

# ArcGis- 9

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Geodatabase QuickStart Tutorial – 3<sup>rd</sup> part

# Editing GIS features

# 3

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ArcMap has the tools you need to create and edit your spatial data. With ArcMap you can create and edit features in shapefiles or a geodatabase. ArcView licensed seats of ArcMap allow you to create a temporary map topology so you can simultaneously edit features that share geometry across multiple feature classes. With ArcEditor or ArcInfo licensed seats of ArcMap, you also have access to advanced editing tools, geometric network editing, and geodatabase topology editing and management.

The easiest way to learn how to edit in ArcMap is to complete the exercises in this tutorial. Most of these tutorials can be completed with ArcView seats of ArcMap—the exceptions are the geodatabase topology exercises.

Exercises 1 and 2 introduce the edit sketch, sketch tools, and edit tasks and show you how to use them to create new features quickly and easily.

Exercise 3 walks you through the process of converting features on a paper map directly into your database using a digitizing tablet.

Exercise 4 teaches you how to move, rotate, scale, extend, trim, and modify the vertices of existing features.

## Exercise 1: Creating polygon features

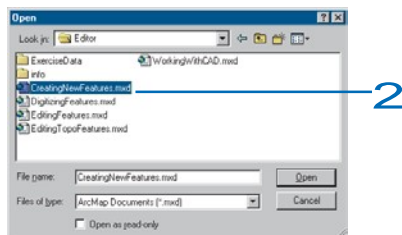
The editing tools in ArcMap make it easy to create new features. You use edit tasks, the edit sketch, sketch tools, and snapping to create new features in ArcMap.

In this exercise, you will digitize a new polygon feature into a shapefile layer that outlines a land use study region. The study area polygon that you create needs to snap to an index grid layer that subdivides the entire geographic region. You will begin by starting ArcMap and loading a map document that contains the shapefile layer and a geodatabase that contains the index grid for the region.

### Starting ArcMap and beginning editing

Before you can complete the tasks in this tutorial, you must start ArcMap and load the tutorial data.

1. Double-click a shortcut installed on your desktop or use the Programs list in your Start menu to start ArcMap.
2. Click the Open button on the Standard toolbar. Navigate to the CreatingNewFeatures.mxd map document in the Editor directory where you installed the tutorial data (C:\ArcGIS\ArcTutor is the default location). Click the map and click Open.



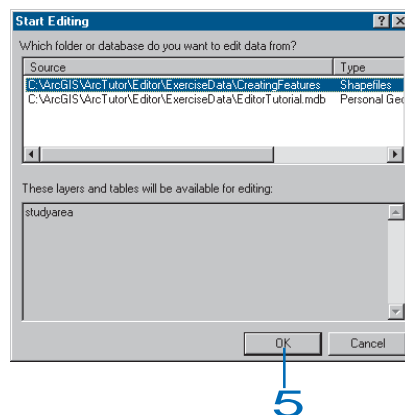
3. Click the Editor Toolbar button on the Standard toolbar to add the Editor toolbar to ArcMap.



4. Click the Editor menu and click Start Editing.

If you only have one workspace in your map, you can start editing the map layers at this point. In this exercise, two workspaces are loaded in the map, so you will need to choose the workspace you want to edit.

5. Click the Editor folder workspace to start editing the studyarea.shp shapefile. Click OK. You will edit the geodatabase in the next exercise.



## Creating a new polygon feature

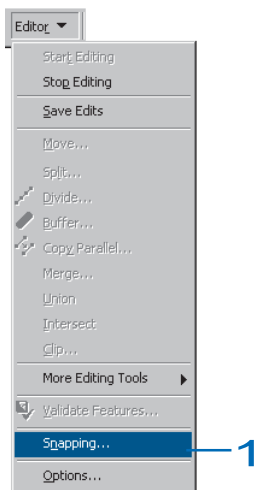
This exercise focuses on creating a new study area polygon that encompasses a parcel CAD drawing. The extent of the study area is defined by the index grid lines located in an existing database. The index grid represents logical divisions within the data.

To create the new polygon, you must do *heads-up digitizing* against the index grid and snap the vertices of your new polygon to the vertices of the grid lines.

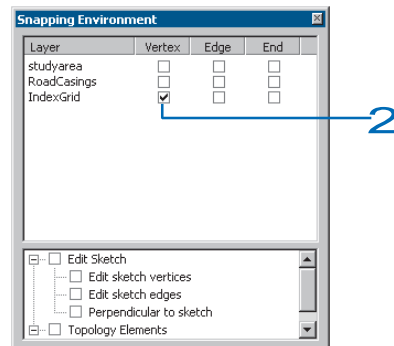
## Setting the snapping environment

Before you start editing the study area shapefile, you need to set your snapping environment so each point you add snaps to the vertices of features in the index grid. For more information about snapping, see 'Using the snapping environment' in *Editing in ArcMap*.

1. Click the Editor menu and click Snapping to display the Snapping Environment dialog box.



2. Check the Vertex check box next to the IndexGrid layer to snap the sketch vertices to the vertices of the index grid. Close the Snapping Environment dialog box.



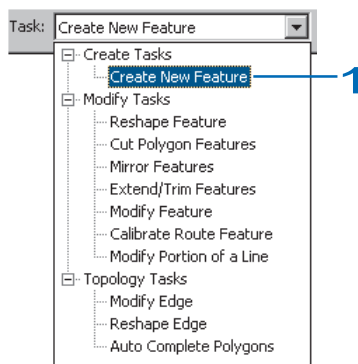
With the snapping environment set, you can create a new study area polygon. Make sure you snap each point to the thick index grid lines shown below.



## Setting the current task

Before you start digitizing a new feature, you must set the current editing task to Create New Feature.

1. Click the Task dropdown arrow and click Create New Feature.



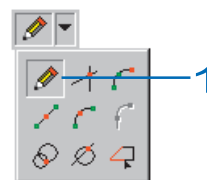
To create a new feature, you also need a target layer. The target layer determines the type of feature you will create and what layer it will be stored in. Since there is only one shapefile in the folder that you started to edit, the target layer is set to the study area shapefile by default.

## Using the Sketch tool

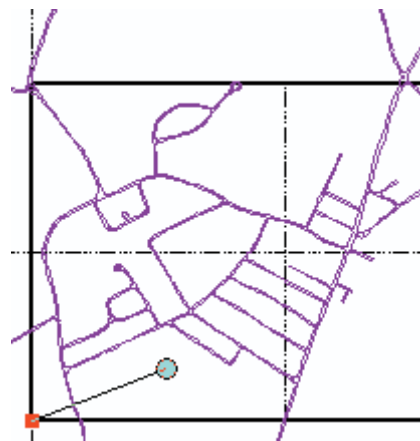
To create a new feature using the Create New Feature task, you must first create an edit sketch. An edit sketch is a shape that you draw by digitizing vertices using the sketch construction tools located on the tool palette.

Several tools can add vertices to the sketch. You will use the Sketch tool to add the study area polygon.

