

## Using Basic StreetMap in ArcMap – Standard Locator

### Overview

StreetMap allows users to generate a point file with (U.S. Postal Service) USPS standardized addresses within the ArcGIS environment. You can do this in either ArcMap or ArcCatalog, but ArcMap is preferred. All data in the input table is retained. The output file is either a shape file or a geodatabase file format.

StreetMap comes with several address locators, which are the index files ArcView needs to process input addresses and convert them to GIS file format. Sometimes a composite locator is available which will step through more than one than one locator. These locators are not available to all users, so this document steps through the use of ‘out of the box’ geocoding using just the StreetMapUSA Address Locator. If your ArcView software was loaded by DHSS staff, this address locator was loaded for you.

Any database type that is supported by ArcGIS (Access, DBF, Excel) can be used as an input file for geocoding. The overall success rate is determined by the quality and completeness of the input addresses provided to the geocoder.

### Before You Begin – Start with a clean input address file

Before beginning any geocoding process, you must have an electronic file containing complete address information.

- The most common file formats are Excel, Access, or Dbase (DBF version 4). Excel files derives its field names from the 1<sup>st</sup> row in each column of the worksheet, so make sure you have added these fields to your file.
- The input file should contain at a minimum: **Primary Address, City, State, Zip**
- Any other fields, such as patientID, county, type, comments etc can remain in the input table. This information will be transferred into the output table.
- The document *Geocode\_PreparingInputAddressData\_BestPractices.doc* provides more complete guidelines for data preparation and common problems with address data. Editing your input file before you start geocoding will increase the number of good matches.


### Start Geocoding – ArcCatalog or ArcMap

You can geocode from either ArcMap or ArcCatalog. Geocoding from ArcCatalog is very simple. Just browse to the file you want to geocode, right click the file name, and select Geocode Addresses. However, geocoding within ArcMap is preferred because you have options for processing any unmatched records. Whether you start geocoding from ArcCatalog or from ArcMap, the prompts in the dialogs are the same.

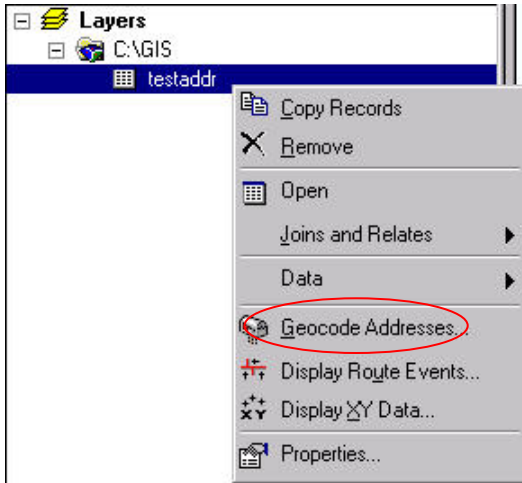


**Open ArcMap.** You can access ArcMap through the icon on the desktop or through the start menu: Start > Programs > ArcGIS > ArcMap

## Load input table

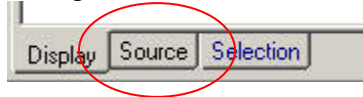
Add your table to your map, using the Add Data button  in ArcMap. Optionally, you can drag the table from ArcCatalog onto ArcMap.

## Select table to be geocoded



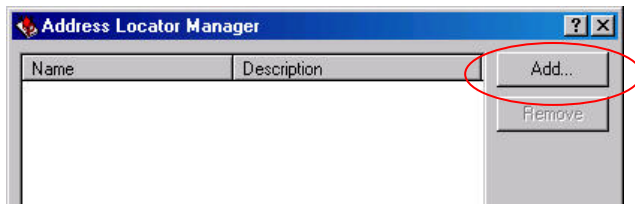
Select the input table in ArcMap. Right click on the table and select Geocode Addresses.

If you don't see your file, remember to select the Source tab, located at the bottom of your layer listing (Table of Contents).



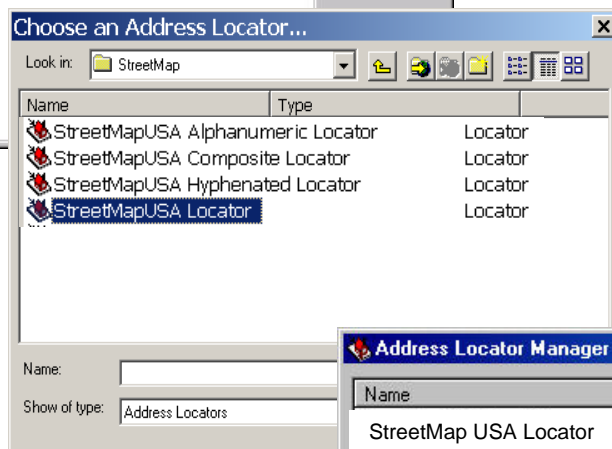
## Specify an Address Locator

You will need an Address Locator file to use as a reference. Address Locators were installed on your local C:\ drive at the time ArcView was installed in a C:\streets folder. (This assumes your software was installed by DHSS staff.)



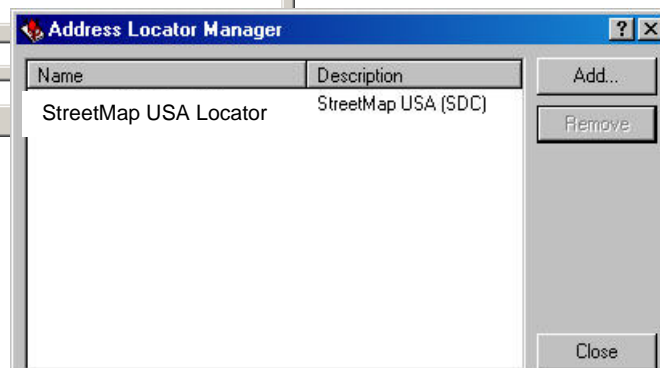
Click Add to browse to the location of the Address locator.

Browse to C:\ streets.

