Lab VI ENVR 4305 Fall 2019 (18 pts)   Name _____

Creating and Editing Feature Data

Part I: From the "Getting to Know ArcGIS" book provided in lab, work through the Chapter 7 **Exercises 12a**.

Part II: Go through the attached exercise "Create and update features."

The data files for part I should be in the C drive under folder EsriPress/GTKarcGIS/

The data files for part II should be in the C drive under folder EsriTraining/ARC2/

Ask the TA or Instructor for help if you are confused at any time.

Each student should sign their own lab and turn it in at the end of lab.

Exercise 4 Create and update features

Create and update features in the city's GIS database.

In this exercise, you will:

- Use an editing map to help visualize editing tasks.
- Create and update features using sketch tools.
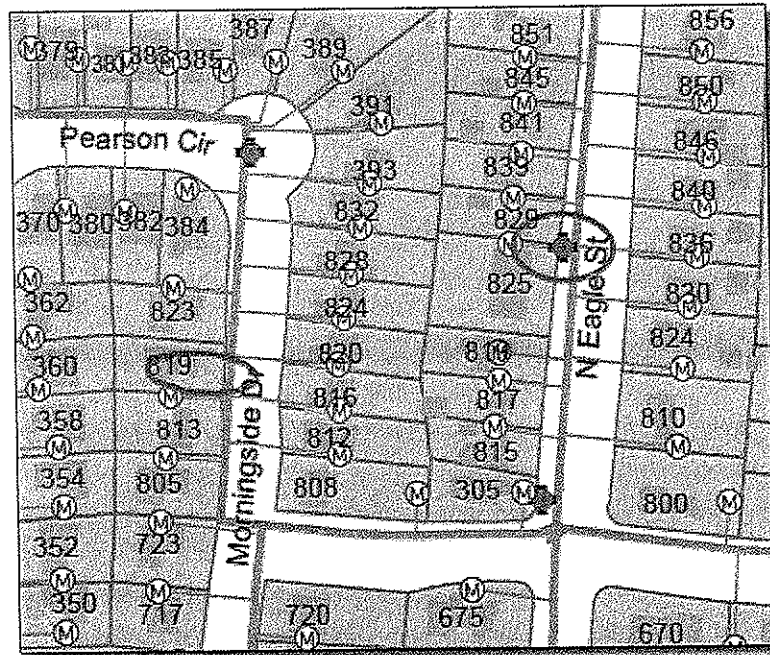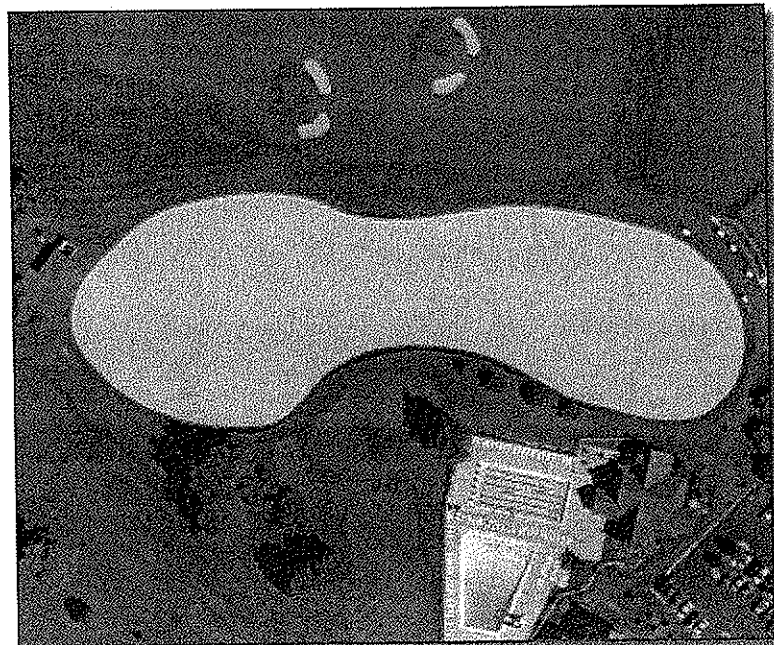
Step 1: Open an editing map to visualize edits

In this exercise, you will use various techniques to create new features and modify existing features for the city of Naperville, Illinois. You will start by reviewing some new additions to the water system.

