# DCGS-A SP-1
## ArcGIS® Pro Map Fundamentals

Instructional Manual
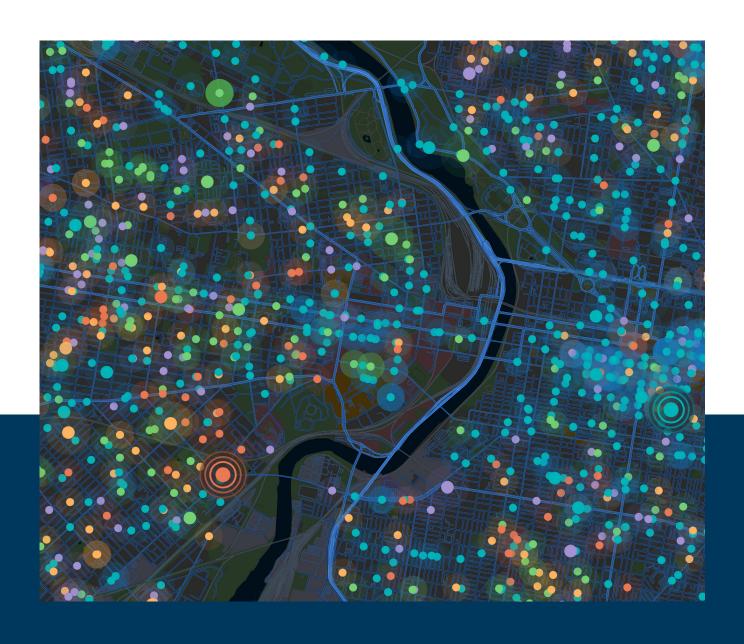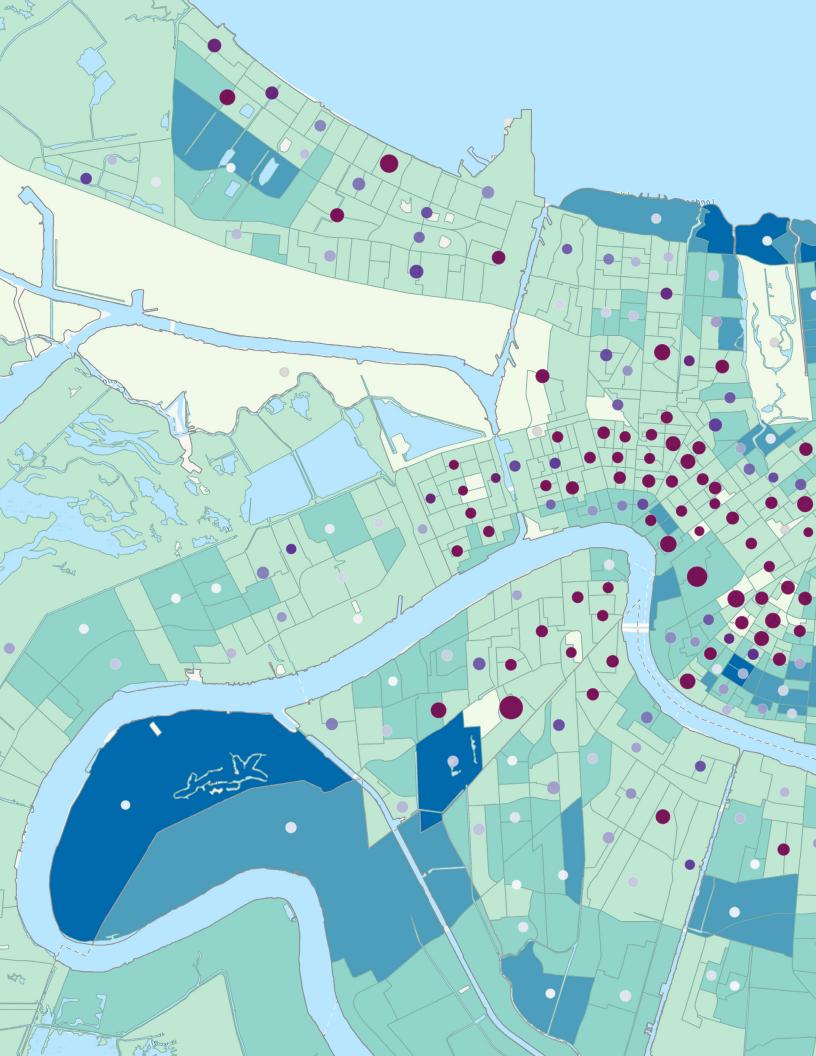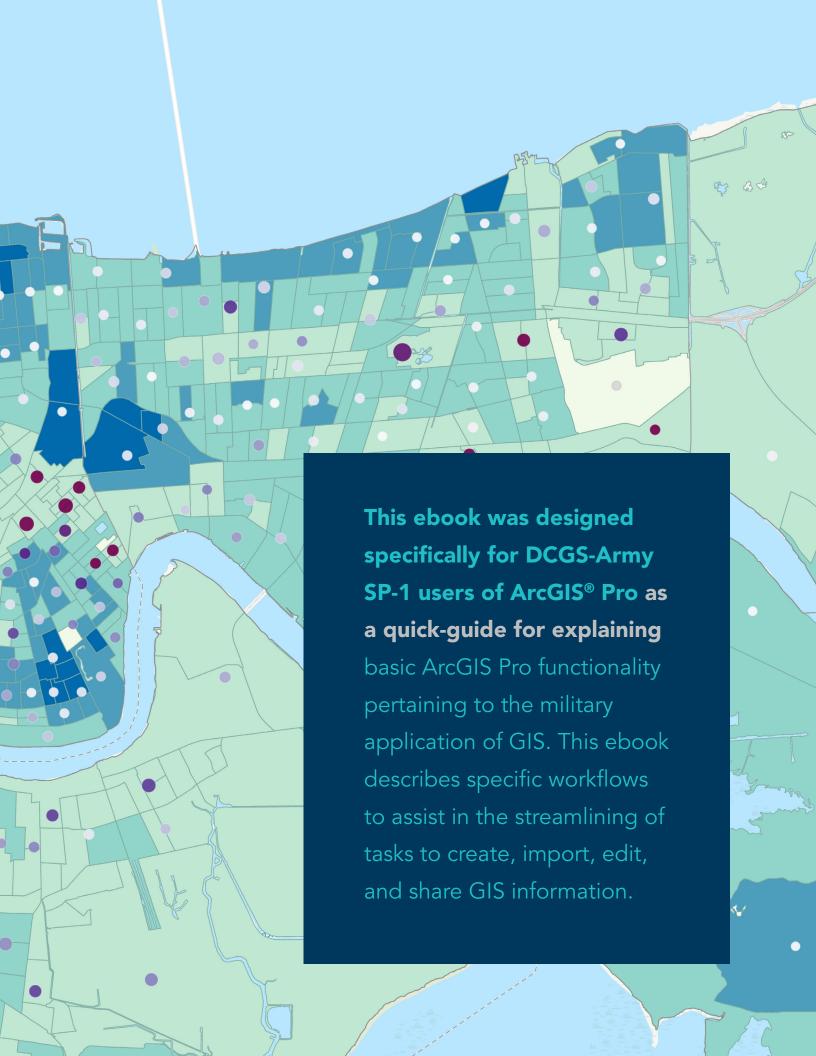
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**This ebook was designed specifically for DCGS-Army SP-1 users of ArcGIS® Pro as a quick-guide for explaining** basic ArcGIS Pro functionality pertaining to the military application of GIS. This ebook describes specific workflows to assist in the streamlining of tasks to create, import, edit, and share GIS information.

# Getting Started with New Feature Class Layers

## ADD POINTS by Entering Coordinate

To perform portions of this workflow, you must have access to a geocoding service such as XY provider, the ArcGIS World Geocoding Service, or a similar geocoding service available on your organization's portal.

1. From the Map tab, in the Inquiry group, click Locate 🔍 to open the Locate pane.

   The pane appears over the Catalog pane.
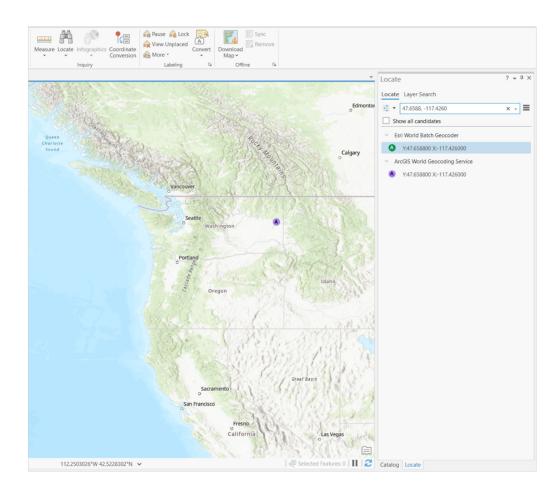
2. In the Locate pane, in the Search field, type the address, place-name, or x,y coordinates you want to find.

