

Basic Mapping with Mango Maps



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2. Geographic Concepts and Terminology

Layers – A visual representation of a spatial dataset in a mapping environment; one slice or feature of the geographic reality. Each layer is represented individually in a legend on a map. For example, if you were looking at a road map, the roads, parks, rivers, and administrative boundaries would be considered different layers.

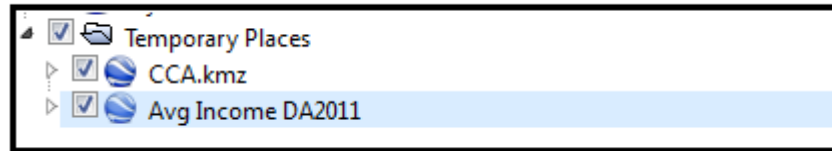


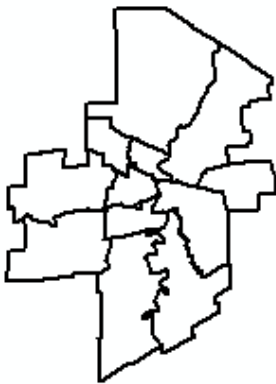
Figure 1: CCA and Avg Income DA2011 are both different layers available in this particular map

Features – a feature is a representation of a real-world object on a map. A line, point, or polygon on a map. A point representing a school would be considered a feature, or a line representing a road, as well as a polygon representing a park.

Attribute Information – non-spatial information, usually tabular or textual describing characteristics of a geographic feature within mapping software. For example, if a school is the **feature** you are investigating, some attribute information that may be associated with it would include the name of the school, the address, the contact information, the number of students, number of teachers etc.

Keyhole Markup Language Zipped (KMZ) – A KMZ, or Keyhole Markup Language Zipped, is the type of file that Google Earth uses to open up files holding geographical information. These are zipped packages containing several individual files that can be opened in Google Earth. Contents of these packages can include, but are not limited to, text files, spatial files, and legend files.

Geographic Levels



Community Area (CA) –Community Areas follow the boundaries of identified neighborhoods, and are defined based on population and natural community boundaries. These Community Areas are used by the WRHA to assess population data and facilitate health planning and service delivery. There are 12 Community areas: Seven Oaks, River East, Transcona, St. Boniface, St. Vital, Fort Gary, River Heights, Downtown, Point Douglas, Inkster, St. James Assiniboia, and Assiniboine South.

Neighborhood Cluster (NC) – Neighborhood Cluster boundaries follow neighborhood boundaries and are defined based on population and natural community boundaries. The Neighborhood Clusters are grouped together to make up the larger Community Areas. There are 25 Neighborhood Clusters: Point Douglas North, Point Douglas South, Downtown West, Downtown East, River Heights West, River Heights East, St James Assiniboia West, St James Assiniboia East, Assiniboine South, Fort Garry North, Fort Garry South, ST Vital North, St Vital South, St Boniface West, St Boniface East, Transcona, River East South, River East West, River East East, River East North, Seven Oaks West, Seven Oaks East, Seven Oaks North, Inkster West, Inkster East.



Neighborhood – An administrative boundary developed by the city of Winnipeg as the basic building blocks of the city for planning purposes. Neighborhoods are defined based on their characteristic features and natural boundaries. There are 238 Neighborhoods in the City of Winnipeg.

Dissemination Area (DA) – Small areas composed of one or more dissemination blocks (the smallest census boundary), with a population of 400-700 persons. This is the standard geographic area for which all census data are disseminated by Statistics Canada. In Winnipeg there are 1150 dissemination areas.

