CANTERBURY MAPS

ADVANCED TRAINING

Training Workbook

Table of Contents

# Course Introduction

Canterbury Maps is a free to use public Geographic Information System (GIS) viewer brought to you by a collaboration of all local councils within Canterbury. It is a web based platform that is accessible from any computer that has an internet browser and internet connection. It is also accessible from Apple and Android mobile devices via the browser or the app. This Advanced Training is designed to introduce you to the more advanced tools the Map Viewer has to offer and take you through some workflows where tools can be linked together to solve common business problems.

Lesson 1: Add Data

The **Add Data** tool also allows you to add shapefiles, GPX files, geo json and CSV files to the map as well as connecting to public layers on ArcGISOnline and directly into ArcGIS web services. It is useful if you have been given one of these file types and want to quickly view it and compare it to other map layers.
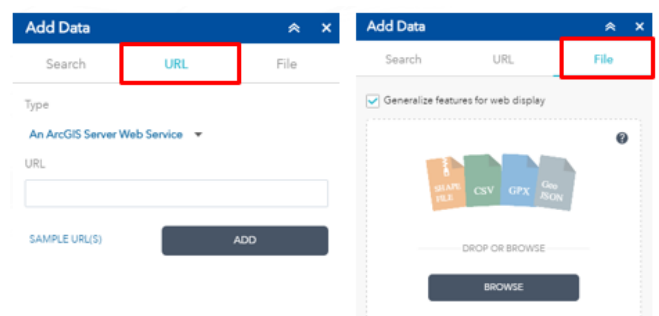

Search for layers on ArcGISOnline

You can view layers made publicly available on ArcGIS Online, not just those available via Canterbury Maps. To do this, in the add data tool click the drop down next to the Canterbury Maps tab and select ArcGIS Online. Put in a keyword in the search bar to find data made public. Click **add** once you have found a layer that interests you.
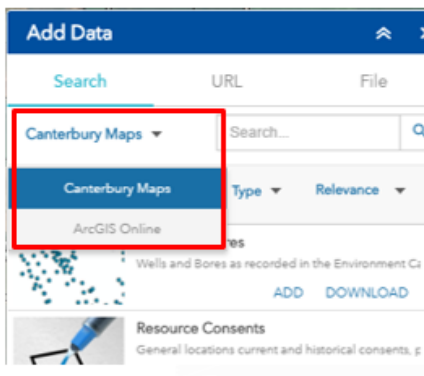
Connecting to data via a URL

You can also bring in data that is available online such as via an ArcGIS Web Server, KML file and a WMS OGC Web Service. To do this open the **add data** tool and go to the **URL** tab. Select the type from the drop down and paste the URL in. *Note: you can see sample URL's at the bottom of this tab if you are unsure of what type to choose.*
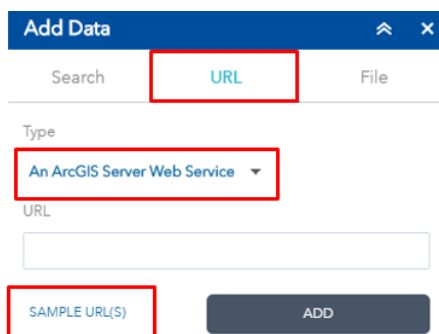
Lesson 2: Add Local Data

The **Add Local Data** tool allows you to add shapefiles, GPX files and CSV files to the map. It is useful if you have been given one of these file types and want to quickly view it and compare it to other map layers.
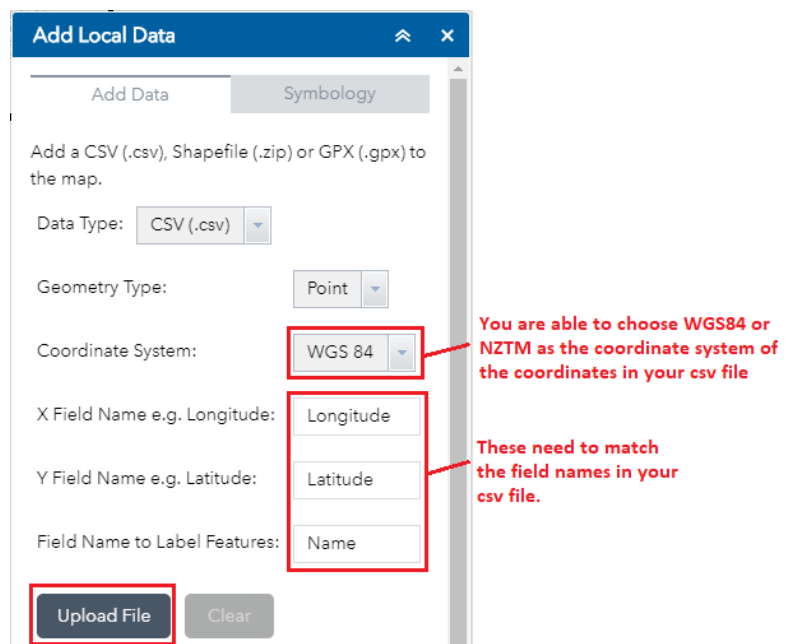
Add a CSV file to the map

Csv stands for Comma Separated Values. It is a type of text file that contains a table of data where the values are separated by a comma delimiter. It can be opened by any test viewer, or in Microsoft Excel. If the csv file has columns that have geographic coordinates, like longitude/latitude and easting/nothing, then it can be displayed on a map. The **Add Local Data** tool allows you to display your data as points, lines or areas. If you want to display your data as lines or areas, then you need an extra column in the csv file that indicates which rows (or points) make up each line or area.

Before you attempt to add a csv file to the map, open the csv file in Microsoft Excel and do the following:
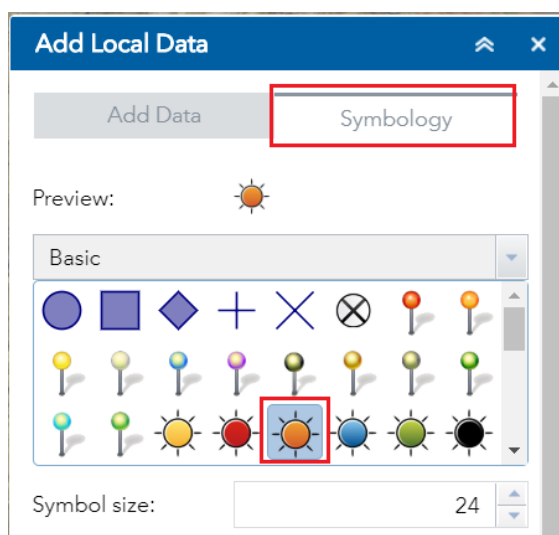
- Check column headings:
    - All columns should have a heading
    - There should be no spaces in the heading names
    - There should be no characters other than numbers, letters and underscores in the headings
    - The headings shouldn't start with a number
- Check coordinate fields
    - The csv must have two coordinate fields that contain either WGS84 latitude and longitude or NZTM easting and northings.
- Note down:
    - The name of the X field (Longitude)
    - The name of the Y field (Latitude)
    - The coordinate system (WGS84 or NZTM)
    - The name of the field that you want to use to label the map features.
    - If you are adding the csv file as lines or areas, note down the name of the field that indicates which rows make up each line or area.

Add CSV file as Points

Open the **Add Local Data** tool

 in the ECanMap Map Viewer and select the CSV option from the drop down. To add your CSV file as points, choose the 'Point' option in the drop down. Fill out the other boxes with the field names you noted down when viewing the CSV file in Microsoft Excel.

You are able to choose WGS84 or NZTM as the coordinate system of the coordinates in your csv file

These need to match the field names in your csv file.

Click 'Upload File', a layer will be added to the **Layer List** showing one point per table row. You can change the default symbology of the point by clicking the Symbology tab and choosing a symbol for the points.

Add CSV file as lines or polygons

If your CSV file represents lines or polygons, you will need to choose either the Line or Polygon option. There will need to be a field in your csv file which indicates which records make up each line or polygon.