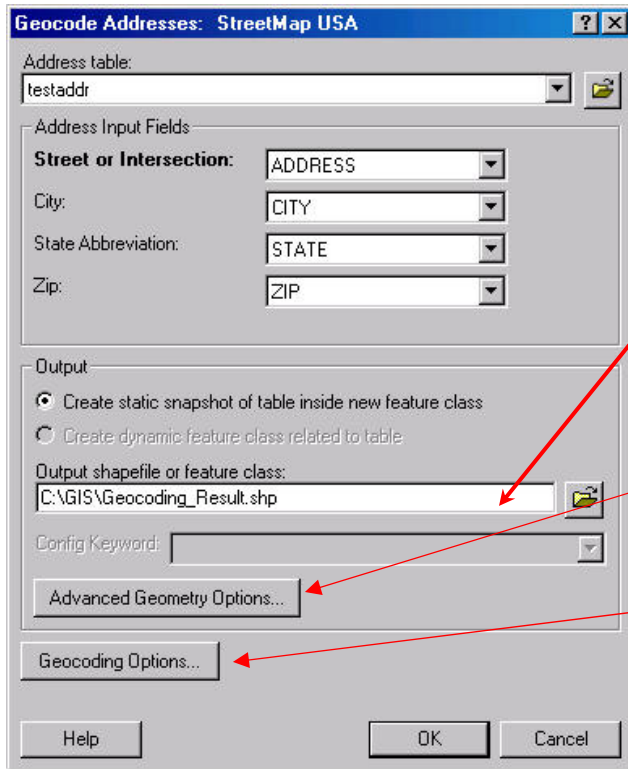


Select StreetMapUSA Locator. Click Choose.

In the Address Locator Manager, click Close.



## Verify Input Address Fields



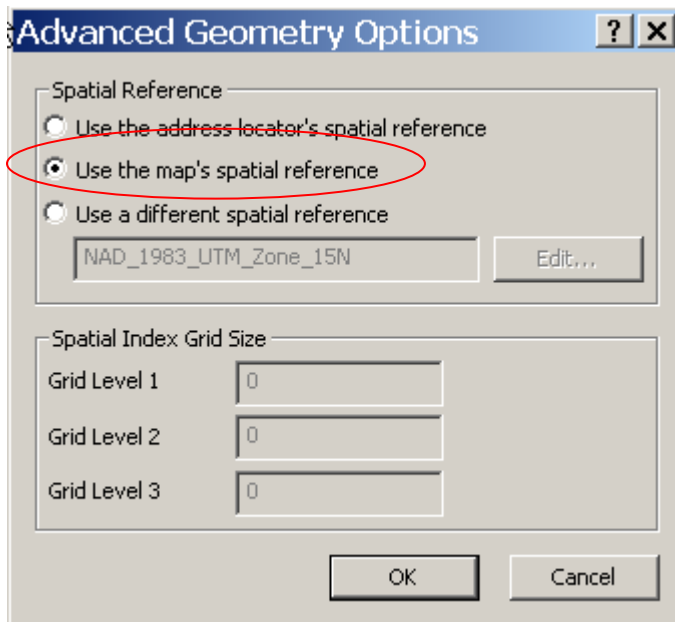
Depending on the names used in your input table, the dialog may or may not be filled out completely.

**! Verify output location and file name. Don't accept a default file name and location. Keep track of what you named the file and what folder you put it in.**

Change the coordinate system of the output shape file to match the other data layers.

You may also wish to alter the spelling sensitivities and the output options. You can do this by clicking Geocoding Options.

## Change the Advanced Geometry Options

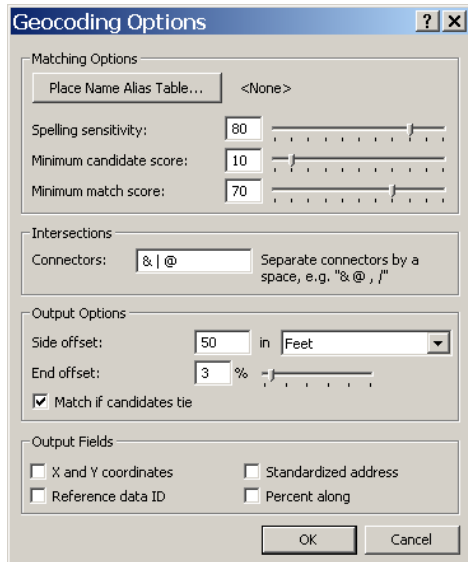


Change the Spatial Reference to Use the map's spatial reference.

Click OK.

## Decide if you want to change the Geocoding Options.

You may also wish to alter the spelling sensitivities and the output options. You can do this by clicking Geocoding Options.



You can either key in a value or use the slider bar to lower the score. Lower spelling sensitivity should give you more matches.

The more you drop this number, the more likely you are to introduce matches that might not be good choices. (For example, you may have 123 Main St in Kennett MO, but you might drop your score low enough to match to 123 Main St in New Madrid.) Spelling sensitivity below 65 is not recommended.

You can also drop the minimum match. Don't drop this score below 55.

You should also change the Side offset to between 20 and 50 feet. If you do not provide an offset the point will fall in the middle of the street instead of one side or the other. Most street right of ways are at least between 30 and 60. Providing the offset is more likely to place the point closer to a structure.

An end offset of 3% provides a similar "correction" to the placement. Addresses at the very ends of the street (100 Main St) will be adjusted slightly to more likely fall within a property rather than in the street.

Once you have adjusted these, click OK to exit the Geocoding Options dialog.

When all your parameters are set, click OK in the Geocode Addresses dialog.

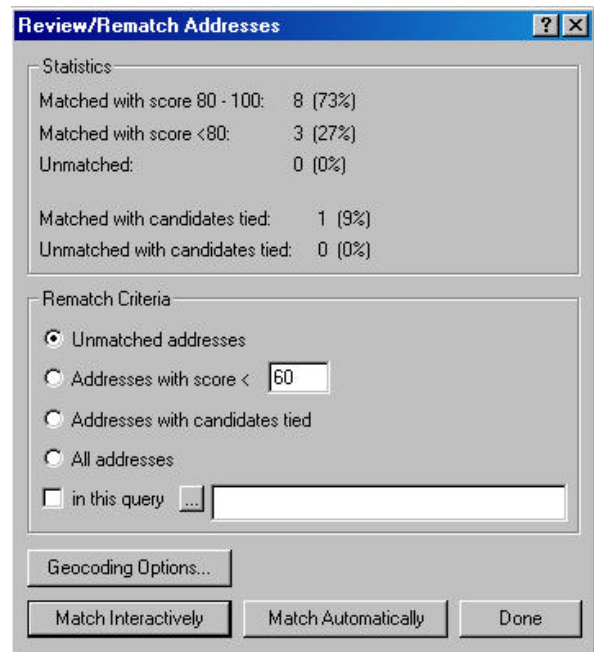


Depending on the number of records you are processing, the process will take anywhere from 1 minute (less than 100 records) to over an hour (thousands of records).