Points – a feature defined by a pair of X, Y coordinates. Point layers are used to represent discontinuous features. For an example, a school or restaurant would be represented as a point layer

2. Overview of Mango Map Functions and Tools:

2.1 Mango Maps: Navigation and Feature Identification

1. Turning Layers on and Off
2. Map Navigation
 - a. Using Navigation Panel
 - i. Zoom in and out
 - ii. Refresh map extent
 - b. Pan Navigation
3. Identifying Layers
 - a. Single layer identification
 - b. Stacked layer identification
 - c. Smart layers

1. Turning Layers on and off

In Mango Maps, the legend is found on the right of the screen. Within this legend is a list of all of the layers available the map, with their symbology and a small box beside each layer name. This small box is a clickable button used to turn each layer on and off.

Note: If there are multiple layers in a single layer group, all of these layers will turn on/off when the check box is checked/unchecked.

2. Map Navigation

a. Using the Navigation Panel

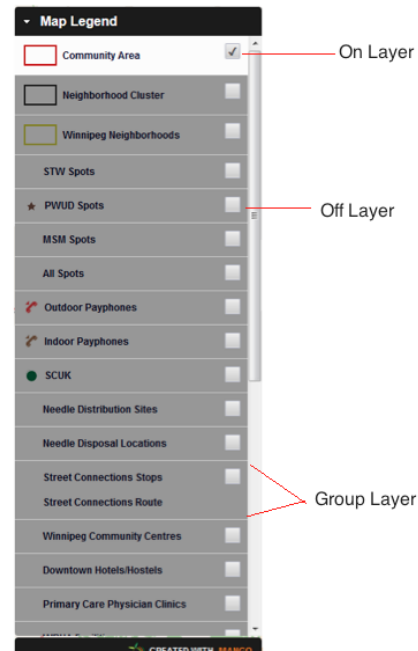
i. Zooming in and out

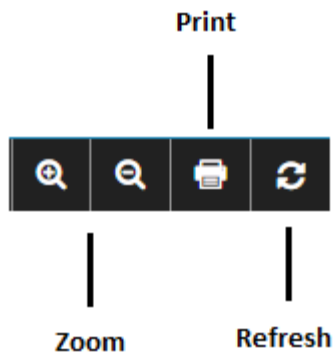
In Mango Maps, there are two ways to zoom in and out:

1. The + and – buttons can be used to zoom in and out on the map
2. If you have a mouse with a center roller ball, you can use the center roller to zoom in and out.

ii. Refresh map extent

It is easy to get lost on a map while you are using the pan and zoom navigation functions to explore, so Mango Maps has created a button that will bring you back to a standard extent on the map. This is useful if you get 'lost' on the map. One click on the "Map Refresh" button will bring you back to starting location of the map.





b. How to Pan

Mango Maps does not include pan functions as a part of the navigation toolbar. To pan, left click and drag your mouse. You will see the map move as your mouse moves. Use this method to navigate around the map.

3. Identifying Layers

a. Single Layer Identification

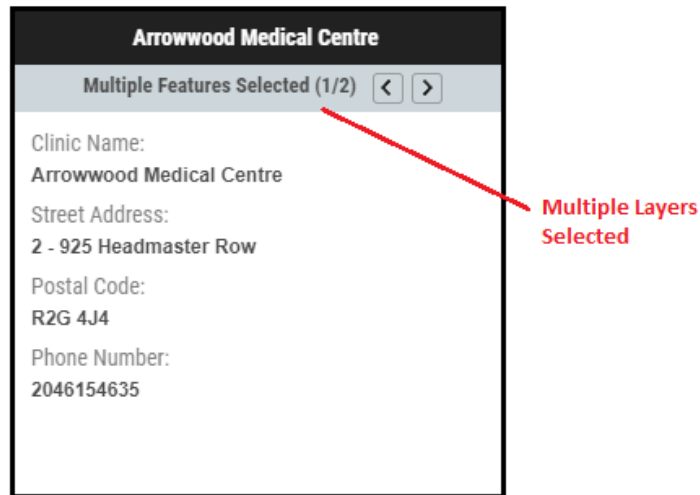
When a specific layer is turned on, you can easily access the attribute information associated with that layer, simply by clicking on the feature you are interested in. Upon clicking, a small bock will pop up in the bottom left corner, displaying all attribute information that is available.