1. Click the tool palette dropdown arrow and click the Sketch tool.



2. Click to add the first vertex of the sketch to the lower left corner of the thick index grid lines. The vertex should snap in place.

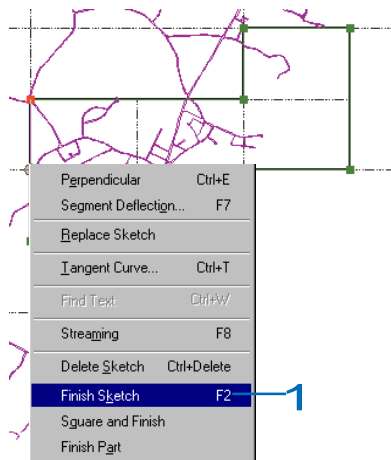


3. Click to add the remaining vertices, snapping each vertex to a corner in the index grid. Create vertices counterclockwise until you return to the point located directly above the first vertex that you placed.

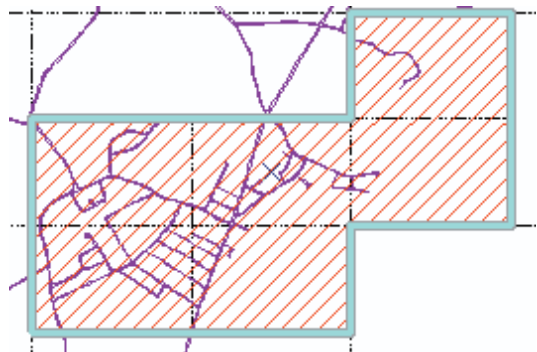
## Finishing the sketch

1. Press the F2 key or right-click and click Finish Sketch.

This action adds the final sketch segment and creates the new feature.



Your new study area polygon is now created. If you snapped each sketch vertex properly, the new polygon should look like the shaded polygon below.



## Adding attributes

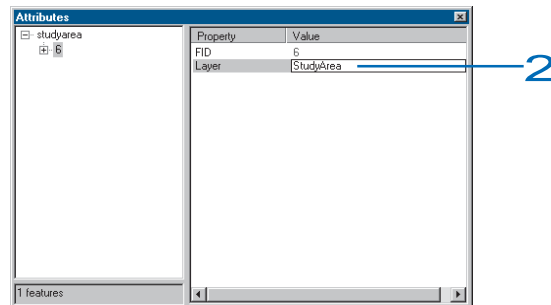
The new feature you created does not contain any attribute information. Because other polygon features are present in this shapefile, distinguish your new polygon from the others by adding descriptive information about it.

You can add descriptive information for a selected feature using the Attributes dialog box.

1. Click the Attributes button on the Editor toolbar to add a description attribute to the new study area polygon.



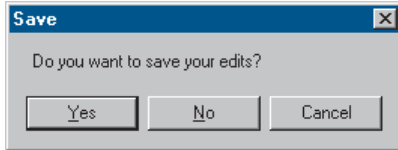
2. Click the layer field for the selected feature and type "StudyArea" as a description of the feature.



## Saving your edits

After you have created the new study area polygon, you can choose to save or discard your edits by stopping the edit session.

1. Click the Editor menu and click Stop Editing.



2. Click Yes to save the new study area polygon into the study area shapefile you were editing or No to discard your edits.

In this exercise you learned how to quickly and accurately create a new polygon feature. You used the Sketch tool to digitize a polygon shape while snapping each vertex to an existing vertex in another layer.

There are several other ways that you can construct new features in your GIS database. The next exercise will show you some of the more advanced methods of constructing vertices in the edit sketch.

For more detailed information about editing tasks and creating polygon features, see the 'Creating new features' chapter in *Editing in ArcMap*.

## Exercise 2: Creating line features

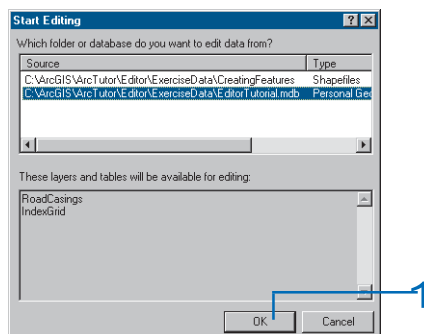
In this exercise, you will update your database with a new road casing line.

In building the line feature, you will learn how to use some of the more advanced construction methods offered with the Sketch tool context menu.

### Editing the geodatabase

Because the road feature class exists inside a different workspace than the study area shapefile, you need to start editing the database before you can create the new line.

1. Click the Editor menu and click Start Editing. Choose the personal geodatabase as the workspace that you want to edit and click OK.

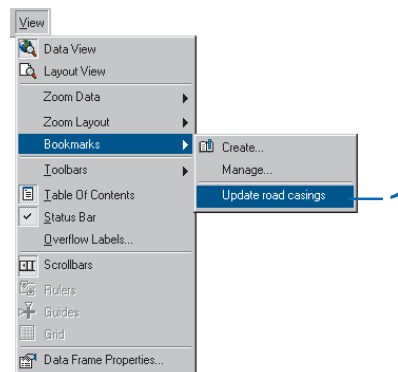


### Locating the update area

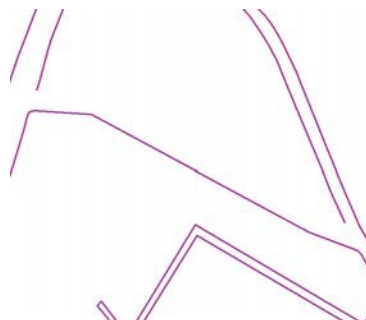
Spatial bookmarks are named extents that can be saved in map documents. Creating a bookmark for areas that you visit frequently will save you time. For information on how to create and manage spatial bookmarks, see the 'ArcMap basics' chapter in *Using ArcMap*.

You will now zoom to a spatial bookmark created for this exercise.

1. Click the View menu, point to Bookmarks, then click Update road casings to set the current view to the edit area of this exercise.



When the display refreshes, note that the top line of this road casing is missing from the layer. You must update the road casing by adding the missing line.

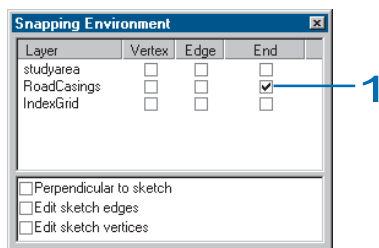




## Setting the snapping environment

The endpoints of the road casing feature need to snap to adjacent casings to ensure that the new feature is connected to the existing casing features. Snapping to the end of road casing lines will help you do this.

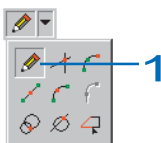
1. Click the Editor menu and click Snapping. Check the End option for the RoadCasings layer to set snapping to the endpoint of casing features. Uncheck any other boxes that may still be checked and close the dialog box.



## Digitizing

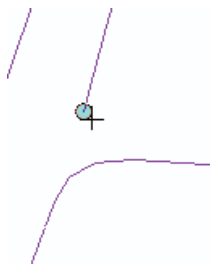
After setting the snapping environment, make sure the target layer is set to the RoadCasings layer. Now you can start digitizing.

