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DATA CREDITS

Tutorial data: Courtesy of Alachua County Florida.

The tutorial scenario is fictitious and some of the data has been altered to suit the purposes of the tutorial.

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Cadastral Editor Tutorial for Survey Analyst

Beta 3

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The cadastral editor introduces a new set of tools for maintaining land records in ArcGIS Survey Analyst 9.2

In this tutorial, you will be introduced to the cadastral fabric dataset. A cadastral fabric is a seamless parcel boundary network, which is created and maintained using data from survey records. You will create a cadastral fabric and migrate some existing parcel-based GIS data from Alachua County, Florida, into your cadastral fabric. In the following exercises you will edit the cadastral fabric and add new parcel data from the Timberbrooke and Edgewood survey plans.

When adding parcel data from survey plans, you are essentially updating your cadastral fabric (boundary network) with new survey measurements. The Least Squares Adjustment adjusts the cadastral fabric in response to these new measurements and finds a new “best-fit” for all the parcel corners.

Many geographic information systems use cadastral records to build the base map for all other layers in the GIS. As the cadastral fabric is adjusted, overlying GIS layers will fall out of alignment with the parcel base map. In exercise 7, you will run a GIS feature adjustment which applies the coordinate shifts resulting from the Least Squares Adjustment to your overlaying GIS feature classes. The GIS feature adjustment will bring your GIS layers back into alignment with your updated cadastral fabric.

Exercise 1: Organizing the tutorial data


To work with this tutorial, you will need to have the ArcGIS Survey Analyst extension installed. Before you can begin the tutorial, you must find and organize the data you will be working with. Using ArcCatalog, browse for and create a new folder connection to your data:

1. Click the start menu, point to Programs, point to ArcGIS and click ArcCatalog.
2. Navigate to the location of the tutorial (the default path is \\arcgis\\ArcTutor on the drive where you have ArcGIS installed).
3. Select the Cadastral Editor folder and copy the folder to your local drive.

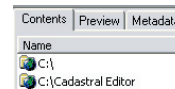
The tutorial data is now copied to your local drive.

Connecting directly to your tutorial data

Folder connections in ArcCatalog simplify the task of navigating to your most frequently used datasets.

1. On the Standard toolbar in ArcCatalog, click Connect to Folder .
2. In the Connect to Folder dialog, navigate to and select your local copy of the Cadastral Editor tutorial folder.
3. Click OK.

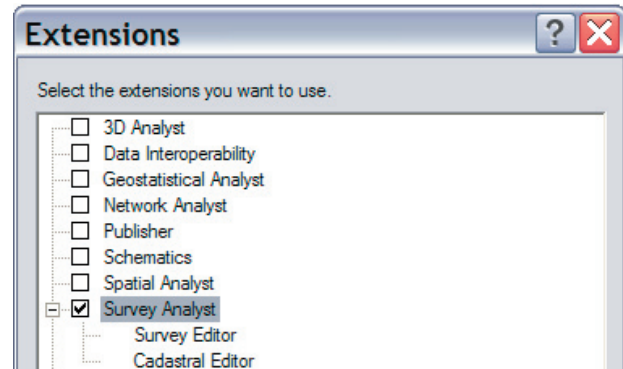
Your new folder connection is now listed in the Catalog tree. You will now be able to access all the data needed for this tutorial through this connection.



Enabling the Survey Analyst Extension

Before you can begin working with the cadastral editor, you need to enable the Survey Analyst extension:

1. In ArcCatalog, click the Tools menu on the Main Menu toolbar.
2. Click Extensions...
3. Check the Survey Analyst checkbox in the Extensions dialog.



The Survey Editor and the Cadastral Editor appear as child nodes under the Survey Analyst extension.

4. Click Close.

The Survey Analyst extension is now enabled.

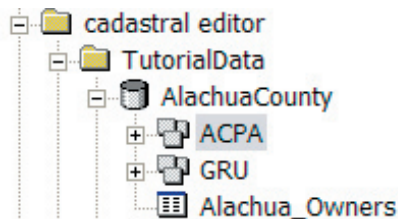
Exercise 2: Creating and managing a cadastral fabric

In this exercise, you will create a new cadastral fabric dataset. Most cadastral fabrics will use, as a starting point, existing parcel data from GIS and CAD layers. You will migrate existing parcel-based GIS data from Alachua county into your cadastral fabric. Later on in the exercise, you will load the cadastral fabric dataset as a layer into ArcMap.

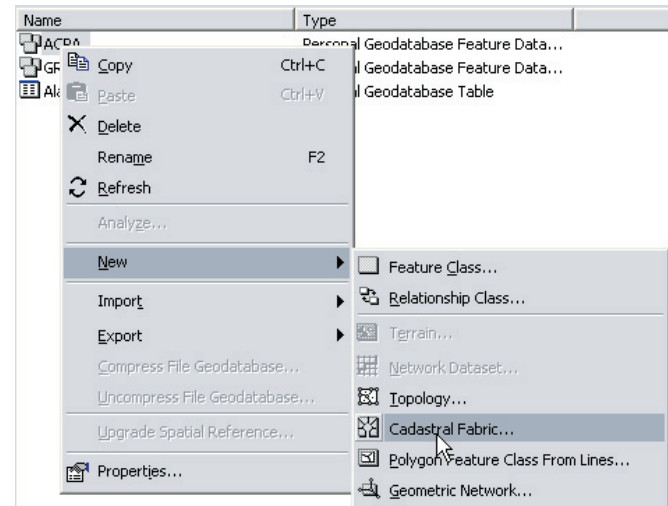
Creating a new cadastral fabric dataset

Cadastral fabric datasets are created as new nodes under feature datasets in ArcCatalog:

1. In ArcCatalog, click the plus sign next to your new cadastral editor folder connection. Click the plus sign next to the TutorialData folder to expand its contents. Click the plus sign to expand the AlachuaCounty geodatabase.

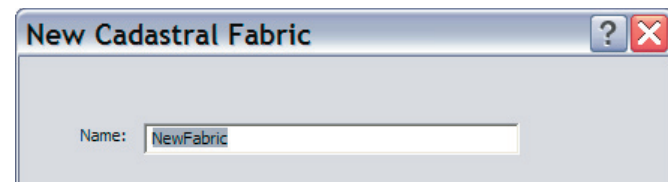


2. Right-click the ACPA feature dataset, point to new and click Cadastral Fabric...



The New Cadastral Fabric Wizard appears.

3. Accept the default cadastral fabric name of “New Fabric”. Click Next.



4. Click Finish on the New Cadastral Fabric summary page to create your cadastral fabric.

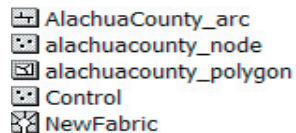
A new cadastral fabric dataset called “NewFabric” appears as a new node under the ACPA feature dataset.

Migrating data into the cadastral fabric

To migrate parcel-based GIS data successfully into a cadastral fabric, the GIS feature classes need to be aware of the cadastral fabric data model. Cadastral fabric parcel polygons are comprised of a set of lines, which have two end points. The cadastral fabric has its own internal arc-node topology. Any GIS data being migrated into a cadastral fabric needs to have arc-node topology. Parcel lines need to be aware of their common endpoints, and of their left and right parcel polygons.

1. Double-click the ACPA feature dataset in the AlachuaCounty geodatabase to expand its contents.

There are three parcel-based feature classes: AlachuaCounty_arc, alachuaCounty_node and alachuaCounty_polygon.

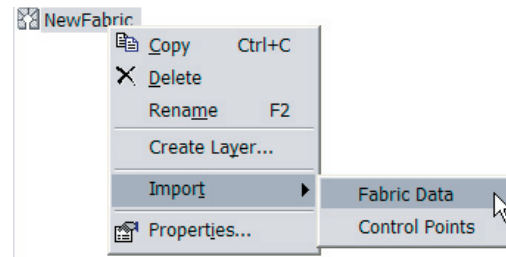


2. Select each feature class and click the Preview tab in the right-hand pane to view the features.

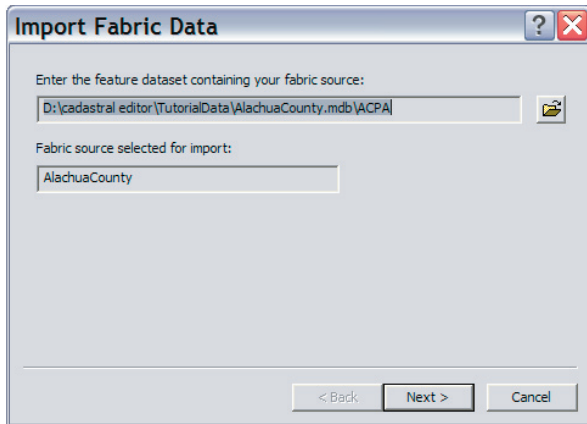
The AlachuaCounty_arc feature class defines the parcel lines that make up the parcel polygons, the alachuaCounty_node feature class defines the common end-points of the parcel lines (parcel corners) and the alachuaCounty_polygon feature class defines the parcel polygons.

You will now migrate the GIS parcel-based feature classes into your cadastral fabric:

3. Click on the Contents tab in the right-hand pane to switch out of preview mode in ArcCatalog.
4. Right-click the cadastral fabric dataset you just created under the ACPA feature dataset. Point to Import and click Fabric Data.




The Import Fabric Data wizard appears.



By default, the Import Fabric Data wizard automatically searches for parcel-based GIS feature classes in the feature dataset in which the cadastral fabric was created. The Import Fabric Data wizard has located your parcel-based GIS feature classes in your ACPA feature dataset.

5. If you want to locate your fabric source data, click the

open file button  to locate the GIS feature classes in the ACPA feature dataset.

6. In the Select a feature dataset dialog, navigate to ACPA feature dataset in the AlachuaCounty geodatabase in your cadastral editor\tutorialdata folder. Select the AlachuaCounty_ arc feature class.

Since all three fabric source feature classes are named the same, you just need to select one fabric source feature class and the importer will identify the remaining two fabric source feature classes.

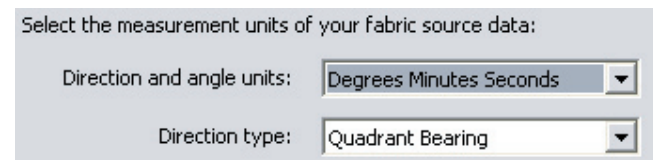
Survey Analyst - Cadastral Editor Tutorial Beta 3

Fabric source GIS feature classes should all have the same name. The parcel lines feature class should be underscored with “_arc”, the parcel polygon feature class should be underscored “_polygon” and the parcel node feature class should be underscored “_node”.

7. Click Next on the Import Fabric Data Wizard.

In the next step of the importer, you need to specify the measurement units of the COGO attributes of your fabric source data. Note that your fabric source data does not necessarily need COGO attributes. If your data has none, the dimension data will be inversed and generated from the shape fields of the fabric source feature classes.

8. Make sure Degrees Minutes and Seconds is selected for Direction and angle units and that Quadrant Bearing is selected for Direction type.



Note that distance units are inherited from the spatial reference of the fabric source feature classes.

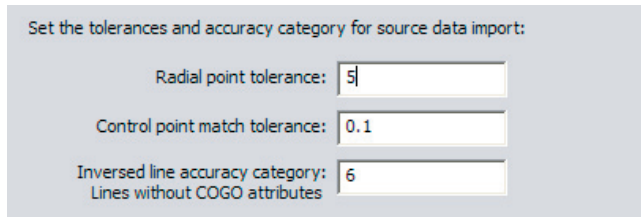
9. Click Next.

Now you will set some data migration tolerances for your fabric source data:

10. Enter 5 feet for the Radial point tolerance. Radial point tolerance is the maximum amount by which two successive curve radii can vary, for them to be considered the same radius with the same center point.

Accept the default for the Link to control tolerance. You need to Enter a Control point match tolerance if you have already imported control points into your cadastral fabric before your fabric source parcel data. You will import control points in a later exercise.

11. For inversed line accuracy category, leave the default as 6. If your fabric source data has no COGO attributes, the dimension data will be inversed from the shape field of the line feature class. These imported parcel lines in the cadastral fabric are given a low accuracy category of 6.



Set the tolerances and accuracy category for source data import:

Radial point tolerance: 5

Control point match tolerance: 0.1

Inversed line accuracy category: 6
Lines without COGO attributes

12. Click Next to view the data migration summary.
13. Click Finish to start the data migration process.
14. Once the data migration has completed, click the Preview tab on the right-hand pane in ArcCatalog to preview the data in your cadastral fabric.

Managing your cadastral fabric

The internal tables and feature classes that make up a cadastral fabric behave just like normal feature classes in ArcCatalog. You can add attributes to, and create relationship classes with, fabric classes and tables. You can also add subtypes and domains.

You will now create a relationship class between the cadastral fabric and the parcel ownership data for Alachua county.

1. Right-click the ACPA feature dataset, point to New and click Relationship Class...

The New Relationship Class wizard will appear.