Attribute Information Popup:

Arrowwood Medical Centre	
Multiple Features Selected (1/2) < >	
Clinic Name:	Arrowwood Medical Centre
Street Address:	2 - 925 Headmaster Row
Postal Code:	R2G 4J4
Phone Number:	2046154635

b. **Stacked Layer Identification**

If you have multiple layers, of the same geographic levels turned on at the same time, they will be “stacked” on one another. In this case the attribute pop up window will display “multiple features selected”. To view the attribute information, click on the feature you are interested in, and this will display the attribute information for the TOP MOST layer (as appears in the legend). In order to view the attribute information for the layer(s) beneath, click on the small arrows (< or >) that appears in the attribute information pop-up box.



c. **Smart Layers**

Many of the maps created in Mango Maps have preloaded “smart layers”; including Smart Community Areas, Smart Neighborhoods, and Smart Neighborhood Clusters. These smart layers are spatial layers that in addition to containing geographic information are linked to other tabular data such as census or youth health survey reports.

To view these reports, click on the smart layer symbol for the geography you are interested in (usually a star). In the attribute information pop-up window, you will see blue, underlined text. When clicked on, this text will automatically launch the link associated with it and bring you to the report.

Some reports available in the smart layers are Census Profiles (Neighborhood, Neighborhood Cluster, and Community Area), Health Profiles (Community Area only), and Youth Health Survey Reports (Community Area only).

2.2 Mango Map: Ground Truthing and Searching for Features

Objectives:

1. Change the Base layer
2. Use Google Street View to ground truth
3. Measure distance
4. Locate features
 - a. Using an Address
 - b. Using a Postal Code
 - c. Using Feature Name

1. Change the Base map

Mango Maps provides a large number of base maps that can be changed on your map at any time. You can view satellite images, terrain imagery, as well as road networks.

To change the base map on your map, click on the map icon in the toolbar located on the right-hand side of the screen. Upon clicking on this icon, a window will appear displaying all of the base maps available. Double click on the base map of your choice and it will begin to load in your map.

The best base map for ground view is the Open Street map (OSM), and the best for satellite images is the Satellite imagery.



2. Using Google Street View to Ground Truth

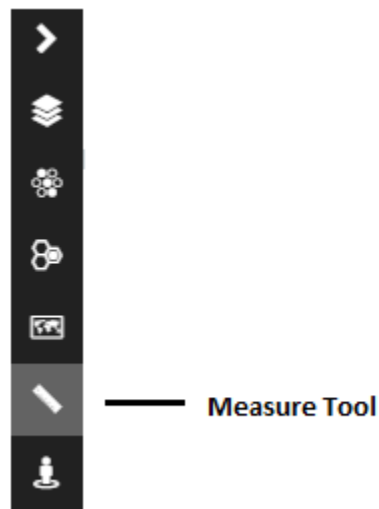
Google Street View allows you to explore landmarks and inside some buildings by using 360-degree images. To launch Google Streetview, click on the pegman located at the bottom of the toolbar on the right-hand side of the screen. When you activate the tool, a yellow target will appear on your screen. Zoom in to the area of the map that you would like to see on street view, and center the target on a specific street segment. Once the target is centered, click on the button that says “Launch Streetview”.

This will open a Streetview image of the area of interest in a new webpage. You can use your mouse to navigate around the area and explore what is on the ground.

3. Measure

The measure tool in Mango Maps allows you to draw lines on the map to determine distances in miles, feet, kilometers, or meters. In addition to being able to draw and measure lines and paths, you can also measure areas by drawing polygons.

The measure tool can be found in the tool bar along the right-hand side of the screen. Once you click on the ruler icon, you then must select whether you want to measure the distance of a line or the area of a polygon. Once you have selected the method of measurement, your cursor will turn into a cross hair. Use your mouse to outline the polygon or draw a path. If you need to change directions, single click with your mouse and a point will be established. The cumulative distance will appear beside the mouse as you draw the path/polygon. Once you are finished, double click to exit drawing.