   As you type, suggestions appear in the drop-down menu based on your input.

   The suggestions are generated by locators based on your input.

3. To set suggestion parameters, perform the following:

   - In the Locate pane, click the Options button 🎚 , and select Provider Settings.
   - In the Provider Settings options, check or uncheck Suggestions to configure, as necessary.
   - Click the Back To Locate Pane button ← to return to the Locate tab.

4. In the Search field, you can press Enter to search based on the text you enter in the search box, or you can click one of the suggestions to perform a search based on that text.

If the address is matched, the suggested result candidates will display in a list under the locator that returned them. In addition, they will display as labeled points on your map.

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**06** RANGE RINGS,
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COORDINATES
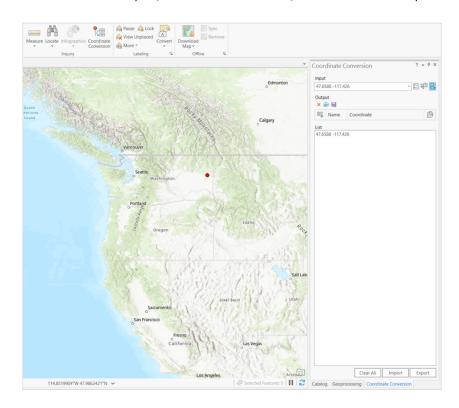
# ADD POINTS by Entering Coordinate
(with Coordinate Conversion)

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Coordinate Conversion tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

1.  From the Map tab, in the Inquiry group, click Coordinate Conversion 📇 .

2.  In the Coordinate Conversion pane, click the Map Point Tool button 🔧 , and then click a location on the map.

3.  Type coordinates in the Input text box, and press Enter.

A coordinate matching your input coordinate format is added to the list, and the location is displayed in the formats you set in the output table.

# IMPORT POINTS by CSV, Spreadsheet

1.  From the Map tab, in the Layer group, click the Add Data down arrow, and click XY Point Data 🔣 .

If the stand-alone table is already in the map, you can right-click it in the Contents pane, and click the Display XY Data button 🔣 .
A new geoprocessing pane will appear over the Catalog pane.

2.  In the XY Table To Point geoprocessing pane, set the following parameters:

- **Input Table**: Your CSV or spreadsheet containing XY points
- **Output Feature Class**: Name and folder location of your new feature class
- **X Field**: Select the x-value in your table
- **Y Field**: Select the y-value in your table
- **Z Field**: (if applicable) Select the z-value in your table
- **Coordinate System**: (if necessary) Select the coordinate system

3.  Click Run.
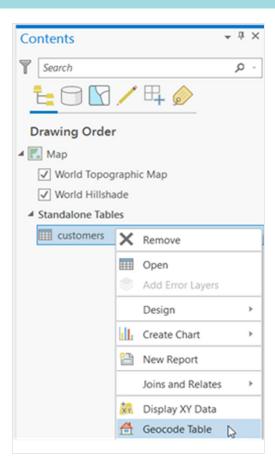
A new point feature class will be added to your map.

# CONVERT A TABLE to locations on the map

To perform this workflow, you must have access to a geocoding service such as XY provider, the ArcGIS World Geocoding Service, or a similar geocoding service available on your organization's portal.

Add the table you want to geocode to your map.

1. From the Map tab, in the Layer group, click the Add Data down arrow, and click Data 🗂 .

2. In the Add Data dialog box, browse to the location of your table, select it, and click OK.

3. In the Contents pane, right-click your table, and choose Geocode Table.

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The Geocode Table pane contains a list of guided steps to geocode your table. There are six overarching steps in this workflow. The first step is to examine your tabular data with the address.

4.  In the Geocode Table pane, click Start.

In **STEP ONE**: **ABOUT YOUR TABLE**, you will look at your data to determine how many fields in your data you want to use for geocoding.

5.  For Input Table, confirm that the correct table is displayed in the text box.

6.  Use the down arrow to answer the question regarding the number of fields you want to geocode in your data.

If you are unsure of the number of fields that need to be geocoded, click the Attribute table button 🔳 to view the table.

7.  Click Next.

In **STEP TWO**: **WHAT LOCATOR ARE YOU USING?** you will decide whether to use the World Geocoding Service, a custom service from your organization, or a custom locator.

8.  For Input Locator, click the down arrow to select the input locator you want to use for geocoding.

Locators added to the project that support batch geocoding automatically appear in the Input Locator drop-down menu. If you do not see a custom locator or custom service, or you can browse to a different locator by clicking the Browse button 📂 .

> Note: When using the ArcGIS World Geocoding Service, this operation may consume available credits.

9. Click Next.

In **STEP THREE**: **MAPPING THE FIELDS IN YOUR TABLE**, you will examine the fields in your data and the fields in your locator to see how they connect to each other to maximize efficiency.

10. For each of the fields in your data that you want to use in geocoding, find the corresponding locator field and choose the appropriate data field in the drop-down menu.

The field mapping is completed automatically, but you should review the field mapping to ensure that you do not want to make any changes or map additional fields.

11. If necessary, click the Attribute table button ⊞ to review the fields in your data that need to be geocoded.

12. Click Next.

In **STEP FOUR**: **OUTPUT**, you will specify where you want your output feature class to be created based on the type of geocoding operation that will be performed.

An output location and name are assigned automatically. You have the option to change the output if desired.

13. For Output, click the Browse button 📁 , and set a new feature class name and location.

14. Check Add Output To Map After Completion if you want to add your new feature class to the map automatically.

15. For Preferred Location Type, choose an option from the available menu.

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When performing geocoding, you may be using the geocoding results to display on a map or perform further analysis. In this case, you may want to change the Preferred Location Type setting to Address Location so that the points represent the rooftop or parcel centroid for the address. The point that is displayed is closest to the center of the feature that represents the address. By contrast, you may be using the geocoding results in a routing application where you want the points to be located on the side of the street for better routing. In this case Routing Location is the better option. With this option, the point that is displayed is typically closer to the street and closer to where a vehicle would arrive at the location.

16. Click Next.

Depending on the size of your table and the location of output, the operation may be time-consuming.

The final two steps are optional based on the type of data you are using. If your locator does not support the Country or Category setting, proceed to Step 20 (Click Finish).

**STEP FIVE**: **LIMIT BY COUNTRY** is an optional step. In this step, you can limit your search to specific countries if you are using a service that supports geocoding by country.

When using the World Geocoding Service or other locators that support multiple countries, you may want to specify that geocoding should only happen in specific countries. This is important because it can improve geocoding performance and reduce the potential for an address to return a false-positive match in another country. It is possible for an address in one country to look very similar to an address in another country. Geocode Table allows you to choose one or more countries to limit the results of the geocoding. In some cases, your table may contain addresses for many countries, in which case you should have a country field in the data and map that field in the field mapping section of the tool as opposed to selecting multiple countries in this step. Mapping a country field from the table will help to pinpoint the country for each record.

The capability to limit geocoding by country is determined by the locator you chose and is not always available. If your locator does not support the Country setting, this page of the guided workflow does not appear.

17. If available, choose any combination of countries from the displayed list.

18. Click Next.

And finally, **STEP SIX**: **LIMIT BY CATEGORY** is another optional step. In this step, if you are using a service that supports geocoding based on categories, you can limit your search to specific categories.

You may want to limit the results of geocoding to specific categories, such as only address matches, because the geocoding results are for parcel delivery. Another example is if you know the entire table consists of cities, and you do not want New York to match to New York State or even New York County. Using this parameter limits matches to a specific type of location.

As with the Country setting, the capability to limit geocoding by category is determined by the locator you chose and is not always available. If your locator does not support the Category setting, this page of the guided workflow does not appear.

19. If available, choose any combination of categories from the displayed list.
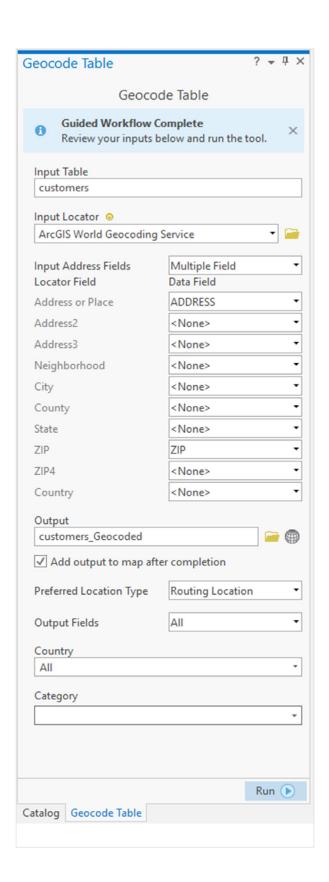
20. Click Finish.

