

## Chapter 7

# Geocoding in ArcGIS Pro



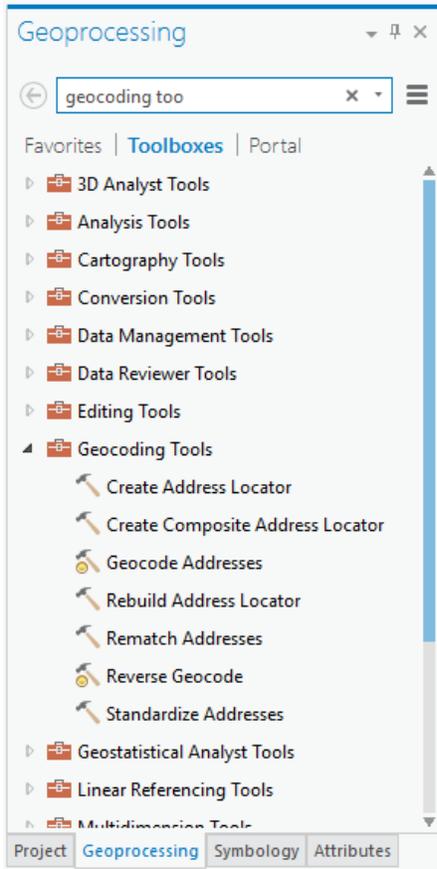
**Summary:** In many cases, online geocoding services are all you will need to convert addresses and other location data into geographic data. When you have a larger number of points to geocode, however, and available lookup data, the case for doing the job yourself can be compelling. This tutorial shows you how to geocode addresses using ArcGIS Pro's built in geocoding utility. If you are unsure of the basics of the ArcGIS Pro user interface, see the quick tour of ArcGIS Pro tutorial.

**Skills you will learn:** How to create an address locator in ArcGIS Pro, and how to use that locator to geocode effectively limitless numbers of addresses and other non-geographic location data.

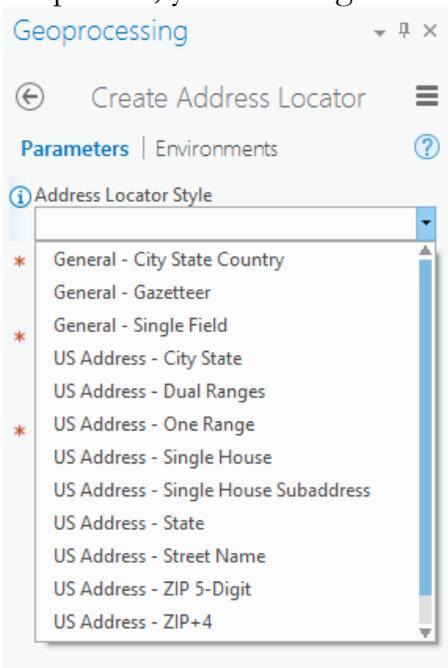
### Creating an address locator

The first step in geocoding using ArcGISPro is to create an address locator, a special intermediary file that makes the connection between a reference map and the data to be geocoded.

On the Analysis Ribbon, click the large red toolkit icon to open the Geoprocessing pane.



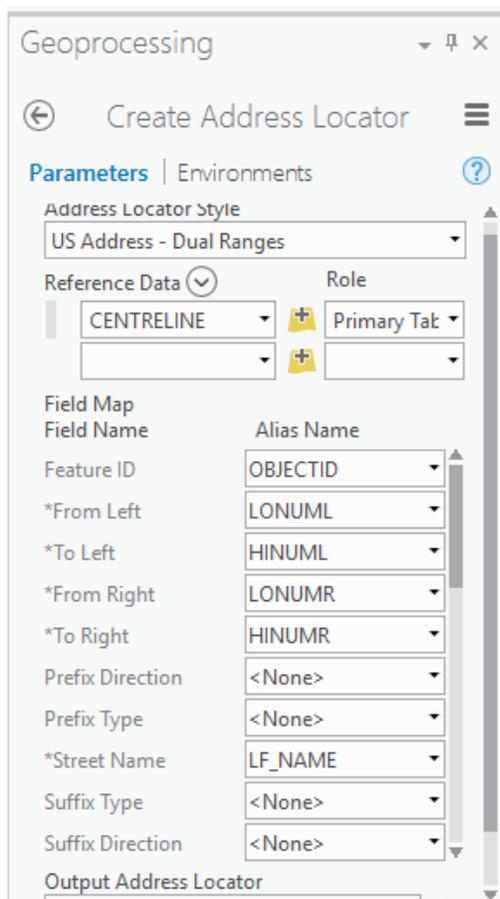
Expand Geocoding Tools and double click on Create Address Locator. This opens the Create Address Locator pane. If you click on the Address Locator Style dropdown, you will be given a choice of a number of possible locator styles.