1. Click the tool palette dropdown arrow and click the Sketch tool.



2. Move the pointer to the broken section of the road casing in the top left corner of the canvas. Once the

pointer is inside the snapping tolerance, the snapping location (blue dot) will jump to the vertex. Click the left mouse button to add the first vertex.



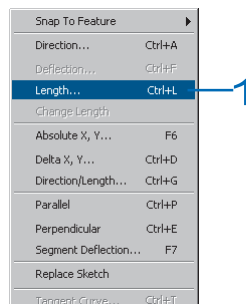
## Beginning construction

With the first vertex of the new road casing properly placed, you can construct the casing line feature. Your new feature will be connected to that casing.

## Setting length and angle measurements

Before creating the second vertex, you must first set the length of the line.

1. Right-click the map and click Length.



2. Type a value of 15 map units and press Enter.



If you move the pointer now, notice that you can't stretch the line further than your length measurement. This is called a *constraint*. To learn more about sketch constraints, see the chapter 'Creating new features' in *Editing in ArcMap*.

You must also set an angle constraint to create the second vertex.

3. Press Ctrl+A and type a value of "260" degrees. Press Enter.



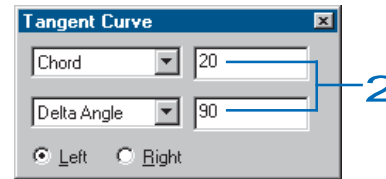
3



### Creating a curve tangent to the last segment

You will add a curve that is tangent to the last segment you added to the sketch. The curve will form the corner of the road casing.

1. Right-click and click Tangent Curve to enter the curve information required to place the next vertex.
2. Click the first dropdown arrow and click Chord. Type "20" to set the chord length. Click the second dropdown arrow and click Delta Angle. Type "90" in the second text box for the angle measurement. Click Left to indicate that the new curve will be tangent to the left of the previous segment. Press Enter to create the curve.



2



### Creating a vertex relative to the last vertex

Often, construction points are calculated relative to the last point recorded. Using the Delta X, Y sketch constructor, you can add relative vertices.

1. Press Ctrl+D. Type "88" for the x-value and "-9" for the y-value. Press Enter to add the point.



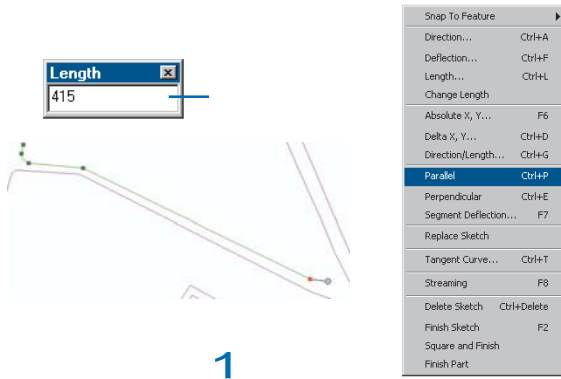
1



### Creating a vertex parallel to an existing line

You can define the angle measurement for points added to the sketch in several ways. You can set an absolute value like you did in the first step of this exercise, or you can use the angles of existing features. Quite often, road casings are constructed using the angles of road centerlines. Since you already have one road casing, you can use its angle in constructing the next segment.

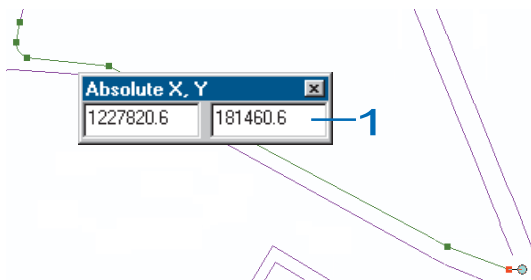
1. Right-click the lower road casing line. Click Parallel. Press Ctrl+L, type a value of “415”, then press Enter.



## Creating a new vertex using absolute coordinates

Exact x and y coordinate information is often available for the construction of vertices. Add the next vertex by typing exact coordinates using the Absolute X, Y constructor.

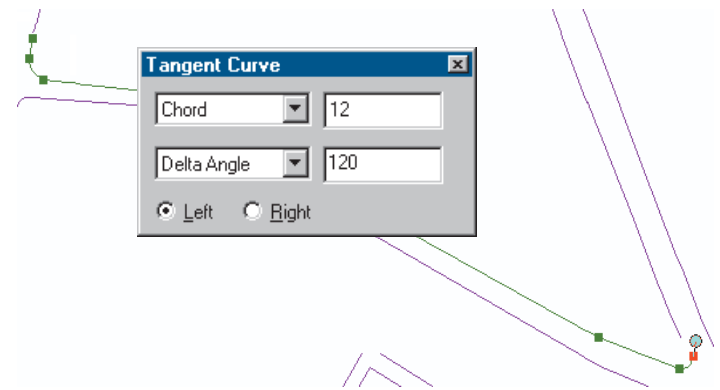
1. Right-click on the map and click Absolute X, Y. Type “1227820.6” in the x field, press the Tab key, and type “181460.6” in the y field. Press Enter to add the point.



## Creating a tangent curve

One final tangent curve needs to be added to the sketch before you can connect it to the existing casing and add the feature.

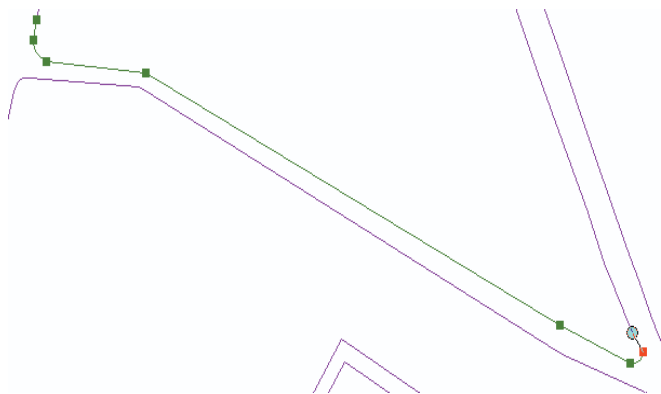
1. Press Ctrl+T. Type a chord length of 12 and a delta angle of 120, then press Enter to create the final curve segment.



## Finishing the sketch

To finish the sketch and create the feature so it is connected to the existing casing, you need to snap the last point of the sketch to the endpoint of the existing road casing.

1. Move the pointer to the endpoint of the existing road casing until it snaps. Double-click to add the last point and create the feature.



With construction now complete, you can continue to search the layer to find additional broken lines and connect them together, experimenting with these and other sketch tools and construction techniques. You can save your edits and the map document if you want.

The next exercise will show you how you can use the construction methods demonstrated in this exercise to capture features from a paper map directly into your GIS layers using a digitizing tablet.

## Exercise 3: Using a digitizing tablet

The first exercise in this chapter showed you how to heads-up digitize features by snapping to an existing vector source. However, often that source information is in paper form. ArcMap lets you trace over the features you are interested in capturing using a digitizing tablet connected to your computer. By *digitizing* data using a tablet, you can get features from almost any paper map into your GIS database.