(a) Start ArcMap and open the ..\ARC2\Editing\Naperville map document.

(b) At the top of the table of contents, click the List By Drawing Order button ⬚, if necessary.

(c) Zoom to the Water System bookmark.

Hint: Click the Bookmarks menu.

Your map displays the city's water system, including meters, hydrants, laterals, and mains. A background basemap layer shows city layers, including parcels, addresses, and street names. There are also two areas in red that have been added by the city's water utility field crews. You will edit the water system features based on these red field notes.

📄 This map and its symbology are based on the ArcGIS for Local Government map, *Water Utility Network Editing*. This symbolized map provides an editing framework for editing water, sewer, and storm water utility data. By applying the symbology included in the editing map, you can create a map document focused on editing workflows.

(d) Zoom to the New Hydrant bookmark.

Your map zooms to an area in which you will add a new water hydrant.

The map shows the parcels and building footprints with address numbers.

(e) With the Identify tool 🔍, click inside the red field note.

The Timestamp and Notes fields were completed by the Water Department field crews. Using these notes, you will complete the edits to the water system. The value for the Completed field is empty—you will mark this as completed after you finish each edit.

1. Record the Timestamp value. You will use this when you add the new hydrant.

_____

(f) Close the Identify window.

Step 2: Add a new point feature

In the step, you will prepare your layers for editing and add a new hydrant feature.

(a) If necessary, close the Catalog and Search windows.

(b) On the Standard toolbar, click the Editor Toolbar button 🖉.

The Editor toolbar is added to your display.

(c) Dock the Editor toolbar to the top of your ArcMap window.

The Editor toolbar provides a central location for many of the most commonly used editing tools. These tools allow you to edit feature geometry and attribute values.

(d) On the Editor toolbar, click the Editor menu and choose Start Editing.

⚠	Start editing encountered one or more layers with warnings. You may not be able to edit some layers if you continue.	
	Name	Description
⚠	Address Points	Cannot edit layer contained in a basemap layer.
⚠	Building Footprints	Cannot edit layer contained in a basemap layer.
⚠	Encumbrances	Cannot edit layer contained in a basemap layer.
⚠	Municipal Boundaries	Cannot edit layer contained in a basemap layer.
⚠	Parcels	Cannot edit layer contained in a basemap layer.
⚠	Road Centerlines	Cannot edit layer contained in a basemap layer.
⚠	Water Bodies	Cannot edit layer contained in a basemap layer.

The Start Editing window appears. This window will appear when the map contains layers that cannot be edited or when the layers access source data from different workspaces. In this case, the warnings are about the Naperville Basemap layer, which cannot be edited.

e Click Continue.

f On the Editor toolbar, click the Create Features button.

The Create Features window opens.

Creating features is accomplished by using feature templates. Feature templates define all the information required to create a feature: the layer where a feature will be stored, the attribute fields and values, and the default tool used to create the feature. The symbol for each editable layer in your map appears in the Create Features window.

g In the Create Features window, double-click the Water Hydrants feature template to display the Template Properties dialog box.

The Template Properties dialog box allows you to set default values for working with the template. You will set a default value for the Manufacturer attribute. Default values will be auto-populated for you when you create a new feature.

h Click the <Null> value next to Manufacturer and type **Mueller Company**.

Facility Identifier	<Null>
Install Date	<Null>
Manufacturer	**Mueller Company**
Operable	1
Last Service Date	<Null>
Enabled	1
Last Editor	<Null>

Fields that cannot be edited, such as the OBJECTID and SHAPE fields, are not listed.

Each new hydrant you add will have this attribute. You can always override the default if a feature requires a different value.

i Click OK to close the Template Properties dialog box.

