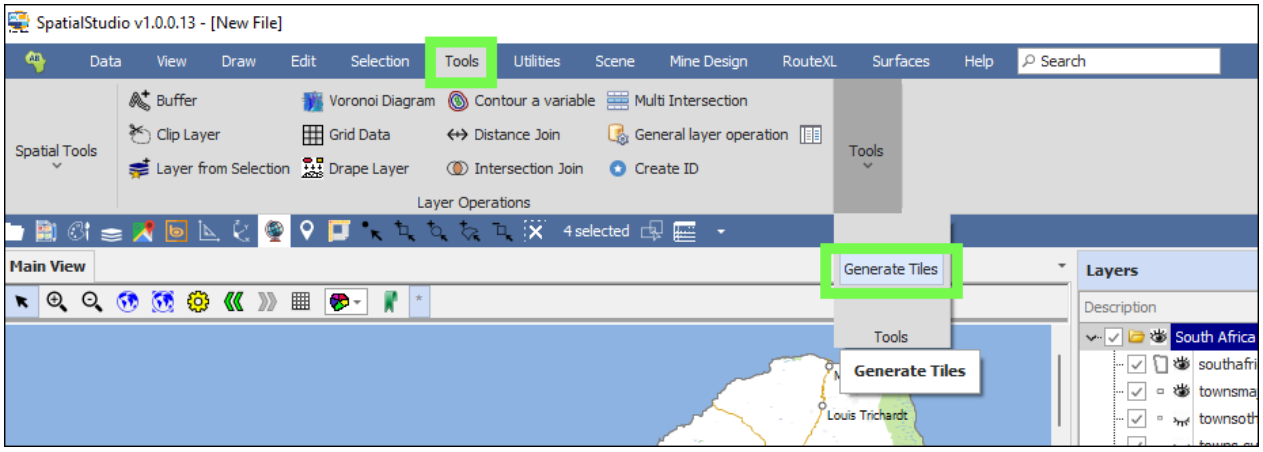
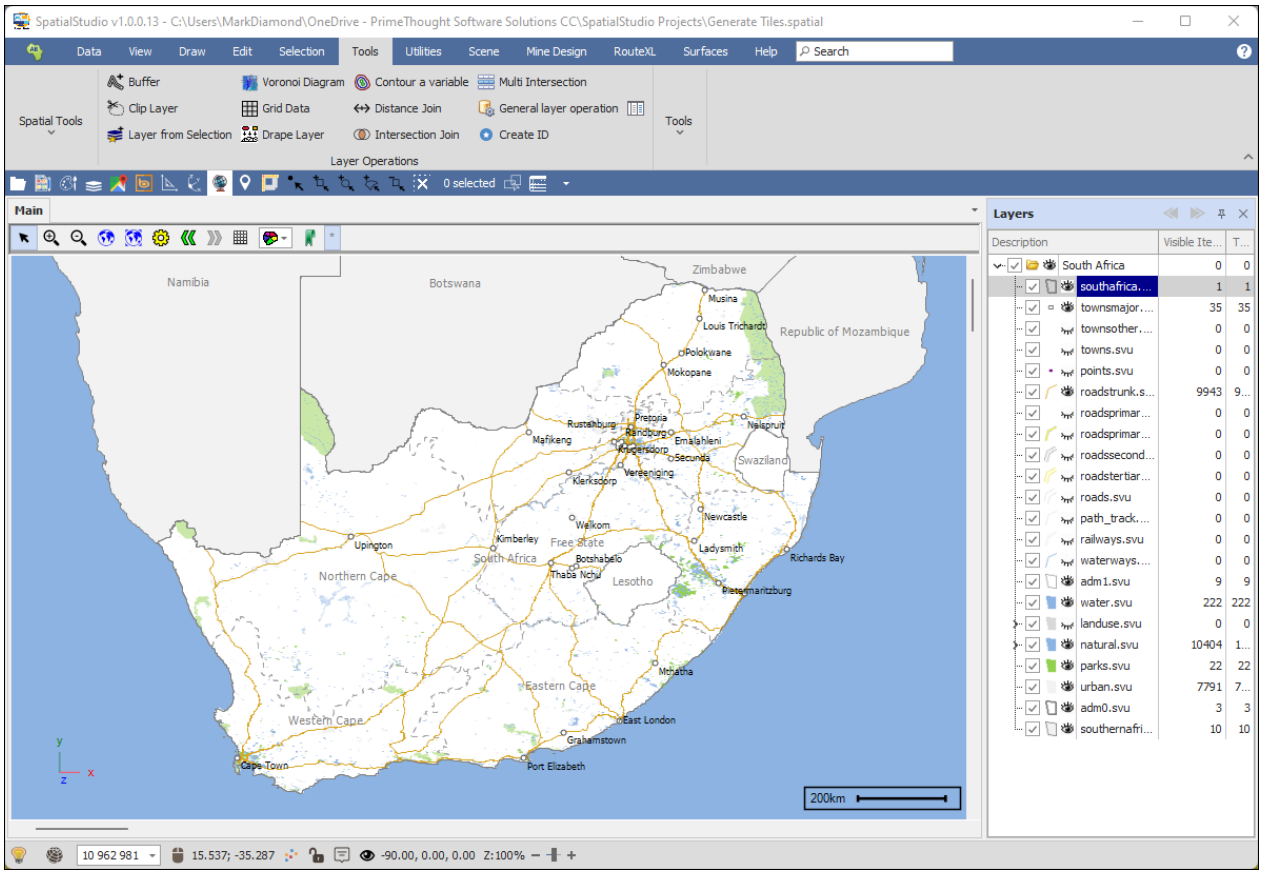
PrimeThought Software Solutions

Generate Tiles



The **Generate Tiles** tool can be used to create tiles of the view on your scene that can then be saved to a SQL Server or SQLite database. These can then be brought in as a layer and displayed as dynamically loaded tiles of your data. This is useful in situations where you might have a lot of data displaying in your scene, such as a background map with many elements, which take up a lot of memory, instead you could have this data displayed as tiled images. Another use case is when you want to protect your data; you can just generate tiled images of it without the actual associated attribute data.

First, zoom to the extent that you want to snapshot and make tiles out of, then open the tool:


SpatialStudio v1.0.0.13 - C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\SpatialStudio Projects\Generate Tiles.spatial
Data View Draw Edit Selection Tools Utilities Scene Mine Design RouteXL Surfaces Help Search
Spatial Tools
Buffer
Clip Layer
Layer from Selection
Voronoi Diagram
Grid Data
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Distance Join
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Lesotho
South Africa
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Eastern Cape
Western Cape
Musina
Louis Trichardt
Polokwane
Mokopane
Pretoria
Rustenburg
Mafikeng
Klerksdorp
Vereeniging
Secunda
Nelspruit
Emalahleni
Newcastle
Ladysmith
Richards Bay
Pietermaritzburg
Welkom
Kimberley
Upington
Botshabelo
Thaba Nchu
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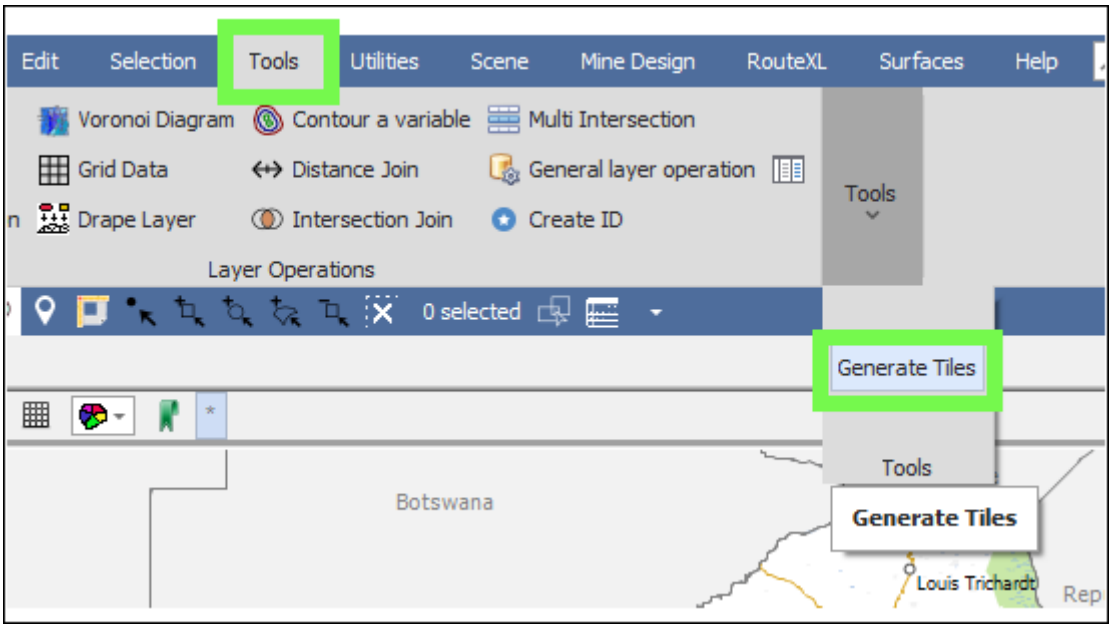
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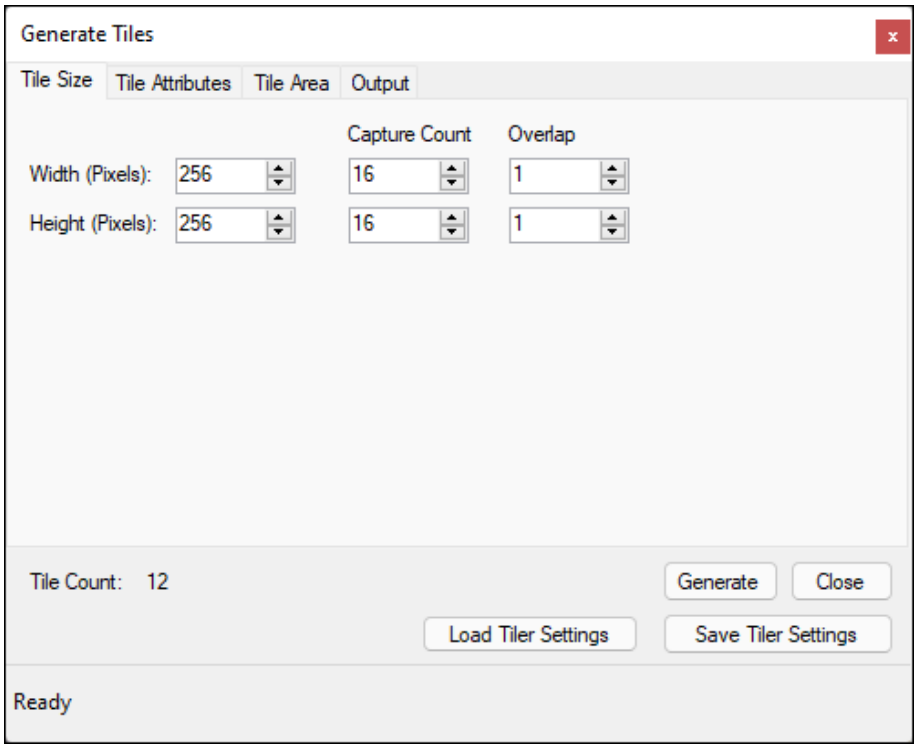
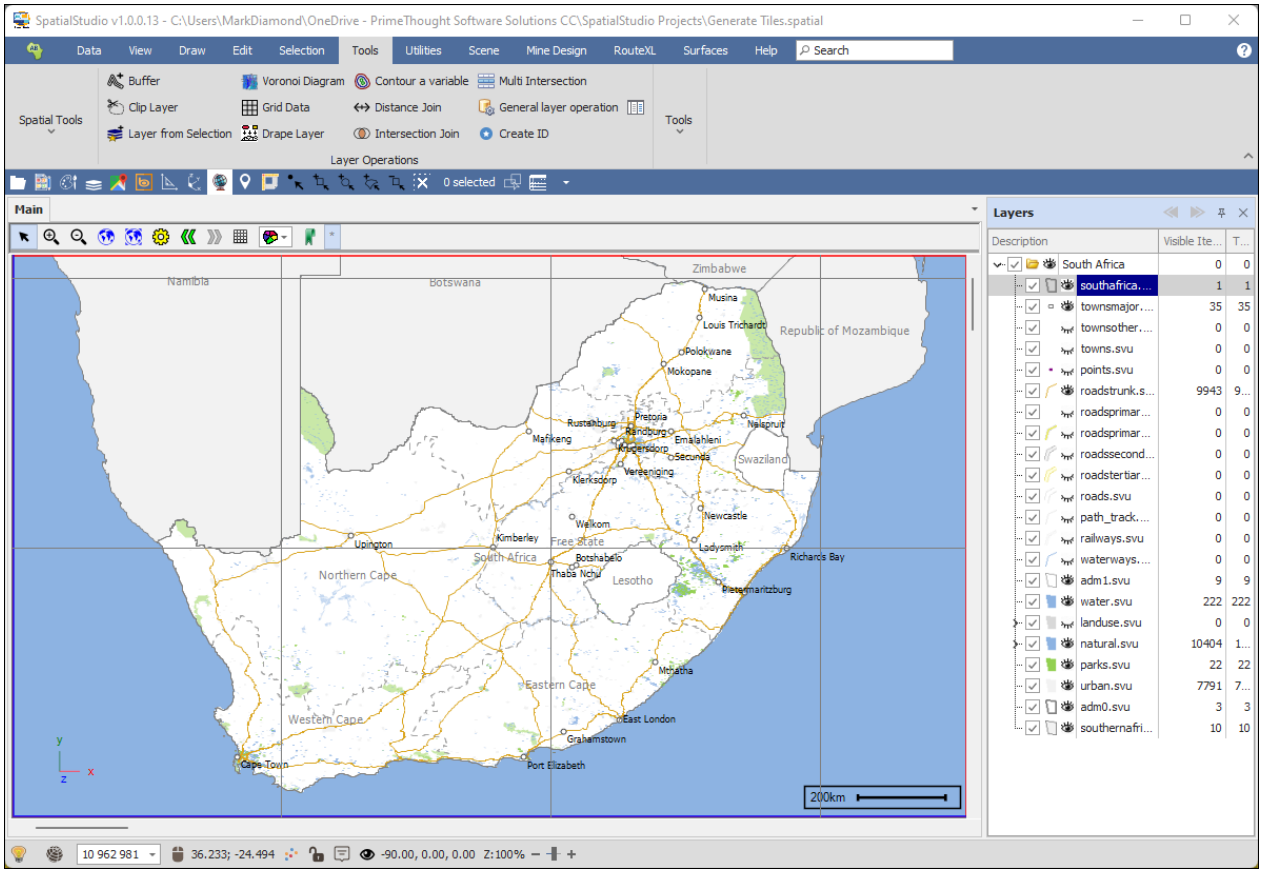
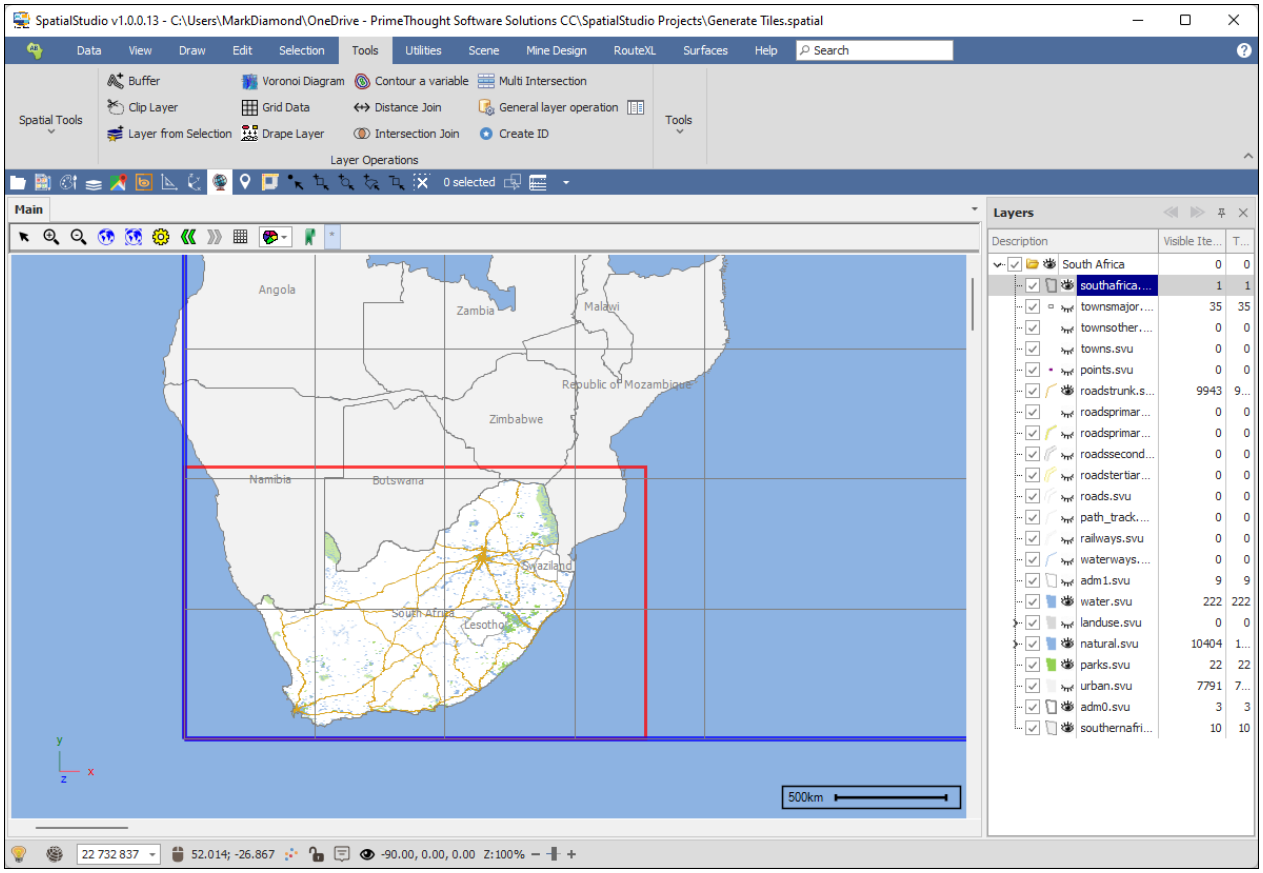