The address locator, StreetMapUSA, may not find matches for all the addresses. There are a variety of reasons for this: incomplete addresses, the use of abbreviations for street or city names, PO Boxes, rural routes, or addresses based on private streets (which often never make their way into street databases). If you have spent time reviewing and cleaning your data before you started geocoding, you have likely found matched the majority of the addresses in your file.

Once you have processed the records the 1<sup>st</sup> time, you will be presented statistics of how many matches you received out of the total records. Anything above 90% is considered a good match rate. You have the option to rematch any unmatched addresses automatically or interactively. (Or you can just click Done).

If you want to try Match Automatically, you should alter the spelling sensitivity or the minimum match score (this assumes you haven't already dropped the sensitivities). This is found in the Geocoding Options. Otherwise you will not gain any more matches.



Once you have lowered these, click Match Automatically.

If you want to try to Match Interactively, click the Match Interactively button and proceed to the Advanced Techniques section of this document for further instructions.

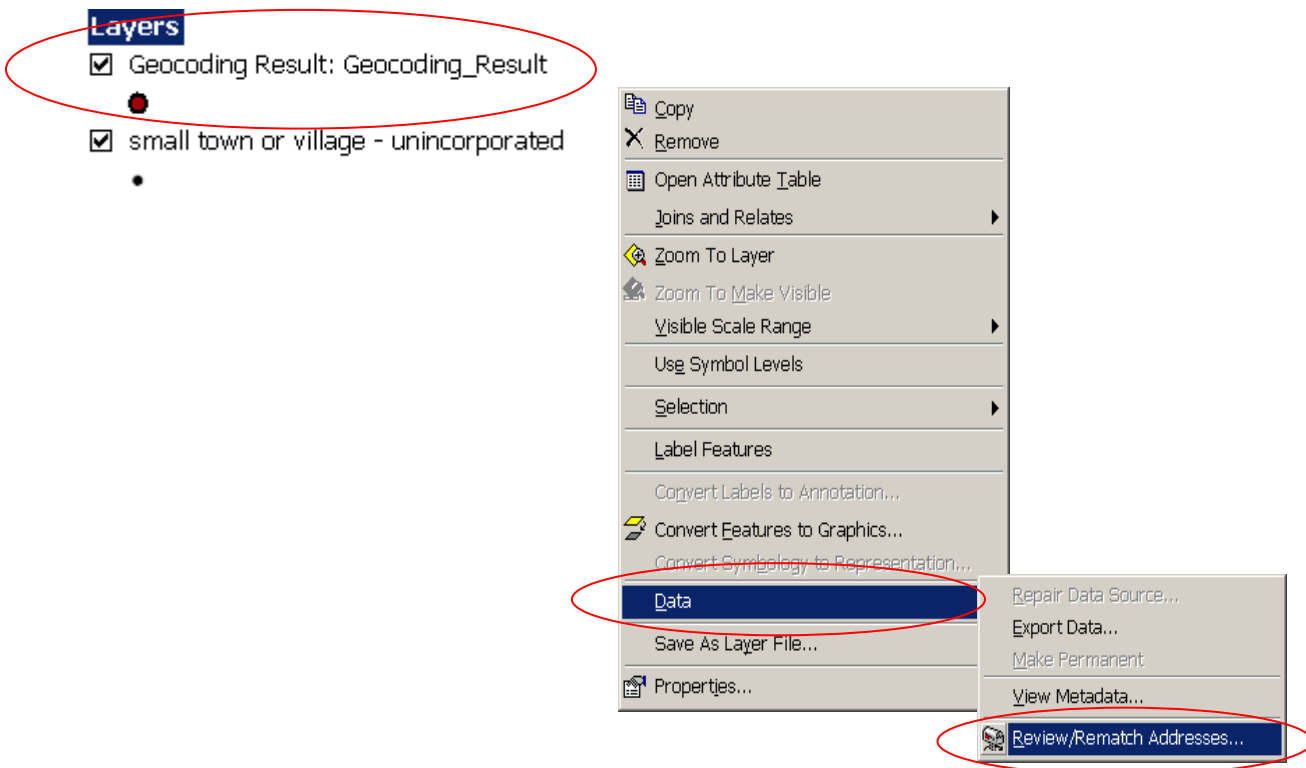
Otherwise click Done to finish the processing. A point file will be added as a new layer in the layer list in ArcMap. (You can still proceed to the Advanced Techniques section if you to try interactively rematching the remaining unmatched records.)

## Advanced Techniques

The following information is provided for users who want to try to place all the remaining unmatched addresses. This can be an extremely time consuming process, which is why it is recommended that you first start up with a good clean input file.