### Setting up your digitizing tablet

Before you can start digitizing, you must set up your tablet and prepare the map from which you want to digitize features. To use a digitizing tablet with ArcMap, it must have WinTab™-compliant digitizer driver software. To find out if a WinTab-compliant driver is available for your digitizer, see the documentation that came with the tablet or contact the manufacturer.

After installing the driver software, use the WinTab manager setup program to configure the buttons on your digitizer puck. One puck button should be configured to perform a left mouse click to digitize point features and vertices; another button should be configured to perform a left double-click to finish digitizing line or polygon features. You may also want to configure a button to perform a right-click so you can access context menus.

If you installed ArcMap before installing your digitizer, the Digitizer tab may not appear in the Editing Options dialog box. To add the tab, you must register the ArcMap digitizer.dll file. To learn how to register digitizer.dll and to find more information on digitizing, see the ‘Using a digitizer’ chapter in *Editing in ArcMap*.

### Preparing the map

You will now print the paper map from which you want to digitize and attach it to your tablet.

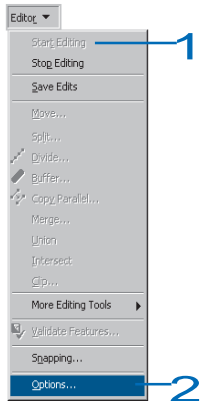
1. Print the DigitizingFeatures.tif image located in the Editor tutorial directory where you installed the tutorial data. The default installation path is C:\ArcGIS\ArcTutor\Editor\ExerciseData\Digitizing.
2. Attach the paper map to your digitizing tablet using masking tape, drafting tape, or a special residue-free putty. Drafting tape looks like masking tape, but leaves less residue when it’s removed.
3. Start ArcMap if you haven’t already done so.
4. Open the DigitizingFeatures.mxd map document so you can register the paper map to your map document.

### Registering your map for the first time

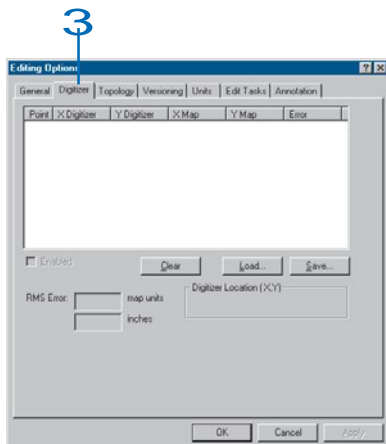
You must always register your paper map before you can begin digitizing from it. This involves establishing control points to register the paper map to the geographic space of your GIS data. If your map has a grid or a set of known ground points, you can use these as your control points. If not, choose four to ten distinctive locations and mark them on your map with a pencil. Give each location a unique number and write down its actual ground coordinates. Control points can also be saved to and loaded from x,y coordinates stored in a comma-delimited text file.

In this exercise, the control points and their ground coordinates are identified for you on the paper map.

1. Click Editor and click Start Editing.



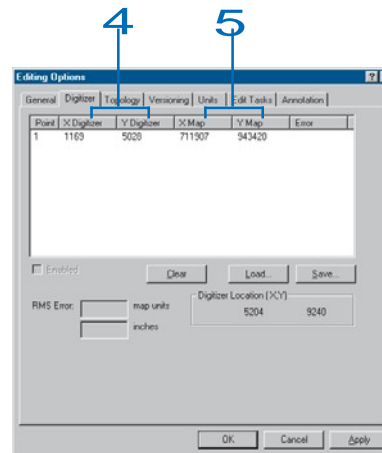
2. Click Editor and click Options.
3. Click the Digitizer tab. You will create and store control points here. The control points you add will be saved with the map document.



4. In the upper left corner of your paper map, locate the point marked Control Pt.1 and click it using the digitizer puck.

A record appears in the X Digitizer and Y Digitizer columns for the control point you digitized.

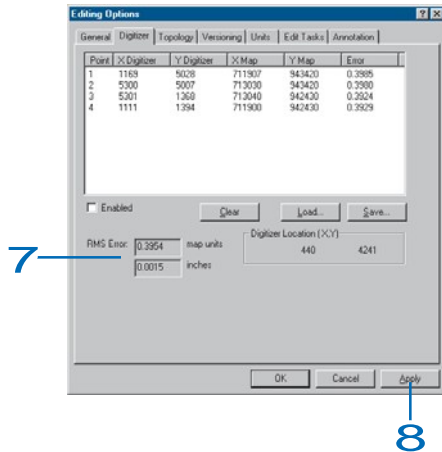
5. Type the actual ground x,y coordinates (labeled X = 711907 and Y = 943420 on the paper map) in the X Map and Y Map fields.



6. Working clockwise, click each of the three other control points on your paper map. After each control point you digitize, type the actual ground coordinates in the X Map and Y Map fields.

An error in map units is displayed for each control point.

- After you have digitized all the control points and typed their actual ground coordinates, the total root mean square (RMS) error is calculated and displayed in map and digitizer units. Your X and Y Digitizer and error values may be different from the ones in this example.



To maintain highly accurate data, your RMS error should be less than 0.004 digitizer units (often inches) or the equivalent scaled distance in *map units*—the ground units in which the coordinates are stored. The map units for this dataset are meters. You can see what the map units are and set the onscreen *display units* by clicking View, Data Frame Properties, then the General tab on the Data Frame Properties dialog box.

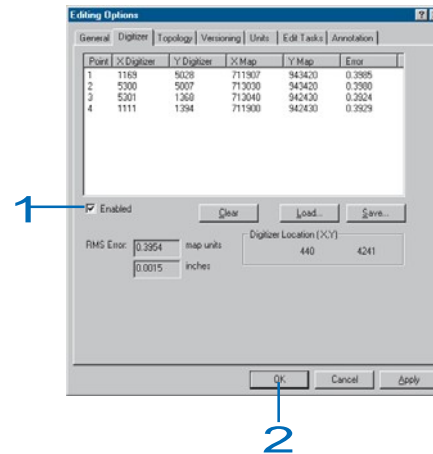
You can redigitize control points by selecting the point you want to replace from the list, then clicking your paper map to capture a new control point. Redigitizing points with large error values can help reduce the total RMS error.

- Click Apply to accept the registration after you have reached an acceptable RMS error.

## Digitizing modes

You need to enable *digitizing mode* once you have registered your map. Enabling digitizing mode maps the location of the puck on the tablet to a specific location on the screen.

- Check the Enabled box on the Digitizer tab of the Editing Options dialog box to enable digitizing mode.



- Click OK.

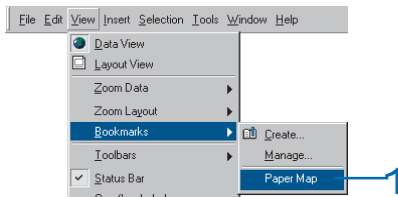
## Digitizing new features

You are now ready to begin digitizing new features. You will add new lot lines representing a new parcel subdivision into an existing shapefile of lot lines.