Now you will review all inputs in the final step of the guided workflow and run the Geocode Table.

21. Confirm that all the inputs on the final page of the guided workflow correctly display for all of the inputs you chose in the previous steps.

22. Click Run.

The progress of the tool is displayed at the bottom of the pane.
If you selected the Add Output To Map option in the Output step of the guided workflow, the output is added to the map automatically.

**Geocode Table** ? ▾ ⏻ ✕

Geocode Table

ⓘ **Guided Workflow Complete**
Review your inputs below and run the tool. ✕

Input Table
customers

Input Locator ⊚
ArcGIS World Geocoding Service ▾ 📁

| Input Address Fields Locator Field | Multiple Field Data Field |
|---|---|
| Address or Place | ADDRESS ▾ |
| Address2 | <None> ▾ |
| Address3 | <None> ▾ |
| Neighborhood | <None> ▾ |
| City | <None> ▾ |
| County | <None> ▾ |
| State | <None> ▾ |
| ZIP | ZIP ▾ |
| ZIP4 | <None> ▾ |
| Country | <None> ▾ |

Output
customers_Geocoded 📁 🌐
☑ Add output to map after completion

Preferred Location Type   Routing Location ▾

Output Fields   All ▾

Country
All ▾

Category
▾

Run ▶

Catalog   Geocode Table

# ADD LINES

A line feature will have two vertices. A polyline will have multiple vertices. The workflow to add a line or a polyline is identical except for the number of vertices used to construct the feature geometry.
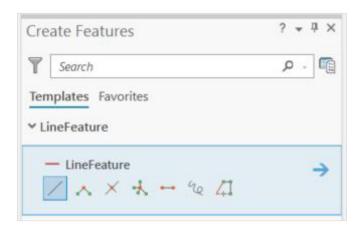
1.  In the Catalog pane, expand Databases, right-click your desired geodatabase, point to New, and choose Feature Class.

2.  In the Define pane, set or confirm the following parameters:

    • **Name**: The name of your new feature class
    • **Alias**: A simple to understand layer alias
    • **Feature Class Type**: Line
    • **Geometric Properties**: Ensure that both boxes are unchecked

3.  Click Next.

4.  In the Fields pane, click the Click Here To Add A New Field option if you know what attributes you want to include in your line feature class.

5.  Click Next.

6.  In the Spatial Reference pane, set the XY Coordinate System to the appropriate system for your work area, and click Next.

7.  In the Tolerance pane, accept the default values, and click Next.

8.  In the Resolution pane, accept the default values, and click Next.

9.  In the Storage Configuration pane, accept the default values, and click Finish.

Your new feature class will automatically be added to your map.

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10. From the Edit tab, in the Features group, click Create 📝 .

The Create Features pane opens, showing each of the editable layers in the map. These layers are the feature templates that contain construction tools to create features.

11. In the Create Features pane, expand the existing line feature that you would like to add lines to, and click the Line construction tool ✏ .



When you clicked the Line construction tool, a construction toolbar appeared at the bottom of the map. This toolbar contains frequently used construction tools.

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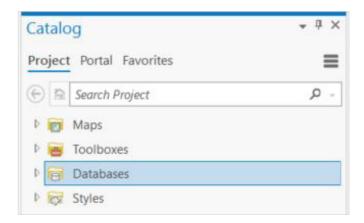COORDINATES

12. Click the map to create the first vertex.

    Note: You can also right-click on the map, click Absolute X,Y,Z…, and in the Absolute X,Y dialog box, type the values of a specific x,y location, and press Enter.

13. Move the pointer and click the map to create the second vertex for a line feature.

14. Alternatively, you can right-click and specify an x,y coordinate location or include the vertex using distance and direction.

15. To undo an edit, on the Quick Access Toolbar, click the Undo button � .

16. To finish the sketch and create the feature, on the construction toolbar, click the Finish button ▱, or press F2.

17. From the Edit tab, in the Manage Edits group, click Save 🖫 .

18. In the Save Edits dialog box, click Yes to save your edits.

# IMPORT LINE from database
# IMPORT POLYLINE from database

A line feature will have two vertices. A polyline will have multiple vertices. The workflow to add a line or a polyline is identical except for the number of vertices used to construct the feature geometry.

1. In the Catalog pane, on the Project tab, right-click Databases, and select Add Database.



2. In the Select Existing Geodatabase dialog box, browse to the location of your geodatabase and select it.

3. Click OK.

4. In the Catalog pane, expand Databases, and from your newly added geodatabase, right-click the line feature class, and select Add To Current Map.

Note: If your geodatabase is empty, you can follow the steps above to add a feature class to your geodatabase.

# ADD POLYLINE

A line feature will have two vertices. A polyline will have multiple vertices. The workflow to add a line or a polyline is identical except for the number of vertices used to construct the feature geometry.
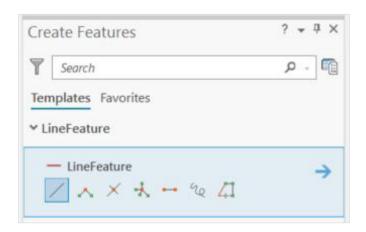
1. In the Catalog pane, expand Databases, right-click your desired geodatabase, point to New, and choose Feature Class.

2. In the Define pane, set or confirm the following parameters:

   • **Name**: The name of your new feature class
   • **Alias**: A simple to understand layer alias
   • **Feature Class Type**: Line
   • **Geometric Properties**: Ensure that both boxes are unchecked

3. Click Next.

4. In the Fields pane, click the Click Here To Add A New Field option if you know what attributes you want to include in your line feature class.

5. Click Next.

6. In the Spatial Reference pane, set the XY Coordinate System to the appropriate system for your work area, and click Next.

7. In the Tolerance pane, accept the default values, and click Next.

8. In the Resolution pane, accept the default values, and click Next.

9. In the Storage Configuration pane, accept the default values, and click Finish.

Your new feature class will automatically be added to your map.

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10. From the Edit tab, in the Features group, click Create 📝 .

The Create Features pane opens, showing each of the editable layers in the map. These layers are the feature templates that contain construction tools to create features.

11. In the Create Features pane, expand the existing line feature that you would like to add lines to, and click the Line construction tool ✏ .



When you clicked the Line construction tool, a construction toolbar appeared at the bottom of the map. This toolbar contains frequently used construction tools.

12. Click the map to create the first vertex, or right-click and specify an x,y location.

13. Move the pointer and click the map to create each vertex of the polyline feature and sketch the remaining geometry.

14. Alternatively, you can right-click and specify an x,y coordinate location or include the vertex using distance and direction.

15. To undo an edit, on the Quick Access Toolbar, click the Undo button ↩ .

16. To finish the sketch and create the feature, on the construction toolbar, click the Finish button ▱, or press F2.

17. From the Edit tab, in the Manage Edits group, click Save ▤ .

18. In the Save Edits dialog box, click Yes to save your edits.

**01** NEW FEATURE
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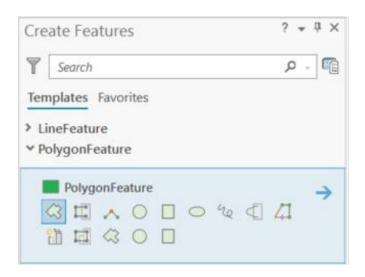**02** MODIFYING
EXISTING LAYERS

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## ADD POLYGON

1.  In the Catalog pane, expand Databases, right-click your desired geodatabase, point to New, and choose Feature Class.

2.  In the Define pane, set or confirm the following parameters:

    - **Name**: The name of your new feature class
    - **Alias**: A simple to understand layer alias
    - **Feature Class Type**: Polygon
    - **Geometric Properties**: Ensure that both boxes are unchecked

3.  Click Next.

4.  In the Fields pane, click the Click Here To Add A New Field option if you know what attributes you want to include in your polygon feature class.

5.  Click Next.

6.  In the Spatial Reference pane, set the XY Coordinate System to the appropriate system for your work area, and click Next.

7.  In the Tolerance pane, accept the default values, and click Next.

8.  In the Resolution pane, accept the default values, and click Next.

9.  In the Storage Configuration pane, accept the default values, and click Finish.

Your new feature class will automatically be added to your map.

10. In the Catalog pane, expand Databases, and from your desired geodatabase, add a polygon feature class to your map.

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11. From the Edit tab, in the Features group, click Create 📝.

The Create Features pane opens, showing each of the editable layers in the map. These layers are the feature templates that contain construction tools to create features.

12. In the Create Features pane, expand the existing polygon feature that you would like to add lines to, and click the Polygon construction tool 🐾.

When you clicked the Polygon construction tool, a construction toolbar appeared at the bottom of the map. This toolbar contains frequently used construction tools.

Note: This construction toolbar is similar to the line construction toolbar but will create polygons with the Polygon tool selected.