When you have brought up the tool, a grid of blocks will be showing over your scene indicating areas to tile:

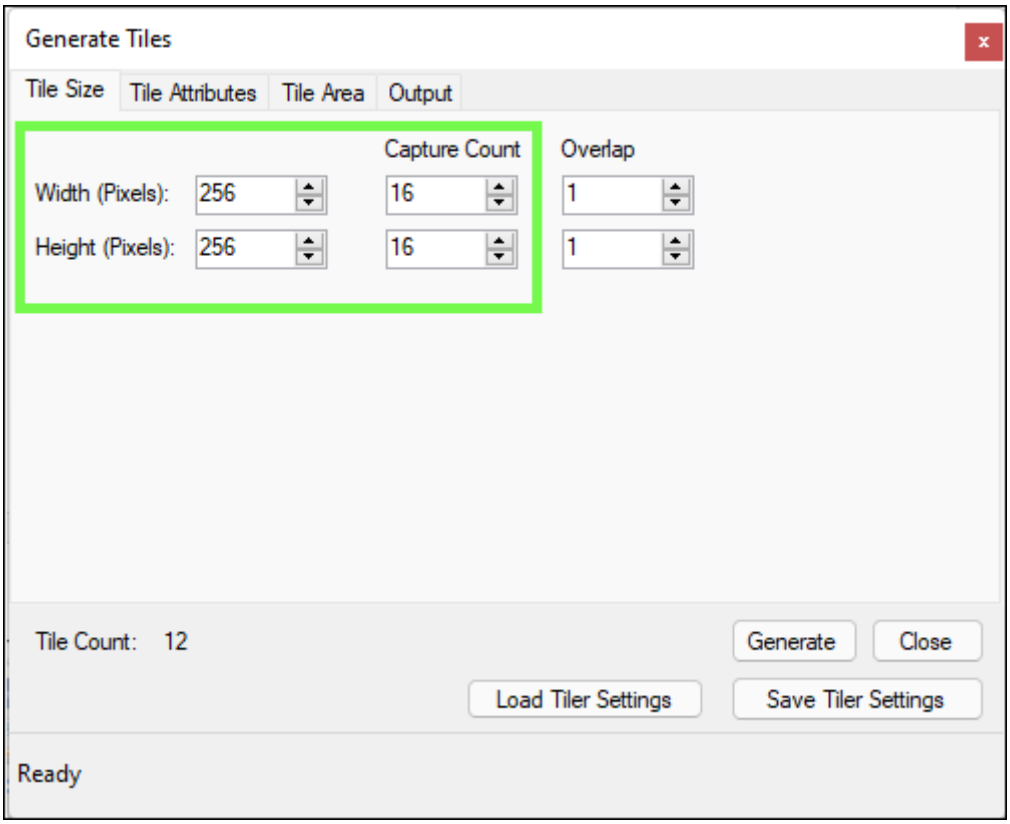


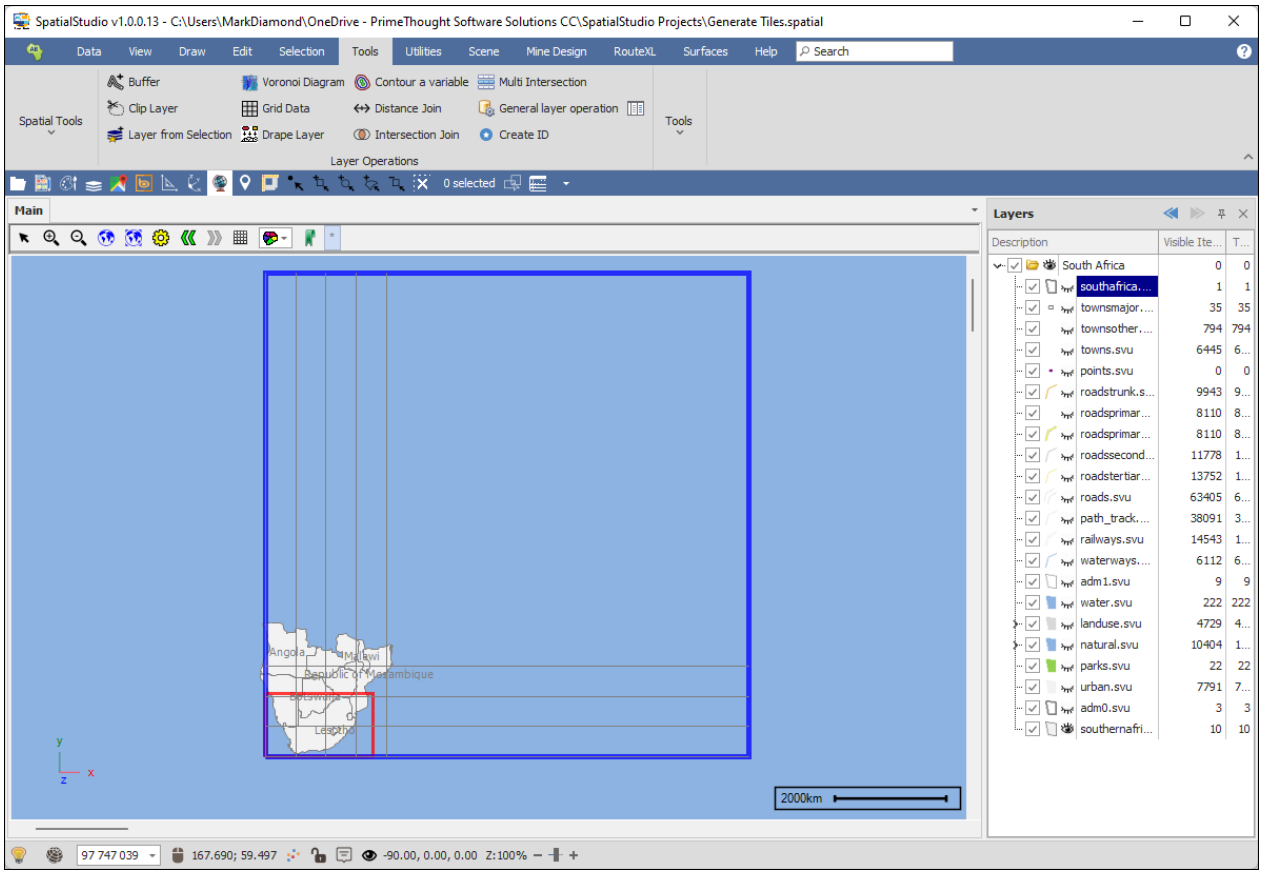
Note: when tiling an area it must have 4 tiles only at the top level, as the way tiling works is that an area is divided into 4 parts each given a unique key (quadkey) and then each of these four parts is further divided into 4 parts and so on down, depending on the tile zoom level that you choose. We will go over later how to have just 4 tiles over your tiling area.

The red border delineates the area that will be tiled and is around the extent that you zoomed to originally. The blue border is the entire area that will be captured factoring in Capture Count as well which will be explained below:

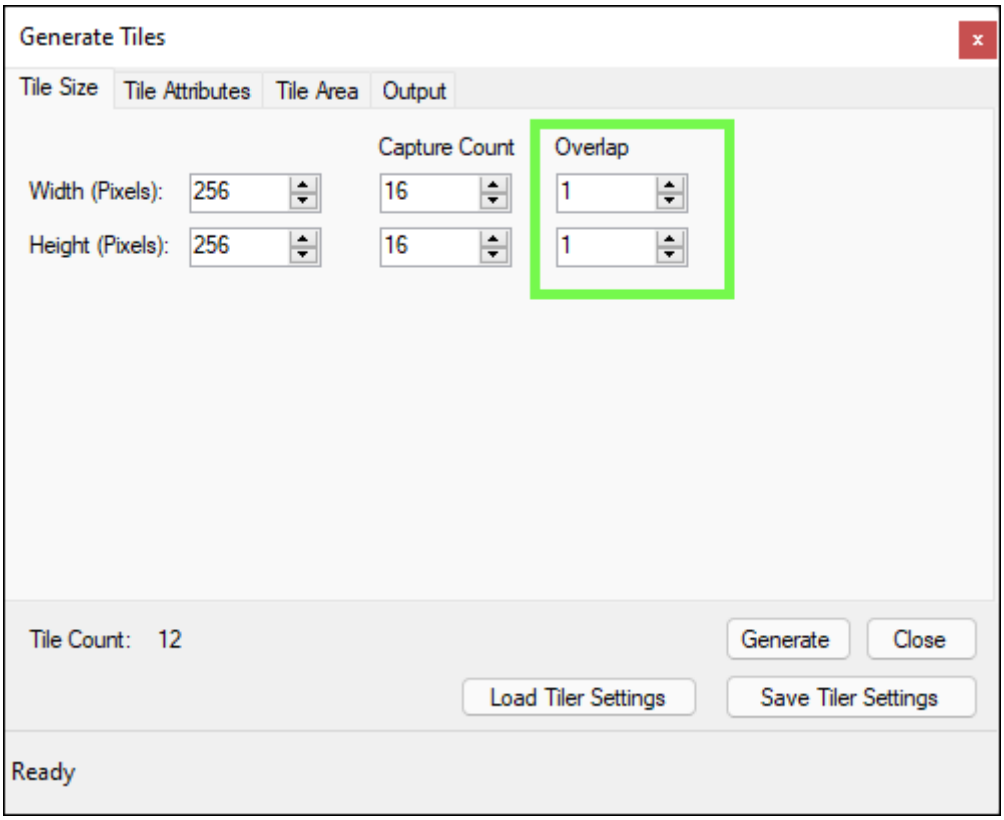


The first tab, **Tile Size**, is where you will specify the width and height of your tiles in pixels, 256 is the default and is what Google Maps etc. normally uses, but you can adjust this. The **Capture Count** is how many tiles are captured at a time in any snapshot of an area you are tiling, so if you have zoomed to a certain extent to do the tiling on, it will capture even further outside of that red border to ensure that any elements such as labels that might have gotten cut off by the red border are still captured correctly – a higher Capture Count will make it less likely that any of your elements will be cut off while tiling but will also make the overall final tiled image larger. The blue border is the entire area captured with Capture Count included:

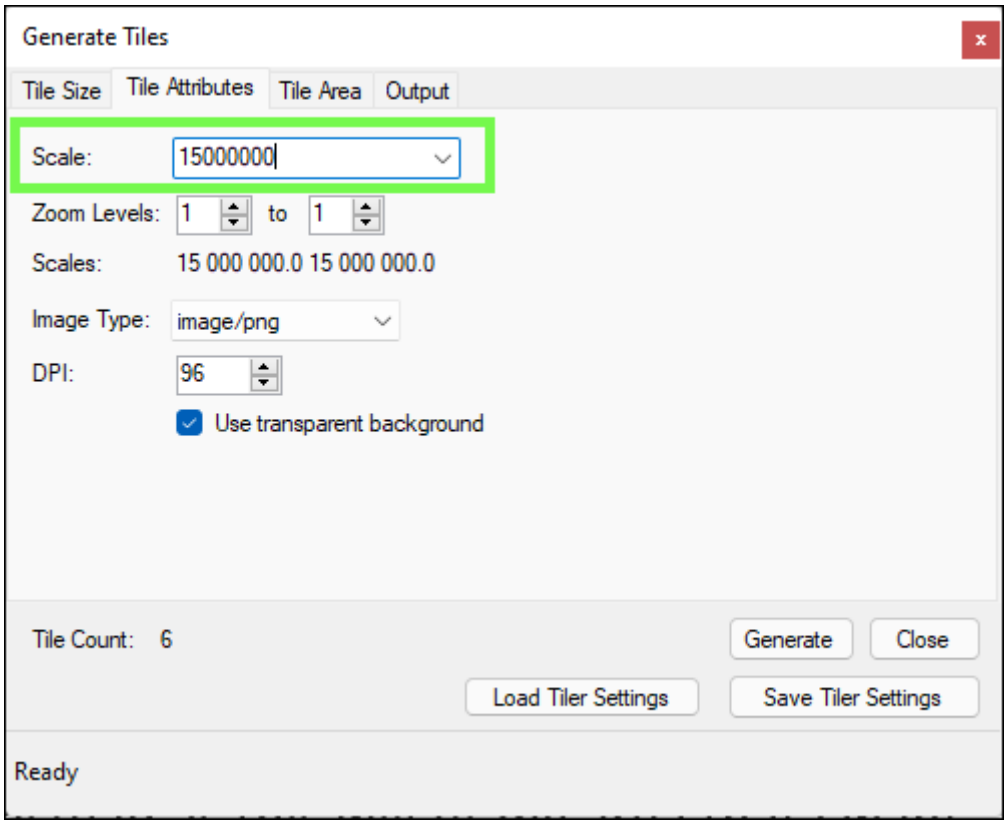




Then finally, **Overlap** is the number of pixels by which to overlap each tile so that there are no lines between the tiles in the resulting tiled image, 1 is the default and usually works well:



In the **Tile Attributes** tab is where you can specify the **Scale** from which your tiling will start, this will be set as the scale at your original zoomed extent before opening the tool. In this example I will set this as 15 000 000 instead as this will fit my area that I want to tile better, and as you will see, brings me closer to having just 4 tiles over my tiling area:


Generate Tiles
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Tile Attributes
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Output
Scale:
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to
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Image Type:
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DPI:
96
Use transparent background
Tile Count: 6
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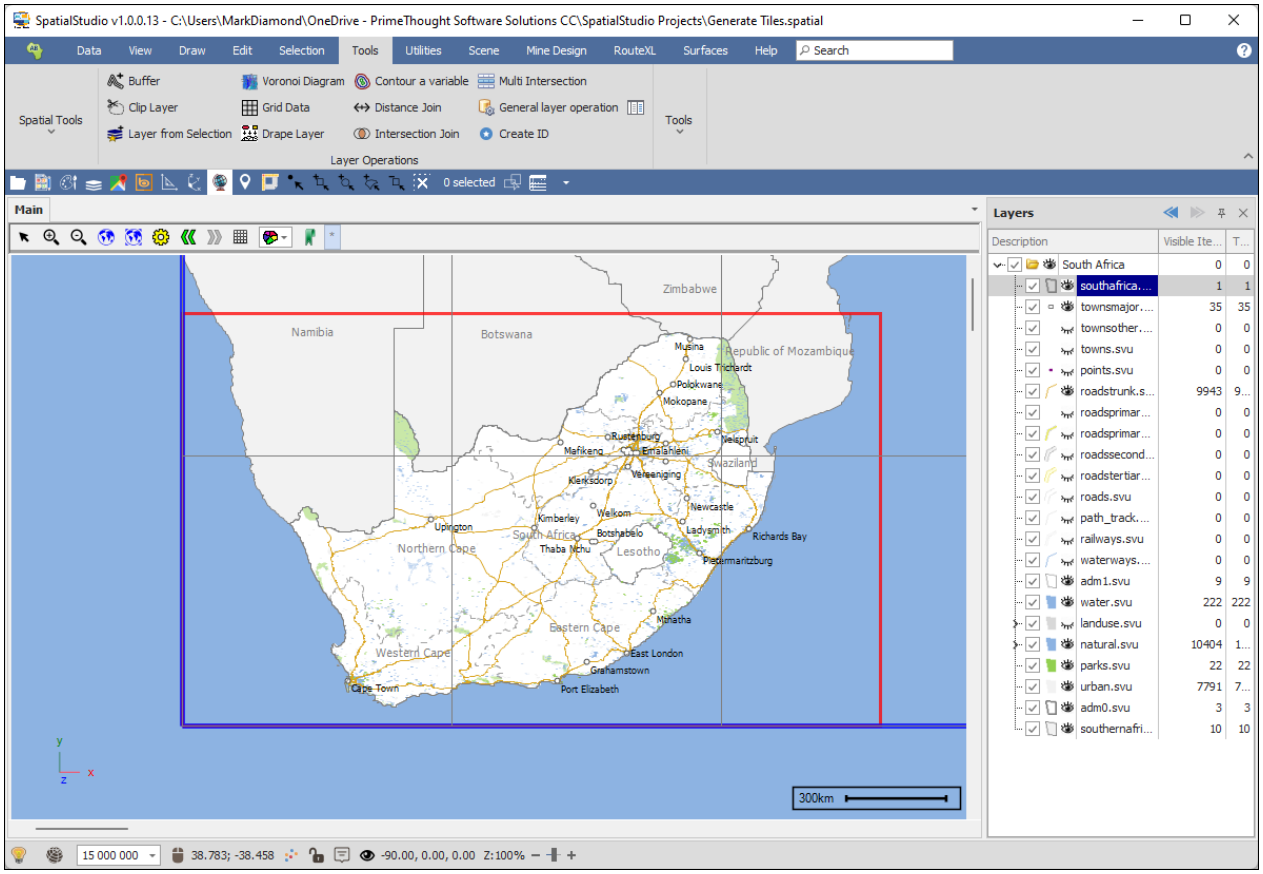
Save Tiler Settings
Ready


SpatialStudio v1.0.0.13 - C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\SpatialStudio Projects\Generate Tiles.spatial
Data
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water.svu
landuse.svu
natural.svu
parks.svu
urban.svu
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southernafri...
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Namibia
Botswana
Republic of Mozambique
Swaziland
Lesotho
South Africa
Northern Cape
Western Cape
Eastern Cape
Musina
Louis Trichardt
Polokwane
Mokopane
Rustenburg
Nelspruit
Mafikeng
Ermelo
Klerksdorp
Vereeniging
Welkom
Kimberley
Upington
Botshabelo
Thaba Nchu
Newcastle
Ladysmith
Richards Bay
Pietermaritzburg
Mthatha
East London
Grahamstown
Cape Town
Port Elizabeth
300km
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38.783; -38.458
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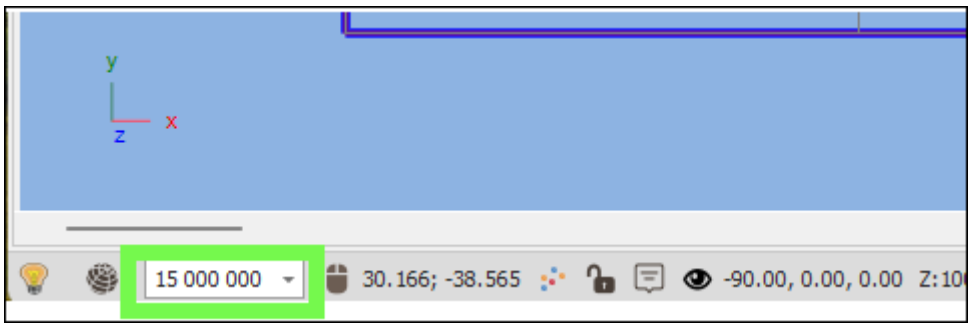
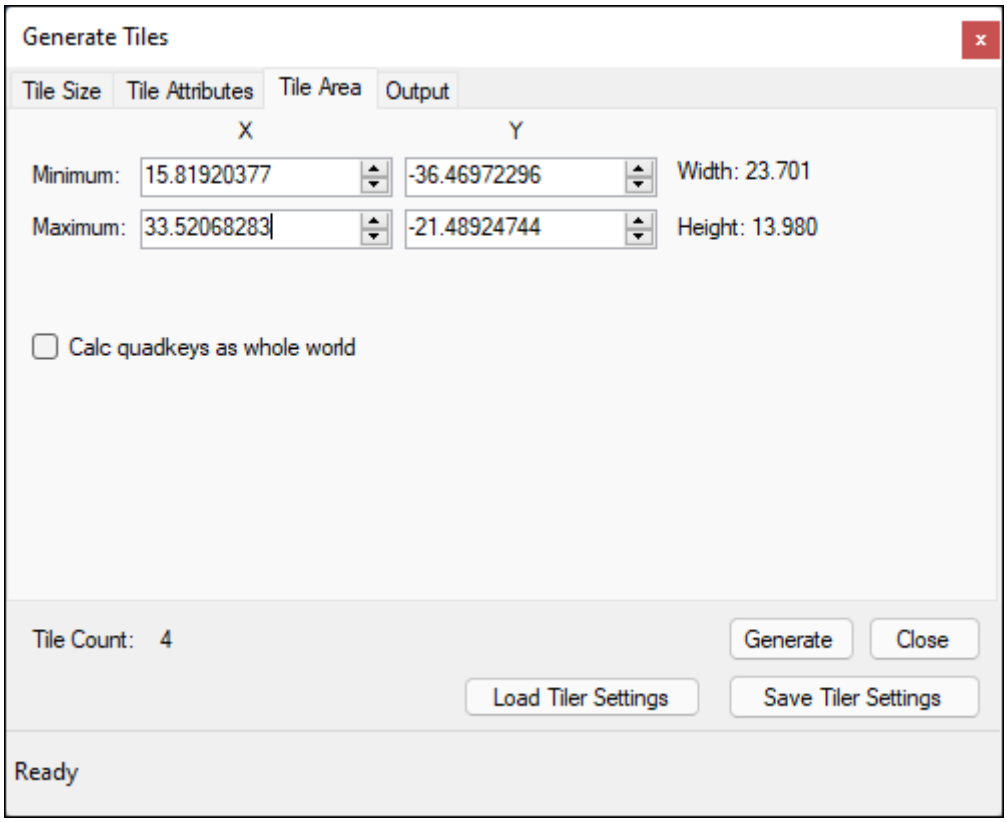
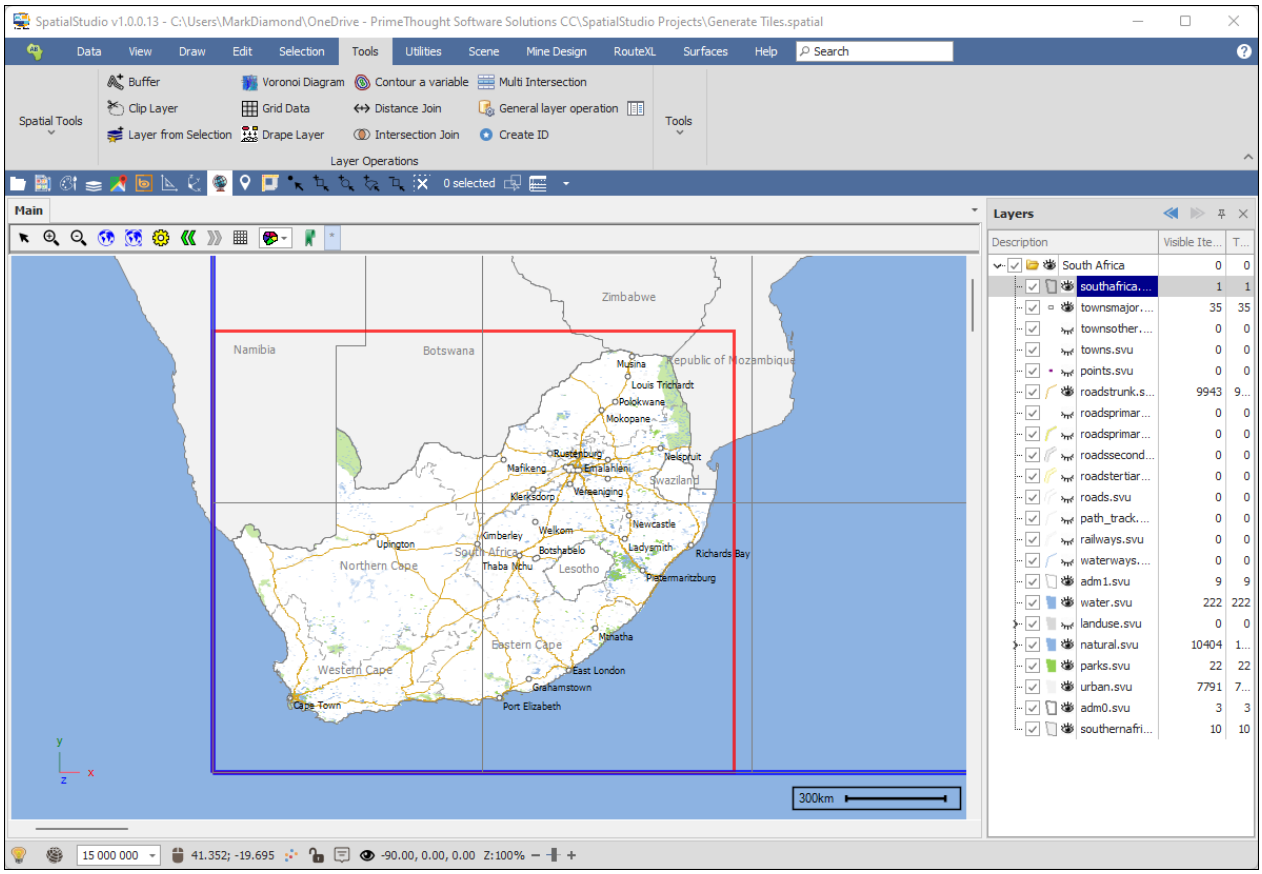
Scale in your scene can be seen at the bottom left of the SpatialStudio window:

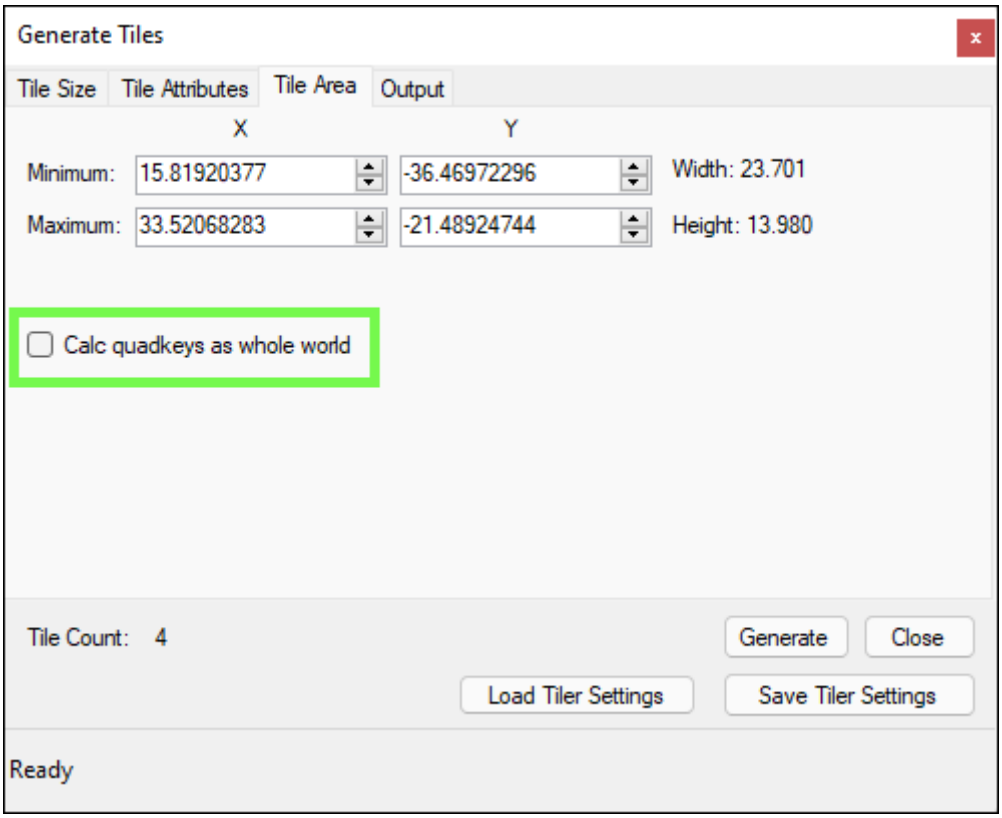


Before we go on with the settings in this tab, I will first go to the **Tile Area** tab to adjust the sizing of my tile area so that just 4 top level tiles are shown over the area. I play around with increasing and decreasing my X and Y minimum and maximum width and height until it fits my area perfectly:

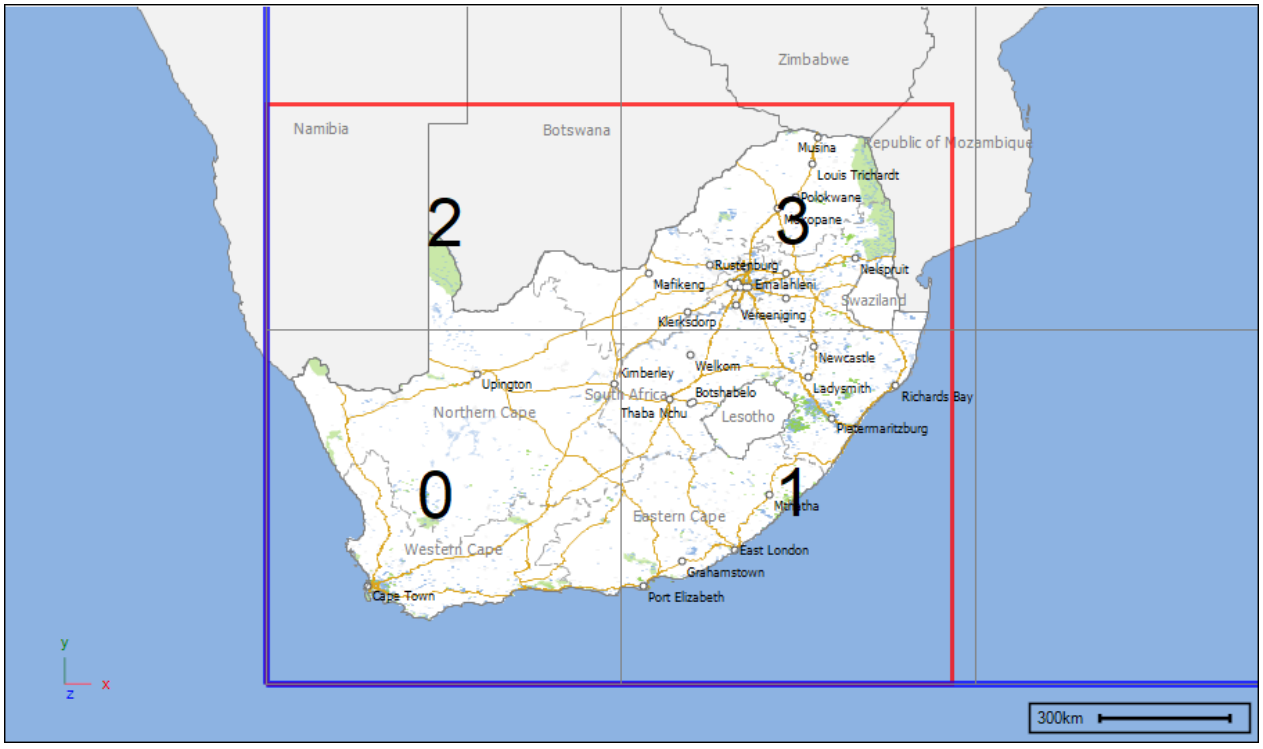




Then you can tick on **Calc quadkeys as whole world** if you want the quadkeys to be calculated from the level of the whole world, in this example I will not:

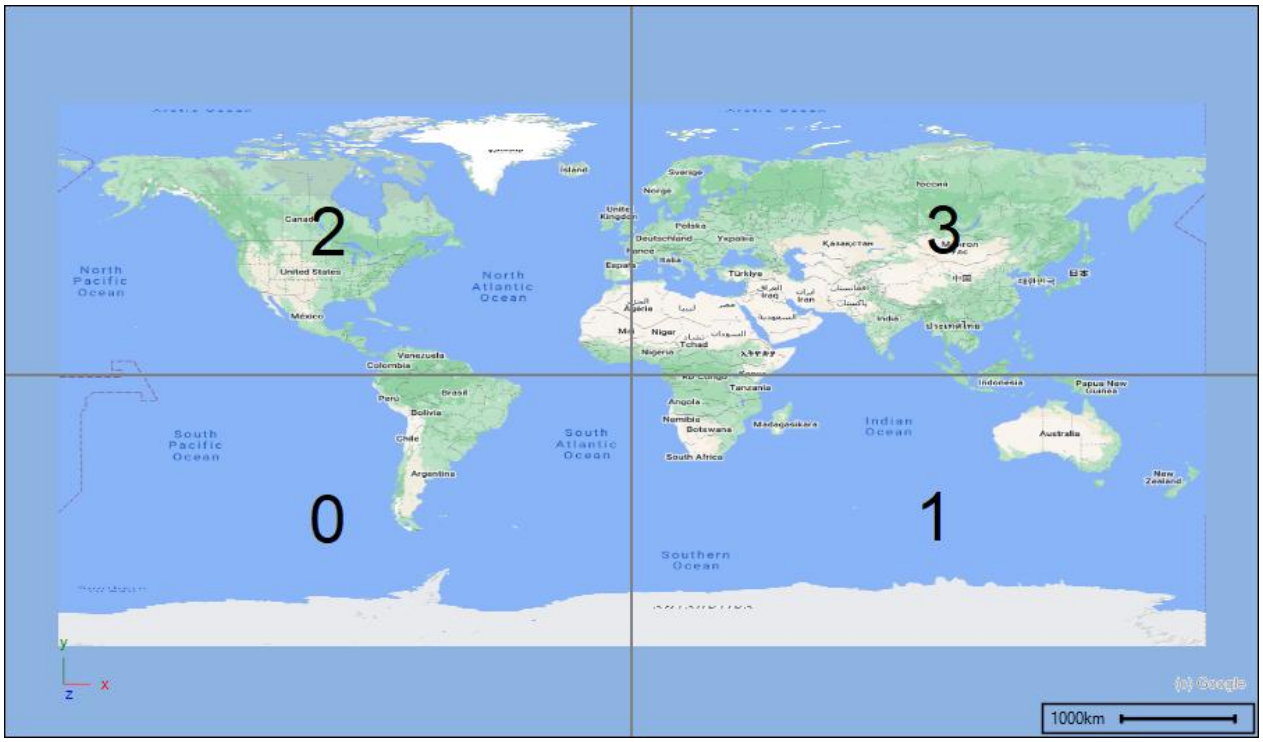


The way quadkeys are calculated locally are as follows:

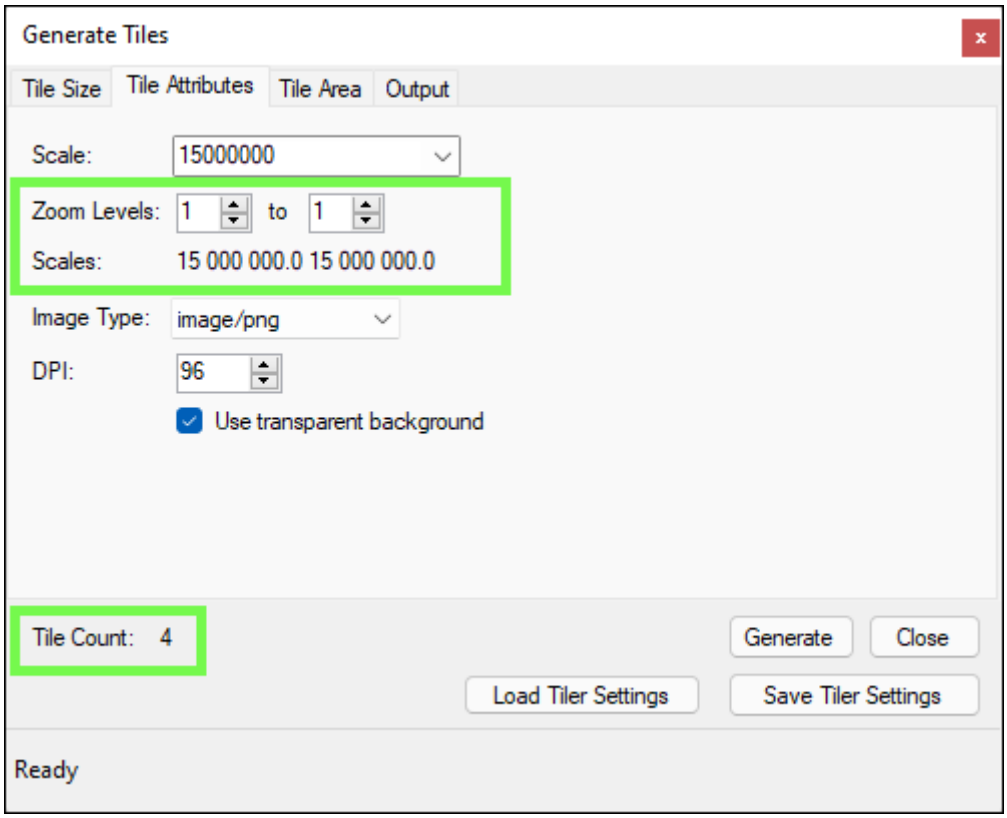


Each tile is then further divided and the sub-tiles are given keys such as 00;01;02;03 in the case of the 0 tile.

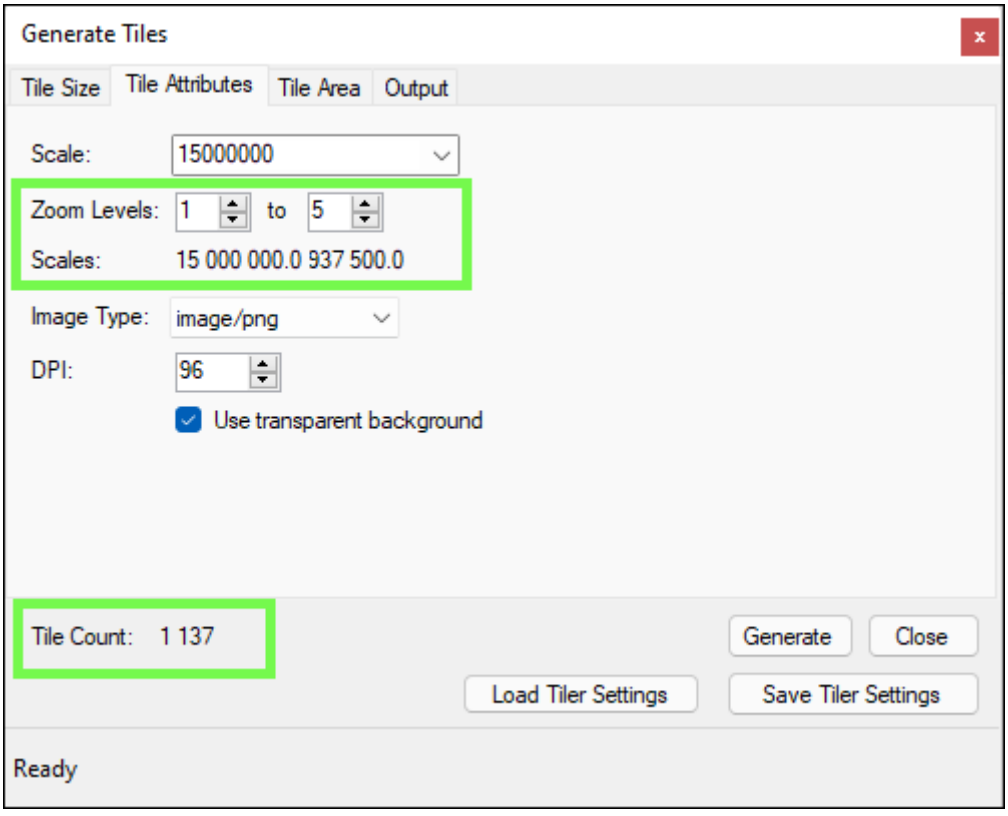
If you choose to calculate quadkeys as the whole world, then the keys generated for your tiles will be from the level of the whole world which will give much bigger numbers:



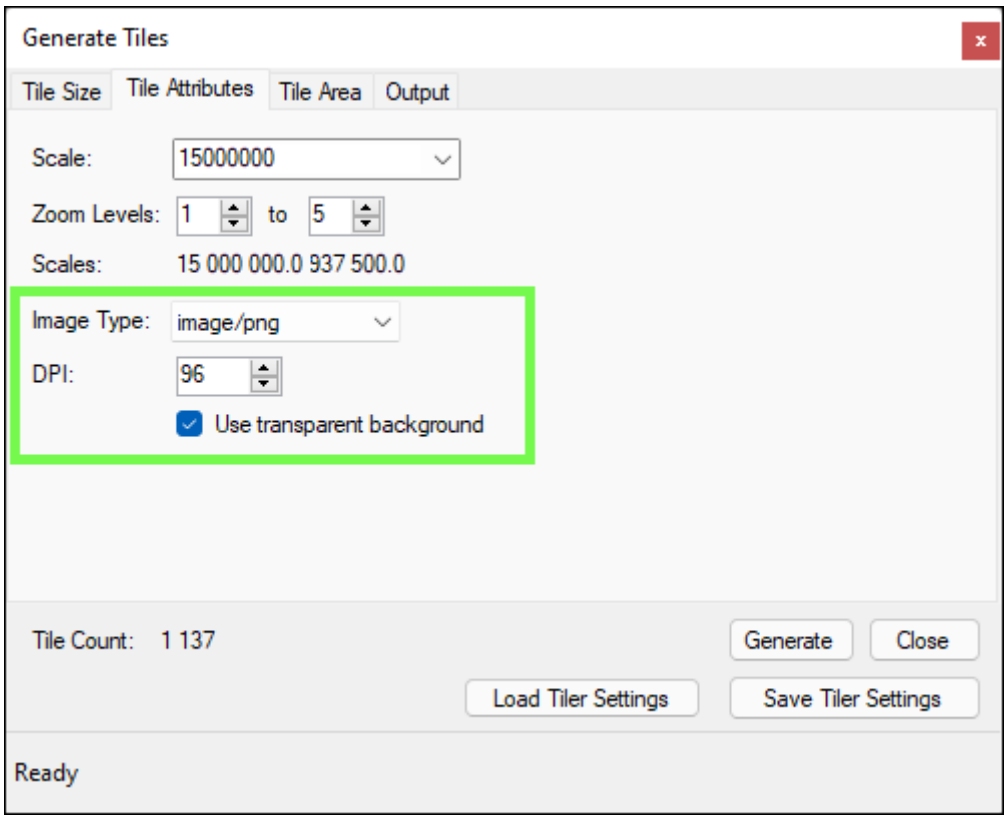
We will now go back to the **Tile Properties** tab. **Zoom Levels** is how many levels in you want the tiling to be done – one level is 4 tiles (just top level), two levels is 20 tiles etc. A higher Zoom Level is a higher amount of detail that will be shown as you zoom in on the resulting tiled image. As you change the Zoom Levels the **Tile Count** at the bottom left of the dialogue will update, as well as the starting scale and end scale being shown by **Scales**:



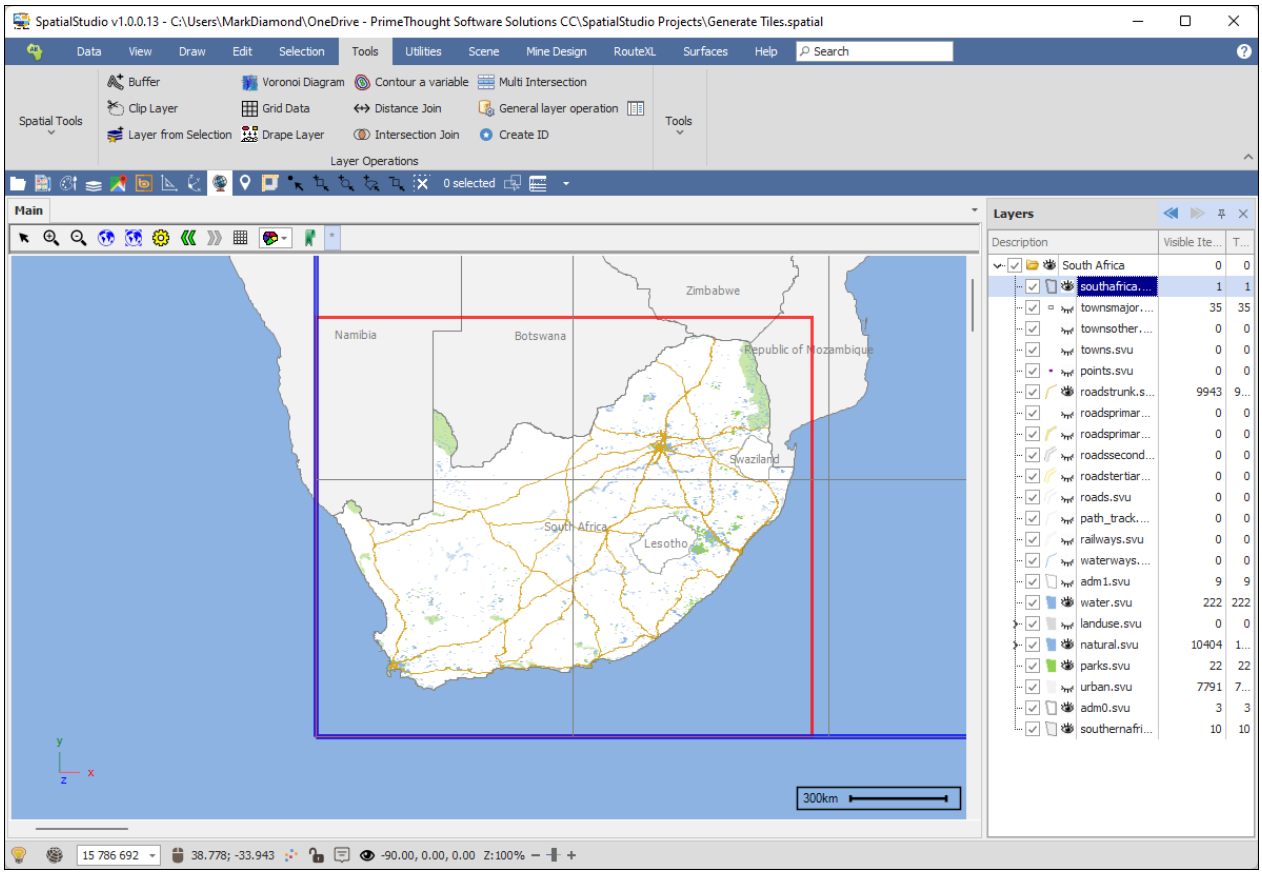
I will choose to do my tiling on five levels in this example:



You can then choose the **Image Type** that will be generated, **image/png** is usually good. Then you can choose the **DPI**(Dots Per Inch), which is the resolution of the image. Finally, you can tick on whether to use a transparent background in the image that's generated, which will allow you to overlay the tiled image on other layers without the background part of the tiled image blocking the other data:



My tile area is looking good and covering everything nicely, however I will just reduce my **Capture Count** in the **Tile Size** tab so that not such a huge area is captured, I will change it to 4:


SpatialStudio v1.0.0.13 - C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\SpatialStudio Projects\Generate Tiles.spatial
Data View Draw Edit Selection Tools Utilities Scene Mine Design RouteXL Surfaces Help Search
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Voronoi Diagram
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Intersection Join
Multi Intersection
General layer operation
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Namibia
Botswana
Republic of Mozambique
Swaziland
South Africa
Lesotho
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townsmajor....
townsother....
towns.svu
points.svu
roadstrunk.s...
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38.778; -33.943
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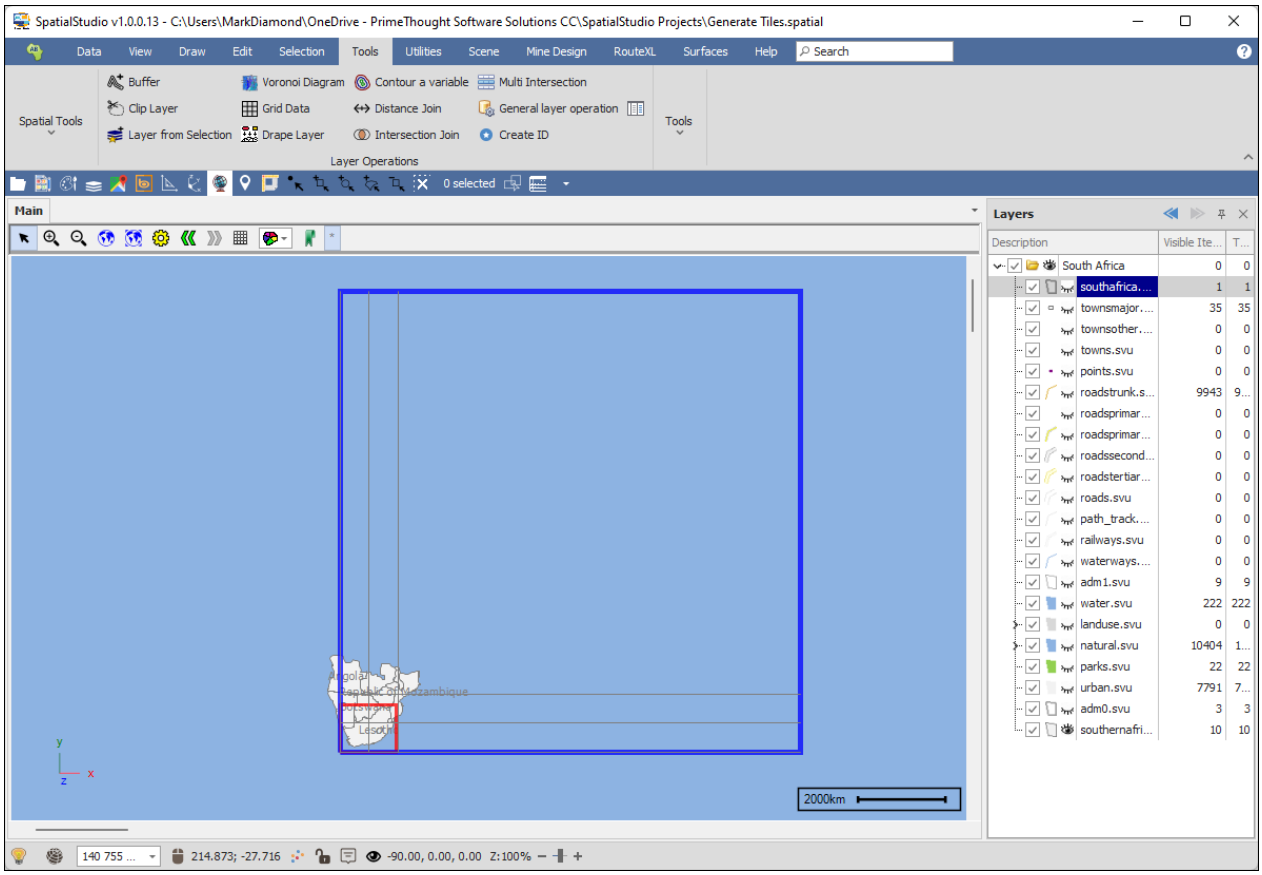
SpatialStudio v1.0.0.13 - C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\SpatialStudio Projects\Generate Tiles.spatial
Data View Draw Edit Selection Tools Utilities Scene Mine Design RouteXL Surfaces Help Search
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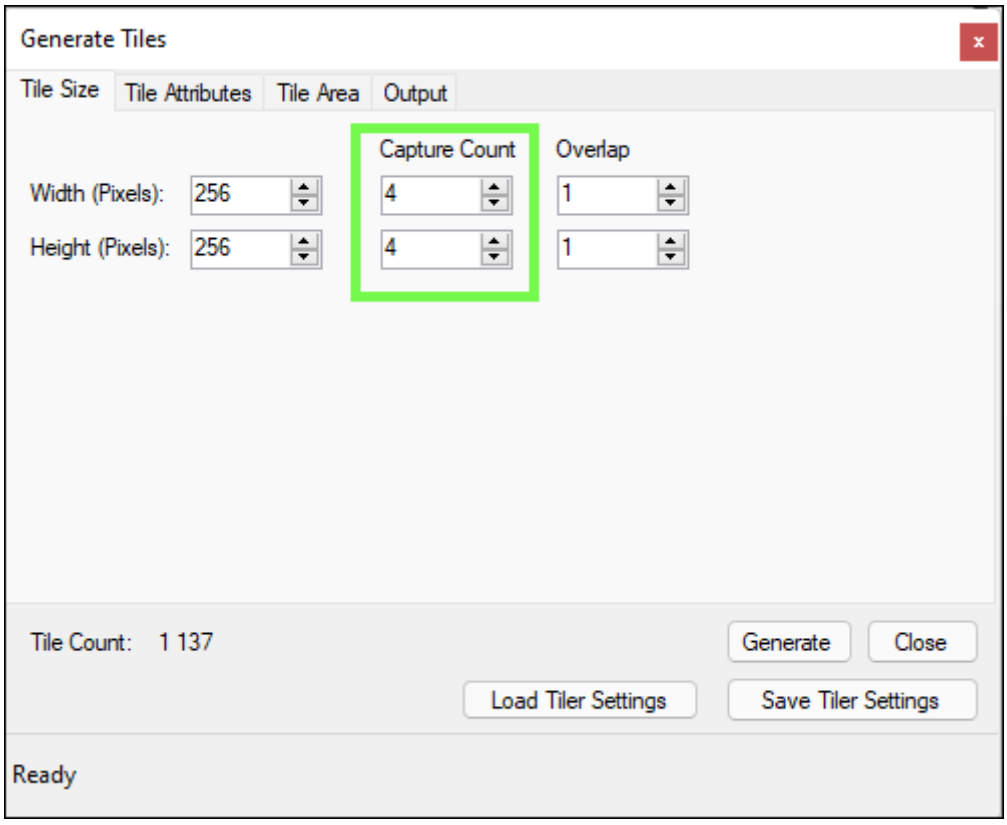
Generate Tiles
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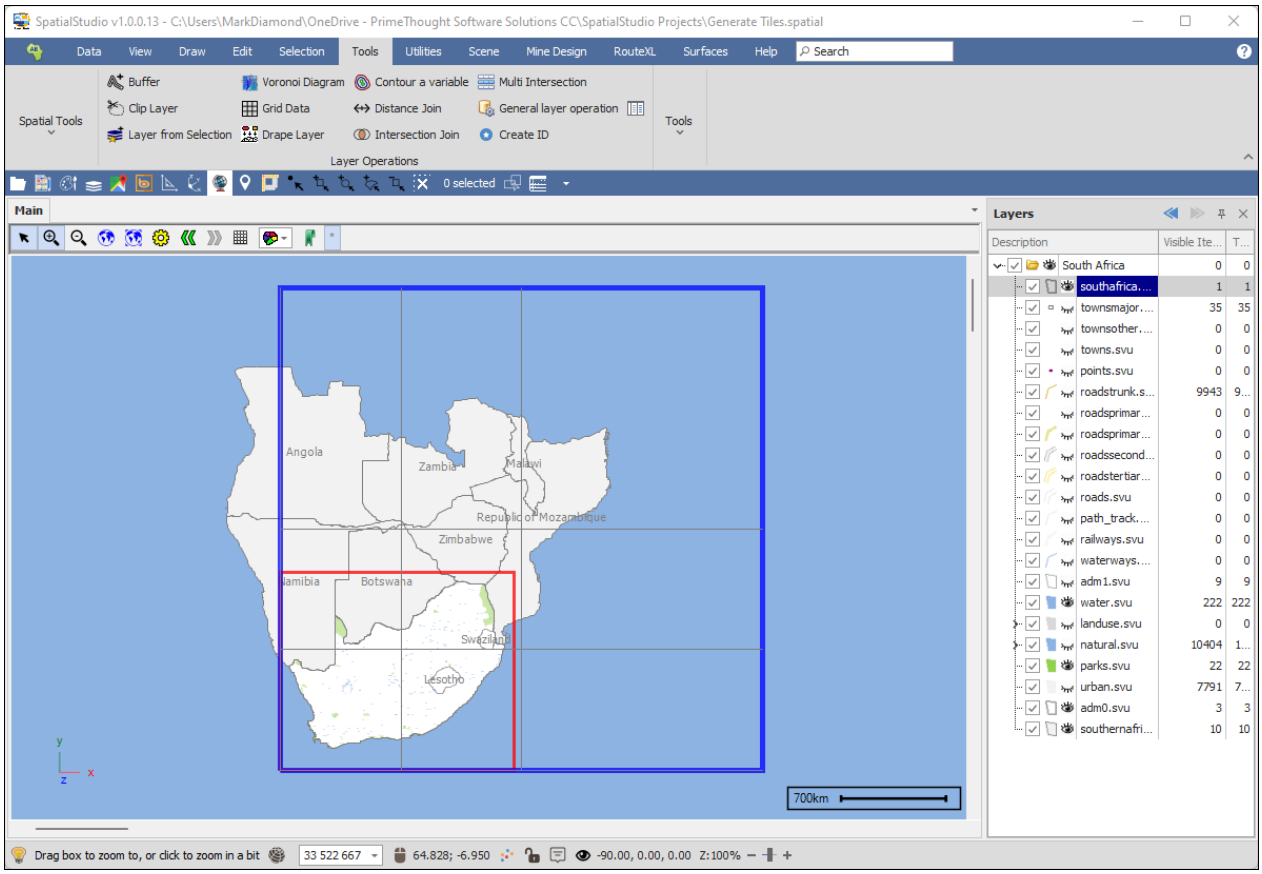
Ready