2. Type in "FabricParcels_Owners for the name of the relationship class.
3. For the origin feature class, expand the ACPA feature dataset and select NewFabric_Parcels. For the destination table, select Alachua_Owners.

Name of the relationship class:

Select the table/feature classes that will be associated by this relationship:

Origin table/feature class:

- NewFabric_Lines
- NewFabric_Parcels
- NewFabric_Points
- GRU
- Topo
- Alachua_Owners
- NewFabric_Accuracy

Destination table/feature class:

- ACPA
- GRU
- Topo
- Alachua_Owners
- NewFabric_Accuracy
- NewFabric_History
- NewFabric_Level

- Click Next.
- For the relationship type, keep Simple (peer to peer) relationship selected.

You will notice that the Composite relationship option is greyed out. This is because a cadastral fabric cannot participate in a composite relationship, where data in a cadastral fabric table could be altered and corrupted by changes in the related table.

- Click Next.
- Accept the default labeling and message propagation settings and click Next.

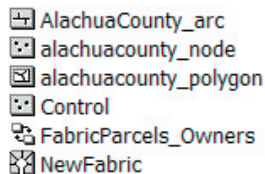
- Click 1-M (One to Many) for the cardinality of the relationship class (one parcel can have many owners). Traditionally, you would define a M-N (Many-Many) relationship between parcels and owners, but for the purposes of this tutorial, you will define a 1-M relationship.
- Choose not to add any attributes to the relationship class and keep the default setting selected. Click Next.
- Click the drop-down list for the primary key in the origin feature class (NewFabric_Parcels) and select "Name".
- Click the drop-down list for the foreign key in the destination table (Alachua_Owners) and select "ID".

Select the primary key field in the origin table/feature class:

Select the foreign key field in the destination table/feature class that refers to the primary key field in the origin table/feature class:

- Click Next to view the relationship class summary.
- Click Finish.

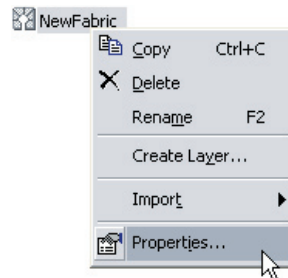
The new FabricParcels_Owners relationship class appears under the ACPA feature dataset.



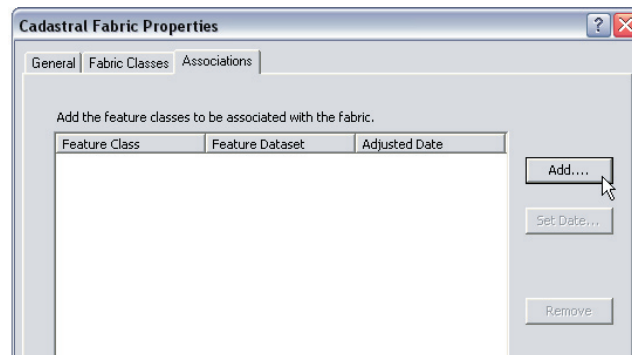
Associating GIS feature classes to your cadastral fabric

When you run a Least Squares Adjustment on your cadastral fabric, new coordinates are computed for the parcel corner points. Parcels in the cadastral fabric will thus adjust over time. GIS features classes that use parcel boundaries as a basemap, will fall out of alignment with the adjusted parcel boundaries. The cadastral editor captures the shifts between the old and new coordinates of the adjusted parcel corners and stores these shifts as displacement vectors in a table in the geodatabase. The displacement vectors are then applied in the GIS Feature Class adjustment to realign the GIS feature classes with the adjusted cadastral fabric. To be able to run a GIS feature class adjustment on your GIS data, you need to associate the feature classes to your cadastral fabric.

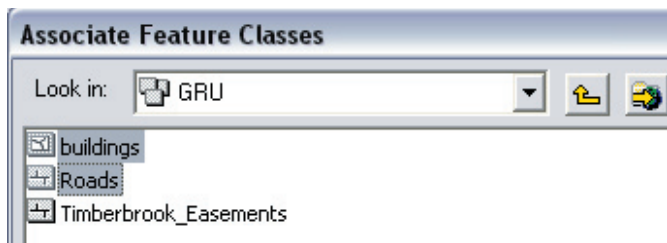
1. Right-click your cadastral fabric in the ACPA feature dataset and click Properties.



2. In the Cadastral Fabric Properties dialog, click the Associations tab.
3. Click the Add button.



4. In the Associate Feature Classes dialog, navigate to the GRU feature dataset in the AlachuaCounty geodatabase, select the Roads and Buildings feature classes and click Add.



Both the Roads and Buildings feature classes are now listed as associated feature classes in the Associations dialog. Note that the adjustment date for both feature classes is set to “Not yet adjusted” until they participate in a GIS Feature Class Adjustment. When the feature classes are adjusted in a GIS feature class adjustment, the adjustment date will be set to the date of the last Least Squares Adjustment run on the cadastral fabric (known as the Adjustment Level).

5. Click OK to close the Cadastral Fabric properties dialog and apply the changes.

Viewing the cadastral fabric in ArcMap

In this section you will add your cadastral fabric dataset as a cadastral fabric layer into ArcMap. The cadastral fabric is loaded as a composite layer into ArcMap. The internal feature classes that make up the cadastral fabric are sublayers under the cadastral fabric composite layer. These fabric sublayers can be queried, symbolized and displayed just like normal feature class layers in ArcMap.

1. Close ArcCatalog.

2. Open ArcMap by clicking the Launch ArcMap button



on the Standard toolbar in ArcCatalog.

3. In the ArcMap dialog, click Browse for maps and click OK. Navigate to the Cadastral Editor tutorial folder on your local drive.

If your ArcMap dialog does not appear, click File -> Open and navigate to your Cadastral Editor tutorial folder on your local drive.

4. Select the AlachuaCounty ArcMap document and click Open.

ArcMap displays a map of your cadastral fabric, with the roads and buildings GIS feature classes. The cadastral fabric composite layer is comprised of the Control, Linepoints, Points, Lines and Parcels sublayers. These are the internal feature classes that make up the cadastral fabric. The Lines sublayer has several line categories, with each category representing an internal cadastral fabric line type. The radial lines (shown in light grey) are displayed for curved boundaries, and they extend out to the center point of each curve boundary in the cadastral fabric.

The Linepoints sublayer displays those parcel corner points that lie on the boundary lines of their adjacent parcels. Linepoints are important in that they do not split the adjacent parcel’s boundary line, rather, they “float” on the adjacent parcel’s boundary line. In this way, the boundary line of the adjacent parcel remains a single boundary line, staying true to the survey record, and not two separate boundary lines.

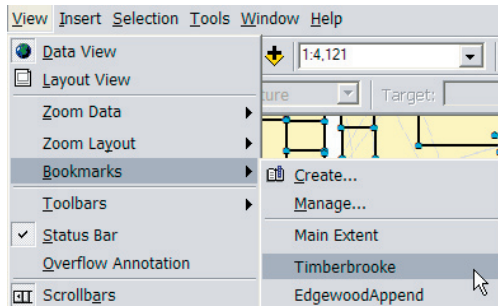
5. Make sure the Survey Analyst - Cadastral Editor extension is turned on for ArcMap (Tools -> Extensions).

For now, turn the display of the GIS feature classes off. You will work with them later:


6. In the table of contents (TOC), uncheck the Buildings and Roads GIS feature classes. Save the map document. (File -> Save)

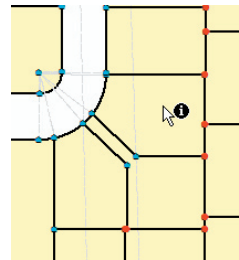
You will now use the Identify tool to examine the attributes and relationships of a parcel in the cadastral fabric. First, you need to zoom in a little closer to the area you will be working with:

7. In ArcMap, click the View menu on the Main Menu toolbar, point to Bookmarks and click Timberbrooke.

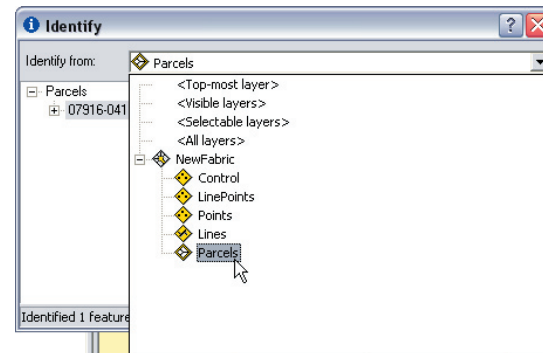


The map display zooms to the extent of the parcels in the Timberbrooke survey plan.

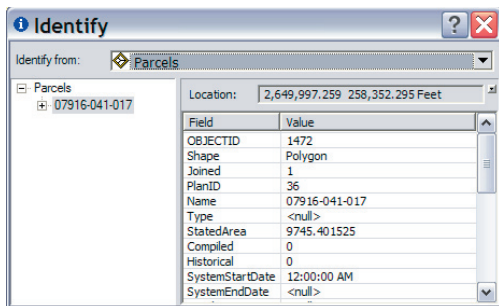
8. Click the Identify tool  on the Tools toolbar. (If the Tools toolbar is not present, Click View, point to Toolbars and click Tools.)
9. Using the Identify tool, click on a parcel that has LinePoints in the map extent.



10. Make sure NewFabric parcels are selected in the Identify from drop down list.

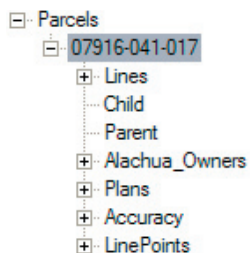


The Identify dialog displays the attributes of the parcel you selected.

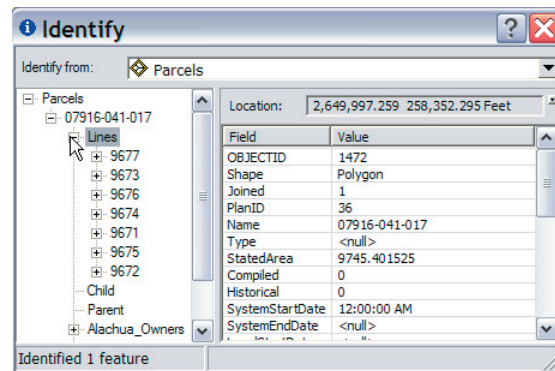


11. Click the plus sign next to the parcel PIN.

The parcel's related lines, plan information and accuracy information appear. The related parcel ownership information (Alachua_Owners) is also displayed. This is from the relationship class you created earlier.



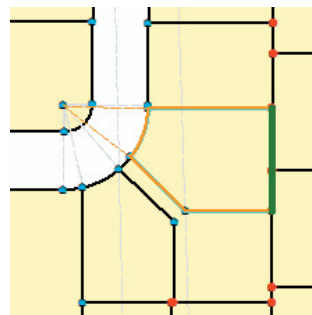
12. Click the plus sign next to Lines to view the parcel lines that make up the parcel polygon.



The parcel lines store the survey record information. Each parcel line stores dimension information, which comes from the associated record of survey, for example, the survey plan.

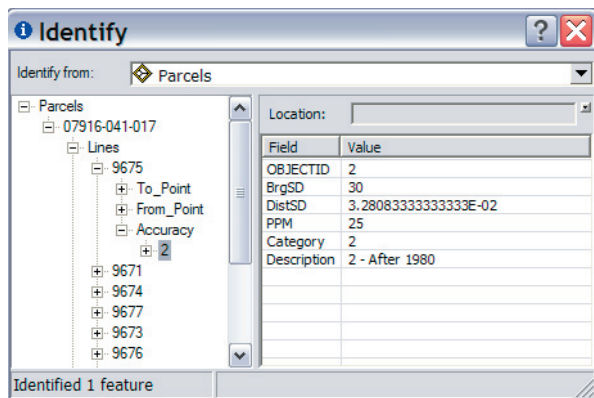
13. Click on each parcel line to view its attributes. The parcel line will also flash green in the map extent.

You will notice that the selected parcel line in the screenshot below is not split by the adjacent parcel corner point lying on the line. This is because there is a line point defined on the adjacent parcel corner point.



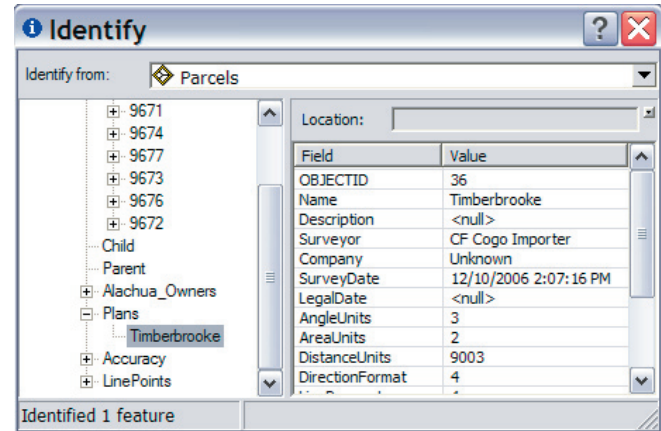
14. Click the plus sign next to one of the parcel lines.

