

# ArcGIS® 9

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## Geocoding in ArcGIS



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#### **DATA CREDITS**

*Burglary Map:* GDT and Vexcel Corp.

*Yellowstone Fire Data:* National Park Service

*Quick-Start Tutorial Data:* Atlanta, Georgia

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# Quick-start tutorial

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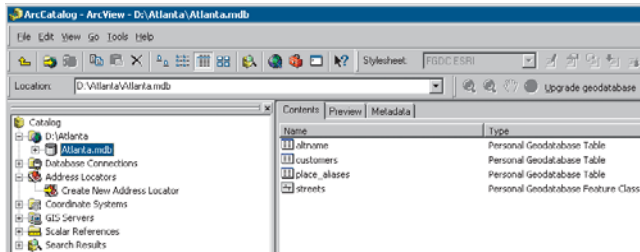
This tutorial introduces you to geocoding with ArcGIS Desktop. You will learn the basic techniques for creating address locators and geocoding with ArcGIS. Exercises 2 and 3 demonstrate some advanced features—using alternate names and place name aliases and creating a dynamic feature class that is related to the address table.

Some procedures in this tutorial require that you be familiar with using ArcCatalog and ArcMap. For example, you should know how to copy data to a new location and add data to a map. You should also have a basic understanding of what a geodatabase is and the objects it can contain. If you're new to GIS or feel you need to refresh your knowledge, please take some time to read *Getting Started with ArcGIS*. You might also find that working through the quick-start tutorials in *Using ArcCatalog* and *Using ArcMap* will help you understand many of these basic concepts.

# Exercise 1: Locating and rematching addresses

In the first part of this tutorial you'll learn how to create a new address locator, how to locate an address on a map, and how to create point features representing street addresses stored in a table such as customer locations.

Before you begin, it is recommended that you make a copy of the data used in this tutorial so the original tutorial data will remain unmodified. Copy the Atlanta folder to a new location on your computer such as the C:\ disk; you'll find it in the ArcTutor\Geocoding folder on the local disk where the tutorial data was installed. You'll need 5 MB of free disk space to store a copy of the Atlanta folder.



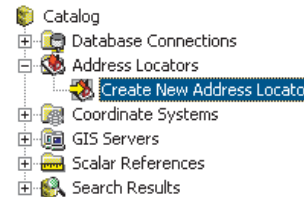
The Atlanta folder contains a personal geodatabase named Atlanta.

## Creating a new address locator

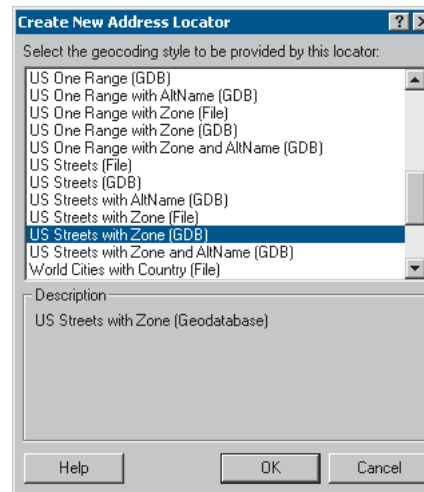
An address locator lets you convert textual descriptions of locations into geographic features. The Address Locators folder near the top of the Catalog tree lets you manage existing locators and create new address locators on your computer. The first thing you'll do is create an address

locator based on your copy of the Atlanta personal geodatabase.

1. Start ArcCatalog.
2. In the Address Locators folder near the top of the Catalog tree, double-click Create New Address Locator.



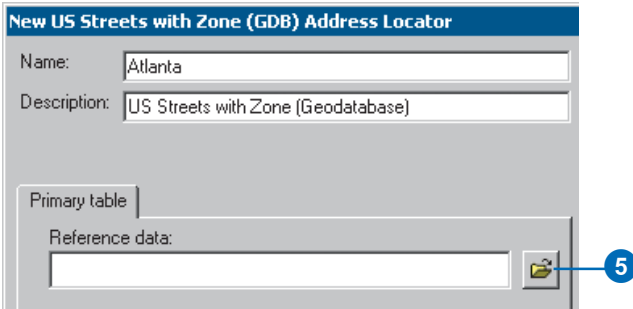
The Create New Address Locator dialog box appears.



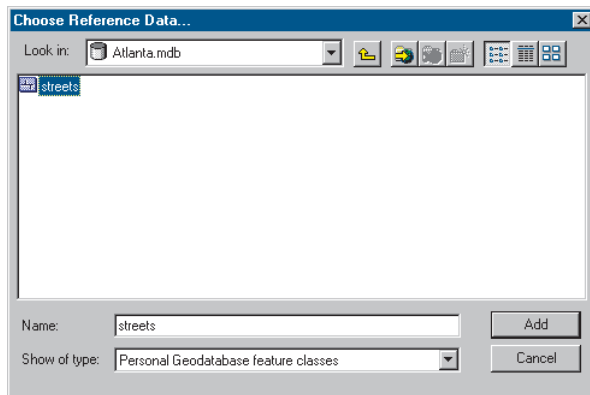
- Click the US Streets with Zone (GDB) geocoding style, then click OK.

