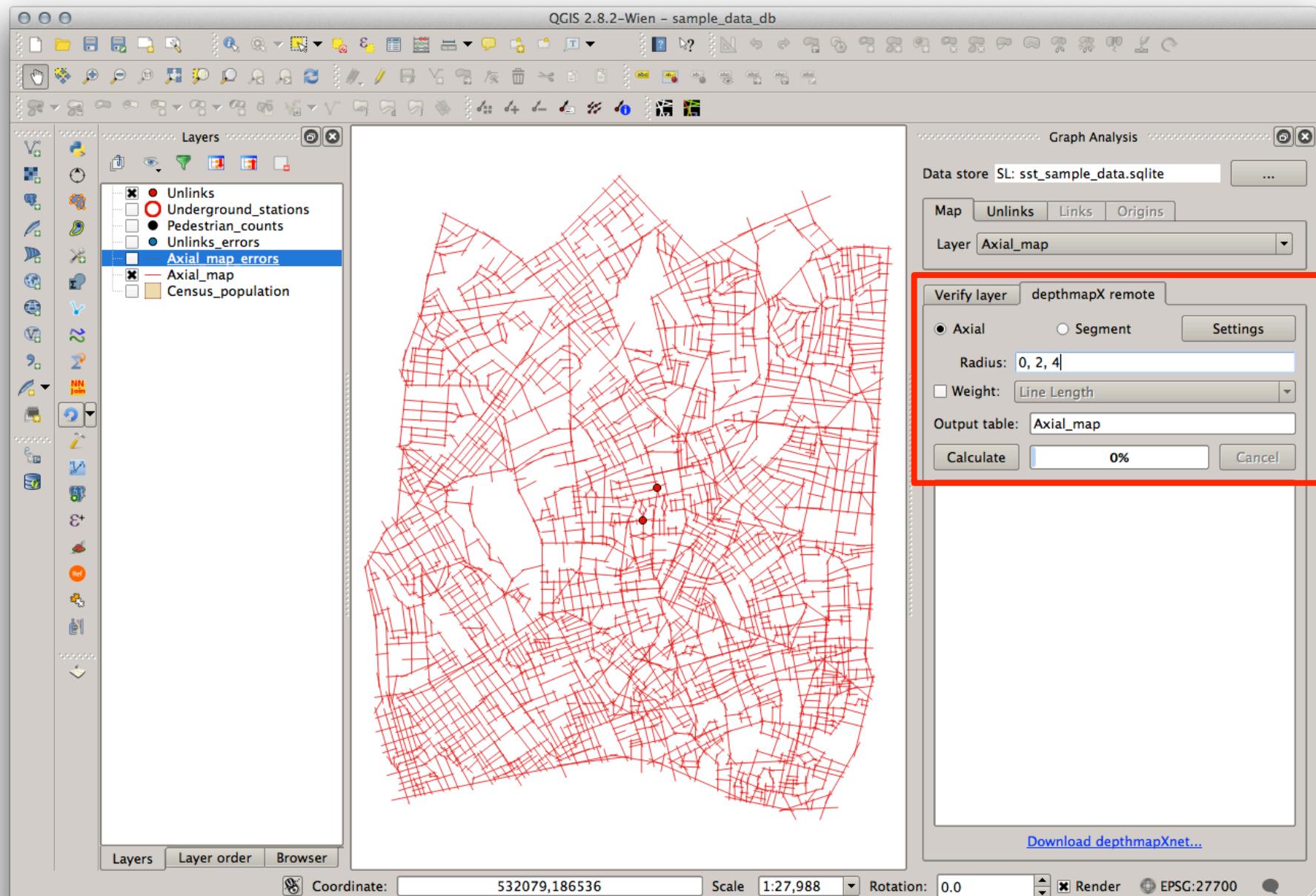


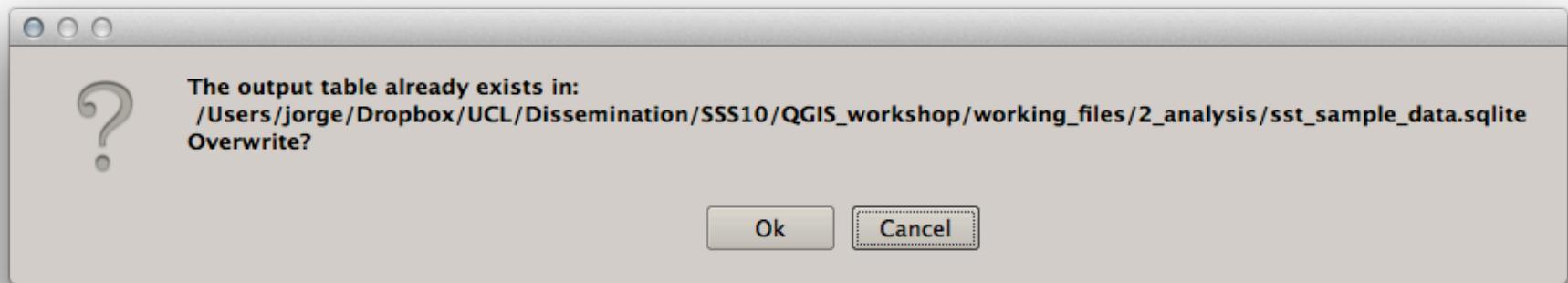
- The model verification process is iterative:
 - Verify and fix axial lines
 - Update unlinks ids
 - Verify and fix unlinks
 - Verify and fix axial lines
 - Verify and fix unlinks
 - Update unlink ids
 - Verify and fix axial lines
 - ...

Model verification concluded

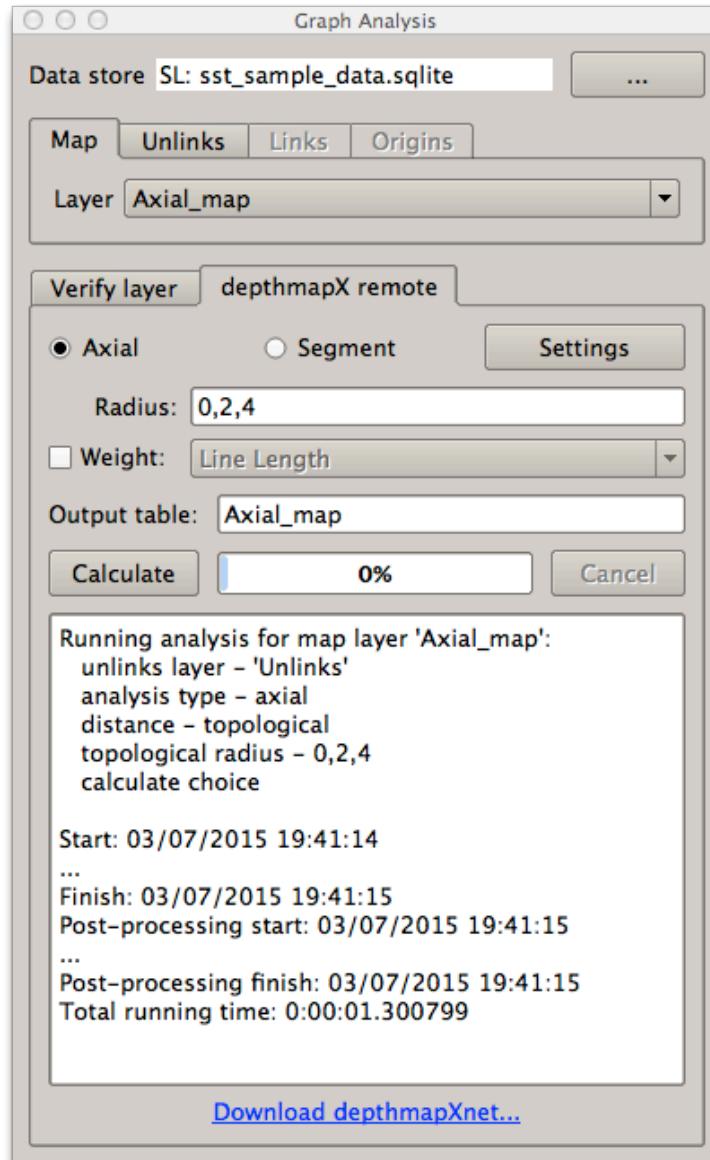


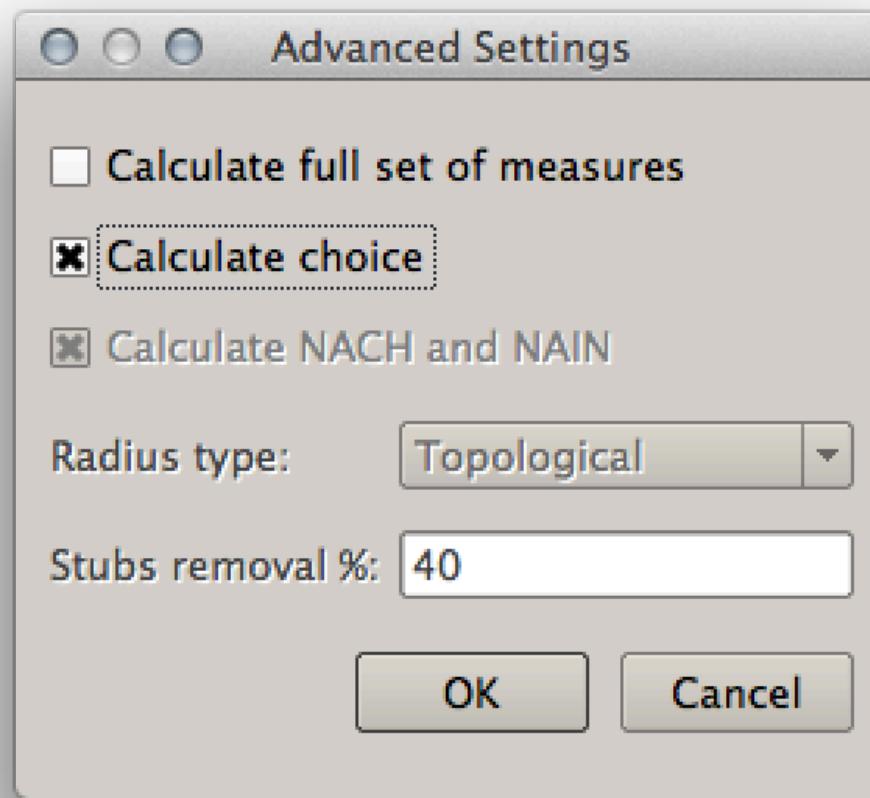
Model analysis: Axial



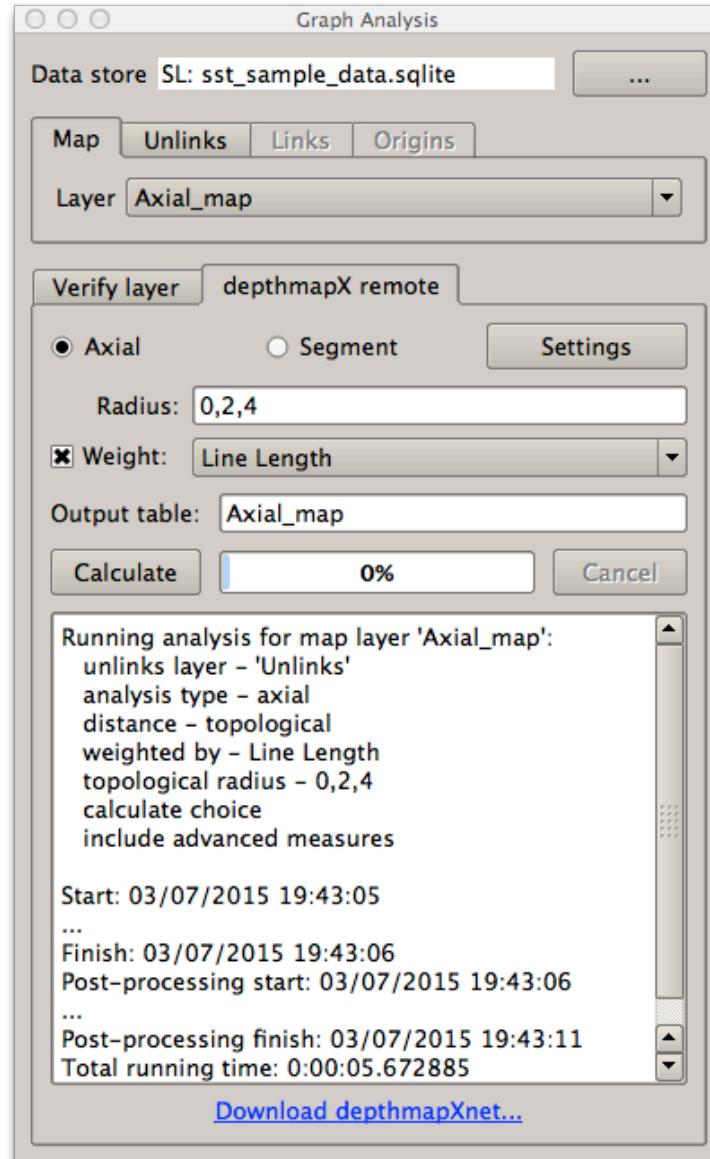


Axial analysis report

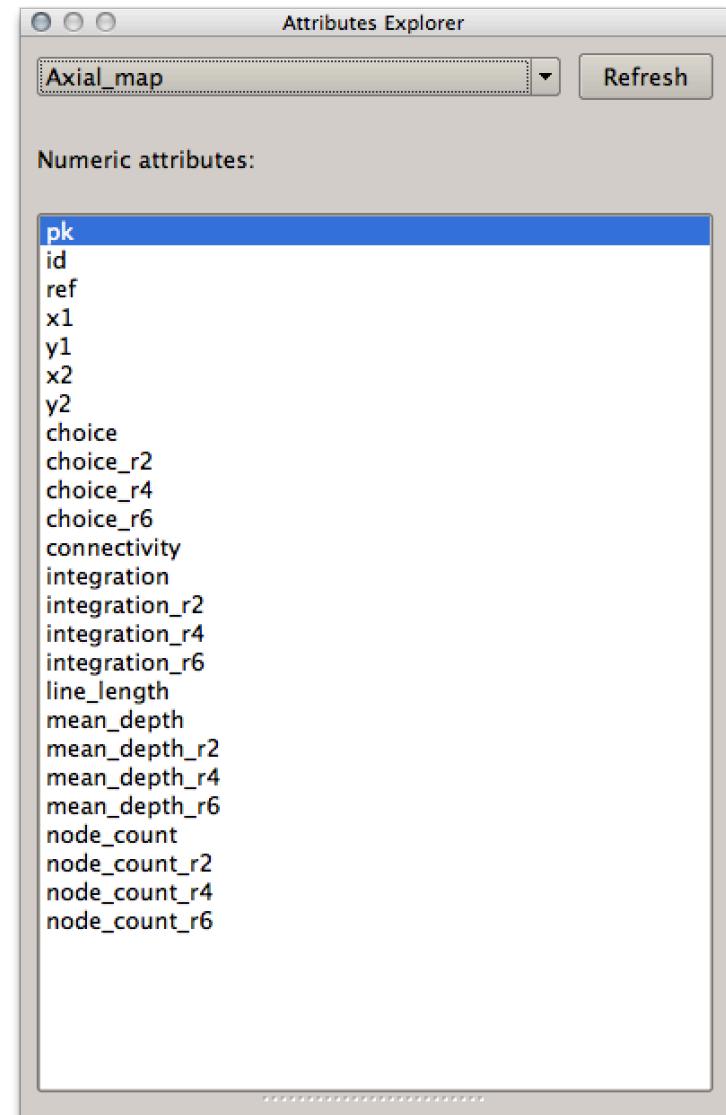
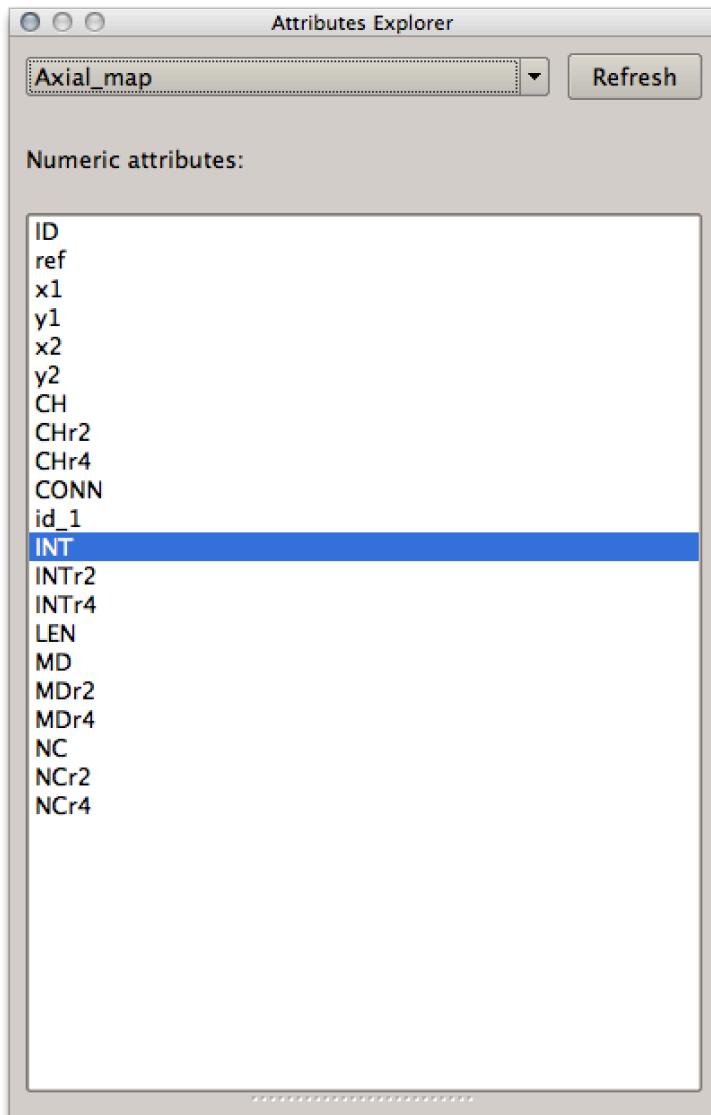




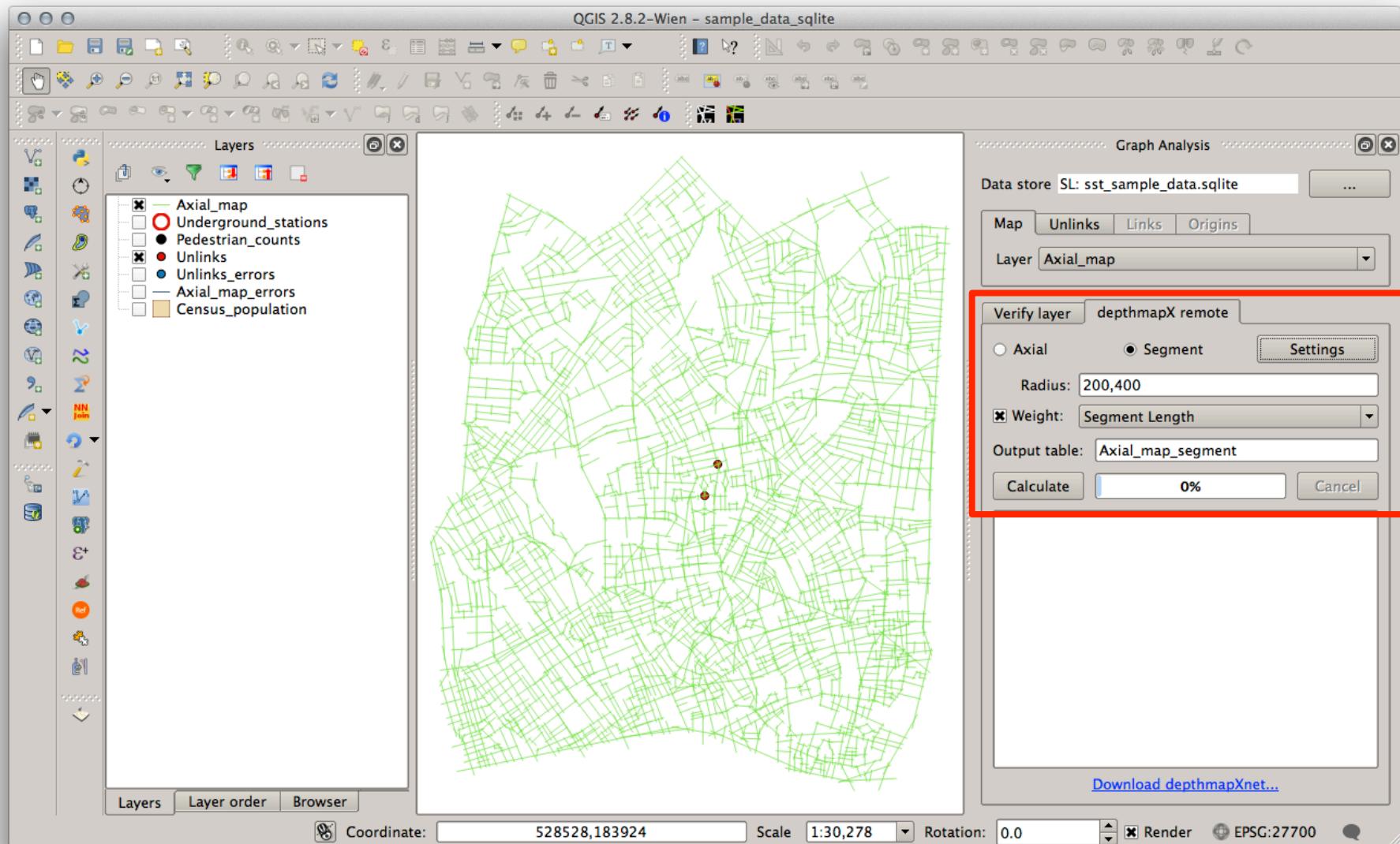
Axial analysis report - advanced



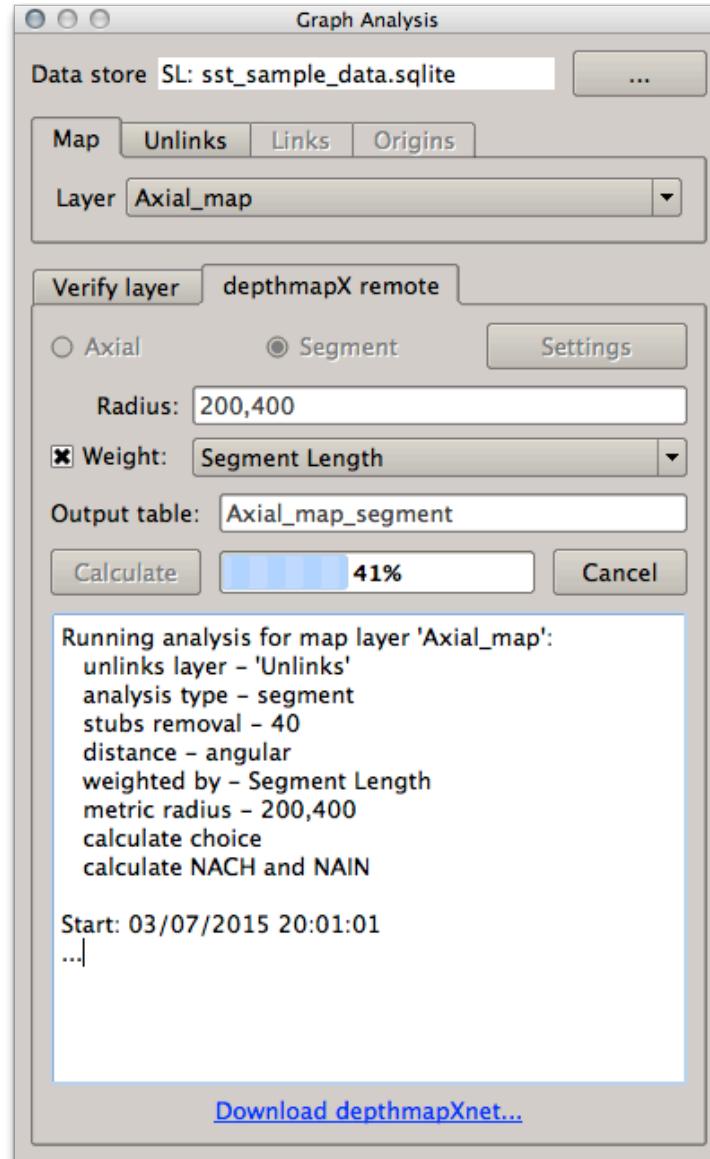
Axial analysis: Post-processing



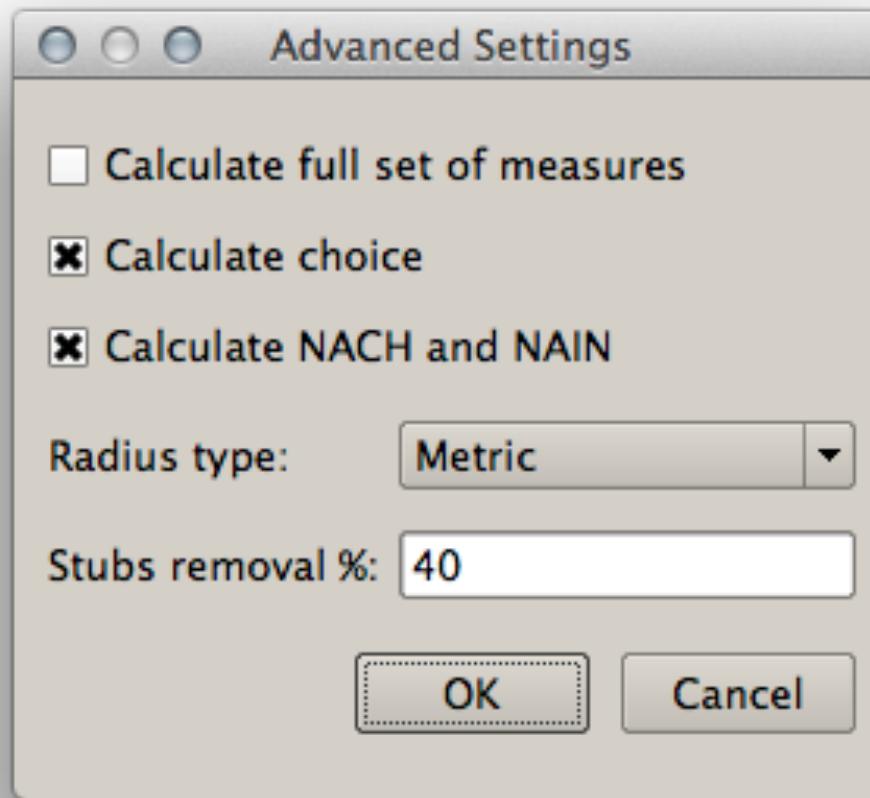
Model analysis: segment



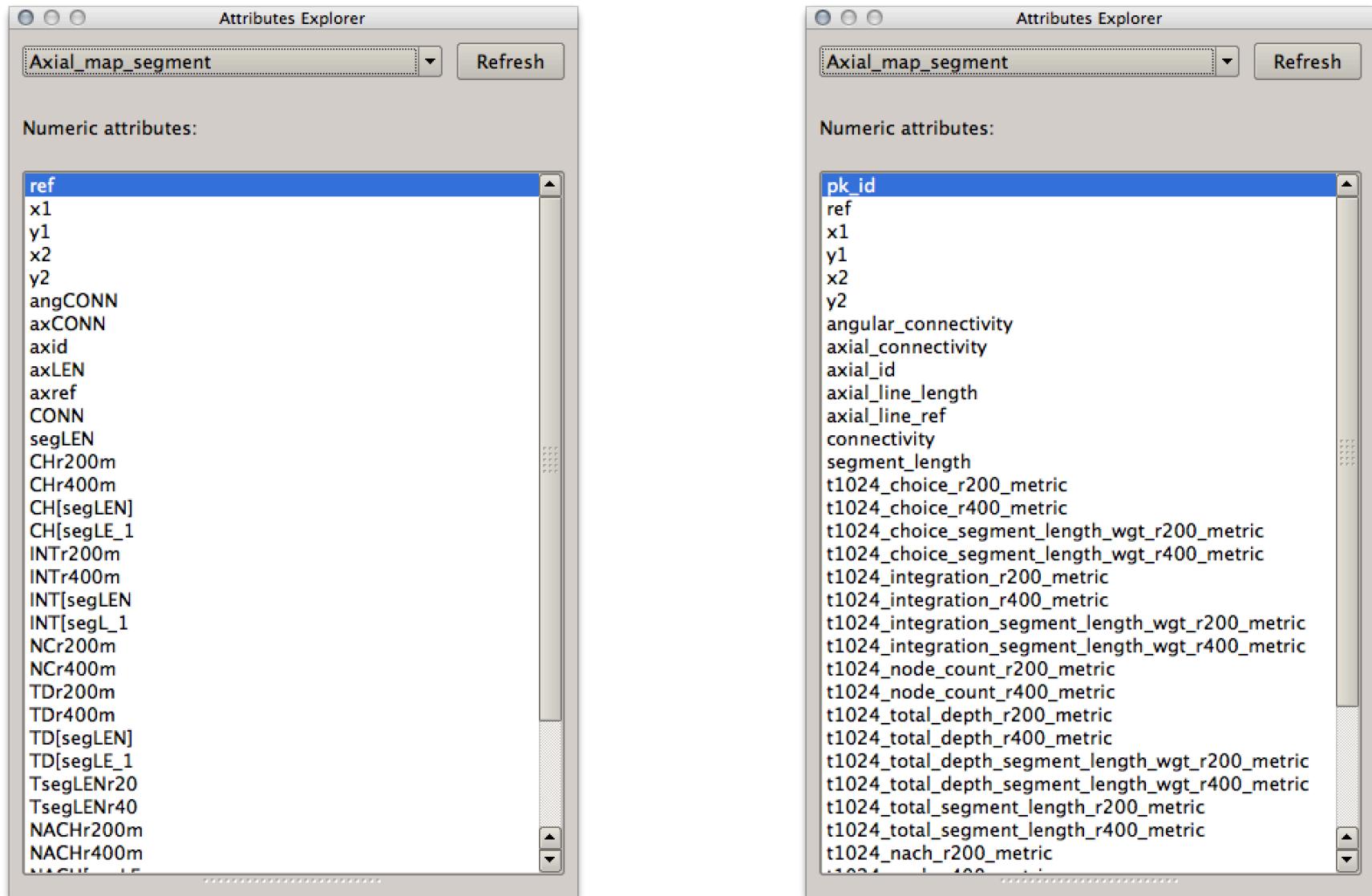
Segment analysis report



Segment advanced settings



Segment analysis: Post-processing



The image displays two identical "Attributes Explorer" windows side-by-side, both titled "Axial_map_segment". Each window has a "Refresh" button in the top right corner.

The left window shows a list of numeric attributes under the heading "Numeric attributes:":

- ref
- x1
- y1
- x2
- y2
- angCONN
- axCONN
- axid
- axLEN
- axref
- CONN
- segLEN
- CHr200m
- CHr400m
- CH[segLEN]
- CH[segLE_1]
- INTR200m
- INTR400m
- INT[segLEN]
- INT[segL_1]
- NCr200m
- NCr400m
- TDr200m
- TDr400m
- TD[segLEN]
- TD[segLE_1]
- TsegLENr20
- TsegLENr40
- NACHr200m
- NACHr400m
- NACHr400m

The right window shows a similar list of numeric attributes:

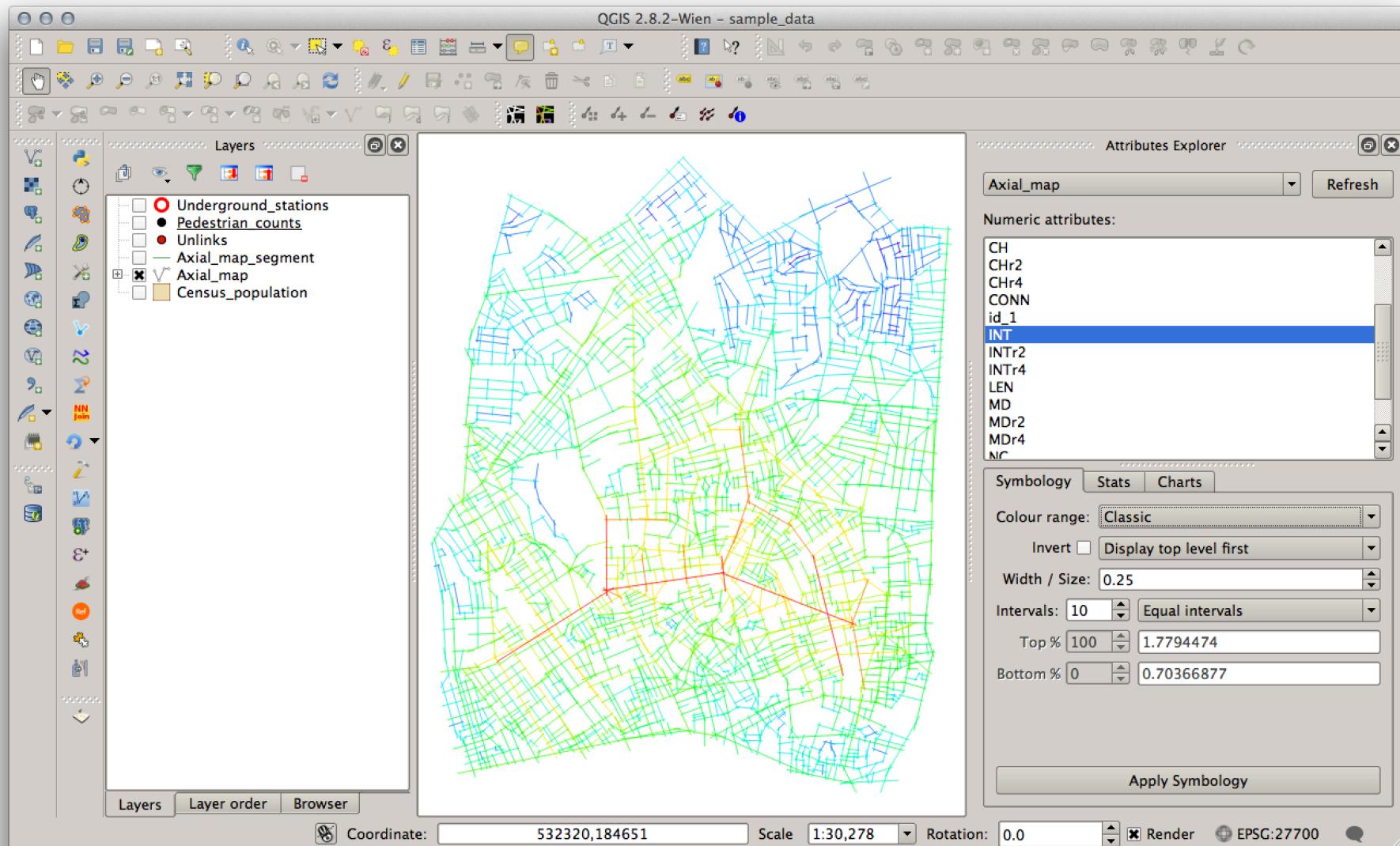
- pk_id
- ref
- x1
- y1
- x2
- y2
- angular_connectivity
- axial_connectivity
- axial_id
- axial_line_length
- axial_line_ref
- connectivity
- segment_length
- t1024_choice_r200_metric
- t1024_choice_r400_metric
- t1024_choice_segment_length_wgt_r200_metric
- t1024_choice_segment_length_wgt_r400_metric
- t1024_integration_r200_metric
- t1024_integration_r400_metric
- t1024_integration_segment_length_wgt_r200_metric
- t1024_integration_segment_length_wgt_r400_metric
- t1024_node_count_r200_metric
- t1024_node_count_r400_metric
- t1024_total_depth_r200_metric
- t1024_total_depth_r400_metric
- t1024_total_depth_segment_length_wgt_r200_metric
- t1024_total_depth_segment_length_wgt_r400_metric
- t1024_total_segment_length_r200_metric
- t1024_total_segment_length_r400_metric
- t1024_nach_r200_metric
- t1024_nach_r400_metric

Analysis results

Attribute table – axial_map_p :: Features total: 1915, filtered: 1915, selected: 0