Next, you will set your snapping environment.

j On the Editor toolbar, click Editor, point to Snapping, and click Snapping Toolbar.

The Snapping toolbar allows you to control if and how your cursor snaps to features in your map, such as at a point, edge, end, or vertex. Snapping is turned on when a button for one or more of the four snapping types is selected (highlighted in blue). You click a selected button to turn off a snapping type.

Your new hydrant feature will be at the end of the water lateral centered within the red field-crew markup polygon.

k On the Snapping toolbar, click the End Snapping button to make End Snapping the only selected snapping option.

l Move or dock the Snapping toolbar as necessary.

m Pause your pointer over the end of the water lateral.
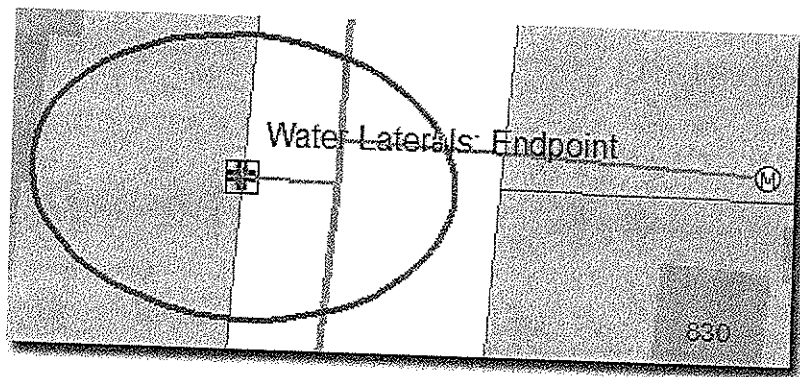
A SnapTip appears, indicating that you are snapped to the endpoint of the Water Laterals line feature.

n Click to add the new Hydrant point feature.

As part of this editing template, your new point feature is highlighted in yellow. You can change this color from the Selection menu by clicking Selection Options.

o On the Editor toolbar, click the Attributes button ▦.

The Attributes window appears, showing the attribute values of your new hydrant. Notice that the Manufacturer value is set to the default value that you specified earlier.

💡 You can switch between the Create Features and Attributes windows by using the tabs at the bottom of the windows.

(p) For Install Date, enter the date and time you recorded earlier from the field notes.

OBJECTID	1440
Facility Identifier	<Null>
Install Date	3/14/2012 1:43:00 PM
Manufacturer	Mueller Company
Operable	1
Last Service Date	<Null>
Enabled	1
Last Editor	<Null>

(q) Clear the selected features to see the hydrant symbol snapped to the end of your water lateral.
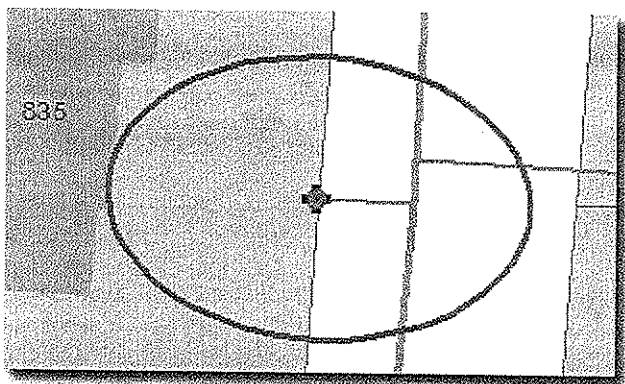
(r) On the Editor toolbar, click the Edit tool ▶.

(s) Click inside the red Field Notes feature to select it.

(t) In the Attributes window, update the Completed attribute with your name or initials.

(u) From the Editor menu, click Save Edits.