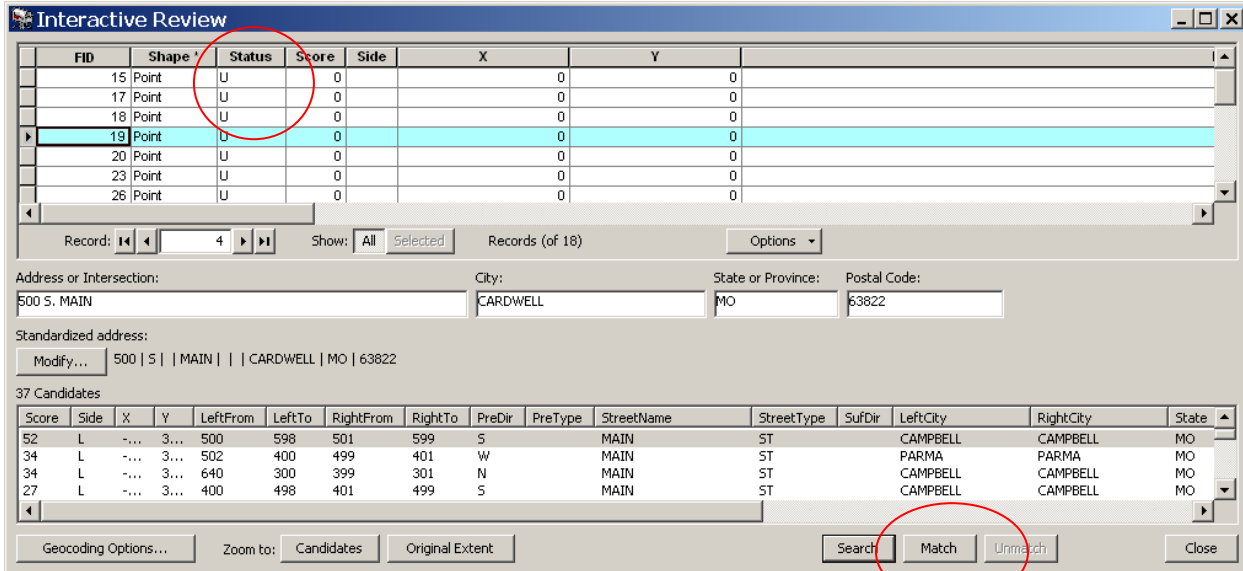
If you haven't yet started the Review and Rematch process, you can open up the attribute table of the newly created shape file. These attributes tell you how accurately the point is placed or if a point was placed at all. There will be a record for every input address. However only the records with a status of 'M' for matched will have a point on the map. The unmatched addresses (status of 'U') are there as place holders waiting for you to specify the location.

To process the unmatched records, you will be working in the Review/Rematch dialog. (Selecting Match Interactively from the Review/Rematch Addresses dialog will open this dialog for you.) If you didn't choose that option, right click on the layer you just created, select Data > Review/Rematch Addresses:



## Interactive Review Process for Unmatched records.

Records with a “U” status appear in the attribute table only; they don’t yet have a point on the map. Step through each record and review the candidate choices carefully.



You may want to lower the spelling sensitivity in the geocoding options to see more candidate choices. You can change the Geocoding Options using the button located in the lower left. You may need to lower your sensitivities and minimum matches at this point to see the most number of potential candidates. (You will be using your own judgment to make each match, so you don’t have to worry about accidentally matching to the wrong town or street type at this point.)

If you find a matching candidate, select your choose from the list of candidates and click the Match button. The status will change from “U” to “M” (for matched) and a point will be placed on the map.

Sometimes there are not any candidates at all or no good choices to pick from. If you still have unmatched records, the next step is to interactive place them by clicking a point on the map.

## Unmatched Records - Matching Interactively by Pointing on the Map

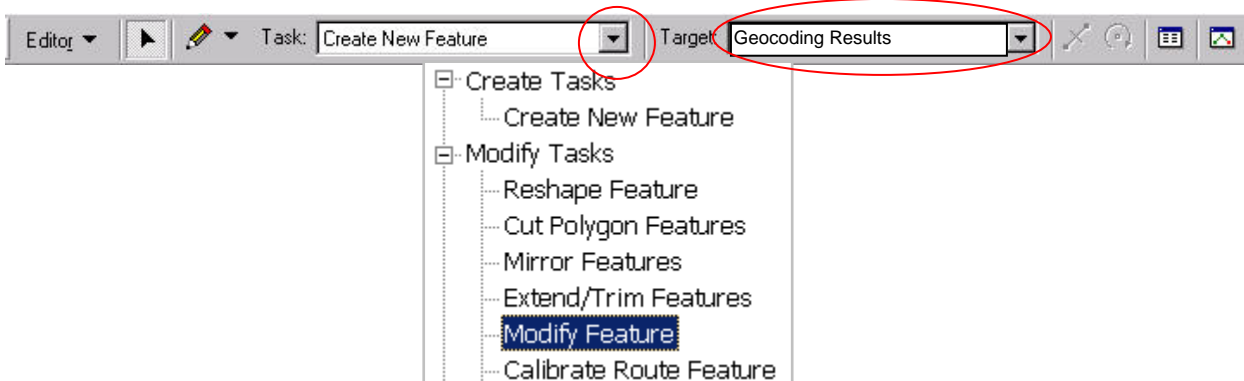
To have a point for every single record in your original address file, you will have to match any remaining records by hand, provided you can locate them on a map. If you are in the Interactive Review dialog, close it. Any remaining points are matched by clicking on a point on a map outside of the Review/Rematch dialog.

It is a good idea to load a few data layers like city limits, town points and major highways to give you some reference on your map. If you have facilities like schools (“North Elementary School”) or hospitals (“Barnes Jewish North”), add these layers from the GISDATA\Facility folder (schoolPublic.shp and hospitals.shp for these examples).

Start an Edit session. Make sure your geocoding results point file is in the folder you are editing.



Set the task on the Editor toolbar to Modify Feature and the target to the geocoded layer.



Open the attribute table of the geocoded points and select/highlight the record to be placed.

In the Status field, change the U to an M for the selected record.