The styles are templates that use different types of reference tables as the bases for address locators.

Choose US Address –SingleHouse if your reference data table is accurate down to individual street addresses (i.e. a map of individual addresses). Use US Address – One Range if the reference data table is accurate down to a street segment (a range of addresses). Use US Address – Dual Ranges if the reference data table is accurate down to a street segment with address ranges on both sides of the street (even and odd sides of the street). Other locators styles allow for situations such as a reference map of postal/zip codes.

Below the Address Locator Style dropdown, there are a number of additional parameters you can set.



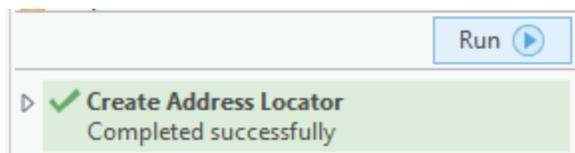
The Reference Data dropdown is used to pick the reference data table you are using. You can also click on the open file folder icon to find a reference data table on your hard drive.

If this will be the only table you use, set its role to be the primary table. It is possible to add more tables to add more precision. See the ArcGIS Pro help topic on geocoding.

The Field Map area at the bottom of the dialogue is used to designate the roles of fields in the reference table, such as which field represents the street name and which one represents the street number or lower/upper limit of a range of numbers. The fields marked with asterisks are required. For the US single house style, the street number and street name are required fields. For the single and dual ranges types, you also need to designate which fields contain the lower and upper limits of the street number ranges, as well as the street name. If your reference table contains a field for the city or the postal code, these fields should be designated as well.

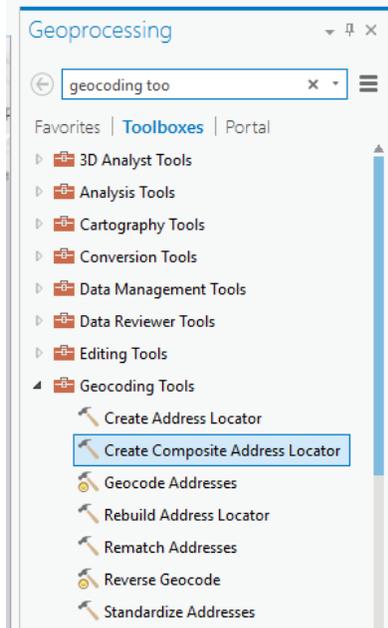
In the Output Address Locator box, you can set the file location for the address locator. This can be a folder, or the geodatabase for the project.

When you are done, click Run. Depending on the size of the reference table, creating the locator may take some time. When it is done, you will get a confirmation message.

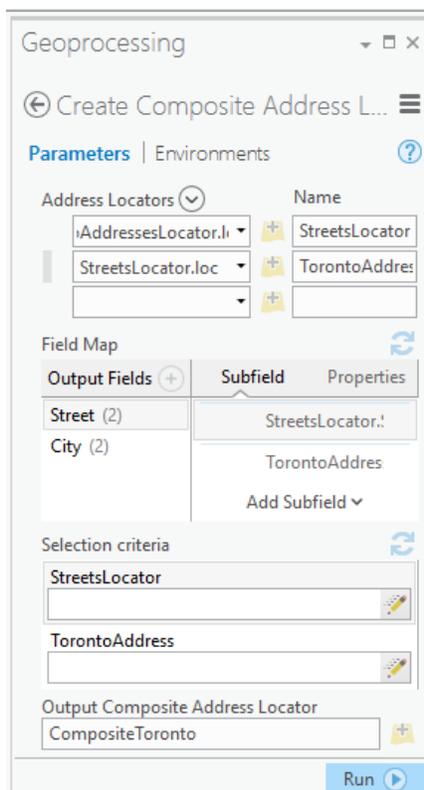


You can also create what is called a composite address locator. This is a locator that is comprised of more than one existing address locator. A composite address locator can increase geocoding accuracy by giving ArcGIS Pro more than one choice of reference data. For example, a composite address locator could be made up of a locator that geocodes down to a specific address and a second one that geocodes to street segments and intersections, to capture those instances in which the precise address is not available.

To create a composite address locator, click on Create Composite Address Locator under Geocoding Tools.