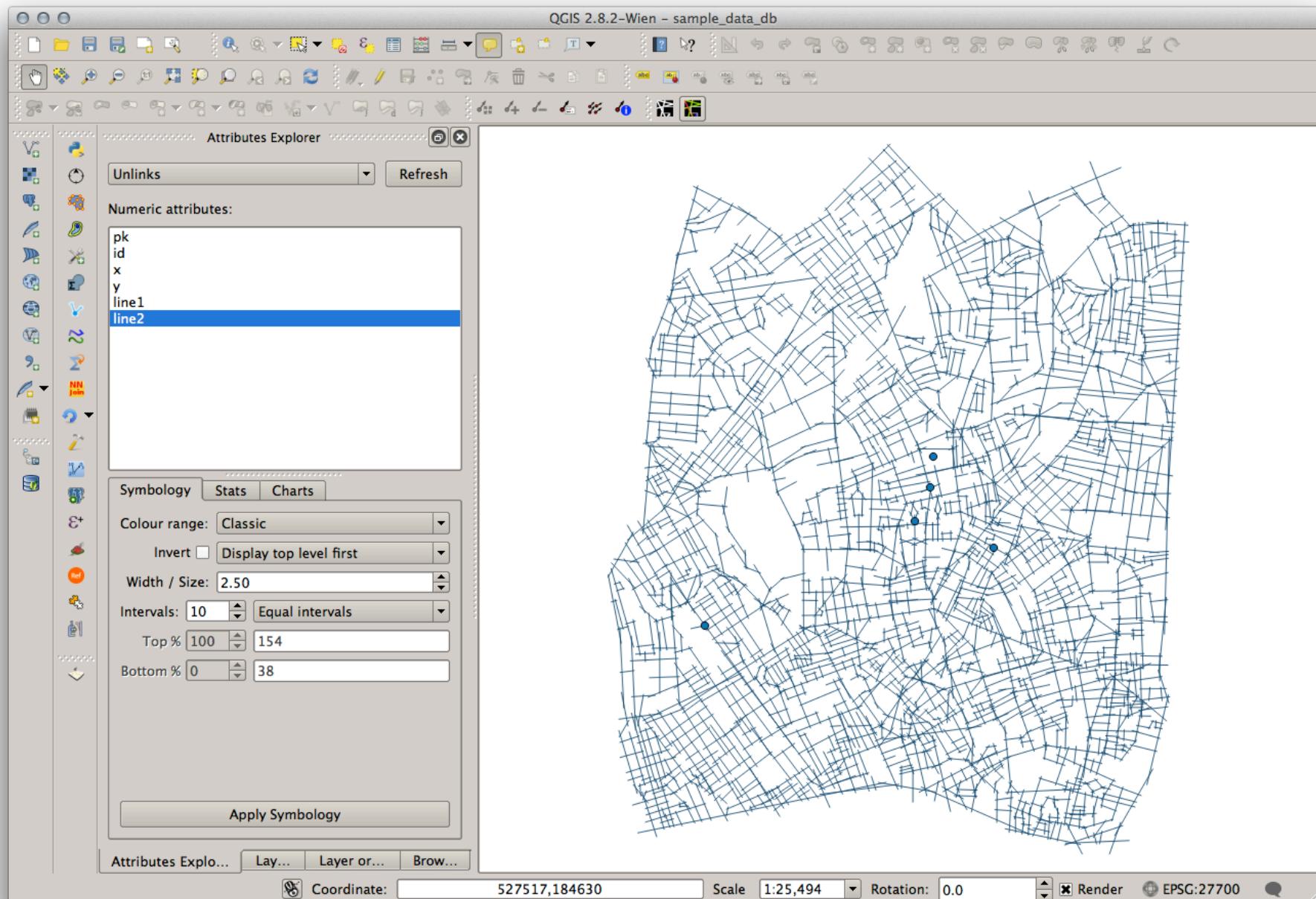
	ID	ref	x1	y1	x2	y2	CH	CHr12	CHr4	CHr8	CO
0	1	0	531620.057...	184591.580...	531718.198...	183833.197...	364211	301119	4825	100261	
1	2	1	531317.562...	184563.168...	531644.017...	184560.769...	92123	80610	996	29640	
2	3	2	530641.467...	184265.063...	531391.768...	184575.864...	126271	114312	3539	49059	
3	4	3	531310.826...	184630.049...	531449.483...	184123.694...	47928	46662	2220	22884	
4	5	4	531197.894...	184076.078...	531687.073...	184187.766...	49513	48837	2240	26287	
5	6	5	531089.471...	184464.526...	531226.306...	184061.362...	20368	19838	1017	9081	
6	7	6	531031.467...	184257.346...	531780.910...	184436.714...	27126	26372	1223	12692	
7	8	7	531122.426...	183822.730...	531223.057...	184099.851...	34334	33470	1175	16711	
8	9	8	530576.859...	184869.061...	530726.870...	183672.793...	354436	315941	7252	124137	
9	10	9	531563.793...	183445.898...	531724.506...	183932.179...	127944	110472	2191	41594	
10	11	10	531306.267...	184332.834...	531918.883...	184454.209...	38165	37076	1339	18351	
11	12	11	531033.627...	185185.660...	531349.677...	184530.178...	54109	53461	2251	27426	
12	13	12	531633.348...	184819.855...	531633.950...	184384.999...	310952	239764	1910	58717	
13	14	13	531383.209...	183821.620...	531437.536...	184233.153...	22129	21805	1407	11383	
14	15	14	530901.211...	183663.266...	530924.669...	184441.493...	69788	63677	1711	28386	
15	16	15	530641.047...	183876.735...	531201.826...	183883.863...	38368	37330	1962	21813	
16	17	16	531382.698...	183429.263...	531393.508...	184007.487...	32200	31823	1744	17493	
17	18	17	531692.243...	183866.078...	532132.356...	183618.718...	239685	194478	2800	64880	
18	19	18	531068.182...	183322.213...	531142.800...	183907.266...	60929	59885	1534	33659	
19	20	19	531008.562...	183873.516...	531403.748...	183914.254...	25145	24881	1280	14291	
20	21	20	531594.580...	184553.651...	531671.292...	184586.521...	558	556	24	302	
21	22	21	531020.031...	184111.957...	531447.348...	184212.728...	14357	13882	729	6098	
22	23	22	531441.172...	183195.510...	531655.297...	183682.760...	192167	158036	1647	49493	
23	24	23	530648.278...	184202.231...	531124.982...	184399.105...	6685	6639	313	3460	
24	25	24	531373.785...	183767.196...	531688.161...	183775.144...	29384	28929	1010	14717	
25	26	25	530664.471...	183267.489...	530720.018...	183826.639...	96274	84438	1895	30898	
26	27	26	531677.129...	184018.074...	531966.012...	183895.049...	22219	21860	1051	11267	
27	28	27	530299.916...	183681.231...	530913.934...	183681.231...	252789	223532	2115	83576	
28	29	28	530745.388...	184782.795...	530941.662...	184374.412...	19285	18733	631	7701	
29	30	29	531560.849...	183498.553...	531822.333...	183713.841...	62554	52812	1014	18412	
30	31	30	531660.606...	184198.403...	532015.507...	184274.311...	27500	26964	939	14602	
31	32	31	531534.292...	183689.188...	531758.962...	183634.194...	49040	40824	196	10961	

Attributes explorer

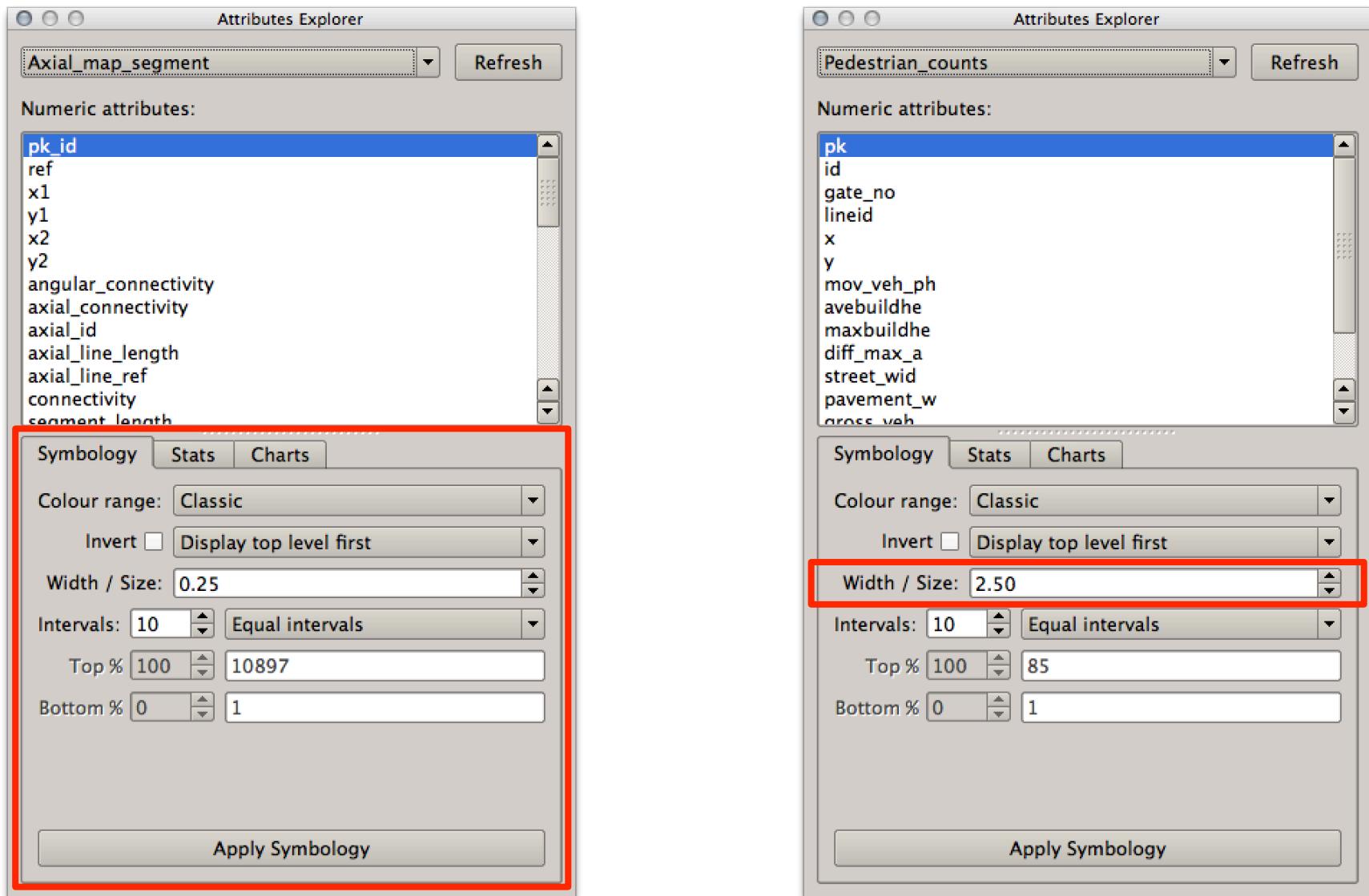


- Intuitive and interactive exploration of attributes
- Simple symbology settings
- Symbology settings for typical academic output
- Stores attributes' symbol settings with project
- Descriptive statistics and charts
- Synchronises with main window selection

Attributes explorer docked left



Layer selection: attribute defaults



The image shows two QGIS Attribute Explorer windows side-by-side, illustrating the configuration of symbology for two different layers.

Left Window (Axial_map_segment Layer):

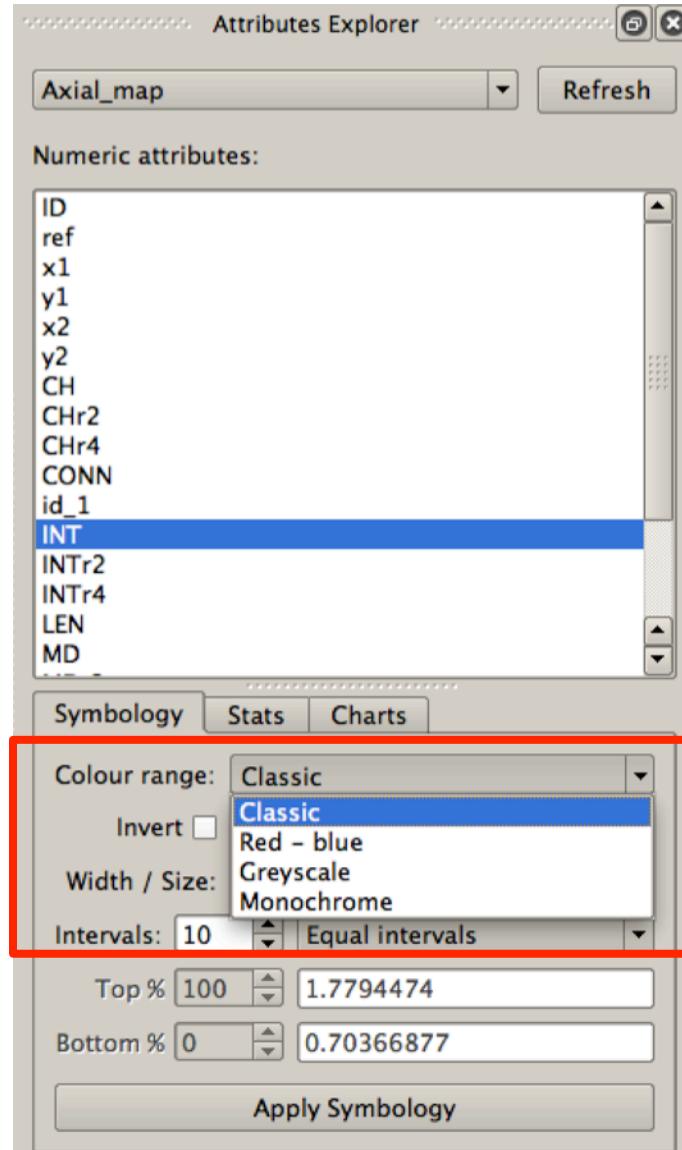
- Numeric attributes:** pk_id, ref, x1, y1, x2, y2, angular_connectivity, axial_connectivity, axial_id, axial_line_length, axial_line_ref, connectivity, segment_length.
- Symbology Tab:** Contains settings for "Colour range: Classic", "Invert" checkbox, "Display top level first" dropdown, "Width / Size: 0.25", "Intervals: 10" (with "Equal intervals" dropdown), "Top % 100" (with value 10897), and "Bottom % 0" (with value 1).
- Buttons:** Refresh, Apply Symbology.

Right Window (Pedestrian_counts Layer):

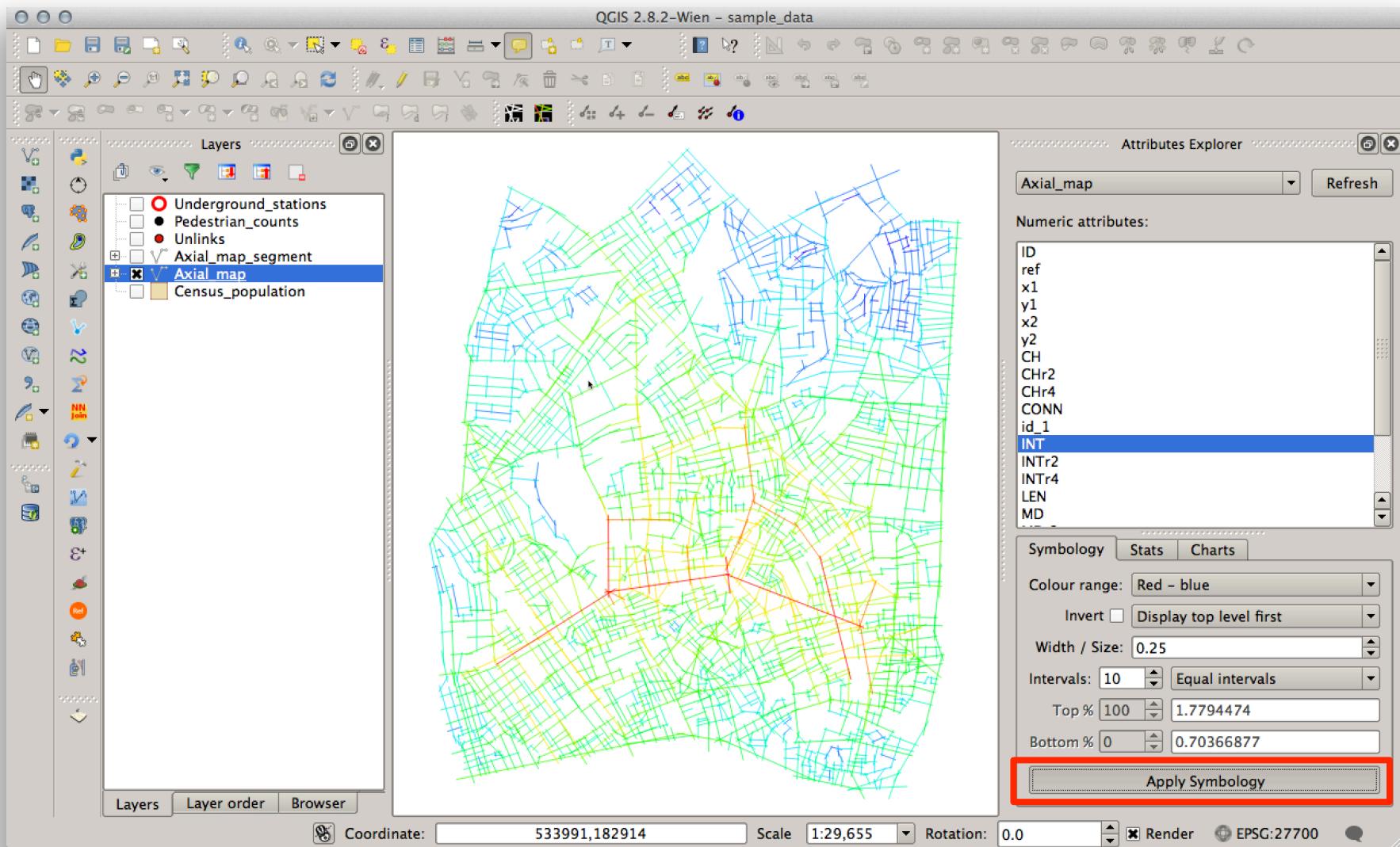
- Numeric attributes:** pk, id, gate_no, lineid, x, y, mov_veh_ph, avebuildhe, maxbuildhe, diff_max_a, street_wid, pavement_w, gross_veh.
- Symbology Tab:** Contains settings for "Colour range: Classic", "Invert" checkbox, "Display top level first" dropdown, "Width / Size: 2.50", "Intervals: 10" (with "Equal intervals" dropdown), "Top % 100" (with value 85), and "Bottom % 0" (with value 1).
- Buttons:** Refresh, Apply Symbology.

In both windows, the "Symbology" tab is highlighted with a red border, and the "Width / Size" input field is also highlighted with a red border, indicating the focus of the comparison.