The New US Streets with Zone (GDB) Address Locator dialog box appears.

- In the Name text box, type “Atlanta”, replacing the default name.

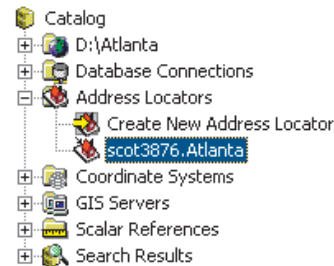


- On the Primary table tab, click the Browse button next to the Reference data text box. This will open the Choose Reference Data dialog box.



- In the Choose Reference Data dialog box, navigate to the folder containing your copy of the Atlanta personal geodatabase. Double-click the personal geodatabase, click the streets feature class, then click Add. This will add the streets feature class as reference data to the Primary table tab and populate the fields.
- Leave all other address locator settings as they are and click OK in the New US Streets with Zone (GDB) Address Locator dialog box. The new address locator appears in the Address Locators folder.

You’ll notice that the name of the address locator is prefaced by your login name. If your login name is “ssmith”, the address locator would appear in the Catalog tree as “ssmith.Atlanta”.



New address locators are private; other users who log in to the same computer won’t have access to your address locators.

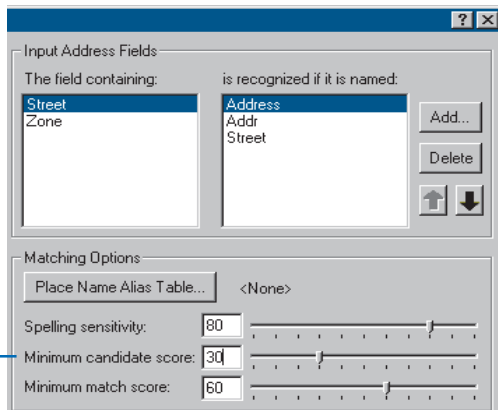
When the new address locator is created, a geocoding index is built for the streets feature class within the Atlanta geodatabase. The index is stored in a new table named GC\_SZS1 in the Atlanta geodatabase. With this index, the street features can be quickly matched to the addresses you want to geocode.

You will now modify the properties of the address locator you just created.

- Right-click the yourLogin.Atlanta address locator and click Properties. The Address Locator Properties dialog box appears.

On the right under Matching Options, you can see that the default Minimum candidate score is 10. This setting determines the matching score needed to return a potential candidate.

- Click and drag the slide bar to change the Minimum candidate score to a value of 30.



- Click OK, closing the Address Locator Properties dialog box.

Your changes are saved in the address locator. Now you can use this address locator to find out where addresses are located on a map.

### Finding an address interactively

You can use address locators to locate addresses while you are working in ArcMap. This process is commonly called geocoding.

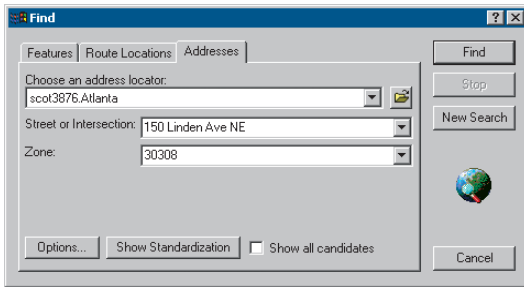
- Start ArcMap and click OK to create a new, empty map.
- Add the streets feature class in the Atlanta geodatabase to the ArcMap document.



- Click the Find button on the Tools toolbar.
  - In the Find dialog box, click the Addresses tab.
- Before you can locate an address on your map, you must identify the address locator you want to use.
- Click the Browse button to choose an address locator. Navigate to the Address locators folder, click the yourLogin.Atlanta address locator, and click Add.

This populates the Choose an address locator text box and adds two additional text boxes that will be used to enter the address elements.

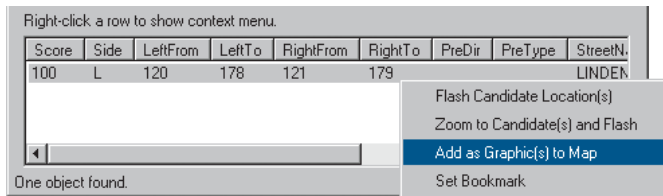
- Type “150 Linden Ave NE” in the Street or Intersection text box. Type “30308” in the Zone text box.