Data
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waterways....
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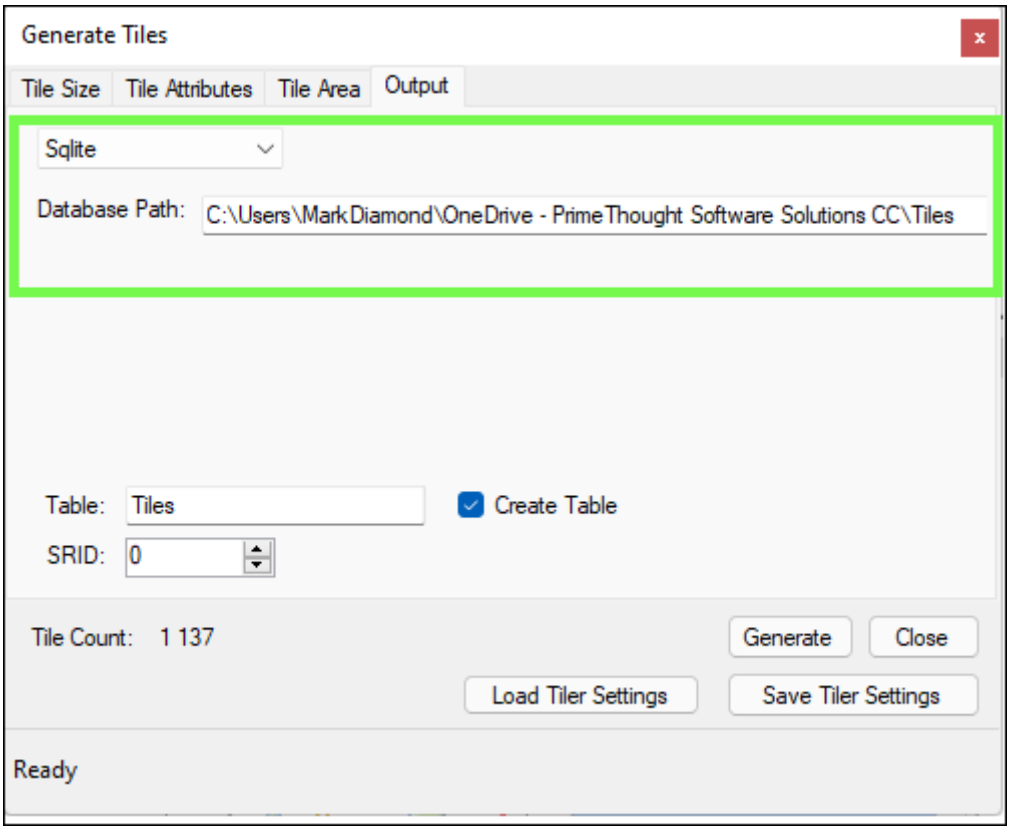
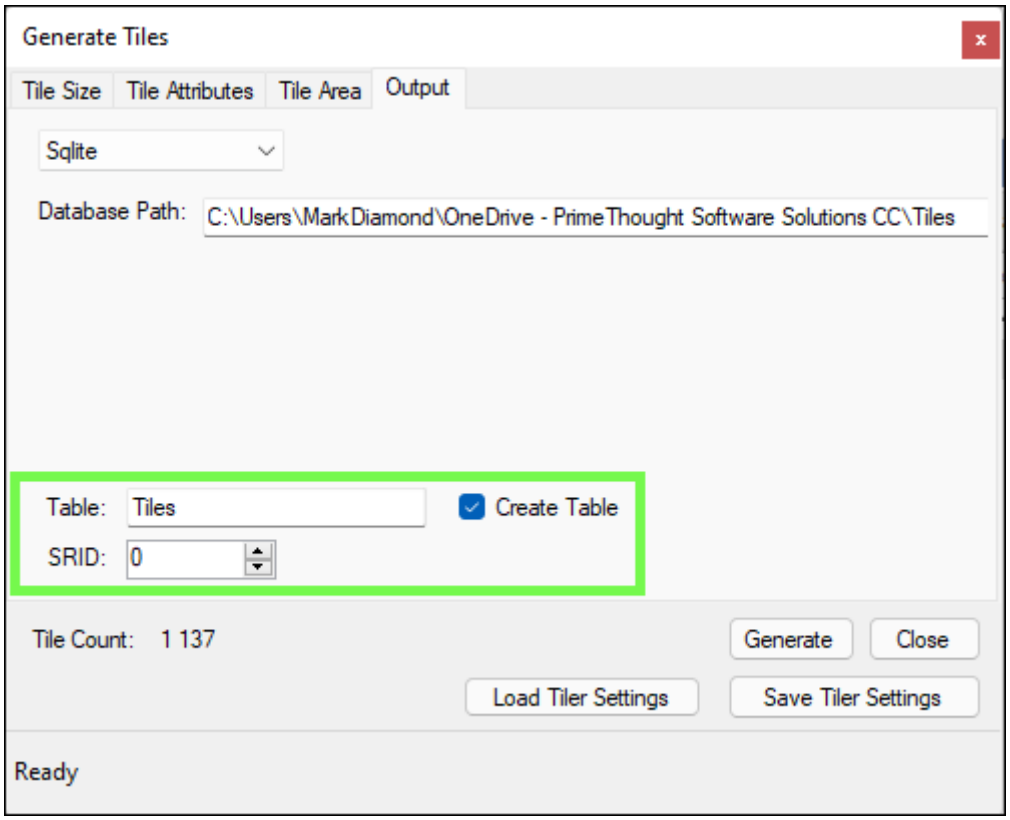
water.svu
landuse.svu
natural.svu
parks.svu
urban.svu
adm0.svu
southernafri...
Angola
Zambia
Malawi
Republic of Mozambique
Zimbabwe
Namibia
Botswana
Swaziland
Lesotho
700km
Drag box to zoom to, or click to zoom in a bit
33 522 667
64.828; -6.950
-90.00, 0.00, 0.00 Z:100%

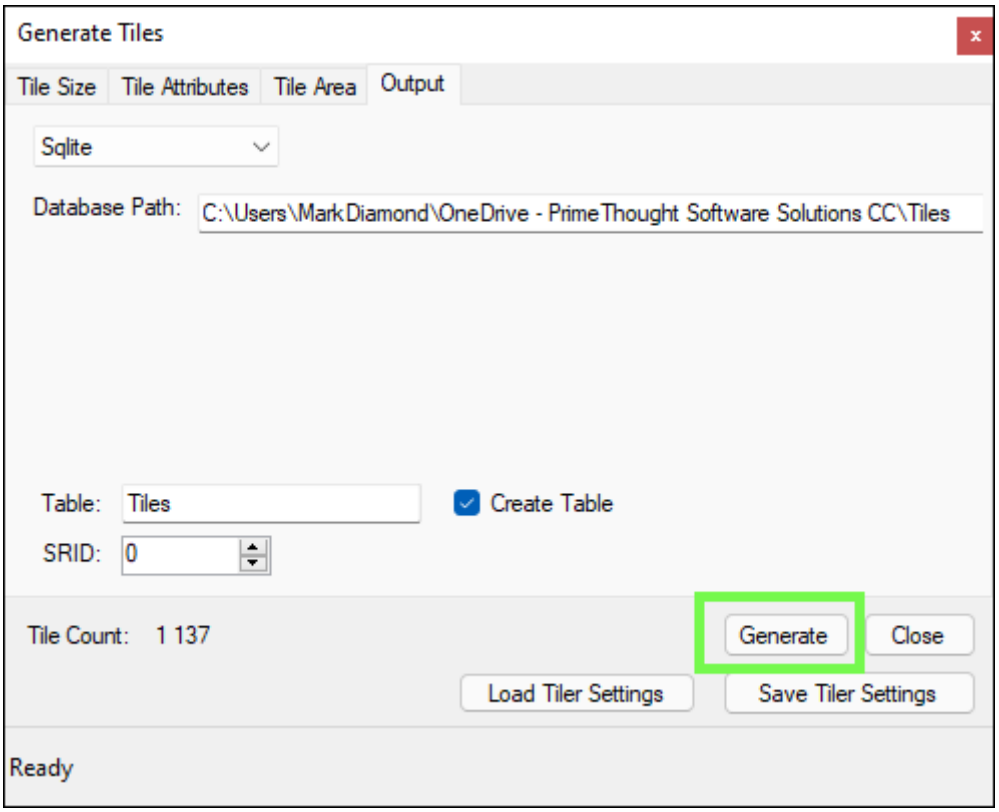
Finally, let's go to the **Output** tab. First, you will choose whether to save your created tiles to a **SQL Server** or **SQLite** database file. Then specify the **Database Path**. I will save it to a SQLite database file, as I can then just drag it in on my scene and my tiled image will be displayed dynamically:



Then you can choose to have a new table automatically created for you in your database by ticking on **Create Table** and then giving it a name, I will leave the default name as Tiles. Then you can set the **SRID** (A spatial reference identifier (SRID) is a unique identifier associated with a specific coordinate system) but this is not normally necessary and can be left at zero:



We are now ready to create our tiles and can click **Generate**:


Generate Tiles
Tile Size
Tile Attributes
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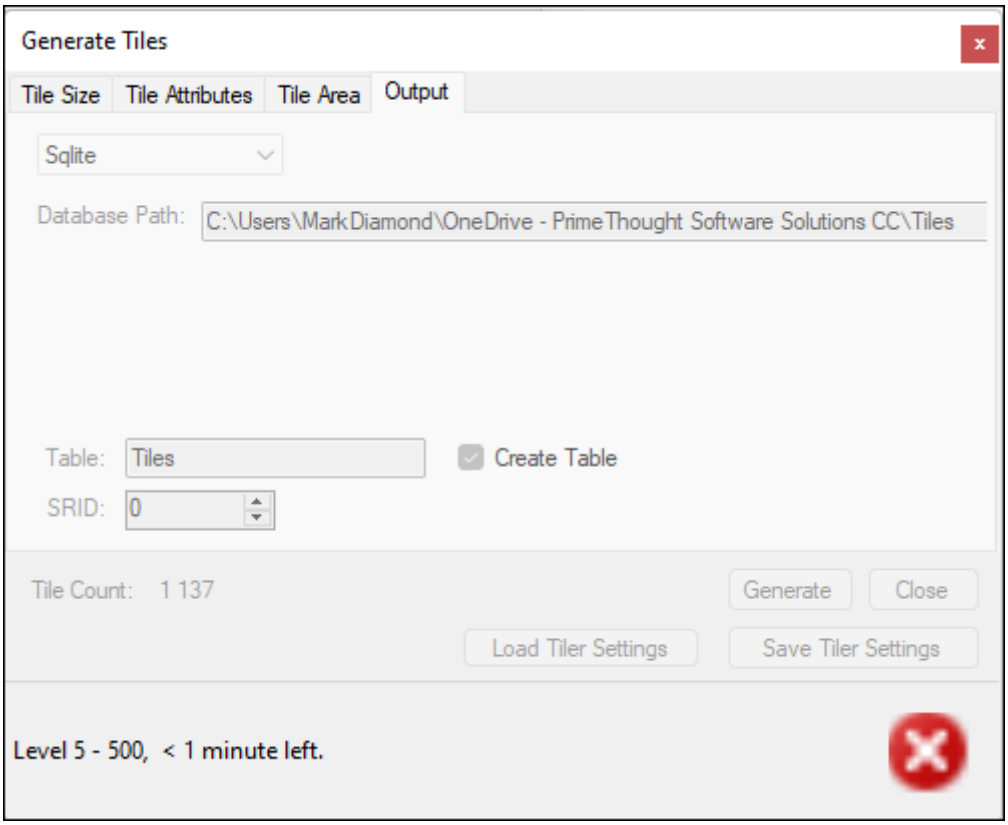
Generate Tiles
Tile Size
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Tile Count:
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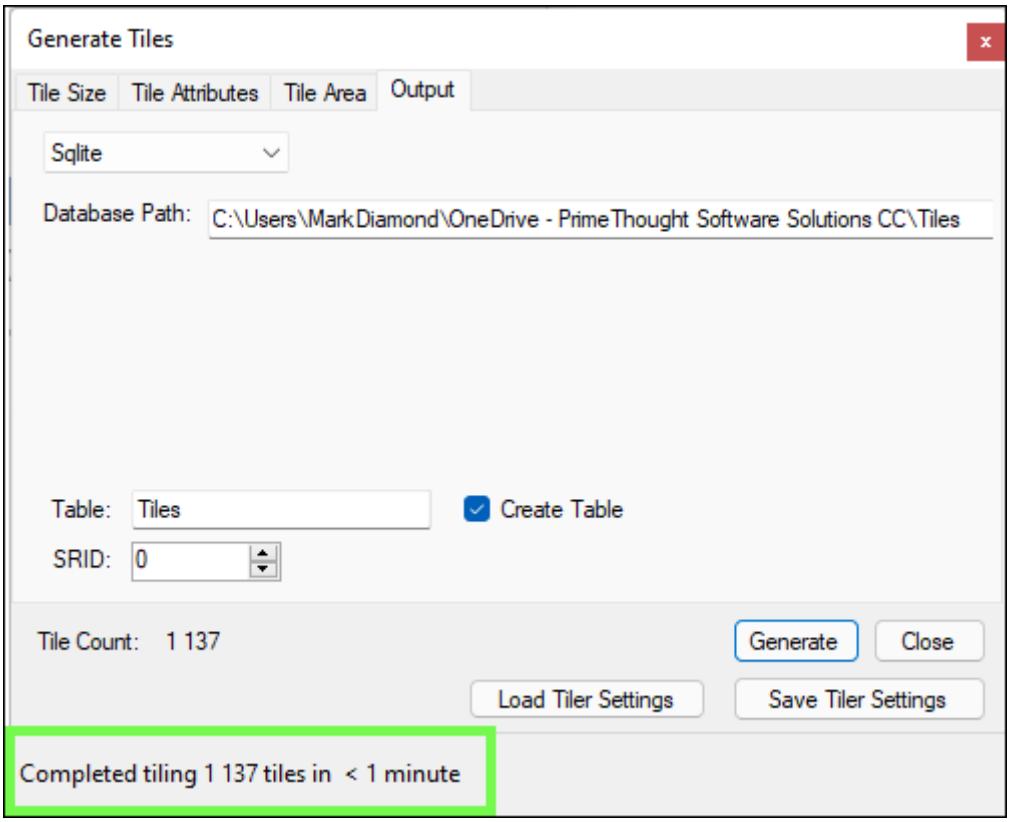
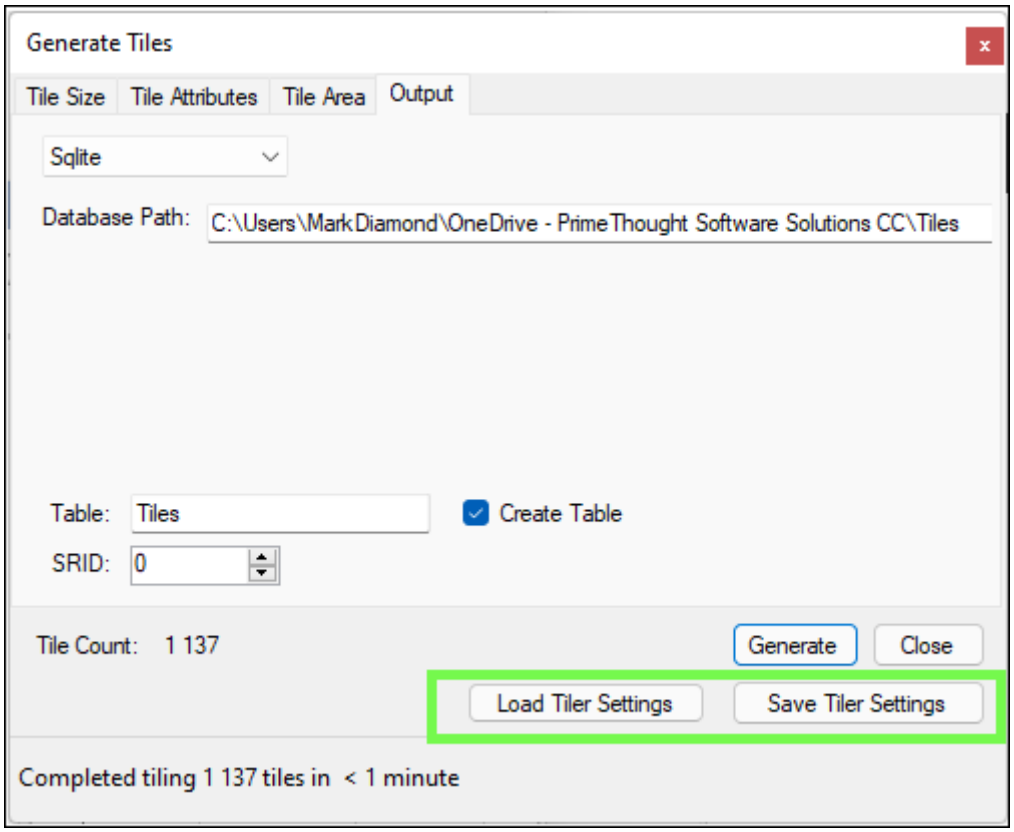
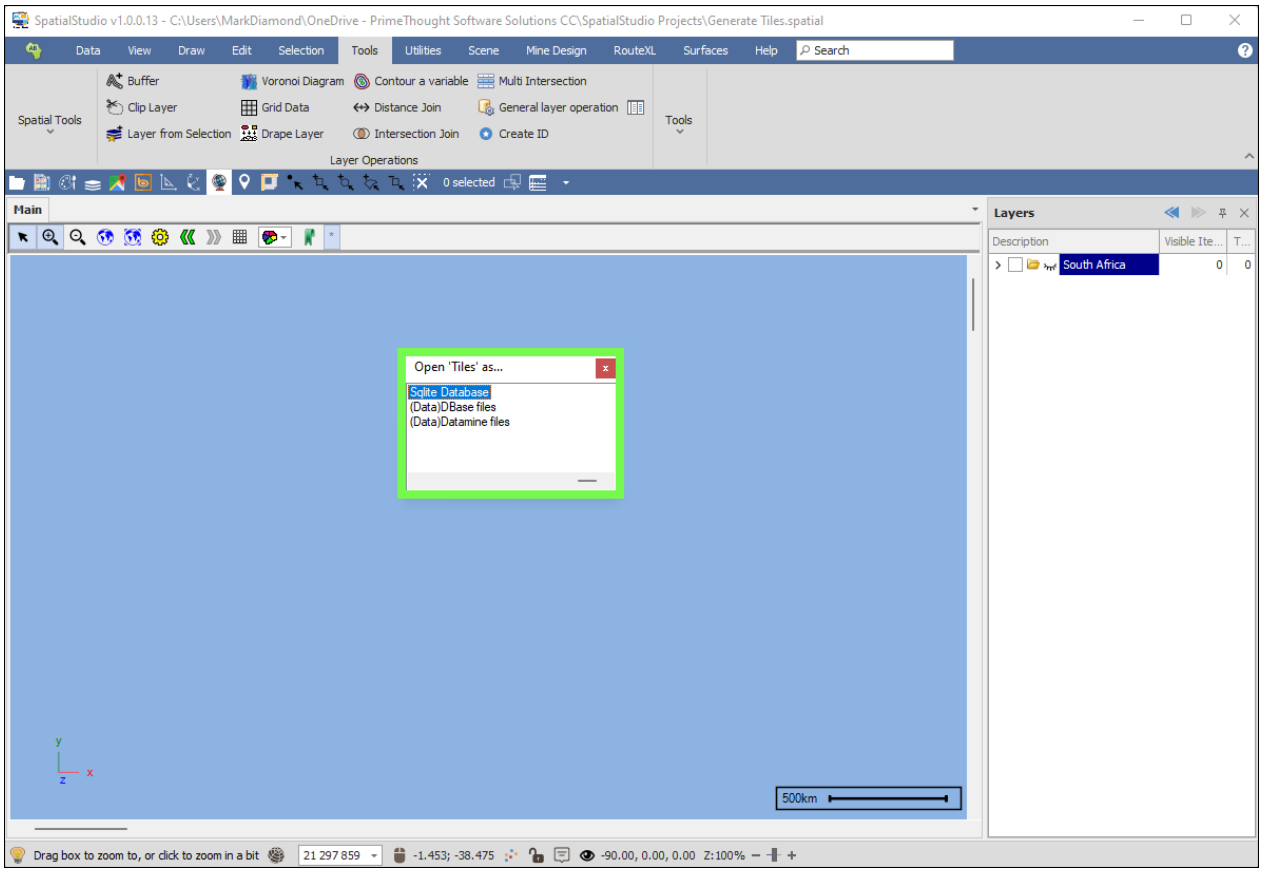
Level 5 - 500, < 1 minute left.