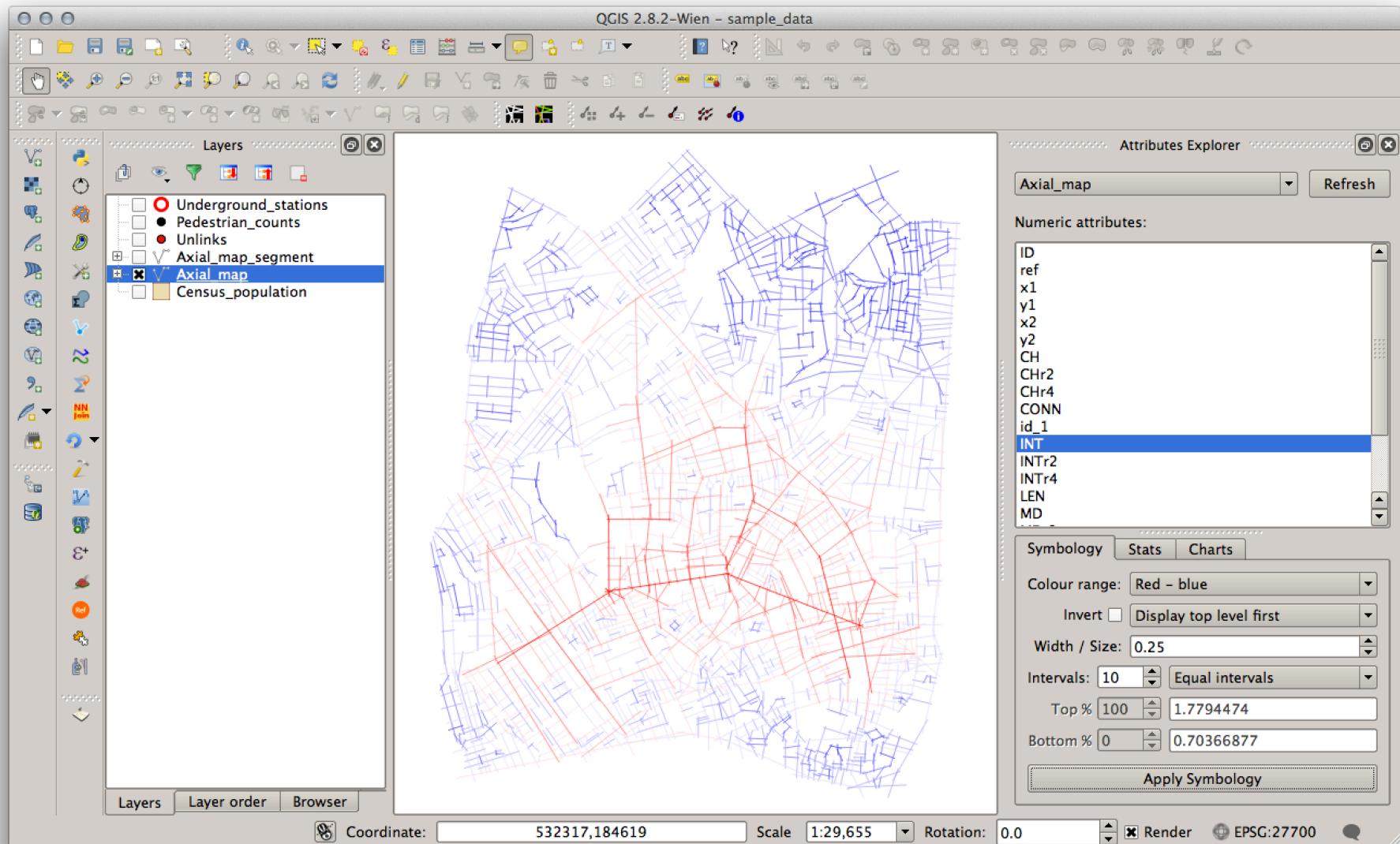
Attribute symbology: colour range



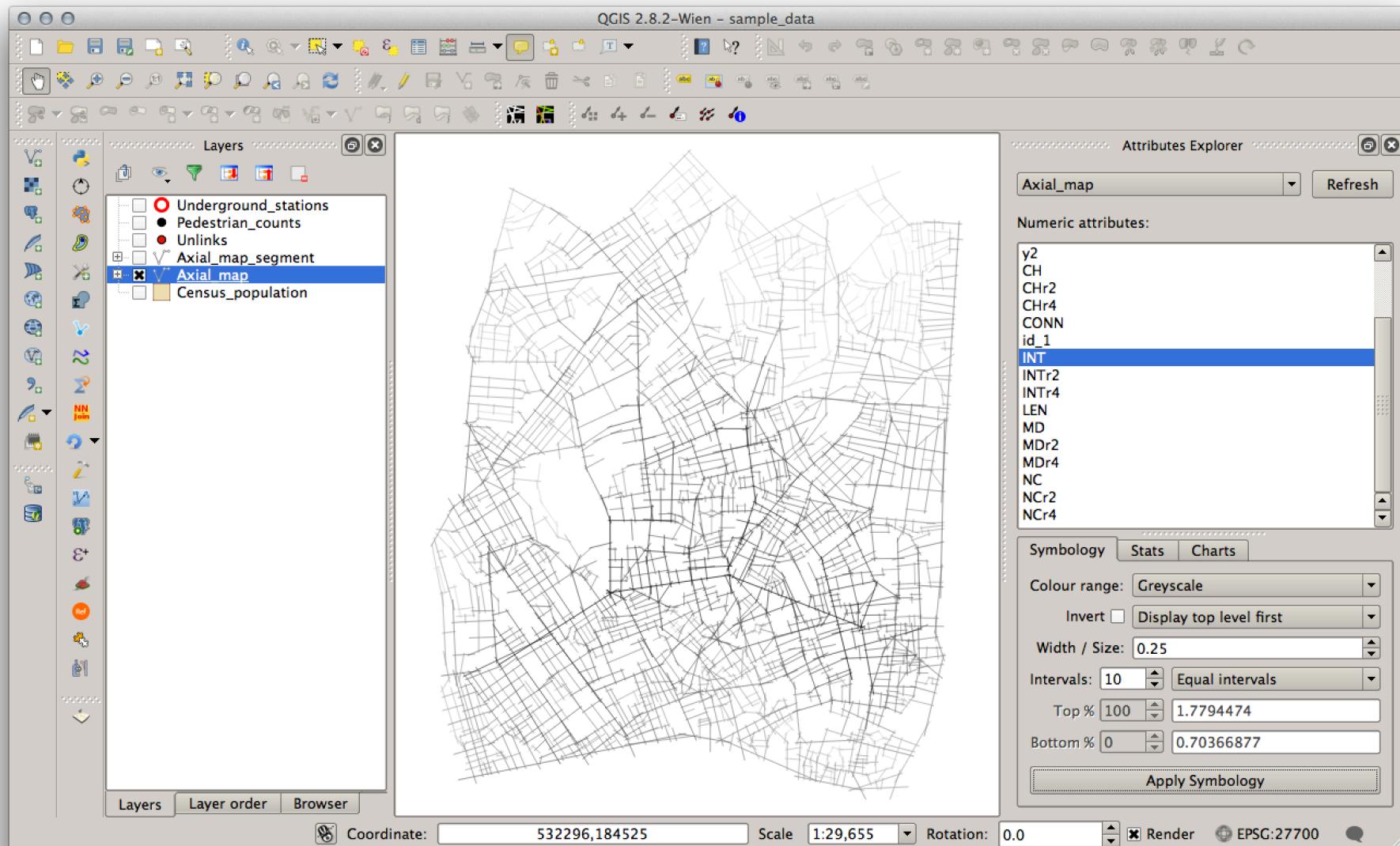
Attribute symbology: colour range



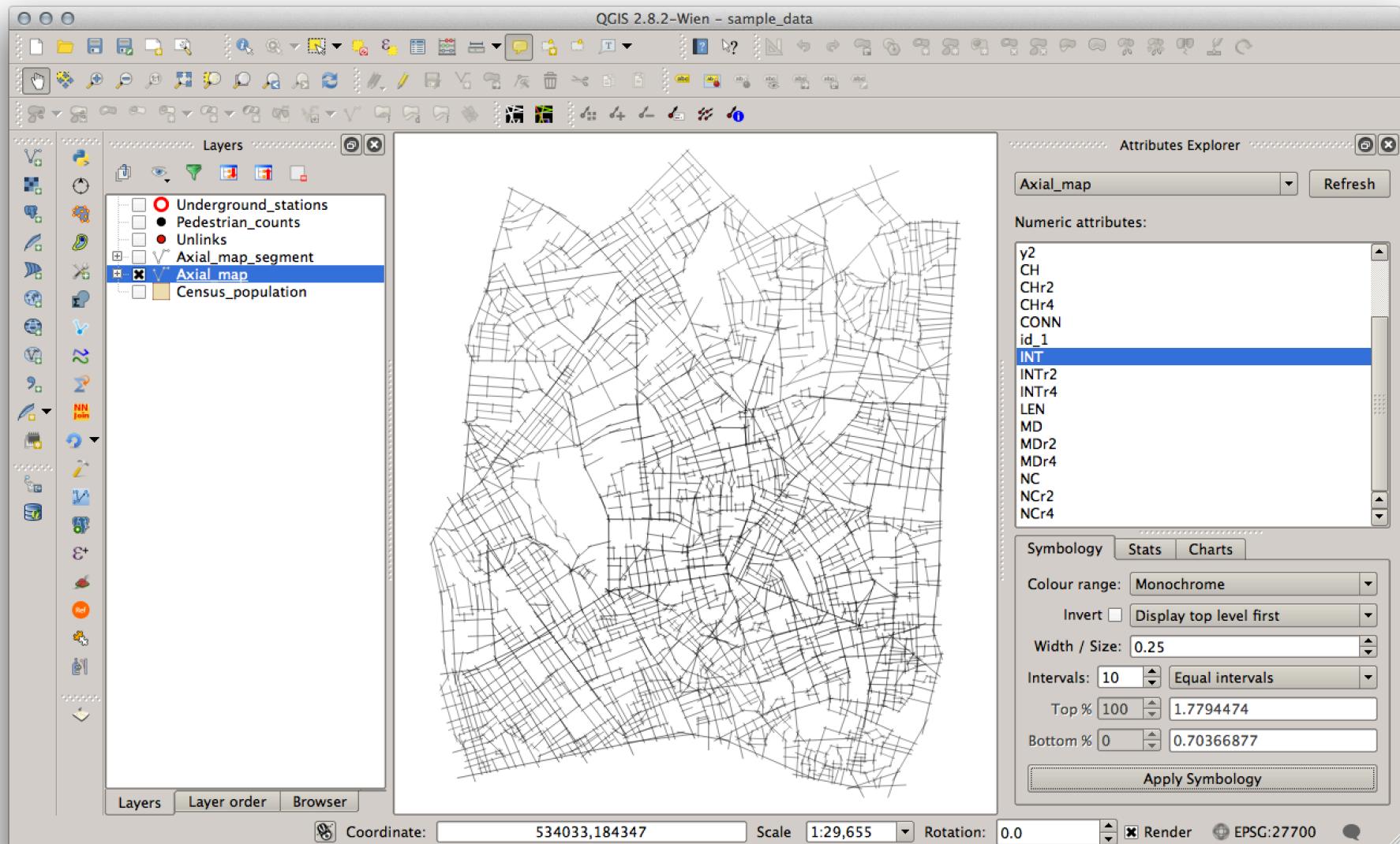
Attribute symbology: colour range



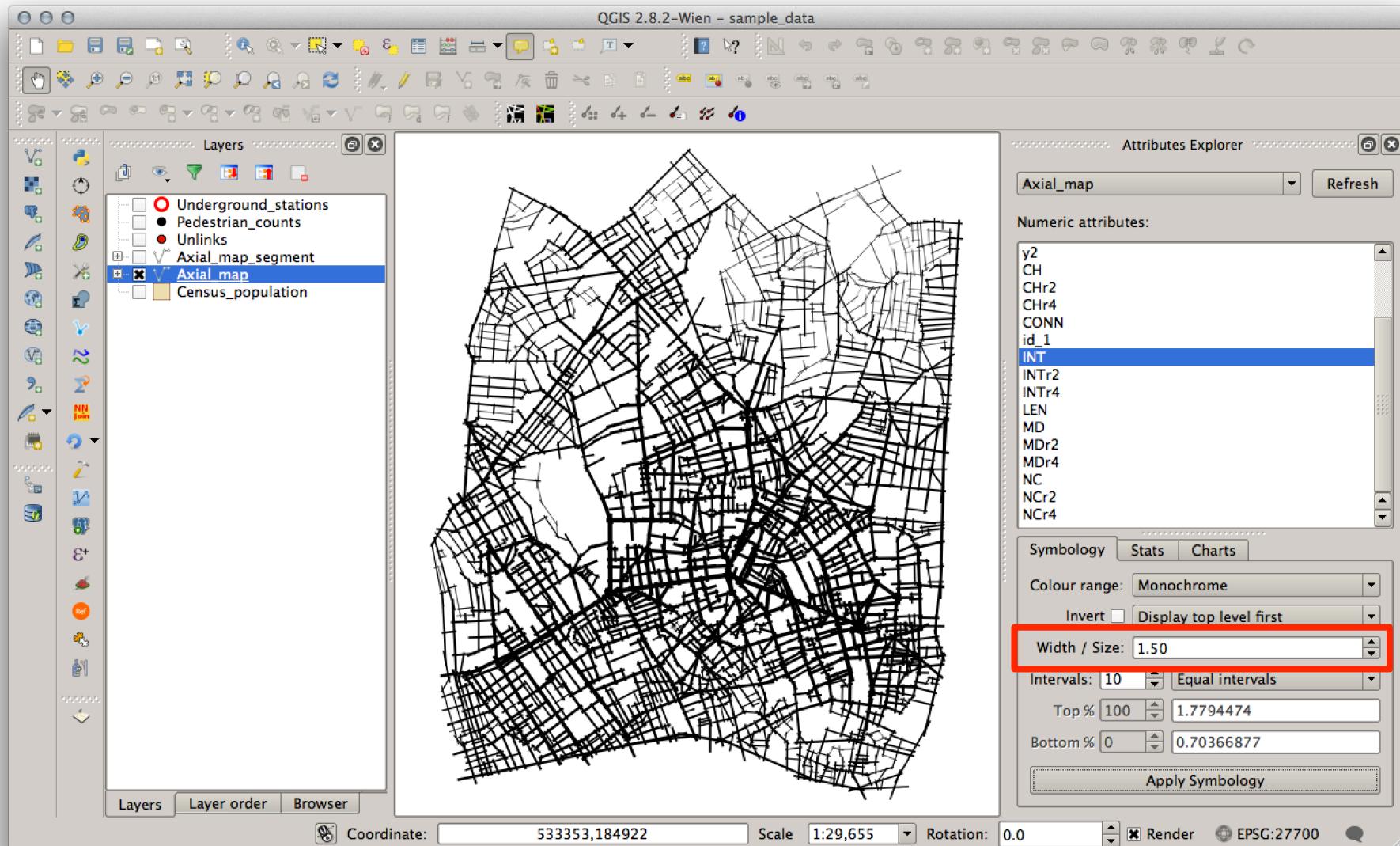
Attribute symbology: colour ranges



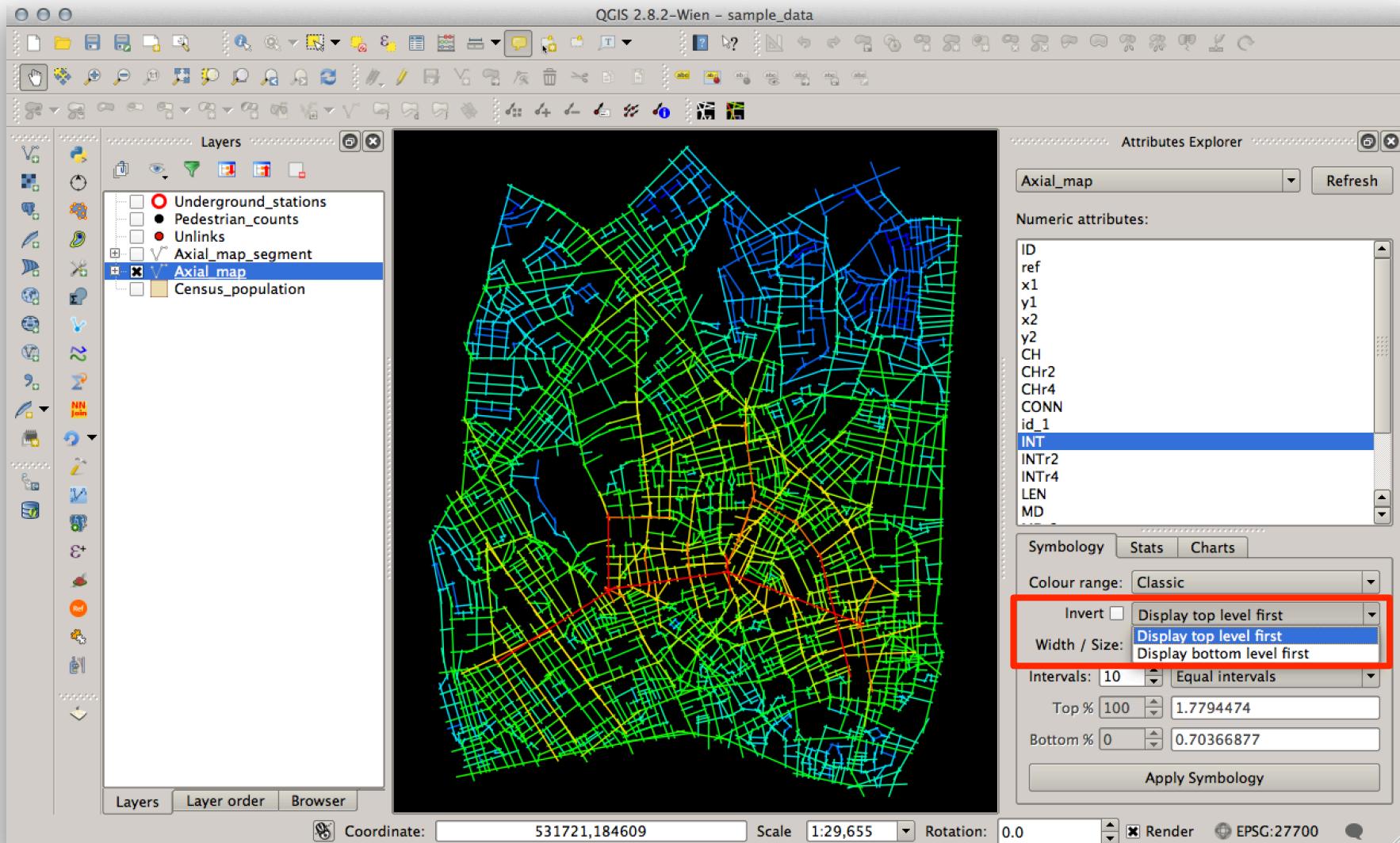
Attribute symbology: colour ranges



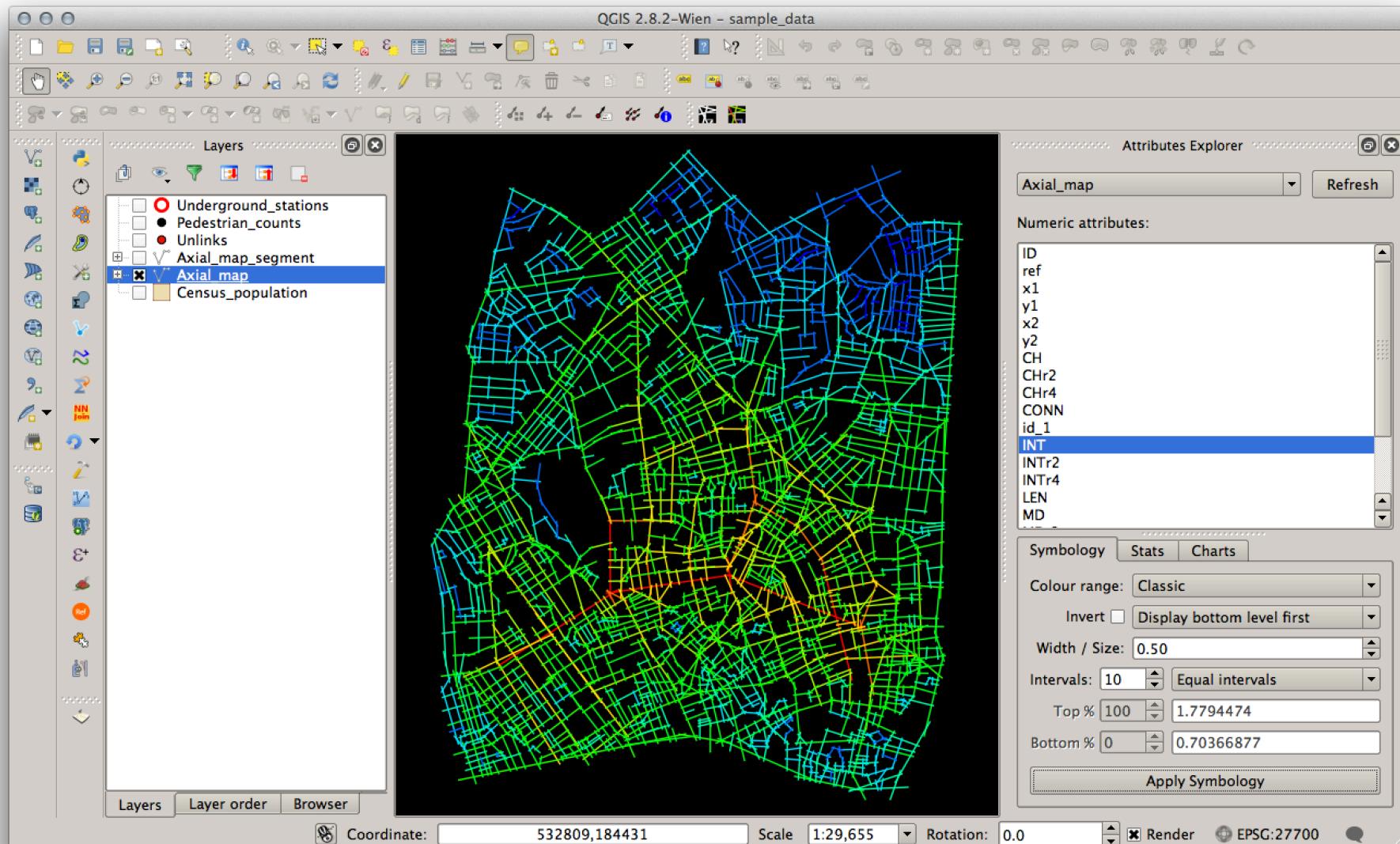
Attribute symbology: Line width



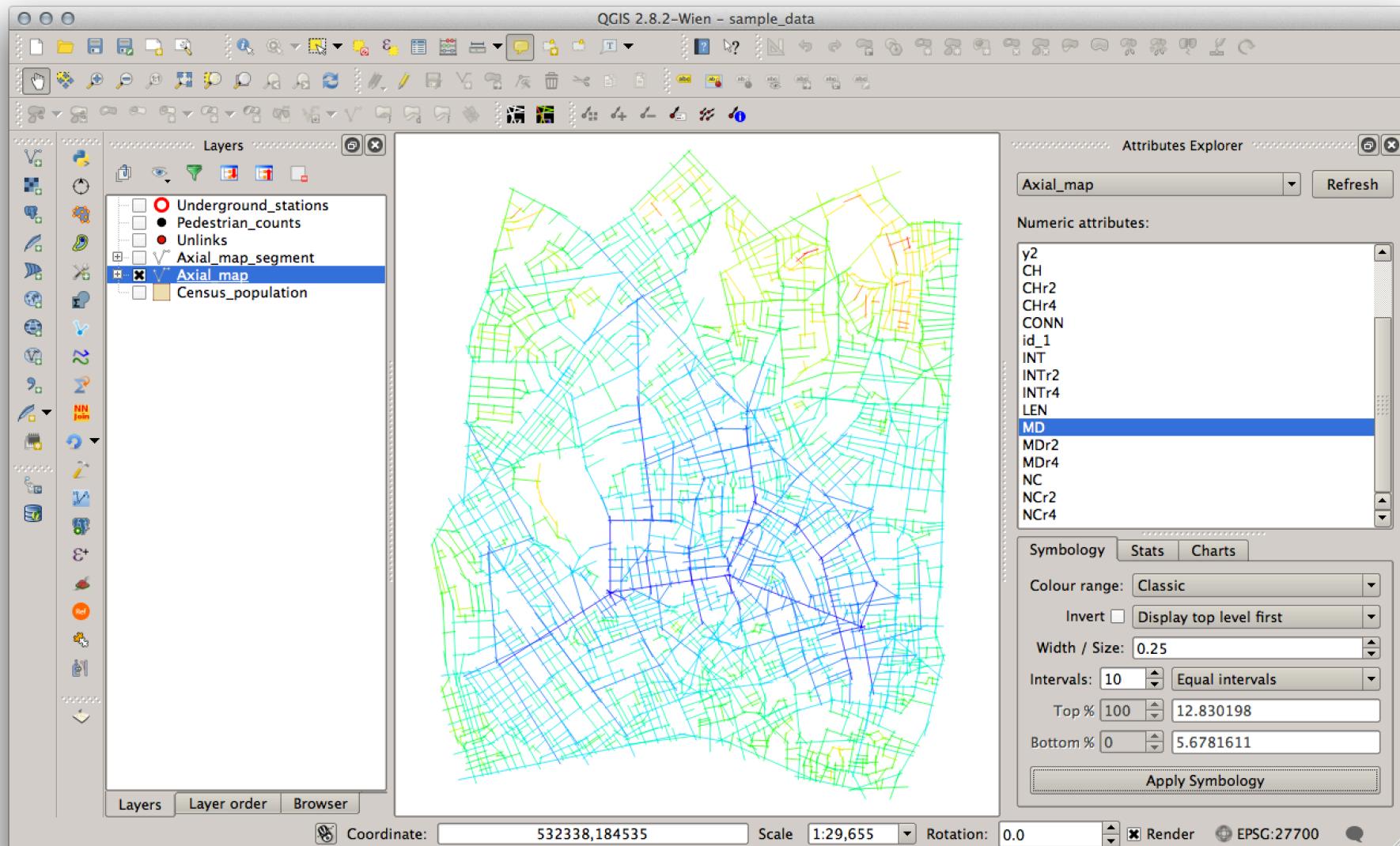
Attribute symbology: display order



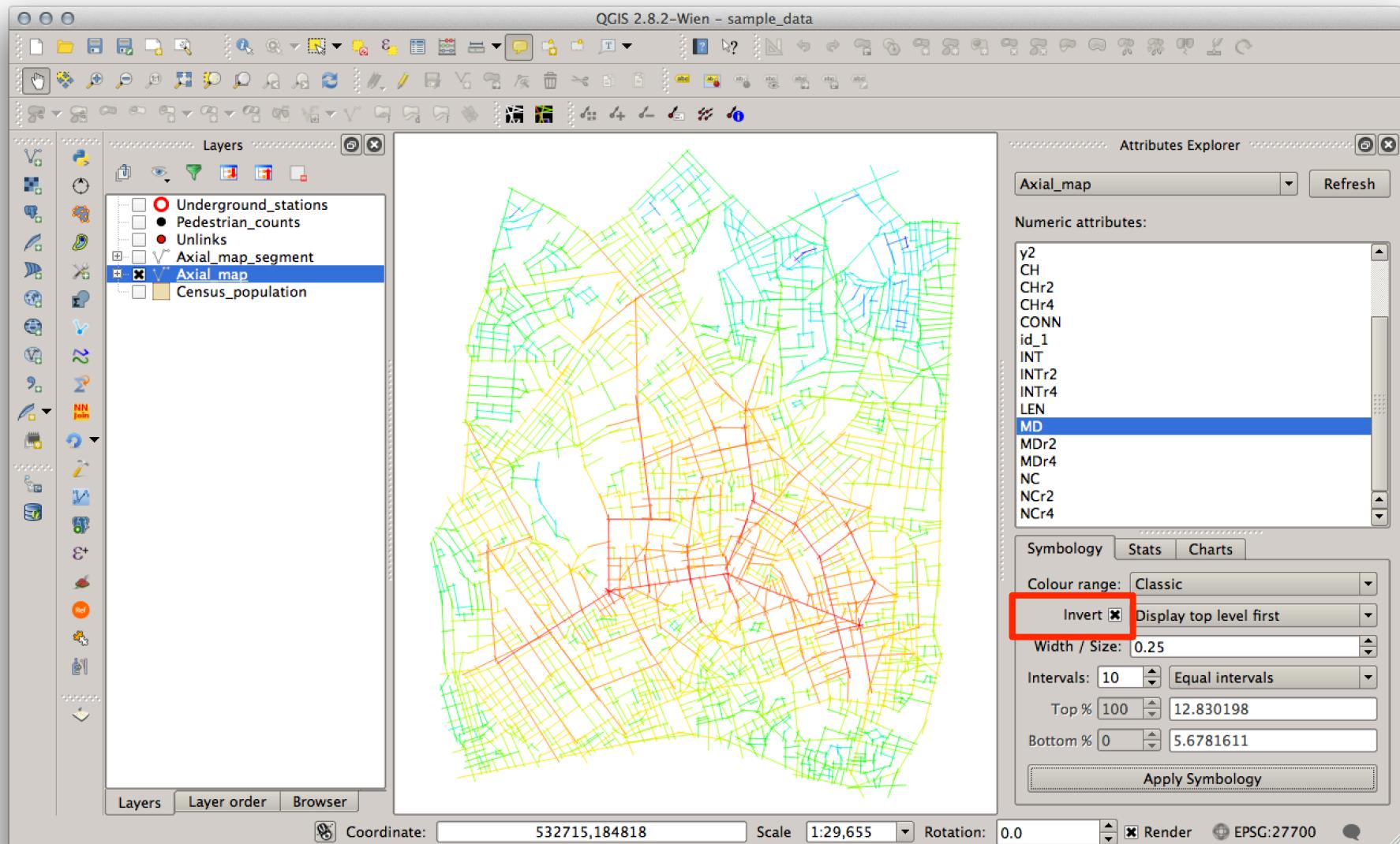
Attribute symbology: display order



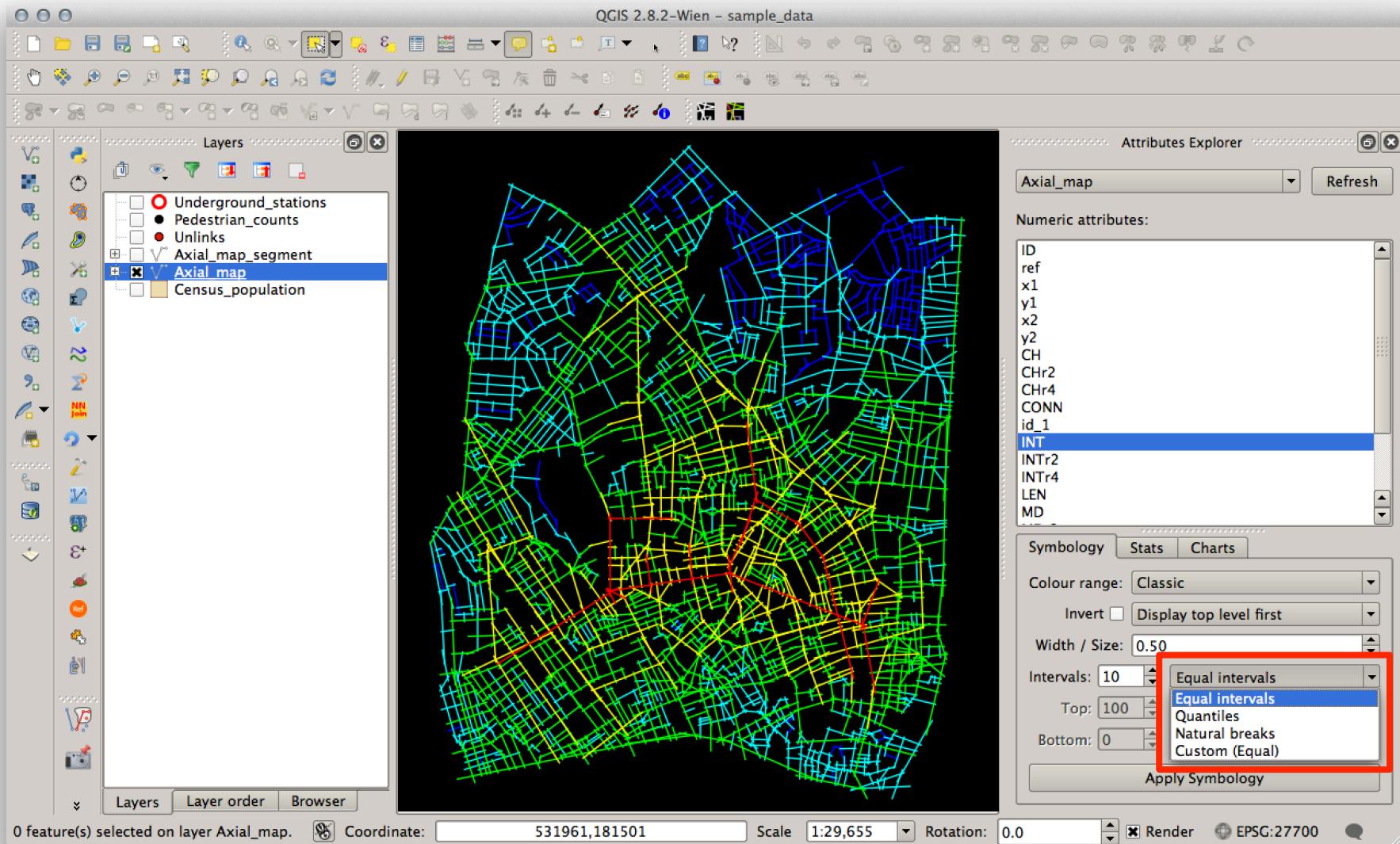
Attribute symbology: invert range



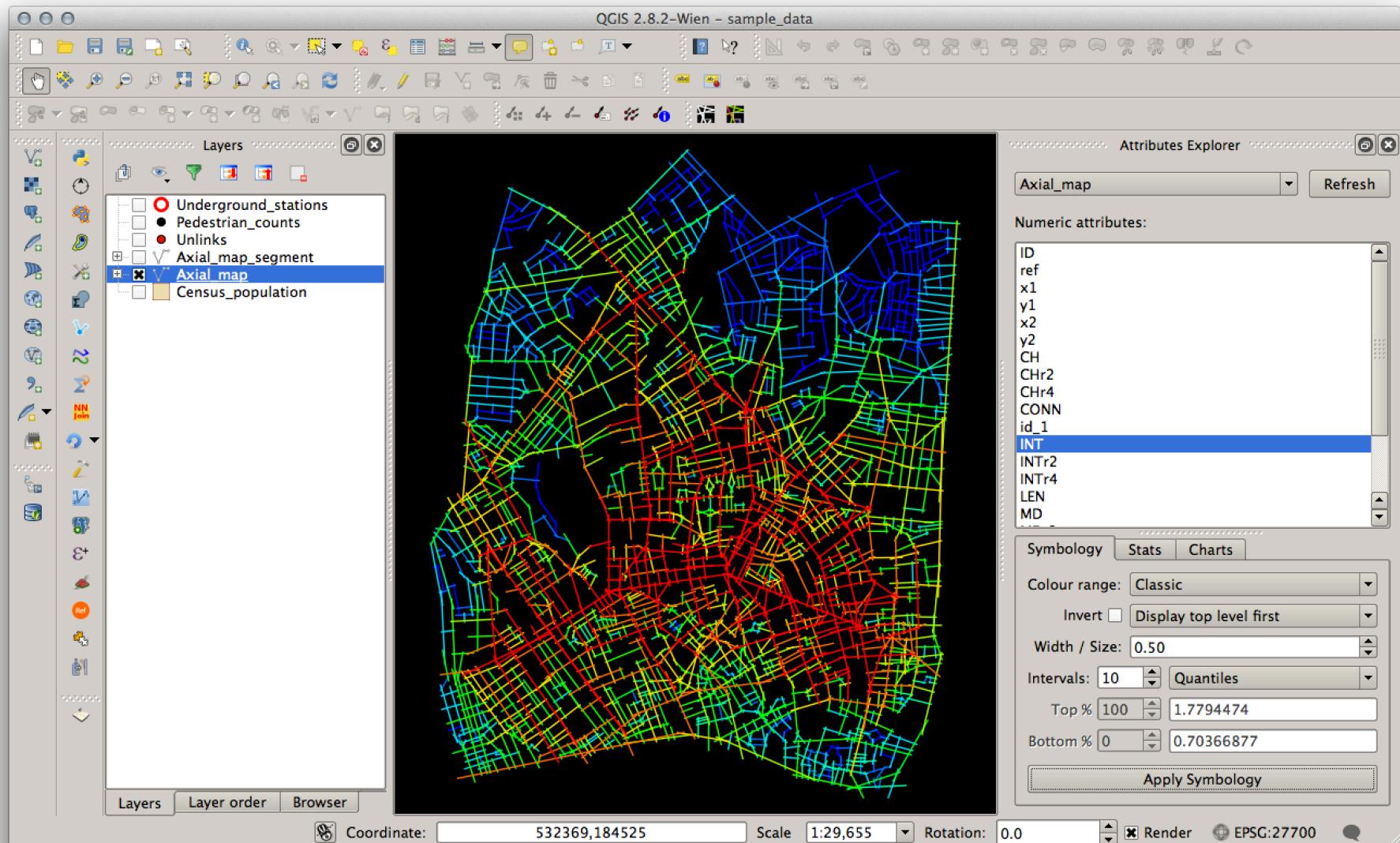
Attribute symbology: invert range



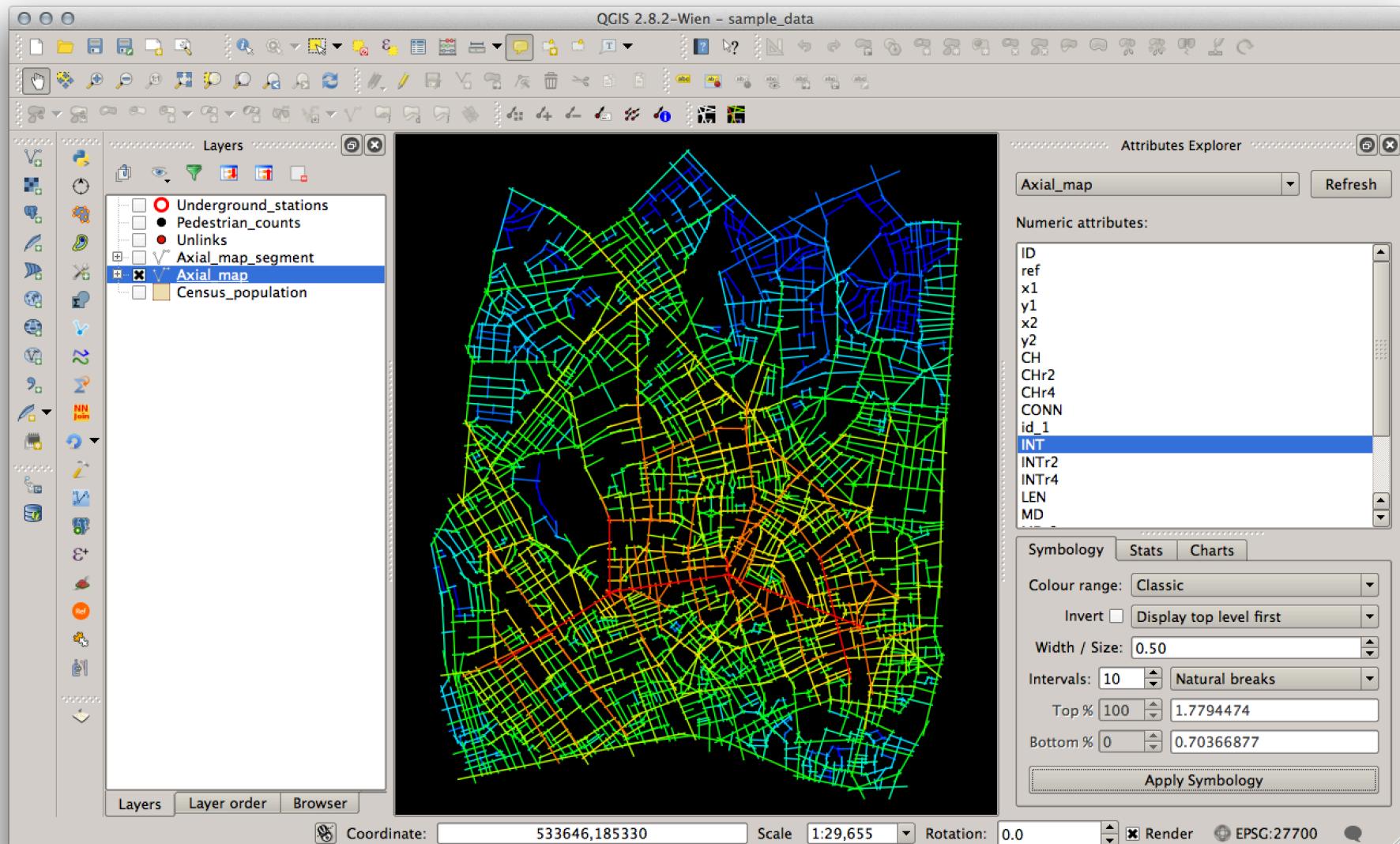
Attribute symbology: intervals



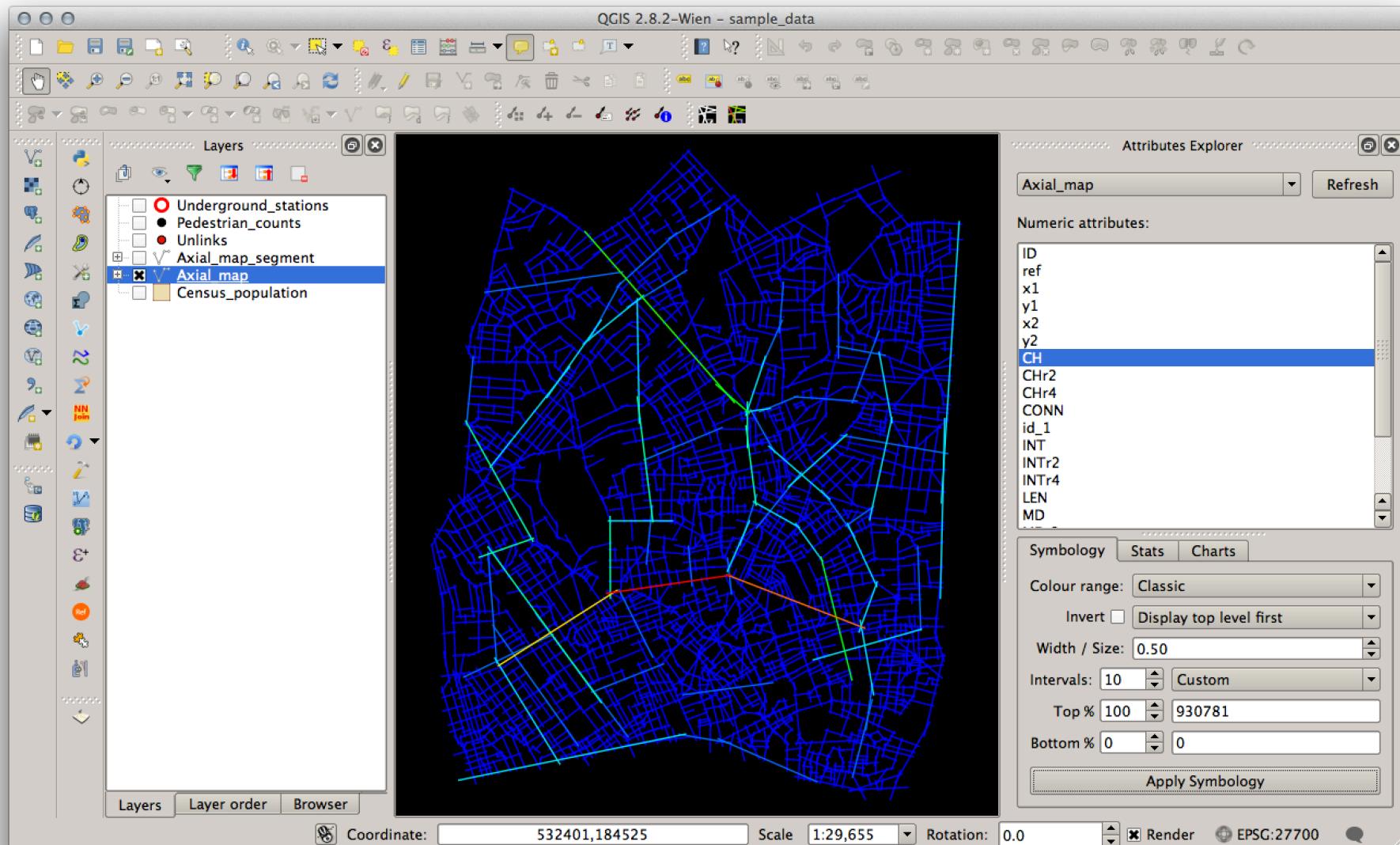
Attribute symbology: quantiles interval



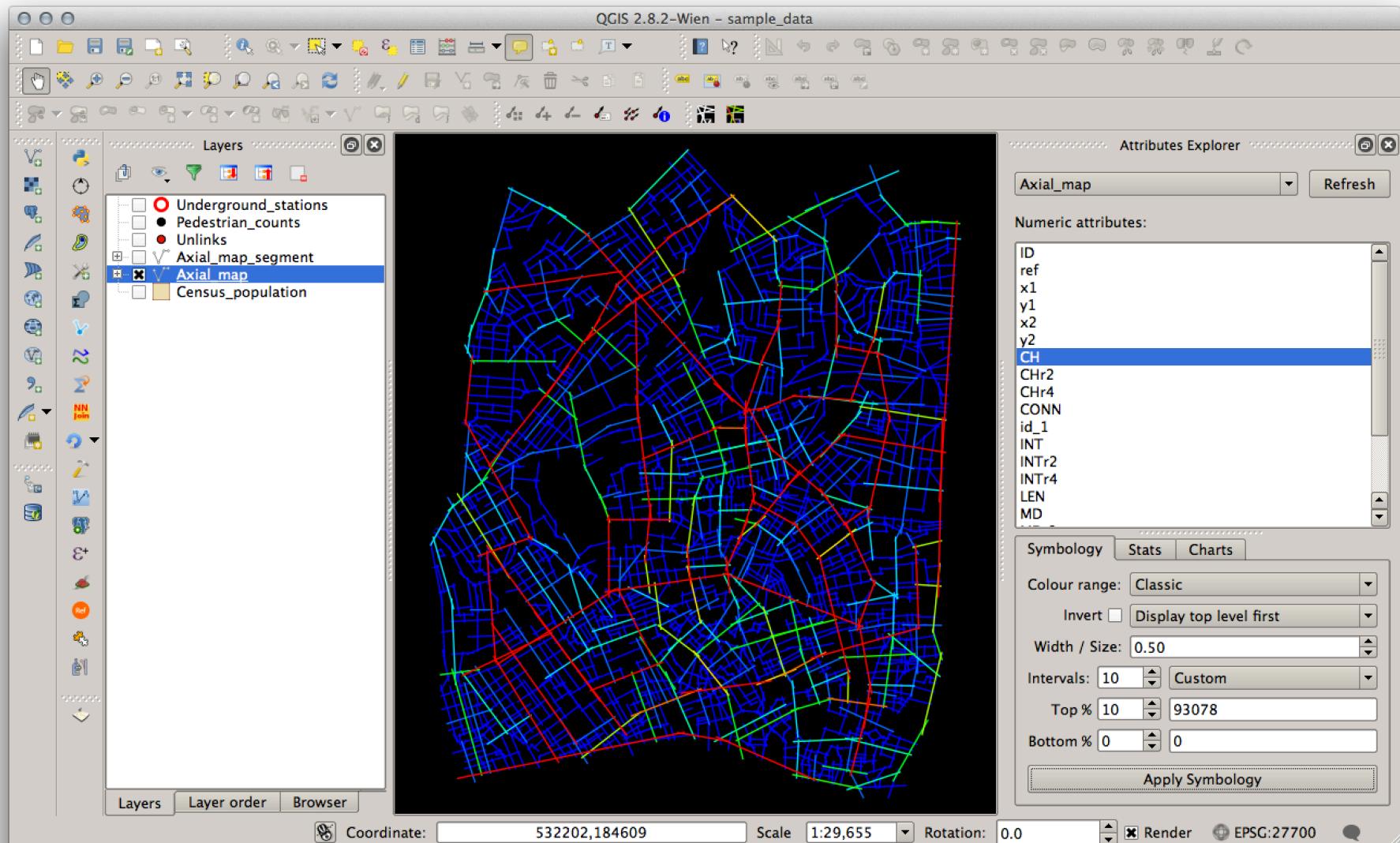
Attribute symbology: natural breaks interval



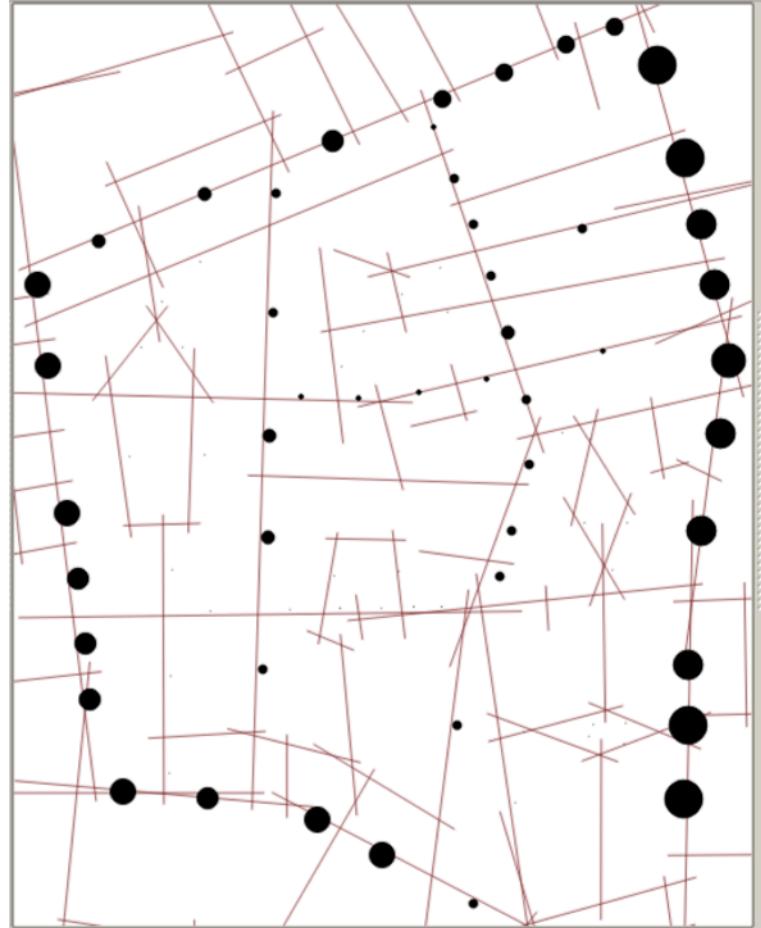
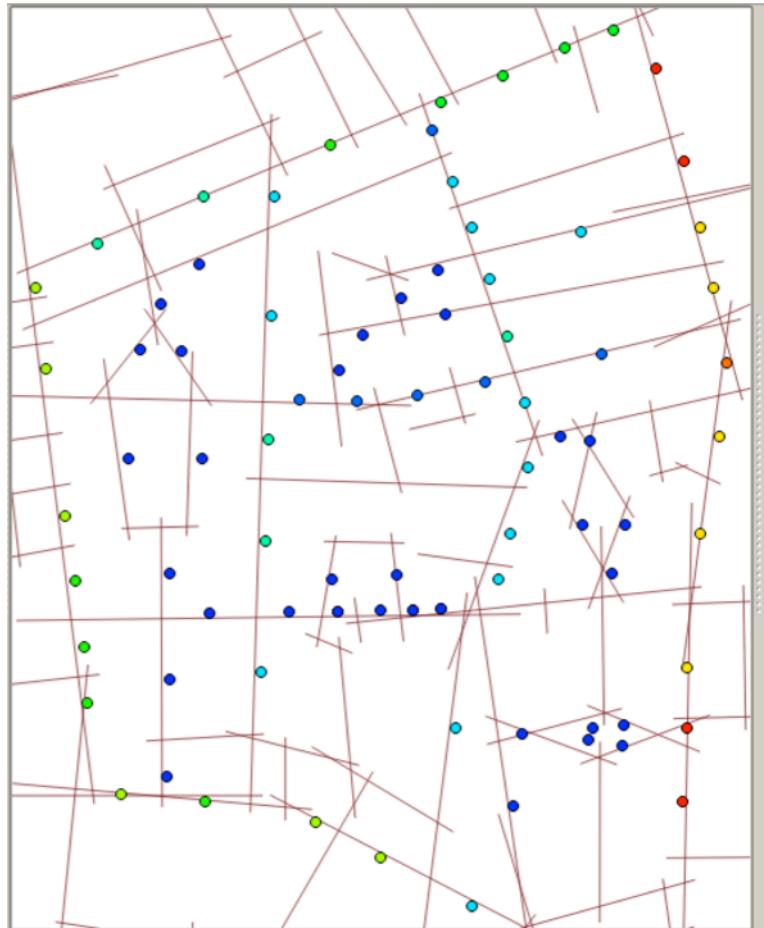
Attribute symbology: equal intervals (Choice)



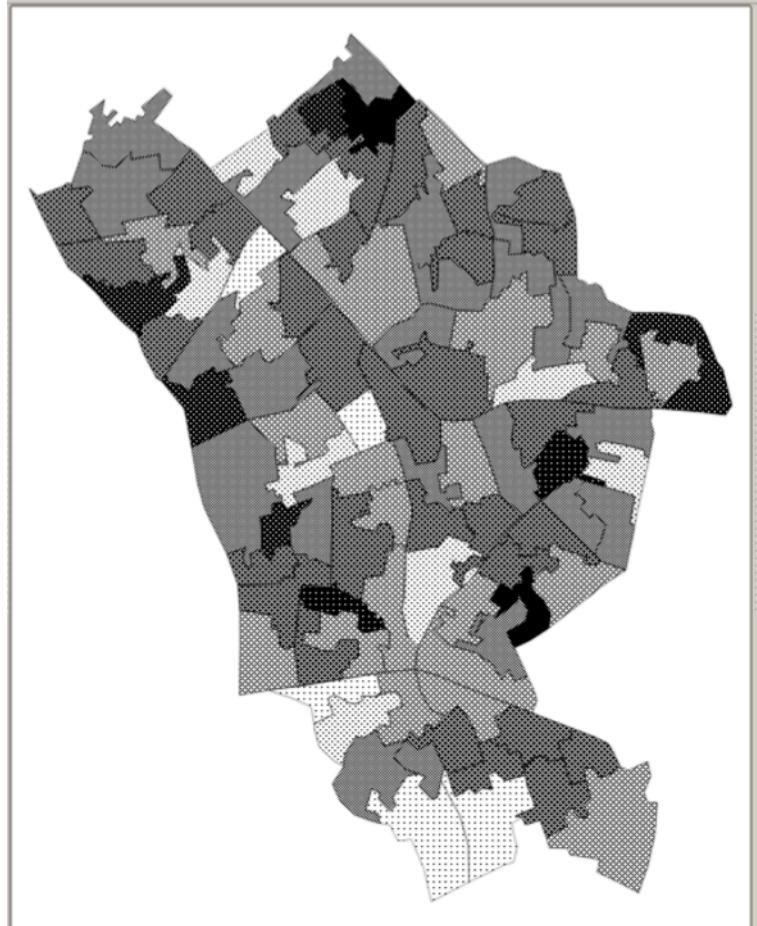
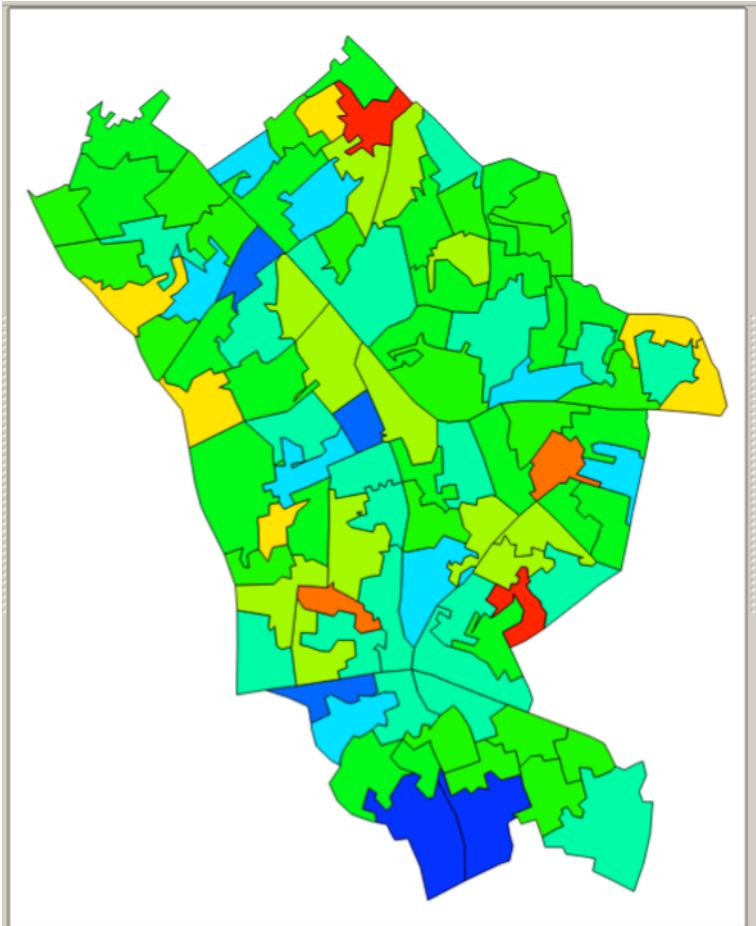
Attribute symbology: custom interval