In the Create Composite Locator pane, use the dropdown lists to pick the locators to be used, or use the file folder icon to locate the locators in the file system. Generally, put the locator with the greatest accuracy at the top of the list and then go down through locators of diminishing accuracy. That way the most accurate method will be tried first, the second most accurate after that, and so on.



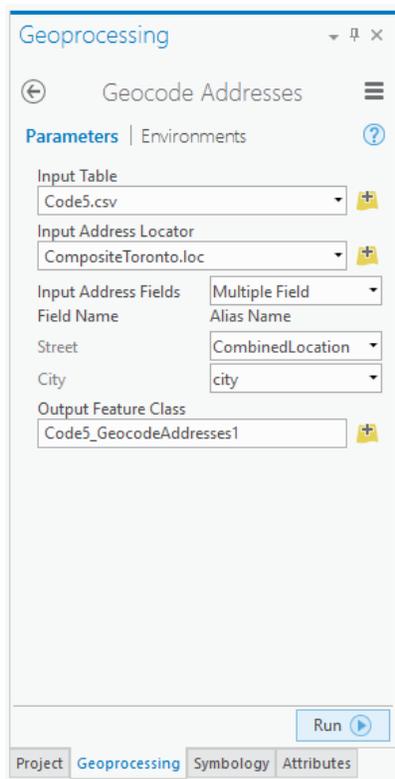
The Field Map area is populated automatically, and selection criteria are only used if you want to limit records to be geocoded by one of the participating address locators. When you are done, click Run, and the new composite locator will be created.

## The geocoding process

Add the table to be geocoded to the project. Tables can be Excel files, dbf format database tables, csv text files, Access data tables (via an OLE connection). Excel, dbf and delimited text files can be opened directly by ArcGIS Pro using the add data button.

**Tip:** If you are geocoding a table using the US Streets-Dual Ranges locator style, or a composite locator containing this locator style, make sure that the table you are geocoding has a city or state/province field. If it just has address information, the geocoding operation will likely fail. If necessary, add the necessary fields to the table using the method described in the tutorial A Quick Tour of ArcGIS Pro.

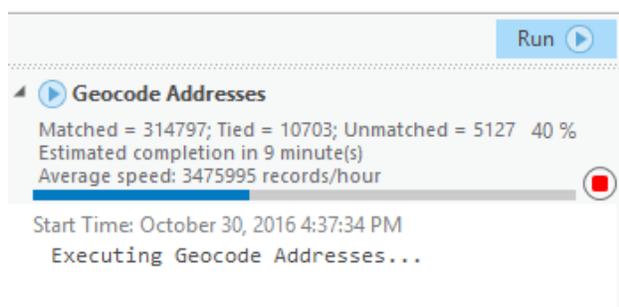
In the contents pane, right click on the table with addresses to be geocoded, and choose Geocode Addresses. The Geocode Addresses pane will open.



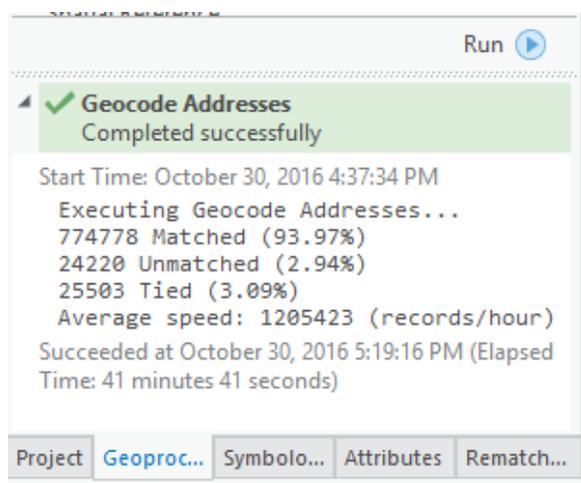
The Input Table pane will be populated with the name of the table containing the addresses you wish to geocode. In the Input Address Locator dropdown, or using the open folder icon, find the address locator you will be using. In the Input Address Fields area, choose Single Field if all of the address information is located in a single field in the table you are geocoding. If the information is in more than one field, choose Multiple Field.

Choose the fields in the table you are geocoding that contain the information required for each dropdown in the locator. Finally, in the Output Feature Class area, indicate the name of the output feature class or shapefile. To save to a shapefile, click on the folder icon, and navigate to a folder in which you would like to save the shapefile.