Add a shapefile to the map

A shapefile is a GIS data storage type created by ESRI which can be used in ArcMap and other non-ESRI mapping softwares. Before you can add a shapefile to the map, all the components that comprise a shapefile must be zipped up into a .zip file. To do this, locate the shapefile in Windows Explorer, select all the files that comprise the shapefile and send them to a zipped folder.
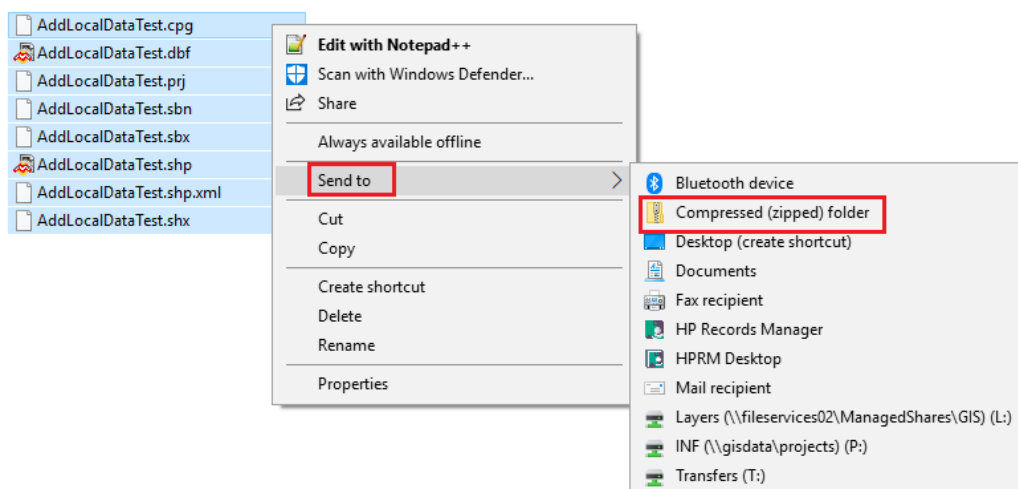
Use the **Add Local Data** tool to add the .zip folder to the map by choosing shapefile in the dropdown and located and uploaded your zipped shapefile.

Add a gpx file to the map

A gpx file is created by a GPS device like a Garmin. To load a gpx file, choose the gpx option from the dropdown in the **Add Local Data** tool, locate the gpx file and upload it.

Lesson 3: Using the Elevation Profile Tool

The Elevation Profile tool allows you to investigate the elevations along a cross section that you manually draw on the map.

To begin, click on the **Elevation Profile** icon in the map viewer. It is located underneath the **Search** tool on the left hand side of the map.

Click the measure button and choose a horizontal unit measurement
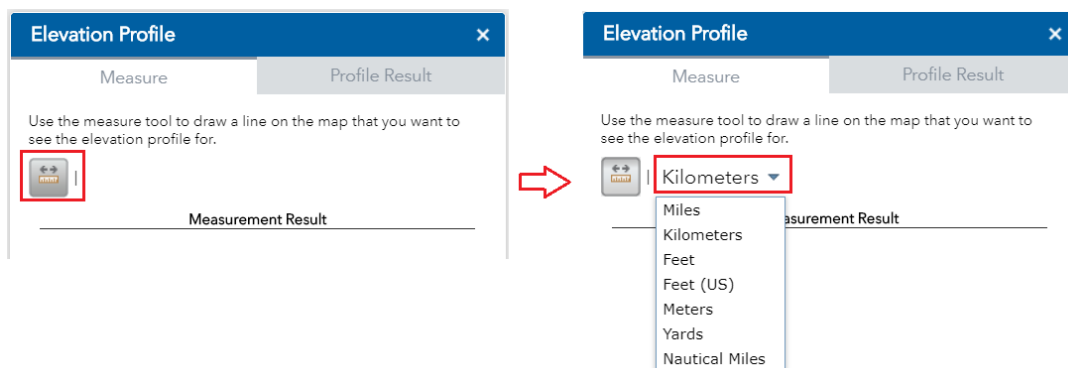
Draw a line on the map by clicking once to add a point. Keep clicking to add multiple points to create a line. Double click to finish the line.

An elevation profile gragh will start generating. This could take a little while if you drew a long line. The profile graph shows the change in elevation across your drawn line. Hover your mouse over the chart to display elevations and show the location on the map.

The elevation profile tool also provides some options that enable you to export the results. Click the three dots in the top right and a drop down of options will appear.
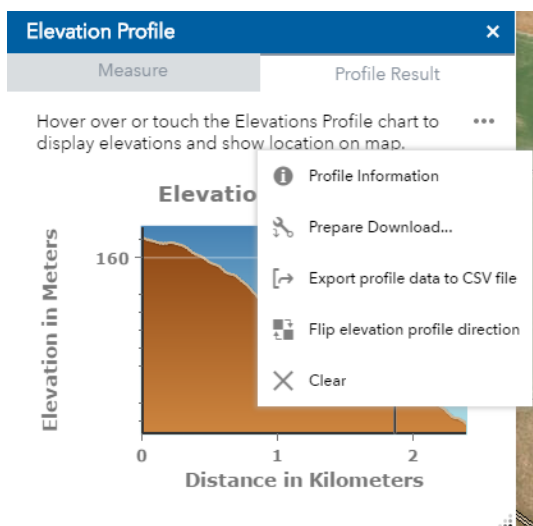

- **Profile Information** – summary statistics about the profile including the resolution of the DEM used to create the profile.
- **Prepare download** – creates a download link that when clicked downloads an image of the profile graph
- **Export profile data to CSV file** – exports the underlying data of the elevtion profile to a CSV file which can then be opened in Microsoft Excel
- **Flip Elevation profile direction** – flips the profile so the start of the line you drew becomes the end
- **Clear** – clears the elevation

Lesson 4: Using the Swipe Tool

The **Swipe Tool** is great for comparing two or more layers. It allows you to choose a layer from the **Layer List** to swipe on and off. It is particularly useful when comparing historic imagery and present day imagery. The **Swipe Tool** can only use layers that have been added to the **Layer List** which means that you cannot swipe basemaps from the Basemap Gallery. You can, however, use the **Add Data** tool to search for and add basemaps to the the **Layer List**. Doing this will make them available to the Swipe Tool.

The **Swipe Tool** is located underneath the Search bar next to the Elevation Profile tool. When you click on it, you will get a list of the layers currently available in the map that you can swipe on and off.
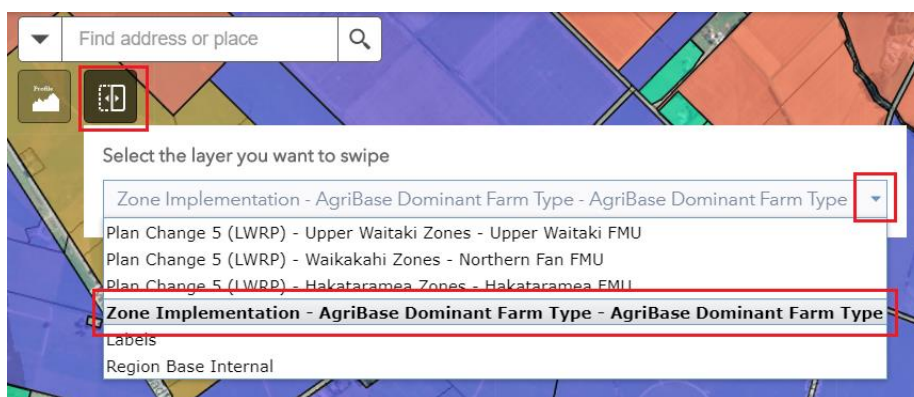

Choose a layer from the dropdown, then click and drag the bar to swipe the layer on and off.

Lesson 5: Advanced Attribute Table Filters

Every layer you add to the map, like wells, planning zones etc. has an attribute table with information about the individual features in the layer. Each row in an attribute table relates to a certain point/line/polygon on the map. The attribute values can be used to find, query and select features.

To open the **Attribute Table** of a map layer, open the **Layer List** , then click the three dots to the right of the layer and click **View in Attribute Table**.
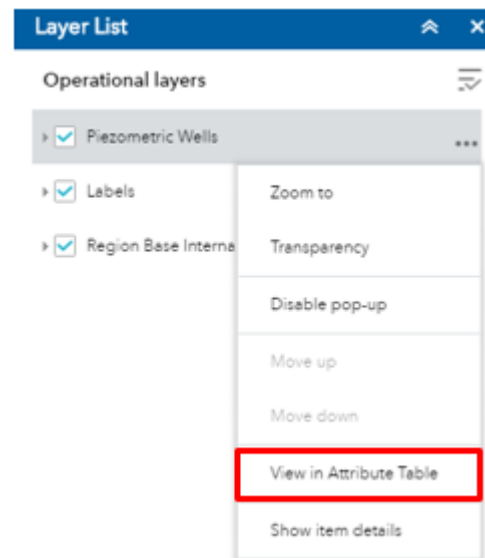
Advanced Filtering