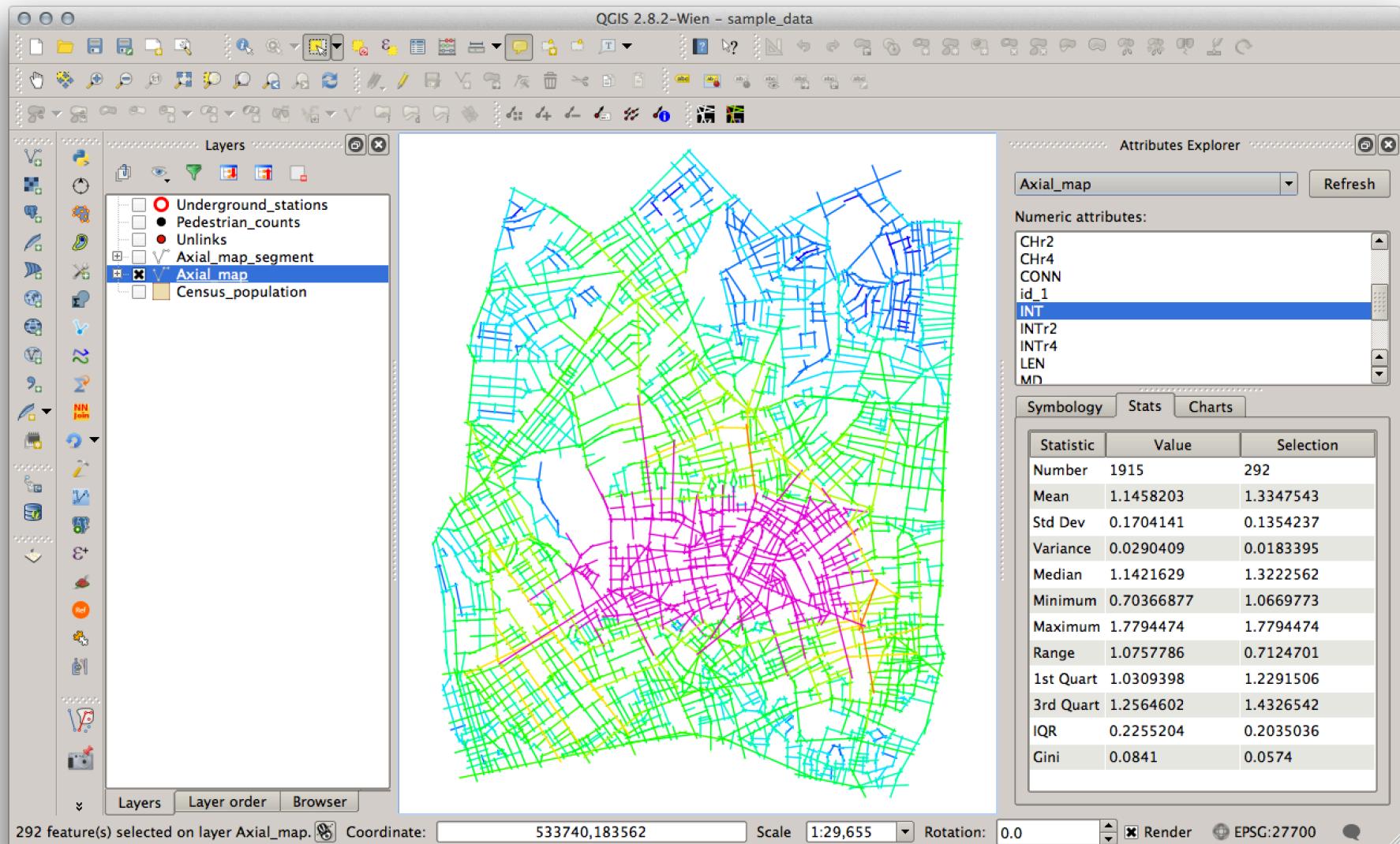
Attribute symbology: points



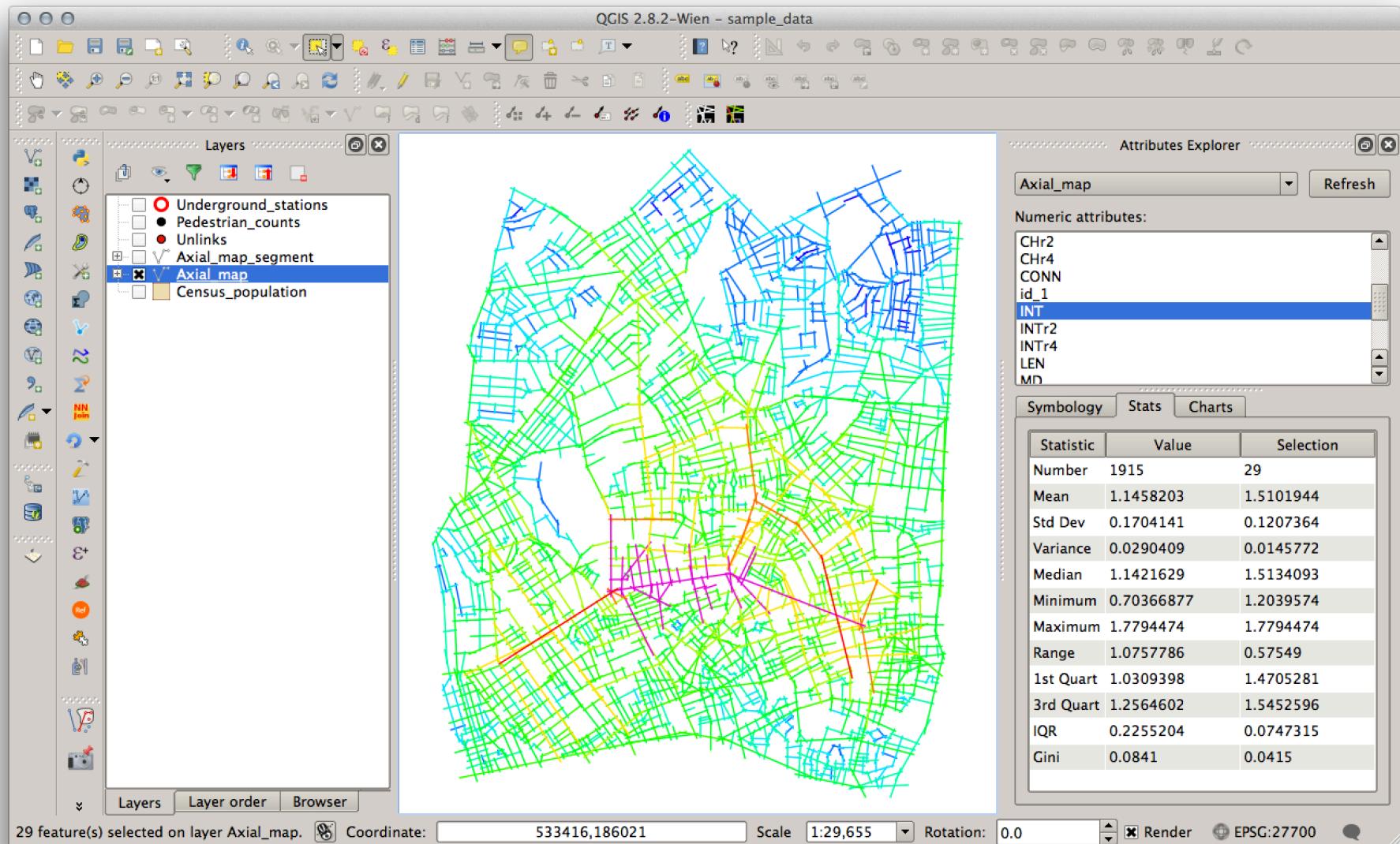
Attribute symbology: polygons



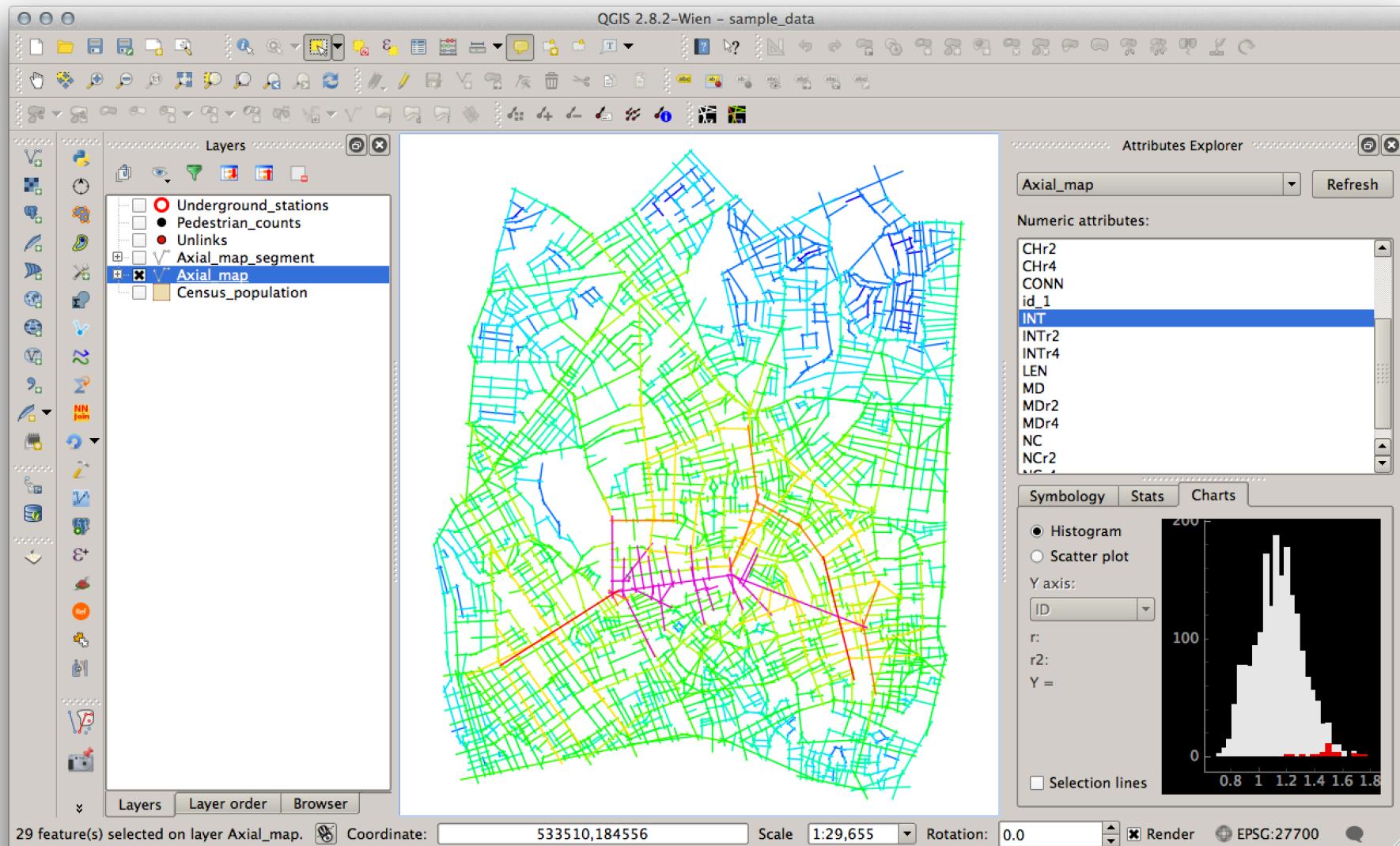
Attribute stats



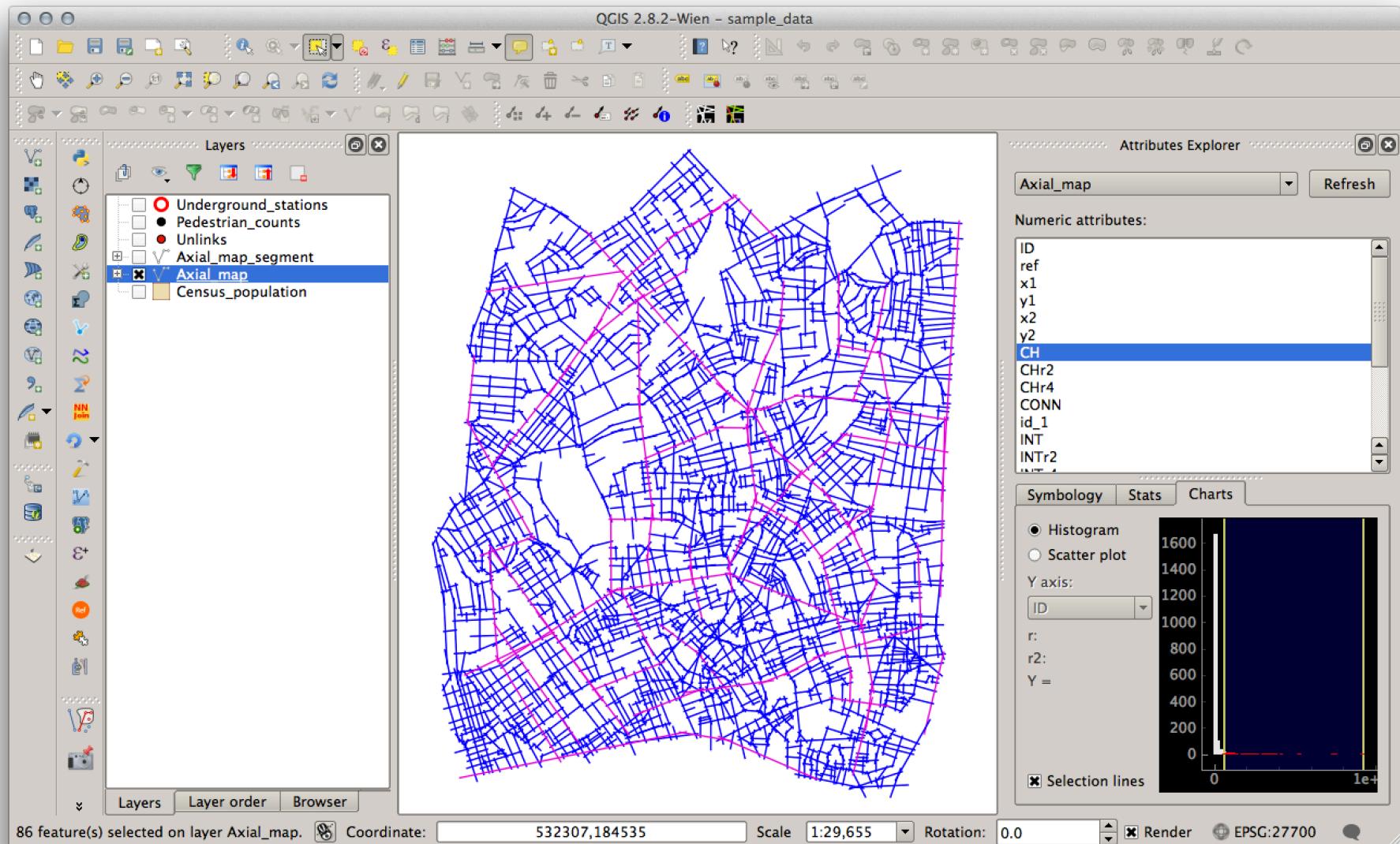
Attribute stats



Attribute charts: histogram



Attribute charts: histogram selection



Attribute charts: histogram selection

Attributes Explorer

Axial_map Refresh

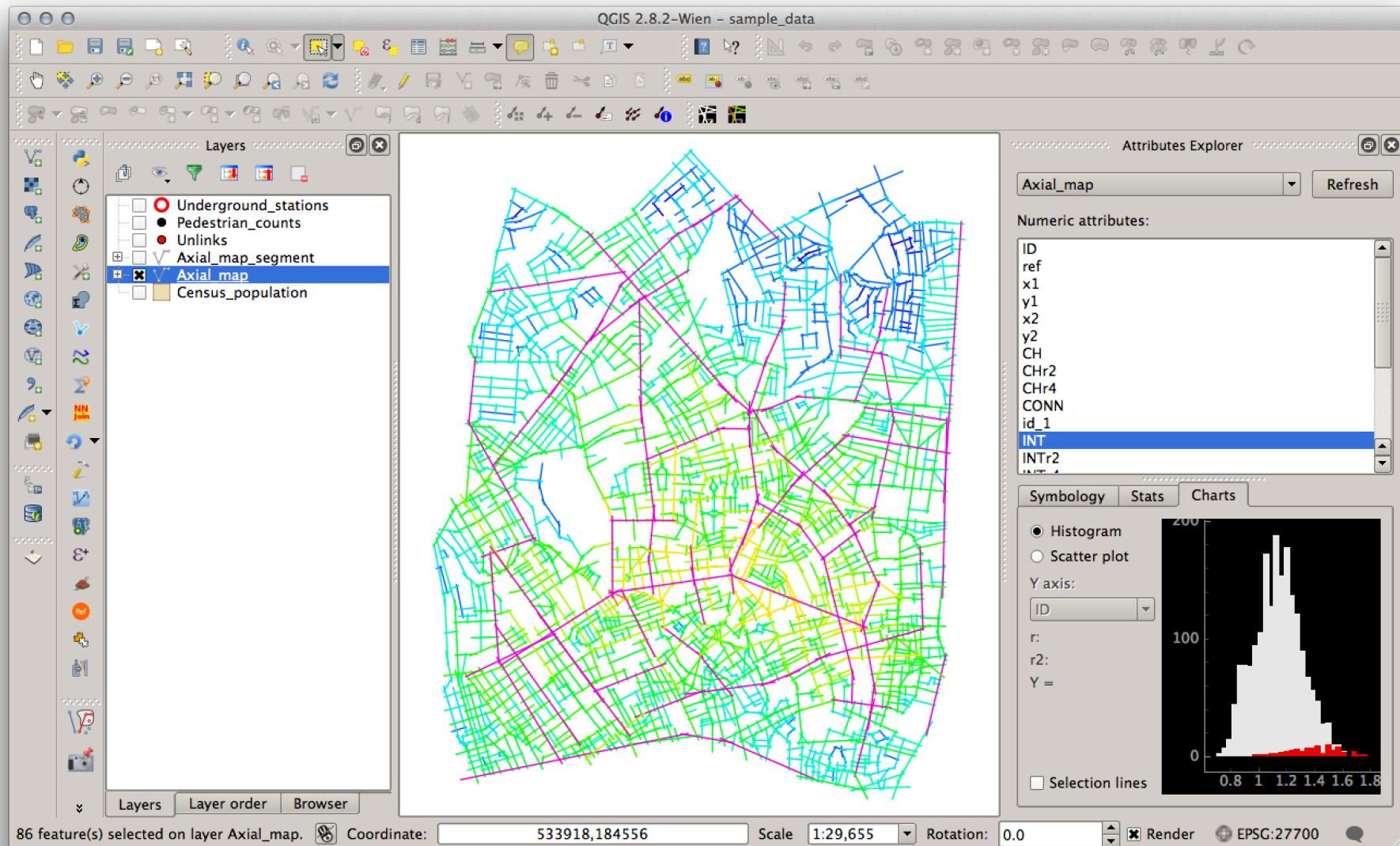
Numeric attributes:

- ref
- x1
- y1
- x2
- y2
- CH**
- Chr2
- Chr4

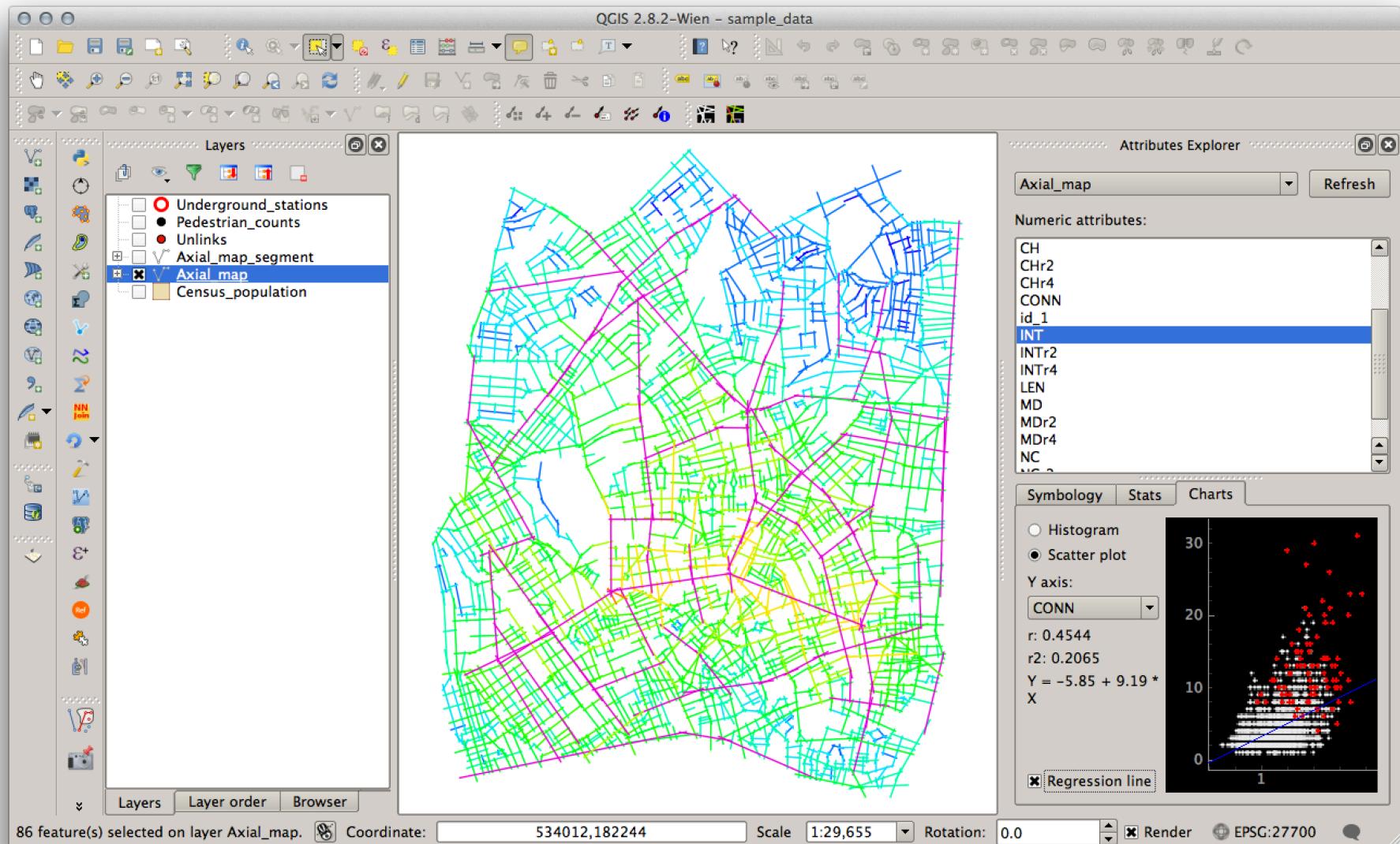
Symbology Stats Charts

Statistic	Value	Selection
Number	1915	77
Mean	14223.258	212225.5
Std Dev	51822.257	150891.66
Variance	268554633	227682937
Median	1676	172626
Minimum	0	81140
Maximum	930781	930781
Range	930781	849641
1st Quart	219	114806
3rd Quart	6798.5	252194
IQR	6579.5	137388
Gini	0.8551	0.3269

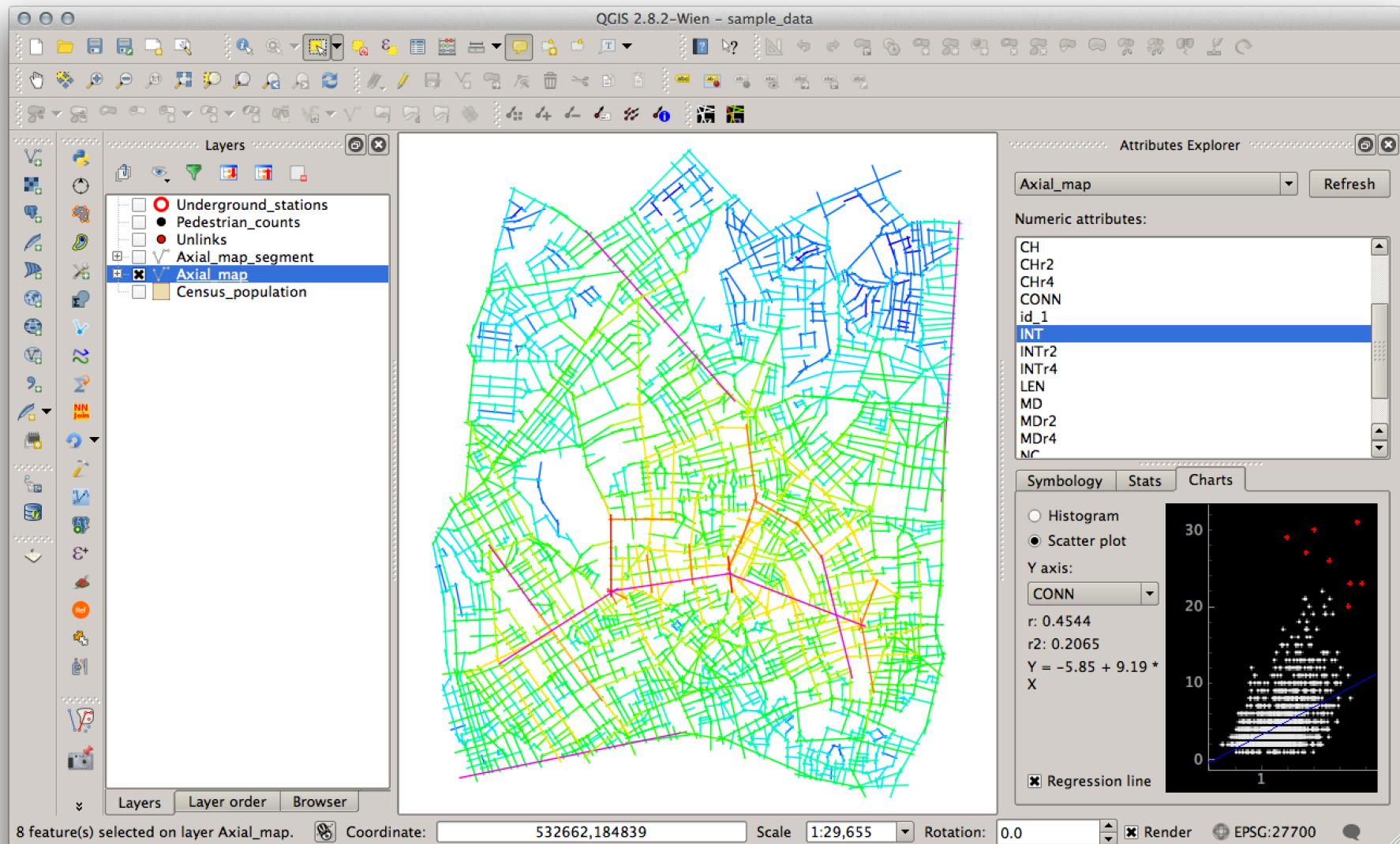
Attribute charts: histogram



Attribute charts: scatterplot



Attribute charts: scatterplot selection



- QGIS:

<http://www.qgis.org/en/site/forusers/download.html>

- DepthmapXnet:

<http://archtech.gr/varoudis/depthmapX/?dir=depthmapXnet>

- SST:

Download from QGIS plugins repository

(Also to manage updates when available)

Plugins | Installed (244)

All

Installed

New

Settings

Search

Spatial Query Plugin

SPIT

Topology Checker

Zonal statistics plugin

Crayfish

Datasource Importer

DB Manager

.01 Test DepthmapX Link

Dimensioning

direction

DumpLoadField

Editable GeoCSV

Elevation

Encoded Polyline Exporter

Space Syntax Toolkit

Event layer plugin

fTools

FieldPyculator

Flow Trace

Freehand Editing

GEarthView

Generalizer

geoUmbriaSUIT

.03 Test geodatabase

geopunt4Qgis

Geospatial Simulation

Space Syntax Toolkit

Collection of tools for spatial network analysis and data exploration.



The "Space Syntax Toolkit" is a QGIS plug-in for spatial network and statistical analysis. It provides a front-end for the depthmapX software within QGIS, offering user friendly space syntax analysis workflows in a GIS environment. It is primarily aimed at supporting the standard space syntax methodology, and enhancing its workflows with standard GIS data, analysis and visualisation features. However, the added functionality can be of general benefit to QGIS users by introducing new tools for exploratory spatial data analysis. The plug-in is being developed at the Space Syntax Laboratory, The Bartlett, UCL. Dependencies: For network analysis requires depthmapXnet. It can be downloaded from: <http://archtech.gr/varoudis/depthmapX/?dir=depthmapXnet>

Category: Vector
 Tags: network analysis, spatial analysis, numeric attribute visualisation
 More info: [homepage](#) [tracker](#) [code repository](#)

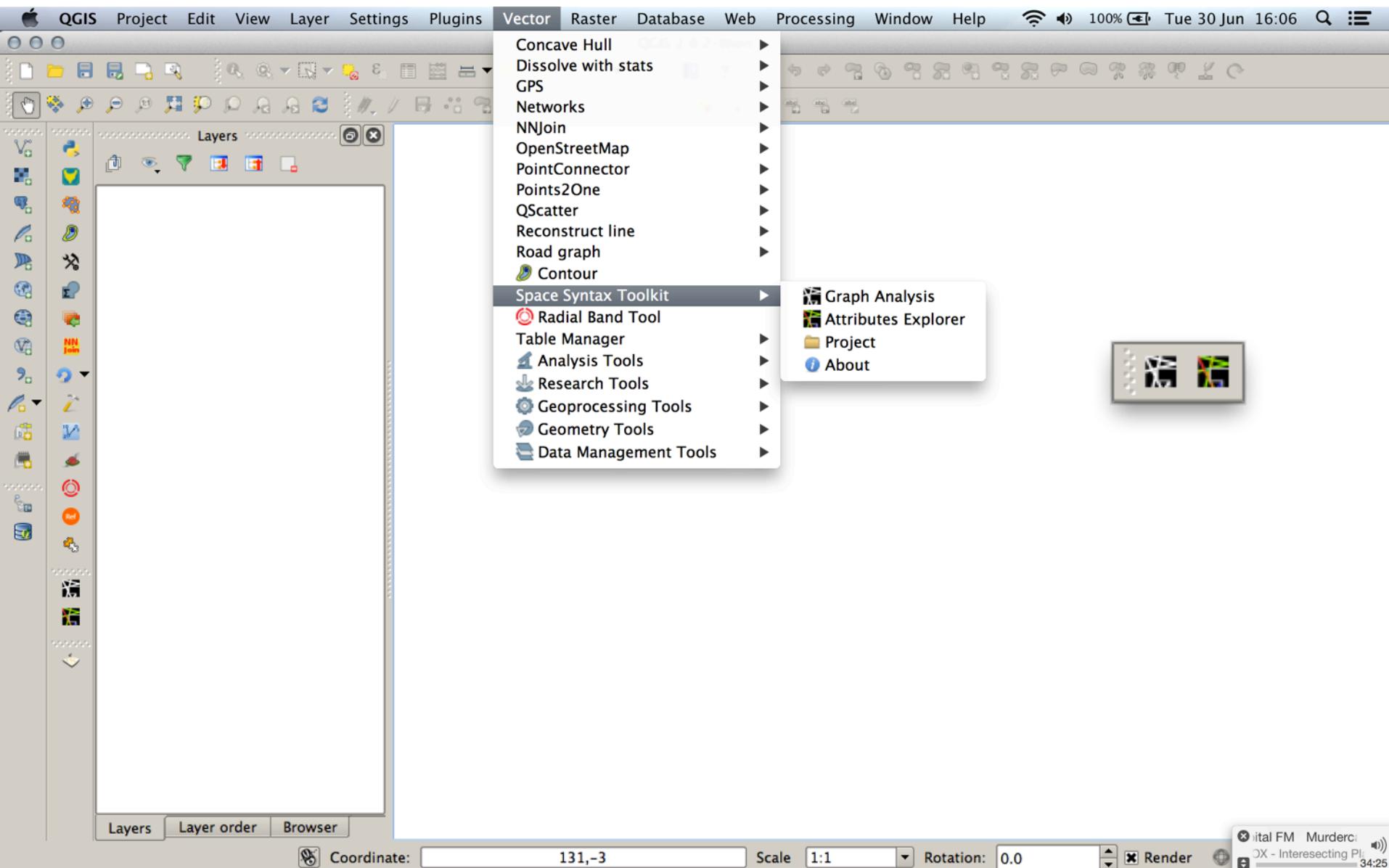
Author: [Jorge Gil, UCL](#)

Installed version: 0.1.0 (in /Users/jorge/.qgis2/python/plugins/esstoolkit)

changelog:

0.1.0 - First public release:
 * faster scatter plot selection
 * small bug fixes
 * minor enhancements

SST installation

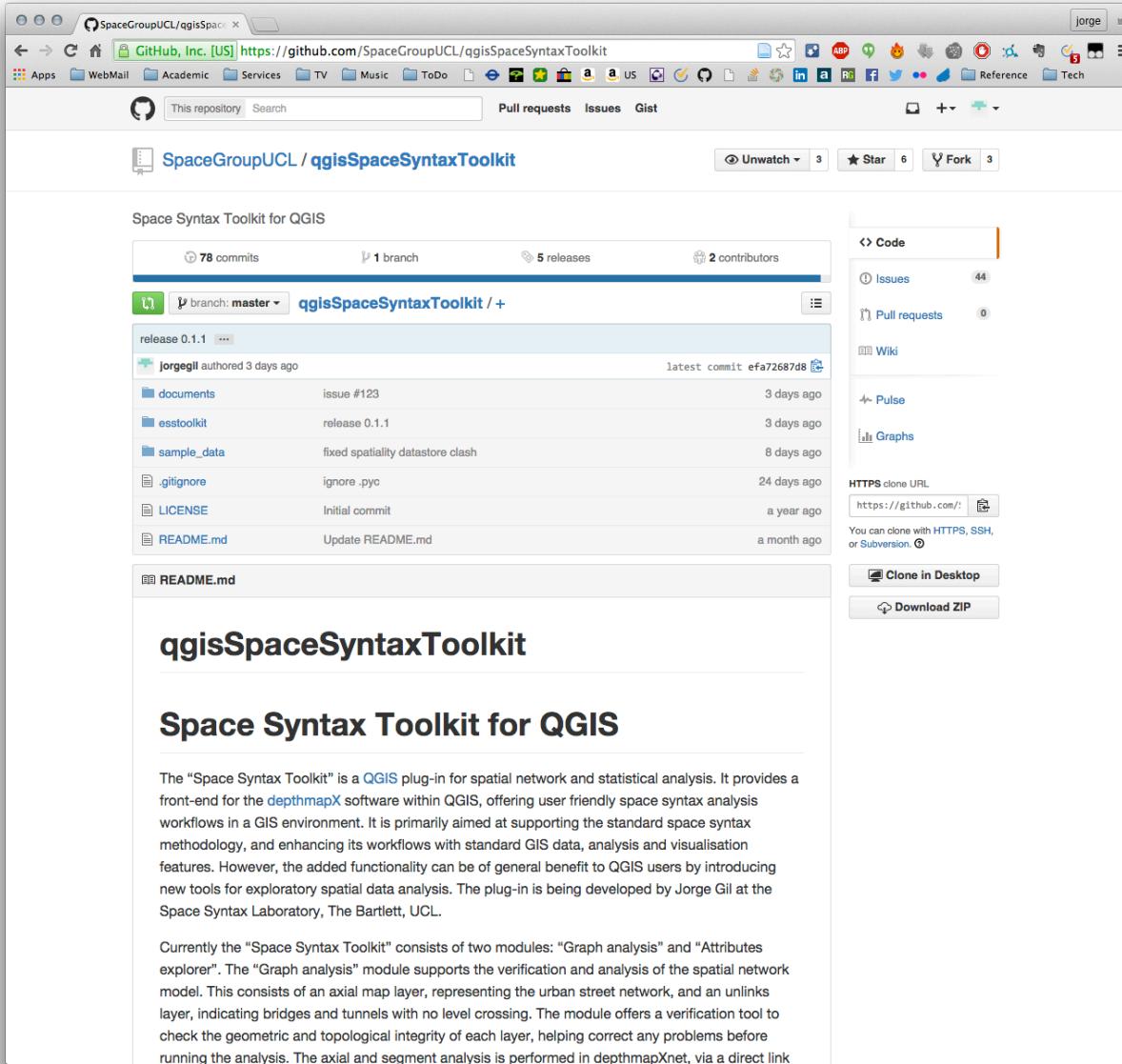


- Openlayers
- Dbmanager
- Processing

(not a comprehensive list, and there are alternatives to some of the above)

- Official Releases
- Latest source code
- Documentation
- Sample data
- Issue tracking – problems and suggestions

<https://github.com/SpaceGroupUCL/qgisSpaceSyntaxToolkit/issues>



The screenshot shows the GitHub repository page for `qgisSpaceSyntaxToolkit`. The repository has 78 commits, 1 branch, 5 releases, and 2 contributors. The latest commit is `efa2687d8`. The repository description is "Space Syntax Toolkit for QGIS". The README.md file contains the following text:

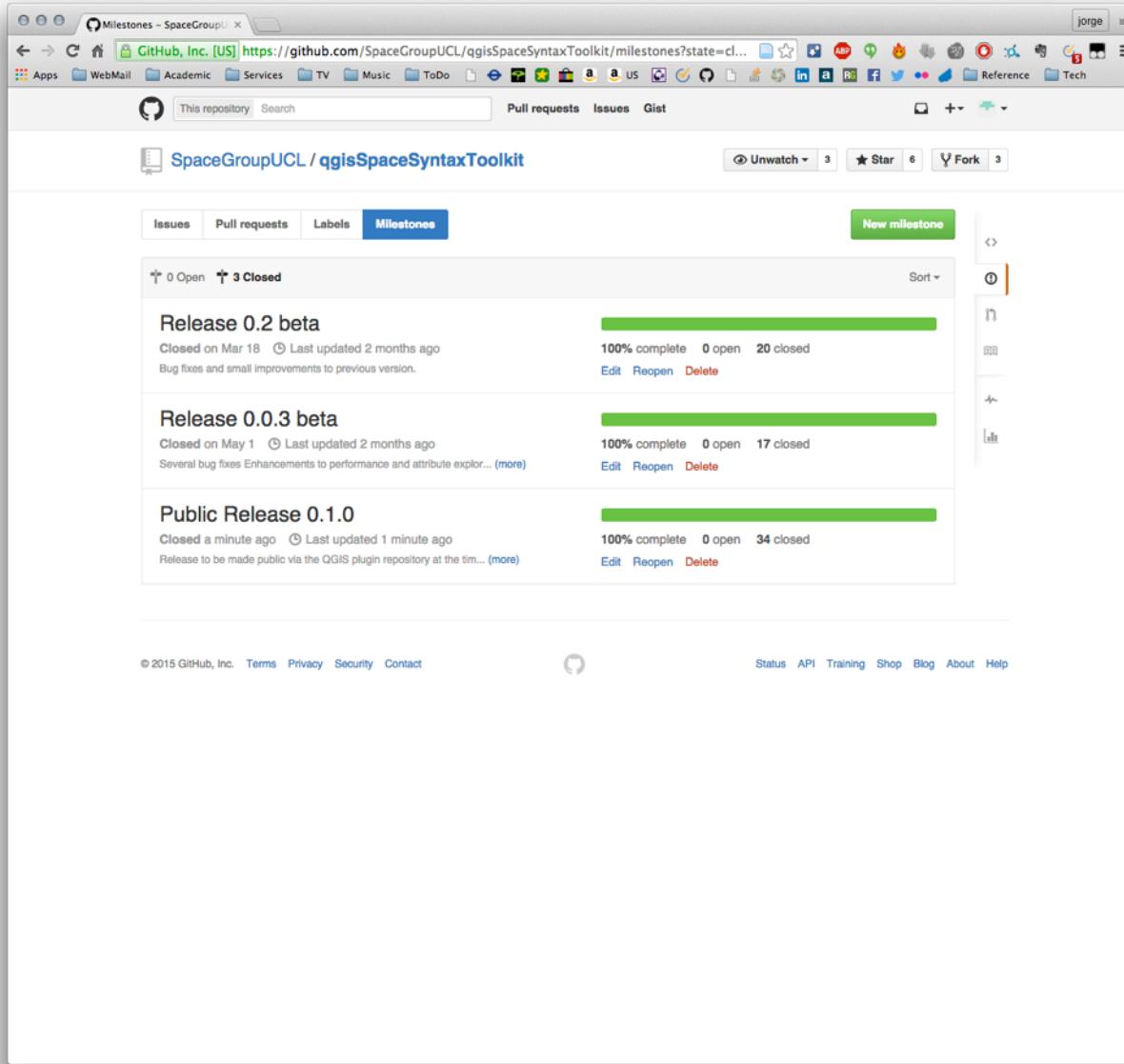
qgisSpaceSyntaxToolkit

Space Syntax Toolkit for QGIS

The "Space Syntax Toolkit" is a [QGIS](#) plug-in for spatial network and statistical analysis. It provides a front-end for the [depthmapX](#) software within QGIS, offering user friendly space syntax analysis workflows in a GIS environment. It is primarily aimed at supporting the standard space syntax methodology, and enhancing its workflows with standard GIS data, analysis and visualisation features. However, the added functionality can be of general benefit to QGIS users by introducing new tools for exploratory spatial data analysis. The plug-in is being developed by Jorge Gil at the Space Syntax Laboratory, The Bartlett, UCL.