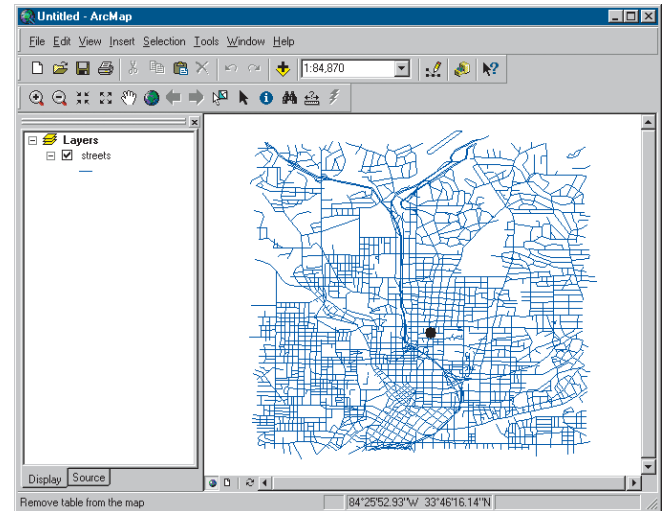
- Click Find.

One candidate address appears in the list at the bottom of the Find dialog box.

- Right-click the candidate and click Add as Graphic(s) to Map.



A graphic point representing the address’s location appears on the map.

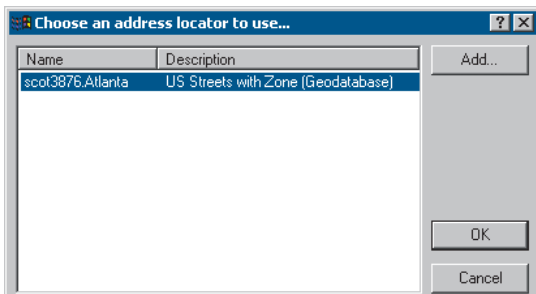


- In the Find dialog box, check Show all candidates.
- Click the Close button in the upper right corner of the Find dialog box.

## Geocoding addresses in a table

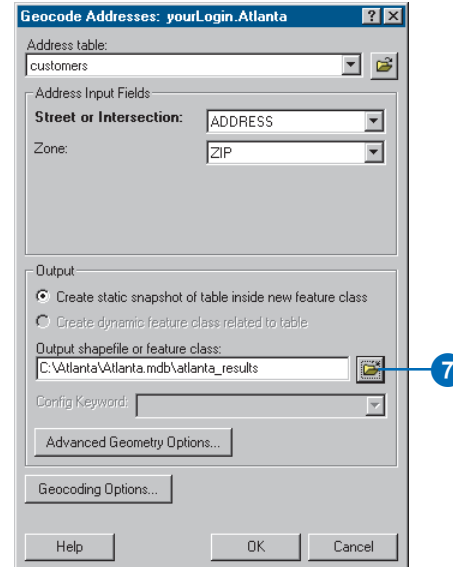
If you have a table that contains address information, you can geocode all of the addresses at once. In this exercise you will begin with a table containing the addresses of customers and geocode the entire table, showing where the customers are located.

1. Open a new map document in ArcMap. You do not need to save the map you created in the previous task.
2. Add the streets feature class and the customers table from your copy of the Atlanta geodatabase to your map.
3. Right-click the customers table on the Source tab of the table of contents and click Geocode Addresses.
4. On the Choose an address locator dialog box, click Add. The Add Address Locator dialog box will open.
5. Navigate to the Address Locators folder, click the yourLogin.Atlanta address locator, then click Add.
6. Click yourLogin.Atlanta in the Choose an address locator to use dialog box, then click OK.

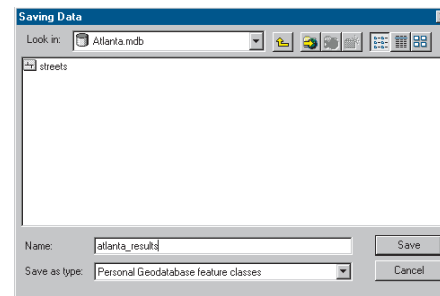


This will open the Geocode Addresses: yourLogin.Atlanta dialog box.

7. Under the Output section, click the Browse button to define the Output shapefile or feature class. This will open the Saving Data dialog box.



8. Click the Save as type dropdown arrow, then click Personal Geodatabase feature classes.





9. Navigate to your copy of the Atlanta personal geodatabase, then double-click the personal geodatabase. In the Name text box, type “atlanta\_results”.