The **Filter** option in the Attribute Table allows you to control what data will be shown on the map by applying a query using values in the Attribute Table. For example, if you had a map layer showing all the consents in Canterbury, you could apply a filter to only show the water take consents. In the Attribute Table select the layer tab that you want to filter. Click on the options drop down list and select **Filter**. Click **Add a filter expression**.
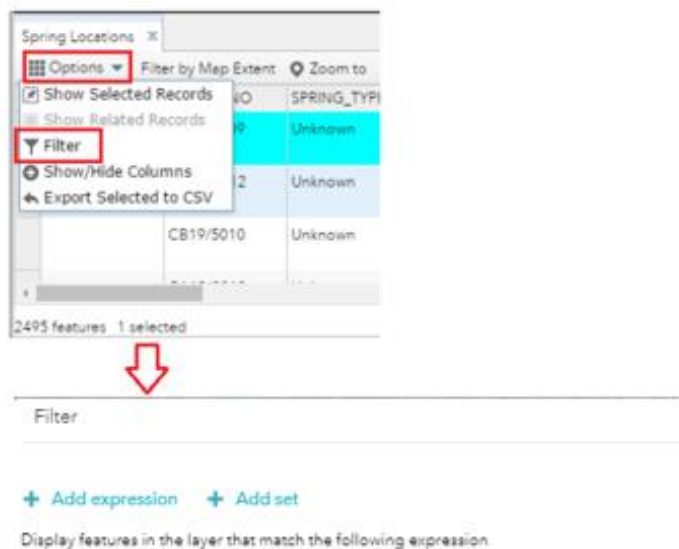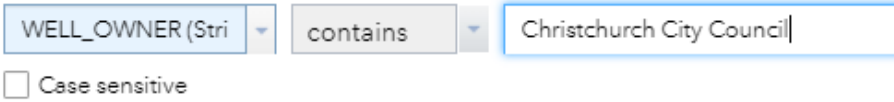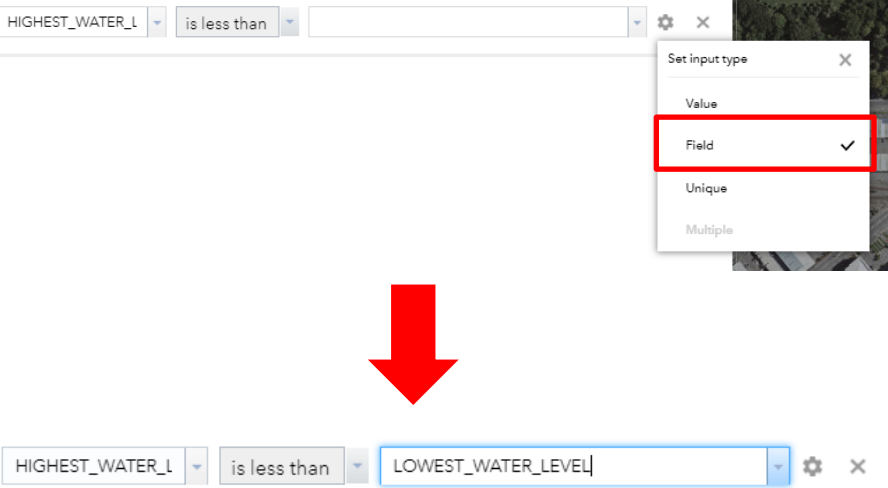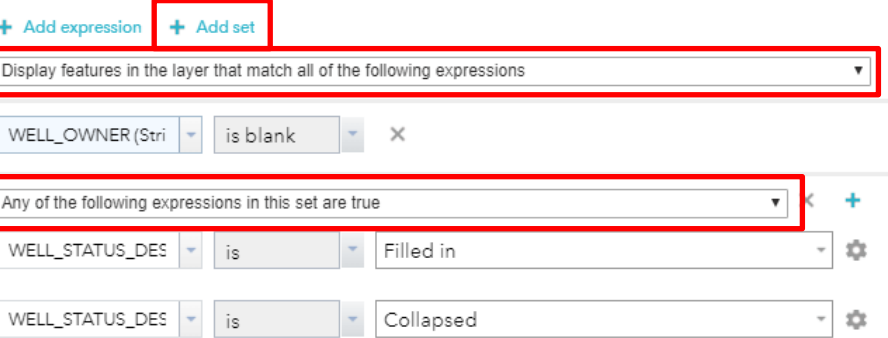

General Syntax

There is a standard way of building query expressions in the Attribute Table. The **Field Name** dropdown gives you a list of all the fields that exist in the Attribute Table of the layer. Different field types allow you to use different **operators**. The standard field types are **String (Text)**, **Number** and **Date**.

Once you have chosen the Field and Operator, you have three options depending on what records you want to see.

1. You check **Value** and type in some text, a number or pick a date.
2. You can check the **Unique** option to get a list of all the values that are currently in the field and choose one of those.
3. You can check **Field** and get a list of other fields of the same data type. This is good if you want to see a subset of features where one field equals another or perhaps where a field is greater that another.

Please see below for some common types of questions and how to construct filter expressions for them.

Scenario	Expression
I want to find all the wells drilled in the month of January	
I want to find all the active wells	
I want to find all the wells owned by Christchurch City Council. Note: The WELL_OWNER field includes many Christchurch City Council departments. Use the contains operator to select all owners that contain the words Christchurch City Council.	

I want to find out which wells have no owner	
To check data integrity, I want to see if there are any wells that have a 'Highest Water Level' reading that is lower than the 'Lowest Water Level' reading	
I want to find wells that are deeper than 20 metres **AND** are classed as active	
I want to find wells that are filled in **OR** collapsed	
I want to find wells that are filled in **OR** collapsed **AND** have no owner	

Lesson 6: Advanced Draw Tools

The **Draw** tools allow you to draw graphics and add labels to your map. It is also possible to save the drawings you create so you can add them to a map in the future.

Intro training discussed the Draw tools and showed how to:

- Add a point, line or polygon by manually drawing them
- Add measurements to your drawings
- Edit Drawings
- Create drawings from existing features
- Save drawings to ECanMaps and load them back in

If you need a refresher, refer to Intro training document.

Advanced Draw Tools

Once you have created some drawings, the tools along the bottom of the Drawing List enable you to do futher edits to your drawings.

Cut Drawings

You can now use the 'Cut' tool to modify the size and shape of your existing polygon and line drawings. Once you have drawn a polygon or line, go to edit this drawing in the Draw tool. You will see the Cut tool icon at the top of the edit panel. Click this icon and draw a line across your existing polygon or line to cut it into two. The result is two new drawings.
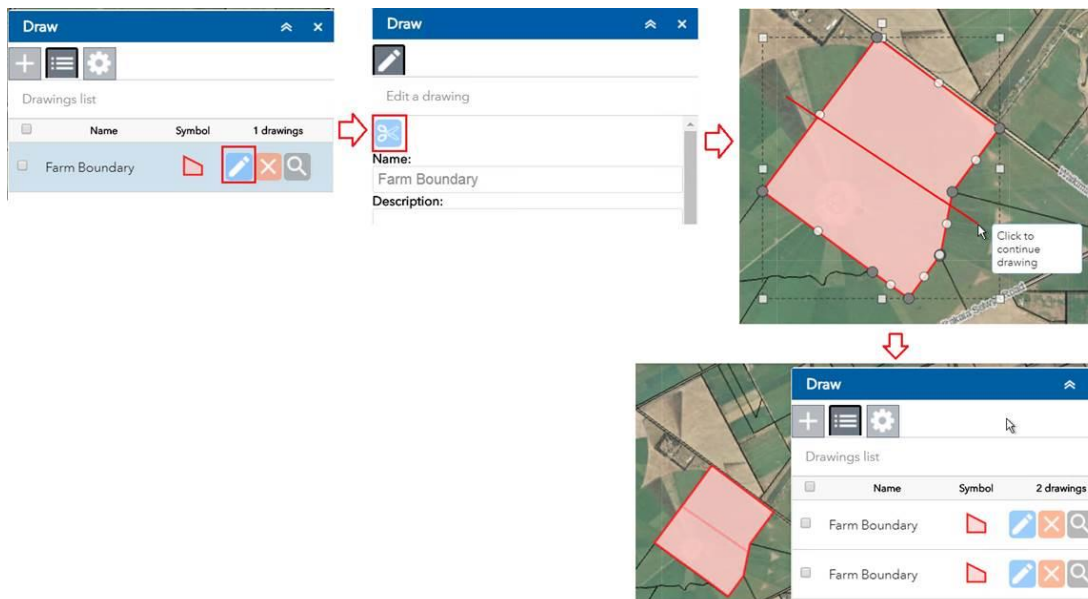
Copy Drawings

You can **Copy** drawings by ticking the ones you want to copy and then clicking .

In this case 'Shipping Lane' was copied and the new drawing called 'Shipping lane (copy)' was created

Buffer Drawings

To **Buffer** drawings, tick the drawing(s) you wish to buffer and then click .

A box will appear that will give you some buffer options in a drop down list, as well as the ability to enter a custom buffer distance.