Currently the "Space Syntax Toolkit" consists of two modules: "Graph analysis" and "Attributes explorer". The "Graph analysis" module supports the verification and analysis of the spatial network model. This consists of an axial map layer, representing the urban street network, and an unlinks layer, indicating bridges and tunnels with no level crossing. The module offers a verification tool to check the geometric and topological integrity of each layer, helping correct any problems before running the analysis. The axial and segment analysis is performed in `depthmapXnet`, via a direct link

Milestones

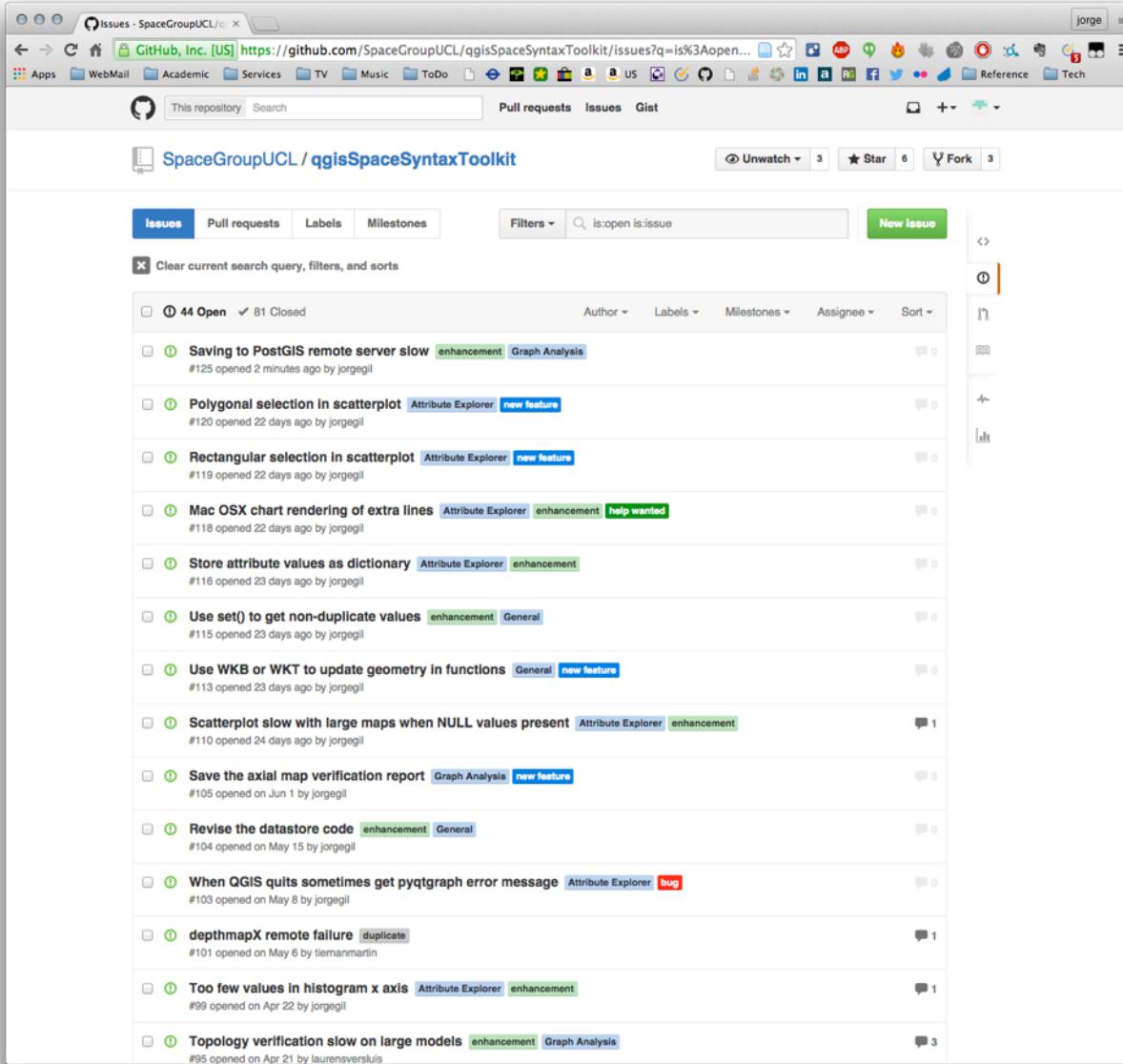


The screenshot shows the GitHub milestones page for the repository `SpaceGroupUCL/qgisSpaceSyntaxToolkit`. The page displays three completed milestones:

- Release 0.2 beta**: Closed on Mar 18, Last updated 2 months ago. Bug fixes and small improvements to previous version. Status: 100% complete (0 open, 20 closed). Actions: Edit, Reopen, Delete.
- Release 0.0.3 beta**: Closed on May 1, Last updated 2 months ago. Several bug fixes Enhancements to performance and attribute explor... (more). Status: 100% complete (0 open, 17 closed). Actions: Edit, Reopen, Delete.
- Public Release 0.1.0**: Closed a minute ago, Last updated 1 minute ago. Release to be made public via the QGIS plugin repository at the tim... (more). Status: 100% complete (0 open, 34 closed). Actions: Edit, Reopen, Delete.

At the bottom of the page, there are links for GitHub status, API, Training, Shop, Blog, About, and Help.

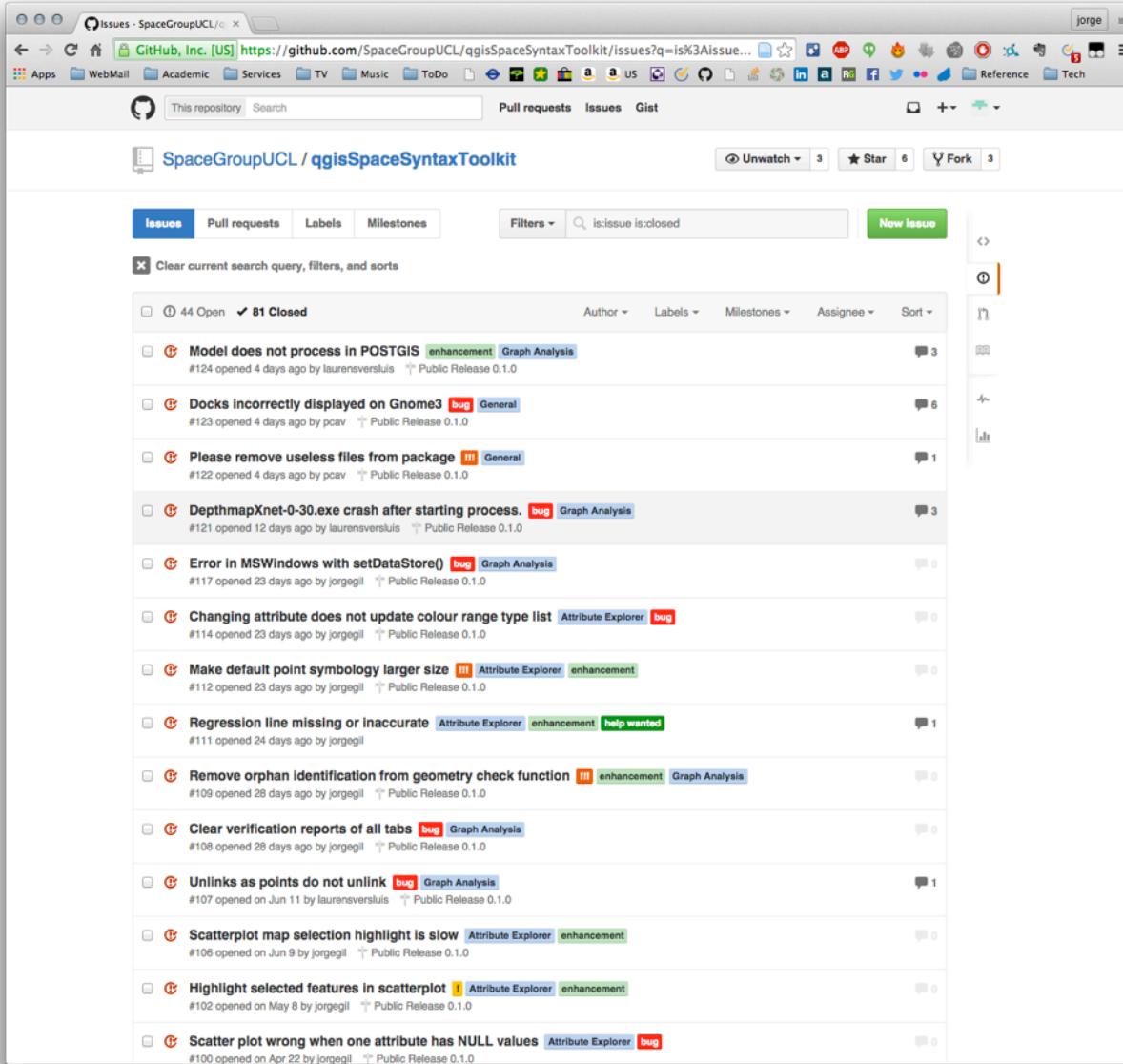
Issue tracking



The screenshot shows a GitHub Issues page for the repository `SpaceGroupUCL/qgisSpaceSyntaxToolkit`. The page displays a list of 44 open issues. The issues are categorized by type (enhancement, bug, new feature, help wanted, etc.) and priority (enhancement, bug, new feature). The issues are listed in chronological order, from oldest at the top to newest at the bottom. Each issue includes a title, a brief description, labels, and a link to the issue details.

Issue Type	Title	Description	Labels	Comments
enhancement	Saving to PostGIS remote server slow	#125 opened 2 minutes ago by jorgegil	enhancement, Graph Analysis	0
enhancement	Polygonal selection in scatterplot	#120 opened 22 days ago by jorgegil	Attribute Explorer, new feature	0
enhancement	Rectangular selection in scatterplot	#119 opened 22 days ago by jorgegil	Attribute Explorer, new feature	0
enhancement	Mac OSX chart rendering of extra lines	#118 opened 22 days ago by jorgegil	Attribute Explorer, enhancement, help wanted	0
enhancement	Store attribute values as dictionary	#116 opened 23 days ago by jorgegil	Attribute Explorer, enhancement	0
enhancement	Use set() to get non-duplicate values	#115 opened 23 days ago by jorgegil	enhancement, General	0
enhancement	Use WKB or WKT to update geometry in functions	#113 opened 23 days ago by jorgegil	General, new feature	0
enhancement	Scatterplot slow with large maps when NULL values present	#110 opened 24 days ago by jorgegil	Attribute Explorer, enhancement	1
enhancement	Save the axial map verification report	#105 opened on Jun 1 by jorgegil	Graph Analysis, new feature	0
enhancement	Revise the datastore code	#104 opened on May 15 by jorgegil	enhancement, General	0
bug	When QGIS quits sometimes get pyqtgraph error message	#103 opened on May 8 by jorgegil	Attribute Explorer, bug	0
duplicate	depthmapX remote failure	#101 opened on May 6 by tiemanmartin	duplicate	1
enhancement	Too few values in histogram x axis	#99 opened on Apr 22 by jorgegil	Attribute Explorer, enhancement	1
enhancement	Topology verification slow on large models	#95 opened on Apr 21 by laurensversluis	enhancement, Graph Analysis	3

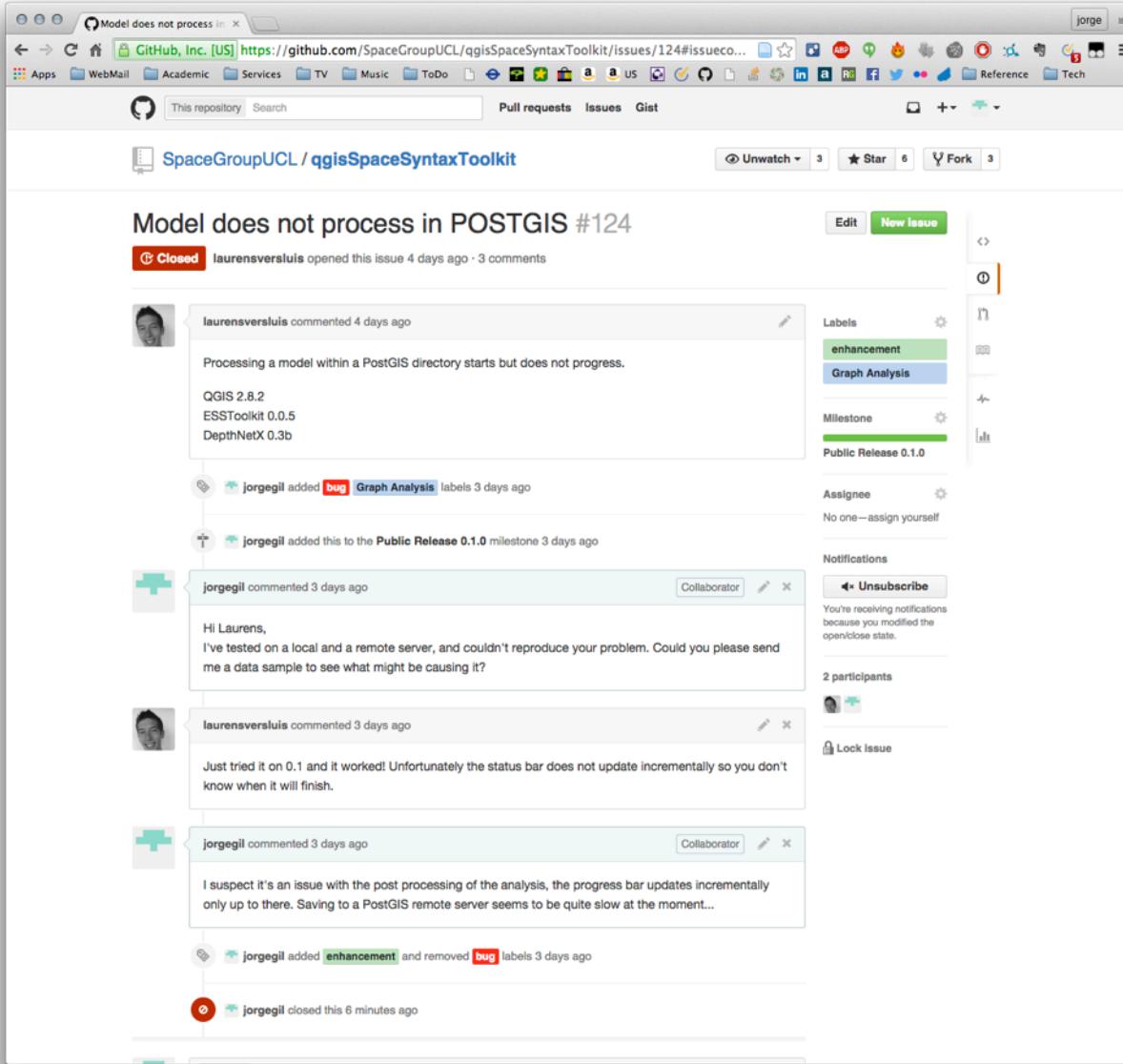
Issue tracking



The screenshot shows a GitHub Issues page for the repository `SpaceGroupUCL/qgisSpaceSyntaxToolkit`. The page displays a list of 81 closed issues. The issues are categorized by type: enhancement, bug, and Graph Analysis. Most issues are labeled as bugs. The issues are listed in chronological order, from oldest at the top to newest at the bottom. Each issue includes a title, a brief description, the assignee, and the date it was opened.

Issue Type	Title	Assignee	Opened Date
enhancement	Model does not process in POSTGIS	laurensversluis	4 days ago
bug	Docks incorrectly displayed on Gnome3	poav	4 days ago
Graph Analysis	Please remove useless files from package	poav	4 days ago
bug	DepthmapXnet-0-30.exe crash after starting process.	laurensversluis	12 days ago
bug	Error in MSWindows with setDataStore()	jorgegil	23 days ago
Graph Analysis	Changing attribute does not update colour range type list	jorgegil	23 days ago
enhancement	Make default point symbology larger size	jorgegil	23 days ago
bug	Regression line missing or inaccurate	jorgegil	24 days ago
enhancement	Attribute Explorer	jorgegil	24 days ago
bug	Remove orphan identification from geometry check function	jorgegil	28 days ago
Graph Analysis	Clear verification reports of all tabs	jorgegil	28 days ago
bug	Unlinks as points do not unlink	laurensversluis	Jun 11
Graph Analysis	Scatterplot map selection highlight is slow	jorgegil	Jun 9
enhancement	Highlight selected features in scatterplot	jorgegil	May 8
bug	Scatter plot wrong when one attribute has NULL values	jorgegil	Apr 22

Issue tracking



The screenshot shows a GitHub issue page for a repository named "SpaceGroupUCL/qgisSpaceSyntaxToolkit". The issue is titled "Model does not process in POSTGIS #124" and is marked as "Closed". It was opened by "laurensversluis" 4 days ago and has 3 comments.

Comments:

- laurensversluis commented 4 days ago**
Processing a model within a PostGIS directory starts but does not progress.
QGIS 2.8.2
ESSToolKit 0.0.5
DepthNetX 0.3b
- jorgegil added bug Graph Analysis labels 3 days ago**
- jorgegil added this to the Public Release 0.1.0 milestone 3 days ago**
- jorgegil commented 3 days ago**
Hi Laurens,
I've tested on a local and a remote server, and couldn't reproduce your problem. Could you please send me a data sample to see what might be causing it?
- laurensversluis commented 3 days ago**
Just tried it on 0.1 and it worked! Unfortunately the status bar does not update incrementally so you don't know when it will finish.
- jorgegil commented 3 days ago**
I suspect it's an issue with the post processing of the analysis, the progress bar updates incrementally only up to there. Saving to a PostGIS remote server seems to be quite slow at the moment...

Labels: enhancement, Graph Analysis

Milestone: Public Release 0.1.0

Assignee: No one—assign yourself

Notifications: You're receiving notifications because you modified the open/close state.

Participants: 2 participants

Actions: Lock issue

Issue tracking

depthmapX remote failure #101

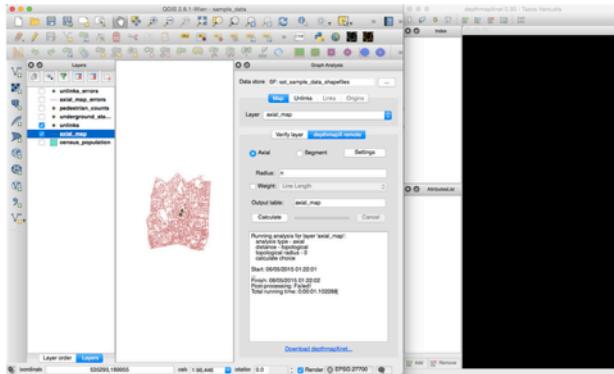
Open tiernanmartin opened this issue on May 6 · 1 comment

tiernanmartin commented on May 6

Advanced apologies if this isn't the right venue for reaching out for troubleshooting help

I installed SST and depthmapX[net] and opened the sample_data qgis project. After restoring the link paths I tried to run a graph analysis but it failed (see screenshot below).

What am I doing wrong here?



jorgegil commented on May 6

Hi,

Thanks for posting this problem. This should not happen, especially with the sample data provided.

From the screenshot I understand you're running OSX Yosemite. This seems to be linked to an intermittent problem others have experienced, issue #9.

I need to look further into it, to understand where exactly it fails, but have not been able to replicate the error so far.

Labels: duplicate

Milestone: No milestone

Assignee: No one—assign yourself

Notifications: You're receiving notifications because you commented.

2 participants

Lock issue

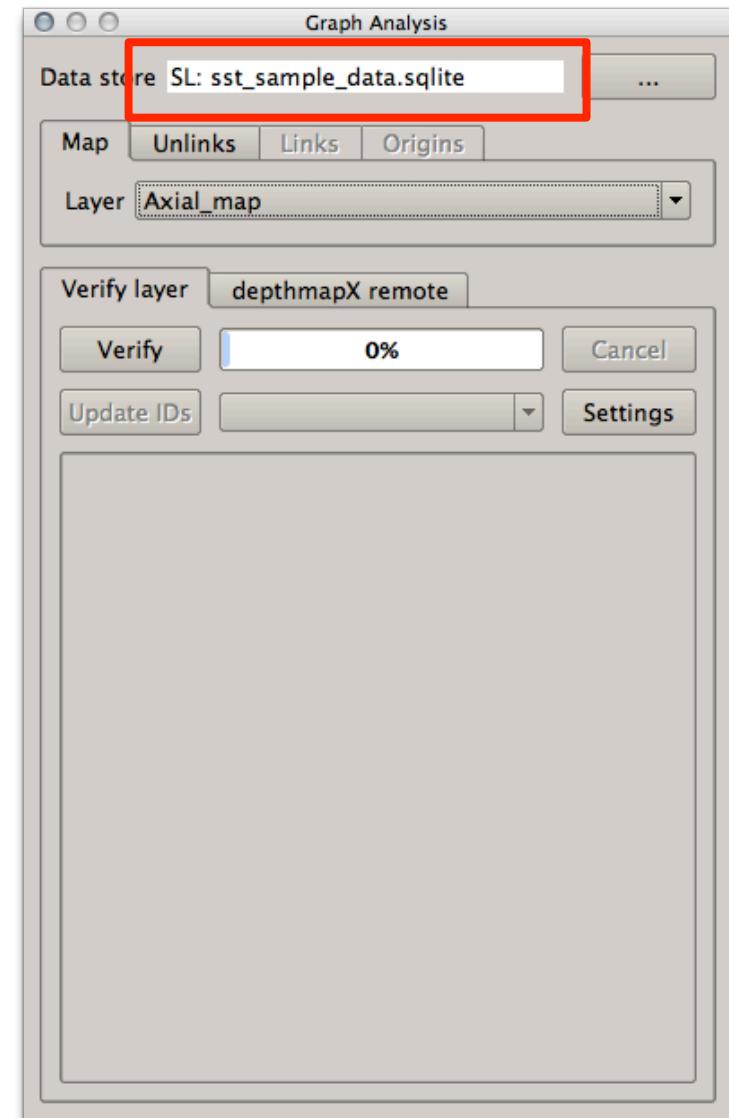
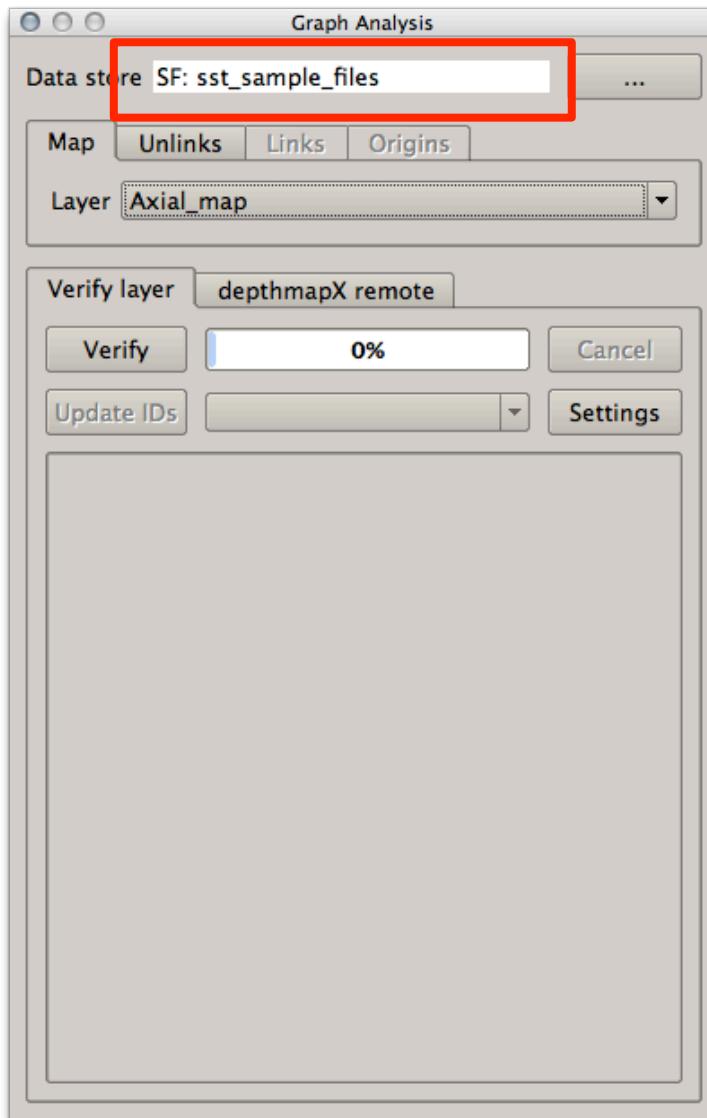


PART 2 – Demonstration and Exercise

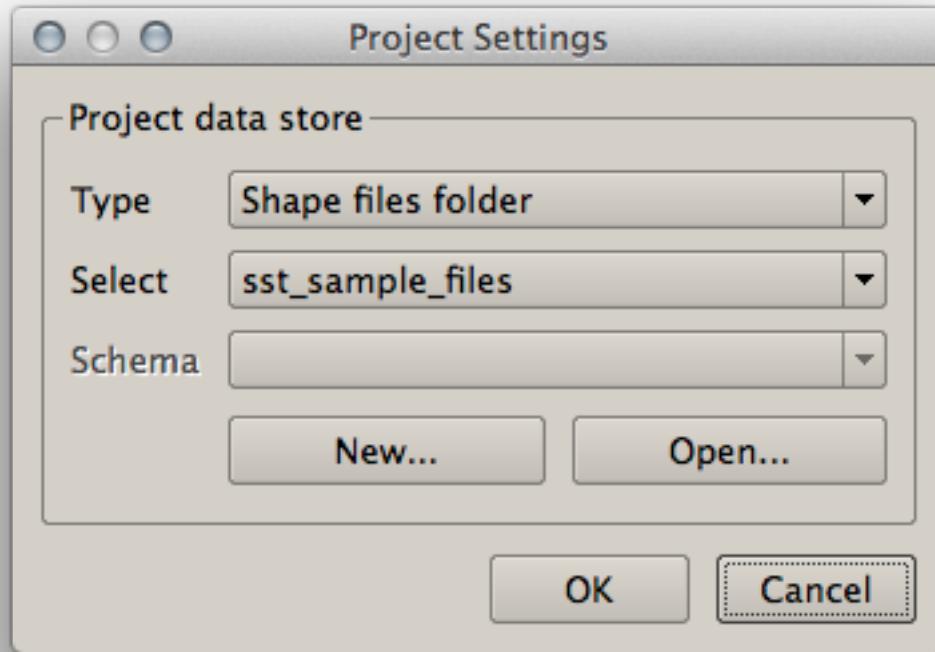
1. Before we begin: data formats
2. Exercise: complete SST workflow
 1. Creating the axial model
 2. Verifying the axial model
 3. Axial and segment analysis
 4. Creating analysis results maps

- Using sample data:
 - open a project file
 - layers are automatically added to QGIS
- Using own data source:
 - adding layers to a project
 - select file / database
- Different data formats, different features

Data store set-up



Data store set-up: Shape Files



▼	📁 sst_sample_files
✓	axial_map_errors.dbf
✓	axial_map_errors.prj
✓	axial_map_errors.qpj
✓	axial_map_errors.shp
✓	axial_map_errors.shx
✓	axial_map.dbf
✓	axial_map.prj
✓	axial_map.qpj
✓	axial_map.shp
✓	axial_map.shx
✓	census_population.cpg
✓	census_population.dbf
✓	census_population.prj
✓	census_population.qpj
✓	census_population.shp
✓	census_population.shx
✓	pedestrian_counts.cpg
✓	pedestrian_counts.dbf
✓	pedestrian_counts.prj
✓	pedestrian_counts.qpj
✓	pedestrian_counts.shp
✓	pedestrian_counts.shx
✓	underground_stations.cpg
✓	underground_stations.dbf
✓	underground_stations.prj
✓	underground_stations.qpj
✓	underground_stations.shp
✓	underground_stations.shx

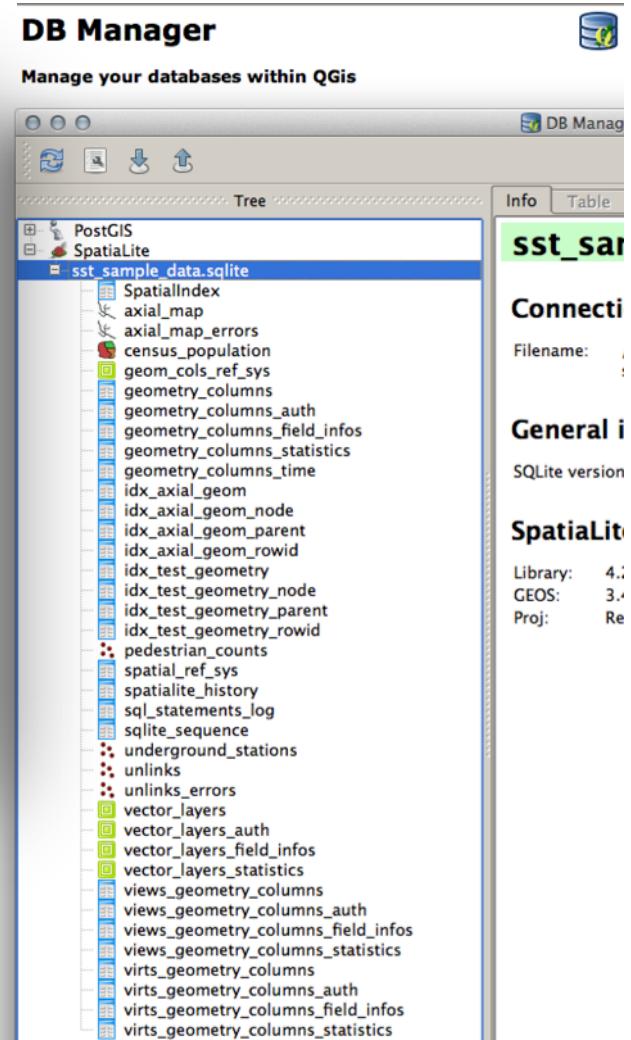
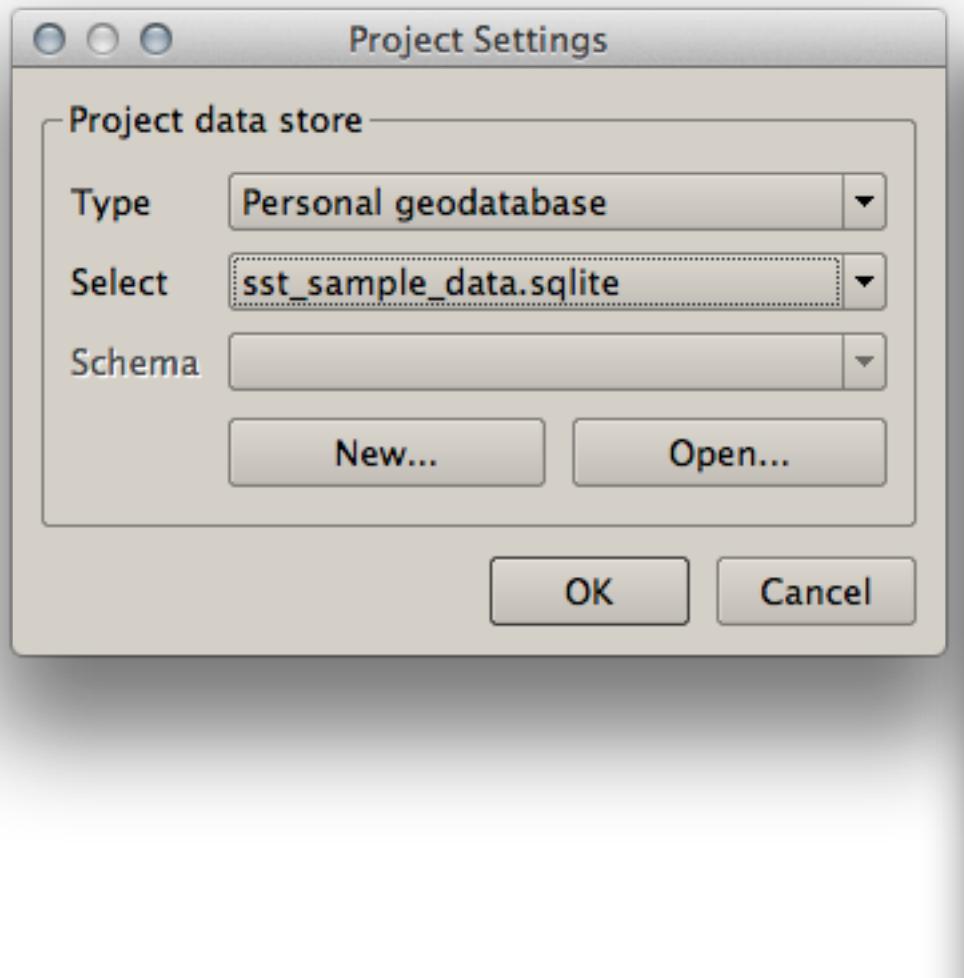
+

- “standard” GIS format used for distributing/sharing;
- most software reads these files;
- uses the standard file and folder approach for storage that every user is familiar with.

