

Making Maps using ArcGIS Pro

Tutorial

Presented by



Proposed by





In This Tutorial:

- Quick recap of data acquisition, saving your files, and opening them on ArcGIS Pro
- Marking Points using Feature Class
- Making Ped Sheds using the Buffer Tool
- Using the Select tool to customise specific parts within features
- 3D Scenes: Using Exploratory 3D Analysis Tools such as creating an elevation profile
- Creating a Print Layout

Introduction



ArcGIS

- ArcGIS is a **Geographic Information System (GIS)** created by Esri.
 - Originally, ArcMap was the main component of Esri's ArcGIS suite of geospatial programs
 - **ArcGIS Pro is like the updated all-in-one-package program with a more user friendly interface.**

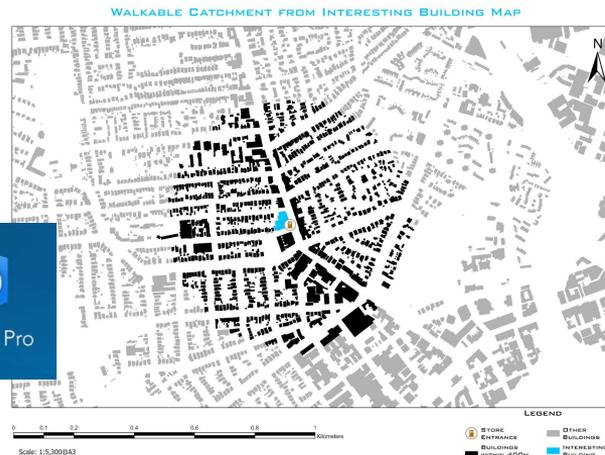
Last Tutorial:
Data Acquisition
Finding Map Info



Data Acquisition



This Tutorial



Map Making

Downloading Data from LINZ Data Service

1. Click **Download or Order**



2. Set the option to **Download** and **GIS**. Change settings according to below then click **Accept terms and create download**

Optional: name the file yourself

Set Map projection to NZGD2000...

Select **Shapefile** or **Geodatabase**

Ensure that only the data you want to download is displayed

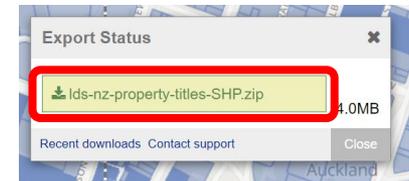
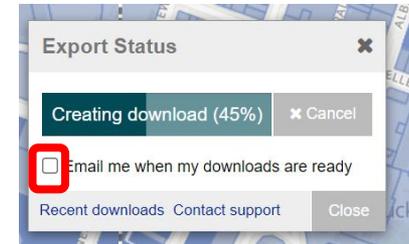
Tips:

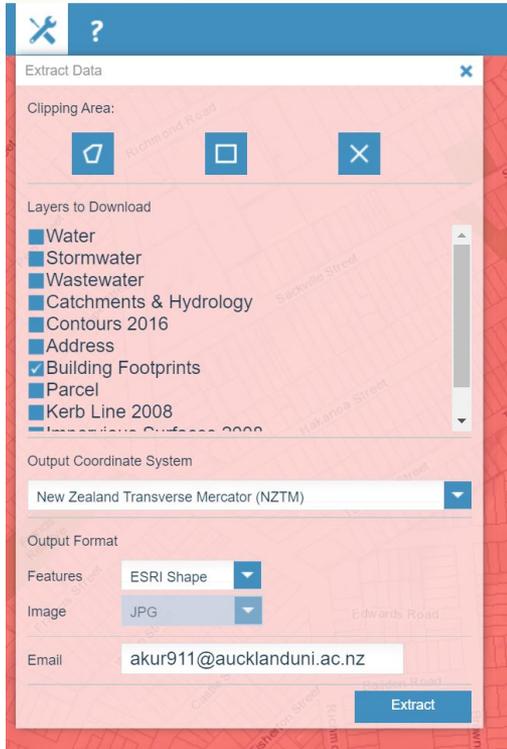
If you are downloading individual data (like this example) **shapefile** is usually more convenient.