4. Locate Features

Mango Maps has a built-in search bar which allows you to search your map using addresses, postal codes, and even feature names. The search bar is located at the top right corner of the map, above the legend.

a. Search Using Address

MangoMaps has the ability to do broad searches by city name, or specific searches by addresses that include the street address and city. When you do a broad search, a point will be placed in the center of your search location, and when you do something as specific as address it will be located exactly at that address. [You can use Google Street view to ground truth it for yourself].

Eg. 490 Hargrave, Winnipeg

b. Search Using Postal Code

You can also use this search bar to search using postal code. The point placed on the map will be located in the center of that postal code area.

Eg. R2K 4C9

Note: It is very important to include a space in between the first and last three characters of the postal code. If you do not format the postal code this way, the search results may produce inaccurate locations

c. Search using Feature Names

This search tool has the ability to do a powerful full text search of your maps layers attribute table. This attribute search brings a Google Style search to your maps attribute data and allows user to easily find features of interest simply by typing it in the tool bar. For example, if you have a school's layer loaded, you can type any of those school's names into the search bar, and once the search is complete you will be zoomed directly to that school's location.

Eg. John Henderson Junior High

2.3 Mango Maps: Printing and Exporting

Objectives:

1. Export your map
 - a. Use the Print Button
 - b. Use the Snip Tool
 - i. Snip the map
 - ii. Snip the legend
 - iii. Insert into presentation or document
-

1. Print to PDF

There are two ways to export a map in Mango Maps:

- a) **Use the Print Button.** By clicking the small print button on ribbon tool along the top of the map, MangoMaps will create a map with a title, and a legend (containing all layers that are currently turned on). Once you click on the Print tool, Mango Maps will open up in a new window, and you will be able to customize the printable PDF. You have the option of changing the map title, displaying a legend, and added a description of the map that is to be printed.



- b) **Use the Snip Tool.** Microsoft Windows 7 comes with a snip tool that allows you to capture a snap shot of the screen at the current extent.

To use this tool, click on the **Start Button >> Snipping tool** icon. If the Snipping Tool icon does not appear, type “Snipping” in the Search Programs and Files box.

Once the Snipping Tool appears, click on the drop-down arrow beside NEW and choose Rectangular Snip. Drag a box around the parts of the map window you want to capture, then click Edit and then Copy to transfer the image to clipboard. Once you snip the area you want, paste it into any program you like (Word, PowerPoint). From there you can add your own title and create a legend.

A good strategy is to do separate snips of the map extent you want, and the legend components that you want in your final presentation.

2.4 Mango Maps – The Query Tool: Selecting and Summarizing 1 Layer

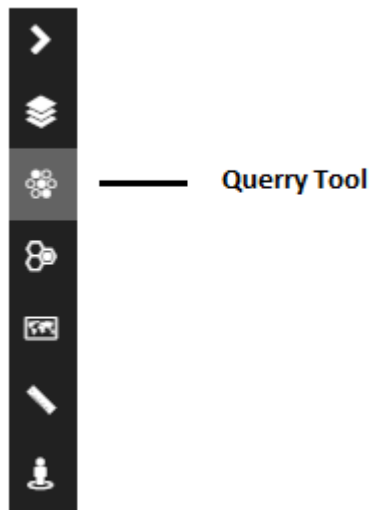
Objectives:

1. The Query Tool
 2. Method of Location Selection
 - a. Rectangle
 - b. Buffer
 - c. Custom Area
 - d. Individual Selection
 3. Filtering your results
 4. Viewing the Results
-

A **query** is method of selecting data based on user-defined criteria, and displays only features that satisfy the criteria. Users can build rule-based queries to discover features of interest contained in your map. Only those features that match the criteria outlined will be displayed on the map.