Your tiling is completed. You can save the tiling settings that you set up so that you can them load them at a later date again:



You can now close the Generate Tiles dialogue and bring in your tiles as a layer from either SQL Server or SQLite database file depending on what you saved it to. I will bring in my SQLite file by simply dragging and dropping it on the scene, I'm then prompted to choose what kind of file it is, as well as its projection, it is then added as a layer and I can view it and zoom in and out:


SpatialStudio v1.0.0.13 - C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\SpatialStudio Projects\Generate Tiles.spatial
Data
View
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Selection
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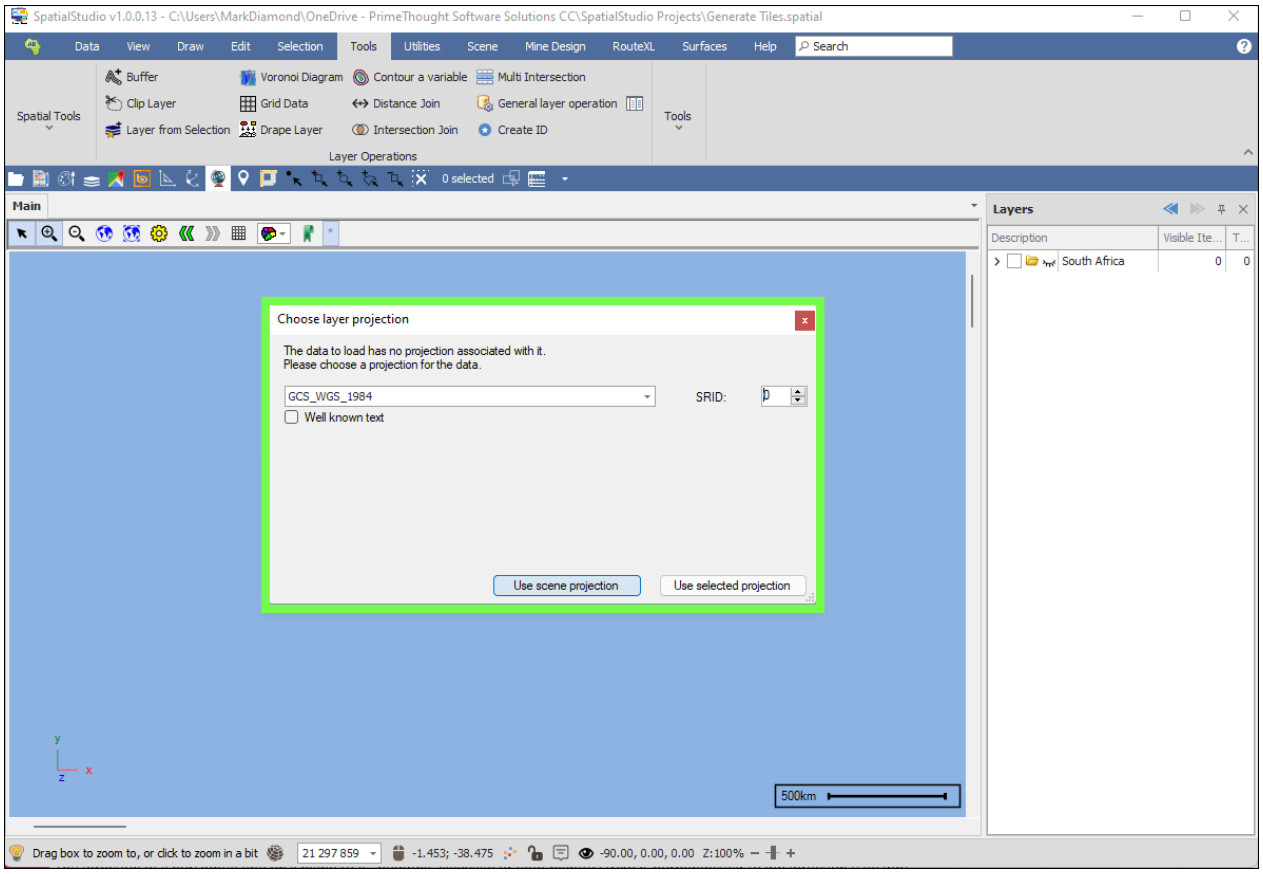
Grid Data
Drape Layer
Contour a variable
Distance Join
Intersection Join
Multi Intersection
General layer operation
Create ID
Tools
Layer Operations
0 selected
Main
Layers
Description
Visible Ite...
South Africa
Open 'Tiles' as...
Sqlite Database
(Data)DBase files
(Data)Datamine files
500km
Drag box to zoom to, or click to zoom in a bit
21 297 859
-1.453; -38.475
-90.00, 0.00, 0.00 Z:100%


SpatialStudio v1.0.0.13 - C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\SpatialStudio Projects\Generate Tiles.spatial
Data
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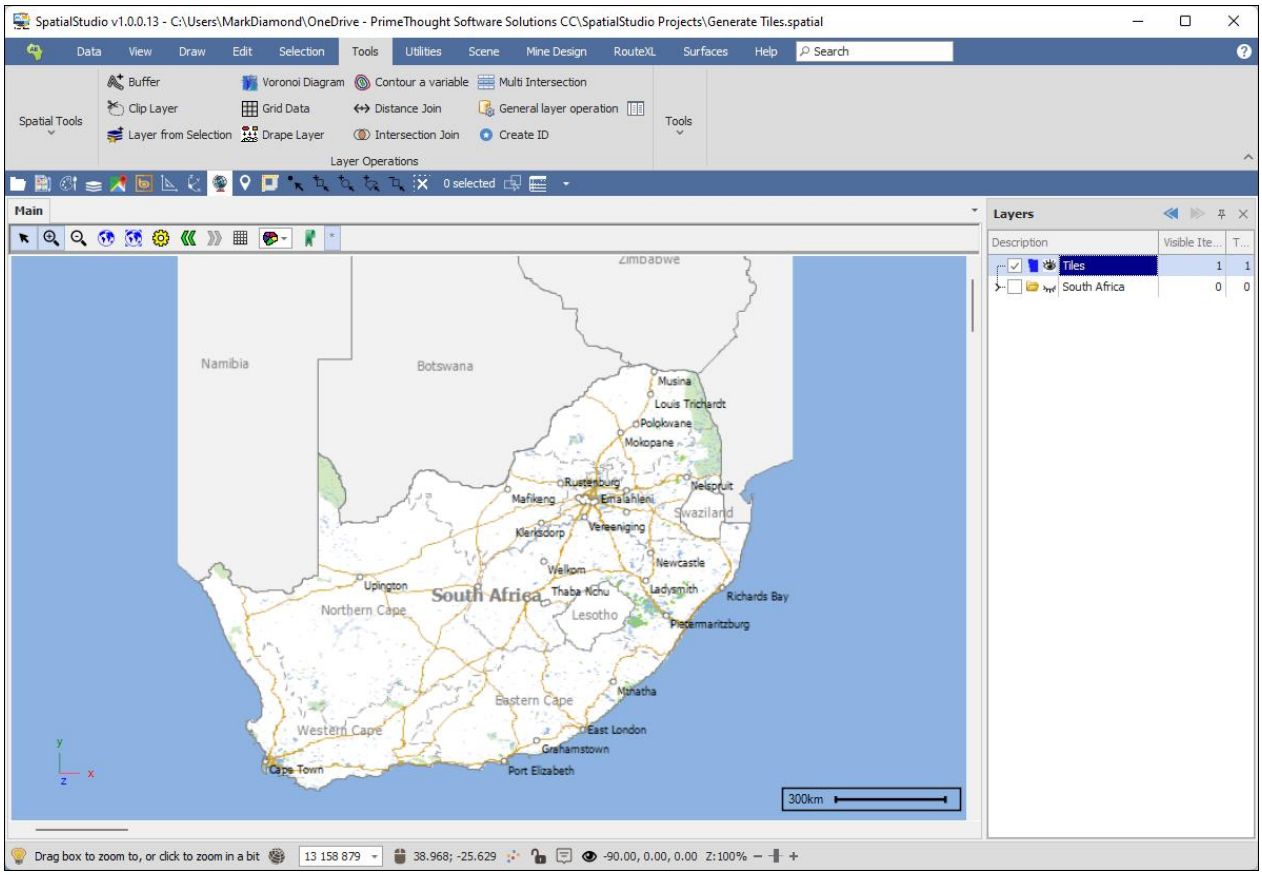
Grid Data
Drape Layer
Contour a variable
Distance Join
Intersection Join
Multi Intersection
General layer operation
Create ID
Tools
Layer Operations
0 selected
Main
Layers
Description
Visible Ite...
South Africa
Choose layer projection
The data to load has no projection associated with it.
Please choose a projection for the data.
GCS_WGS_1984
SRID:
Well known text
Use scene projection
Use selected projection
500km
Drag box to zoom to, or click to zoom in a bit
21 297 859
-1.453; -38.475
-90.00, 0.00, 0.00 Z:100%