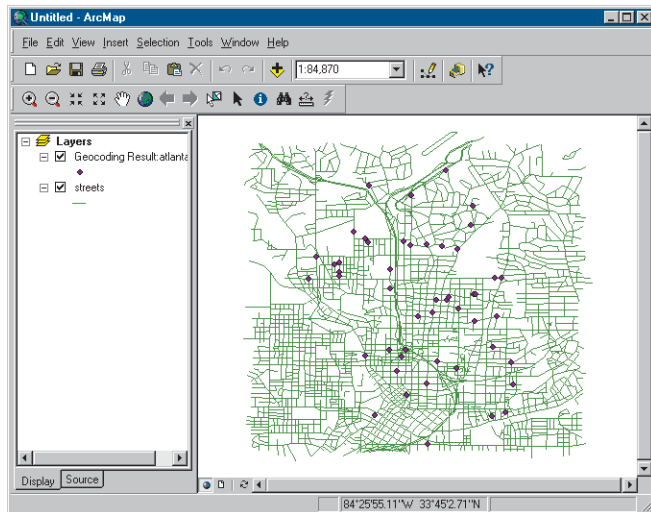
10. Click Save.

A new point feature class named atlanta\_results will be created in the Atlanta geodatabase. The point features generated by the geocoding process will be saved in that feature class.

11. Click OK to start geocoding.

When the geocoding process is finished, the Review/Rematch Addresses dialog box appears. It shows the statistics of the addresses that were matched or not matched. You’ll rematch the unmatched addresses later in the tutorial.

12. Leave the rematch criteria as is and click Done to close the Review/Rematch Addresses dialog box.



A Geocoding Result layer is added to the map. It shows the points that were added to the atlanta\_results feature class.

You can also geocode a table of addresses in ArcCatalog. To do so, right-click the customers table in the Atlanta geodatabase and click Geocode Addresses. This will induce a series of dialog boxes identical to those identified in this exercise. You can then add the created feature class to an ArcMap document.

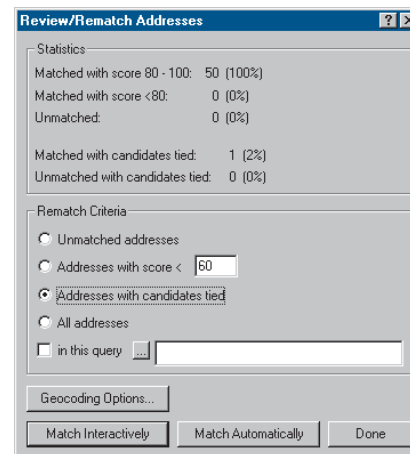
### Rematching addresses

1. In ArcMap, click the Tools menu, point to Geocoding, point to Review/Rematch Addresses, then click Geocoding Result: atlanta\_results.

2. The message “This operation requires that you be editing this workspace. Would you like to start editing?” appears. Click Yes.

The Review/Rematch Addresses dialog box opens.

3. In the Rematch Criteria section, click the option Addresses with candidates tied.



4. Click Match Interactively.

The Interactive Review dialog box appears. The address records that you have chosen to rematch are listed at the top of the dialog box. In this exercise there is one record in the feature class that has two candidates that are tied for the highest match score. The tied candidates are listed at the bottom of the dialog box.

5. Arrange the ArcMap window and the Interactive Review dialog box so you can see the map.

Near the center of the map, you will notice two points highlighted, one in yellow and the other in blue. These are the locations of the two candidates listed in the bottom window of the Interactive Review dialog box. The selected candidate is highlighted in yellow on the map.

6. Click the second candidate in the candidate list. The location of the yellow highlighted candidate changes on the map.

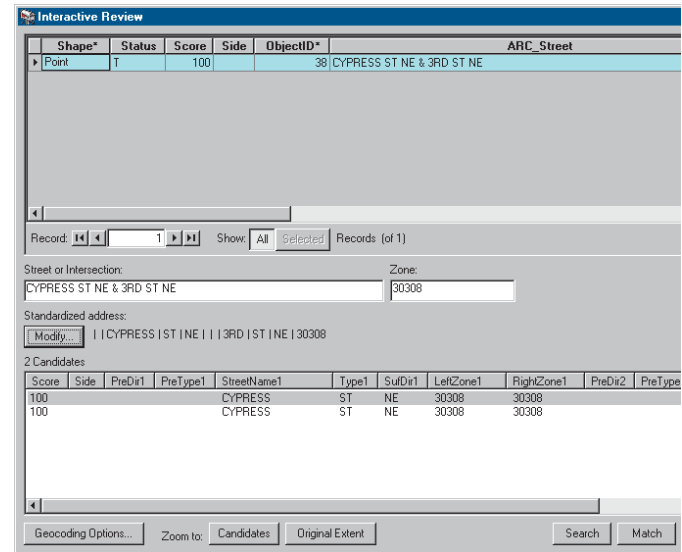
7. In the bottom right corner of the Interactive Review dialog box, click Match. The selected address in the list at the top of the dialog box is now associated with the second candidate in the list at the bottom.