The To and From points of the parcel line are displayed in the Identify dialog. The parcel line's associated accuracy information is also displayed. Parcel lines in the Timberbrooke survey plan have an accuracy level of 2.



15. Click the plus sign next to Alachua_Owners to view the ownership information for the identified parcel.

16. Click the plus sign next to Plans to view the parcel's associated plan or record of survey information.



Since the parcel data was migrated, only the Plan name information is displayed. Later on, you will populate the remaining plan attributes.

17. Close the Identify dialog to complete Exercise 2.

Exercise 3: Creating new parcels in fabric jobs

In this exercise you will add a new parcel to the cadastral fabric using a parcel traverse. The new parcel is part of the Timberbrooke survey plan. Whenever you edit your cadastral fabric, you need to select and extract the parcels you are working with, out into a fabric job. Fabric jobs are created automatically for you during the extraction process. You can also manually create and customize a fabric job, and provide a job title, operator and a job description. You will customize a fabric job in a later exercise.

Modifying parcels in the cadastral fabric


You will be working with parcels from the Timberbrooke survey plan. To view this plan, open the Timberbrooke PDF file in your Cadastral Editor\TutorialData\ folder on your local drive. You will need Adobe Reader to view this file.

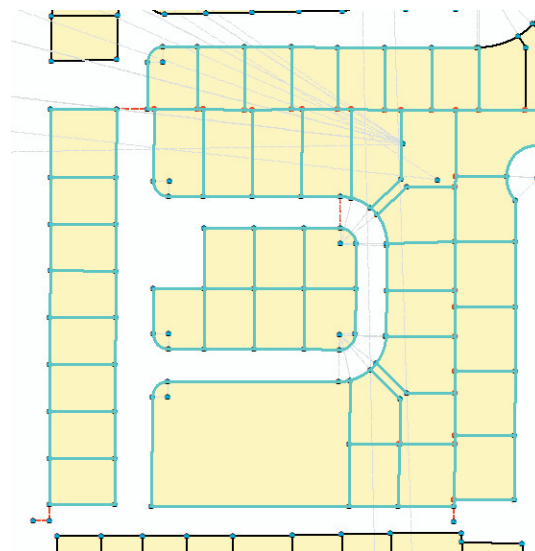
1. If ArcMap is not open, restart ArcMap and open the AlachuaCounty map document.
2. Zoom to the extent of the Timberbrooke survey plan (View -> Bookmarks -> Timberbrooke).

Make sure that the Editor and Cadastral Editor toolbars are loaded in ArcMap:

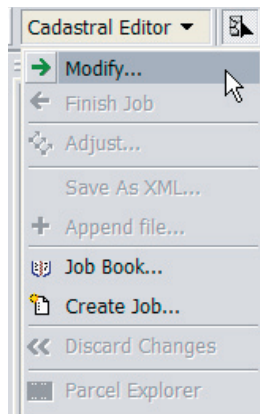
4. Click the View menu on the Main Menu toolbar, point to Toolbars and click Cadastral Editor. Do the same for the Editor toolbar.
5. Click the Editor menu on the Editor toolbar and click Start Editing to start an edit session.

You will now select the parcels you will be working with and extract them out into a fabric job:

6. Click the Select Cadastral Features tool  on the Fabric Editing toolbar.
7. On the map display, drag a box around the parcels in the area of the Timberbrooke survey plan.

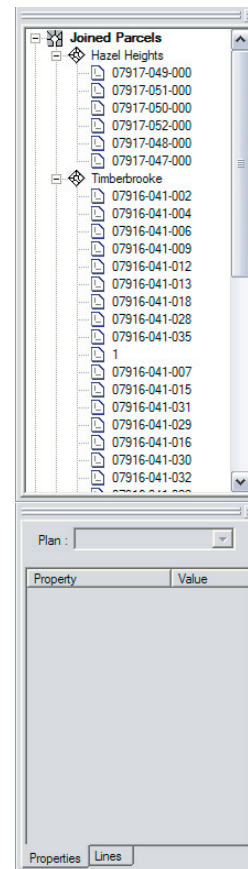


8. Click the Cadastral Editor menu on the Cadastral Editor toolbar and click Modify...



The selected parcels are extracted out to a fabric job and the fabric job is automatically created in the background. The cadastral fabric is now displayed in fabric job mode: The parcels that are part of the fabric job are displayed as active and are available for editing. The parcels outside of the fabric job are displayed as inactive and are not available for editing.

A docked Parcel Explorer window is also displayed on the map, as well as a docked Parcel Properties window.

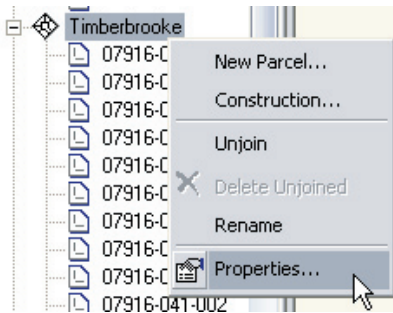


The Parcel Explorer lists all the active parcels in the open fabric job by their associated survey plan. In the fabric job you just created, there are parcels from the Hazel Heights survey plan, the Timberbrooke survey plan, and the Timberbrooke Unit 2 survey plan.

Entering record data into the cadastral fabric

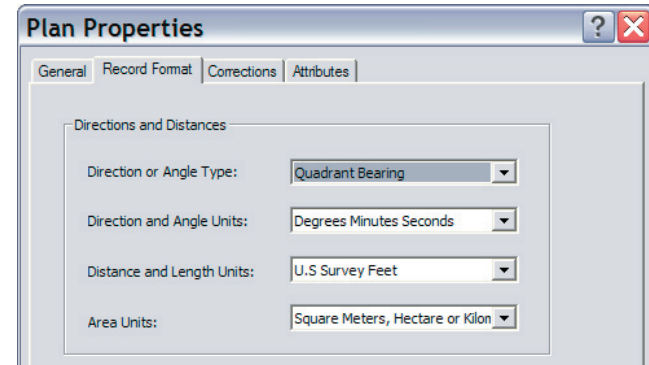
Before you create a new parcel in the Timberbrooke survey plan, you first need to set the record units you will be working with, as well as some other record information:

1. Right-click the Timberbrooke plan in the Parcel Explorer window and click Properties.

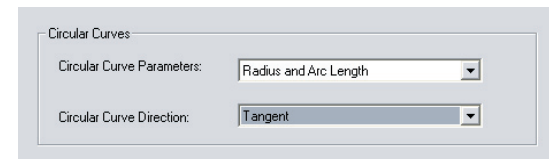


The Plan Properties dialog appears.

2. Click the Record Format tab. Under this tab, you can set the record units associated with the selected plan. These units will be used when entering parcel data from the plan.
3. Make sure Quadrant Bearing is selected for the Direction or Angle Type.
4. Make sure Degrees Minutes Seconds is selected for the Direction and Angle Units.
5. Make sure U.S. Survey Feet is selected for the Distance and Length Units.



6. For circular curves, click the Circular Curve Parameters drop-down list and select Radius and Arc Length.
7. Click the Circular Curve Direction drop-down list and select Tangent.



You will now enter some additional record information from the Timberbrooke plan:

8. Click on the General tab of the Plan Properties dialog. You can enter the legal description of the Timberbrooke plan in the Description text box.

9. Click the Attributes tab.
10. Enter the Survey Company name and the Survey Date. You can get this information from the Timberbrooke PDF file in your \Cadastral Editor\TutorialData folder on your local drive.

Name	Timberbrooke
Description	
Surveyor	
Company	A.K Flowers and Associates
Survey Date	4/29/1995
Legal Date	

11. Enter a plan accuracy of level 2. The record data in the Timberbrooke survey plan is accurate to the standard deviations defined for accuracy level 2.

Line Parameters	Unknown
Distance at Ground	True
Combined Grid Factor	1
True Mid Bearing	0
Accuracy	2

12. Click OK on the Plan Properties dialog to apply your changes.

To view the default accuracy categories defined for the cadastral fabric, open the Accuracies table:

13. Right-click the Parcels sublayer in the Table of Contents and click Open Attribute Table

The Parcels attribute table appears.

14. Click the Options button on the attribute table, point to Related Tables and click

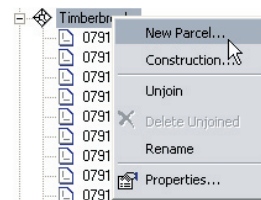
SD_1_Accuracy_Parcels: Accuracy. The attribute table storing the default Accuracy categories defined on the cadastral fabric appears. You can modify the information stored in this table to define your own Accuracy categories.

15. Close the Parcel and Accuracy attribute tables.

Entering parcel data using the parcel traverse

Nearly all the parcels in the Timberbrooke survey plan have been entered into the cadastral fabric. You will complete the Timberbrooke survey plan and enter in the final parcel:

1. Right-click the Timberbrooke plan in the Parcel Explorer, and click New Parcel...



The data frame switches from the open fabric job to a new, blank data frame for parcel construction. You will essentially enter in the parcel data in its own local coordinate space. In most cases, there is no coordinate or spatial reference information on a survey plan, there is only dimension information. Data entry in the cadastral editor is tailored to an environment where only dimensions are known, with no coordinates or spatial reference information.

In parcel construction mode in ArcMap, the docked Parcel Properties window has become active.

2. In the Parcel Properties window, make sure the Timberbrooke plan is selected.

Plan : Timberbrooke

Property	Value
Name	1
Type	0
Joined	False
Stated Area	
Legal End Date	
Accuracy	
Complied	False
Historical	False
Rotation	
Scale	1
Misclose Ratio	
Misclose Distance	

3. Type “07916-041-033” in the empty field next to the parcel Name field and push <Enter> on your keyboard. This is the parcel PIN.

Plan : Timberbrooke

Property	Value
Name	07916-041-033
Type	0
Joined	False
Stated Area	
Legal End Date	
Accuracy	

4. Click on the Lines tab of the Parcel Properties window.

An empty parcel traverse grid appears. You may need to expand the Parcel Properties window to see the full grid.

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From	Bearing	Distance	Radius	Arc Len...	To	Category
1						0

5. Click on the Bearing field to enter the first leg of the parcel traverse. Enter a bearing of “N89-52-06W”. Push <Enter> to enter a Distance of “82” feet.
6. Push <Enter> on your keyboard to display the first traverse leg in the construction data frame.

You do not need to populate the From and to fields as they are populated automatically.

From	Bearing	Distance	Radius	Arc Len...	To	Category
1	N89-52-06W	82			2	0 Boundary
2						0 Boundary

7. Enter in the dimension data for the second parcel traverse leg: Enter a bearing of “N00-13-00E” and a distance of “72.26” feet. Push <Enter>.

From	Bearing	Distance	Radius	Arc Len...	To	Category	Ts
1	N89°52'06"...	82			2	0 Boundary	
2	N0°13'00"E	72.26			3	0 Boundary	
3					0 Boundary		
					0 Boundary		

8. Enter in the circular curve dimension data for the third leg of the parcel traverse: Enter a bearing of “N00-13-00E”, a radius of “25” feet and an arclength of “39.22” feet. Push <Enter>.

From	Bearing	Distance	Radius	Arc Len...	To	Category
1	N89°52'06"W	82.000			2	0 Boundary
2	N0°13'00"E	72.260			3	0 Boundary
3	N0°13'00"E		25.000	39.220	4	0 Boundary

9. Enter in dimension data for the fourth leg of the parcel traverse: Enter a bearing of “S89-53-24W” and a distance of “57.05” feet. Push <Enter>.

From	Bearing	Distance	Radius	Arc Len...	To	Category
1	N89°52'06"W	82.000			2	0 Boundary
2	N0°13'00"E	72.260			3	0 Boundary
3	N0°13'00"E		25.000	39.220	4	0 Boundary
4	S89°53'24"E	57.050			6	0 Boundary

10. Enter in the fifth and final leg of the traverse to close the parcel. Enter a bearing of “S00-13-00W” and a distance of 97.25*” feet. Enter an asterisk “*” character next to the “97.25” to indicate that this is the final leg of the traverse. Push <Enter>.

From	Bearing	Distance	Radius	Arc Len...	To	Category
1	N89°52'06"W	82.000			2	0 Boundary
2	N0°13'00"E	72.260			3	0 Boundary
3	N0°13'00"E		25.000	39.220	4	0 Boundary
4	S89°53'24"E	57.050			6	0 Boundary
6	S0°13'00"W	97.250*			1	0 Boundary
					0 Boundary	

Once you close the parcel traverse back on its starting point, misclosure information for the parcel is displayed at the bottom of the Parcel Properties window. The misclosure is the difference between the starting point of the first traverse leg and the ending point of the last traverse leg. The parcel misclosure should be as small as possible. The misclosure for the parcel you just entered is 0.005 feet, which is within acceptable limits.

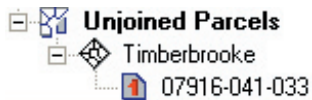
Misclose: S0°39'07"E 0.005 ftus Acc: High Area: 728 sqm

Large misclosures indicate either a data entry error, or a problem with the survey data.