Step 3: Add a new line feature

In this step, you will add a new line feature to represent a water lateral. You will use distance measurements to place your new lateral in the correct location.

a Zoom to the New Service bookmark.
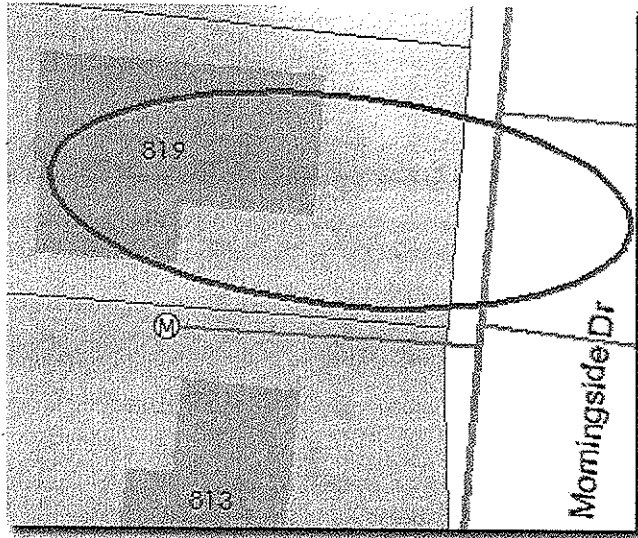
Your map zooms to an area where you will add a new water lateral and a service meter.

b Use the Identify tool to examine the attributes of the field notes.

c Right-click the Timestamp value and click Copy.

d Close the Identify dialog box and turn off the Field Notes layer.

e In the Create Features window, click Water Laterals to select the feature template.

f If necessary, pan your map to see the parcel for 820 Morningside Dr (or hide or close the Create Features window).
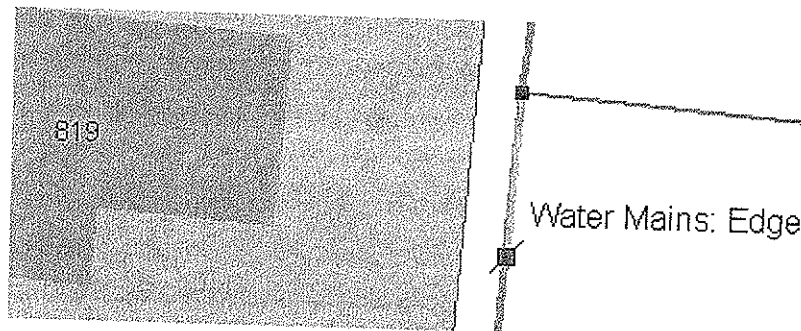
g Snap to and click the intersection of the water main and the water lateral that serves 820 Morningside Dr.
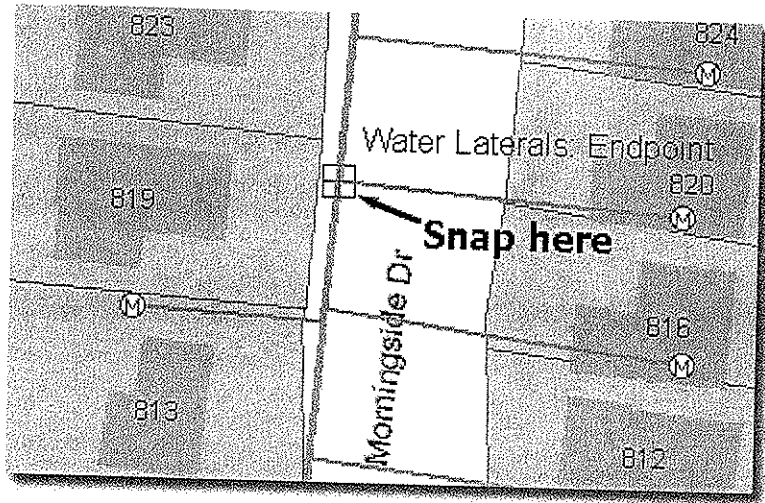
h On the Snapping toolbar, turn on Edge Snapping.

i Right-click in your map and choose Length.

j In the Length dialog box, type **25** and press Enter.

Your segment is now 25 feet long.

k Move your cursor to snap to the water main and then click to add a new vertex.

This will be the actual start point of your new lateral service line. Now you will delete your first vertex to remove the starting segment.

l Place the point of the cursor directly over the first vertex, then right-click and choose Delete Vertex.