8. Click the Close button to close the Interactive Review dialog box.

9. Click Done to close the Review/Rematch Addresses dialog box.

10. On the Editor toolbar, click the Editor menu and click Stop Editing. Click Yes to save your changes.

11. Close ArcMap. You do not need to save the changes to your map document.



You can also rematch addresses with ArcCatalog. To do so, refresh the contents of the Atlanta geodatabase if you don't see the atlanta\_results feature class listed in the Contents tab. Right-click the atlanta\_results feature class, then click Review/Rematch Addresses. This will induce a series of dialog boxes similar to those described in this exercise.

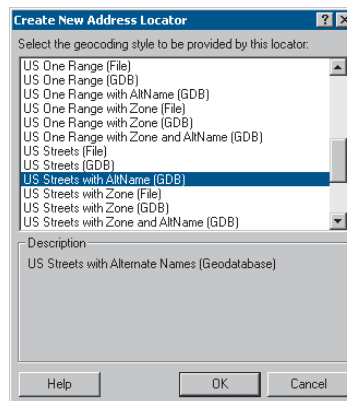
## Exercise 2: Using alternate street names and place name aliases

When you create an address locator, you have the option to use alternate street names and place name aliases. Place name aliases let you associate names of well-known places with street addresses—for example, the names of museums, hospitals, or landmarks. When geocoding an address, the place name alias table is consulted first. If a place name is found, the street address from the place name alias table is geocoded. Similarly, alternate street names can be defined for features in the reference data. When geocoding an address, the alternate street name table is also searched to find potential candidates where streets have more than one name.

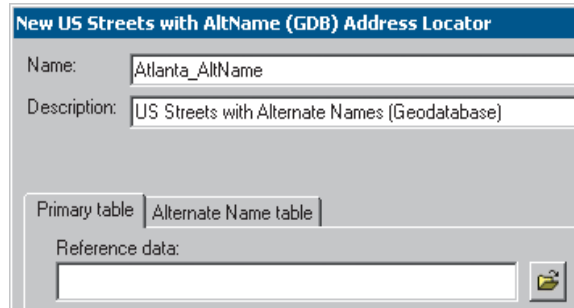
### Creating an address locator that uses alternate names and place name aliases

In this task you'll create a new address locator that uses alternate street names and place name aliases, then use it in ArcMap to find addresses.

1. In ArcCatalog, click the Address Locators folder at the top in the Catalog tree, then double-click Create New Address Locator.
2. Click the US Streets with AltName (GDB) geocoding style, then click OK.



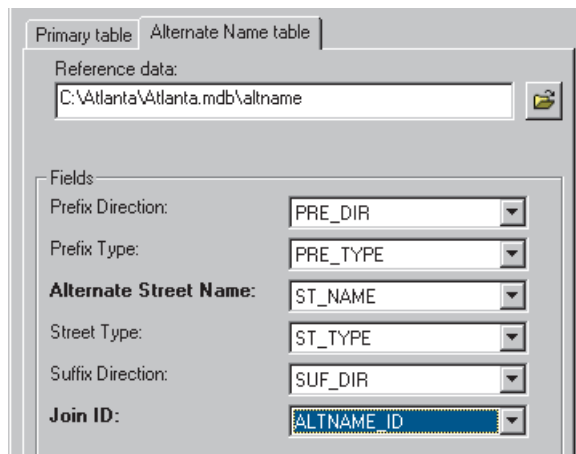
The New US Streets with AltName (GDB) Address Locator dialog box appears.



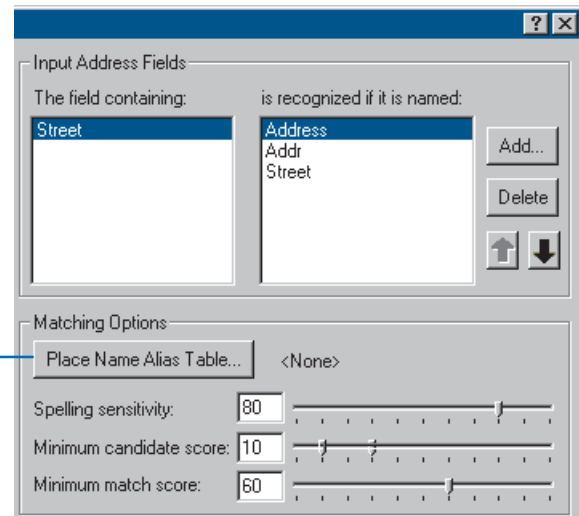
3. In the Name text box, type “Atlanta\_AltName”, replacing the default name.
4. On the Primary table tab, click the Browse button next to the Reference data text box.

5. From the Choose Reference Data dialog box, navigate to the Atlanta personal geodatabase. Double-click the personal geodatabase, click the streets feature class, then click Add.
6. Click the Alternate Name table tab.
7. Click the Browse button next to the Reference data text box.
8. In the Choose Reference Data dialog box, navigate to your copy of the Atlanta personal geodatabase. Double-click the personal geodatabase, click the altname table, then click Add.
9. On the Alternate Name table tab, click the Join ID dropdown list, then click ALTNAME\_ID.