You can also choose up to 5 rings. This means that multiple buffers of the buffer distance will be created. So, for example, two buffers, one of 10m and one of 20m will be created in the example to the right.
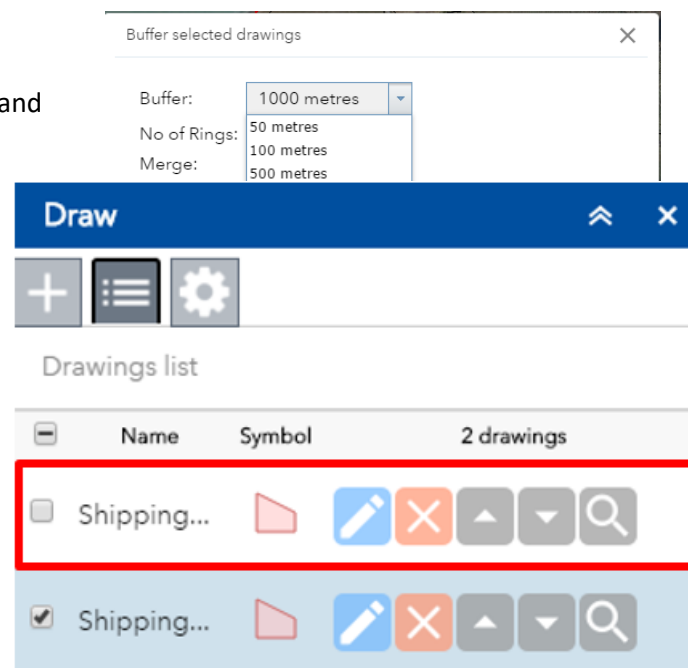
Merge Drawings

You can merge two or more line drawings or two or more area/polygon drawings into one using the **merge** tool (you cannot merge points)

Tick the drawings you want to merge and click the merge tool. The drawings will now be combined into one drawing.

Explode Drawings

You can also explode a single multi-part drawing into multiple drawings using the **explode** tool
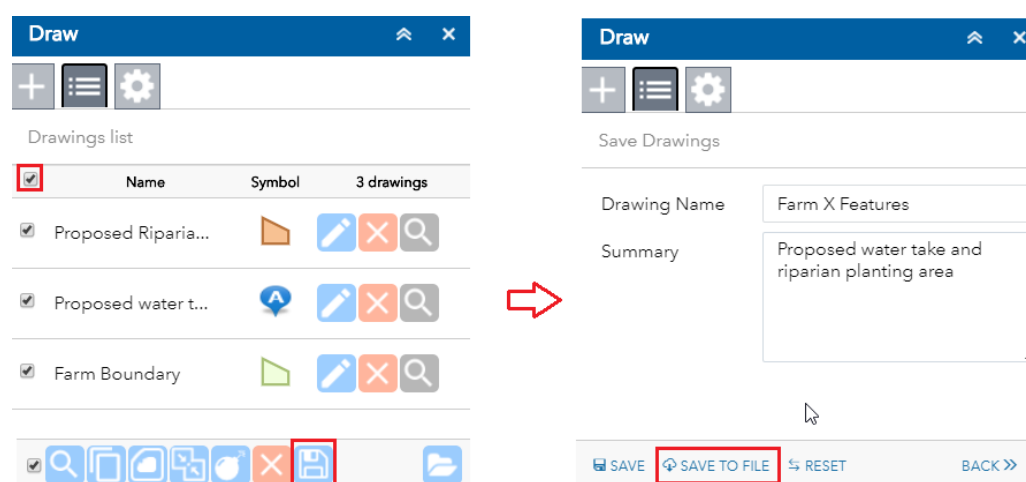
Delete Drawings

Tick the drawing that you want to delete and click the delete icon
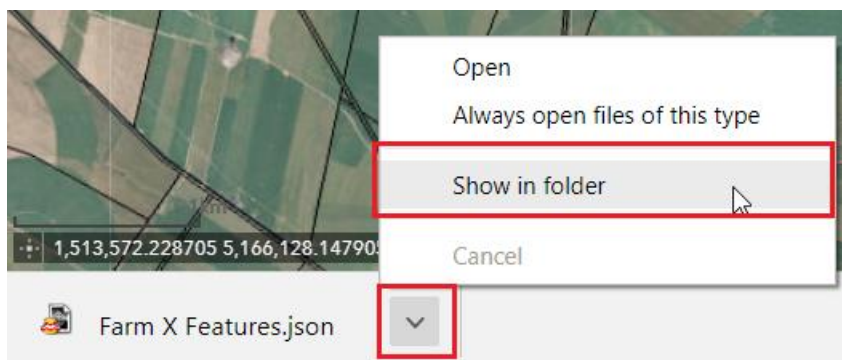
Share your drawings with others

It is possible to send drawings to others by generating a file that can be emailed and then loaded into Canterbury Maps.

To do this, create your drawings as normal, tick the drawings you want to save in the Drawing List and click the **Save** Icon. Give you drawings a name and a summary as usual, and click '**Save to File**'.
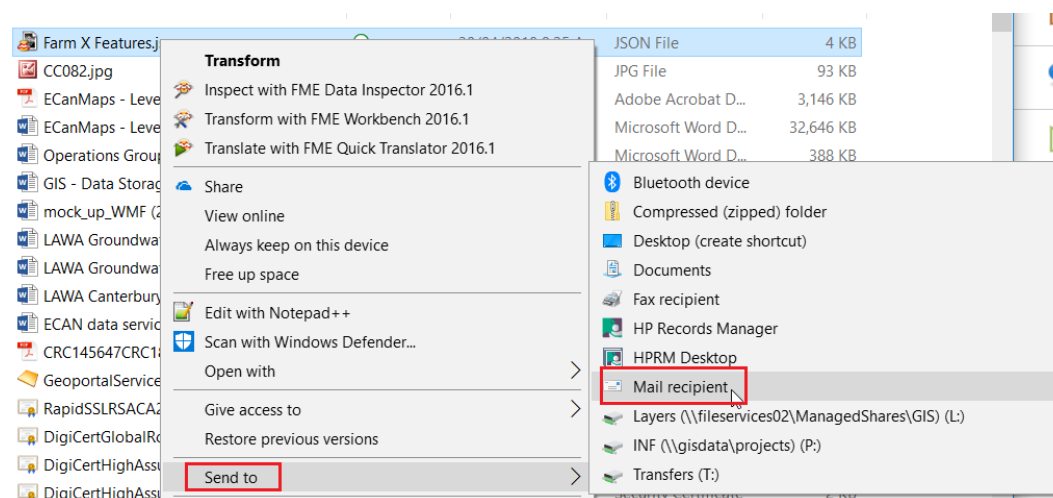

A **.json** file will download at the bottom of the browser. Choose to 'Show in Folder'.

You can attach it to an email by right clicking the file, choosing Send to, Mail recipient. This will attach the file to an email that you can then send to your colleague or customer.

Load drawings into Canterbury Maps from a file

If a colleague or consultant has emailed you a .json file, you can easily view it in Canterbury Maps.

Open the **Draw Tool**. Select the middle tab and then click the 'Import Drawings' icon. Instead of choosing a drawing from the drawings list, click 'Import Drawings' at the bottom. Then click 'Choose file', navigate to the '.json' file and open it. The drawings will now be listed in the Draw Tool and displayed on the map.
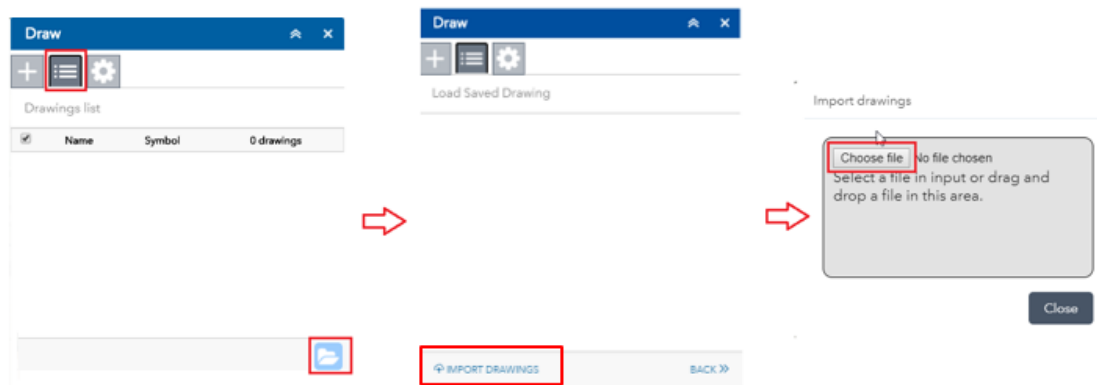
Lesson 7: The Select Tool

The **Select Tool** allows you to select features on the map which then makes these features available
to other functions. To open the Select Tool click this icon . You will see a panel that lists all the
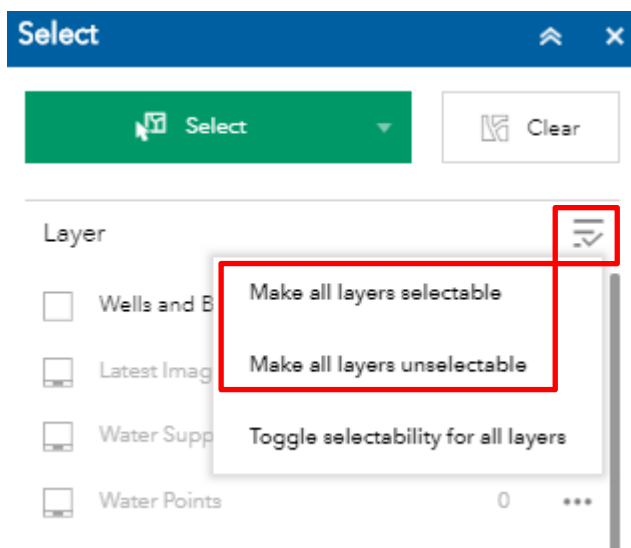layers currently in the map. Tick on the layers that you want to select and tick off any layers that you
are not interested in. You can tick all layers on and off in one go by clicking the option on the top
right.