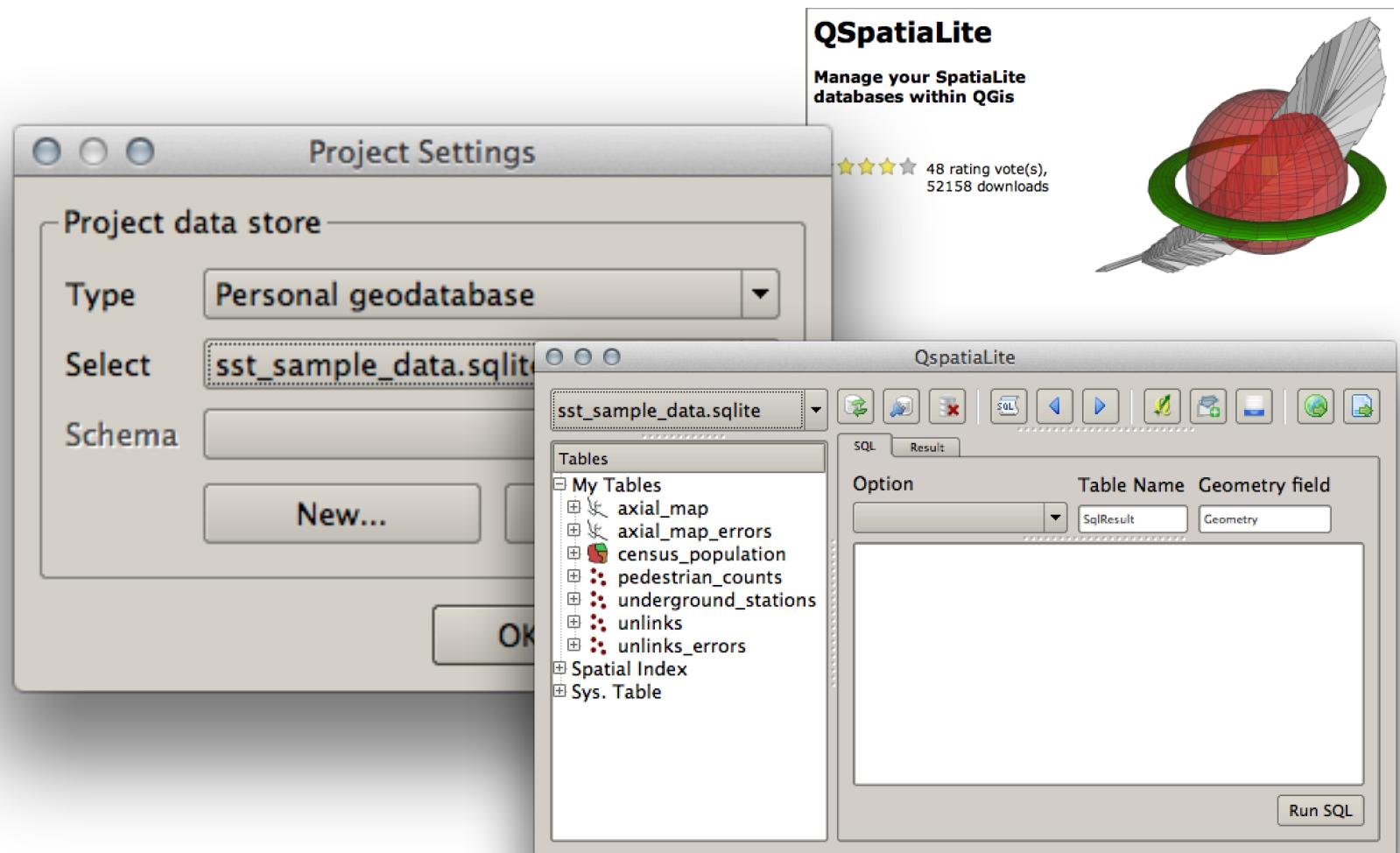
-

- easy to lose components when moving things around;
- limited to 10 characters in attribute names;
- limited to 2GB in the dbf (attributes) file;
- leads to huge folders with many files;
- depends solely on the QGIS API for querying and analysis.

Data store set-up: Spatialite



Data store set-up: Spatialite



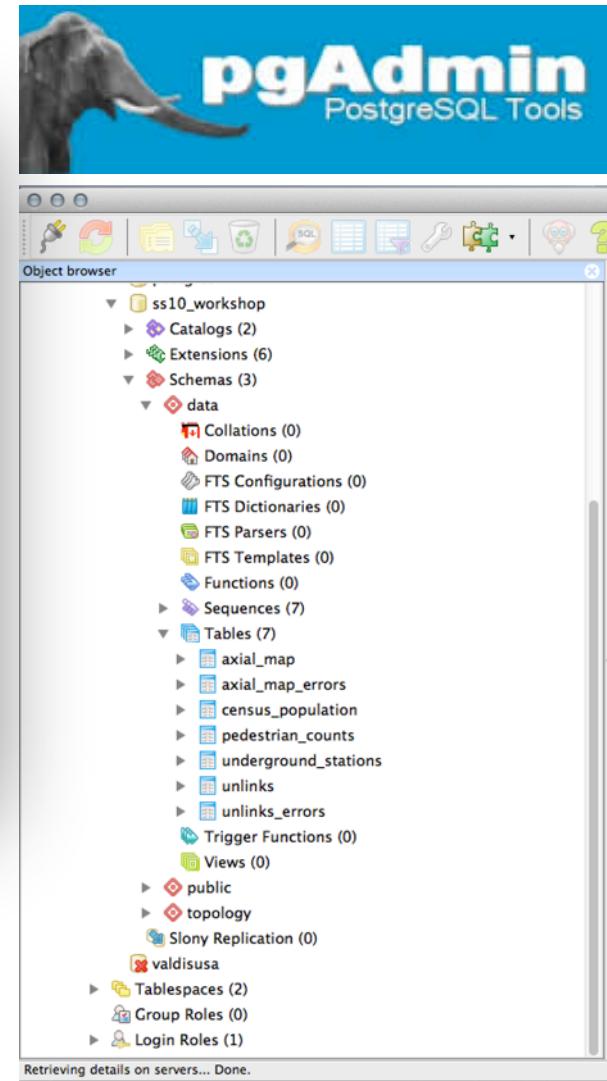
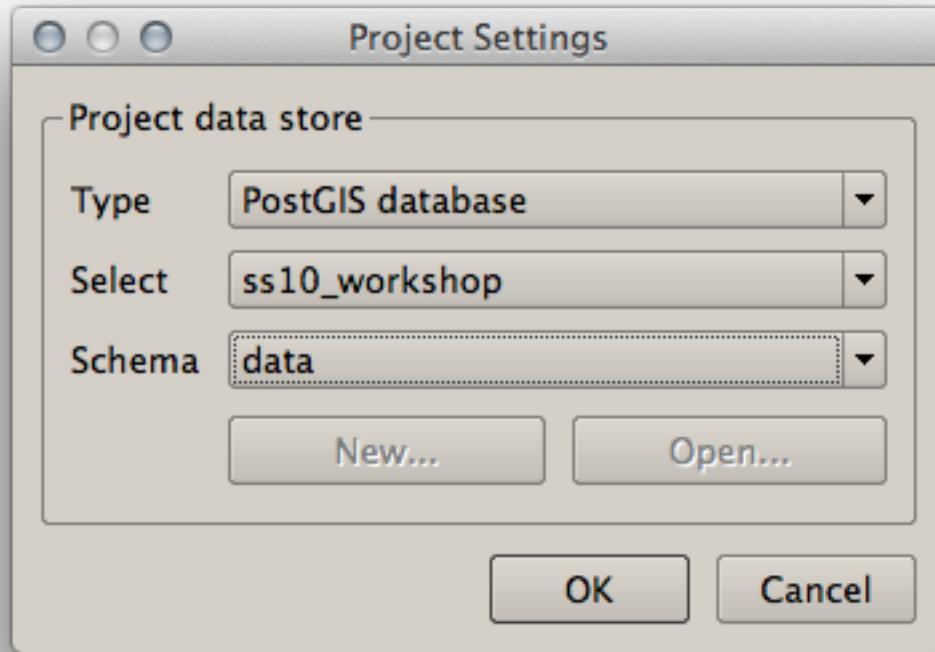
+

- data is stored in a single file, easy to backup and share;
- embedded SQL allows data query and analysis;
- embedded functions are many times faster than QGIS equivalents;
- no restrictions on table and attribute names;
- QGIS offers user-friendly data manager interfaces.

-

- requires familiarity with database principles to manage;
- database can quickly grow to have many tables;
- can be temperamental;
- the SQLite SQL standard has some limitations;
- only supports vector data.

Data store set-up: PostGIS

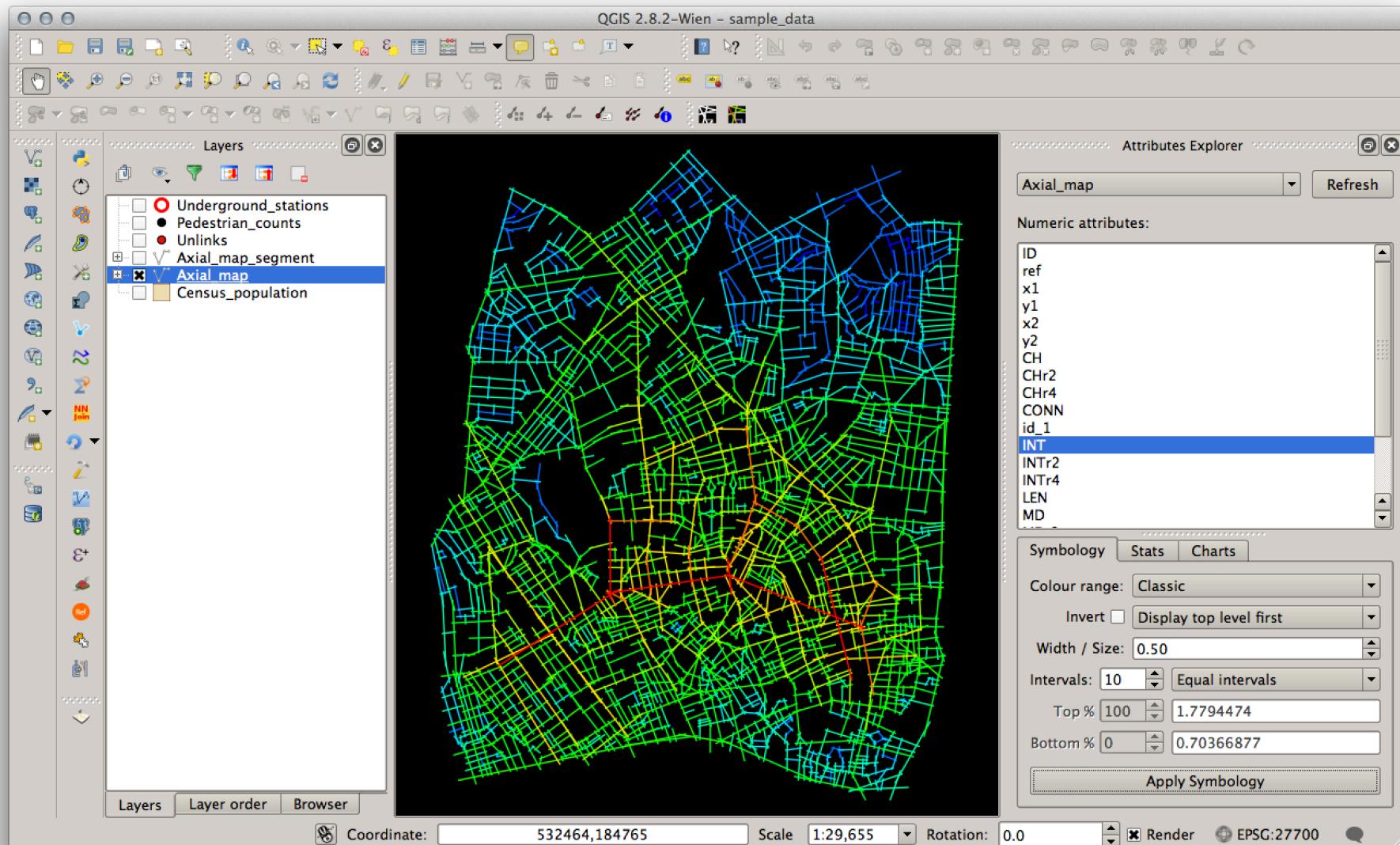


+

- no data size limit;
- full and enhanced SQL support;
- rich set of analysis functions;
- extremely fast operations;
- supports vector and raster data;
- has “schemas” that help keep the database organised;
- possible to have multiple users collaborating.

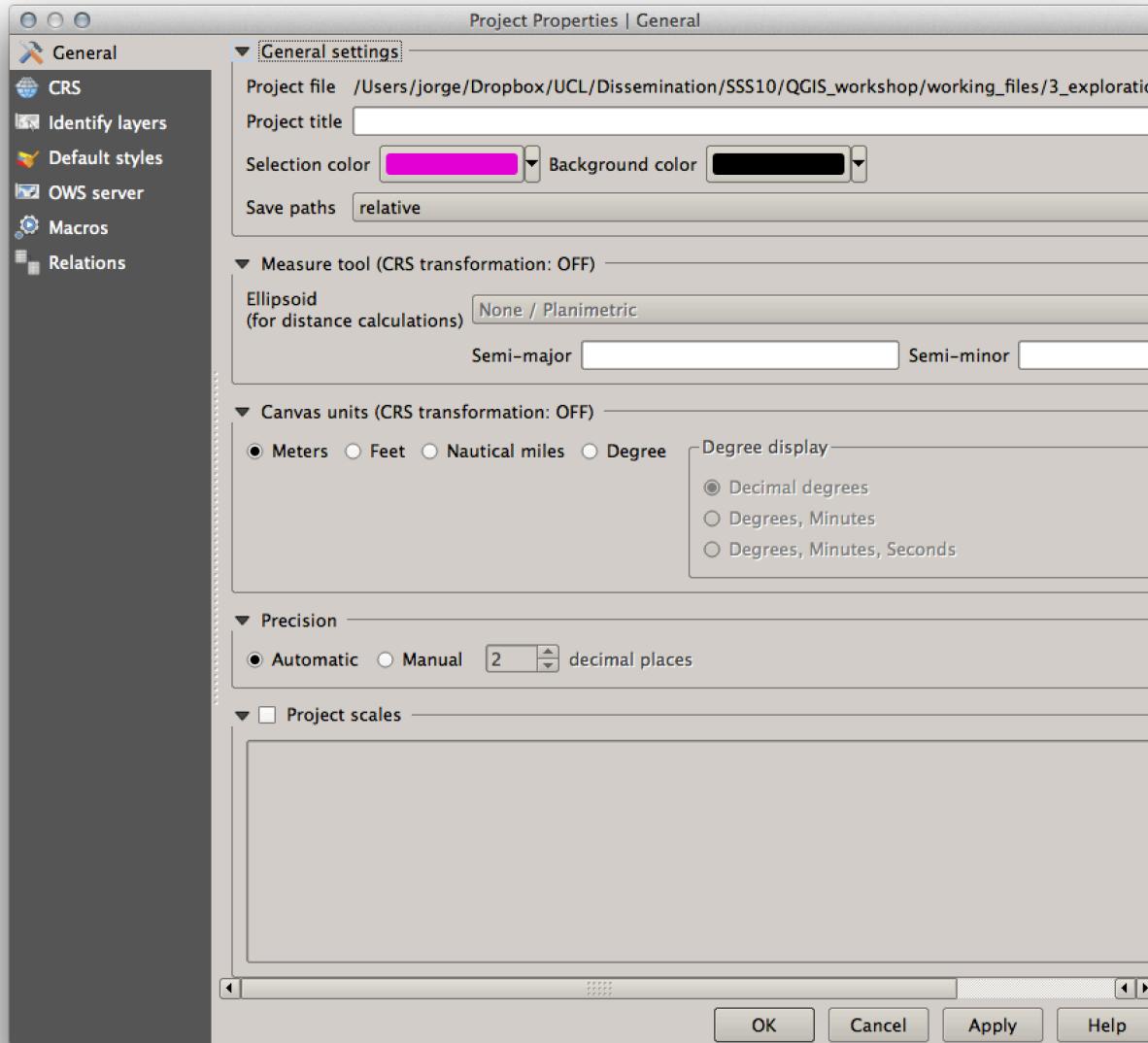
-
- requires installation of server and/or client platform;
- for personal use it requires knowledge of database systems and management;
- data sharing using shape files, when others don't have access to the server.

Exercise: complete SST workflow

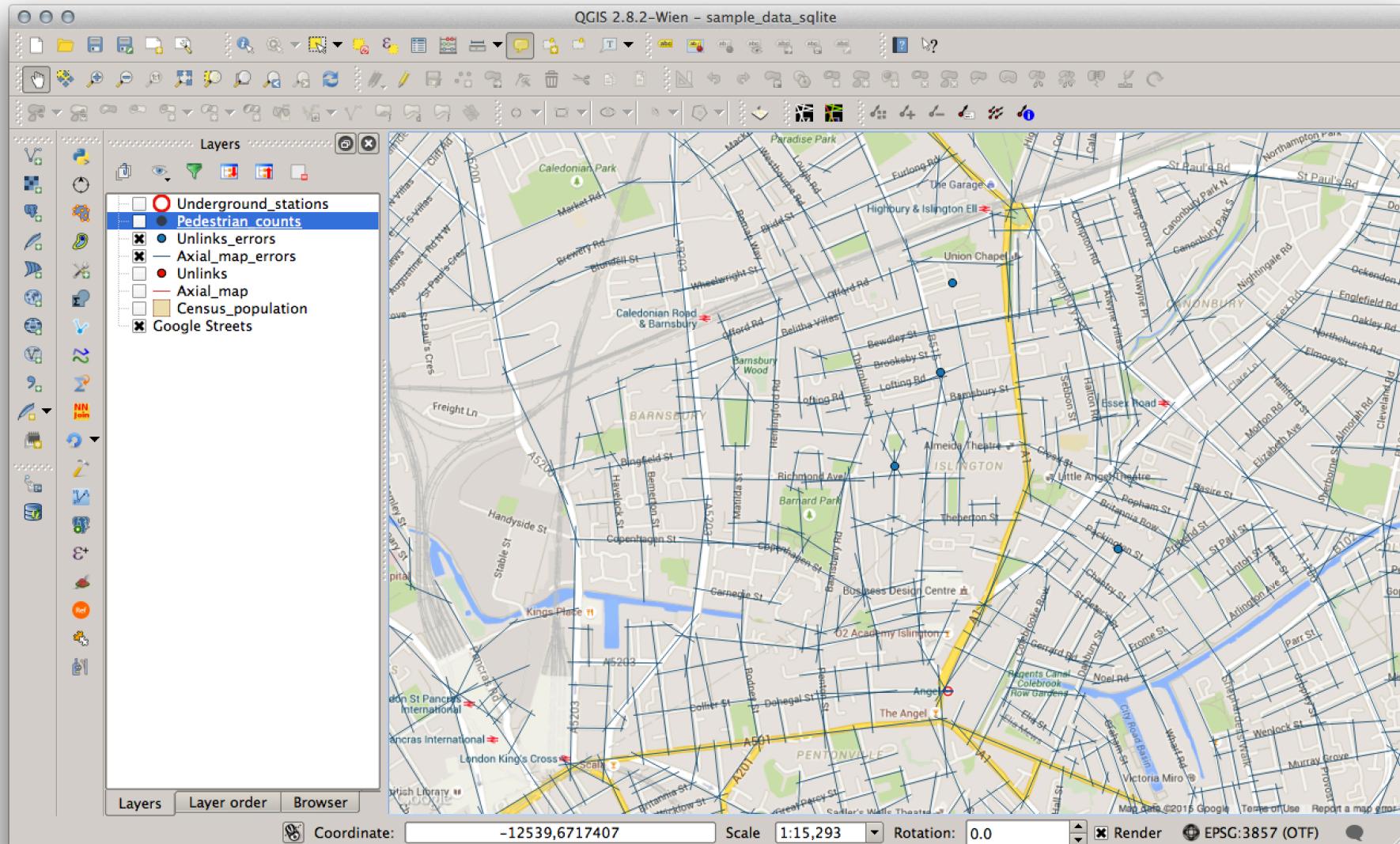


- Using sample data:
 - open a project file
 - layers are automatically added to QGIS
- Using own data source:
 - adding layers to a project
 - select file / database

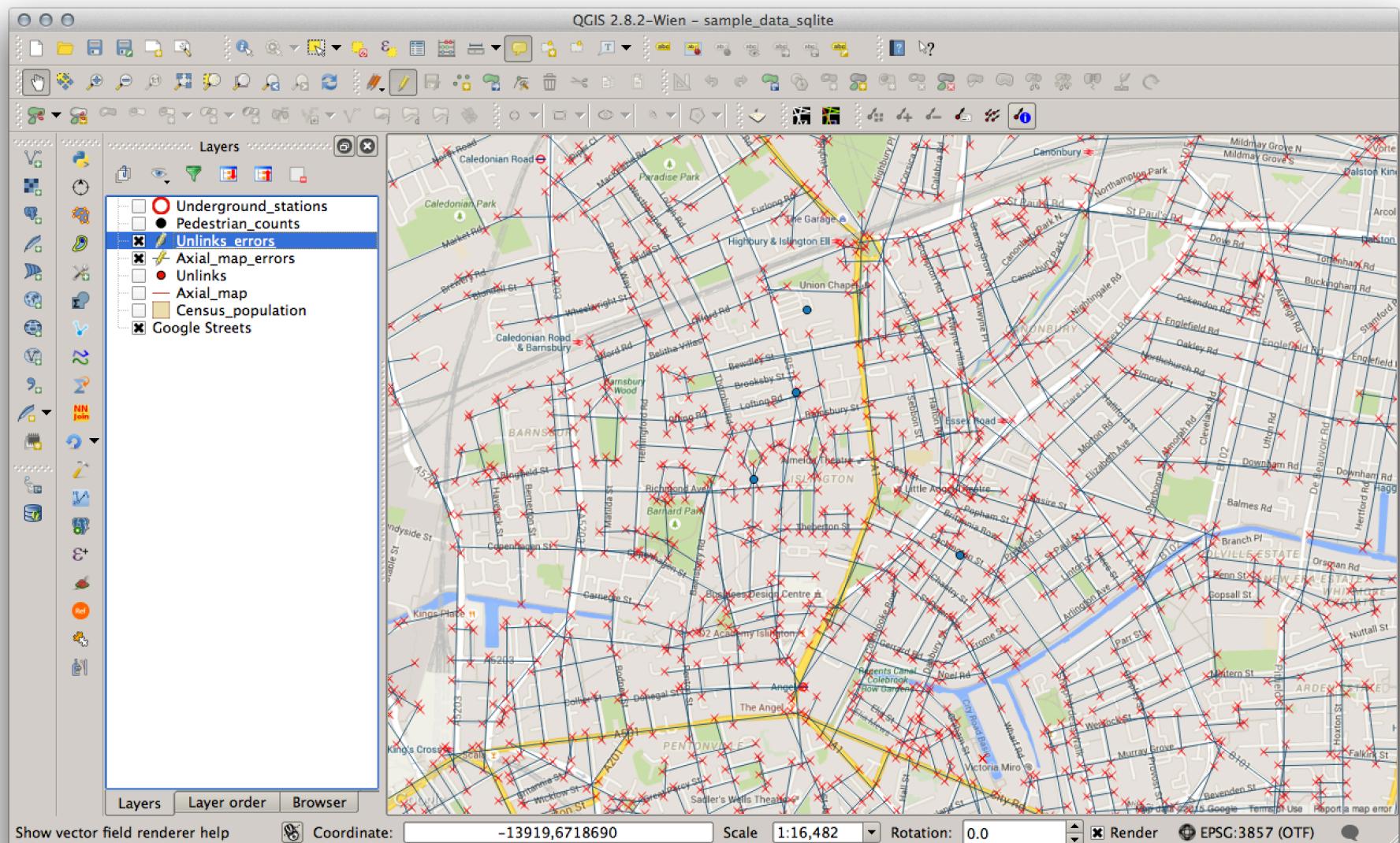
Changing project properties



Load background imagery



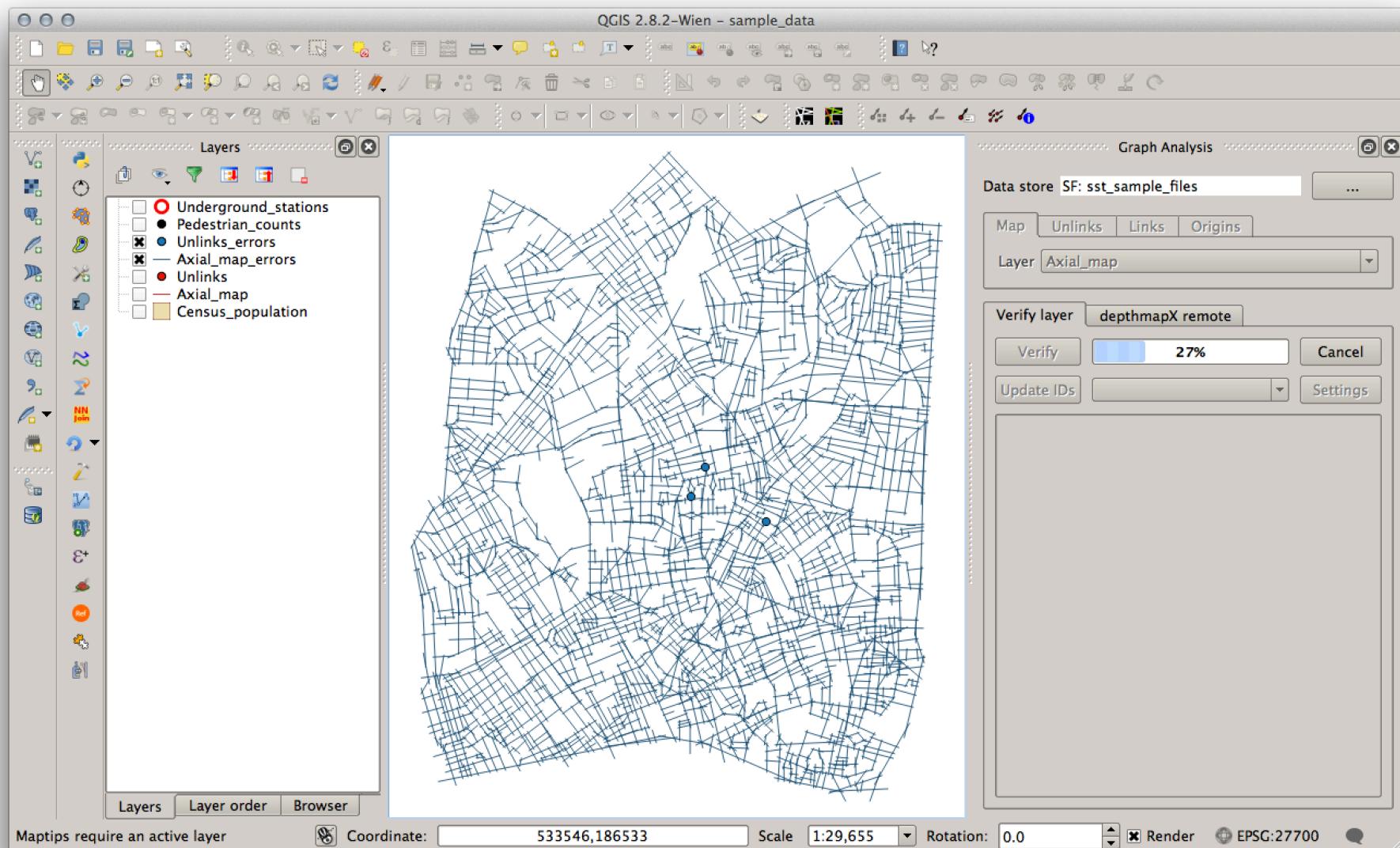
Create axial lines and unlinks



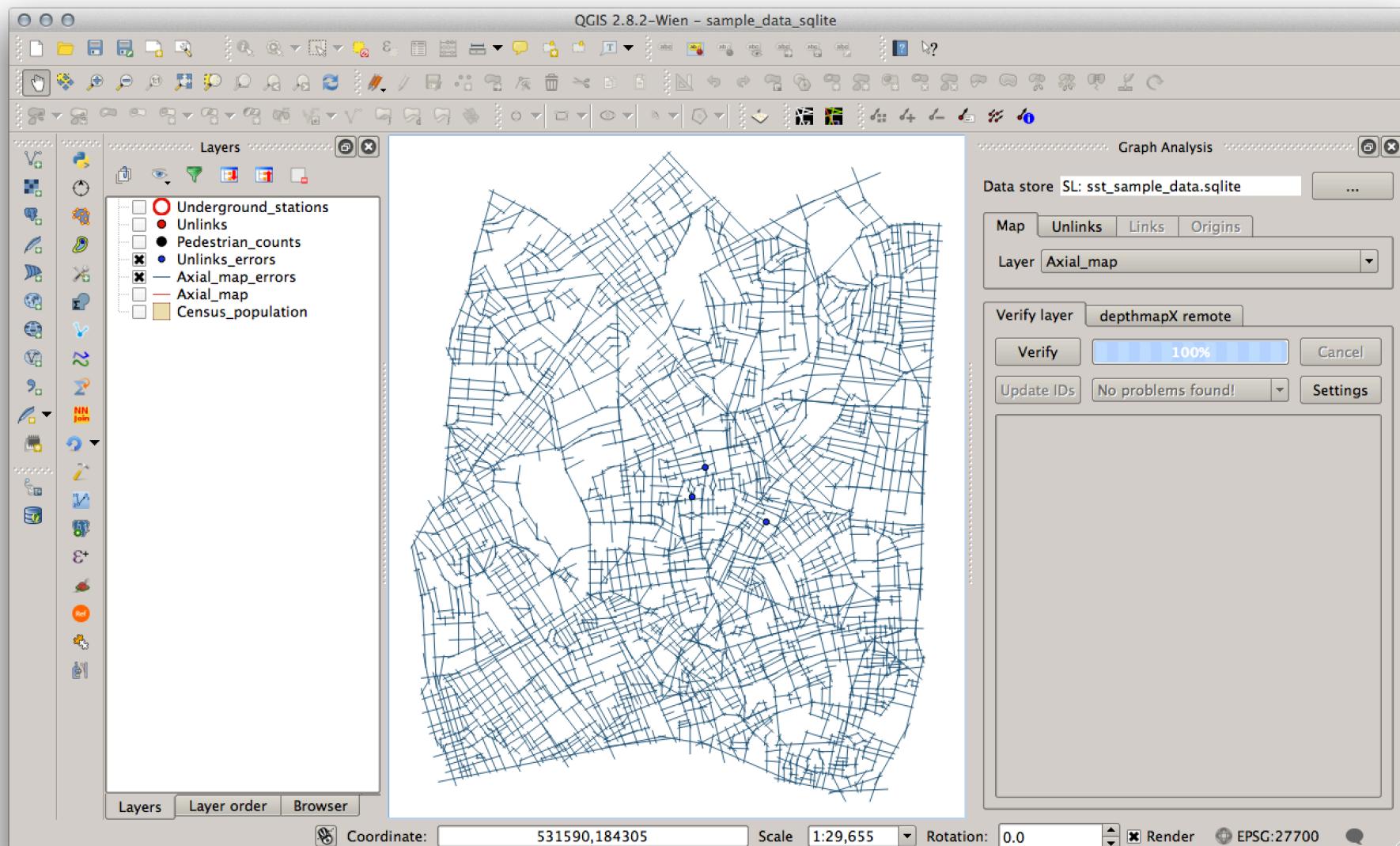
- The model verification process is iterative:
 - Verify and fix axial lines
 - Update unlinks ids
 - Verify and fix unlinks
 - Verify and fix axial lines
 - Verify and fix unlinks
 - ...
- **Caution!**

Verify and fix unlinks before updating ids a second time, some unlinks might be on incorrect lines!

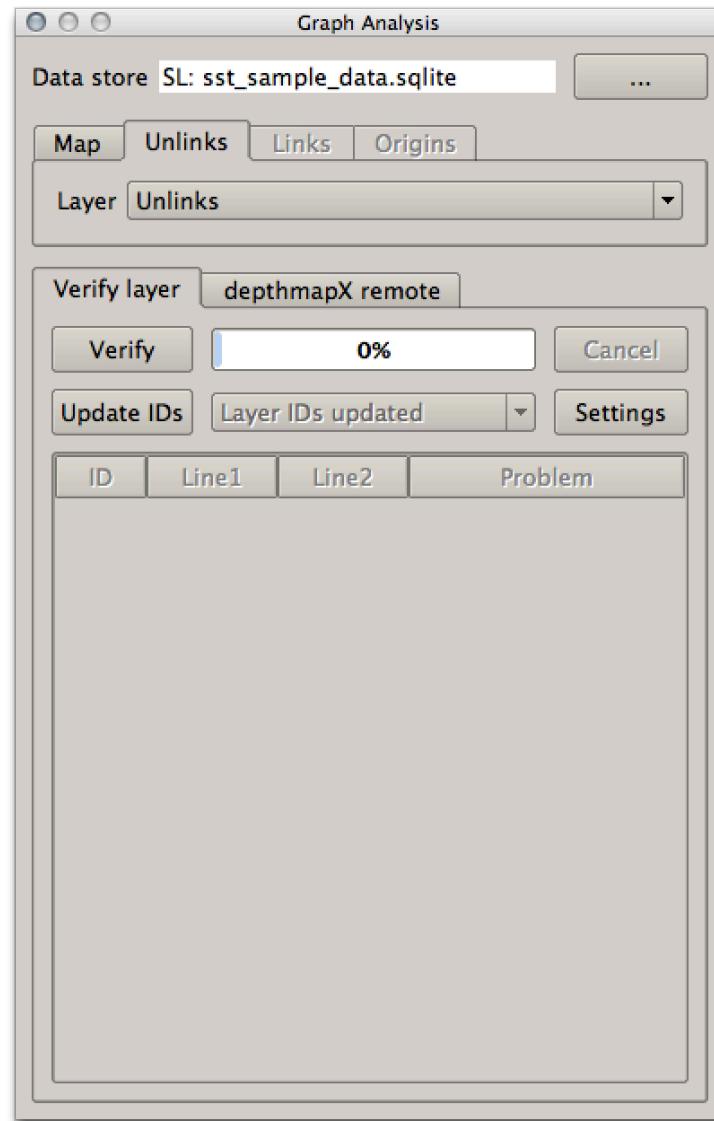
Verifying the axial map



Verifying the axial map (geodatabase)



Updating unlink ids



Fixing the axial map

QGIS 2.8.2-Wien – sample_data

The screenshot shows the QGIS interface with the following details:

- Layers Panel:** Shows a list of layers: Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors (selected), Unlinks, Axial_map, and Census_population.
- Map View:** Displays a network diagram with several red error markers (x and square icons) indicating problems like orphan nodes and short lines.
- Graph Analysis Panel:** Titled "Graph Analysis" with "Data store SF: sst_sample_files". It shows the "Map" tab selected, with "Layer" set to "Axial_map_errors".
 - Verify layer:** Set to "depthmapX remote".
 - Progress:** 100%.
 - Update IDs:** All problems (12).
 - Settings:** Button.
- Error Table:** A table listing 12 errors with their IDs and descriptions:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Bottom Bar:** Validation finished (0 error(s) found.), Coordinate: 532356.5,184947.4, Scale: 1:736, Rotation: 0.0, Render, EPSG:27700.

Fixing the axial map

QGIS 2.8.2-Wien – sample_data

The screenshot shows the QGIS interface with the following components:

- Layers Panel:** Shows a list of layers: Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors (selected), Unlinks, Axial_map, and Census_population.
- Map View:** Displays a map with several blue lines representing an axial network. Red square markers with a white 'X' are placed on some of the lines, indicating errors. A yellow line segment connects two such markers.
- Graph Analysis Panel:** Titled "Graph Analysis".
 - Data store: SF: sst_sample_files
 - Map tab selected, Layer: Axial_map_errors
 - Verify layer: depthmapX remote
 - Status: Verify 100% complete
 - Update IDs: All problems (12)
 - Settings button
- Table:** Shows a list of 18 errors with their IDs and descriptions:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Bottom Bar:** Validation finished (0 error(s) found.), Coordinate: 532373.6,184946.1, Scale: 1:736, Rotation: 0.0, Render, EPSG:27700.