You now have your beginning vertex snapped to the water main 25 feet south of the lateral that serves 820 Morningside Dr.

Your next segment will be perpendicular to the existing water main.

(m) Right-click anywhere along the water main, close to your starting vertex, and choose Perpendicular.

(n) Move your pointer and notice that you are now constrained to being perpendicular to the water main.

(o) Right-click inside the parcel for 819 Morningside Dr. and choose Length.

(p) Enter a value of **52.5** and then press Enter.

💡 The Length dialog box also supports adding units abbreviations, which ArcMap converts to the native units of the coordinate system used by your map. For a complete list of units, search the ArcGIS Help for the article *About distance units and editing.*

(q) Right-click again and choose Finish Sketch.

💡 You can also finish your sketch by pressing the F2 key or double-clicking.
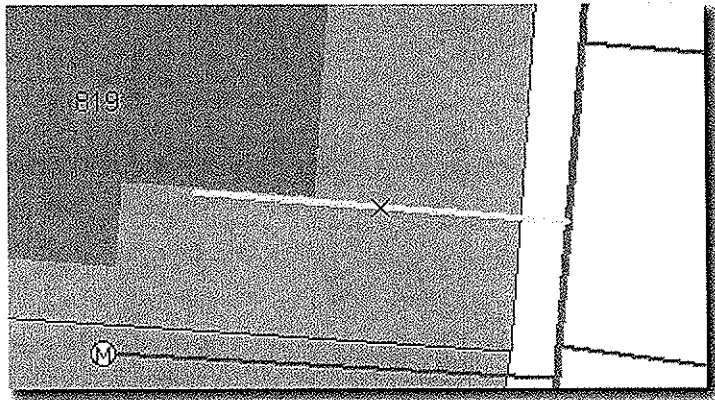
(r) Update the Install Date attribute with the value you recorded from the field notes.

*Hint:* On the Editor toolbar, click the Attributes button, select the Install Date attribute, and paste the Timestamp value you copied earlier.

(s) Clear the selected features.

Next, you will add a service meter to the end of the water lateral and update the field notes.

(t) On your own:

- Add a new Water Meters point to the end of your service line. (Remember to select the appropriate feature template.)
- Update the Install Date attribute.
- Update the Completed field of the Field Notes polygon with your name or initials.
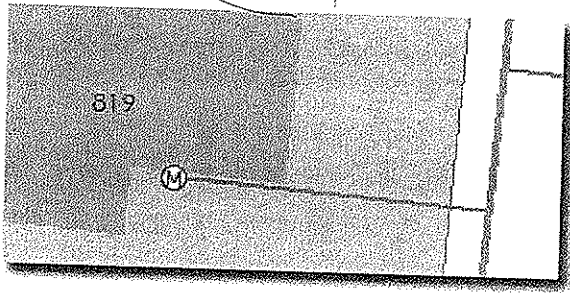
(u) Save your edits.

(v) Close the Create Features and Attributes windows.

(w) From the Editor menu, choose Stop Editing.

💡 If you stop editing without first saving your changes, ArcMap will prompt you to either save or discard your changes.

Step 4: Delete a feature

In this step, you will delete a feature.

(a) Collapse the Water System data frame.

(b) Expand and activate the Lakes data frame.

Hint: Right-click the data frame and choose Activate.

💡 You can also activate a data frame by clicking the data frame while pressing the Alt key.

(c) Zoom to the Delete Lake bookmark.

(d) Turn off the Water Bodies layer to see the area under the lake polygon.

This area has been recently developed, and the small lake no longer exists.

(e) Turn on the Water Bodies layer.

This time, you will use a different method to start editing.

(f) Right-click the Water Bodies layer, point to Edit Features, and click Start Editing.

> 💡 If you cannot start editing, make sure you stop editing in the Water System data frame. You can have an active edit session only in one data frame.

(g) Confirm that the Edit tool ▶ is active and click the lake polygon.

(h) On the Standard toolbar, click the Delete button ✖ .

> 💡 You can also press the Delete key on your keyboard to delete features.