FID	Shape	Status	Score	Match_addr	ARC_City	ARC_State	COUNTY	LOCATION	Address
0	Point	M	100	BUTTERFIELD, BARRY	Butterfield	BARRY	BARRY	Butterfield Community Center	602 Ash St.
1	Point	U	0			BARRY	BARRY	LaCobba Special Assist Living	
2	Point	U	0		Monett	BARRY	BARRY	Monette Hospital (Private)	
3	Point	M	100	WASHBURN, BARRY	Washburn	BARRY	BARRY	Washburn Church of Christ	
4	Point	U	0		Monett	BARRY	BARRY	Church of Nazarene	201 S Highway 37
5	Point	M	100	LAMAR, BARTON	Lamar	BARTON	BARTON	Hall	11th and Broadway
6	Point	M	100	GOLDEN CITY, BARTON	Golden City	BARTON	BARTON	Community Cente	Depot Ave
7	Point	M	100	LAMAR, BARTON	Lamar	BARTON	BARTON	Senior Citizens Bldg	
8	Point	M	100	CAMDENTON, CAMDEN	Camdenton	CAMDEN	CAMDEN	Mid County Fire Dept	148 N Highway 5
9	Point	M	100	STOCKTON, CEDAR	Stockton	CEDAR	CEDAR	Assembly of God Church	1505 S. 3rd. Street
10	Point	M	100	CLEVER, CHRISTIAN	Clever	CHRISTIAN	CHRISTIAN	Clever City Hall	304 S Clarke Av
11	Point	M	100	OZARK, CHRISTIAN	Ozark	CHRISTIAN	CHRISTIAN	1st Baptist Church	1400 W Jackson
12	Point	M	100	BILLINGS, CHRISTIAN	Billings	CHRISTIAN	CHRISTIAN	Billings Community Center	119 SE Washington
13	Point	M	100	NIXA, CHRISTIAN	Nixa	CHRISTIAN	CHRISTIAN	Nixa Fire District	711 N. Main St.
14	Point	M	100	NIXA, CHRISTIAN	Nixa	CHRISTIAN	CHRISTIAN	Nixa Fire Station 4	301 S Nicolas Rd.
15	Point	M	100	OZARK, CHRISTIAN	Ozark	CHRISTIAN	CHRISTIAN	Countryside Christian Church	3350 W. Jackson St.
16	Point	U	0			CHRISTIAN	CHRISTIAN	James River Assembly	Hwy 65 & CC
17	Point	U	0		Union Hill	CHRISTIAN	CHRISTIAN	Union Hill Church of Christ	865 N. Nicolas Rd
18	Point	M	100	HIGHLANDVILLE, CHRISTIAN	Highlandville	CHRISTIAN	CHRISTIAN	Highlandville Fire Station	1162 Glossip Rd.
19	Point	M	74	LEASBURG, CRAWFORD	Leesburg	CRAWFORD	CRAWFORD	Leesburg 1st Baptist Church	378 Hwy H



Place the point using the Sketch tool by clicking on the map at the desired position. The point you placed will become the location of the record you have selected. Some of these points might



be pretty much a 'guestimate', but at least you will have the same number of points that you do records. You might consider coming up with your own status codes to indicate what type of match you had to use (C for city center ).

Make sure you save your edits often! ArcMap does not keep any temporary files like Microsoft does.

The Internet is a great resource to find out additional information about a site, especially if are looking for a business rather than an individual and have only a partial address. Sites such as maps.google.com or melissadata.com are suggested.

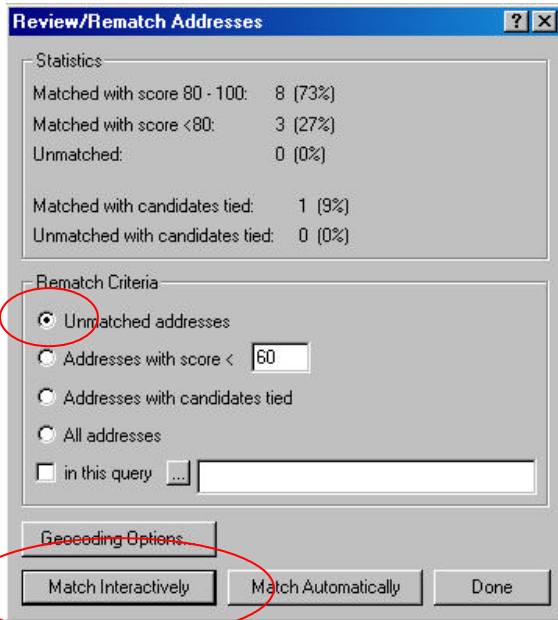
*Created 5/22/2008*

*Last Updated 11/14/2008*

*Tracy Schloss*

## Matching Interactively

You might choose to interactively match some of the candidates if you weren't able to place the points even to the center of the city.

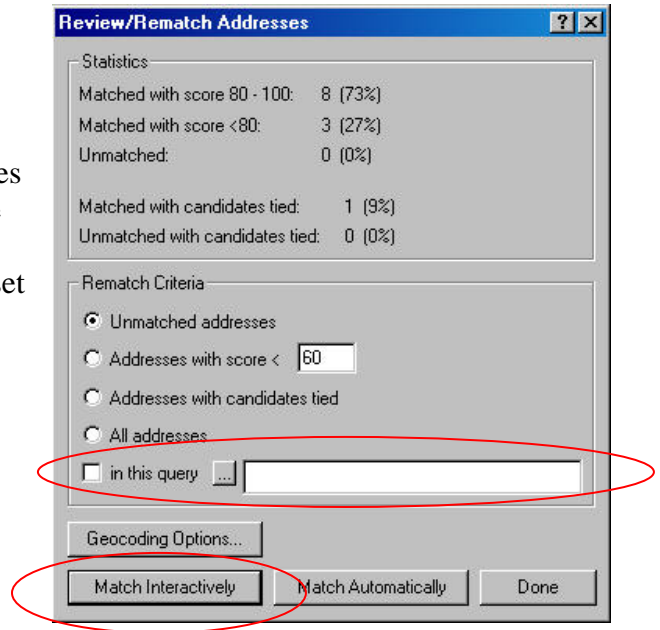


The dialog will likely already have “Unmatched addresses” as the selected choice in the Rematch Criteria section of the dialog.