13. Create the polygon feature using one of the following methods:

- Click the map, move the pointer, and click the map again until you have created your desired number of vertices.
- In your map, right-click and use the context menu to specify x,y,z coordinate locations, distance, and direction.

14. To undo an edit, on the Quick Access Toolbar, click the Undo button .

15. To finish the feature, right-click and click the Finish button , or press F2.

16. From the Edit tab, in the Manage Edits group, click Save .

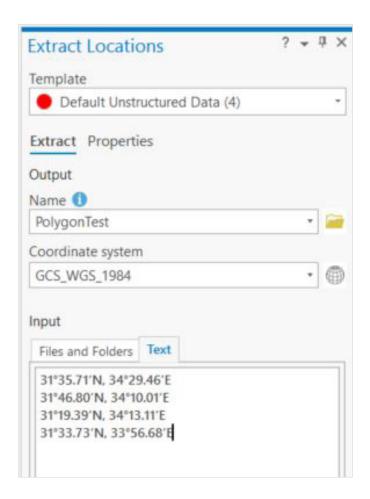17. In the Save Edits dialog box, click Yes to save your edits.

# IMPORT POLYGON from text

To perform this workflow, you must have access to the ArcGIS LocateXT extension.

1. From the Map tab, in the Layer group, click the Add Data down arrow, and click Extract Locations 📇 .

2. In the Extract Locations pane, in the Output section, set the following parameters:

   - **Name**: Provide a name for the feature class.
   - **Coordinate System**: Set this based on the input coordinates of your file.

3. If your polygon coordinates are located in a file, click the Files and Folders tab and specify the items/files:

   - In the Input field, you can click Browse, and from the Add Files And Folders dialog box, browse to the location of your file and add them.
   - Alternatively, you can also drag your file directly into the Extract Locations pane and drop it into the Input field.
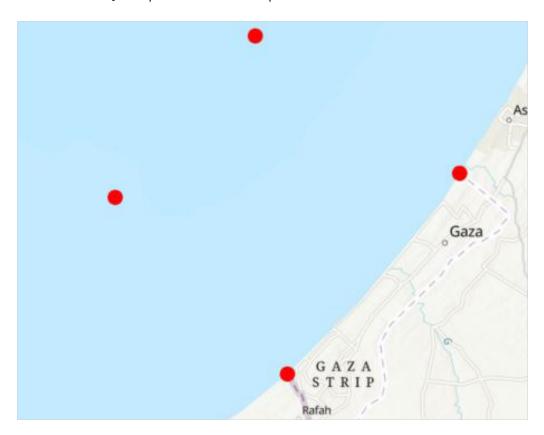
4. If your polygon coordinates can be copied/pasted from text, click the Text tab and type the coordinates for locations:

Use the Copy/Paste capabilities in a document, email, or web page to add bulk coordinates for your new polygon into the Input field.

5. Click Extract.

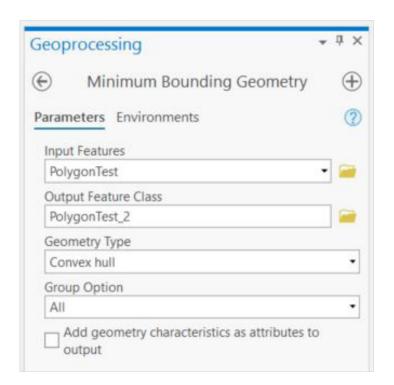This will add your points to the map as a new feature class.



Now that you have points, you must connect them to create a new polygon feature class.

6. From the Analysis tab, in the Geoprocessing group, click Tools 🧰.

7. In the Geoprocessing pane, search for Minimum Bounding Geometry.

8. Click Minimum Bounding Geometry (Data Management Tools).

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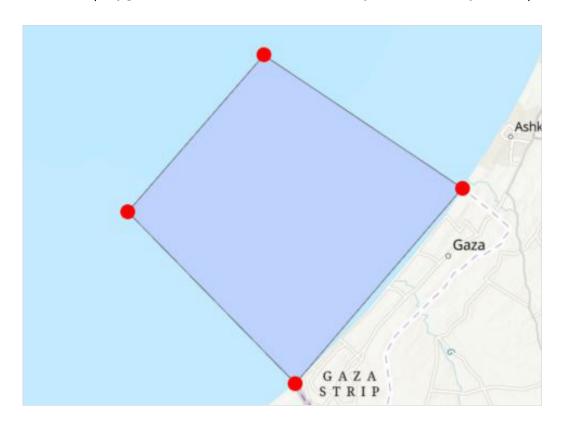EXISTING LAYERS

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9.  In the Geoprocessing pane, set the following parameters:

- **Input Features**: Click the down arrow, and select the feature class that you just created using the Extract Locations tool.
- **Output Feature Class**: Provide a name and location for the new polygon feature class.
- Geometry Type: Select Convex Hull .
- Keep the remaining options on the default settings.

## 10. Click Run.

Your new polygon feature class will automatically be added to your map.

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## ADD EXCEL TABLE to Map

If you attempt to access an Excel file in ArcGIS Pro without the appropriate driver installed, you will receive the error **Required Microsoft Driver Is Not Installed**.

To work with Excel files in ArcGIS Pro, you must download and install the Microsoft Access Database Engine 2016 Redistributable the Microsoft Download Center.
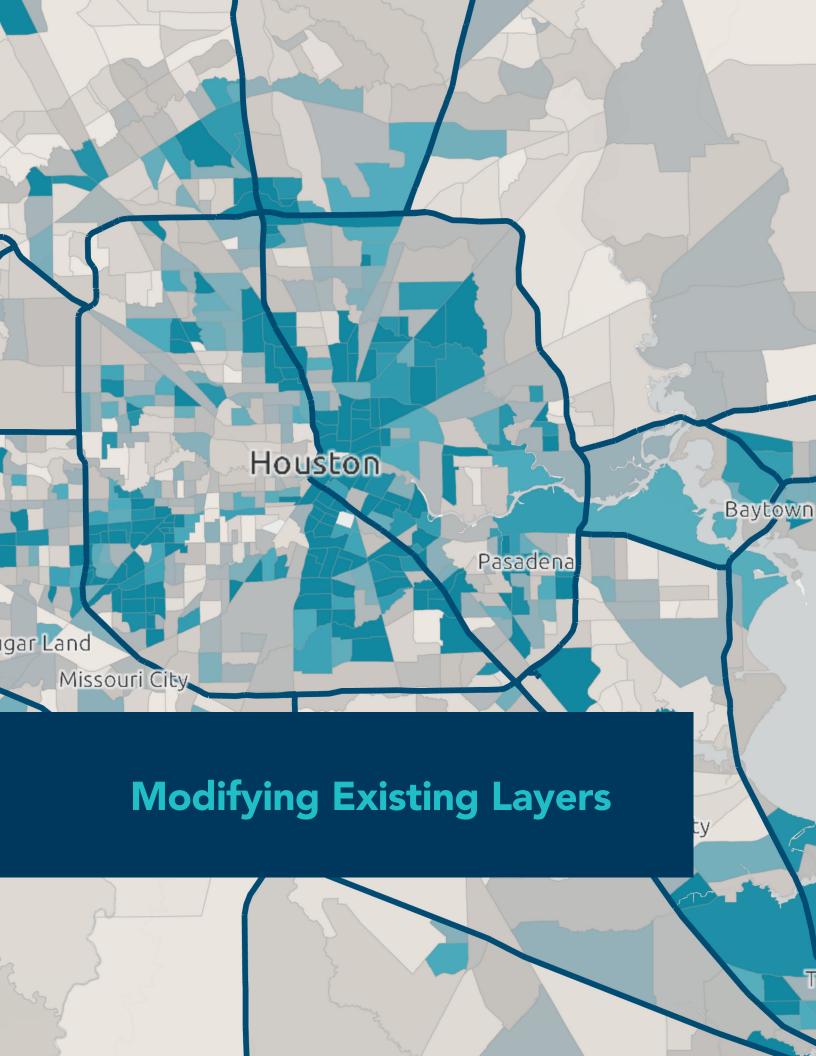
1. From the Map tab, in the Layer group, click Add Data .

2. In the Add Data dialog box, browse to the location of the Excel workbook.

3. Select the Excel workbook, and click OK.

4. In the Contents pane, click the table you want to add to the map.

5. Click Select.

Alternatively, you can add an Excel table directly to your map from the Catalog pane.

1. In the Catalog pane, expand Folders, and browse to the folder where your Excel workbook is located.

2. Right-click your Excel workbook, and select Add To Current Map.

You may need to add a folder connection to access the appropriate folder.

- In the Catalog pane, right-click Folders, and select Add Folder Connection.
- In the Add Folder Connection dialog box, browse to the folder you wish to connect, and then click OK.