When downloading multiple layers, **geodatabase** often makes file management easier later.

3. It will prompt you to login to LINZ. Enter your email and **create a free account** if you don't have one.

4. **Untick** the box below. Then to download, **click the folder name** once the download finishes creating.





Use these settings when downloading from other sources as well.

Auckland Council GeoMaps

Saving your Map Files



Unzip

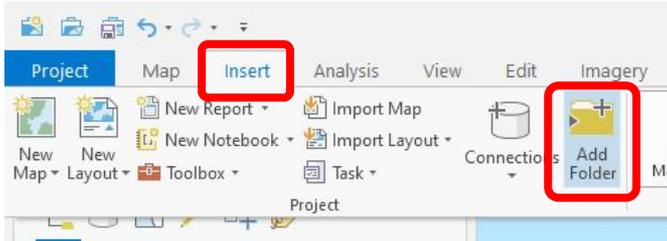
- The downloaded data will be a .zip file so unzip it in put everything in one file.
(To unzip, **right click** on the file in File Explorer and select **Extract files** or **WinZip > Unzip to here**)

Saving Location

ArcGIS draws the map based on the data so when you open the map again, the programme will still need to know where the data is.

- Save all your files including the project file (map) and shape files etc to a USB stick or Home drive (link on desktop on uni pcs) (alternatively, OneDrive/another cloud storage)
 - somewhere accessible & secure. Don't save to desktop on university computers.
 - Note: OneDrive files are removed when you graduate
- If you ever move some data files, your map will not display the information when you open the map again. When this happens, click on the red exclamation mark next to the layer and locate where the data is now (relink).

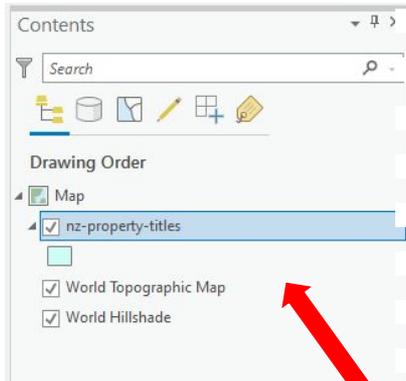
Opening the spatial data on ArcGIS Pro



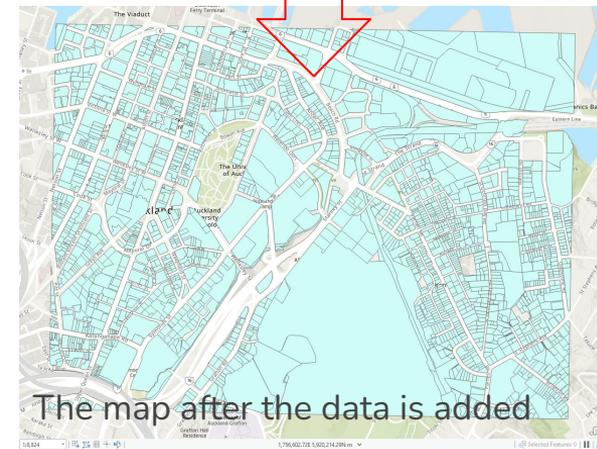
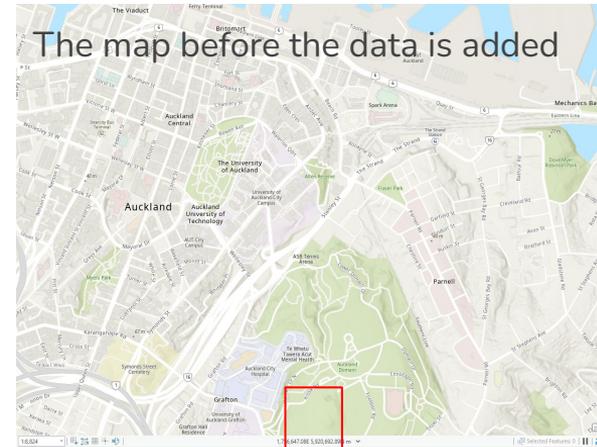
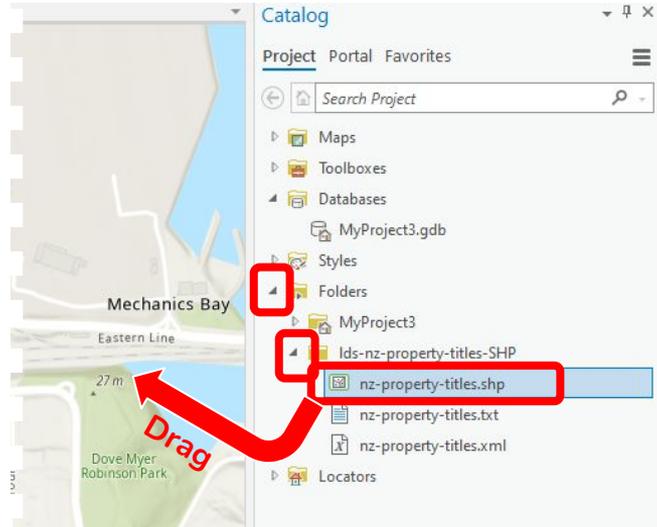
- Open **ArcGIS Pro** and click **Map** (or open the map you want to add this data to if you have already created one)
 - a. Remember to save the project in the right place!
- In the **Insert** tab click **Add Folder**. Click on the extracted folder then **OK**.