Select Features Manually

In the following example we will select a couple of land parcels manually.

1. Open the select tool, look down the list and tick land parcels.
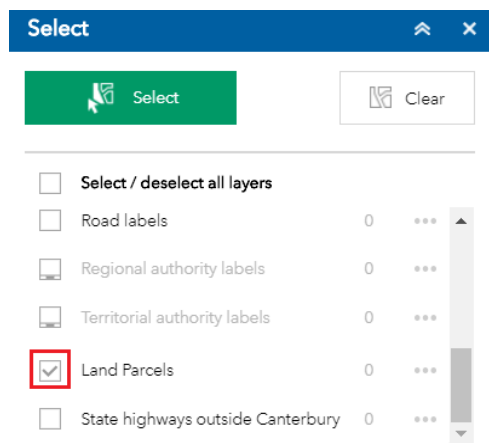
2. Select the 'select' shape you require from the drop down

3. On the map, zoom in until you see some land parcels appear and draw a box to select one. The feature will become selected.
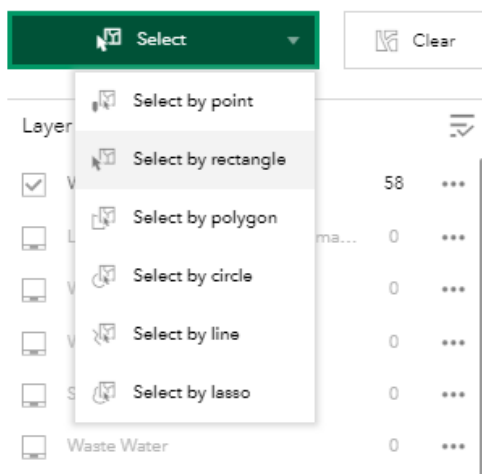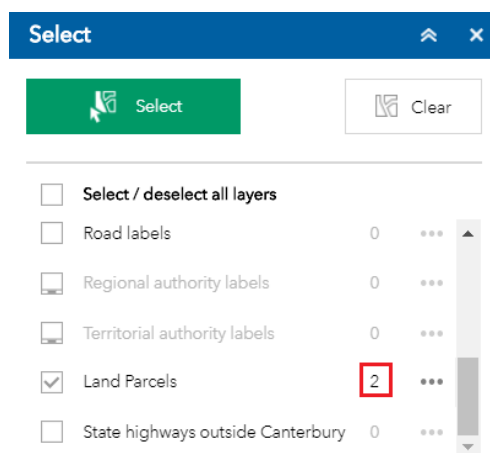
4. If you would like to select more than one map feature, you can either draw a box that crosses both features or hold down the **shift key** and select another.

5. Now have a look at the **Select Tool Panel**, you will see a '2' next to the land parcels. This means that two features are selected.

Select Features using the Geometry of another Feature(s)

You can also select features using the geometry of another feature(s).

For the example below, we want to find out how many wells exist within a catchment.

1. First, make sure the catchment layer and the wells and bores layer have been added to the map (Hint: use the Add Data tool)

2. Open the Select Tool and make sure the wells and bores layer is ticked. Close the Select Tool
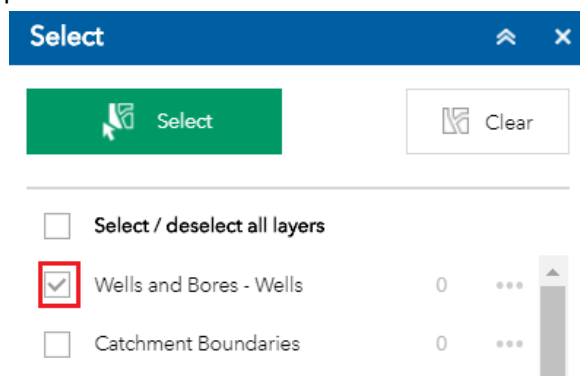
3. On the map, click the catchment so that you get a pop-up box appear. Click the three dots on the bottom right of the pop-up box and click 'Select by Geometry'. This will then use this

catchment boundary to select the wells within it. The wells will be highlighted on the map and the number of wells within the catchment will be shown next to the wells layer in the Select Tool.
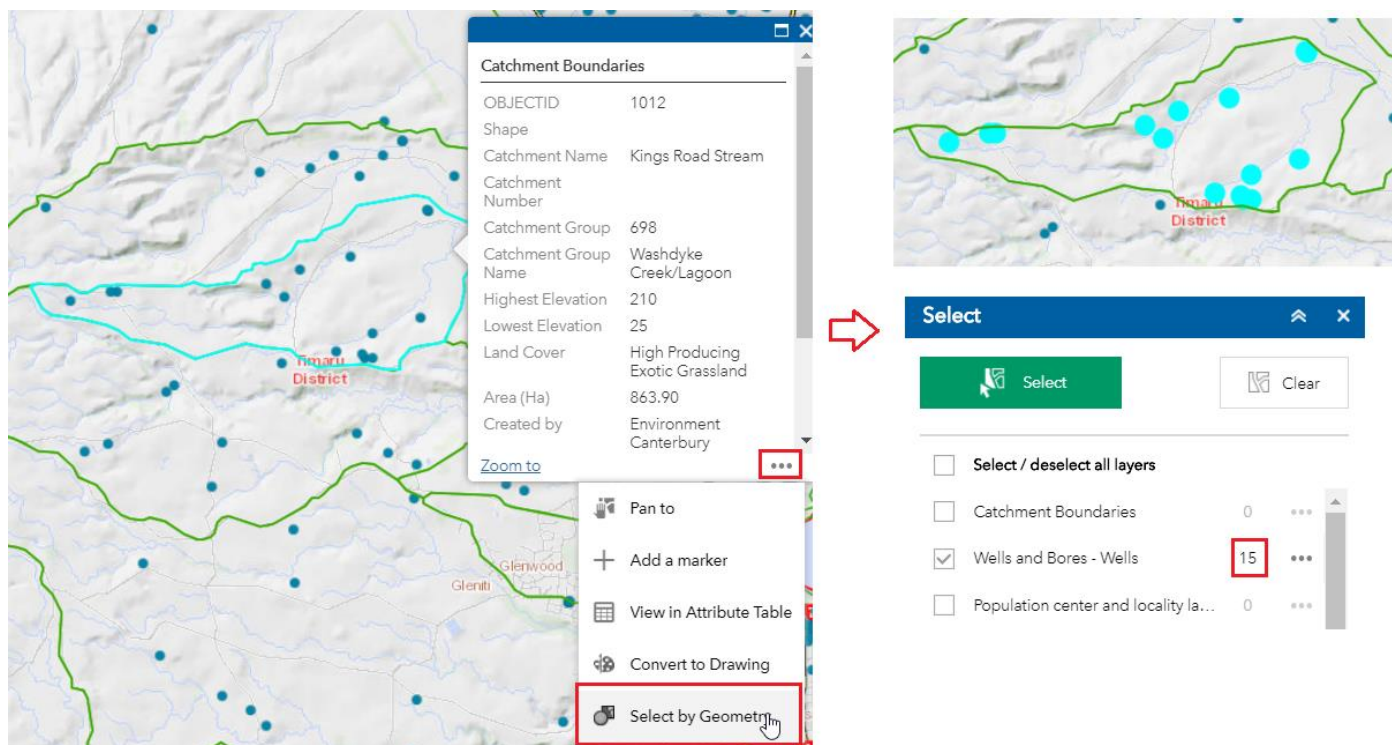
Select Tool Options