# Modifying Existing Layers
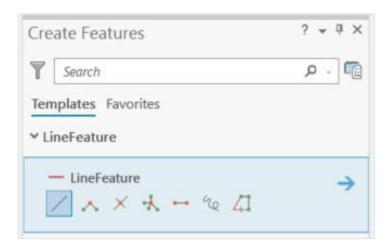
# 02
## chapter

## ADD LINES to Existing Layer

A line feature will have two vertices. A polyline will have multiple vertices. The workflow to add a line or a polyline is identical except for the number of vertices used to construct the feature geometry.

1. In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2. From the Edit tab, in the Features group, click Create 📝 .

The Create Features pane opens, showing each of the editable layers in the map. These layers are the feature templates that contain construction tools to create features.

3. In the Create Features pane, expand the existing line feature that you would like to add lines to, and click the Line construction tool ✏️ .

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When you clicked the Line construction tool, a construction toolbar appeared at the bottom of the map. This toolbar contains frequently used construction tools.



4.  Click the map to create the first vertex.

    Note: You can also right-click on the map, click Absolute X,Y,Z…, and in the Absolute X,Y dialog box, type the values of a specific x,y location, and press Enter.

5.  Move the pointer and click the map to create the second vertex for a line feature.

6.  Alternatively, you can right-click and specify an x,y coordinate location or include the vertex using distance and direction.

7.  To undo an edit, on the Quick Access Toolbar, click the Undo button  .

8.  To finish the sketch and create the feature, on the construction toolbar, click the Finish button , or press F2.
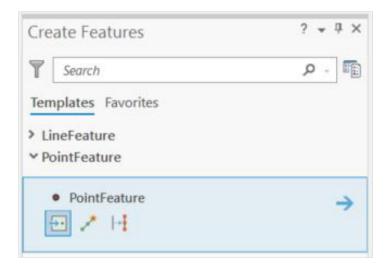
Next you will save your edits.

9.  From the Edit tab, in the Manage Edits group, click Save  .

10. In the Save Edits dialog box, click Yes to save your edits.

## ADD POINTS to Existing Layer

1.  In the Catalog pane, expand Databases, and from your desired geodatabase, add a point feature class to your map.

2.  From the Edit tab, in the Features group, click the Create button 📝.

The Create Features pane opens, showing each of the editable layers in the map. These layers are the feature templates that contain construction tools to create features.

3.  In the Create Features pane, expand the existing point feature that you would like to add lines to, and click the Point construction tool ➡️ .

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When you clicked the Point construction tool, a construction toolbar appeared at the bottom of the map. This toolbar contains frequently used construction tools.

4.  Create one, or more, point features using one of the following methods:

    • Click on the map where you would like to add your new point.

    • Right-click on the map, click Absolute X,Y,Z…, and in the Absolute X,Y dialog box, type the values of your desired new point, and press Enter.

5.  To undo an edit, on the Quick Access Toolbar, click the Undo button .

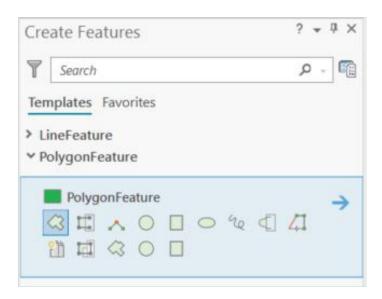6.  When you are finished adding your point (or points), right-click and click the Finish button , or press F2.

Next you will save your edits.

7.  From the Edit tab, in the Manage Edits group, click Save .

8.  In the Save Edits dialog box, click Yes to save your edits.

# ADD POLYGON to Existing Layer

1. In the Catalog pane, expand Databases, and from your desired geodatabase, add a polygon feature class to your map.

2. From the Edit tab, in the Features group, click Create 📝.

The Create Features pane opens, showing each of the editable layers in the map. These layers are the feature templates that contain construction tools to create features.

3. In the Create Features pane, expand the existing polygon feature that you would like to add lines to, and click the Polygon construction tool ✎ .

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When you clicked the Polygon construction tool, a construction toolbar appeared at the bottom of the map. This toolbar contains frequently used construction tools.

Note: This construction toolbar is similar to the line construction toolbar but will create polygons with the Polygon tool selected.

4. Create the polygon feature using one of the following methods:

- Click the map, move the pointer, and click the map again until you have created your desired number of vertices.
- In your map, right-click and use the context menu to specify x,y,z coordinate locations, distance, and direction.

5. To undo an edit, on the Quick Access Toolbar, click the Undo button 🔄 .

6. To finish the feature, right-click and click the Finish button 🏴, or press F2.

Next you will save your edits.

7. From the Edit tab, in the Manage Edits group, click Save 🗒️.

8. In the Save Edits dialog box, click Yes to save your edits.
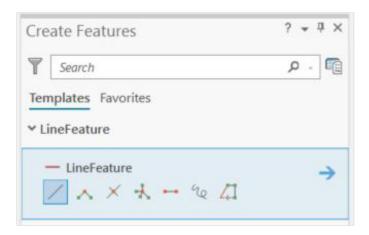
# ADD POLYLINES to Existing Layer

A line feature will have two vertices. A polyline will have multiple vertices. The workflow to add a line or a polyline is identical except for the number of vertices used to construct the feature geometry.

1. In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2. From the Edit tab, in the Features group, click Create 🖊.

The Create Features pane opens, showing each of the editable layers in the map. These layers are the feature templates that contain construction tools to create features.

3. In the Create Features pane, expand the existing line feature that you would like to add lines to, and click the Line construction tool ✏.

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When you clicked the Line construction tool, a construction toolbar appeared at the bottom of the map. This toolbar contains frequently used construction tools.

4.  Click the map to create the first vertex, or right-click and specify an x,y location.

5.  Move the pointer and click the map to create each vertex of the polyline feature and sketch the remaining geometry.

6.  Alternatively, you can right-click and specify x,y,z coordinate locations or include a vertex using distances and directions.

7.  To undo an edit, on the Quick Access Toolbar, click the Undo button ↺ .

8.  To finish the sketch and create the feature, on the construction toolbar, click the Finish button ⬚ , or press F2.

Next you will save your edits.

9.  From the Edit tab, in the Manage Edits group, click Save 🖫 .

10. In the Save Edits dialog box, click Yes to save your edits.

# EDIT/MOVE LINE

A line feature will have two vertices. A polyline will have multiple vertices. The workflow to edit/move a line or a polyline is identical except for the number of vertices used to construct the feature geometry.
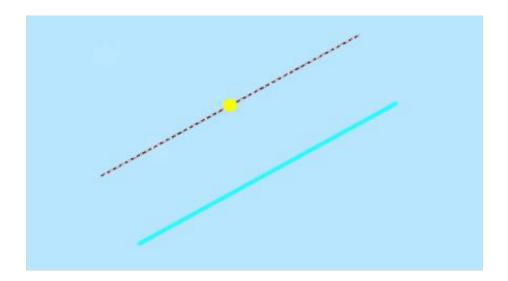
1.   In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2.   From the Edit tab, in the Features group, click Modify .

3.   In the Modify Features pane, expand Alignment, and click Move .

4.   In the Modify Features pane, click Select One Or More Features , and in your map, select the line feature (or features) that you would like to move.

Note: You can click the Select One Or More Features down arrow to change the selection type.

When you clicked the Move button and selected your feature, an editing toolbar appeared at the bottom of the map. This toolbar contains frequently used editing tools.

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5.  In the map, pause your pointer near your selection until the move pointer appears ✛ , then click and drag the feature to the new location on the map.



The line feature's old location will appear in cyan, and the new location will appear as a dashed line highlighted with a large yellow dot.

6.  Use the tools on the toolbar to move, rotate, or scale the selected features.

7.  To undo an edit, on the Quick Access Toolbar, click the Undo button  .

8.  To apply your changes, on the construction toolbar, click the Finish button  , or press F2.

Next you will save your edits.

9.  From the Edit tab, in the Manage Edits group, click the Save button  .

10. In the Save Edits dialog box, click Yes to save your edits.

## EDIT/MOVE POINT(S)

1. In the Catalog pane, expand Databases, and from your desired geodatabase, add a point feature class to your map.

2. From the Edit tab in the Features group, click Modify .

3. In the Modify Features pane, expand Alignment, and click Move .

4. In the Modify Features pane, click the Select One Or More Features , and in the map select the point feature (or features) that you would like to move.

   Note: You can click the Select One Or More Features down arrow to change the selection type.

When you clicked the Move button and selected your feature, an editing toolbar appeared at the bottom of the map. This toolbar contains frequently used editing tools.

5. In the map, pause your pointer near your selection until the move pointer appears , then click and drag the feature to the new location on the map.

The point feature's old location will appear in cyan, and the new location will appear in yellow.

6.  Use the tools on the toolbar to move, rotate, or scale the selected features.

7.  To undo an edit, on the Quick Access Toolbar, click the Undo button .

8.  To apply your changes, on the construction toolbar, click the Finish button , or press F2.

Next you will save your edits.