Opening the spatial data on ArcGIS Pro - continued

4. In the Catalog panel, go into **Folders**, and **drag** the **shapefile (.shp)** (or **Feature Class** if you downloaded as geodatabase) onto the Map or the Contents panel



Drag here if you are adding this data to a map with other layers and you want it in a specific order (You can always click & drag to change the order later as well)





**Marking Points
using *Feature Class***

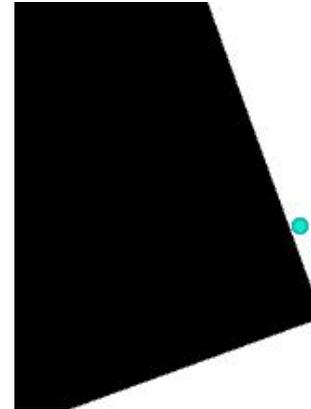
**Making Ped Sheds
using the *Buffer Tool***



Marking point/s on your map with Feature Class



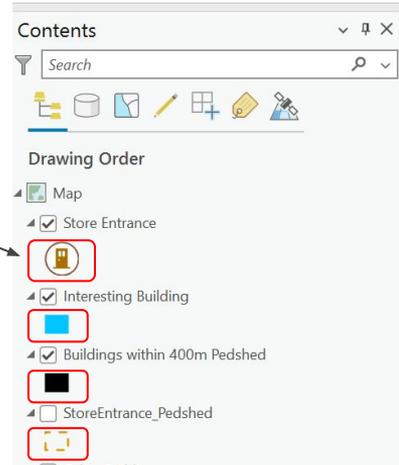
- Make your new feature under *Databases* in the *Catalog Pane*
 - The gdb file is where all your map-specific geographic information is stored
- Feature class > Point Feature
- Edit > Create
- Click on the map ('draw' the point) > Finish
- Save edits



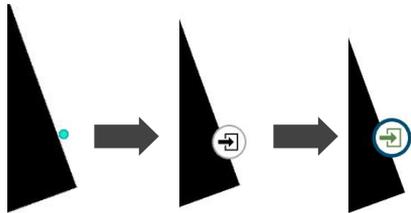
Editing Symbology of Features

You can edit the point feature to other symbols or simply change colour/size. The same steps are followed for other features too (e.g. building footprints).