The ALTNAME\_ID column in the altname table and the OBJECTID column in the streets feature class are used to relate the records in the altname table to the records in the streets feature class.

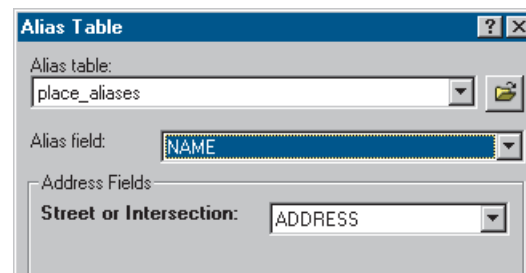


10. On the right under Matching Options, click Place Name Alias Table.

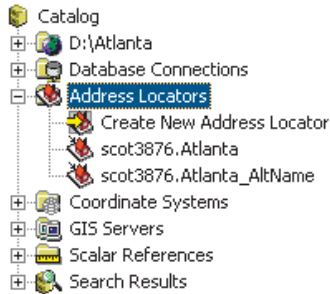


The Alias Table dialog box appears.

11. Click the Browse button, then navigate to the Atlanta geodatabase. Double-click the personal geodatabase, click the place\_aliases table in the Atlanta geodatabase, then click Add.
12. Click the Alias field dropdown arrow, then click NAME.



13. Click OK.
14. Click OK in the New US Streets with AltName (GDB) Address Locator dialog box. The new yourLogin.Atlanta\_AltName address locator appears in the Address Locators folder.



An additional geocoding index table has been added to your copy of the Atlanta personal geodatabase. This new table facilitates searching in the alternate name table.

15. Close ArcCatalog.

You can now use this address locator to find out where an address is located on a map.

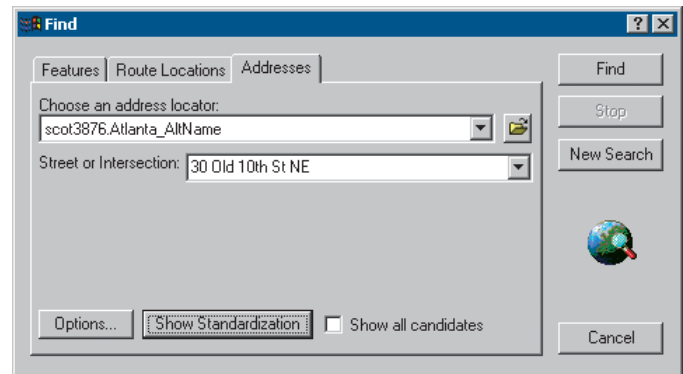
### Finding locations using alternate street names and place name aliases

1. Open a new map document in ArcMap.
2. Add the streets feature class from the Atlanta geodatabase to your map.
3. Click the Find button on the Tools toolbar.
4. In the Find dialog box, click the Addresses tab.
5. Click the Browse button to choose an address locator. Navigate to the Address Locators folder, click the

yourLogin.Atlanta\_AltName address locator, and click Add.

A street may have more than one name. For example, “Atlanta Blvd” is defined as an alternate name for “Old 10th St NE” in the Atlanta database. With the yourLogin.Atlanta\_AltName address locator, “30 Old 10th St NE” and “30 Atlanta Blvd” will both find the same location.

6. Type “30 Old 10th St NE” in the Street or Intersection text box, then click Find.



7. Right-click the candidate and click Add as Graphic(s) to Map.

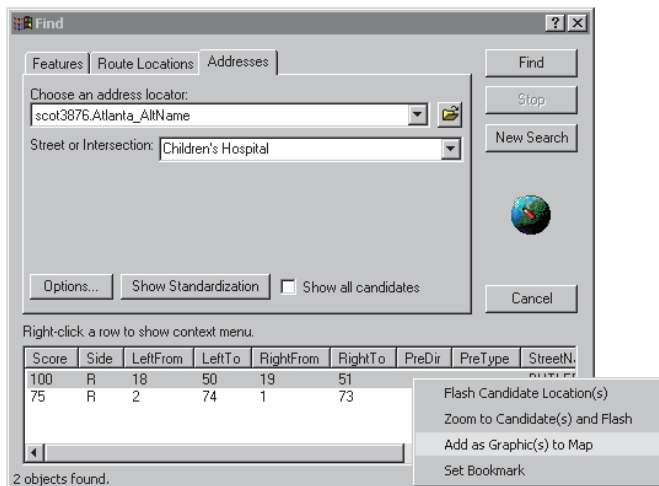
A graphic point representing the address’s location appears on the map.