1. The Query Tool

The Query tool is located in the toolbar on the right-hand side of the screen. To launch the tool, select the tool from the toolbar:

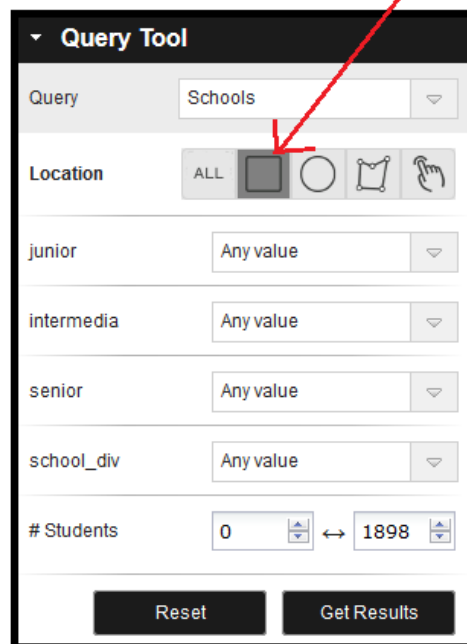


Once the tool is launched, you have several options in creating your query:

- a) The individual layer you would like to query
- b) The method of location selection
 - All
 - Rectangle Selection
 - Buffer
 - Custom Area
 - Individual Selection
- c) Additional attribute filters
 - This allows you to filter the selected features further based on attribute information. The ability to filter by attribute will change depending on the layer you are basing the query on.

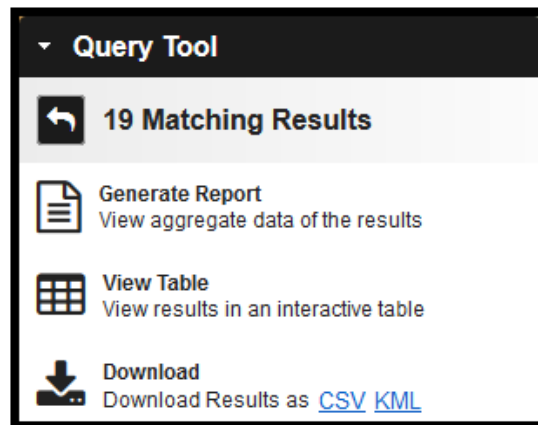
2. Method of Location Selection

a) Select by location – Rectangle



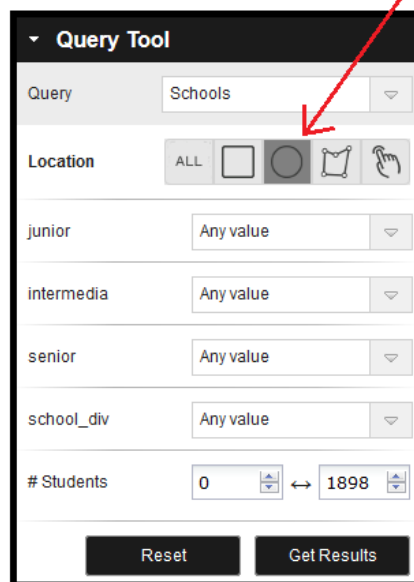
To select features within a small sub-selection of the map, you can select by rectangle. By selecting the square option, your cursor will turn into a cross hair. Use this cross hair to draw a rectangle in the desired location on your map. All of the features within this rectangle will be selected. If you need to query these attributes further, you can use the attribute filters, or you can continue without applying an attribute filter.

To summarize the features within this small rectangle that you have drawn, select 'Get Results'. The following screen will appear:



Note: The options available on this screen may vary depending on the layer you have based your query on.