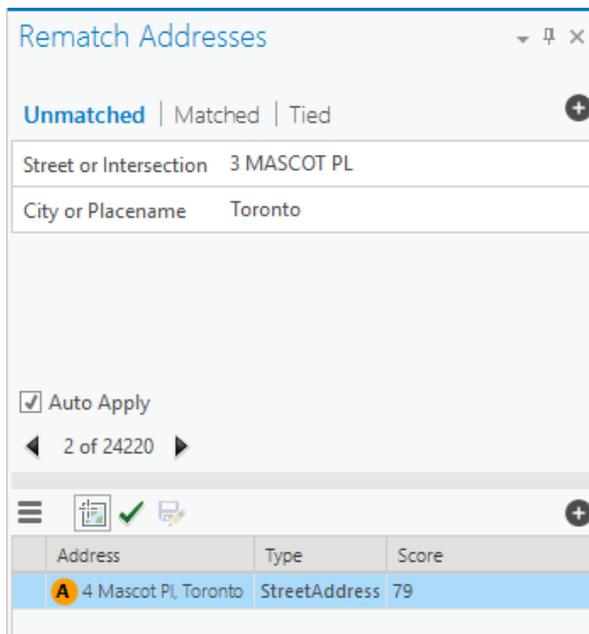
When you are finished filling out these options, click Run. The Geocoding process will begin and the progress indicated at the bottom of the Geocode Addresses pane. In this image, we can see that more than 300,000 addresses have been completed so far at an average speed of about 3.5 million addresses per hour, with the vast majority successfully matched (geocoded).



When the geocoding operation is completed you will see the results, including the number of addresses successfully matched, the number matched but which had two possible candidates for matches (tied), and the number that didn't match.



If you wish to rematch addresses that didn't match, or were tied, right click on the name of the geocoding results layer in the contents pane, and choose Data>Rematch Addresses. This will open the interactive rematch pane. You can then go through the addresses one at a time, and try to find matches for those that didn't match.



In this case, ArcGIS Pro found a near match, 4 Mascot Place. This is likely across the street from the actual address point. If matching to a nearby address would be acceptable, try editing the address in the top part of the pane. You may wish to do further research then confirm what the correct address should be, because perhaps the address in the data is incorrect.

Changing the address in the top part of the pane may result in a new match address being offered.

Sometimes the problem will be with the spelling of the address in the data table. Changing the spelling may also result in a new match candidate being offered.

Clicking on the green checkmark will cause ArcGIS Pro to match that candidate address. You can also click on the pick from map icon, which allows you to find a matching point on the map, manually.

If matching a great many addresses, you should sort the unmatched addresses in ascending order, then see if there are any patterns that could be changed in bulk. You can read more about the rematching process at <http://pro.arcgis.com/en/pro-app/help/data/geocoding/rematch-geocoding-results.htm>

## Display a file that already has X and Y coordinates

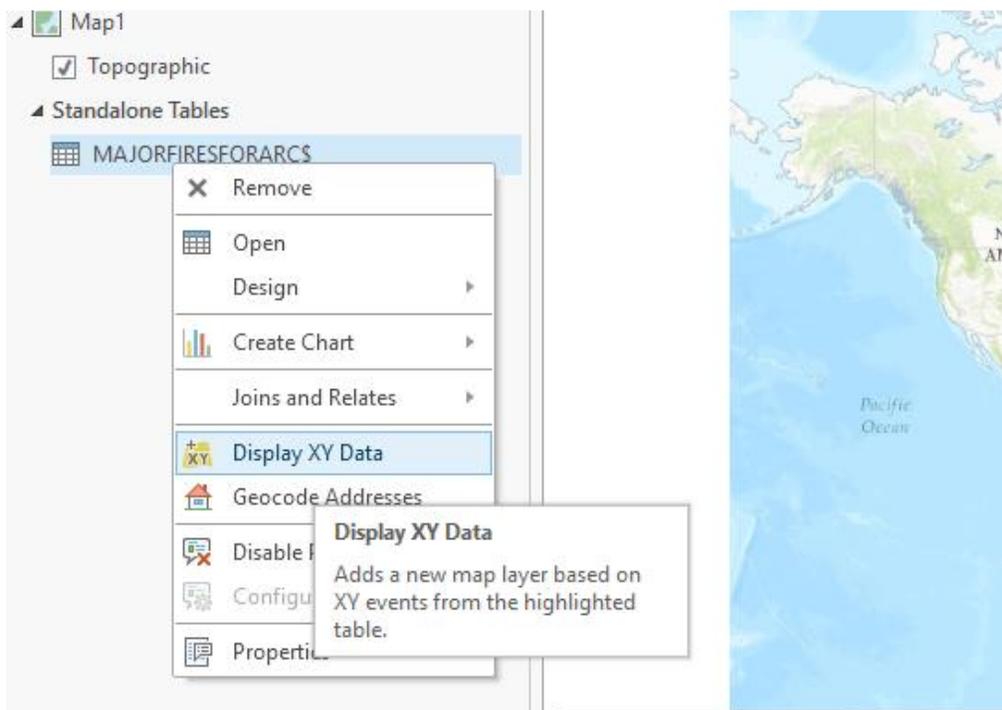
Occasionally, a table of data will already have X and Y coordinates, for geographic points, that can be displayed and used, but you must know the coordinate system the data is in. This is because coordinate numbers in and of themselves mean nothing, until ArcGIS know what the numbers mean.