11. Click Keep changes to parcel data on the Parcel Construction toolbar to save your parcel traverse.



The data frame switches back to the active parcels in your fabric job and the newly created parcel is listed as an unjoined parcel in the Parcel Explorer.



New parcels reside in unjoined space in an open fabric job. Remember, you created your new parcel with no knowledge of coordinates, or of a spatial reference. Your parcel has no knowledge of where it fits in the cadastral fabric. For your new parcel to become part of the cadastral fabric it has to be “fitted” or joined into the cadastral fabric.

12. Select the unjoined parcel and click on the Properties tab of the Parcel Details dockable window

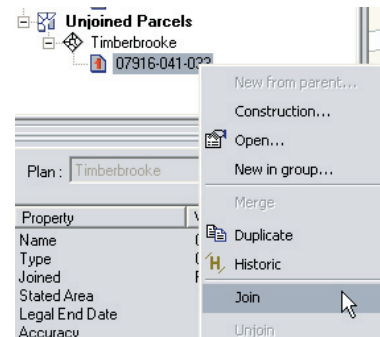
Notice that the Accuracy of the new parcel is level 2. New parcels inherit the accuracy of the plan in which they are created, unless another accuracy level is specified.

Name	07916-041-033
Type	0
Unclosed	False
Stated Area	
Legal Start Date	
Legal End Date	
Accuracy	2
Compiled	False

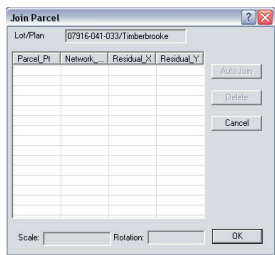
Joining a parcel to the cadastral fabric

You will now join your new parcel “07916-041-033” to the cadastral fabric:

1. With the fabric job still open, click the View menu, point to Bookmarks and click Join Timberbrooke Parcel to zoom into the area where you will be joining the parcel.
2. Right-click the unjoined parcel “07916-041-033” and click Join.



The unjoined parcel appears as a floating geometry in your data extent, and the Join Parcel dialog appears. If necessary, drag the parcel to a position where join lines can be easily constructed between parcel corners.



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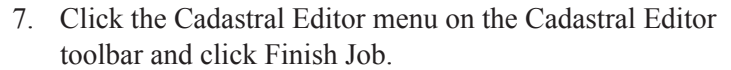
-


-

Join residuals are an indication of how well the unjoined parcel fits with the surrounding cadastral fabric parcels. The residuals are derived from a difference in measurements between the joining parcel's boundaries and the adjacent cadastral fabric parcel boundaries. Large residuals are an indication of either an inaccurate cadastral fabric, or of problems in the unjoined parcel data. In this case, the join residuals are small and acceptable.

- The data frame will refresh to display your new parcel as one of the active parcels in the fabric job.

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- 

The fabric job changes are posted back to the cadastral fabric.

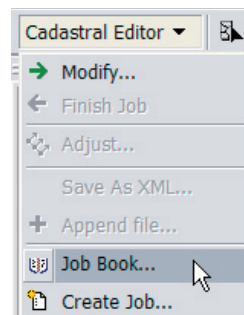
Exercise 4 : Working with parcel construction tools

In the previous exercise, you learnt how to add a new parcel to the cadastral fabric using the parcel traverse. In this exercise, you will learn how to create a group of new parcels using existing parcel geometry as a template. Using parcel construction tools, you will split a parcel block into smaller, subdivided parcels. Once again you will edit your parcels in a fabric job.

Using parcel construction tools to subdivide an existing parcel block

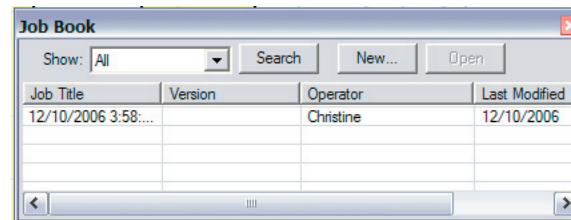
For this exercise, you will re-open the fabric job you worked with in the previous exercise. You do not need to re-select and extract parcels out to a fabric job every time you want to edit the cadastral fabric. If you want to work with the same set of parcels already added to a previous job, you can just re-open the existing fabric job from the Job Book.

1. If ArcMap is not open, re-open the application and load the AlachuaCounty map document.
2. Make sure your map is zoomed out to the correct extent. (View -> Bookmarks -> Timberbrooke).
3. Start an edit session. (Editor -> Start Editing.)
4. Click the Fabric Editing menu and click Job Book... to open the fabric job book.



The dockable Job Book window appears on the screen.

5. Resize the Job Book window, if necessary. In the list of fabric jobs, you should see the single fabric job you worked on in Exercise 3.




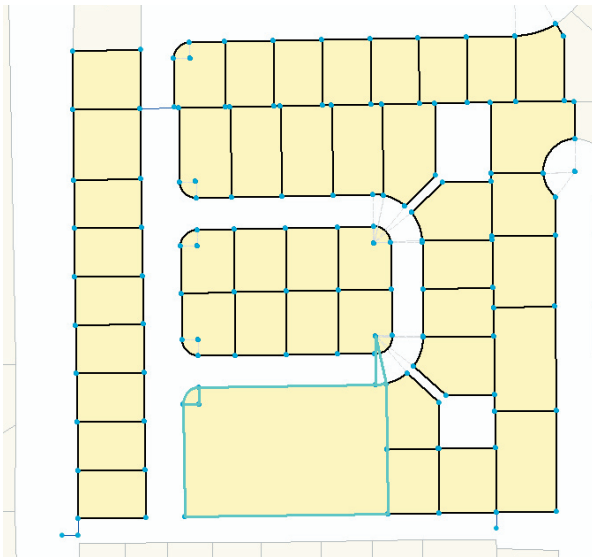
You will re-open this fabric job to continue with your parcel edits.

6. Select the fabric job in the Job Book window and click Open. You can also double-click on the selected fabric job to open it.

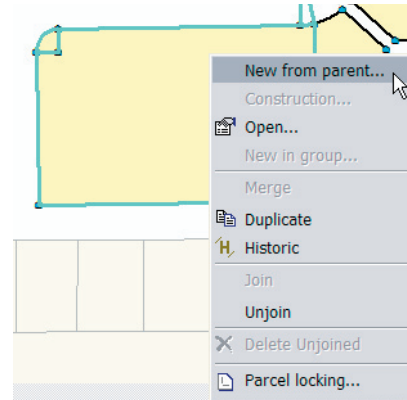
The parcels in the selected fabric job are extracted again and re-opened in the fabric job.

7. Close the Job Book.

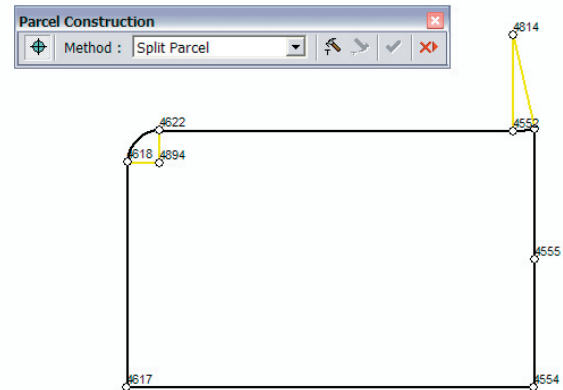
8. Click on the Select Cadastral Features tool  and click on the large, unsubdivided parcel block in the active fabric job. You can also select parcel “07916-041-022” in the Parcel Explorer.



9. Right-click on the selected parcel and click New from parent...

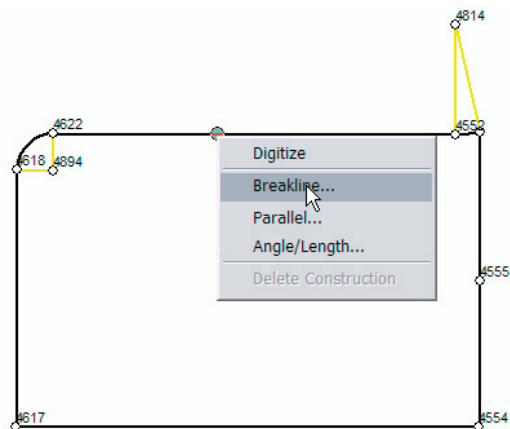



The selected parcel is opened in the parcel construction environment.



You will now use the Breakline tool to split the parcel block into its subdivided parcels:

10. Right-click on the top-most line of the parcel and click Breakline...



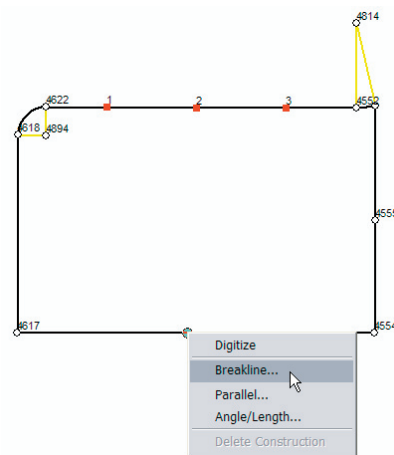
Tip: If you lose focus of the parcel construction tool cursor, click the Construction Tool  button on the Parcel Construction toolbar to switch back to the parcel construction tool cursor.

11. On the Breakline dialog, click in the first empty line in the Break at distance column and enter “54.03” to create your first construction point. Click enter.
12. Enter “79.00” on the second line to create your second construction point.
13. Enter “79.00” for your third and final construction point for the line.

The Breakline dialog box shows the 'Breakline between points' section with '4622' and '4552' selected, and a 'Switch' button. Below is a table for 'Break at distance' with four rows. The first row contains '54.03', the second row contains '79', and the third and fourth rows are empty. Below the table, it shows 'Sum of distances: 133.030' and 'Line length: 274.370'. At the bottom are 'OK' and 'Cancel' buttons.

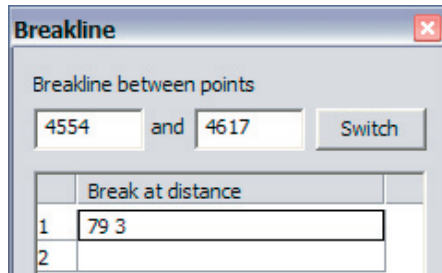
Break at distance	
1	54.03
2	79
3	
4	

14. Click OK. All three construction points are created on the parcel line.
15. Now right-click the bottom-most parcel line and click Breakline...

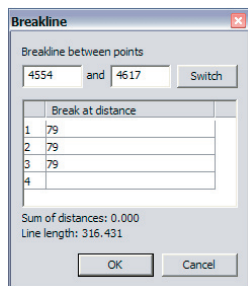


The construction points on the bottom line are all at an equal distance of 79.00 feet.

16. Click the Switch button to switch the direction of the breakline.
17. On the first line, enter “79” and then a space and the number “3”. Push Enter on your keyboard.



This is a quick method of adding equally spaced construction points in succession on a parcel line.

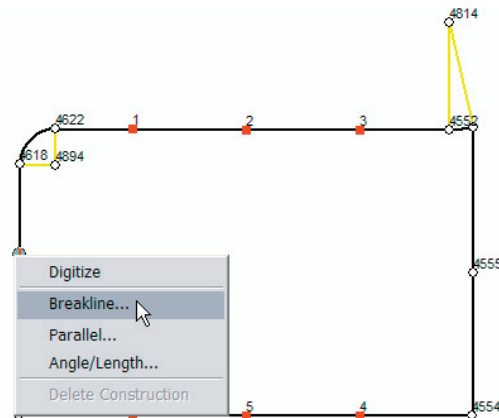


18. Click OK to close the Breakline dialog.

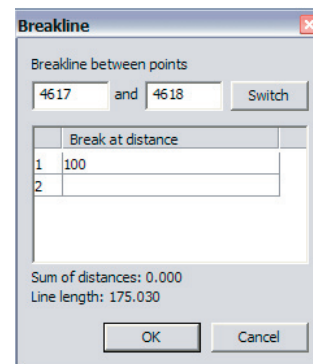
The three new construction points are added on the bottom-most parcel line.

You will now add a construction point on the left-most line of the parcel block:

19. Right-click on the left-most line of the parcel block and click Breakline.

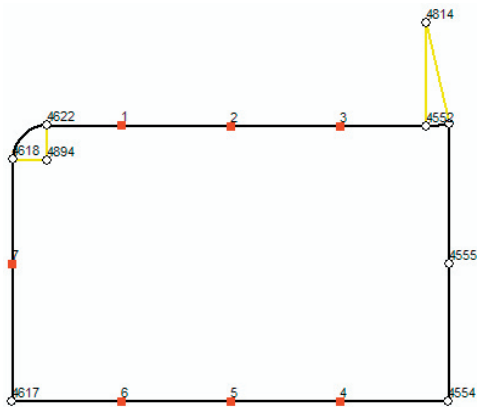


20. On the Breakline dialog enter “100”. The breakline should be going from bottom to top).



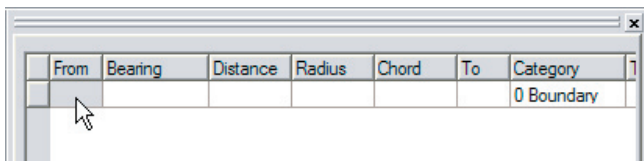
21. Click OK to create the construction point.