- **Double click** on the symbol under the relevant layer in the **Contents** pane to open the **Symbology** pane.
 - You can search for a preset symbol in **Gallery**.
 - Example A: symbol was selected from searching “door”
 - Example B: a preset symbol “Black” was used for building footprints
 - You can also manually edit settings in **Properties** such as:
 - Size
 - Colour
 - Outline width



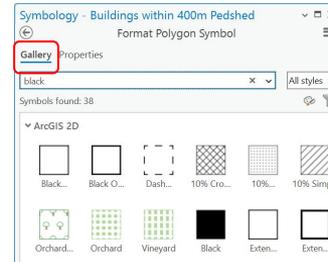
Example A: Possible changes on a point feature



Example B:
building footprints

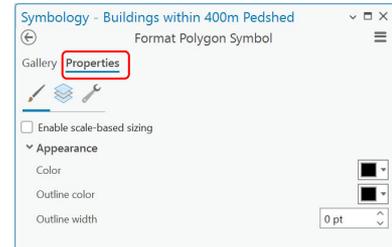


Gallery in Symbology



Properties in Symbology

Remember to click **Apply** once you finish editing



Making a pedshed using the Buffer tool



Draws a circle around from the point feature with a defined circumference

- Analysis > Tools (*Geoprocessing* pane opens)
- Search *Buffer*
- *Input feature* is your point feature
- Type the distance and set unit (e.g. *400* and *Meters*)
- *Run*

Planer (default) is fine for pedsheds as it draws the circle considering the surface as a flat plane. But geodesic is more relevant for large buffers to consider the shape of the Earth.

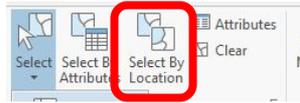
No Dissolve (default) is fine for singular pedsheds. You may want to try different dissolve types when doing multiple.

The properties of this can also be customised



**Using the Select tool
to customise specific parts
within features**

Or Select by Location



Selecting in relation to another feature (e.g. Pedshed)

1. Select by location
2. Input Features = what you want to select (the buildings)
3. Selecting Features (the pedshed)
4. Try different *Relationships: Intersect, have their centre in ...etc*
5. If it seems to be selecting wrong, try deselecting everything then try again (Map > Clear)
6. Click Ok

Make those selected a new layer (which means you can change the symbology of these specific features):

7. Right click on building layer > Selection > *Make Layer from Selected Features*
8. Customise Symbology



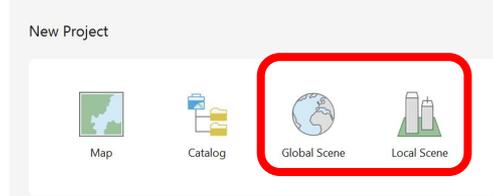
Example: Buildings within the pedshed have been selected and a new layer has been created from that selection.

The original layer was coloured grey and the new layer black by editing in the symbology pane.

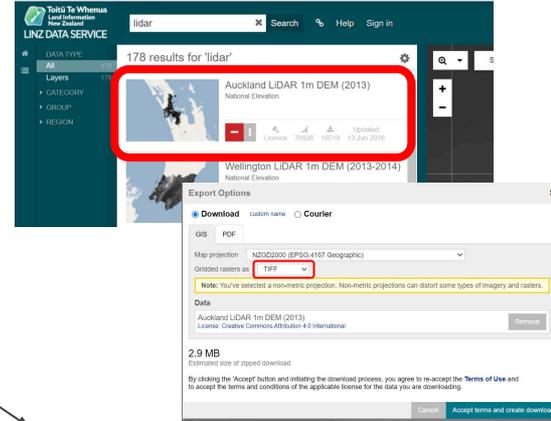


Introduction to 3D Scenes

- You can also make 3D scenes on ArcGIS Pro

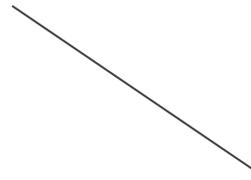


- WorldElevation3D* should be there as default, however, it may not be detailed/accurate so it is recommended to download Lidar data as TIFF