The most important thing to understand is that you must tell ArcGIS what coordinate system applies to your data, or the points will be plotted in the wrong places.

### Getting started

Begin by adding the table with coordinates to the map document. It needs to be an Excel spreadsheet, a delimited text file (CSV) or a dbf file.

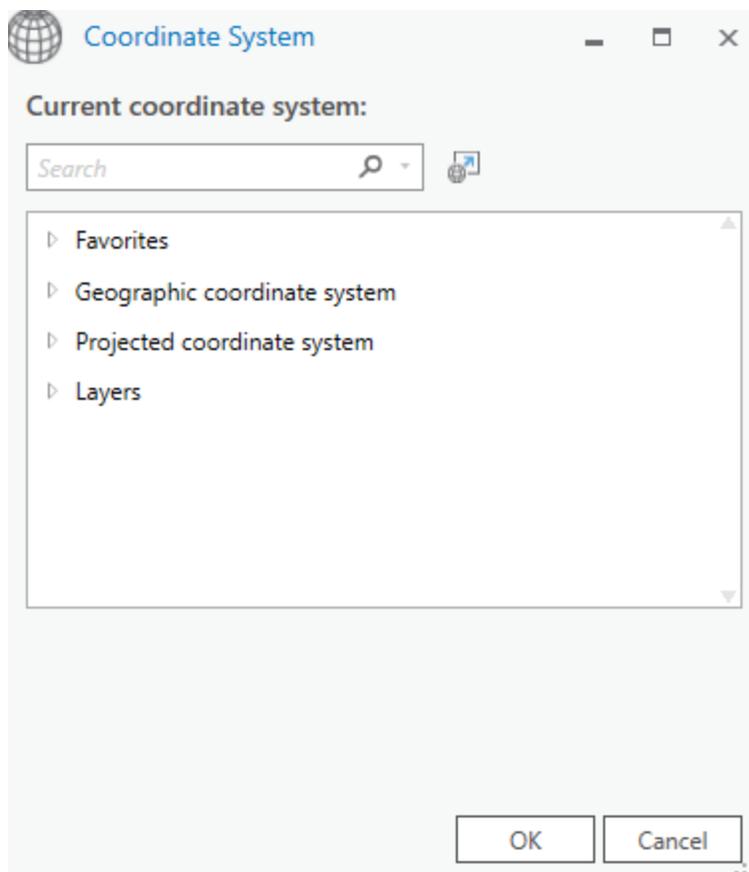
Once the file has been added to the map document, using the add data button, right click on the name of the table in the table of contents and choose Display XY Data.



In the pane that opens, choose the appropriate fields in the table that contain the X and Y coordinates. You will need to know what the fields are before you begin this step. Latitudes and longitudes will typically be labeled as such, but such fields may also be labeled as X or Y or something else.

You also need to tell ArcGIS Pro what the coordinate system is supposed to be, otherwise it can't interpret the coordinates. If you have previously added a shapefile or feature class to your project, Arc will propose to use that layer's coordinate system (actually the coordinate system of the map, which is set by the first layer you add). This might be, but probably isn't, the coordinate system you need for your data.

To define the coordinate system yourself, click on the world icon beside the Spatial Reference dropdown, and navigate to the correct coordinate system. If the coordinates in your file are latitudes and longitudes, you need to look in the list of geographic coordinate systems. If they are X and Y coordinates for a projected coordinate system, you will need to look in the list of projected coordinate systems.



Once you have selected the coordinate system, click OK.

To begin the import, click on Run. The points will be added to a new layer, and added to the map.



Normally, you will need to export the data from the layer that will be created, into a new shapefile or feature class, using the Data>Export Features command, so you can do further analysis with it.

Note that there are some limitations in what you can do with point data that have just a geographic coordinate system so it is usually wise to use the ArcGIS Pro Project to create a new shapefile or feature class that also has a projected coordinate system based on the same geographic coordinate system. This allows for more accurate measurements in tools such as Select by Location.