Fixing the axial map

QGIS 2.8.2-Wien – sample_data

Layers

- Underground_stations
- Pedestrian_counts
- Unlinks_errors
- Axial_map_errors
- Unlinks
- Axial_map
- Census_population

Graph Analysis

Data store SF: sst_sample_files

Map Unlinks Links Origins

Layer Axial_map_errors

Verify layer depthmapX remote

Verify 100% Cancel

Update IDs All problems (12) Settings

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry

Coordinate: 530378,182469 Scale 1:3,061 Rotation: 0.0 Render EPSG:27700

Fixing the axial map

QGIS 2.8.2-Wien – sample_data

The screenshot shows the QGIS interface with the following details:

- Layers Panel:** Shows layers: Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors (selected), Unlinks, Axial_map, and Census_population.
- Map View:** Displays a network of blue lines with red 'X' markers indicating errors. A yellow line also intersects the network.
- Graph Analysis Panel:** Data store: SF: sst_sample_files. Layer: Axial_map_errors. Verify layer: depthmapX remote. Status: 100% completed. Problems found:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Bottom Bar:** 1 feature(s) selected on layer Axial_map_. Coordinate: 530206.9,182494.7 Scale: 1:765 Rotation: 0.0 Render: EPSG:27700

Fixing the axial map

QGIS 2.8.2-Wien – sample_data

The screenshot shows the QGIS interface with the following components:

- Layers Panel:** Displays layers including Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors (selected), Unlinks, Axial_map, and Census_population.
- Map View:** Shows a network of blue lines with red 'X' marks indicating errors. A specific error is highlighted with a red square marker.
- Graph Analysis Panel:** Titled "Graph Analysis".
 - Data store: SF: sst_sample_files
 - Map tab (selected) showing Layer: Axial_map_errors
 - Verify layer: depthmapX remote
 - Status: Verify 100% complete
 - Update IDs: All problems (12)
 - Settings button
- Table:** Lists 18 errors with their IDs and descriptions:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Bottom Bar:** Validation finished (0 error(s) found.), Coordinate: 530281.2,182476.9, Scale: 1:765, Rotation: 0.0, Render, EPSG:27700.

Fixing the axial map

QGIS 2.8.2-Wien – sample_data

The screenshot shows the QGIS interface with the following details:

- Layers Panel:** Shows layers including Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors (selected), Unlinks, Axial_map, and Census_population.
- Map View:** Displays a network of blue lines with red 'X' marks indicating errors. A yellow line also intersects the network.
- Graph Analysis Panel:** Data store: SF: sst_sample_files. Layer: Axial_map_errors. Verify layer: depthmapX remote. Progress: 100%. Problems found:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Bottom Status Bar:** Validation finished (0 error(s) found.), Coordinate: 530258.2,182499.8, Scale: 1:765, Rotation: 0.0, Render, EPSG:27700.

Fixing the axial map

QGIS 2.8.2-Wien – sample_data

The screenshot shows the QGIS interface with the following components:

- Layers Panel:** Shows a list of layers: Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors (selected), Unlinks, Axial_map, and Census_population.
- Map Canvas:** Displays a network of blue lines with red 'X' markers indicating errors. These errors are primarily located at nodes where multiple lines intersect.
- Graph Analysis Panel:** Titled "Graph Analysis".
 - Data store: SF: sst_sample_files
 - Map tab: Layer Axial_map_errors selected.
 - Verify layer: depthmapX remote
 - Status: Verify 100% complete.
 - Update IDs: All problems (12) listed.
 - Settings button.
 - Table of errors:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Bottom Status Bar:** Shows 1 feature(s) selected on layer Axial_map_errors, Coordinate: 532109.6,182986.0, Scale: 1:1,595, Rotation: 0.0, Render, EPSG:27700.

Fixing the axial map

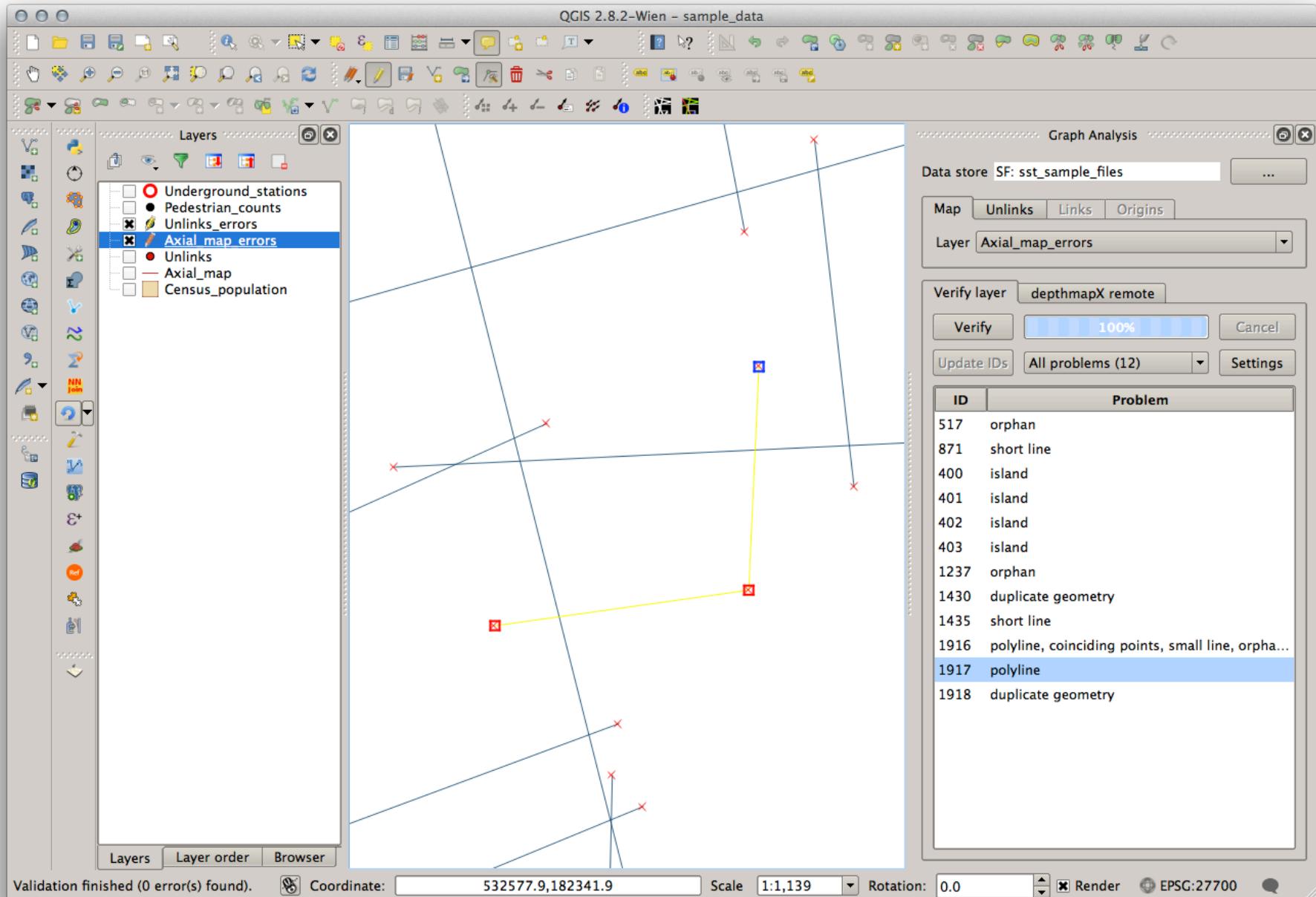
QGIS 2.8.2-Wien – sample_data

The screenshot shows a QGIS interface with the following details:

- Layers Panel:** Shows several layers: Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors (selected), Unlinks, Axial_map, and Census_population.
- Map View:** Displays a network of blue lines with red 'X' marks indicating errors.
- Graph Analysis Panel:** Data store: SF: sst_sample_files. Layer: Axial_map_errors. Verify layer: depthmapX remote. Status: 100% completed. Problems found:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Status Bar:** 1 feature(s) deleted. Coordinate: 532041.0, 183262.8. Scale: 1:1,595. Rotation: 0.0. Render: EPSG:27700.

Fixing the axial map



Fixing the axial map

QGIS 2.8.2-Wien – sample_data

The screenshot shows the QGIS interface with the following components:

- Layers Panel:** Displays a list of layers: Underground_stations, Pedestrian_counts, Unlinks_errors, Axial_map_errors (selected), Unlinks, Axial_map, and Census_population.
- Map View:** Shows a network of blue lines with red 'X' marks indicating errors. A yellow line segment is also visible.
- Graph Analysis Panel:** Titled "Graph Analysis".
 - Data store: SF: sst_sample_files
 - Map tab: Layer Axial_map_errors selected.
 - Verify layer: depthmapX remote
 - Status: Verify 100% complete, 1430 problems found.
 - Update IDs: All problems (12)
 - Settings
- Table:** Shows a list of errors with their IDs and descriptions.

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Bottom Status Bar:** Validation finished (0 error(s) found.), Coordinate: 532694.4,182395.3, Scale: 1:1,139, Rotation: 0.0, Render, EPSG:27700.

Fixing the axial map

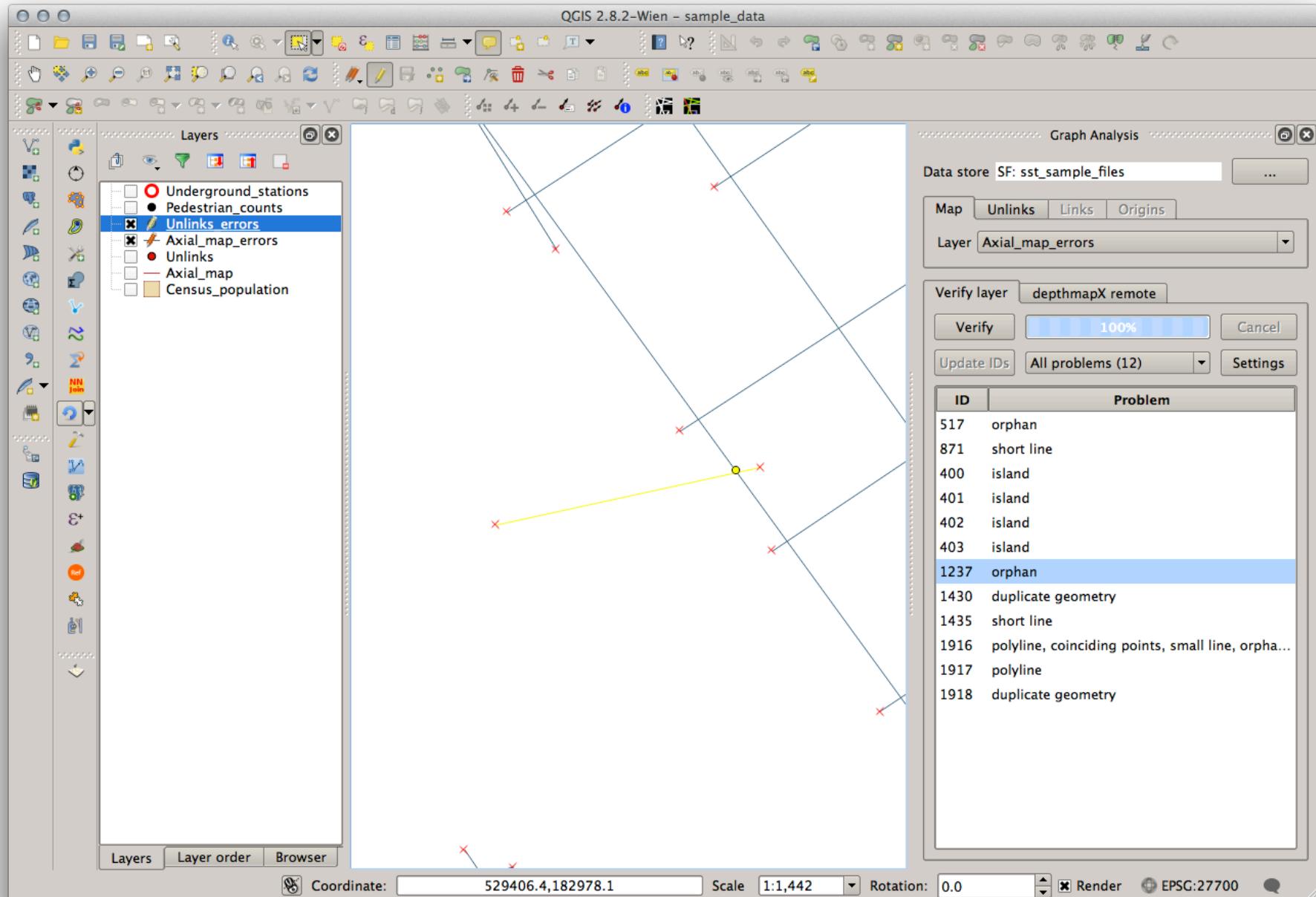
QGIS 2.8.2-Wien – sample_data

The screenshot shows a QGIS interface with the following elements:

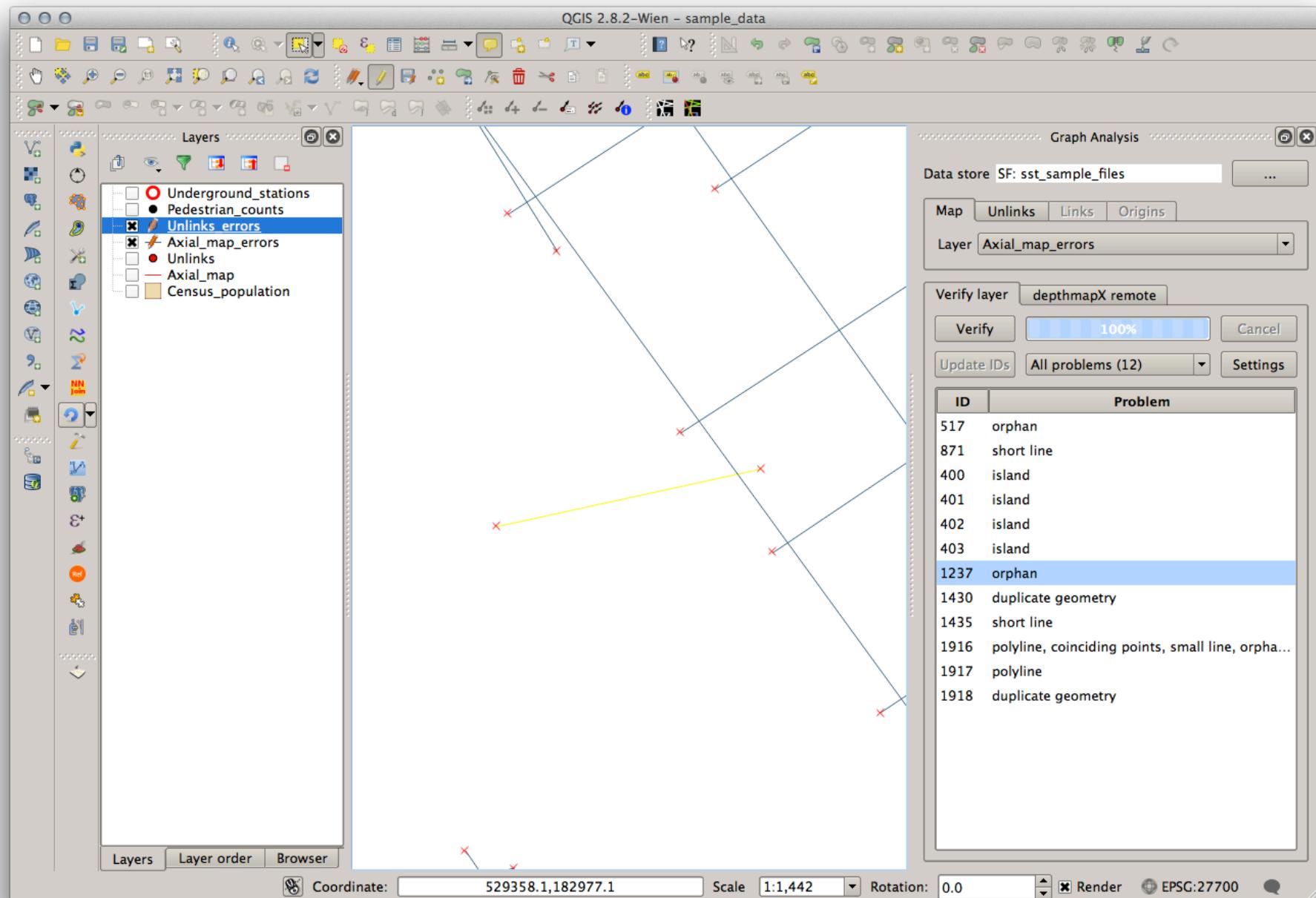
- Layers Panel:** Displays several layers including "Underground_stations", "Pedestrian_counts", "Unlinks_errors" (selected), "Axial_map_errors", "Unlinks", "Axial_map", and "Census_population".
- Map View:** Shows a network of blue lines representing an axial map. Red 'X' marks are placed at various nodes and intersections, indicating errors. A yellow line highlights a specific segment of the network.
- Graph Analysis Panel:** Contains a "Data store" section with "SF: sst_sample_files" and tabs for "Map", "Unlinks", "Links", and "Origins". The "Layer" dropdown is set to "Axial_map_errors".
- Verify Layer Panel:** Shows a progress bar at 100%, a button for "Verify", and a dropdown for "All problems (12)".
- Table:** Lists 12 problems with their IDs and descriptions:

ID	Problem
517	orphan
871	short line
400	island
401	island
402	island
403	island
1237	orphan
1430	duplicate geometry
1435	short line
1916	polyline, coinciding points, small line, orpha...
1917	polyline
1918	duplicate geometry
- Bottom Bar:** Includes validation status ("Validation finished (0 error(s) found.)"), coordinate ("529448.1,182961.3"), scale ("1:1,442"), rotation ("0.0"), render settings, and EPSG code ("EPSG:27700").

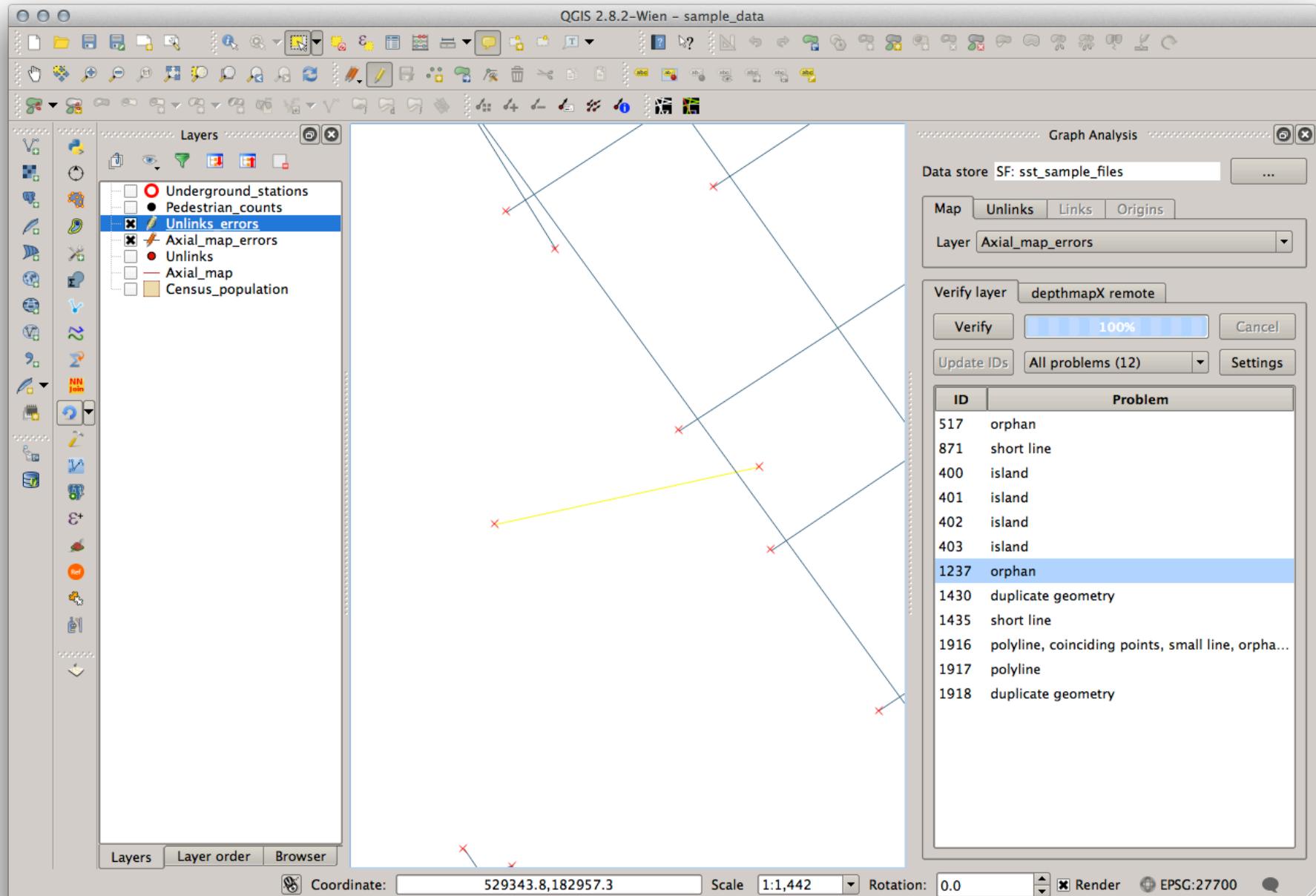
Fixing the axial map



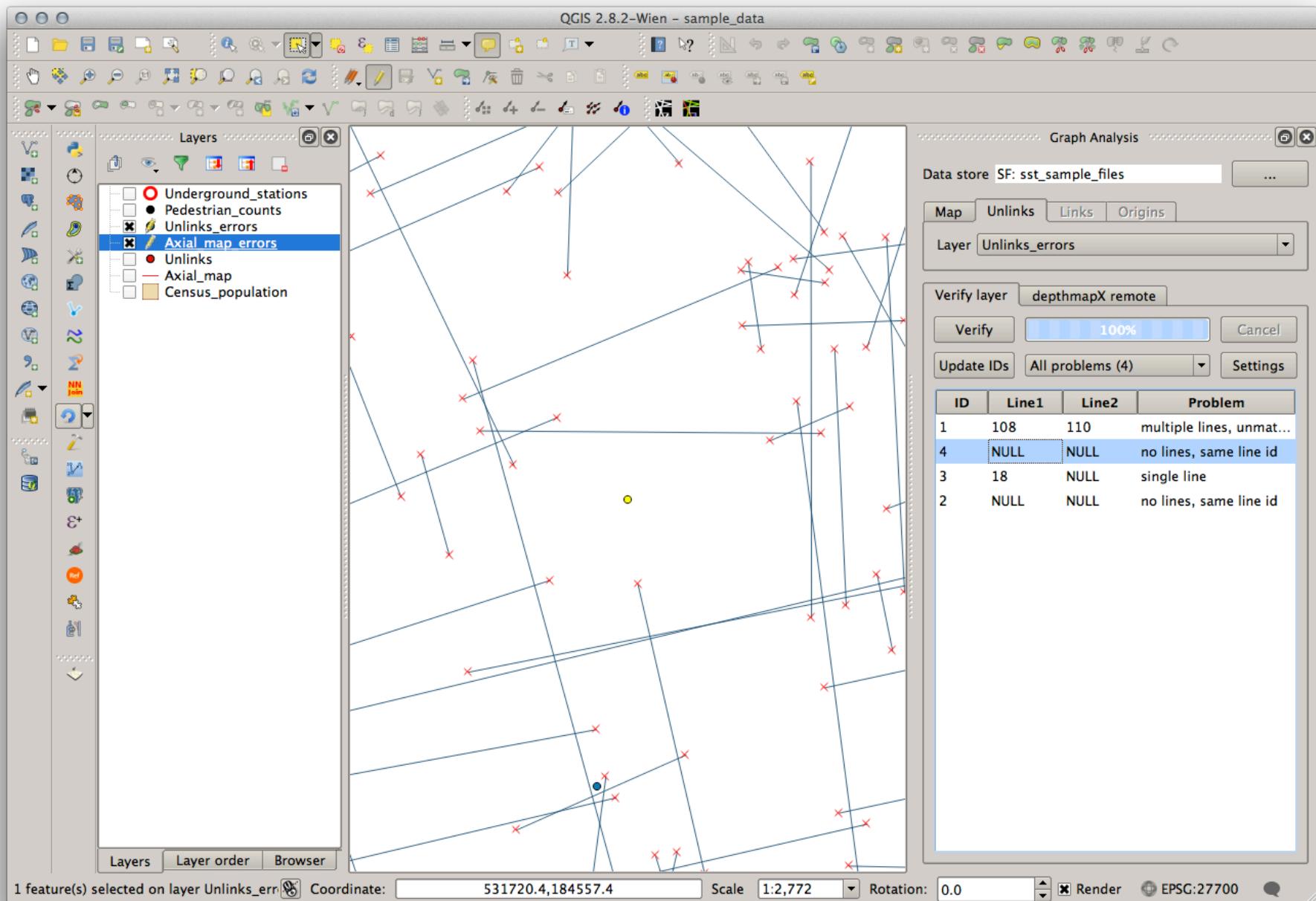
Fixing the axial map



Fixing the axial map



Verifying unlinks



Fixing unlinks

QGIS 2.8.2-Wien – sample_data

The screenshot shows a QGIS interface with the following components:

- Layers Panel:** Displays layers including Underground_stations, Pedestrian_counts, Unlinks_errors (selected), Axial_map_errors, Unlinks, Axial_map, and Census_population.
- Map View:** Shows a network of blue lines representing roads or paths. Red 'X' marks indicate errors in the 'Unlinks_errors' layer, specifically at road intersections.
- Graph Analysis Panel:** Titled "Graph Analysis".
 - Data store: SF: sst_sample_files
 - Tab: Unlinks (selected)
 - Layer: Unlinks_errors
 - Verify layer: depthmapX remote
 - Status: Verify 100% Complete
 - Update IDs: All problems (4)
 - Settings
- Table:** Lists the four identified problems with their details:

ID	Line1	Line2	Problem
1	108	110	multiple lines, unmatched
4	NULL	NULL	no lines, same line id
3	18	NULL	single line
2	NULL	NULL	no lines, same line id
- Bottom Status Bar:** Validation finished (0 error(s) found.), Coordinate: 532041.7,183657.8, Scale: 1:693, Rotation: 0.0, Render, EPSG:27700.

Fixing unlinks

QGIS 2.8.2-Wien – sample_data

The screenshot shows a QGIS interface with a map containing several blue lines representing a network. Red 'X' marks are placed at various nodes along these lines, indicating specific points of interest or error. The 'Layers' panel on the left lists several layers, with 'Unlinks_errors' selected. The 'Graph Analysis' tool is open on the right, connected to a data store 'SF: sst_sample_files'. The 'Unlinks' tab is active, showing a list of errors:

ID	Line1	Line2	Problem
1	108	110	multiple lines, unmatched
4	NULL	NULL	no lines, same line id
3	18	NULL	single line
2	NULL	NULL	no lines, same line id

Validation finished (0 error(s) found). Coordinate: 531941.7,183686.5 Scale: 1:693 Rotation: 0.0 Render: EPSG:27700

Fixing unlinks

QGIS 2.8.2-Wien – sample_data

The screenshot shows a QGIS interface with a map view and a graph analysis tool. The map view displays a network of blue lines with several red 'X' marks indicating unlinked segments. A yellow dot is placed at a junction point. The graph analysis tool on the right shows the following details:

- Data store: SF: sst_sample_files
- Map tab selected
- Layer: Unlinks_errors
- Verify layer: depthmapX remote
- Status: 100% completed
- Update IDs: All problems (3)
- Settings button
- Table of errors:

ID	Line1	Line2	Problem
2	18	NULL	unmatched line id
1	NULL	NULL	same line id, unmatched
0	108	110	unmatched line id

Layers panel:

- Underground_stations (red circle)
- Pedestrian_counts (black dot)
- Unlinks_errors** (selected, crossed-out icon)
- Axial_map_errors (crossed-out icon)
- Unlinks (red dot)
- Axial_map (blue line)
- Census_population (brown square)

Coordinate: 531359.2, 183959.0

Scale: 1:693

Rotation: 0.0

Render

EPSG:27700

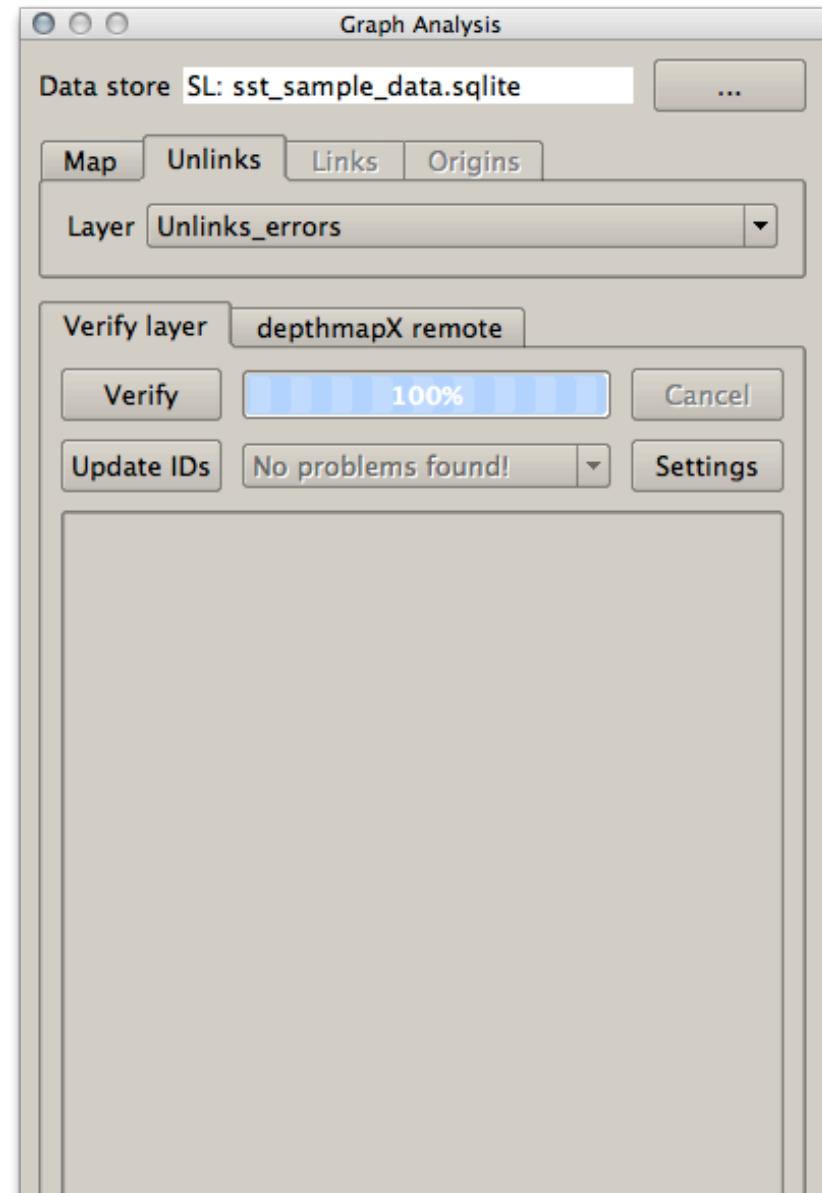
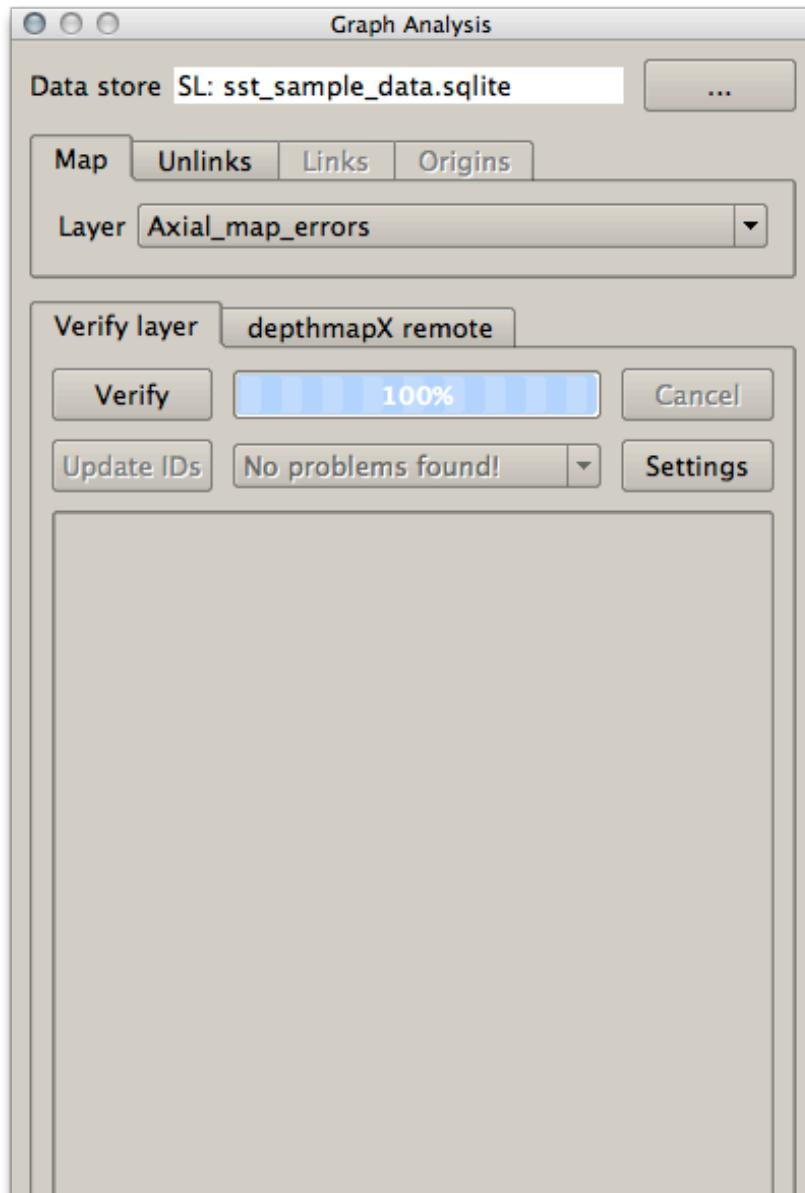
Fixing unlinks

QGIS 2.8.2-Wien – sample_data

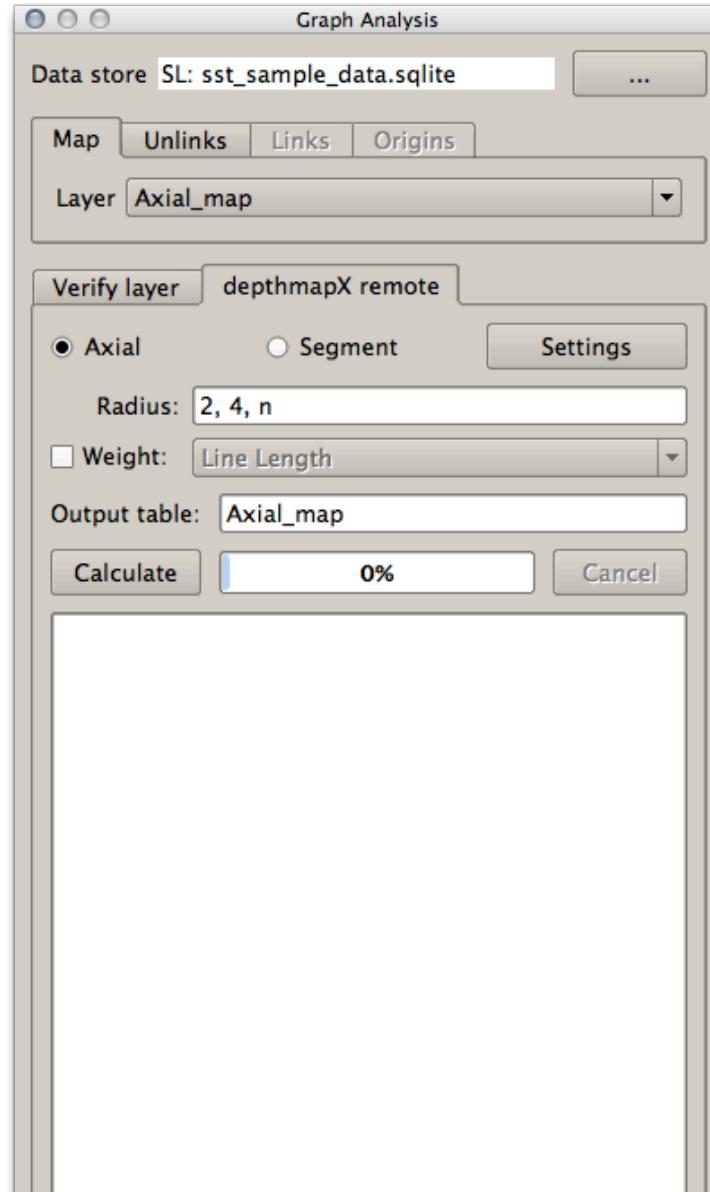
The screenshot shows a QGIS interface with the following elements:

- Layers Panel:** Displays several layers: Underground_stations (red circle), Pedestrian_counts (black dot), Unlinks_errors (highlighted in blue), Axial_map_errors (cross icon), Unlinks (red dot), Axial_map (blue line), and Census_population (orange square).
- Map View:** Shows a network of blue lines representing roads or paths. Several nodes where lines intersect are marked with red 'X' symbols, indicating they are unlinked.
- Graph Analysis Panel:** Titled "Graph Analysis".
 - Data store: SF: sst_sample_files
 - Map tab (selected): Layer: Unlinks_errors
 - Verify layer: depthmapX remote
 - Status: Verify 100% (button)
 - Update IDs: Layer IDs updated (button)
 - Settings (button)
 - Table: ID | Line1 | Line2 | Problem
- Bottom Bar:** Shows 0 feature(s) selected on layer Unlinks_err, Coordinate: 532059.1,183715.4, Scale: 1:693, Rotation: 0.0, Render, EPSG:27700.