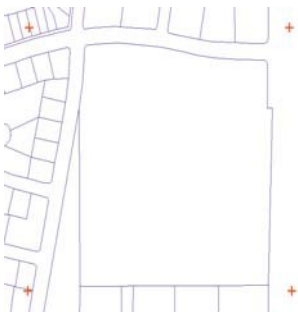


To get a better view of the area you'll digitize in, you'll zoom to a spatial bookmark that has been defined for you.

1. Click View, point to Bookmarks, and click Paper Map.



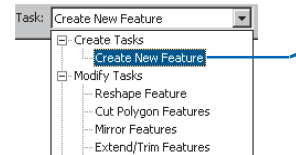
The map zooms to the area of your paper map.



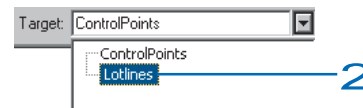
## Setting the current task and target layer

Creating new features using a digitizer puck is identical to creating new features using the mouse. You must set the current task and target layer before you start digitizing.

1. Click the Task dropdown arrow and click Create New Feature.



2. Click the Target layer dropdown arrow and click Lotlines to set the target layer.



## Creating new features

There are two ways to digitize features: point mode digitizing and stream mode digitizing (streaming). You can toggle between point and stream mode by pressing the F8 key or by right-clicking with the Sketch tool active and clicking Streaming from the menu. Point and stream mode digitizing are available either when you're using a digitizing tablet or when you're digitizing onscreen with your mouse.

*Point mode* is the default and most common method of digitizing features that are on paper maps. In point mode, you convert a feature on a paper map by digitizing a series



of points, or vertices. ArcMap then connects the vertices to create a digital feature. You generally use point mode when precise digitizing is required—for example, when digitizing a perfectly straight line.

*Stream mode digitizing* provides a quick and easy way to capture features on a paper map when you don't require as much precision or when you're digitizing smooth, curved lines—for example, rivers, streams, and contour lines. With stream mode, you create the first vertex of the feature and trace over the rest of the feature with the digitizer puck. When you're finished tracing, you use the puck to complete the feature.

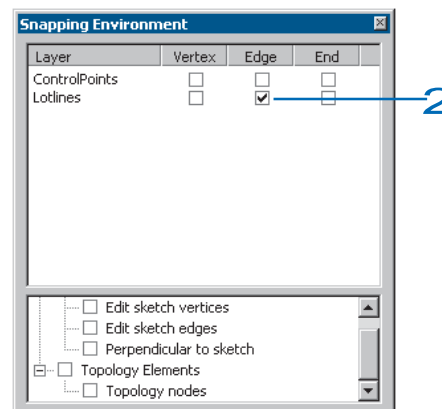
As you stream, ArcMap automatically adds vertices at an interval you specify; this interval, expressed in current map units, is called the *stream tolerance*. You can change the stream tolerance at any time, even while you're in the process of digitizing a feature.

## Digitizing in point mode

1. Click Editor and click Snapping.



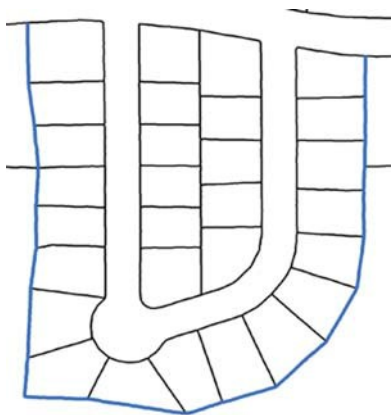
2. Check the Edge box for the Lotlines layer so the features you digitize snap to existing edges. Close the Snapping Environment dialog box.



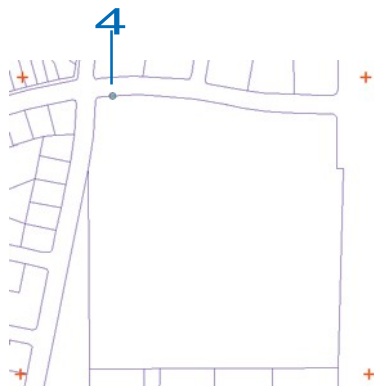
3. Click the Sketch tool.



The lines you are going to digitize now are the exterior boundary lot lines. These lines are drawn in blue.



4. Using the puck, click the upper leftmost point of the exterior boundary lot line to start digitizing. You'll notice that the cursor snaps to the edges of the lot lines.



For straight segments, you should add a vertex where lot lines intersect. In curved segments, you should click more points to make sure their shapes are defined.

5. When you're done with your sketch, finish it by clicking the button on your puck that you configured as a double-click.



### Digitizing in stream mode

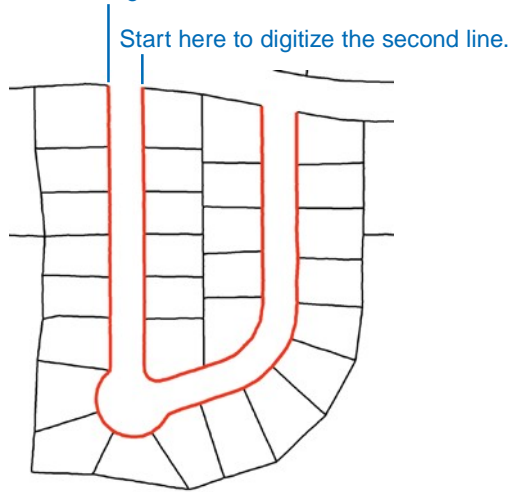
When tracing line or polygon features, you may want to add vertices as you move the mouse rather than clicking each time you want to add a vertex. Stream mode digitizing lets you do this.

Before starting to digitize in stream mode, you need to set a stream tolerance—the interval at which the sketch adds vertices along the feature you are digitizing. The default tolerance value is 0 map units, so if you don't enter a tolerance value, you may find vertices that overlap each other.

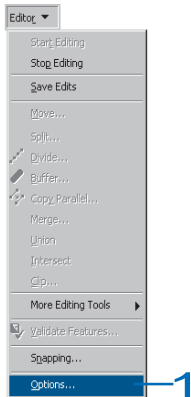
You will also specify the group tolerance—the number of streaming vertices you want to group together. The number you set tells ArcMap how many vertices to delete when you click the Undo button. For example, if you set this number to 20 and click the Undo button while you're digitizing a feature, ArcMap deletes the last 20 digitized vertices from your feature.

You are now going to digitize the frontage lot lines—the lines drawn in red—that define the road leading into the new subdivision. You will digitize these lot lines as two features, one for the outer line and one for the inner line.

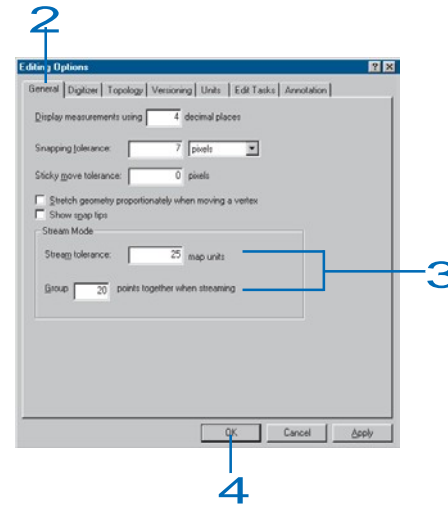
Start here to digitize the first line.