9.  From the Edit tab, in the Manage Edits group, click Save .

10. In the Save Edits dialog box, click Yes to save your edits.

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## EDIT/MOVE POLYGON

1.  In the Catalog pane, expand Databases, and from your desired geodatabase, add a polygon feature class to your map.

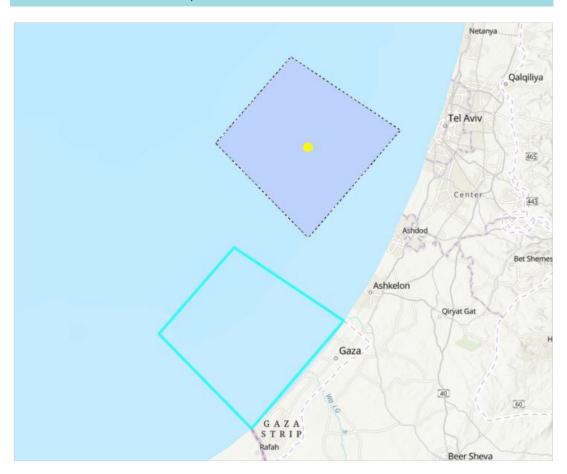2.  From the Edit tab, in the Features group, click Modify .

3.  In the Modify Features pane, expand Alignment, and click Move .

4.  In the Modify Features pane, click the Select One Or More Features , and in your map select the polygon feature(s) that you would like to move.

Note: You can click the Select One Or More Features down arrow to change the selection type.

When you clicked the Move button and selected your feature, an editing toolbar appeared at the bottom of the map. This toolbar contains frequently used editing tools.

5.  In the map, pause your pointer near your selection until the move pointer appears ✛ , then click and drag the feature to the new location on the map.

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The polygon feature's old location will appear in cyan, and the new location will appear as a dashed outlined polygon highlighted with a large yellow dot at the polygon's centroid.

6.  Use the tools on the toolbar to move, rotate, or scale the selected features.

7.  To undo an edit, on the Quick Access Toolbar, click the Undo button ↺ .

8.  To apply your changes, on the construction toolbar, click the Finish button ⬚✓ , or press F2.

Next you will save your edits.

9.  From the Edit tab, in the Manage Edits group, click Save 🖫 .

10. In the Save Edits dialog box, click Yes to save your edits.

# EDIT/MOVE POLYLINE

A line feature will have two vertices. A polyline will have multiple vertices. The workflow to edit/move a line or a polyline is identical except for the number of vertices used to construct the feature geometry.

1.  In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2.  From the Edit tab, in the Features group, click Modify .

3.  In the Modify Features pane, expand Alignment, and click Move .

4.  In the Modify Features pane, click Select One Or More Features , and in your map select the polyline feature (or features) that you would like to move.

Note: You can click the Select One Or More Features down arrow to change the selection type.

When you clicked the Move button and selected your feature, an editing toolbar appeared at the bottom of the map. This toolbar contains frequently used editing tools.
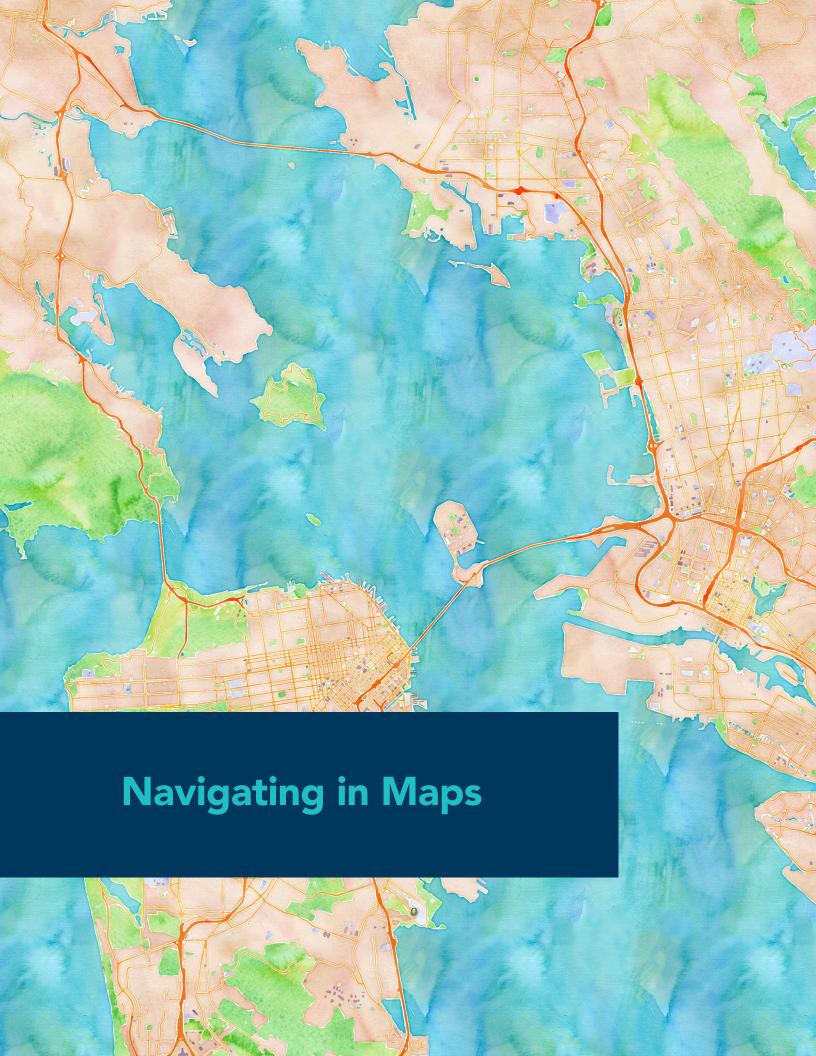
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5. In the map, pause your pointer near your selection until the move pointer appears ✛ , then click and drag the feature to the new location on the map.

The polyline feature's old location will appear in cyan, and the new location will appear as a dashed line highlighted with a large yellow dot.

6.  Use the tools on the toolbar to move, rotate, or scale the selected features.

7.  To undo an edit, on the Quick Access Toolbar, click the Undo button   ↶   .

8.  To apply your changes, on the construction toolbar, click the Finish button 🔲 , or press F2.

Next you will save your edits.

9.  From the Edit tab, in the Manage Edits group, click Save 🖫.

10. In the Save Edits dialog box, click Yes to save your edits.

# Navigating in Maps

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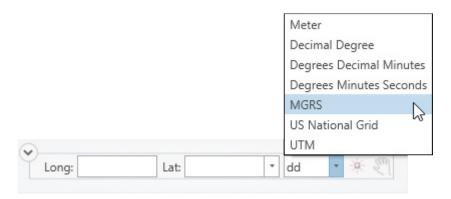
## JUMP to MGRS

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1. If necessary, from the Insert tab, in the Project group, click New Map.

2. From the Map tab, in the Navigate group, click Go To XY ⊕ .

The Go To XY Control dialog box appears at the bottom of the map. Initially the input coordinates are set to decimal degrees. You can change these to a coordinate type of your choosing.
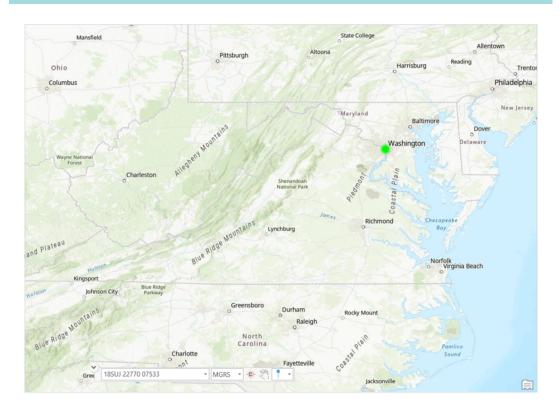


3. In the Go To XY Control dialog box, click the Coordinate Type down arrow, and select MGRS.



Your input coordinate system is now set to MGRS.

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4.  In the coordinate field, type the MGRS coordinates.

5.  In the Go To XY Control dialog box, click the Flash button ⊞ to visually identify the location.



A green dot will flash in your map to identify the MGRS coordinate.

6.  In the Go To XY Control dialog box, click the Pan button 🖐 to center the map on this point.

Now that your map is centered on the MGRS coordinate, you can use the various Navigate tools to zoom to your location.
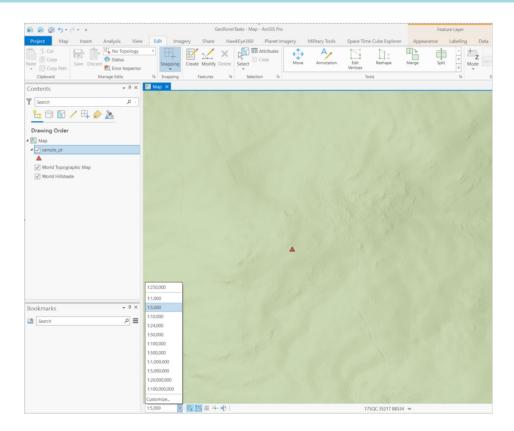
7.  From the Map tab, in the Navigate group, click Fixed Zoom In ⊠ .