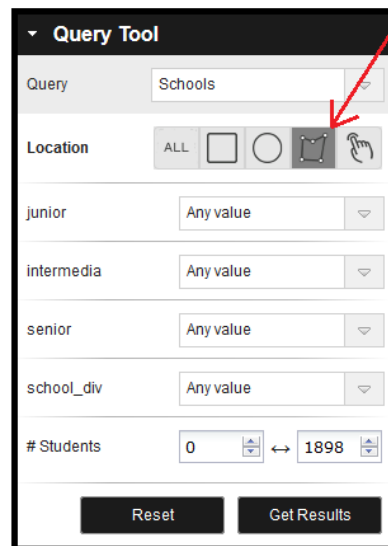
b) **Select by location – Buffer**



Another method of selecting by location is to draw a buffer around a point of interest. This may be useful if there is a fire, and you would like to determine the populations impacted in the surrounding area – or similar situations.

To select by buffer, select the circle from the query tool. Your cursor will once again turn into a cross hair. To begin to create a buffer area, place the crosshair in the middle of the point of interest, click and drag the circle to the desired size. As you drag your buffer area away from the point of interest, you will see the radius distance beside the cursor. This will help to document the buffering distance.

c) Select by location – Custom Area



Sometimes we do not want to select feature within a rectangle or within a buffer area and instead we want to draw a custom shape. To draw a custom shape, click on the custom shape button on the query tool. Once again, your cursor will turn into a crosshair, and you can use this cursor to draw your custom shape. Click once to create a point and change the direction of your line, and click twice to complete your shape.

d) **Select by Location – Select individual features**

If you want to select random points, from different areas of the map, you can use the select individual features tool. This tool allows you to select random features from all corners of the map.

3. **Filtering your results**

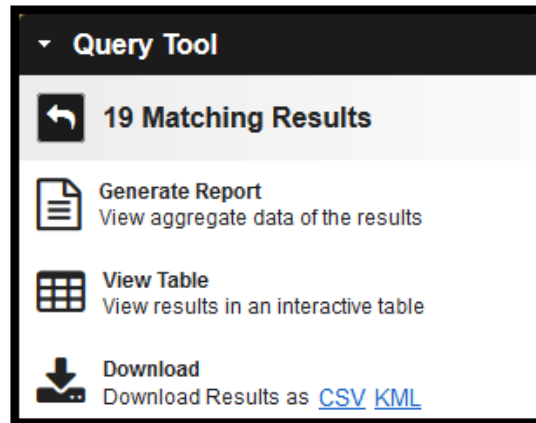
In addition to filtering features based on their location, you can filter them based on values found in their attribute table. An example of this would be if you were selecting a group of schools within a custom rectangle, and in addition to having the rectangle as a restriction of your query, you also want to select schools that have more than 1000 students. This is an example of an attribute that you would like to filter. In the query tool, any attribute filters will be displayed as either a drop down, or with value ranges.

**Attribute
Filters**

The screenshot shows a 'Query Tool' window. At the top, there's a 'Query' dropdown menu set to 'Schools'. Below this is a 'Location' section with five icons: 'ALL', a rectangle, a circle, a polygon, and a hand. The rectangle icon is selected. Underneath the location icons are five attribute filter rows, each with a label and a dropdown menu set to 'Any value': 'junior', 'intermedia', 'senior', 'school_div', and '# Students'. The '# Students' row is unique as it has a range filter with two input boxes containing '0' and '1898', separated by a double-headed arrow. At the bottom of the tool are two buttons: 'Reset' and 'Get Results'.

4. Viewing the Results

Results Screen:



You have the option of viewing the query results using three different methods:

1. **Generate Report** – This will give you a summary of all of the countable attributes. For example, the number of students (cumulative) in all of the schools selected by a query.
2. **View Table** – this will generate a table of attributes for each of the features selected based on the query. For example, if your query selects a total of 10 schools, the generated table will list the 10 schools selected, as well as any other attributes associated with them.
3. **Download** – Some layers allow you to download the results of a query, so you can import them into another GIS application. You can download the file as a KMZ, and import them into a Google Earth map, or download as a Shapefile and open in an ArcGIS map.