1. Click Editor and click Options.



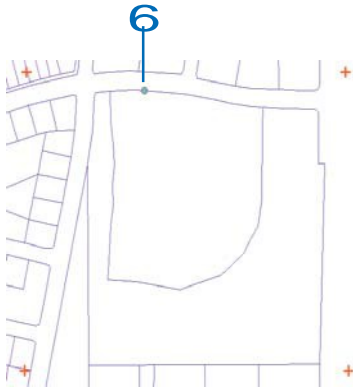
2. Click the General tab.



3. Type a stream tolerance value of 25 map units and set the group tolerance to 20.
4. Click OK.
5. Click the Sketch tool.



6. Snap the cursor to the upper leftmost point of the outer frontage lot line, but don't click yet.



7. Press F8 to start digitizing in stream mode.
8. Click to start the sketch.
9. Carefully trace along the boundary of the lots until you reach the last lot in the upper right. Notice that vertices are added at consistent intervals that are 25 map units apart. Although you're working in stream mode, you can still click when you want to add a point by hand.

If you make a mistake while streaming, you can click the Undo button to remove the last 20 vertices. You'll need to press F8 to suspend streaming while you're choosing interface elements, and press F8 again when you want to return to stream mode digitizing.

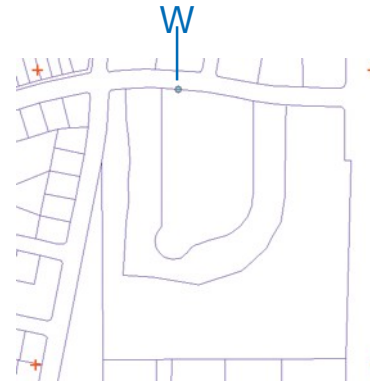
Undo will delete 20 vertices—the number set in the group tolerance—at a time.



10. Snap the last vertex of your line to the existing lot line and finish the sketch by clicking the button on your puck that you configured as a double-click.

Now you are going to digitize the second red line, the inner frontage lot line.

11. Snap the cursor to the existing lot line and click to start digitizing the inner frontage line. You should still be in streaming mode, but if you find yourself in point mode, press F8 to switch to streaming.



12. Carefully trace along the boundary of the lots until you reach the last lot in the upper rightmost point of the inner frontage line.
13. Snap the cursor to the existing lot line and press F8 to stop digitizing in stream mode.

14. Finish the sketch by clicking the button on your puck that you configured as a double-click.



With the exterior boundary lines and the outer and inner frontage lot lines digitized, use point mode to digitize the remaining line features that define the lots.

Once you've digitized all the new lot lines, your map should look like this:



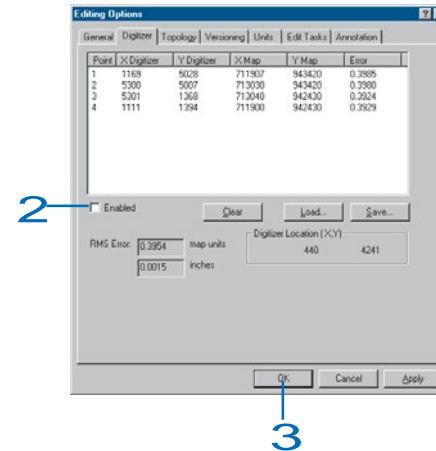
## Disabling the puck

After you're finished digitizing, you should disable the digitizer puck.

1. Click Editor and click Options.



2. Click the Digitizer tab and uncheck Enabled to disable the digitizer.



3. Click OK.

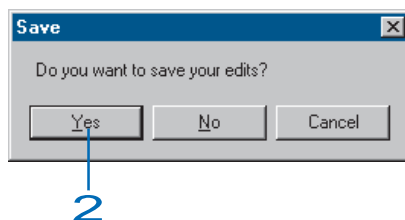
## Finishing your digitizing session

Once you have finished tracing lot lines and have disabled the digitizer puck, you can stop editing and complete the exercise by saving your edits.

1. Click Editor and click Stop Editing.



2. Click Yes to save your edits.



In this exercise you learned how to create new features in your GIS database by digitizing shapes directly from a digitizing tablet. The next exercise will show you how to copy shapes from existing vector sources—CAD drawing layers—and paste them into your GIS database.

To learn more about digitizing, see the ‘Using a digitizer’ chapter in *Editing in ArcMap* or the ArcGIS Desktop Help. If you need to find out if ArcMap supports your digitizing tablet, consult the ESRI Web site at [www.esri.com](http://www.esri.com) for the most recent information.

## Exercise 4: Editing features

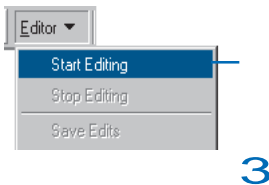
In the first three exercises, you learned how to create new features in ArcMap. In this exercise, you'll learn how to copy and paste, move, rotate, scale, and extend existing features.

### Opening the exercise document and starting an edit session

1. Start ArcMap.
2. Click the Open button on the Standard toolbar. Navigate to the EditingFeatures.mxd map document located in the Editor directory where you installed the tutorial data (C:\ArcGIS\ArcTutor is the default location).



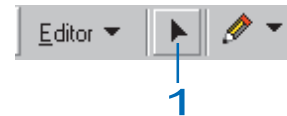
3. Click the Editor menu and click Start Editing.



### Copying and pasting features

When creating vector features of the same type as existing ones, it is more efficient to copy their shapes than to digitize over the top of them. You can copy the shapes of any vector feature that you can select in ArcMap. In this step, you will select buildings from a CAD drawing and paste them into a geodatabase layer of buildings.

1. Click the Edit tool on the Editor toolbar and drag a box around all of the new building features to select them.



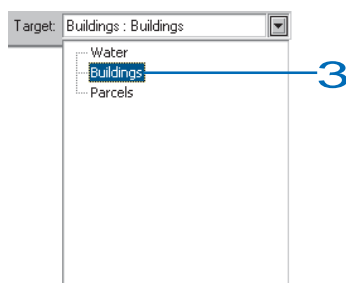
All selected CAD features should be highlighted as shown below.



- Click the Copy button on the Standard toolbar to copy the selected features to the clipboard.

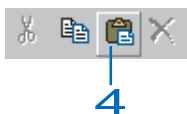


- Set the Buildings layer as the target layer so you can paste the copied features into it.



- Click Paste to copy the selected building features into the target layer. The progress bar will update as each feature is copied into the target layer.

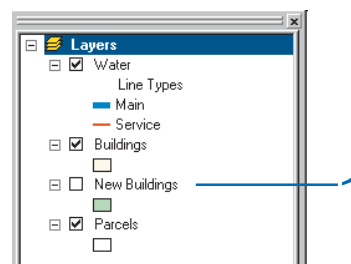
It is important to note that only the shapes are copied from the CAD file into the geodatabase. If you need to paste the attributes as well, you must use the object loader. Exercise 6 of this chapter shows you how to do this.