Alternatively, you can use the Explore tool to interactively pan and zoom to your location using your mouse controls.
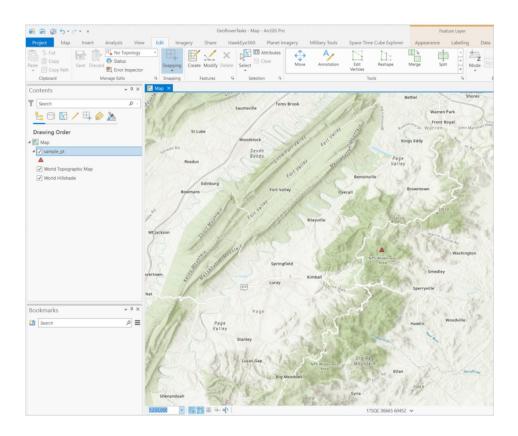
# ZOOM to Specific Scale

This workflow will work for zooming to any map scale.

1.  If necessary, from the Insert tab, in the Project group, click New Map 🗺 .

2.  On the bottom left of the map, click the down arrow next to the map scale, and select the desired scale.

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3.  If the desired scale is not listed, in the scale field,
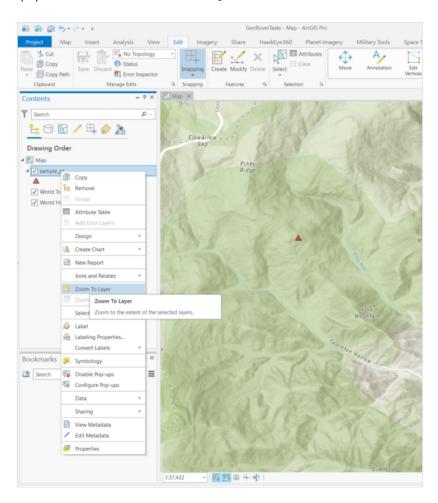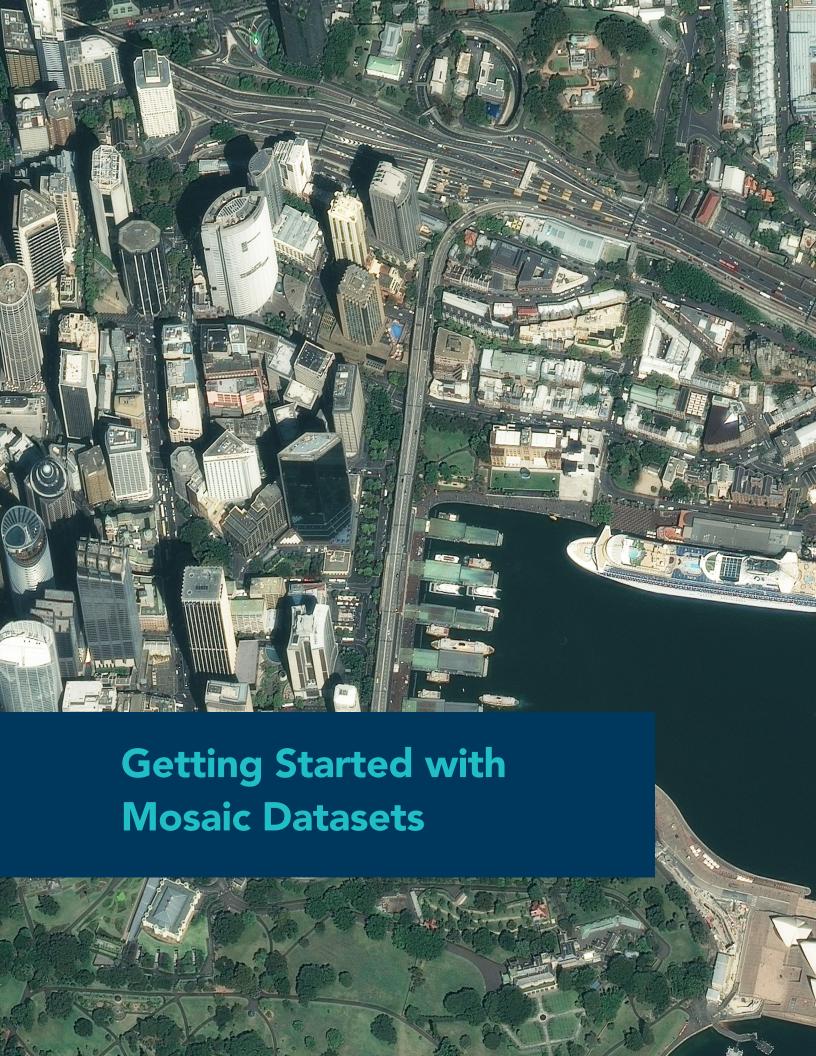    double-click and type the desired scale and press Enter.



Note: When typing a scale, you can type either the full
representative fraction (1:250,000) or the denominator (250,000).

# ZOOM to Layer

1. If necessary, from the Insert tab, in the Project group, click New Map 🗺️ .

2. In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

3. In the Contents Pane, right-click the layer, and select Zoom To Layer.

The map pans and zooms to the layer.

# Getting Started with
# Mosaic Datasets

## CREATE MAP CATALOGS (Create Mosaic Dataset)

A mosaic dataset must exist within a geodatabase.
You must create a new mosaic dataset before you can add rasters.

1.  In the Catalog pane, expand Databases, right-click the desired geodatabase, point to New, and choose Mosaic Dataset.

This will open the Create Mosaic Dataset tool.

2.  In the Geoprocessing pane, set the following parameters:

- Output Location: This will be set to the geodatabase and location you selected.
- Mosaic Dataset Name: Name of your new mosaic dataset.
- Coordinate System: From the Coordinate System drop-down list, you can choose the coordinate system of any of the layers in your map. You can also click the Select Coordinates button 🌐 to add a new coordinate system if desired.
- Product Definition: Select the type of imagery you are working with from the list. You can also select None if you are unsure of the imagery or sensor type.
- Product Properties: This will automatically populate the fields for the specifications of each band based on the selected input for Product Definition. If you selected None or Custom, you could enter unique information if desired.
- Pixel Properties: Select the bit depth for your imagery if you know it.

Note: For Product Definition, ArcGIS Pro supports the most common sensors. ArcGIS Pro will use information in the metadata of your imagery to intelligently manage it.

3.  Click Run.

An empty mosaic dataset has been added to your map. Next, you will need to add your imagery to this mosaic dataset.

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4.  In the Catalog pane, expand Databases, expand your default
    geodatabase, right-click the mosaic dataset you just created, and
    choose Add Rasters.

5.  In the Geoprocessing pane, set the following parameters:

    • Mosaic Dataset: Choose your newly created mosaic dataset.

    • Raster Type: Click the down arrow and select the same raster
      type when you created the empty mosaic dataset. (This raster
      type will be the same as the Product Definition in step 2 above.)

    • Input Data: You can select a folder, an individual raster, or a set
      of rasters.

    Note: If you selected a folder, every raster of the specified raster
    type in that folder will be added to the mosaic dataset. Under the
    Advanced Input Data Options section, use the check box to include
    the subfolders.

The rest of the fields are optional and pertain to creating overviews,
pyramids, and calculating statistics. These options are dependent on
the type of data you have, and how you set them depends on the
kinds of analysis you want to perform.

6.     Click Run.

## VIEW MAP CATALOG (Images)

The mosaic dataset is ideal for managing a collection of raster data. You can view the mosaic dataset as a single mosaicked image; however, you can also view and access individual rasters within the mosaic dataset if necessary. There are multiple ways to do this.

Note: Examining the mosaic dataset layers does not alter the source mosaic dataset.

1. In the Catalog pane, expand Databases, from your desired geodatabase, add the mosaic dataset to your map.

2. In the Contents pane, click the mosaic dataset layer to activate the Mosaic Layer contextual menus.

3. From the Mosaic Layer: Data tab, in the Table group, click Attribute Table.

4. Scroll through the Attribute Table to explore the mosaic dataset rasters.

The Attribute Table contains a list of all the raster data or images in your mosaic dataset. You can use this table in the same way you use any other table in ArcGIS Pro. You can select individual rows or columns. Selecting rows in your table will highlight them in the map.

The primary rasters are the source images for the mosaic dataset. Other datasets present are the various Overview layers. These reduced resolution datasets are various layers that allow for easy rendering at different map scales. You can visually examine more information about these layers by using Explore Raster Items.