## Matching Interactively

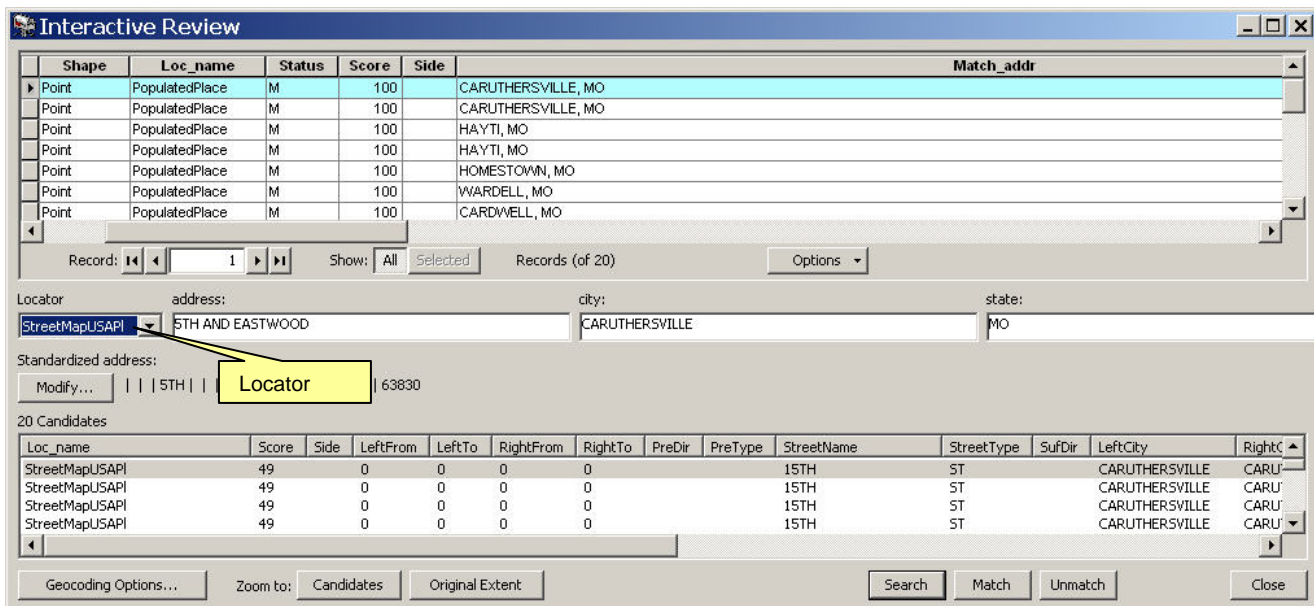
You might choose to interactively match some of the candidates if you have many complete addresses that only matched to the city center. If you choose to do this, you can change the Rematch Criteria to the option “in this query”, hit the ellipse (...) and set a definition of "Loc\_name" = 'PopulatedPlace'

Interactive matching is the most time consuming part of geocoding, especially if you have not spent any time making sure your addresses are complete and clean as possible.

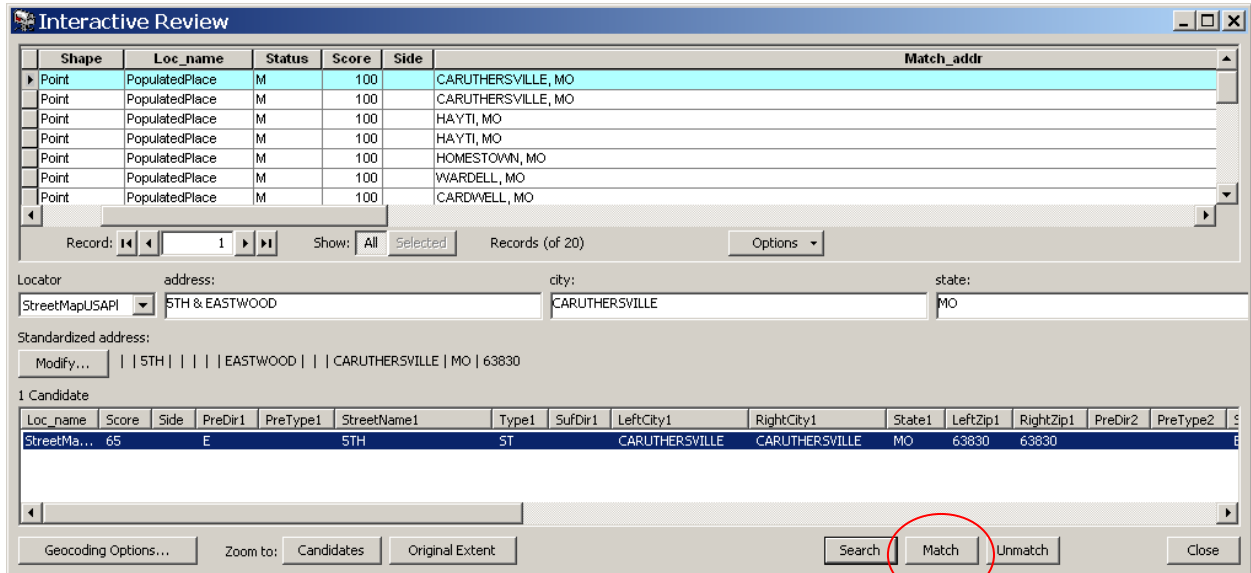


In this example, a match was made to the PopulatedPlace locator, which means the point is in the center of the town. However, the record does have a complete address of “5<sup>th</sup> and Eastwood”. One problem with this particular record is the use of the word “and”. So the 1<sup>st</sup> thing to try is to change it to either “&” or “@”. Both of these are acceptable for an address based on an intersection.

Next change the Locator from PopulatedPlace to StreetMapUSAPI.



Once the Locator is changed to StreetMapUSA and the address format changed, you will see that there is a candidate available for matching.



Make sure the candidate is selected and click Match. The location of the point will be adjusted from the center of town (Caruthersville) to the more accurate placement at the intersection of 5<sup>th</sup> St at Eastwood.

Each address may have more than one candidate. In this example, the record was matched to the center of the town because the address number, 801, did not appear in any of the segments with the street name Oates.

All the potential candidates will be shown below. Notice that the score for each candidate in this example is below the score of “80”, which is the default spelling sensitivity.

The screenshot shows the 'Interactive Review' window with a list of records and a table of candidates. The record with FID 14 is selected, showing a score of 100 and a match address of 'HAYTI, MO' with an ARC address of '801 N. Oates'. Below the records, the locator shows 'StreetMapUSAPI' with address '801 N. OATES', city 'HAYTI', and state 'MO'. The standardized address is '801 | N | | OATES | | | HAYTI | MO | 63851'. The candidates table shows three options for the address 801 N. Oates, with scores of 57, 54, and 50. The first candidate (1506 1706 1117 1505 N Oates Dr) is circled in red.