(i) Save your edits.

Step 5: Create a new polygon feature

In this step, you will digitize a new lake that was formed by redesigning the golf course.

(a) Zoom to the Golf Course bookmark.

Before you add your new lake polygon, you will change the symbol used to display your edit sketch. This will allow you to better see your sketch on top of the aerial photo.

(b) From the Editor menu, choose Options.

(c) Confirm that the General tab is active.

(d) At the bottom of the Editing Options dialog box, under Edit Sketch Symbology, click the Current Segment button [_____], which is shown with the current edit sketch line symbol.

(e) In the Symbol Selector dialog box, change the Color to a light blue.

(f) Set the Width to **2** and click OK.

(g) In the Editing Options dialog box, clear the check box next to Use Symbolized Feature During Editing.

[handwritten margin notes] Make sure you "stop" editing on other layer projects first, on the editor. then start editing from Editor Toolbar for the new layer in the Table of Contents

h Click OK to close the Editing Options dialog box.

i On the Editor toolbar, click the Create Features button 📝 to display the Create Features window.

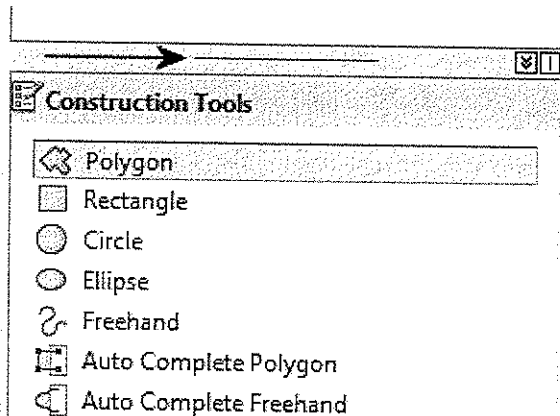**j** Notice that you have two feature templates for this layer:

- Lake Or Pond
- Stream Or River

💡 Layers support multiple feature templates. You can have a separate template for each category of features in the layer.

k Click the Lake or Pond feature template.

At the bottom of the Create Features window is a list of Construction Tools. These tools will change based on the geometry of the layer. These are all the tools for constructing polygons.

l At the bottom of the Create Features window, locate the horizontal bar above Construction Tools (as shown), and then click and drag it up so that you can see all of the available construction tools.

📝 **Construction Tools**

- ⬦ Polygon
- ▢ Rectangle
- ◯ Circle
- ◯ Ellipse
- ϑ Freehand
- ▦ Auto Complete Polygon
- ◁ Auto Complete Freehand

m Click the Freehand tool ϑ.

n Click anywhere along the shoreline of the larger lake to start your sketch.

o Without clicking, drag your pointer along the shore of the lake.

As you drag your pointer, you can see the line you are digitizing. Do not be concerned with the accuracy of your shoreline. Using the Freehand tool gets easier with practice.

(p) When you get back to your start point, click again to finish your sketch.

> ☑ The Freehand is best used for curved features, such as lakes or streams, but you can use it for any type of feature.

Now you will use another technique to digitize the next lake.

(q) Pan to the smaller lake to the east of the lake you digitized.

(r) From the Create Features window, choose the Polygon tool ◌.

(s) Click the shoreline of the lake to start your sketch.

(t) Instead of dragging your pointer as you did with the Freehand tool, click points along the shoreline to digitize your lake.

(u) When you have digitized all of your points, finish your sketch.

   Hint: Double-click or press the F2 key.

(v) Close the Create Features window.

(w) Save your edits.

(x) Stop editing.

Step 6: Copy and paste features

In this step, you will add a newly annexed area into the city.

(a) Collapse the Lakes data frame.

(b) Expand and activate the Annexation data frame.

(c) Zoom to the Annexation bookmark.

The Annexation area has been recently added to the city. You will add this polygon to the Municipal Boundaries layer.

(d) Turn the Annexation layer off and on.

Notice that this area is not currently included in the Municipal Boundaries layer.

(e) Start editing.