## Rotating features

Now that you've copied the building features into the Buildings layer of your geodatabase, you need to orient the features to fit the parcel subdivision into which you'll move them.

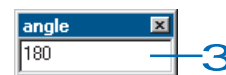
- To avoid selecting features from the CAD layer—called New Buildings—uncheck it in the table of contents to hide its features.



- Click the Rotate tool on the Editor toolbar.



- Press the A key, type "180", and press Enter to rotate the selected building features 180 degrees.



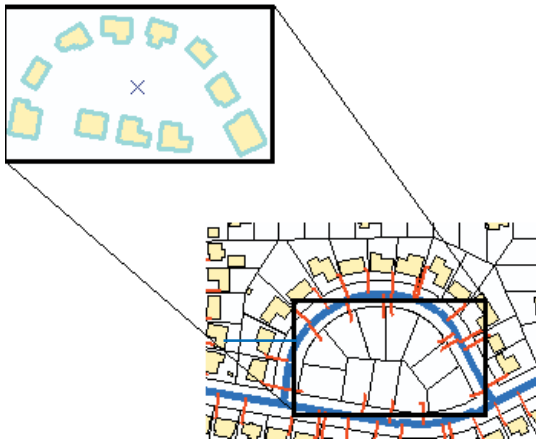


The selected features are now oriented 180 degrees from their previous location.



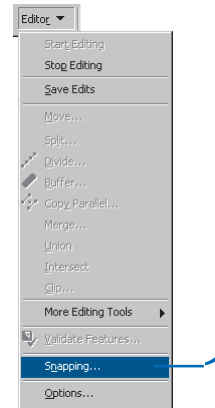
## Moving features

Now that the buildings are oriented properly, you are ready to move and scale them so that they fit inside the subdivision located near the bottom center of the map.

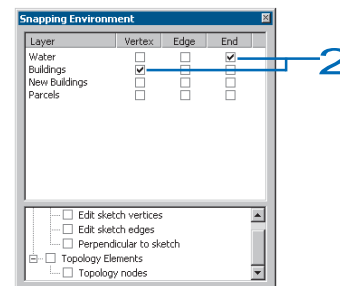


You can ensure the proper relocation of the building features by snapping the lower left selected building feature to the endpoint of the lower left water service line, shown in red.

1. With the buildings selected, click the Editor menu and click Snapping.



2. Check the End option for the Water layer and the Vertex option for the Buildings layer so you can snap the corner of a building feature to the endpoint of a waterline. Close the dialog box.



3. Click the Edit tool so you can move the selection anchor for selected features.



The selection anchor is a small x located at the center of selected features. It is the point on the feature or group of features that will be snapped when you move them.

4. Hold down the Ctrl key and move the pointer over the selection anchor. When the pointer icon changes, click and drag the selection anchor until it snaps to the corner of the lower left building.



5. Drag the selected buildings until they snap to the endpoint of the waterline.



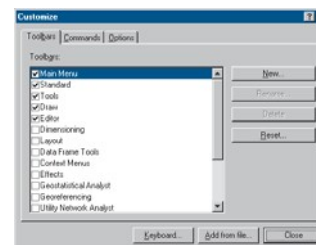
Notice that some of the buildings are too large to fit inside the parcels. You must scale these features to make them fit.

## Scaling features

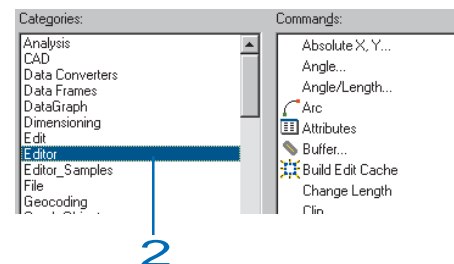
When data is created using a coordinate system different from that of your database, you may need to adjust the projection and scale of the data to fit the projection and scale of your database. Often, simply moving, rotating, and scaling those features are sufficient.

Because scaling is not a common operation, the Scale tool is not located on the Editor toolbar. You must, therefore, add it to the toolbar before you can use it.

1. Click the Tools menu and click Customize.



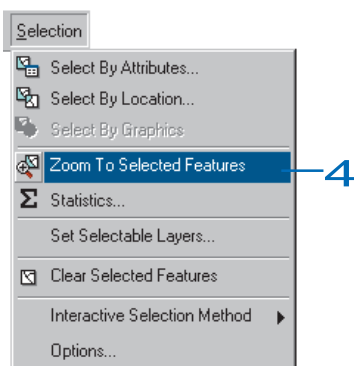
2. Click the Commands tab and click Editor in the Categories list. The Editor category contains many editing tools, regardless of their location.



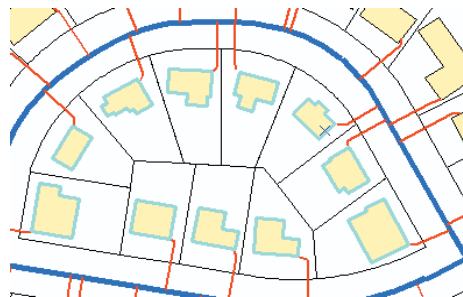
3. Scroll down the list of commands on the right until you find the Scale tool. Drag and drop the tool next to the Rotate tool on the Editor toolbar. Click Close on the Customize dialog box.



4. Before scaling the selected features, you may want to zoom in so that your scaling is more accurate. Click the Selection menu and click Zoom To Selected Features.



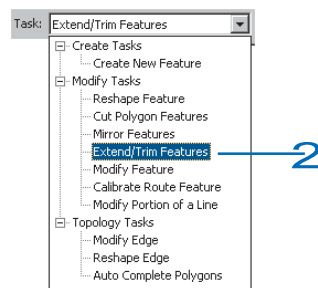
5. Click the Scale tool and drag the selected building features to scale them. Shrink the features until they fit inside the parcel subdivisions. Use the waterlines as a guide. Scale features until the lower right building matches the endpoint of the waterline.



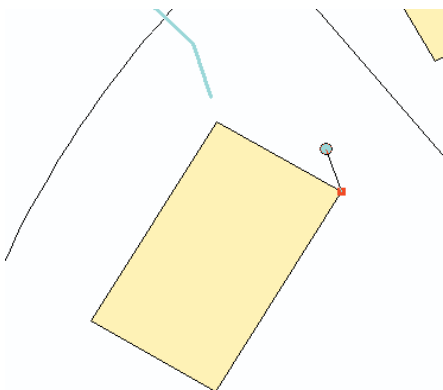
## Extending and trimming waterlines using the Extend/Trim Features task

Now that you have scaled the building features to fit inside the parcel subdivision, you need to extend the waterlines so that they snap to the side of each building. You can extend and trim waterlines using the Extend/Trim Features task.