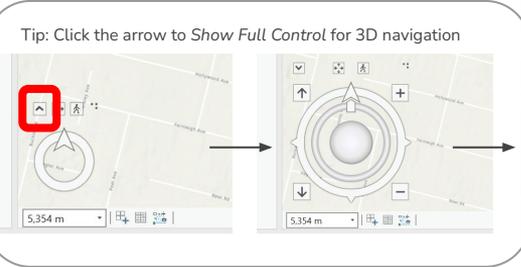
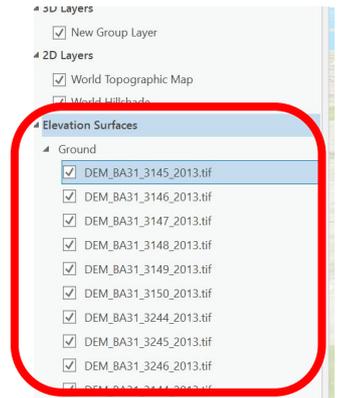
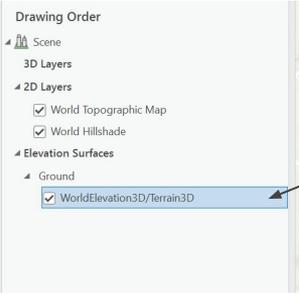


- Drag the .tif files onto the Elevation Surfaces layer

Remember to follow the same steps

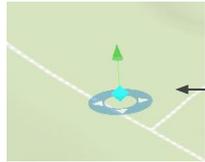


- Use Bottom left “Joystick” to navigate

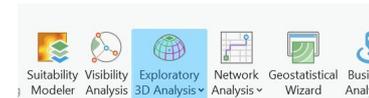
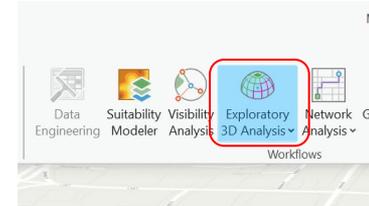
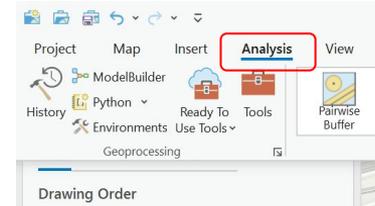


Exploratory 3D Analysis Tools

- Under **Analysis**, in Exploratory 3D Analysis, there are various tools you can use



- To move, resize, or delete an analysis you have placed, click on the relevant tool again under *Exploratory 3D Analysis* and click on the central point/a point to select it



Examples



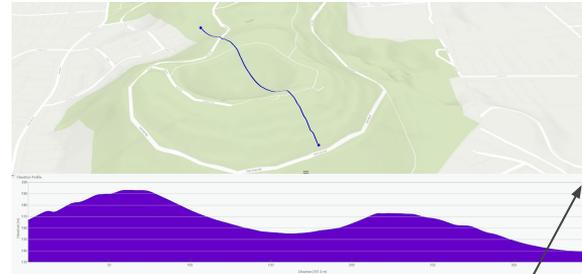
View Dome

See the areas that are visible from a certain point (pink is where it won't be visible)



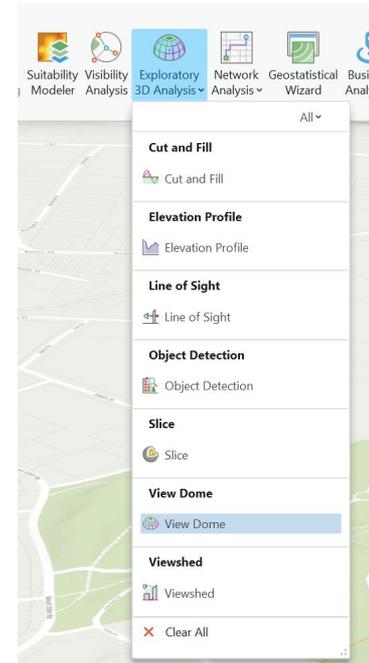
Cut and Fill

See what areas need to be cut or filled to make the area flat



Elevation Profile

Click **export graph icon** to export the graph into an **image (png)**.