Your parcel block should now have the following construction points:



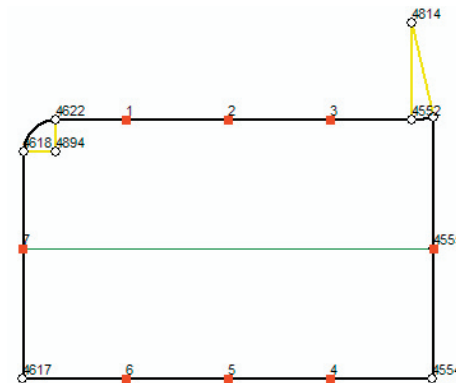
You will now add a construction line between the construction points on the left and right parcel lines:

22. In the construction line grid, click in the From field of the first empty grid line.



23. Click on the construction point on the left parcel line and then click on the construction point on the right parcel line to construct a line in the middle of the parcel block.

The construction line's parameters are populated in the construction grid.

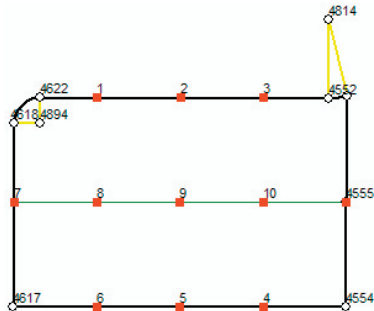


From	Bearing	Distance	Radius	Arc Len...	To	Category
7	N89°59'36"E	316.429			4555	0 Boundary
						0 Boundary

24. Right-click on the line you have just added and click Breakline... to add construction points to this line .

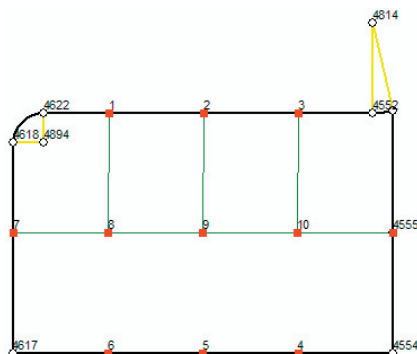
25. In the Breakline dialog, enter "79 3" to enter three equally spaced construction points at 79 feet apart. Click OK.

Your parcel should now have the following construction points:

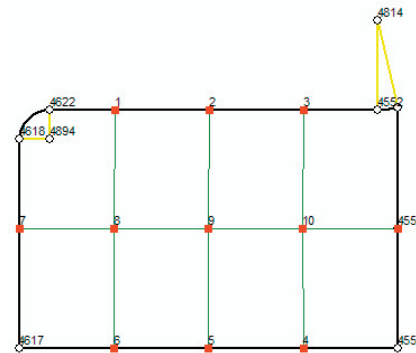



You will now construct vertical lines between the construction points to split the parcel block into smaller, subdivided parcels.

26. In the construction line grid, click in the From field of the first empty line.
27. Click on construction points 1 and 8, 2 and 9, 3 and 10 to add three lines to the top half of the parcel block.



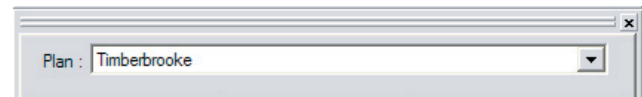
28. Click on construction points 8 and 6, 9 and 5, 10 and 4 to complete the subdivision of the parcel block.



29. Click the Build Parcel  button on the Parcel Construction toolbar to build parcels from the newly added construction lines and points.

The new parcels are generated and the Parcel Details window displays the properties of the selected parcel in the parcel group.

30. Make sure that Timberbrooke is selected in the plan drop down list as you are adding these new, subdivided parcels to the Timberbrooke plan.



You can now enter in a parcel PIN and various other parcel attribute information on the Parcel Properties tab. You can also select parcels in the parcel group and change their line

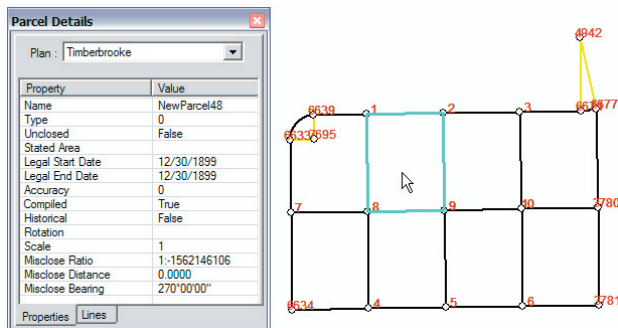
attributes as well. You may need to edit the line dimensions generated (inversed) from the construction lines if they do not match the dimensions on the survey record.

In the case of these grouped parcels, some of the dimensions generated from the construction line work are slightly different from the record. For the purposes of the tutorial, you do not have to go through and edit every incorrect dimension for each parcel. In reality however, it is highly recommended that you do so if you want to obtain realistic results from the Least Squares Adjustment.


You can also accept the default parcel names. You do not need to set the individual accuracy level of each new parcel as the parcels will inherit the accuracy level of the Timberbrooke survey plan.

31. Using the Select Cadastral Features tool, select any one of the newly generated parcels to view its properties.

The parcel Properties window refreshes to show the attributes of the newly selected parcel. You can click on the Lines tab to view and edit the line dimensions.

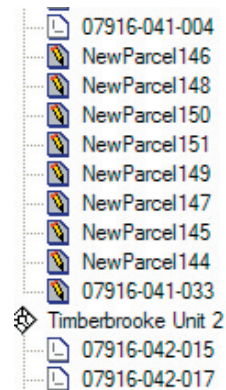


You are now going to save the newly generated parcels:

32. Click Keep changes to parcel data  on the Parcel Construction toolbar to save the parcels to the fabric job.

Notice that you do not need to join these parcels to the fabric job. Since the parcels were created from the geometry of an existing job parcel, the parcels are already spatially aware of where they fit in the cadastral fabric.

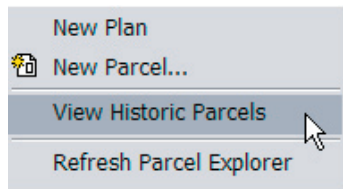
The new parcels are now listed under the Timberbrooke plan node in the Parcel Explorer.




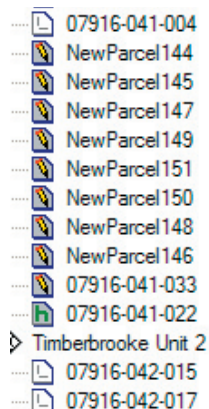
Viewing historic parcels

When you replaced the existing parcel block in the Timberbrooke plan with new, subdivided parcels, the parcel became a historic parcel. The parcel block was automatically flagged as historic when you clicked the “New from parent...” command and saved your new, subdivided parcels to the fabric job.

1. Right-click in empty space in the Parcel Explorer and click View Historic Parcels.



The parcel explorer refreshes to display historic parcels. A historic icon  is displayed next to parcel 07916-041-022.



2. Select the historic parcel in the Parcel Explorer.

The historic parcel block is also selected on the map.

3. Click the Cadastral Editor menu and click Finish Job to post your changes back to the cadastral fabric.
4. Click the Editor menu and click Save Edits to save your changes and complete Exercise 4.

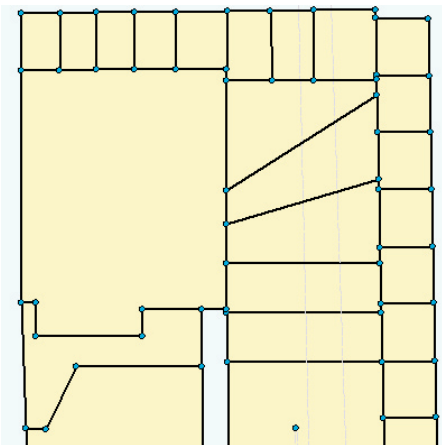
Exercise 5 : Appending groups of parcels to the cadastral fabric

So far, you have seen how to add new parcel data to a cadastral fabric using the parcel traverse and parcel construction tools. You can also append groups of parcels to your cadastral fabric in the form of XML files. This would be the equivalent of a digital submission of parcels. In this exercise you will append a subdivision of parcels from the Edgewood survey plan.

1. To view the Edgewood survey plan, navigate to your \cadastral editor\TutorialData folder in windows explorer. Open EdgewoodPhase1.pdf

Creating a custom fabric job

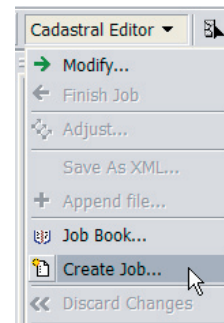
1. If ArcMap is not already open, open the application and load the AlachuaCounty map document.
2. Click the View menu, point to Bookmarks and click EdgewoodAppend to zoom the Edgewood survey plan



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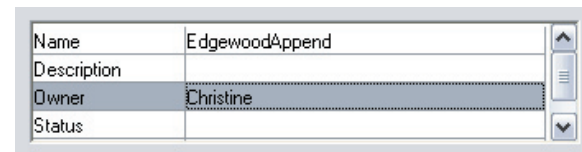
You will create a custom fabric job to append the Edgewood Phase 1 plan parcels:

3. Click the Editor menu and click Start Editing.
4. Click the Cadastral Editor menu and click Create Job...




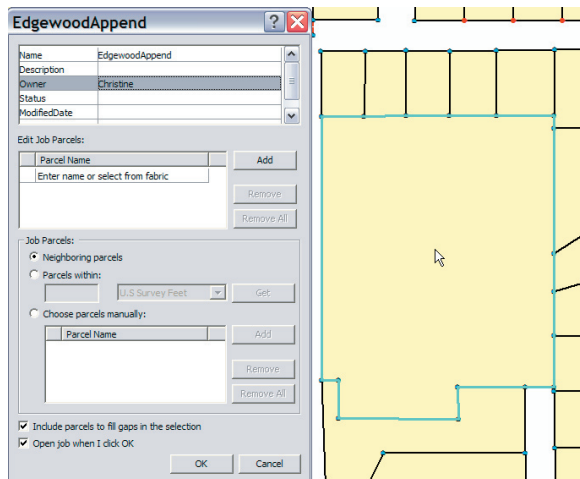
The custom fabric job dialog appears on the screen.

5. In the empty field next to Name, type EdgewoodAppend as the job title.
6. Type an operator name in the empty field next to Owner.



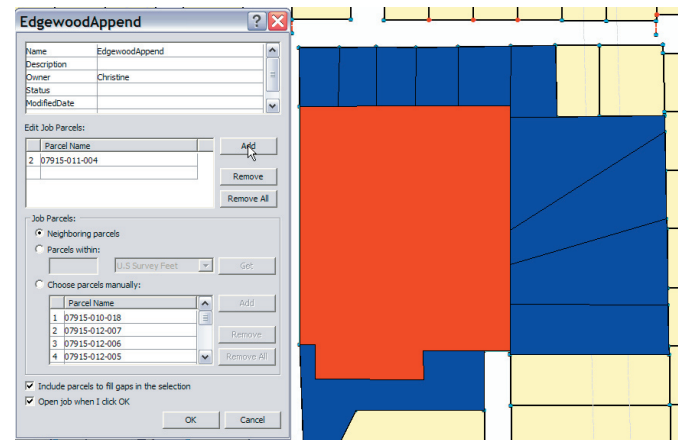
In a custom fabric job, you can specify the parcels you want to edit. Edit parcels are locked and this is relevant on a multi-user, SDE environment. Locked parcels cannot be edited by overlapping jobs.

- Click the Select  Cadastral Features tool on the Fabric Editing toolbar and select the large, unsubdivided parcel on your map extent.



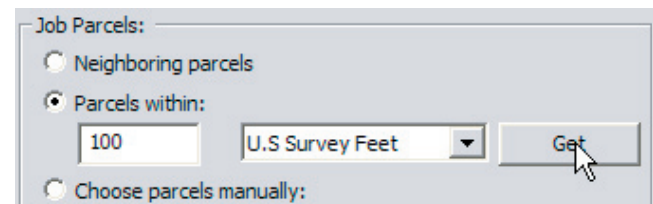
- Click the Add button next to the Edit Job Parcels list to add the selected parcel as an edit parcel to the custom fabric job.

The parcel name appears in the Edit Job Parcels list and is displayed in red on the map. For joining purposes, the immediate, surrounding neighboring parcels are added as additional job parcels to the fabric job. These parcels are displayed in blue and their parcel names are added to the list of job parcels.