FID	Shape	Loc_name	Status	Score	Side	Match_addr	ARC_addr
4	Point	PopulatedPlace	M	100		CARUTHERSVILLE, MO	5th and Eastwood
5	Point	PopulatedPlace	M	100		CARUTHERSVILLE, MO	5th and Ferguson
14	Point	PopulatedPlace	M	100		HAYTI, MO	801 N. Oates
15	Point	PopulatedPlace	M	100		HAYTI, MO	Hayti Ballfield Complex
17	Point	PopulatedPlace	M	100		HOMESTOWN, MO	City Hall
18	Point	PopulatedPlace	M	100		WARDELL, MO	Wardell City Park
19	Point	PopulatedPlace	M	100		CARDWELL, MO	500 S. Main

Loc_name	Score	Side	LeftFrom	LeftTo	RightFrom	RightTo	PreDir	PreType	StreetName	StreetType	SufDir	LeftCity	RightCity
StreetMapUSAPI	57	R	1506	1706	1117	1505	N		OATES	DR		HAYTI	HAYTI
StreetMapUSAPI	54		0	0	0	0	N		OATES	DR		HAYTI	HAYTI
StreetMapUSAPI	50		0	0	0	0			OATES			HAYTI	HAYTI

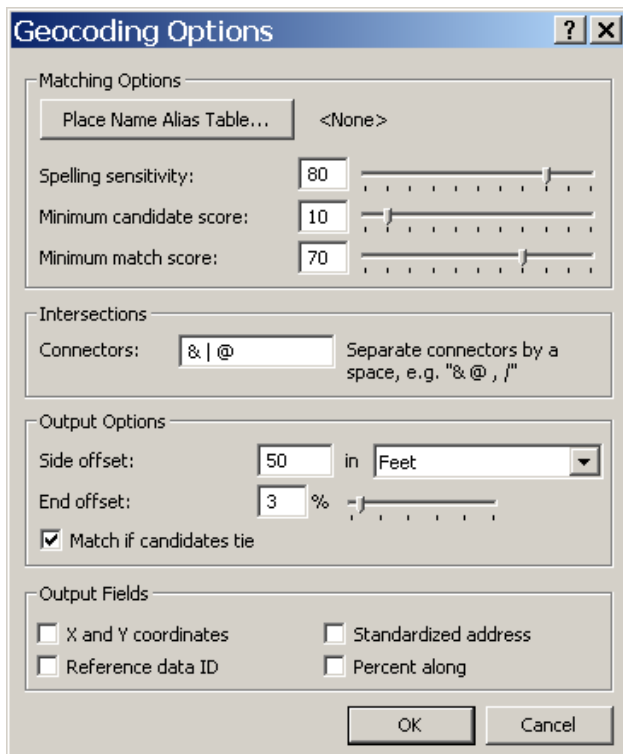
The input address was 801 N Oates. Notice the LeftFrom, LeftTo, RightFrom, RightTo numbers. These are the address ranges for the nearest street segments to the address 810. This particular record was not matched because there is no 800 block for Oates.

You can choose to match to the nearest segment, the 1st candidate (1506 1706 1117 1505 N Oates Dr).

Alternately, you can zoom to the candidates to view these 3 options on the map before you decide.

## Changing the Sensitivity of the Geocoding Options.

If you don't have any candidates to choose from, you can lower the spelling sensitivity and



The screenshot shows the 'Geocoding Options' dialog box with the following settings:

- Matching Options:**
  - Place Name Alias Table...: <None>
  - Spelling sensitivity: 80 (slider bar)
  - Minimum candidate score: 10 (slider bar)
  - Minimum match score: 70 (slider bar)
- Intersections:**
  - Connectors: & | @ (text box)
  - Separate connectors by a space, e.g. "& @ , /" (text)
- Output Options:**
  - Side offset: 50 in Feet (dropdown)
  - End offset: 3 % (slider bar)
  - Match if candidates tie
- Output Fields:**
  - X and Y coordinates
  - Standardized address
  - Reference data ID
  - Percent along

Buttons: OK, Cancel

minimum match rate in the Geocoding Options dialog. This is located in the lower left of the Interactive Review dialog.

You can either key in a value or use the slider bar to lower the score. Lower spelling sensitivity should give you more candidates. The more you drop this number, the more likely you are to introduce candidates that might not be good choices. (For example, you may have 123 Main St in Kennett MO, but you might drop your score low enough to see 123 Main St in New Madrid as an option.) Make sure you scroll over to the right in the candidates list to confirm you haven't strayed too far.

## Unmatched Records - Interactive Review Process

If you chose the basic StreetMap USA locator for your geocoding, rather than the composite geocoder in the M:\GISDATA\StreetMap, you will likely have many unmatched records.

You will know a candidate is unmatched because the Status is set to “U”.

The screenshot shows the 'Interactive Review' window. At the top, a table lists records with columns: FID, Shape, Status, Score, Side, X, and Y. Record 19 is highlighted in cyan and has its 'Status' cell circled in red. Below this table are navigation controls and a search area. The search area includes fields for 'Address or Intersection' (500 S. MAIN), 'City' (CARDWELL), 'State or Province' (MO), and 'Postal Code' (63822). Below the search area is a 'Standardized address' field and a '37 Candidates' table. The '37 Candidates' table has columns: Score, Side, X, Y, LeftFrom, LeftTo, RightFrom, RightTo, PreDir, PreType, StreetName, StreetType, SufDir, LeftCity, RightCity, and State. At the bottom of the window, there are buttons for 'Geocoding Options...', 'Zoom to:', 'Candidates', 'Original Extent', 'Search', 'Match', 'Unmatch', and 'Close'. The 'Match' button is circled in red.

FID	Shape	Status	Score	Side	X	Y
15	Point	U	0		0	0
17	Point	U	0		0	0
18	Point	U	0		0	0
19	Point	U	0		0	0
20	Point	U	0		0	0
23	Point	U	0		0	0
26	Point	U	0		0	0

Address or Intersection: 500 S. MAIN City: CARDWELL State or Province: MO Postal Code: 63822

Standardized address: 500 | S | | MAIN | | CARDWELL | MO | 63822

Score	Side	X	Y	LeftFrom	LeftTo	RightFrom	RightTo	PreDir	PreType	StreetName	StreetType	SufDir	LeftCity	RightCity	State
52	L	...	3...	500	598	501	599	S		MAIN	ST		CAMPBELL	CAMPBELL	MO
34	L	...	3...	502	400	499	401	W		MAIN	ST		PARMA	PARMA	MO
34	L	...	3...	640	300	399	301	N		MAIN	ST		CAMPBELL	CAMPBELL	MO
27	L	...	3...	400	498	401	499	S		MAIN	ST		CAMPBELL	CAMPBELL	MO

Records with a “U” status appear in the attribute table only, they don’t yet have a point on the map. Step through each record and review the candidate choices carefully. You may want to lower the spelling sensitivity in the geocoding options to see more candidate choices.