8. Type “30 Atlanta Blvd” in the Street or Intersection text box, then click Find.

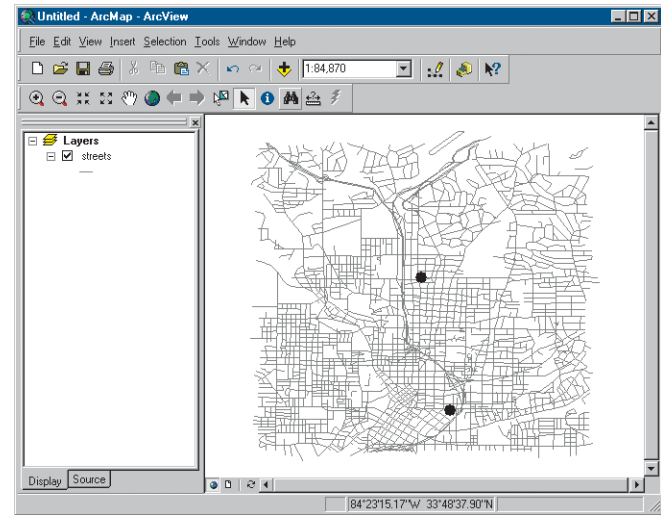
- Right-click the candidate and click Flash Candidate Location(s). You can see that both addresses are matched to the same location on the map.

In addition to geocoding addresses, you can also geocode place names that have been defined in the place\_aliases table.

- Type “Children’s Hospital” in the Street or Intersection text box, then click Find.
- Right-click the first candidate in the candidates list, which has a score of 100, and click Add as Graphic(s) to Map.



The location of the hospital appears on the map as if you had typed its complete address.



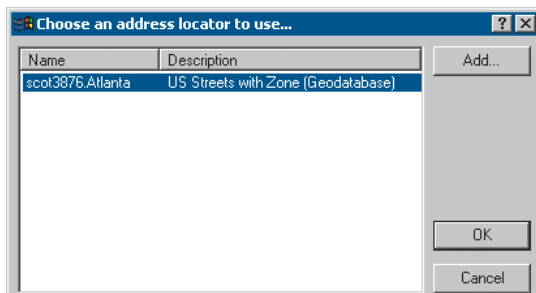
- Click Cancel to close the Find dialog box.

Creating address locators that use alternate names and place name aliases is beneficial for people who know a landmark’s name but not its address. It will also help in situations where a street has more than one name.

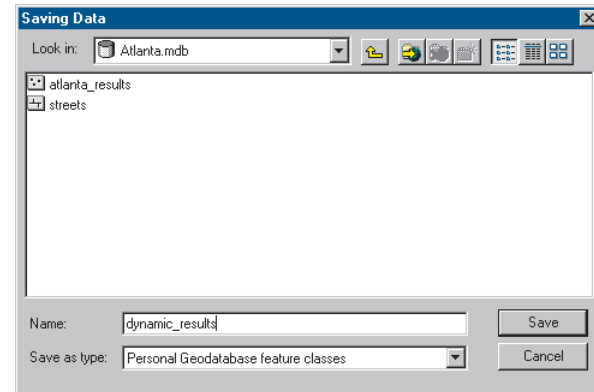
## Exercise 3: Creating a dynamic geocoded feature class

With an ArcInfo™ or ArcEditor™ seat, your geocoding results can be dynamically linked to the original addresses if the address table and the result feature class are stored in the same geodatabase. With dynamic results, modifications to the primary address table will cause the geocoded feature class to be updated automatically. ArcView® users will not be able to complete this exercise.

1. Open a new map document in ArcMap. You do not need to save your previous map document.
2. Add the customers table and the streets feature class in the Atlanta geodatabase to your map.
3. Right-click the customers table in the Source tab of the map's table of contents and click Geocode Addresses.
4. Click Add in the Choose an address locator to use dialog box.
5. In the Add Address Locator dialog box, navigate to the Address Locators folder, click the yourLogin.Atlanta address locator, then click Add.
6. Click yourLogin.Atlanta in the Choose an address locator to use dialog box, then click OK.

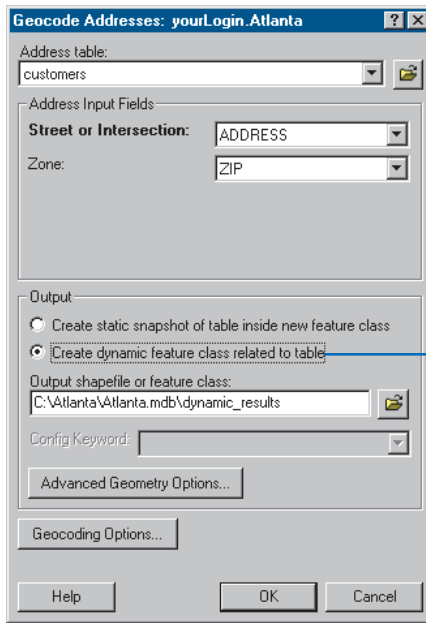


7. In the Geocode Addresses: yourLogin.Atlanta dialog box, click the Browse button to define the Output feature class.
8. In the Saving Data dialog box, click the Save as type dropdown arrow and click Personal Geodatabase feature classes.
9. Navigate to the Atlanta personal geodatabase, then double-click the personal geodatabase.
10. In the Name text box, type “dynamic\_results”. Click Save.