Once you have selected some features, there are further things you can do with them. In the Select Tool, click the three little dots to the right of Land Parcels and you will see some options.
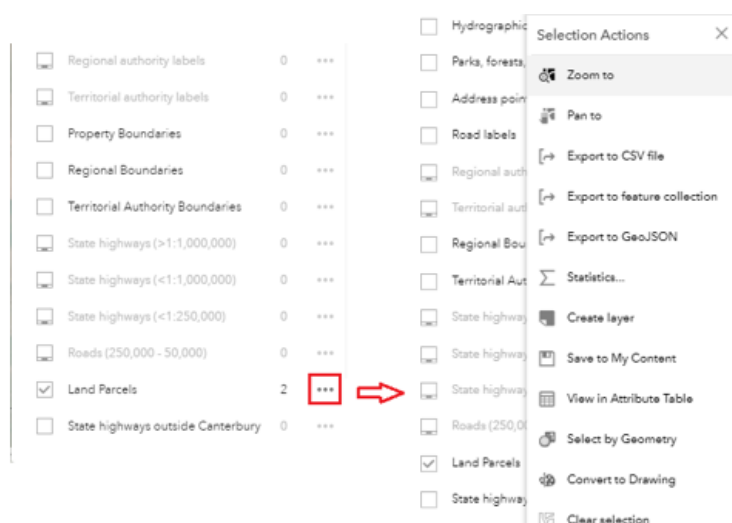
- **Zoom to** – this will zoom to the selected features in the map
- **Pan to** – this will keep the map at the same zoom scale and move to the selected features
- **Export to csv** – This will export the selected features to a spreadsheet
- **Export to feature collection** – This will export a .json file to your computer
- **Export to GeoJSON** – This will export a .geojson file to your computer
- **Statistics** – this will allow you to look at some statistics for the numeric fields of the selected features

Statistics   ✕

Field: DEPTH ▾

Number of values	15
Sum of values	1,277.30
Minimum	19.00
Maximum	190.00
Average	85.15
Standard deviation	42.91

OK

- **Create Layer** – this will add the selection as a layer to the **Layer List**. This is temporary and will only exist in the current map session.
- **Add a Marker** – this will add a marker to the centre of the selected features
- **View in Attribute Table** – this will open the **Attribute Table** and show the selected records (which you could then export to a .csv file).
- **Convert to Drawing** – this will send the selected features to the **Draw Tool** where they can be named, symbolised and saved for later use.
- **Select by Geometry** – this will use the currently selected features to select other features in the map.
- **Clear Selection** – this will unselect the features.

# Lesson 8: Business Scenarios – Stringing Tools Together

This section gives two examples of common business questions that can be solved in Canterbury Maps by stringing several tools together

Scenario 1

I want to get a list of the wells that are 50 metres or deeper, and are within 500 metres of a property of interest. The property is made up of 5 land parcels.

Step 1 - Add the layers to the map

1. Use the **Add Data** tool to search for and add the 'Wells and Bores' layer to the map

Wells and Bores

Wells and Bores as recorded in the Environment Ca

ADD   DETAILS
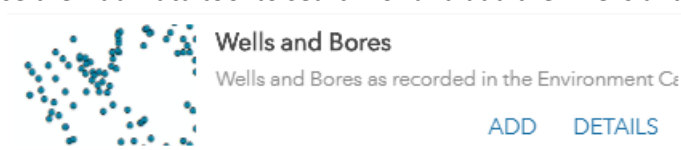
Step 2 - Apply Attribute Table Filter to the Wells Layer

1. Open the **Attribute Table** of the 'Wells and Bores' layer. Hint: you can get to it by clicking the three dots to the right of the layer in the **Layer List**
2. Deselect the 'Filter by Map Extent' option in the **Attribute Table**
3. Go to the Attribute Table options and click **Filter**
4. We will now use the **Filter** function in the **Attribute Table** to only show wells that are 50 metres or deeper.
5. Click 'Add Filter Expression' and put in the following filter.


| DEPTH (Number) | ▼ | is at least | ▼ | 50 | ⚙ ✕ |

6. You can check that it was successfully applied by sorting the depth field in ascending order. You shouldn't see any depths that are shallower than 50.
7. Close the **Attribute Table**.

Step 3 - Define the property boundary

1. Search for *98 Parish Road, Burnt Hill, Waimakariri District* (Hint: use the search bar in the top left of the map.) The map will zoom to the address point
2. You know that this property is made up of the following land parcels. To select them first open the **Select Tool** and tick the 'Land Parcels' layer. Then draw small boxes over each land parcel while holding down the shift key to select all 5 land parcels.

3. In the Select Tool, click the three dots to the right of the Land Parcels layer and click 'Convert to Drawing'
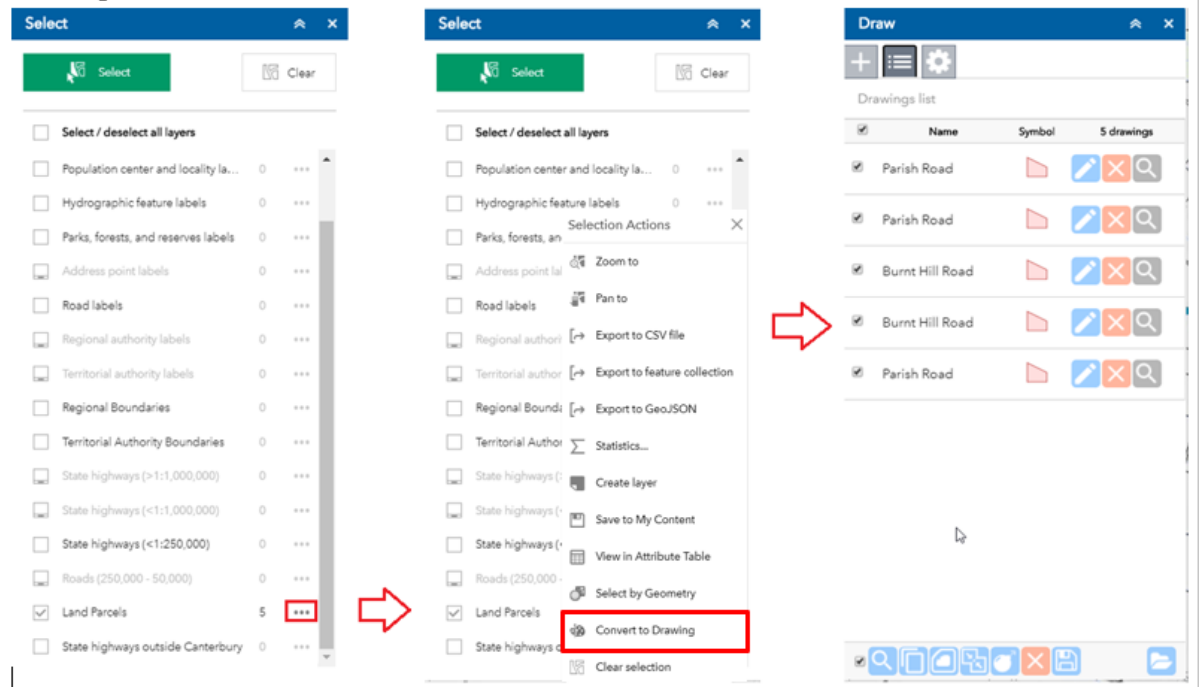

4. The **Draw Tool** should automatically open and you will see the five land parcels listed. Merge these into a single area by ticking them all and clicking the **merge** tool at the bottom. You now have a single area/polygon that represents the property.
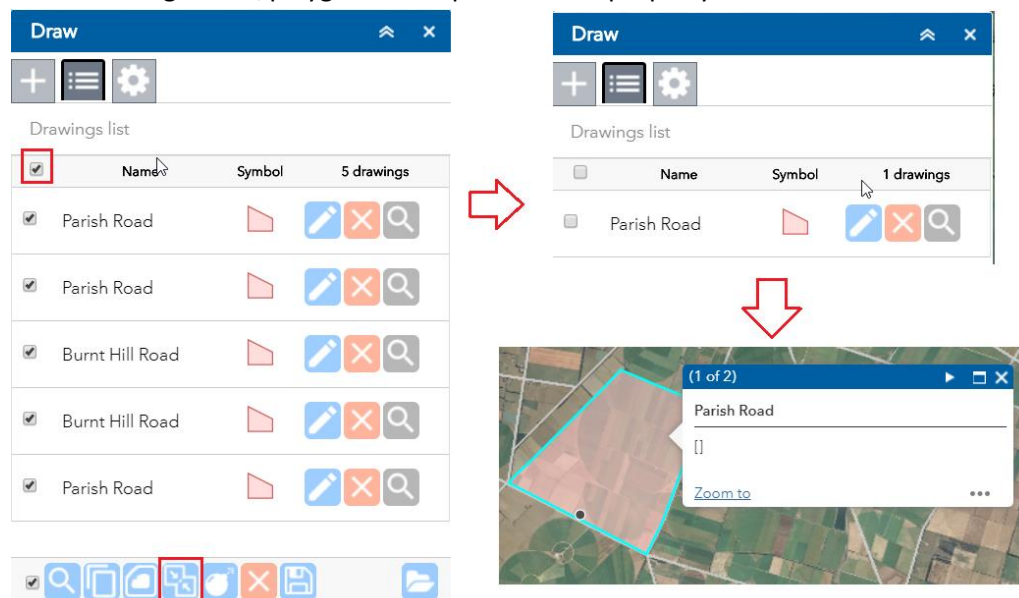
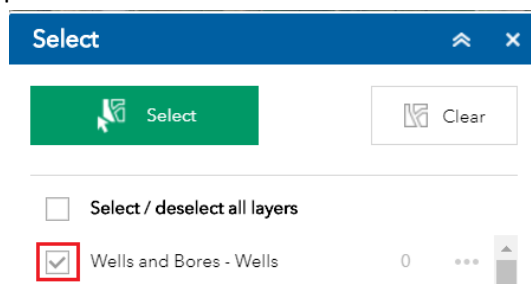## Step 4 - Buffer the Property by 500 metres