Creating a Print Layout





Creating a Print Layout

1. Insert > New Layout > Select a paper
2. Place the map on the page: Insert > Map Frame > Click on relevant map > Click and drag on the page
 - a. If you want, you can create margins before placing the map:
 - i. Right click on the ruler > Add Guides
 - ii. Orientation: Both
 - iii. Placement: Offset from edge
 - iv. Type length (e.g. 20 mm from edge)
3. Adjust the scale and place displayed:
 - a. To move around *within* the map: Layout > Activate
 - b. Scale can be typed at left bottom

Adding Basic Elements of a Map

Maps need...

- North Arrow
- Scale Bar
- Scale
- Title
- Legend

& Annotations if needed

WALKABLE CATCHMENT FROM INTERESTING BUILDING MAP

Under *Insert* of the Layout view

Map Surrounds

Graphics and Text

Dynamic Text

Scale 1:4,000

LEGEND

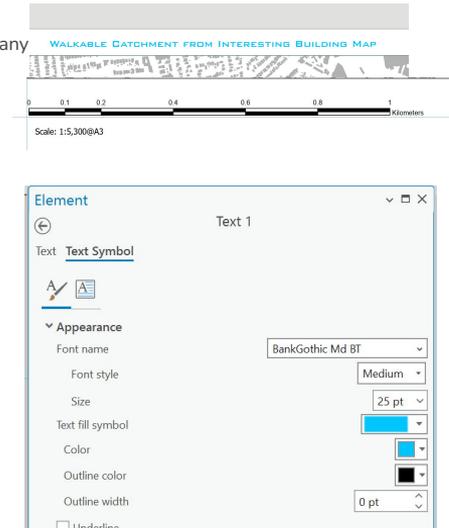
- STONE ENTRANCE
- BUILDINGS WITHIN 400M PERIMETER
- OTHER BUILDINGS
- INTERESTING BUILDING

Scale: 1:5,300:043

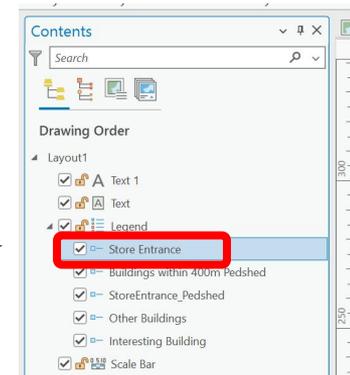
Customising Elements of your Layout

- Click and drag to move or resize
- Change what/how you display elements in your map layout by **double clicking** on them
And the **Element** Panel will pop up

Double Click on any elements



- Customise the legend:
 - To change the names of features, change it in the Contents Panel and the legend will also update
 - Changing font for parts of the legend: click on the relevant features on the **Contents** Panel, then edit on the **Element** Panel



Export the Map & Final Tips



- **Share > Export Layout**

To export it to files such as PDF or Jpeg

* You can edit the file on Adobe Illustrator to make some edits when exported as a PDF, however, it is recommended that you create as much as possible on ArcGIS, as it will be easy to make changes or variations for your project (e.g. create a similar map that is more zoomed in) - it will save you a lot of time to adjust scale etc!

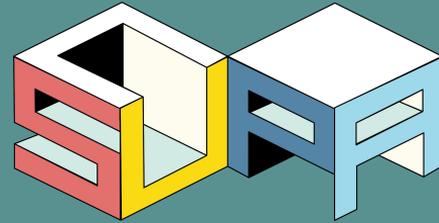
- **Keep in mind what kind of data you are dealing with**

Just like the above, technically you could draw a scale bar on Illustrator but it's often much easier on ArcGIS. Similar to this, there are many ways you can create something that looks similar in the end within ArcGIS as well...

E.g. You could draw a circle on your layout via Graphics and Text and it may essentially look the same as creating a pedshed using a buffer tool

However, this (often) is information which we want it to be geo-referenced accurately. And in your projects it may be a feature/information that we want to reproduce in multiple maps so using the buffer tool directly on the map will be much helpful.

DRH



drh.nz



@DigitalResearchHub



drh.nz



supa_social



SUPA - Students of Urban
Planning and Architecture