# ArcInfo and ArcEditor

11. Click Create dynamic feature class related to table.



A new point feature class named `dynamic_results` will be created in the Atlanta geodatabase. The point features generated by the geocoding process will be saved in that feature class. A relationship class between the table and feature class will be created.

12. Click OK to start geocoding.  
When the geocoding process is finished, the Review/Rematch Addresses dialog box appears.
13. Click Done to close the Review/Rematch Address dialog box.

A Geocoding Result layer is added to the map. It shows the points that were added to the `dynamic_results` feature class.

14. Right-click the Geocoding Result layer in the map's table of contents and click Open Attribute Table.

Attributes of Geocoding Result: dynamic_results						
	Shape*	Status	Score	Side	ObjectID*	Street or Intersection
▶	Point	M	100	R	1	1171 PIEDMONT AVE NE
	Point	M	100	L	2	1670 W PEACHTREE ST NE
	Point	M	100	R	3	455 BEVERLY RD NE
	Point	M	100	R	4	241 16TH ST NW

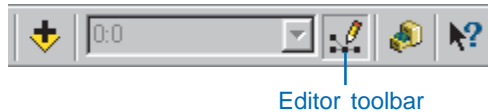
The first record in the table has the address 1171 PIEDMONT AVE NE in the Street or Intersection column. The Status (M: matched, U: unmatched, or T: tied), Score (match score), and Side (R: right side of the road or L: left side of the road) columns contain the values M, 100, and R respectively. To see where this customer is located on the map, click this record in the table. The feature will be highlighted on the map.

15. Minimize the Geocoding Result layer's attribute table.
16. Right-click the customers table in the map's table of contents and click Open.

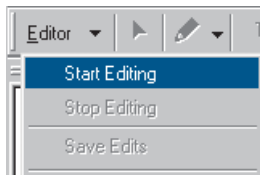
The address that appears for the first customer in the table, Ace Market, is 1171 Piedmont Ave. NE. That customer has moved to a new address, 30 12th St. The ZIP Code remains the same. The customers table must be updated with this information.



17. If the Editor toolbar is not showing, click the Editor Toolbar button to show the Editor toolbar.



18. On the Editor toolbar, click the Editor menu and click Start Editing.



19. Type “30 12TH ST” in the Address column next to Ace Market.

Attributes of customers		
OBJECTID*	NAME	ADDRESS
1	Ace Market	30 12TH ST
2	Andrew's Gasoline	1670 W PEACHTREE ST NE
3	AP Supermarket	455 BEVERLY RD NE
4	Atlanta Market	241 16TH ST NW

20. Click another record in the table.  
 21. Minimize the customers table and maximize the Geocoding Result layer’s attribute table.

The new address was geocoded automatically, and the corresponding values have been updated in the layer’s attribute table. The Status, Score, and Side columns now contain the values T, 81, and L, respectively. The value “T”

in the Status field stands for tied; two or more candidates had the highest score. To see on the map where Ace Market is now located, click this record in the layer’s attribute table.

Attributes of Geocoding Result: dynamic_results					
Shape*	Status	Score	Side	ObjectID*	Street or Intersection
Point	T	81	L	1	30 12TH ST
Point	M	100	L	2	1670 W PEACHTREE ST NE
Point	M	100	R	3	455 BEVERLY RD NE
Point	M	100	R	4	241 16TH ST NW

Now you need to add a new customer to the customers table.

22. Minimize the Geocoding Result layer’s attribute table and maximize the customers table.  
 23. Scroll down to the bottom of the customers table.  
 24. In the blank record after the last record in the table, click in the NAME column. Type “Vine Cafe”.

	48	Sidebottom Inc	1276 W PEACHTREE ST NW
	49	SJ's Marker	400 PONCE DE LEON AVE NE
	50	Southern Flavor	699 JUNIPER ST NE
		Vine Cafe	

Record: 51 Show: All Selected Records (0 out of 50 Selected.)

A new blank record is added to the bottom of the table.

25. In the same record, type “379 VINE ST NW” in the ADDRESS column.  
 26. Type “30314” in the ZIP column.  
 27. Type “Cafe” in the TYPE column.  
 28. In the SALES column type “10000”.

## ArcInfo and ArcEditor

29. Close the customers table. Maximize the Geocoding Result layer's attribute table, then scroll to the bottom.  
A new feature was automatically added to the result feature class representing the new address.
30. On the Editor toolbar, click the Editor menu and click Stop Editing. Click Yes to save your changes.
31. Close ArcMap. Click No to stop ArcMap without saving this map.