1. Tick your single property drawing in the **Draw Tool** and click the **Buffer Tool** at the bottom.

2. Choose to buffer by 500 metres.
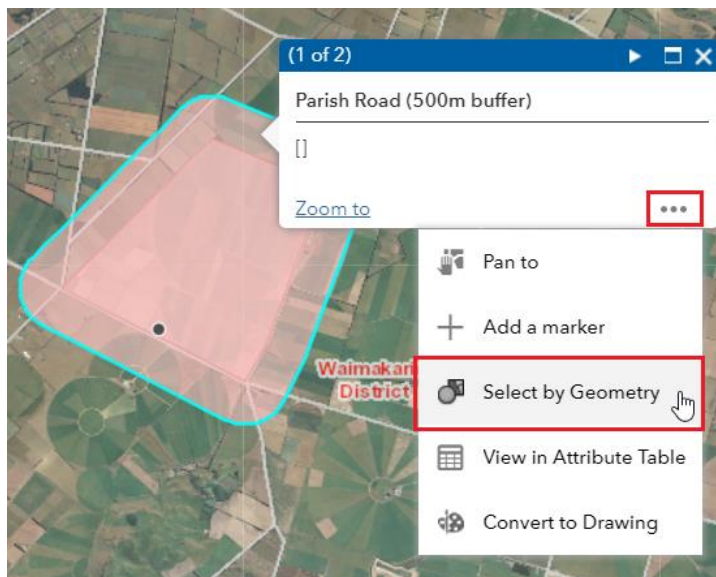3. A new area will be created in the draw list.
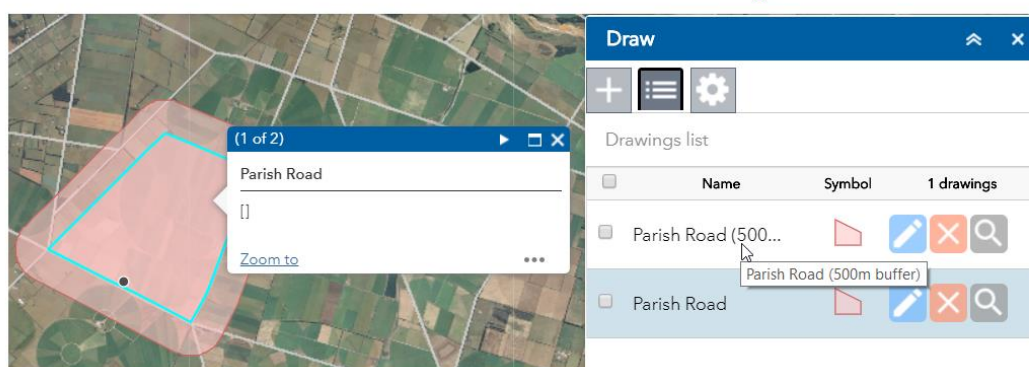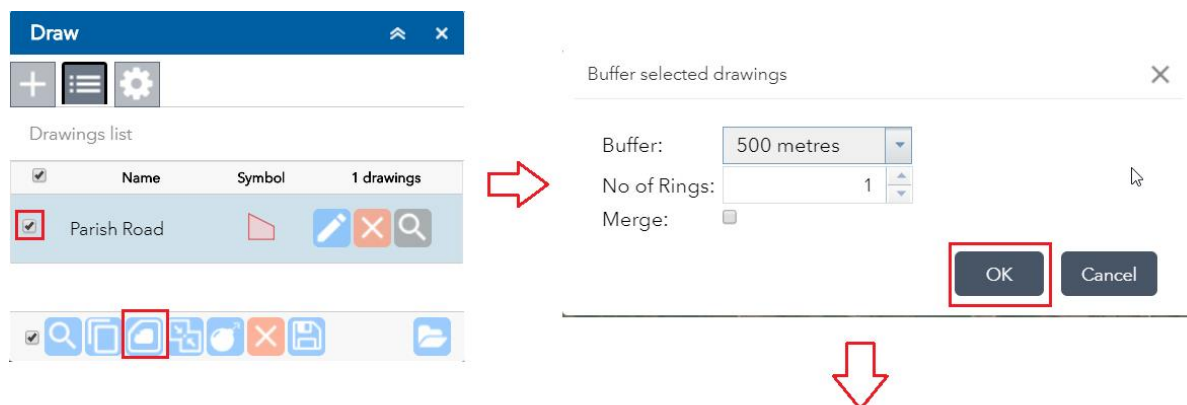
## Step 5 - Select wells that within the buffered property

1. Open the **Select Tool** and tick the Wells and Bores layer. Close the **Select Tool**.

2. Click the buffered property drawing to get a pop-up. Click the three dots in the bottom right of the pop-up and click 'Select By Geometry'.
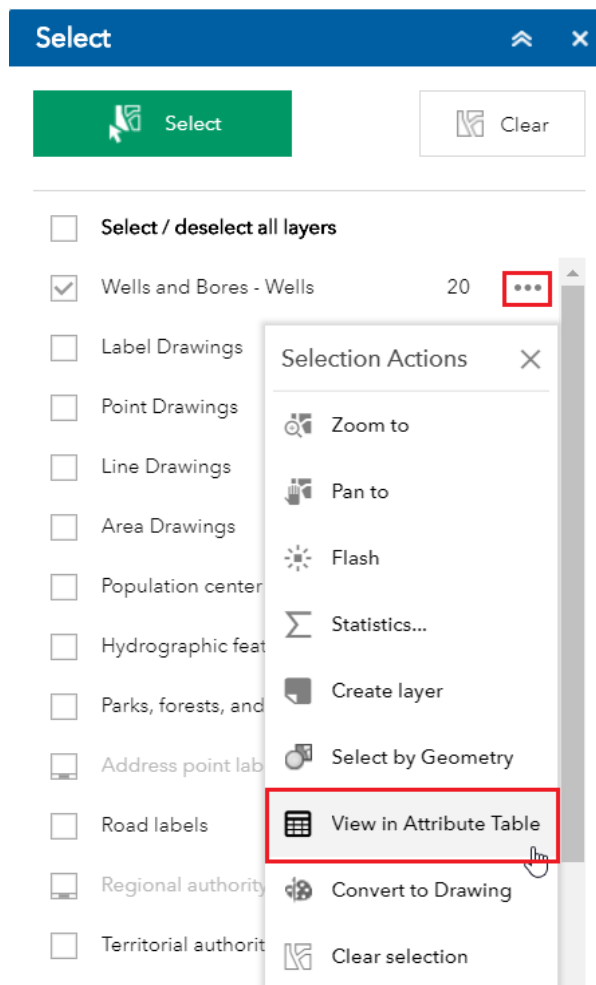
3. The **Select Tool** will open up and you will see that there are 20 wells that are within 500 metres of the property.
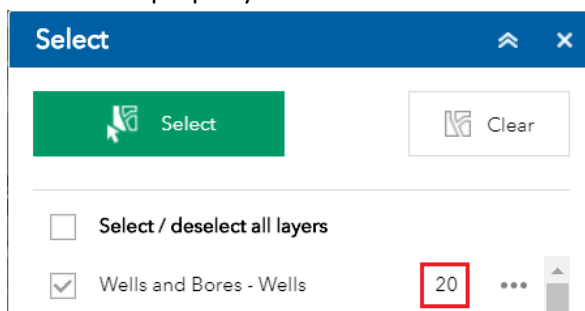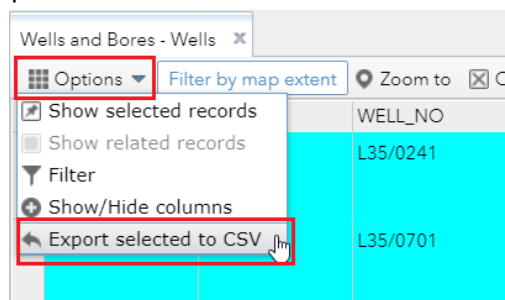

Step 6 - Export the list of selected wells to csv

1. Open the **Attribute Table** of the selected features by clicking the three dots to the right of the Wells and bores layer in the **Select Tool**.