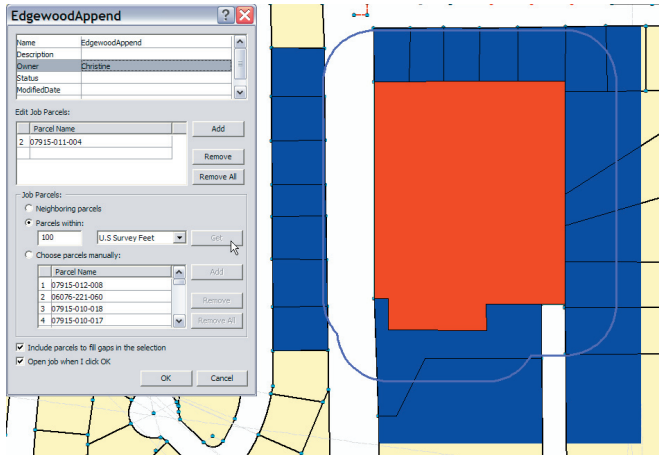
Neighboring parcels are added by default to a custom fabric job. You can add additional surrounding parcels using a radius buffer, or by manually selecting parcels.

- Click the Parcels within option and enter a radius of 100 feet.
- Select U.S Survey Feet from the units drop down list.




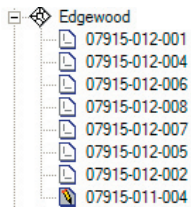
- Click the Get button.

A radius buffer line is displayed on the map and all parcels intersecting this line are added as job parcels to the fabric job, and displayed in blue.



12. Leave the Include parcels to fill gaps in the selection and Open job when I click OK options checked, and click OK to open the fabric job.

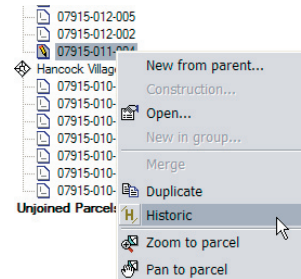
The parcels are extracted out into a fabric job. The locked edit parcel is displayed with a locked icon  in the Parcel Explorer.



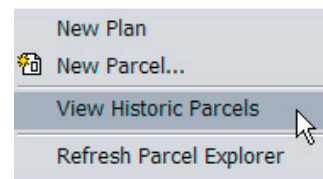
Flagging parcels as historic

Before you append the Edgewood Phase 1 subdivision of parcels to the fabric job, you will mark the existing parcel block as historic.

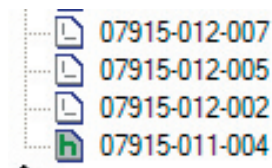
1. With the fabric job still open, right-click the locked parcel under the Edgewood plan node and click Historic to turn on the historic flag for the parcel.



2. Right-click in empty space in the Parcel Explorer and click View Historic Parcels.



The locked parcel icon changes to the historic parcel icon.

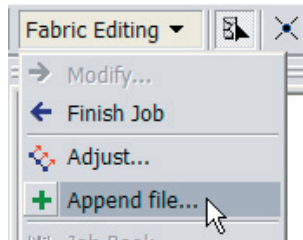


3. Turn the display of historic parcels off. (Right-click in empty space in the Parcel Explorer and click View Historic Parcels)

The historic parcel block is no longer visible on the map.

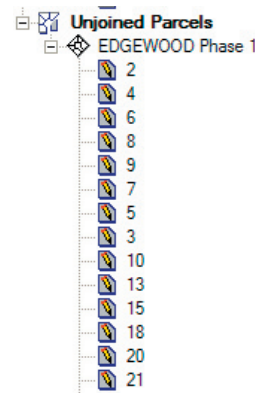
Appending parcels to a fabric job

1. With the fabric job still open, click the Cadastral Editor menu and click Append file...



2. In the Open dialog, navigate to your \cadastral editor\ TutorialData\ folder on your local drive and select the EdgewoodPhase1.xml file.
3. Click Open.

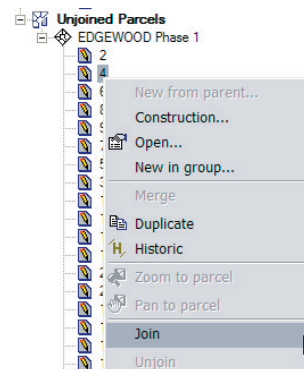
The Edgewood Phase 1 plan parcels are loaded as unjoined parcels in the fabric job.



Joining a parcel group to the cadastral fabric

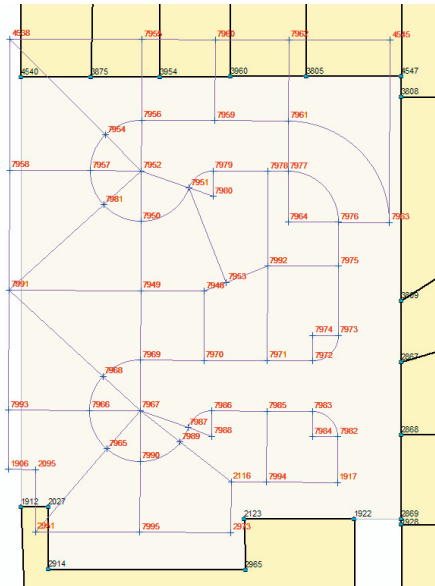
You will now join the Edgewood Phase 1 unjoined parcel group:

1. With the fabric job still open, zoom closer into the join area.
2. Right-click any of the unjoined parcels in the Edgewood Phase 1 plan and click Join.

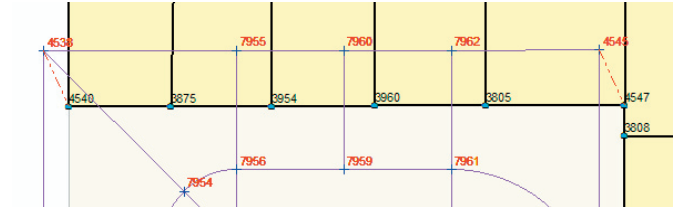


The geometry of the parcel group is floated on the map extent.

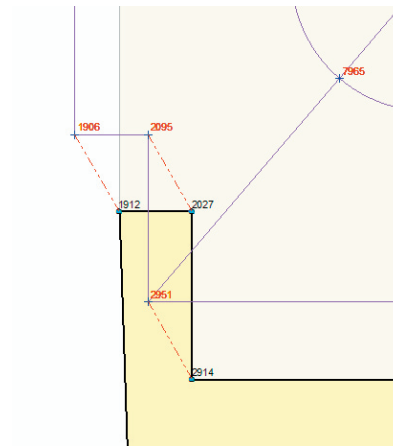
- Click anywhere within the parcel group geometry and drag the geometry to position the unjoined parcel corners for joining.



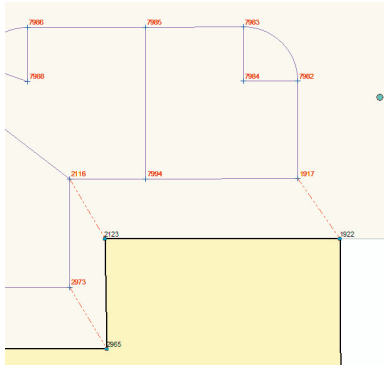
- Snap on the top left corner of the parcel group and snap on its corresponding corner in the cadastral fabric to create the join line.
- Join the top right corner.



- Now join the three bottom left corners of the parcel group



- Join the bottom right corners of the parcel group.



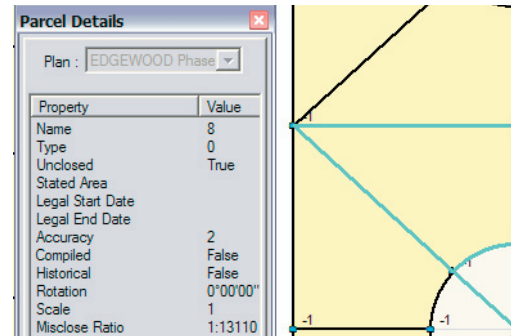
8. Click Auto Join on the Join dialog to pick all remaining join lines

The residuals vary, some are small and some are a little bigger. This is because the parcel data you have just appended to the fabric job is more accurate than the surrounding parcel data.

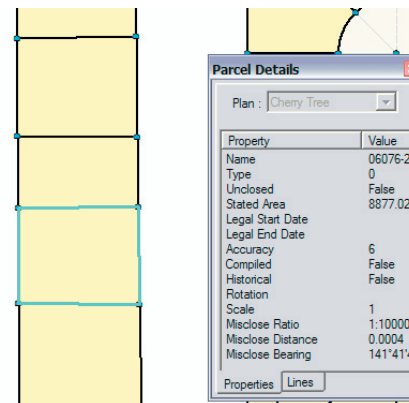
9. Click OK on the Join Parcel dialog to accept the join.

The appended subdivision parcels are now active parcels of the open fabric job.

10. Select one of the parcels you have just appended and confirm that the parcel's accuracy is level 2 in the Parcel Details window



11. Select one of the parcels surrounding your appended parcels and confirm that its accuracy level is 6 in the Parcel Details window.



The parcels you appended in the Edgewood Phase 1 plan are more accurate than the surrounding parcels, hence the varying join residuals. Even though it may seem that your more accurate Edgewood Phase 1 parcels were joined and “fitted” into the less accurate surrounding parcels, running a Least Squares Adjustment on this fabric job would result

in the less accurate parcels adjusting around the more accurate parcels. The more accurate parcels will maintain their survey integrity through the Least Squares Adjustment.

Post your job changes back to the cadastral fabric to complete Exercise 5:

12. Click the Cadastral Editor menu and click Finish job.
13. Click the Editor menu and click Save Edits to save your changes.
14. Stop the Edit Session (Editor -> Stop editing).

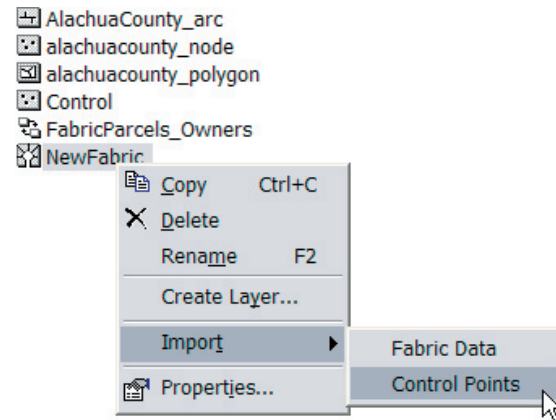
Exercise 6 : Adding control points to your cadastral fabric

In a Least Squares Adjustment of the cadastral fabric, control points are used as a basis for improving the spatial accuracy of all other parcel points in the network. Control points are held as fixed points in the Least Squares Adjustment and georeference the cadastral fabric. While fabric parcels may be accurately defined in relation to each other, control points, used in a Least Squares Adjustment, accurately coordinate parcels on the surface of the earth.


In this exercise, you will import control points into the cadastral fabric from an existing feature class. Control points can also be entered manually in a fabric job. You will enter a new control point into the Timberbrooke survey plan.

Importing control points from a feature class into the cadastral fabric

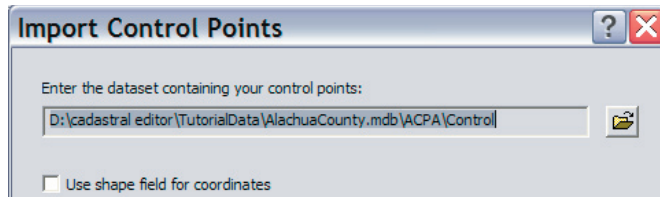
1. Open ArcCatalog if it is not already open.
2. Open the connection you created to your tutorial data in Exercise 1. Navigate to your cadastral fabric (NewFabric) in the ACPA feature dataset.
3. Right-click on the cadastral fabric, point to Import and click Control Points.



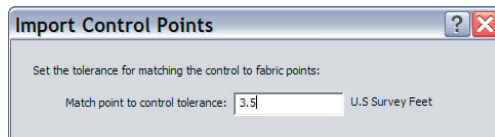
The Import Control Points wizard will appear.

4. Click the Open File button  and navigate to the Control feature class in the ACPA feature dataset.
5. Select the Control feature class and click Add on the Import Control Points dialog.
6. Do not check the Use shape field for coordinates box.

The control feature class has X, Y, Z coordinate attributes and the importer will be using these attribute coordinates. If your control point feature class has no X, Y, Z coordinate attributes, you can check the Use shape field for coordinates box. The importer will then obtain the X, Y, Z coordinates from the shape field of the feature class.




7. Click Next
8. Enter “3.5” feet for the Match point to control tolerance value.



The Match point to control tolerance is the tolerance used when matching control points to parcel points in the cadastral fabric. Control points must be associated with parcel points in the cadastral fabric for them to be included in the Least-Squares Adjustment of the network. If a cadastral fabric is inaccurate, parcel points in the cadastral fabric may not match the locations of their control points exactly. If this is the case, control points can be linked (or associated) to parcel points that lie within a specified distance (tolerance) of the control points.

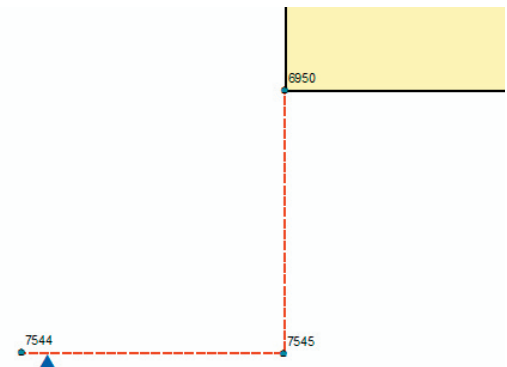
9. Click Next to view the import summary and click Finish to import the control points.
10. Open ArcMap and re-open the AlachuaCounty map document in your \cadastral editor\ folder.