Once you have selected a matching candidate, click the Match button. The status will change from “U” to “M” (for matched).

If you still have unmatched records, the next step is to interactive place them by clicking a point on the map.

## Unmatched Records - Matching Interactively by Pointing on the Map

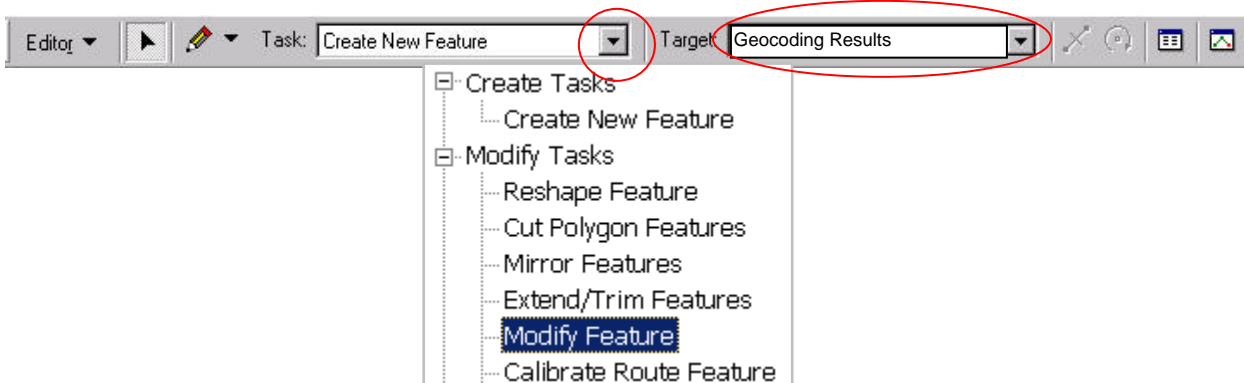
If you have no candidates to choose from, you can match the last of the points by hand, provided you can pinpoint them on a map. It is a good idea to load a few data layers like city limits, town points and major highways to give you some reference on your map. If you have facilities like schools (“North Elementary School”) or hospitals (“Barnes Jewish North”) it is a good idea to add these layers as well from the M:GISDATA\Facility folder (schoolPublic.shp and hospitals.shp for these examples).

First, exit out of the geocoding dialog you’ve been working in by clicking Close. The remaining points can be matched by clicking on a point on a map.

Start an Edit session.



Set the task on the Editor toolbar to Modify Feature and the target to the geocoded layer.



Open the attribute table of the geocoded points and select/highlight the record to be placed.

In the Status field, change the U to an M for the selected record.

Attributes of Geocoding Result: Geocoding\_Result

FID	Shape	Status	Score	Match_addr	ARC_City	ARC_State	COUNTY	LOCATION	Address
0	Point	M	100	BUTTERFIELD, BARRY	Butterfield	BARRY	BARRY	Butterfield Community Center	602 Ash St.
1	Point	U	0			BARRY	BARRY	LaCobba Special Assist Living	
2	Point	U	0		Monett	BARRY	BARRY	Monette Hospital (Private)	
3	Point	M	100	WASHBURN, BARRY	Washburn	BARRY	BARRY	Washburn Church of Christ	
4	Point	U	0		Monett	BARRY	BARRY	Church of Nazarene	201 S Highway 37
5	Point	M	100	LAMAR, BARTON	Lamar	BARTON	BARTON	Hall	11th and Broadway
6	Point	M	100	GOLDEN CITY, BARTON	Golden City	BARTON	BARTON	Community Cente	Depot Ave
7	Point	M	100	LAMAR, BARTON	Lamar	BARTON	BARTON	Senior Citizens Bldg	
8	Point	M	100	CAMDENTON, CAMDEN	Camdenton	CAMDEN	CAMDEN	Mid County Fire Dept	148 N Highway 5
9	Point	M	100	STOCKTON, CEDAR	Stockton	CEDAR	CEDAR	Assembly of God Church	1505 S. 3rd. Street
10	Point	M	100	CLEVER, CHRISTIAN	Clever	CHRISTIAN	CHRISTIAN	Clever City Hall	304 S Clarke Av
11	Point	M	100	OZARK, CHRISTIAN	Ozark	CHRISTIAN	CHRISTIAN	1st Baptist Church	1400 W Jackson
12	Point	M	100	BILLINGS, CHRISTIAN	Billings	CHRISTIAN	CHRISTIAN	Billings Community Center	119 SE Washington
13	Point	M	100	NIXA, CHRISTIAN	Nixa	CHRISTIAN	CHRISTIAN	Nixa Fire District	711 N. Main St.
14	Point	M	100	NIXA, CHRISTIAN	Nixa	CHRISTIAN	CHRISTIAN	Nixa Fire Station 4	301 S Nicolas Rd.
15	Point	M	100	OZARK, CHRISTIAN	Ozark	CHRISTIAN	CHRISTIAN	Countryside Christian Church	3350 W. Jackson St.
16	Point	U	0			CHRISTIAN	CHRISTIAN	James River Assembly	Hwvy 65 & CC
17	Point	U	0		Union Hill	CHRISTIAN	CHRISTIAN	Union Hill Chruch of Christ	865 N. Nicolas Rd
18	Point	M	100	HIGHLANDVILLE, CHRISTIAN	Highlandville	CHRISTIAN	CHRISTIAN	Highlandville Fire Station	1162 Glossip Rd.
19	Point	M	74	LEASBURG, CRAWFORD	Leesburg	CRAWFORD	CRAWFORD	Leesburg 1st Baptist Church	378 Hwy H

Record: 1 | Show: All Selected | Records (1 out of 20 Selected) | Options



Place the point using the Sketch tool by clicking on the map at the desired position. The point you placed will become the location of the record you have selected.



The Internet is a great resource to find out additional information about a site, especially if are looking for a business rather than an individual and have only a partial address. Sites such as maps.google.com or melissadata.com are suggested.

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Tracy Schloss*