2.5 Mango Maps – The Proximity Tool:

Objectives:

1. The Proximity Tool
 2. Creating the Query
 3. Viewing the Results
-

The Proximity Analysis tool allows you to build powerful spatial queries to determine the relationship between selected points or features and neighboring points or features across one or more dataset. For example, you can use the Proximity Analysis tools to locate all of the Schools within an area with a specific Average Household income.

1. The Proximity Tool

The proximity tool is located in the toolbar, on the right-hand side of the screen. To launch the tool, select the tool from the toolbar.

Proximity Tool -->



2. Creating the Query

Once the Proximity tool is launched, you must use the drop downs to select the layers that you are going to include in your query.

The screenshot shows the 'Proximity Tool' interface. It has a dark sidebar on the left with icons for navigation, layers, and search. The main panel contains the following elements:

- Find:** A dropdown menu with 'Schools' selected. A red circle with the number '1' is next to the label.
- That:** A dropdown menu with 'are within' selected. A red circle with the number '2' is next to the label.
- Selected:** A dropdown menu with 'Before Tax Median Household Income, 2016' selected. A red circle with the number '3' is next to the label.
- Select:** A section with a list of layers and a set of selection tools. The layer 'Before Tax Median Household Income, 2016' is selected. A red circle with the number '5' is next to the layer name. The selection tools include a radio button labeled 'ALL', a square icon, a circle icon, a polygon icon, and a hand icon. A red circle with the number '4' is next to the selection tools.
- Buttons:** 'Reset' and 'Get Results' buttons at the bottom.

1. The “Find” Drop Down: This is the layer that is your primary interest. The features in this layer will be the ones selected as a result of the query that you are building in the Proximity Tool.
2. The “That” Drop Down: In this drop down, you are to select the relationship that the layer selected from the “Find” Drop down, has with the layer that is selected in the “Selected” Drop down.

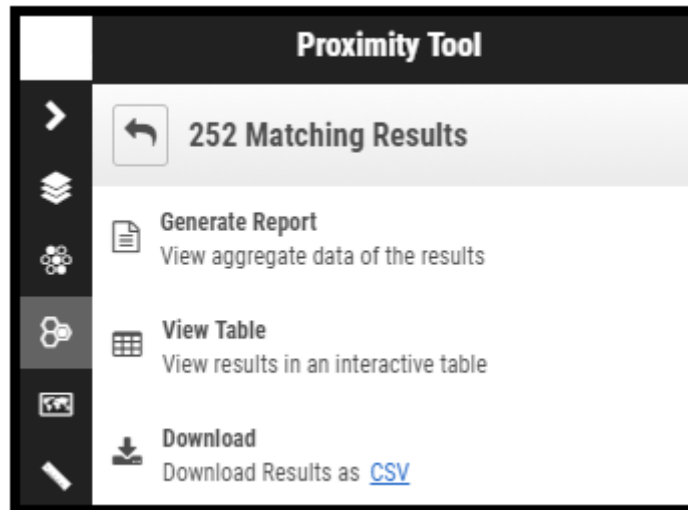
You can select from the following relationship types:

- Within
- Touch
- Closer than
- Further than
- Outside of

HINT: You should complete this drop down AFTER both the “Find” drop down, and the “Selected” Drop down.

3. The “Selected” Drop Down: In this drop down, you must select the second layer that is a part of the relationship with the first layer selected.
4. This small symbol on the right on the “Selected” Drop Down, gives you the option to query that layer further. For example, if you selected “Average Income” as the layer of interest, you could use this query feature to select only those areas with an average income of less than X amount.
5. The 5th section of this tool, allows you to restrict the query to a specific area of the map. You can contain the query results within a square, radius, or within a custom geography. Simply click on the shape of the restriction, and use your mouse to trace out the specific area of interest on the map.

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3. Download – Some layers allow you to download the results of a query, so you can import them into another GIS application. You can download the file as a KMZ, and import them into a Google Earth map, or download as a Shapefile and open in an ArcGIS map.