The control points should now be visible on the map.

If the importer was unable to find fabric points within the specified tolerance, the imported control points will not be able to participate in a Least Squares Adjustment. In this case, you can use the manual control point link tool  to associate control points to their parcel points.

11. Zoom into the Timberbrooke survey plan on the map (View -> Bookmarks->Timberbrooke)

If you zoom in a little closer to each of the control points, you will notice that the fabric parcel points do not exactly match the locations of their control points. This is because the control data is more accurate than the parcel data. The fabric points do however, all fall within the specified 3.5 foot tolerance and are associated to their control points.




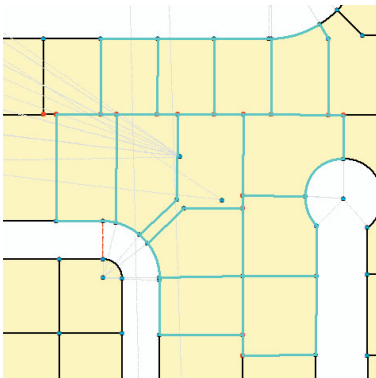
Adding control points manually to the cadastral fabric

In addition to importing control points, you can also manually add control points to your cadastral fabric. You will now manually enter a control point from the Timberbrooke survey plan:

1. Click the Editor menu and click Start Editing to start and edit session.

You will add a control point to top-right corner of the Timberbrooke survey plan parcels.

2. Click the Select Cadastral Features tool  on the Cadastral Editor toolbar and drag a box to select the parcels in the area where you will be adding a control point.



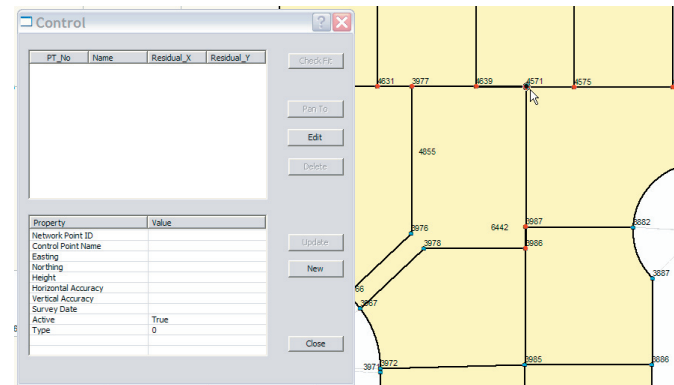
3. Click the Cadastral Editor menu and click Modify... to extract the selected parcels into a fabric job.

3. Zoom to the active parcels in the open fabric job.

4. Click on the Maintain control points  button on the Cadastral Editor toolbar.

The control dialog appears on your screen.

5. Click the New button on the Control dialog and click on the top right parcel corner point of the parcel shown in the screenshot below.



The grid on the Control dialog is populated with the Network point ID (Associated parcel point ID), a default control point name and the Easting and Northing values of the parcel point. You will re-enter the Control Point Name, and the Easting and Northing values of the control point as the parcel point coordinates do not match the coordinates of the control point.

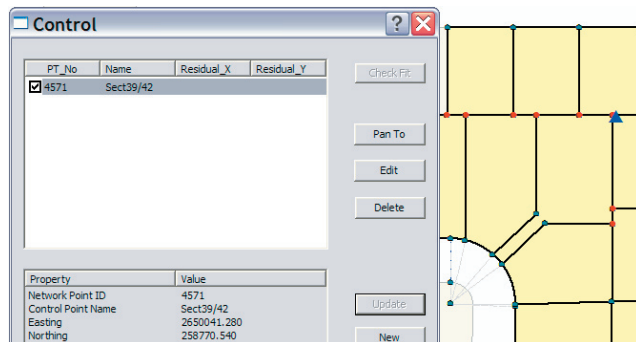
6. In the Control dialog, click the value field of the Control Point Name and enter a name of “Sect39/42”

- Click the Easting value field and enter a coordinate of “2650041.28”. For the northing coordinate, enter “258770.54”.

Property	Value
Network Point ID	4571
Control Point Name	Sect39/42
Easting	2650041.28
Northing	258770.54

- Click Update to add the new control point to the control points list and to the active fabric job. Close the control dialog.

The control point will appear in its correct location on the map.



- Click the Cadastral Editor menu and click Finish job to post your changes back to the cadastral fabric. Save your edits and stop the edit session to complete Exercise 6.

Exercise 7 : Adjusting your cadastral fabric

Now that you have added control points to the Timberbrooke survey plan, you are able to run a Least Squares Adjustment on the parcels in this area. Least Squares Adjustments are run on the active parcels in an open fabric job. The adjusted parcels are then posted back to the cadastral fabric.

The Least Squares Adjustment processes all the parcel line measurements together with the control points to derive new coordinates for the parcel points. The adjustment essentially finds a “best-fit” for the parcel point coordinates, based on the new and existing parcel data, the accuracy of the parcel data, and on the control points. Control points are treated as fixed points in a fabric adjustment and do not shift.

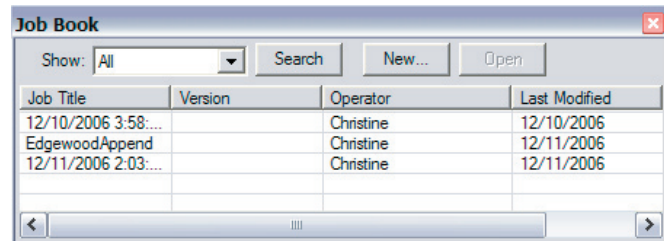
Since the Least Squares Adjustment derives new coordinates for the parcel corner points, parcel boundaries will adjust slightly or significantly, depending on how accurate the parcel data is in relation to the control points. As the cadastral fabric is adjusted, overlying GIS layers will fall out of alignment with the parcel base map. In this exercise, You will run a GIS Feature Adjustment to bring your GIS layers back into alignment with your adjusted parcels.

Adding connectivity to a parcel boundary network

Before you run an adjustment on your parcels, you need to ensure that there is good connectivity in the network.

1. If ArcMap is not open, restart the application and open the AlachuaCounty map document. Start an edit session.
2. Zoom to the Timberbrooke survey plan area. (View -> Bookmarks -> Timberbrooke)
3. Click the Cadastral Editor menu and click Job Book to open the fabric job book.

You will notice 3 jobs now present in the job book. The first job is the automatic job that was created in Exercise 3. The second job is the custom, named job you created to append the Edgewood Phase 1 survey plan parcels in Exercise 5. The third job is the automatic job that was created when you entered the control point in exercise 6.

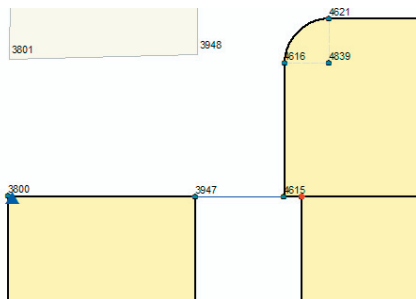


4. In the Job book, select the first job you created to open the parcels in the Timberbrooke survey plan area. Click Open.

The Timberbrooke survey plan parcels are re-opened in the existing fabric job. Notice that the control points are now picked up as part of the fabric job as well, since they are associated to parcel points in the fabric job.


5. Close the job book.

When running an adjustment on a group of parcels in a fabric job, you need to ensure that there is sufficient connectivity in the parcel boundary network. There is already a connection line that connects the western strip of parcels to the eastern block of parcels

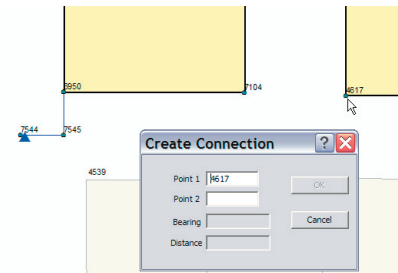


However, this connection line is not sufficient to run an adjustment on a parcel group of this shape and size. More connectivity is needed further south. You will now add one more connection line to the parcel network in the job.

6. Click the View menu, point to Bookmarks and click AddConnectionLine to zoom in closer to the points you will connect.

7. Click the Create Connection tool  on the Cadastral Editor toolbar.

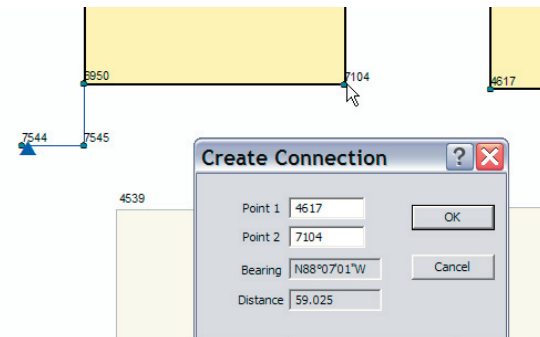
8. In the Create Connection dialog, click in the empty box next to “point 1”.
9. Click on the bottom left corner point of the parcel on the right of the empty road space.



The parcel point ID is added to the empty box in the Create Connection dialog.

10. Click in the empty box next to “Point 2” and click on the bottom right corner point of the parcel on the left of the empty road space.

The bearing and distance of the new connection line is displayed in the Create Connection dialog.

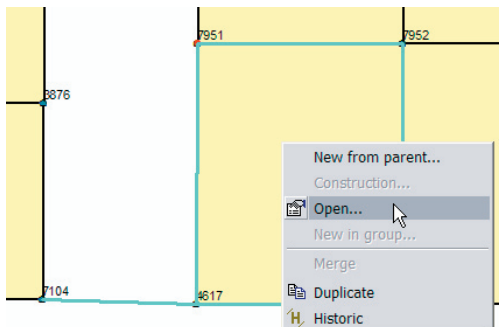


If the bearing and distance of the connection line does not match the survey record, you need to edit the dimensions of the newly created connection line so that it reflects the survey record. You will do this now.

11. Click the OK to create the new connection line.

The map will refresh to display your new connection line.


12. Using the Select Cadastral Features tool, right-click the parcel to the right of the new connection line and click Open.



13. In the parcel edit frame, click the Lines tab of the Parcel Details Window.

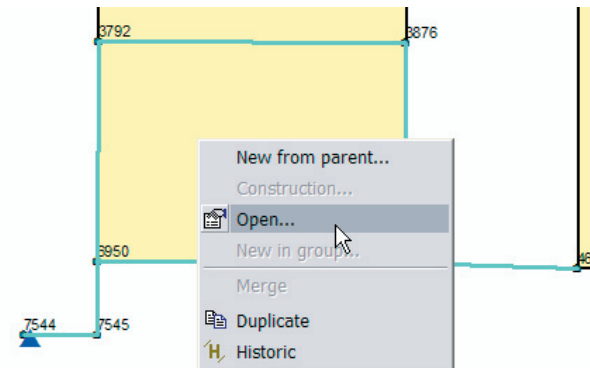
14. Change the bearing and distance of the parcel's new connection line to "N89-50-47W" and "60 feet".

	From	Bearing	Distance	Radius	Arc Len...	To	Category
	4617	N0°13'00"E	100.000			7951	0 Boundary
	7951	N89°59'36"E	79.000			7952	0 Boundary
	7952	S0°01'50"E	99.999			7953	0 Boundary
	7953	S89°59'36"W	79.431			4617	0 Boundary
	4617	N89°50'47"W	60.000			7104	3 Connection

15. Click the Keep changes to parcel data button  on the Parcel Construction toolbar.

The parcel is saved back to the fabric job. Now do the same for the parcel on the left of the new connection line:

16. Open the parcel on the left of the connection line.



17. Change the bearing and distance of the new connection line to "S89-40-47E" and "60 feet".

	From	Bearing	Distance	Radius	Arc Len...	To	Category	Type
	6950	N0°13'00"E	75.000			3792	0 Boundary	
	3792	S89°50'47"E	105.000			3876	0 Boundary	
	3876	S0°13'00"W	75.000			7104	0 Boundary	
	7104	N89°50'47"W	105.000			6950	0 Boundary	
	7545	N89°50'47"W	25.000			7544	3 Connection	
	6950	S0°13'00"W	25.000			7545	3 Connection	
	7104	S89°50'47"E	60.000			4617	3 Connection	

18. Save the parcel changes back to the fabric job.

Running a Least Squares Adjustment on parcels in a Fabric Job

You will now run a Least Squares Adjustment (LSA) on the active parcels in your open fabric job. But first, you need to examine the control points in the fabric job.

1. Zoom back to the Timberbrooke extent (View -> Bookmarks -> Timberbrooke).

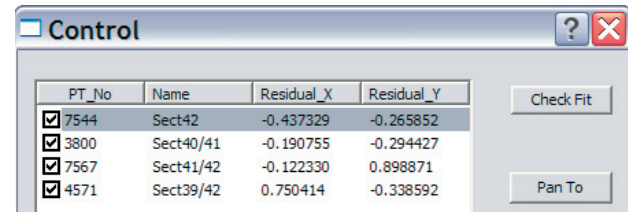
2. Click on the Maintain Control Points tool  on the Cadastral Editor toolbar.