📋 If you cannot start editing, make sure you stop editing in the Water System data frame. You can have an active edit session in only one data frame.

(f) In the table of contents, right-click the Annexation layer, point to Selection, and choose Select All.

Instead of digitizing this feature into the Municipal Boundaries layer, you will copy and paste the geometry.
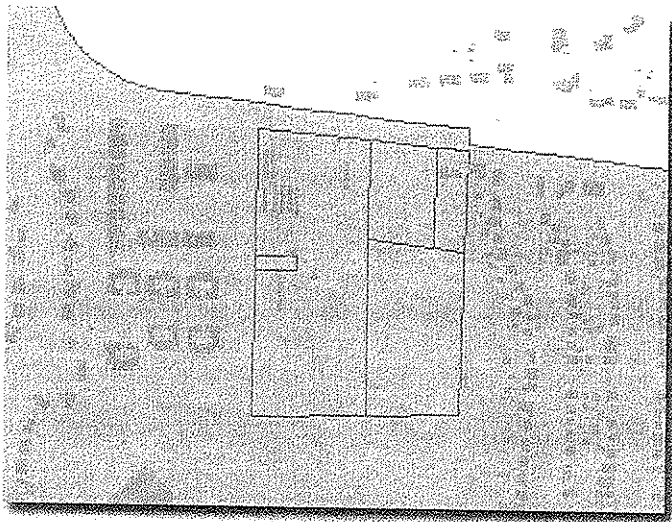
(g) On the Standard toolbar, click the Copy button 📋.

(h) On the Standard toolbar, click the Paste button 📋.

(i) In the Paste dialog box, choose Municipal Boundaries and click OK.

(j) Clear your selected features.

(k) Turn off the Annexation layer.

The polygons have been added to your Municipal Boundaries layer.

(l) Save your edits.

Step 7: Merge features in the same layer

In this step, you will merge your new annexation polygons with the rest of the Municipal Boundaries layer.

(a) Select all the Municipal Boundaries features.

   *Hint:* Right-click the Municipal Boundaries layer, point to Selection, and choose Select All.

(b) From the Editor menu, choose Merge.

The Merge dialog box lists several features. This allows you to choose a set of attributes from one feature that will be applied to your new merged feature. In this case, each polygon simply represents an area of the city, and you do not need to consider the attributes of the new feature.

    The Merge command on the Editor menu combines features in the same feature class, whereas the Merge geoprocessing tool creates a new feature class by combining two or more feature classes together.

(c) Click OK.

(d) Clear your selected features.
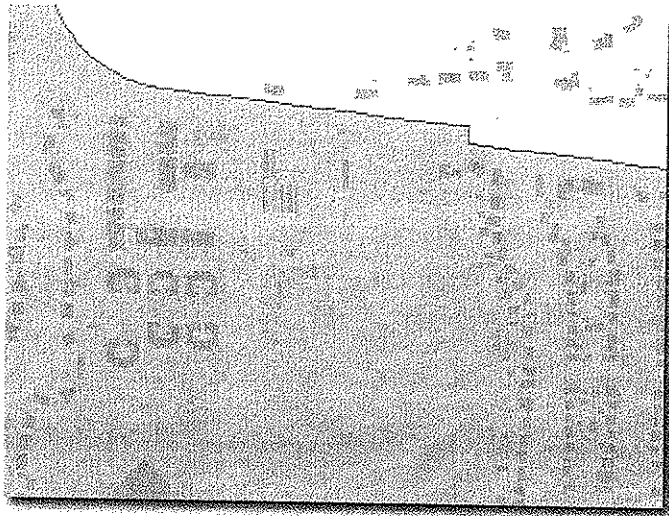
The new annexed area is now merged to the larger Municipal Boundaries polygon.

(e) Save your edits and stop editing.

f Click Editor, point to Snapping, and clear the Snapping Toolbar check box to remove the toolbar from your display.

g On the Standard toolbar, click the Editor Toolbar button to turn off the Editor toolbar.

h Exit ArcMap without saving the map document.