SpatialStudio v1.0.0.13 - C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\SpatialStudio Projects\Generate Tiles.spatial
Data
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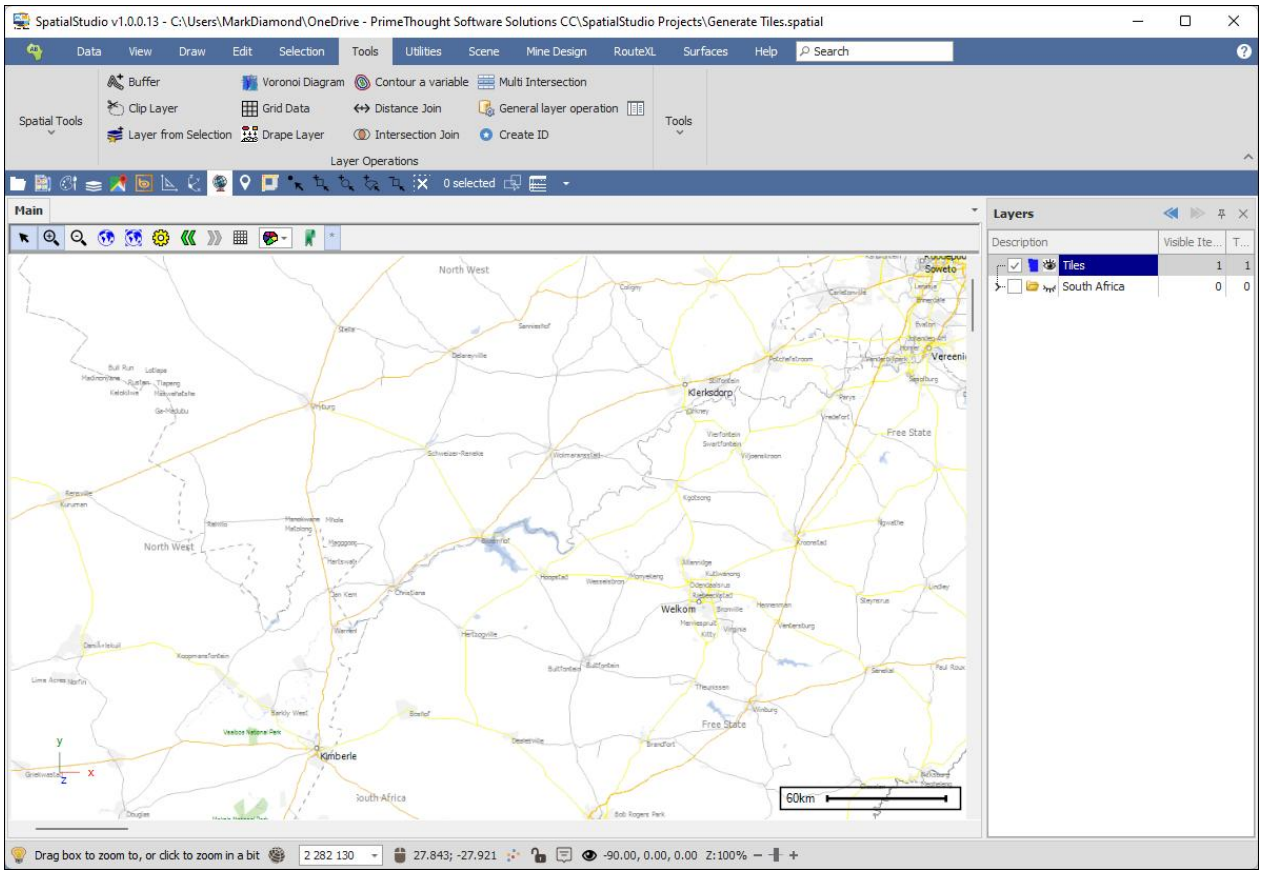
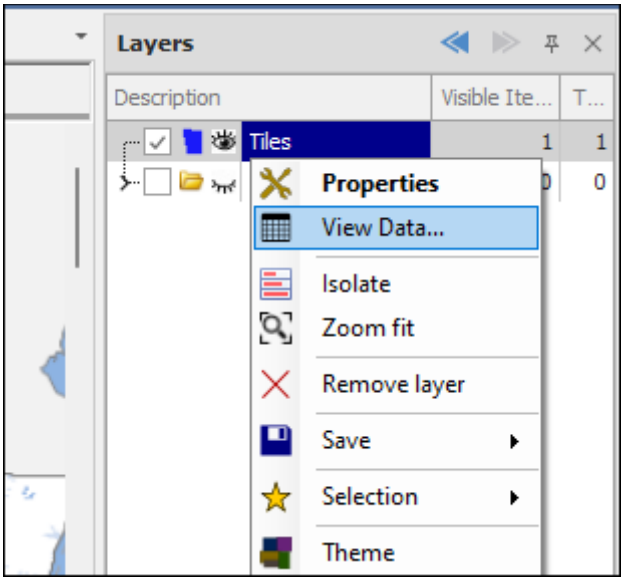
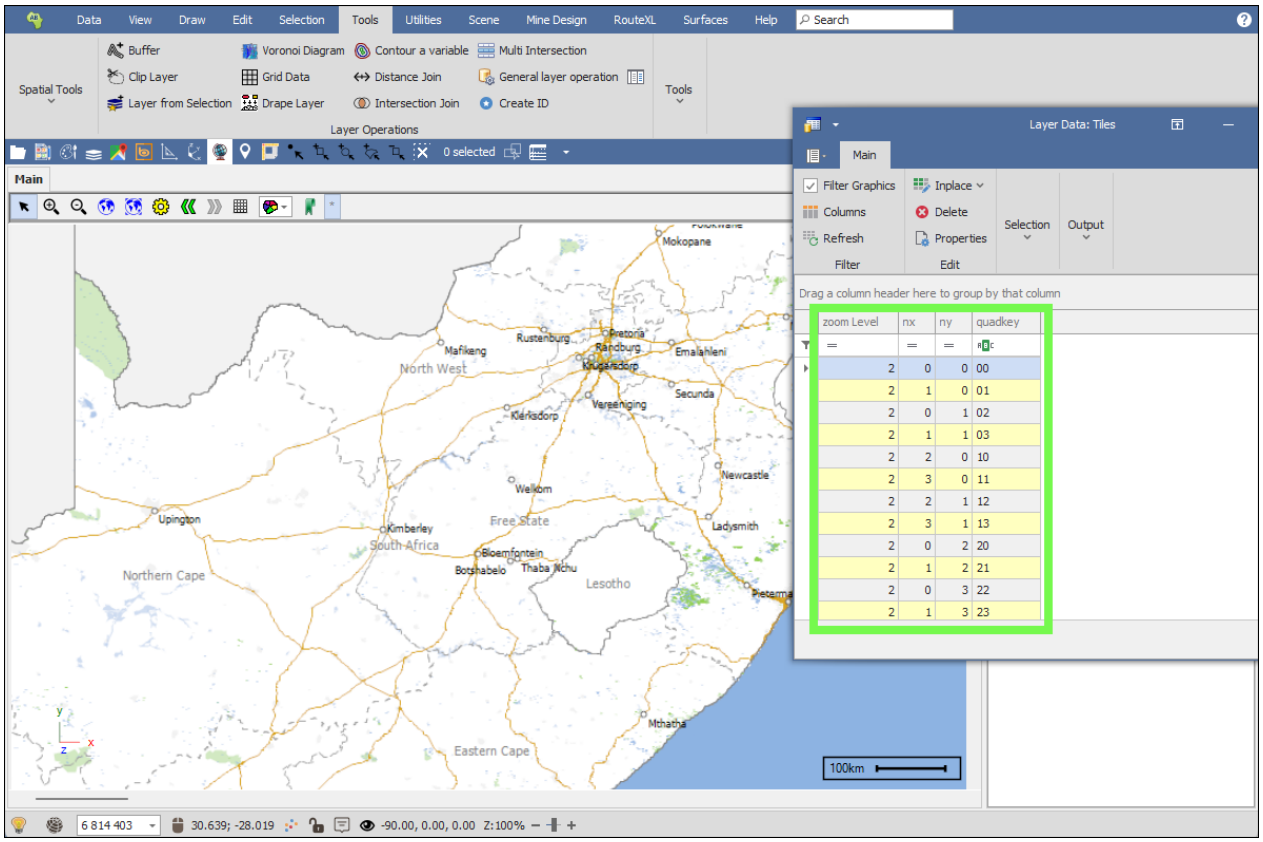
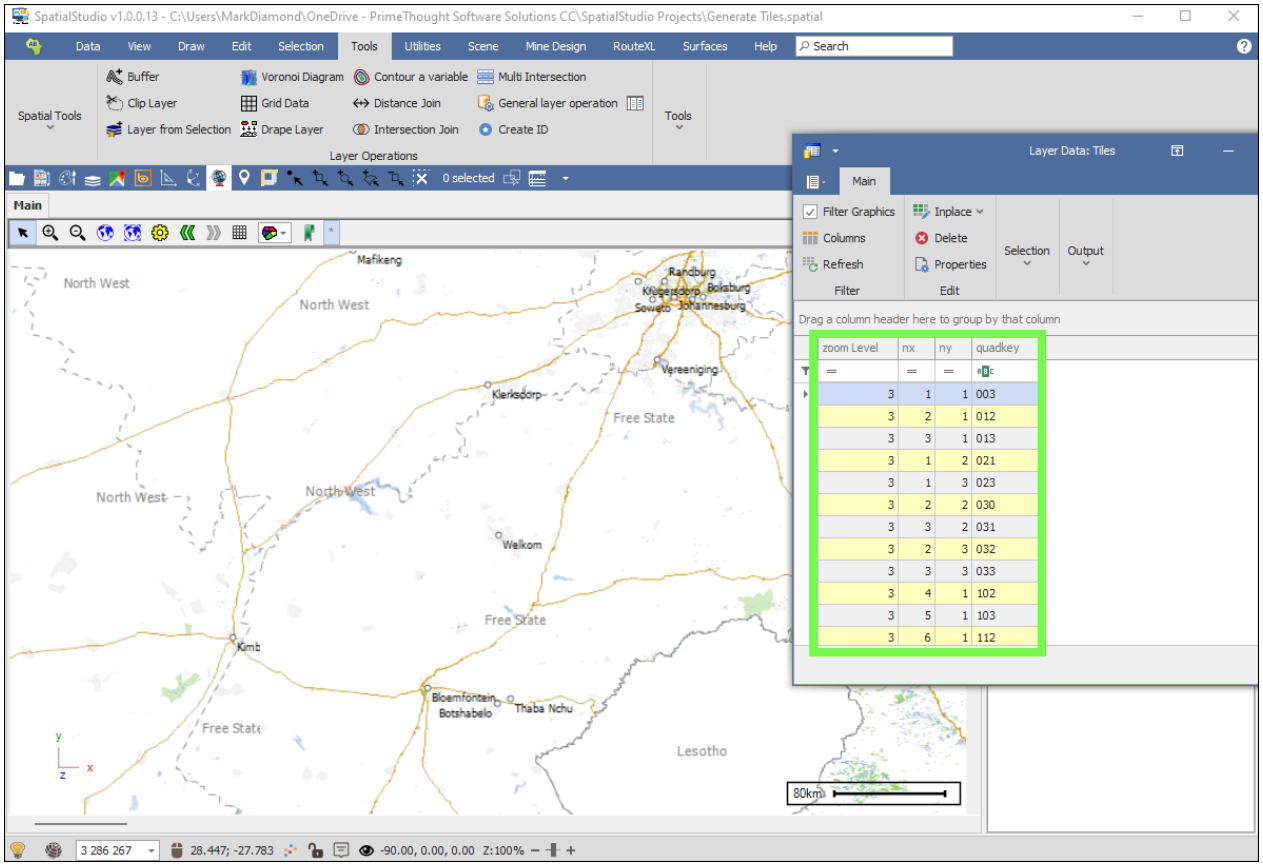
Intersection Join
Multi Intersection
General layer operation
Create ID
Layer Operations
Tools
0 selected
Main
Layers
Description
Visible Ite...
Tiles
South Africa
Zimbabwe
Namibia
Botswana
Musina
Louis Trichardt
Polokwane
Mokopane
Rustenburg
Mafikeng
Emalahleni
Nelspruit
Swaziland
Vereeniging
Klerksdorp
Newcastle
Welkom
Upington
South Africa
Thaba Nchu
Ladysmith
Richards Bay
Northern Cape
Lesotho
Pietermaritzburg
Mthatha
Eastern Cape
Western Cape
East London
Grahamstown
Cape Town
Port Elizabeth
300km
Drag box to zoom to, or click to zoom in a bit
13 158 879
38.968; -25.629
-90.00, 0.00, 0.00 Z:100%



If you view the data of the Tiles layer you will see that it contains the quadkey as well as the zoom level for each tile, and as you zoom in and out you will see the data update dynamically in the layer data grid as the tiles are displayed:




Data View Draw Edit Selection Tools Utilities Scene Mine Design RouteXL Surfaces Help Search
Spatial Tools
Buffer Clip Layer Layer from Selection
Voronoi Diagram Grid Data Drape Layer
Contour a variable Distance Join Intersection Join
Multi Intersection General layer operation Create ID
Layer Operations
Tools
0 selected
Main
Layer Data: Tiles
Main
Filter Graphics Columns Refresh
Inplace Delete Properties
Selection Output
Filter Edit
Drag a column header here to group by that column
zoom Level nx ny quadkey
2 0 0 00
2 1 0 01
2 0 1 02
2 1 1 03
2 2 0 10
2 3 0 11
2 2 1 12
2 3 1 13
2 0 2 20
2 1 2 21
2 0 3 22
2 1 3 23
Mokopane
Rustenburg
Mafikeng
North West
Pretoria
Randburg
Emalahleni
Secunda
Vereeniging
Klerksdorp
Welkom
Newcastle
Upington
Kimberley
South Africa
Free State
Bloemfontein
Botshabelo
Thaba Nchu
Lesotho
Ladysmith
Northern Cape
Eastern Cape
Mthatha
100km
6 814 403
30.639; -28.019
-90.00, 0.00, 0.00 Z:100%


SpatialStudio v1.0.0.13 - C:\Users\MarkDiamond\OneDrive - PrimeThought Software Solutions CC\SpatialStudio Projects\Generate Tiles.spatial
Data View Draw Edit Selection Tools Utilities Scene Mine Design RouteXL Surfaces Help Search
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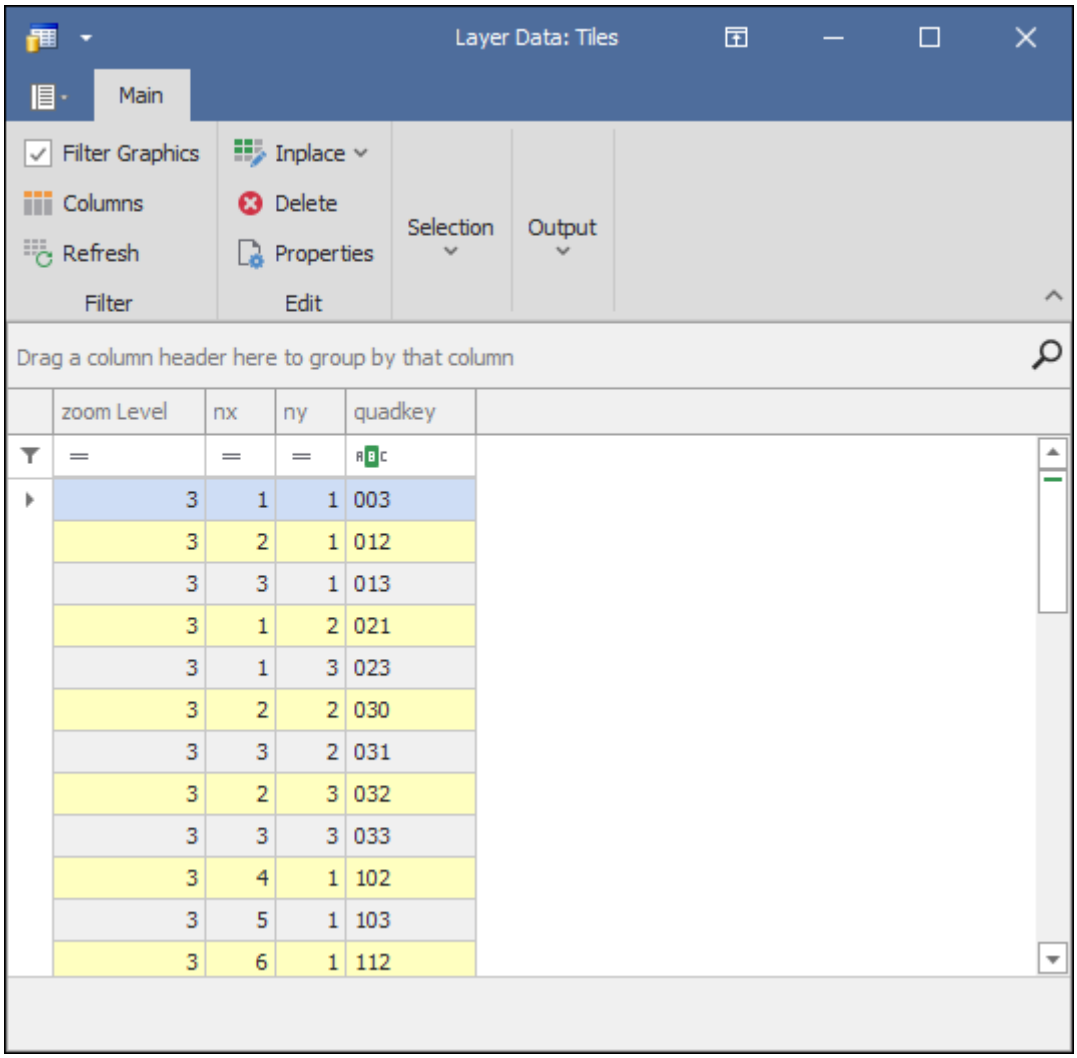
0 selected
Main
Layer Data: Tiles
Main
Filter Graphics Columns Refresh
Inplace Delete Properties
Selection Output
Filter Edit
Drag a column header here to group by that column
zoom Level nx ny quadkey
3 1 1 003
3 2 1 012
3 3 1 013
3 1 2 021
3 1 3 023
3 2 2 030
3 3 2 031
3 2 3 032
3 3 3 033
3 4 1 102
3 5 1 103
3 6 1 112
Mafikeng
North West
Randburg
Krugersdorp
Boksburg
Soweto
Johannesburg
Vereeniging
Klerksdorp
Free State
Welkom
Bloemfontein
Botshabelo
Thaba Nchu
Lesotho
80km
3 286 267
28.447; -27.783
-90.00, 0.00, 0.00 Z:100%



zoom Level	nx	ny	quadkey
3	1	1	003
3	2	1	012
3	3	1	013
3	1	2	021
3	1	3	023
3	2	2	030
3	3	2	031
3	2	3	032
3	3	3	033
3	4	1	102
3	5	1	103
3	6	1	112

The **nx** and **ny** columns are index numbers assigned for the x and y values of each tile, indicating the position of each tile in the set of tiles.

Support

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1684, South Africa