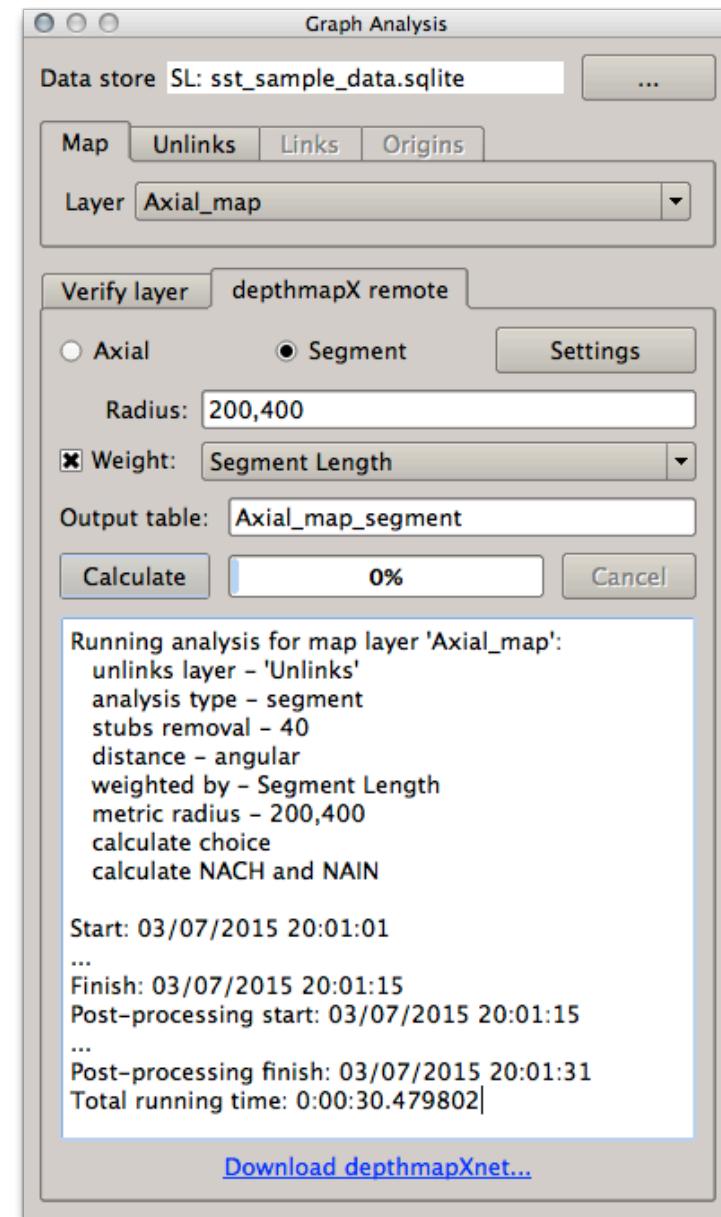
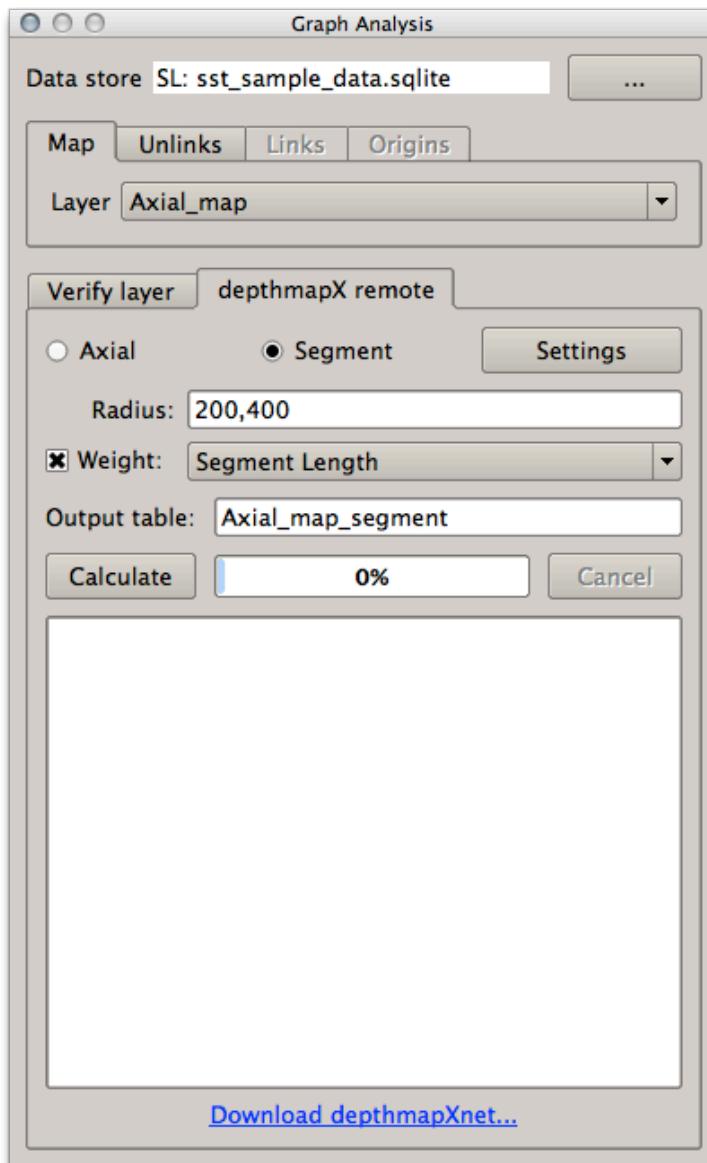
Verification completed



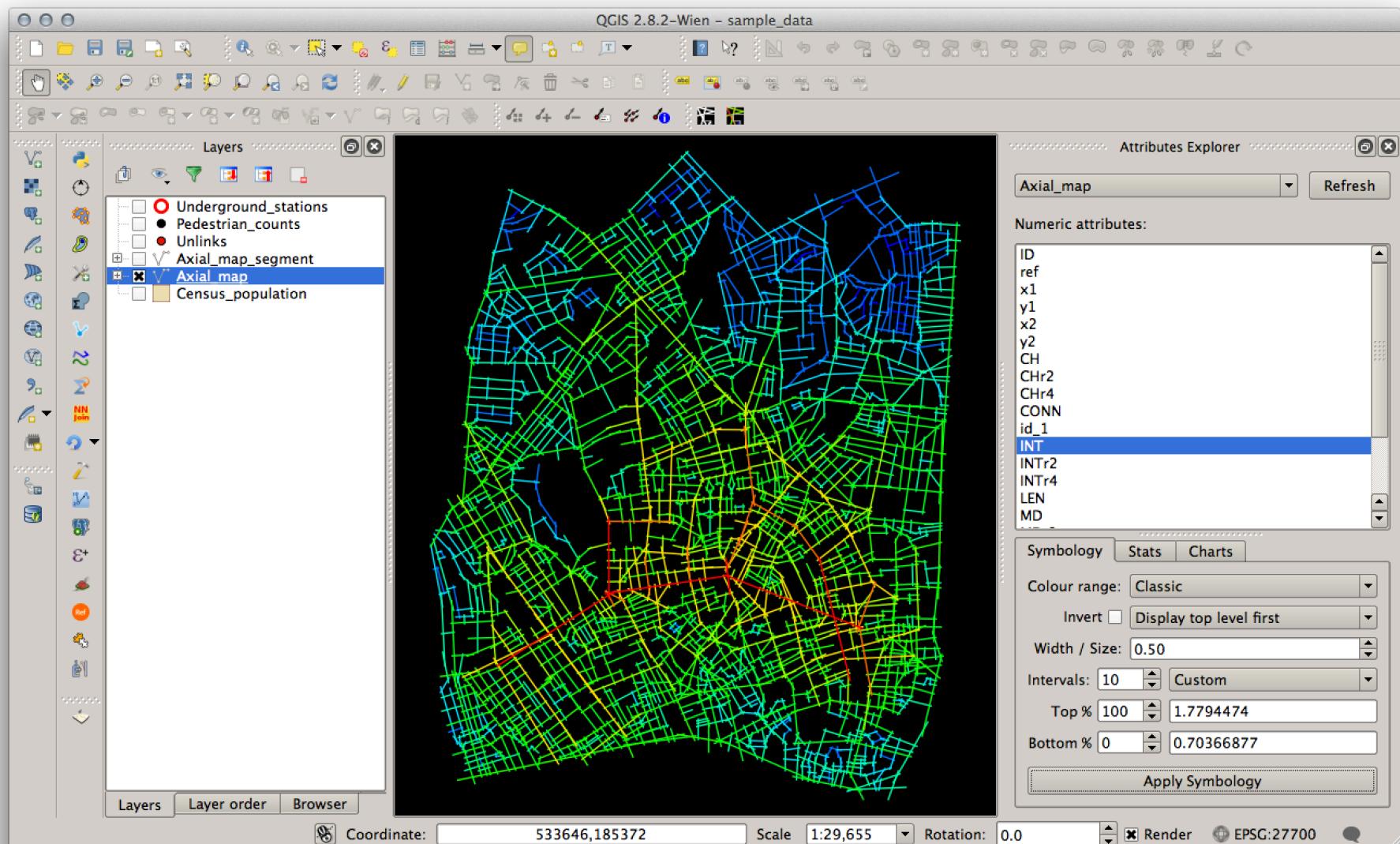
Running axial analysis



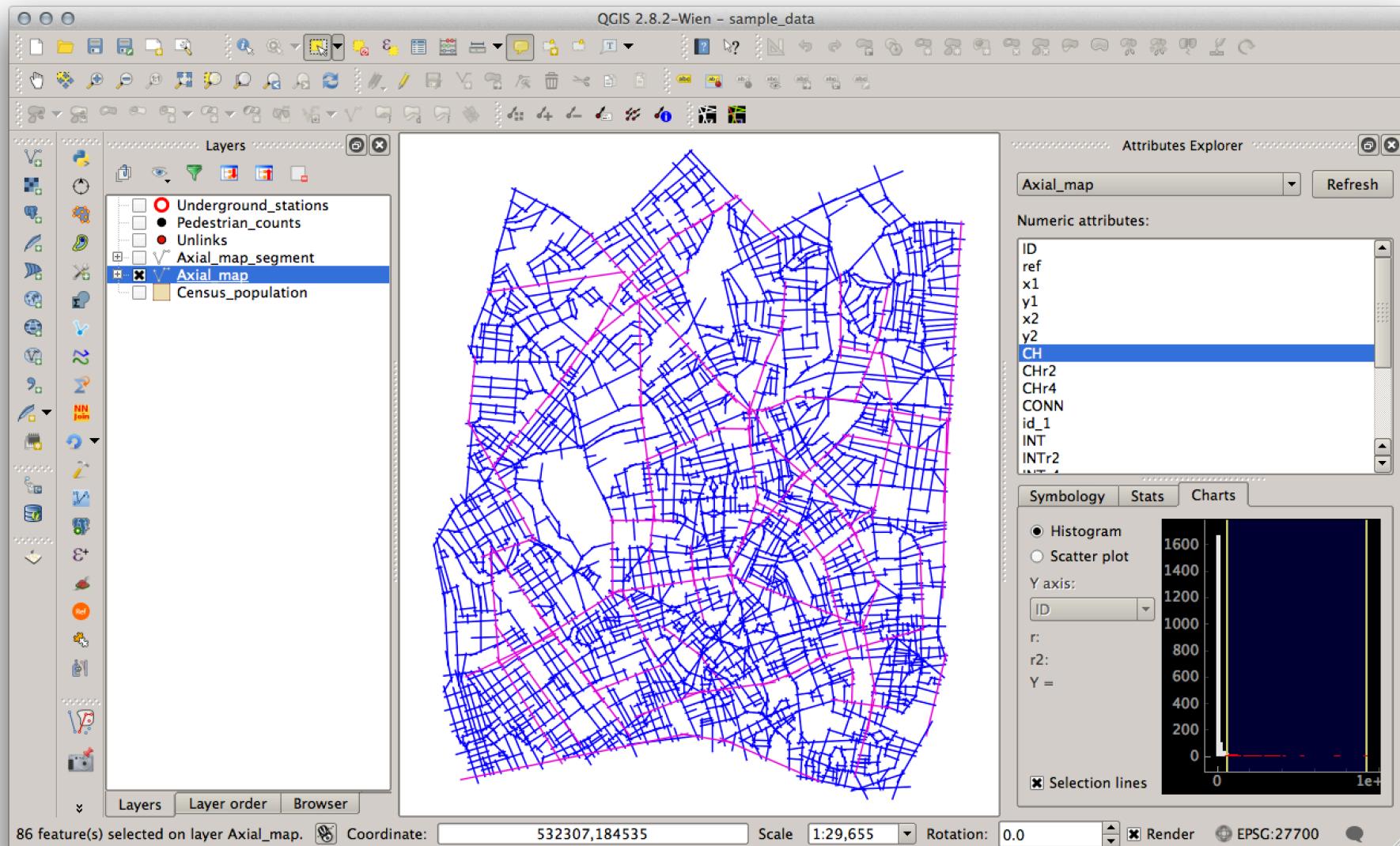
Running segment analysis



Displaying syntax measures



Showing the choice structure



Showing the choice structure

Attributes Explorer

Axial_map Refresh

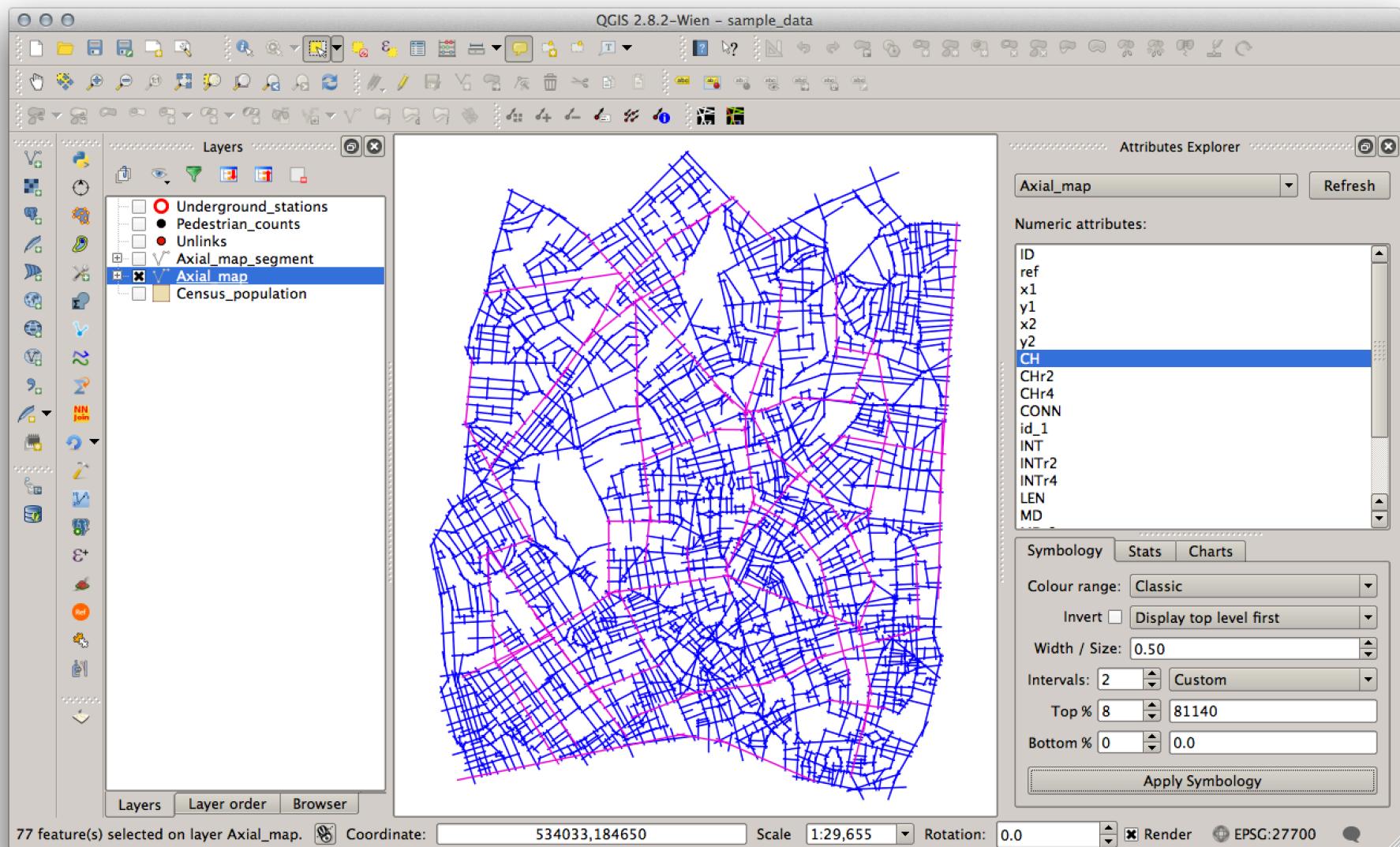
Numeric attributes:

- ref
- x1
- y1
- x2
- y2
- CH**
- Chr2
- Chr4

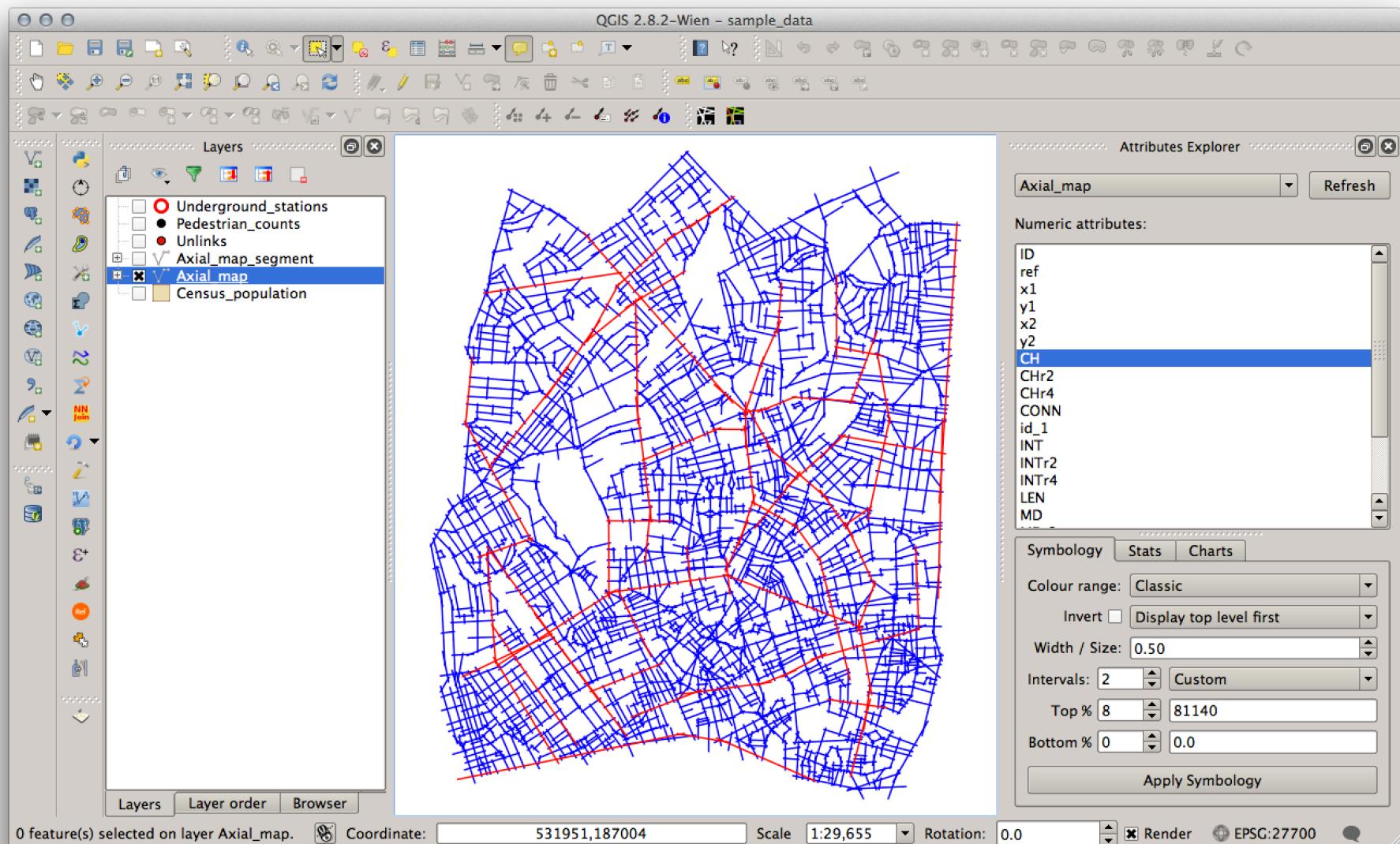
Symbology Stats Charts

Statistic	Value	Selection
Number	1915	77
Mean	14223.258	212225.5
Std Dev	51822.257	150891.66
Variance	268554633	227682937
Median	1676	172626
Minimum	0	81140
Maximum	930781	930781
Range	930781	849641
1st Quart	219	114806
3rd Quart	6798.5	252194
IQR	6579.5	137388
Gini	0.8551	0.3269

Showing the choice structure



Showing the choice structure





PART 3 – Exploration and Discussion

1. GIS stages and operations for space syntax
2. Useful QGIS plugins and tools
3. Examples of work
4. Exploration of QGIS workflows for space syntax
 1. Continue exercise with own data, or
 2. Experiment new workflows
5. Discussion on new workflows for the SST

Stage	Operations
Data acquisition	Collect base map data Convert data formats Georeference vector and raster data User behaviour data entry Location survey data entry
Geo-processing	Filter, aggregate and join data based on attributes and spatial relations Find nearest feature Transform geometries Attributes update and calculation
Network model preparation	Draw map Extract map from larger data set Prepare plans Generalise road network Map verification Manage unlinks and links
Network analysis	Analyse network models (space syntax) Post process analysis results (attribute naming, selection, new calculations) Calculate shortest route and catchment areas Street and block morphology

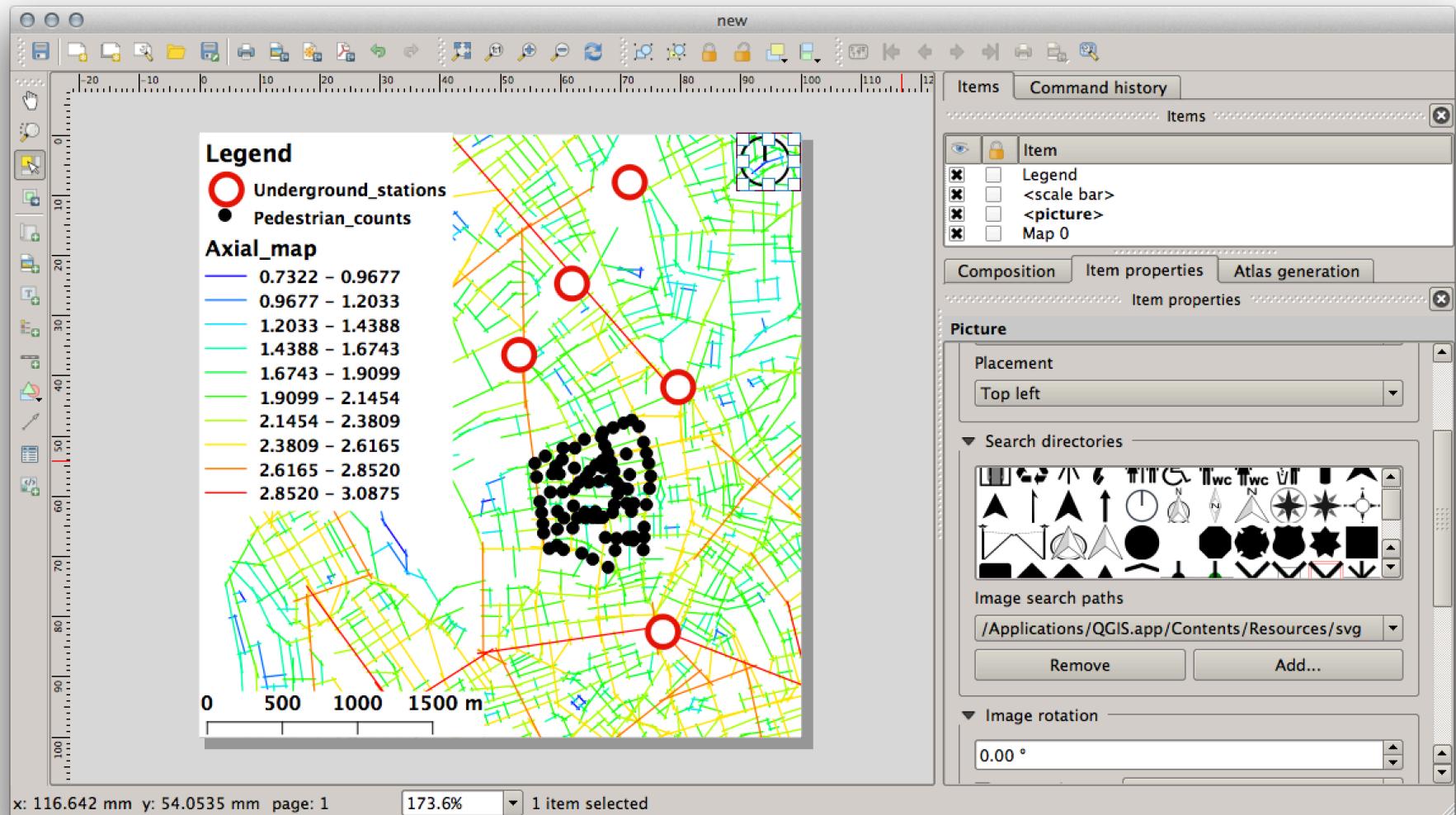
Stage	Operations
Exploratory spatial data analysis	Interactive visual exploration of results Inquiry of individual feature values Identify the core of the network Spatial analysis (interpolation, hotspots, clustering) Terrain analysis
Statistical analysis	Descriptive statistics Transform columns Interactive charts (histogram, scatter plot) Linear regression Multivariate regression Statistical clustering (PCA, k-means, hierarchical) Export data to statistics packages
Reporting and visualisation	Create base map compositions for print Set output format and resolution Standard visualisation (colour ranges) for screen and print Store named views Produce map series based on attributes

Source: Based on work by Stephen Law and colleagues at Space Syntax Ltd

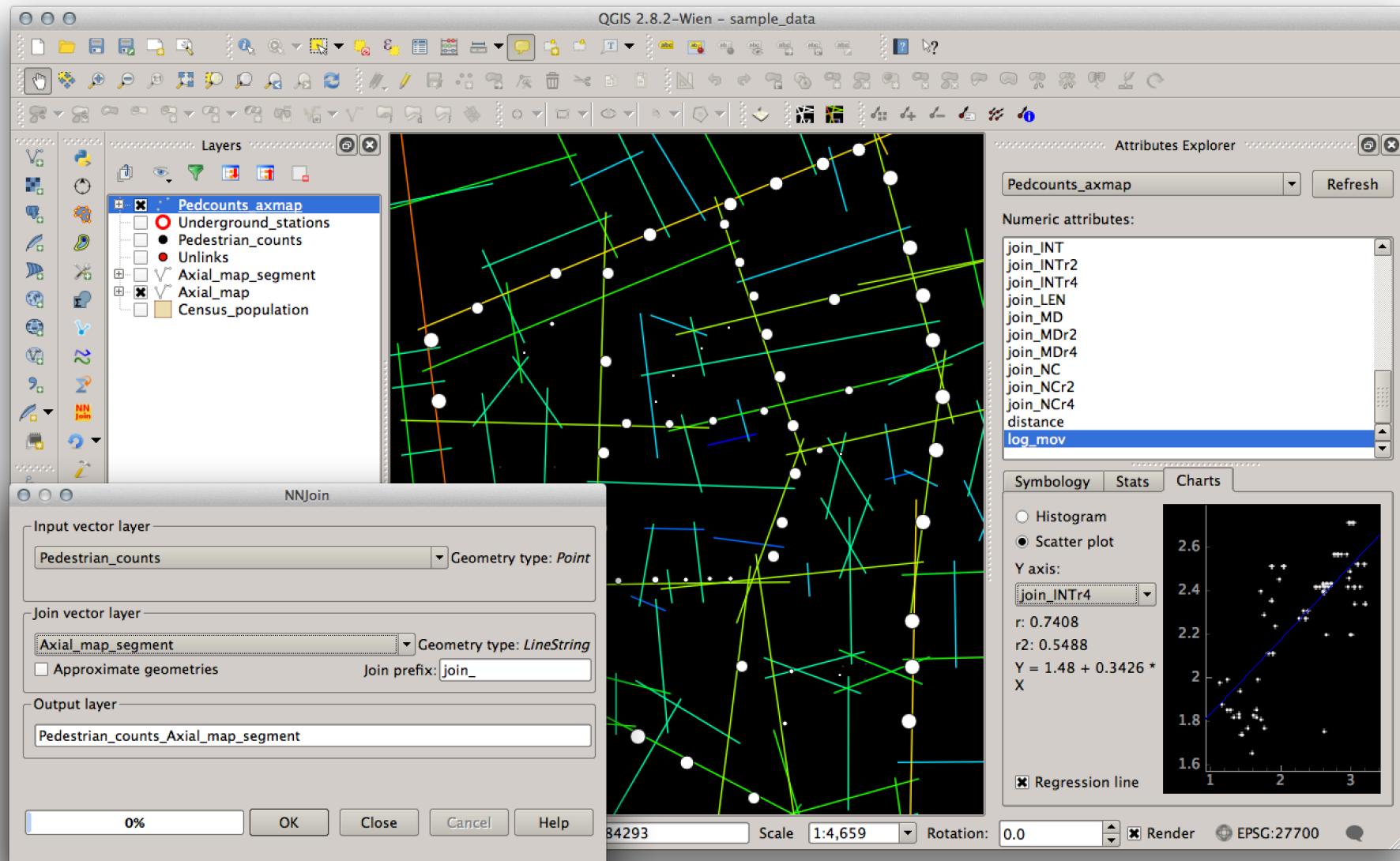
- Openlayers
- Dbmanager
- Dissolve with stats
- CADDigitize
- Contour Plugin
- Concave Hull
- Ftools
- Generalizer
- Heatmap
- MMQGIS
- NNJoin
- Qscatter
- Spatialjoin
- Spatial Query plugin
- SPIT
- Table manager
- Affine transformations
- Composer
- Processing
- ...

- Producing a map for publication
- Movement predictive model
- Impact maps
- Aggregation of network with census
- Creating density maps

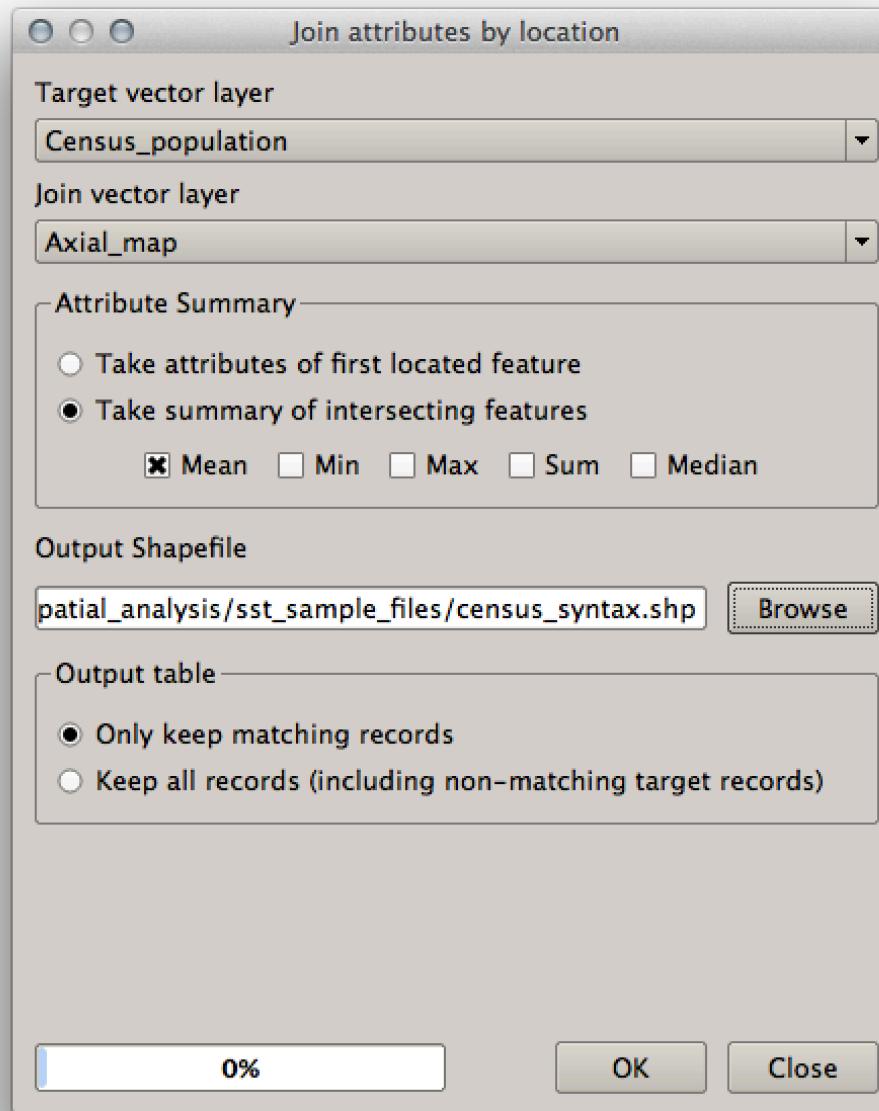
Producing a map for publication



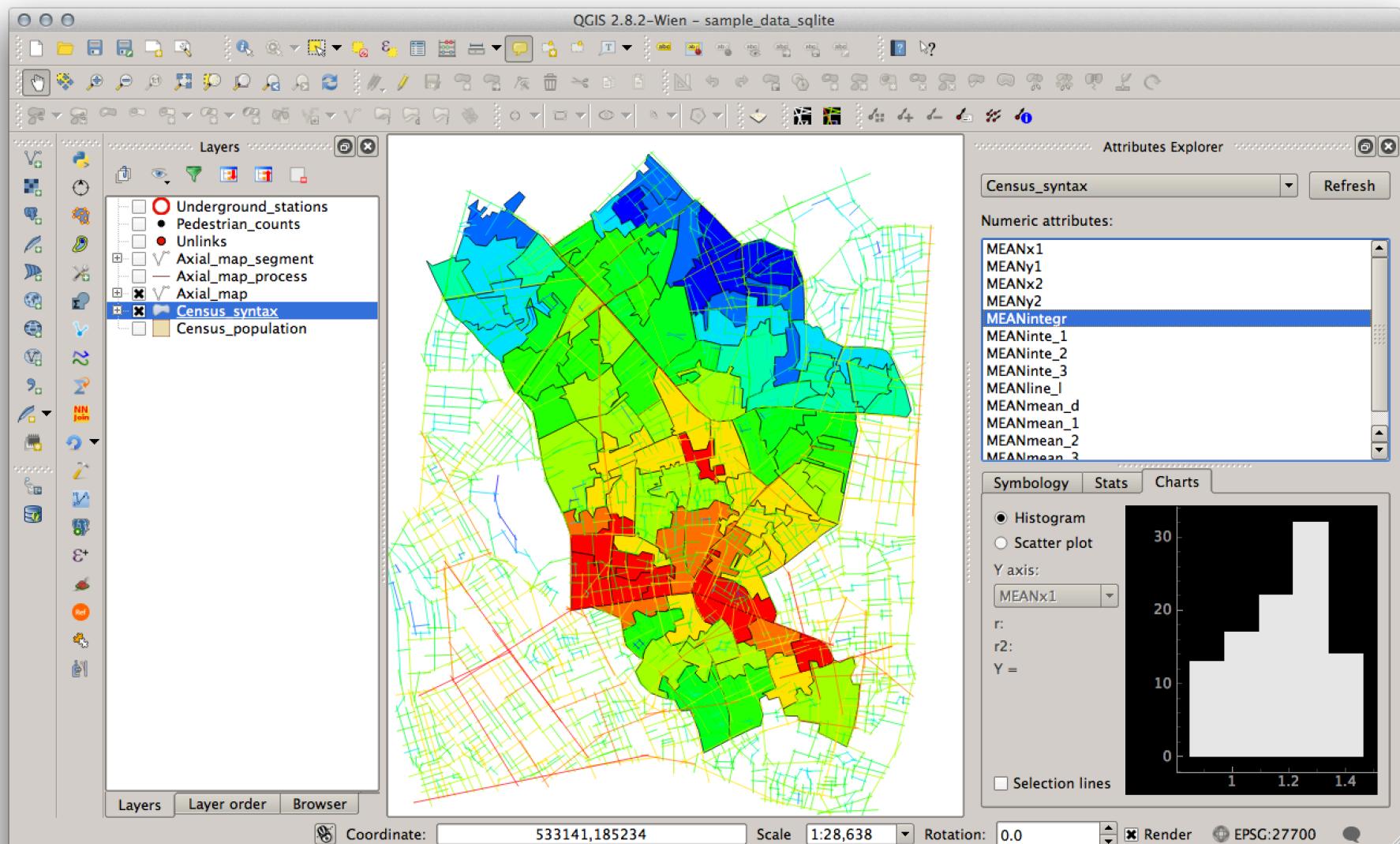
Movement predictive model



Aggregation of network with census



Aggregation of network with census



- Road centre line analysis
- Linking model levels
- Catchment / Service areas
- ???

Thank you!

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