The Control dialog appears. You will notice that all of the control points are active.

You will now check the fit of your active control points with the parcel network in the fabric job. The control point “check fit” residuals are an indication of how well the parcel network fits with the control points. Large residuals indicate that the parcel network does not fit well with the control points, which means that the parcels are inaccurate in relation to their control points. These residual values can be used as a guideline for setting Check Tolerances in the Adjust dialog. Your check tolerances need to be at least as large as the “check fit” residuals, as this is the amount the parcel points will need to adjust to be coincident with their control points.

3. Click the Check Fit button on the Control dialog.

The check fit residuals are displayed in the Control dialog, and are just under 1 foot, so your adjustment tolerances need to be at least around 1 foot.

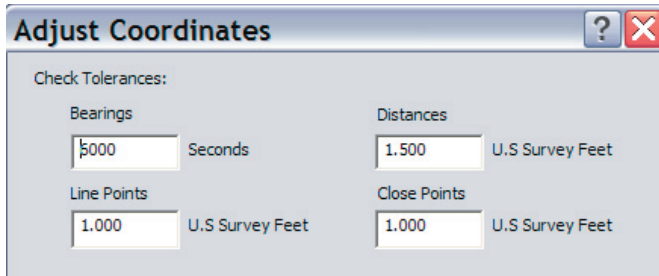


4. Close the Control dialog.
5. For visual purposes, turn on the display of your roads and buildings GIS feature classes in the map. This will give you an idea of the misalignment between the GIS layers and the fabric parcels after the Least Squares Adjustment is applied.

6. Click the Cadastral Editor menu and click Adjust.

The Adjust Coordinates dialog appears on the screen. You will specify the adjustment tolerances in this dialog before you run the adjustment. Adjustment tolerance values are for analysis purposes of the LSA results. Large tolerance values should be entered when adjusting an inaccurate network where much movement is expected in the data. Small tolerances should be used when adjusting an accurate and stable network. Any movements exceeding the tolerance values will be reported in the adjustment report.

7. For the Distances tolerance, enter a value of 1.5 feet. Enter a value of 1 foot for the tolerances for Line points and Close points as well. Leave the default of 6000 seconds for the Bearings tolerance.



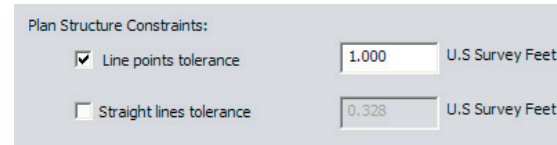
Adjust Coordinates

Check Tolerances:

Bearings	Distances
5.000 Seconds	1.500 U.S Survey Feet
Line Points	Close Points
1.000 U.S Survey Feet	1.000 U.S Survey Feet

The **Bearings** tolerance is the maximum allowable difference between the line computed from the new point coordinates resulting from the adjustment, and the original measured line. The **Distance** tolerance is the maximum allowable difference between the distance computed from the new point coordinates resulting from the adjustment, and the original measured distance. The **Line Points** tolerance is a check tolerance that flags any line point that lies further away from its line than the specified tolerance. Line points can fail to lie on their lines due to parcel joining. The **Close Points** tolerance flags any points that lie closer together than the specified tolerance.

8. Under Force Plan Structure, check the Line points tolerance check box. The line points tolerance checks for line points that are not lying on the line on which they are supposed to lie. Line points that lie within the specified tolerance of their lines are forced back onto their lines. Checking this tolerance will correct slivers that have been created from line points during the joining process. Enter a value of 1 foot.



Plan Structure Constraints:

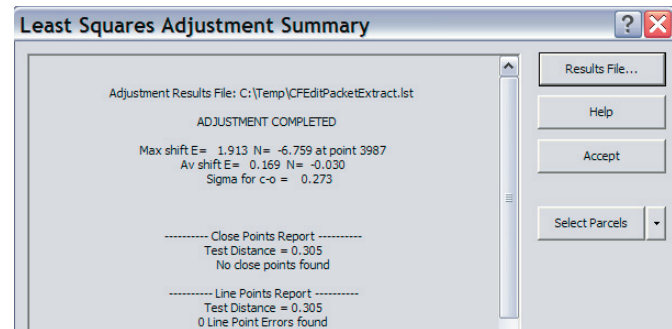
☒ Line points tolerance 1.000 U.S Survey Feet

☐ Straight lines tolerance 0.328 U.S Survey Feet

9. Leave the default values for the remaining options on the Adjust Coordinates dialog and click OK to run the adjustment.

Make sure you have a temp directory created under your c:\ drive. A c:\temp directory is required to store the adjustment results file.

The adjustment completes successfully and displays an overview of the adjustment results. The adjustment finds no close points and no line point errors. The report also displays the point with the largest change in its coordinates.



Least Squares Adjustment Summary

Adjustment Results File: C:\Temp\CFEditPacketExtract.lst

ADJUSTMENT COMPLETED

Max shift E= 1.913 N= -6.759 at point 3987
 Av shift E= 0.169 N= -0.030
 Sigma for c-o = 0.273

----- Close Points Report -----
 Test Distance = 0.305
 No close points found

----- Line Points Report -----
 Test Distance = 0.305
 0 Line Point Errors found

Results File...
 Help
 Accept
 Select Parcels

Under the Lines Report, recomputed lines that exceeded the specified tolerance for Bearings and Distances are reported.

Six recomputed lines exceeded your bearing and distance tolerances, however none of these lines had to be significantly recomputed to fit into the solution.

The largest line change is 1.778 feet, which is slightly above your distance tolerance of 1.5 feet.

```

----- Line Points Report -----
Test Distance = 0.305
0 Line Point Errors found
----- Lines Report -----
Direction (C-O) Limit is 1.40 00
Distance (C-O) Limit is 1.500

"07917-052-000/Hazel Heights" Line: 3889-4824 Distance(c-o)=1.694
"07917-052-000/Hazel Heights" Line: 3882-4824 Dirn(c-o)= N 1°48'02E,
Effect=1.573
"07916-041-029/Timberbrooke" Line: 4556-4814 Dirn(c-o)= N56°08'35E,
Effect=1.747
"07916-041-029/Timberbrooke" Line: 4553-4814 Distance(c-o)= -1.721
"NewParcel144/Timberbrooke" Line: 4617-7104 Dirn(c-o)= N 1°43'11E, Effect=1.772
"07916-041-001/Timberbrooke" Line: 7104-4617 Dirn(c-o)= N 1°43'32E,
Effect=1.778

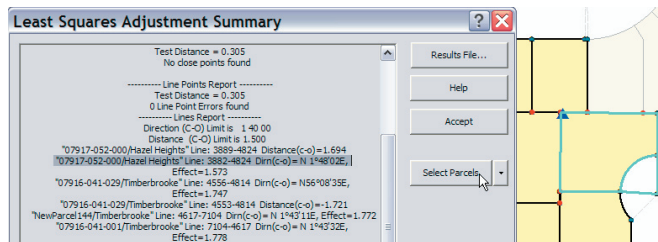
```

You can select and zoom to the parcels containing the lines that exceeded your line tolerances:

10. Click on any of the line errors listed in the adjustment report.

11. Click the Select Parcels button.

The parcel containing the line error is selected on the map and in the Parcel Explorer.



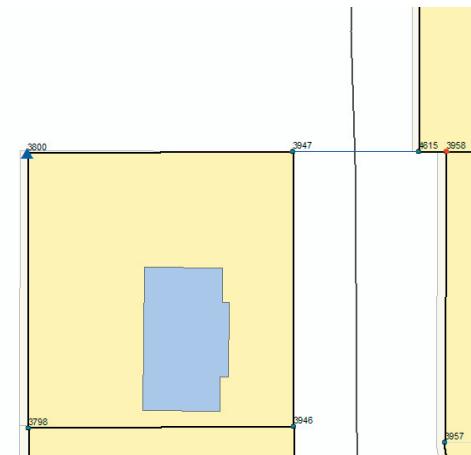
You can also zoom and pan to the parcel by clicking on the drop-down arrow next to the Select Parcels button.

To view the complete adjustment report, click on the Results File button on the Least Squares Adjustment Summary dialog.

12. Click Accept on the Least Squares Adjustment Summary dialog to accept the results of the adjustment.

You will notice a slight adjustment in the parcel geometry.

13. Zoom in closer to view the change between adjusted parcel lines in the fabric job and the unadjusted parcel lines in the cadastral fabric



You will also notice that parcel points are now coincident with the location of their associated control points.

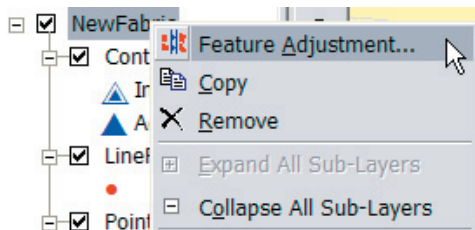
14. Zoom back out to the Timberbrooke extent and post the job back to the cadastral fabric. (Fabric Editing -> Finish Job).

15. Save your edits.

Adjusting GIS Data using the GIS Feature Adjustment

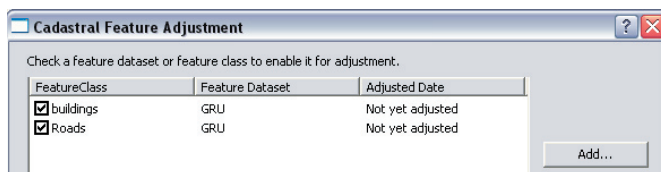
Now that you have successfully adjusted parcels in your cadastral fabric, you will be able to run a GIS Feature Adjustment on GIS features in the area of adjustment. In this step, you will adjust the roads and buildings feature classes in the Timberbrooke survey plan job extent. You will also associate and adjust the Timberbrook_Easements feature class.

1. With ArcMap still open and the edit session still active, right-click the NewFabric layer in the TOC and click Feature Adjustment...



The Cadastral Feature Adjustment dialog appears.

2. Check the checkboxes for both the buildings and Roads feature classes.



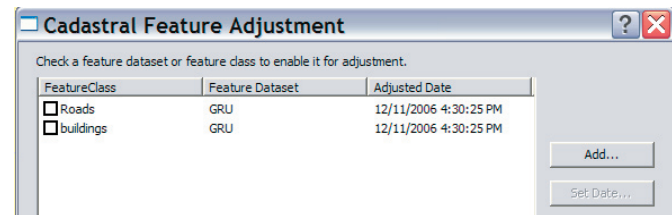
3. Click the Adjust button on the Cadastral Feature Adjustment dialog to run the feature adjustment.

Once the feature adjustment completes you will notice a slight shift in both the roads and the buildings feature classes as they re-align with the adjusted parcels.

You will now associate the Timberbrook_Easements feature class to the cadastral fabric and adjust the easement data.

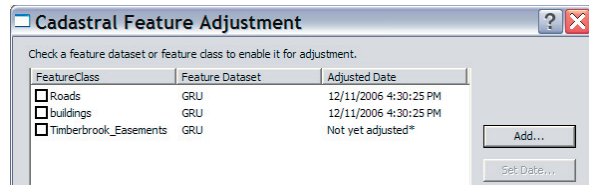
4. Add the Timberbrook_Easements feature class (located in the GRU feature dataset) to the map.
5. Right-click the NewFabric layer in the TOC and click Feature Adjustment.

You will now notice that the Adjusted Date for both the roads and buildings feature class has been set to the date and time of the last Least Squares Adjustment run on the cadastral fabric. This date and time is known as the adjustment level.

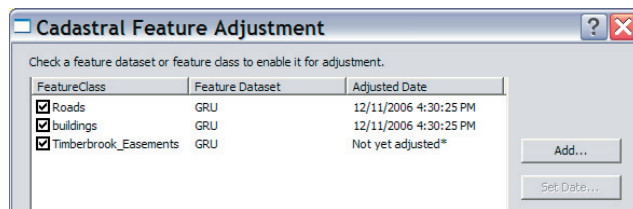


6. Click the Add... button on the Feature Adjustment dialog.
7. Navigate to, and select the Timberbrook_Easements feature class in the AlachuaCounty\GRU feature dataset. Click Add.

The Timberbrook_Easements feature class is added to the Cadastral Feature Adjustment dialog and its adjusted date is set to “Not Yet Adjusted”.



8. Select all three feature classes to participate in the adjustment.



9. Click the Adjust button to rerun the feature adjustment.

You will notice that only the Timberbrook_Easements feature class is adjusted. That is because the roads and buildings feature classes are already at the most current adjustment level and are not re-adjusted with this adjustment. If you re-open the Cadastral Feature Adjustment dialog, you will notice that the Adjusted Date for the Timberbrook_Easements feature class is now the same as the Adjusted Date for the roads and buildings feature classes.

10. Save your edits and close ArcMap to complete the tutorial.