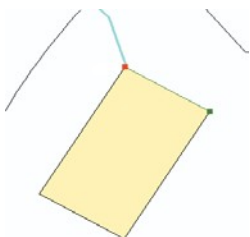
1. To get a better view of the waterline that you need to extend, you can zoom in to the Extend Water Line bookmark. Click the View menu, point to Bookmarks, and click Extend Water Line.
2. Click the Task dropdown arrow and click Extend/Trim Features to set the edit task.



3. The Extend/Trim edit task will extend selected polyline features to the sketch you digitize. Click the Edit tool and click the waterline feature that you need to extend.
4. Click the Sketch tool and snap the first sketch point to the upper right corner of the building feature you want to extend to.

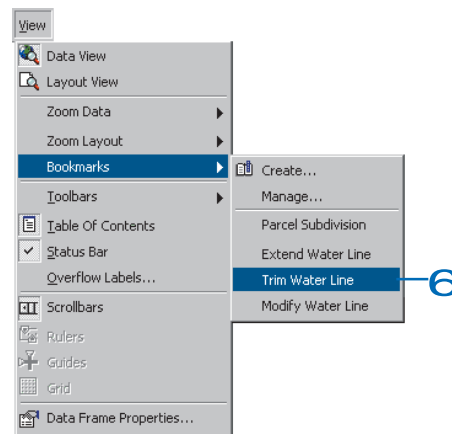


5. Move the pointer until it snaps to the upper left building corner and double-click to finish the sketch. The waterline will then extend until it intersects the line that you have digitized. Since the line is identical to the side of the building, the end of the waterline should snap to the building.

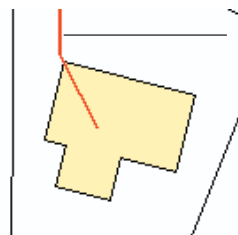


You can also use the Extend/Trim Features task to cut a waterline feature if it extends too far into the building.

6. To get a better view of the waterlines, you must zoom to the bookmarked extent called Trim Water Line, which was created for you. Click the View menu, point to Bookmarks, and click Trim Water Line.

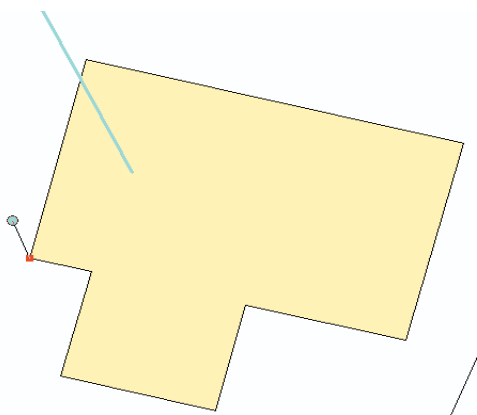


7. Click the Edit tool and click to select the waterline that extends into the building and needs to be trimmed.

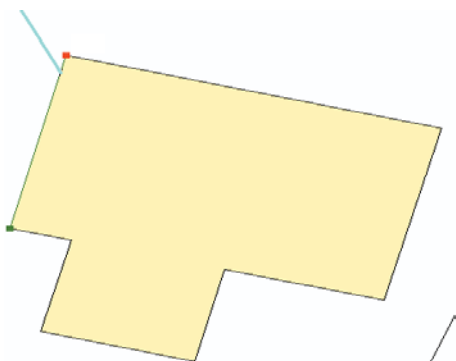


8. If you changed the current task, make sure that you change it back to Extend/Trim Features, then click the Sketch tool to start digitizing.

9. Snap the first sketch point to the lower left corner of the building feature.



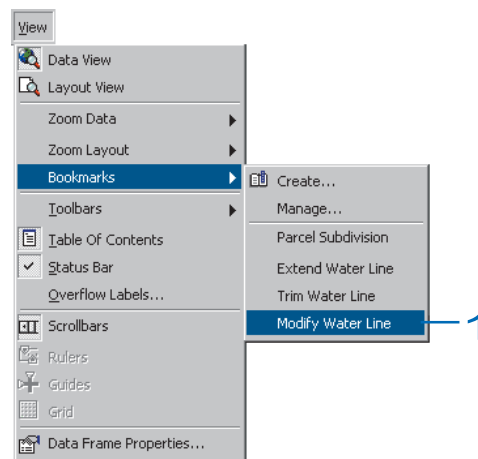
10. Move the pointer to the upper left corner of the building. Double-click to snap the last point of the sketch to the building corner and trim the waterline feature.



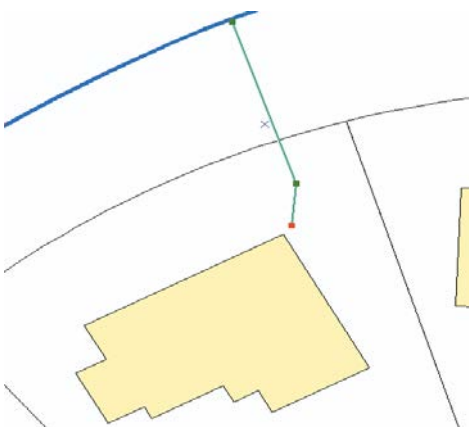
## Extending and trimming waterlines using the Modify Features task

The Extend/Trim Features task lets you extend and trim selected waterlines using a sketch that the features either cross or extend to. However, that is not the only method for extending or trimming waterlines. You can move, insert, or remove vertices of the waterline by making its shape the edit sketch. You can do this using the Modify Features task.

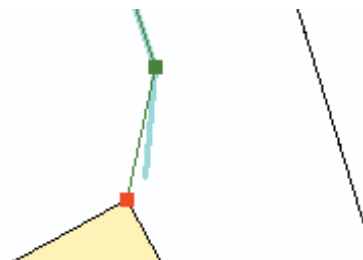
1. To get a better view of the waterlines, you need to zoom to the bookmarked extent called Modify Water Line. Click the View menu, point to Bookmarks, and click Modify Water Line.



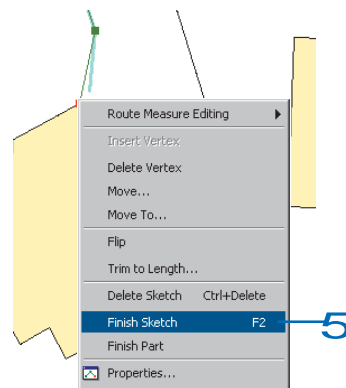
- Click the Edit tool and click to select the waterline feature that needs to be extended.
- Click the Task dropdown arrow and click Modify Feature to display the vertices of the waterline.



- Click the Edit tool and move the pointer over the red vertex at the end of the waterline. Drag the vertex until it snaps to the building corner.



- Move the pointer over the red vertex, right-click, then click Finish Sketch to finish modifying the waterline.



You can follow the same steps to trim line features using the Modify Features task. You can use the Trim command to reduce the length of the sketch by an exact distance as well.

With modifications to these waterlines completed, continue modifying the rest of the waterlines that don't connect to building features and experiment with other methods of modifying shapes.

For more information about editing features, see the 'Editing existing features' chapter in *Editing in ArcMap*.