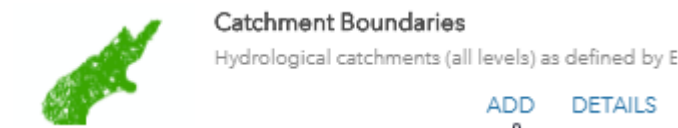2. Export the selected features to a csv file.

Scenario 2

I want to know how many 'Issued-Active' consents that have a 'Take Groundwater' activity and are within the 'Ohapi Creek South Branch' catchment. I also want to print a map of the locations and the catchment

Step 1 - Add the layers to the map

1. Use the **Add Data** tool to search for and add the 'All Activities – Consents' layer to the map

All Activities - Consents
Records showing a summary of a consented activity
ADD   DETAILS
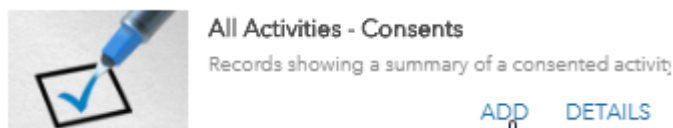
2. Search for and add the 'Catchment Boundaries' layer to the map

Catchment Boundaries
Hydrological catchments (all levels) as defined by E
ADD   DETAILS

Step 2 - Apply Attribute Table Filter to the Consents layer

1. Open the **Attribute Table** of the 'All Activities – Consents' layer (Hint: go to the **Layer List** to do this)
2. Apply the following filter. This will show the consents that are 'Issued-Active' and have a 'Take Groundwater' activity.

Display features in the layer that match all of the following expressions ▼

| ConsentStatus (Strir | ▾ | is | ▾ | Issued - Active | ▾ | ⚙ | ✕ |

| ActivityText (String) | ▾ | is | ▾ | Take Groundwater | ▾ | ⚙ | ✕ |

Step 3 - Apply Attribute Table Filter to the Catchment Layer

1. Open the Attribute Table of the Catchment Boundaries layer
2. Apply the following filter to isolate the catchment of interest.

| Catchment Name (S | ▾ | is | ▾ | Ohapi Creek South Branch | ▾ | ⚙ | ✕ |

Step 4 - Select consents that are within the Ohapi Creek South Branch catchment

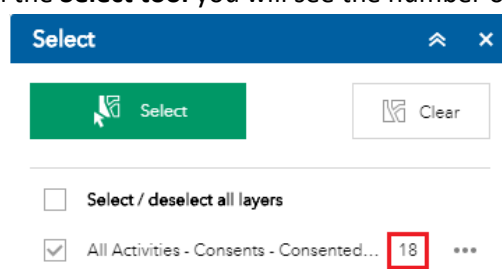1. Open the **Select Tool** and tick the 'All Activities – Consents' layer
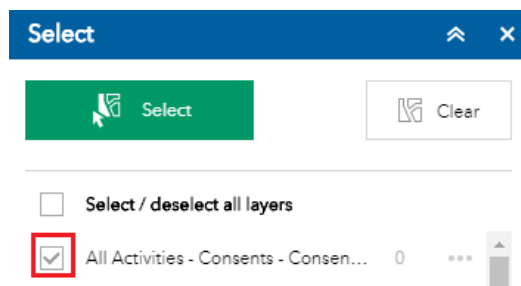
2. Close the **Select Tool**
3. Zoom in on the map until the consents layer becomes visible and you can see the Ohapi Creek South Branch catchment.
4. Click on the catchment to get a pop-up and click the three dots in the bottom right of the pop-up and click 'Select by Geometry'
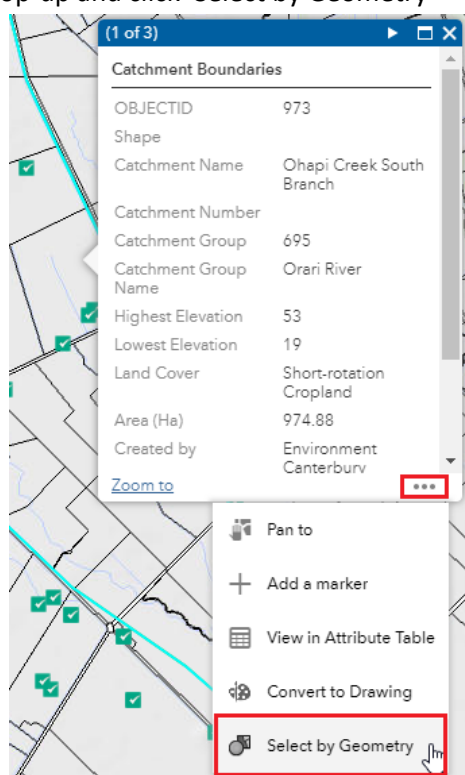

Step 5 - Export Consents to a separate layer

1. In the **Select tool** you will see the number of selected consented activities.

2. In the **Select Tool**, click the three dots to the right of the 'All Activities – Consents' layer and click 'Create Layer'. Call the layer – 'Issued Active Groundwater Takes'. You now have a new layer in the **Layer List** which contains just the consents of interest.
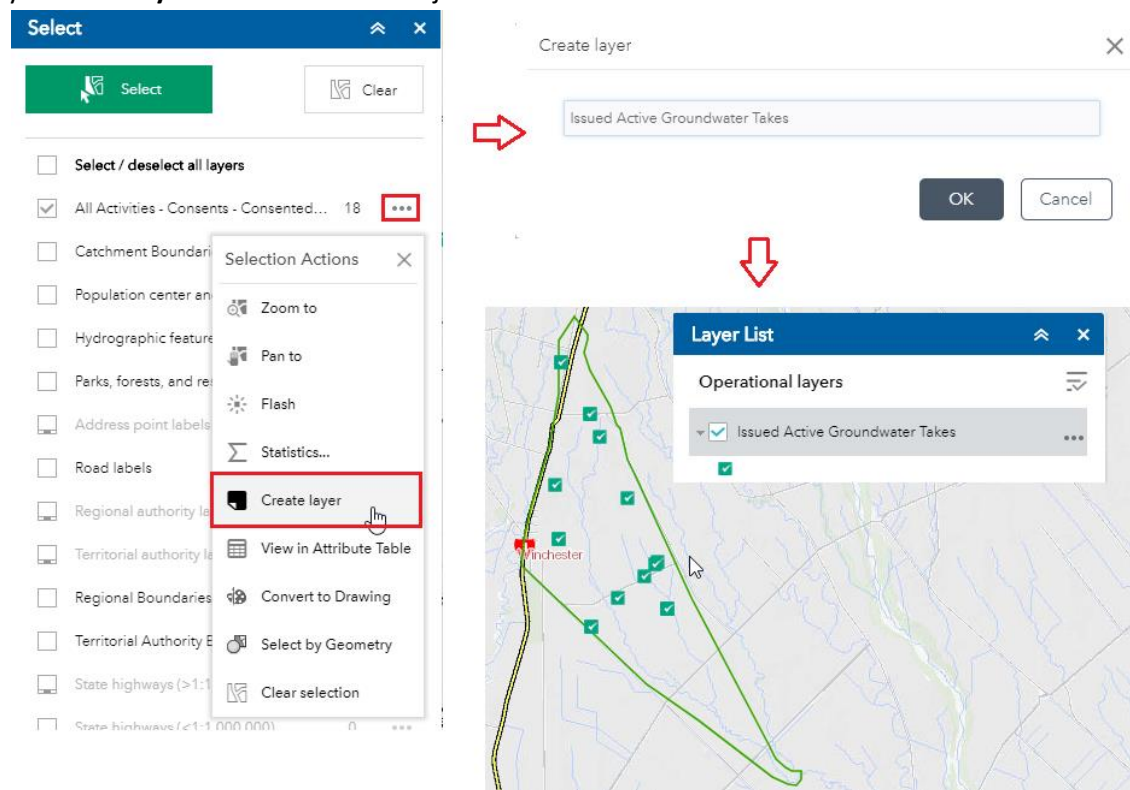
Step 6 - Print a map

1. You are now going to print a pdf map of the catchment and the consents within it.
2. First, send the 'Ohapi Creek South Branch' catchment boundary to the **Draw Tool** so you can symbolise it and name it appropriately. Hint: click on the catchment to get a pop-up, click the three dots in the bottom right of the pop-up and click 'Convert to Drawing'.
3. Re-order the layers in the **Layer List** so the consents layer is on top
4. Go to the **Print Tool**. Choose the A3 Landscape Legend Layout option.