5. From the Mosaic Layer: Data tab, in the Selection group, click Explore Raster Items.

6. In the Explore Raster Items pane, click the Inspect tab.
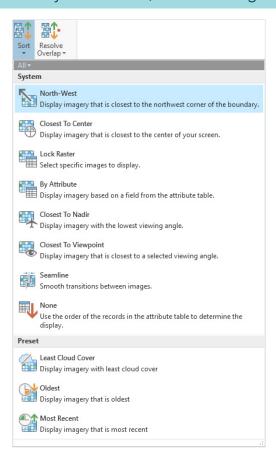
7. If necessary, expand Preview and Raster Information.

As desired, you can scroll through the various raster datasets and overview layers in your mosaic dataset to view the properties of each layer.

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# VIEW OVERLAPPING MAPS (Images)

Deciding how to resolve conflicts of overlapping imagery is a component of working with collections of imagery. You can set up rules that apply to each layer as a whole, or you can apply rules to only the parts of the imagery that are overlapping. First you will set sorting options.

## Sorting With Mosaic Methods

1. In the Catalog pane, expand Databases, from your desired geodatabase, add the mosaic dataset to your map.

2. In the Contents pane, click the mosaic dataset layer to activate the Mosaic Layer contextual menus.

3. From the Mosaic Layer: Data tab, in the Table group, click Sort.

Some of the sort methods are suited for having your collection of imagery (rasters) be simply a collection of imagery (rasters). You do not need to do any analysis; you just need to have your imagery in a logical order. In this case, the North-West and the None methods are good options.

- North-West : Resolves the sorting by choosing the layer closest to the northwest corner of the boundary.
- None : Orders the images in the same order as the attribute table.

Other sort methods can be used for zooming in and panning around your collection of imagery.

- Closest To Center : As you pan and zoom through your mosaic dataset, you will be looking at the images closest to the center of your screen. When you zoom in to a feature, the selection updates automatically, so you see the imagery closest to the feature.
- Seamline : When you put your collection of imagery together, there are a few options for identifying seamlines. They can be based on the footprints of the imagery or the features within the imagery. However your collection is set up, when you choose this option, it generates the seamlines, ranks your images based on the distance to those seamlines, and chooses the closest imagery. The result is a smooth transition from one image to the next.

A large amount of high-resolution imagery is taken from a viewing angle that is not directly overhead. A drawback to this is that all the angles are different, which can be disorienting as you pan from one image to another in your mosaic.

Closest To Nadir : Selects the imagery closest to the image being viewed from directly overhead. Assuming that all your imagery is oblique, you will end up with a less abrupt transition from one scene to the next if you have a lot of tall features because the viewing angles will be fairly close together.
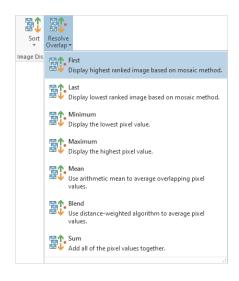
Other sorting methods use different properties in the image or raster metadata.

- • By Attribute ⬚ : Selects imagery based on specific attributes.
- • Lock Raster ⬚ : Displays only the images you select Insert Text.
- • Closest To Viewpoint ⬚ : Imagery over an area from multiple flight paths stores these paths in the metadata, which allows you to view the imagery from many different angles so you can see your imagery from all sides.
- • The three remaining attribute sorting methods are preset: Least Cloud Cover, Oldest, and Most Recent. They and are self-explanatory.

## Resolving Overlapping Pixels

After you have determined the method for ordering, you can fine-tune using the overlap options.

1. If necessary, in the Catalog pane, expand Databases, from your desired geodatabase, add the mosaic dataset to your map.

2. In the Contents pane, click the mosaic dataset layer to activate the Mosaic Layer contextual menus.

3. From the Mosaic Layer: Data tab, in the Table group, click Resolve Overlap.
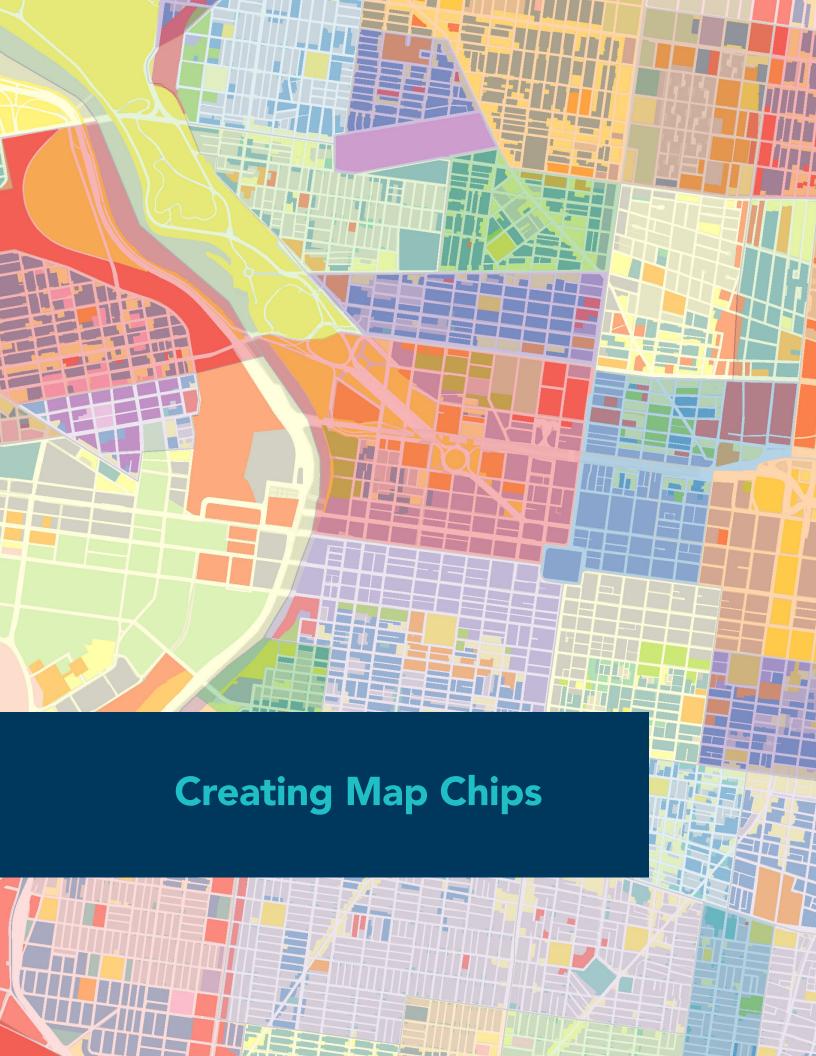


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The first two overlap methods are based on the parameters of each source of rasters/images.

- First: The images at the top of the list will be drawn first.
- Last: The counterpart that starts at the bottom of that same list will be drawn last.

You can also work on the pixel level. There are different averaging and statistical approaches that you can take.

- Minimum and Maximum operators take the lowest and highest valued pixel of all the overlapping layers. Using this option means that you have no guarantee of looking at the pixels of just one image in the overlapping area but rather a combination of potential layers.
- Blend and Mean: Averages the values of the pixels in question. Using either of these operators means that you may not be looking at pixel values from any of your layers.
- Mean: This uses the standard averaging technique.
- Blend: This works by giving more weight to pixels closer to neighboring images to produce a smoother image.
- Sum: Adds the values of all the overlapping pixels. If you assume that most pixel values are relatively close to one another for each layer, this technique can be useful to visualize where you have the most layers.

# Creating Map Chips

## CREATE MAP CHIPS by Polygon

(Clip Raster [Data Management])

This tool allows you to extract, or chip out, a portion of a raster dataset in your map based on a template extent. This tool can be used to clip a raster dataset, mosaic dataset, or image service layer. A raster dataset or mosaic dataset will be used for this workflow example. The clip output includes any pixels that intersect the template extent.You must create a new mosaic dataset before you can add rasters.



**Clip**

1. In the Catalog pane, expand Databases, and from your desired geodatabase, add a raster dataset or a mosaic dataset to your map.

2. From the Analysis tab in the Geoprocessing group, click Tools 🔧 .

3. In the Geoprocessing pane, in the search field, type Clip Raster.

4. In the search results, click Clip Raster (Data Management Tools).

5. In the Geoprocessing pane, set the following parameters:

   • Input Raster: Choose the raster dataset or mosaic dataset
   • Output Extent: (Optional): A raster dataset or feature class to use as the clipping extent. If a raster dataset or feature class is selected, the Rectangle bounding box coordinate will fill in automatically

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- Rectangle: The four coordinates that define the bounding box of the clipping extent
- Output Raster Dataset: The name and geodatabase location of your new raster dataset
- Maintain Clipping Extent: Check this to have the new raster dataset columns and rows exactly match the clipping extent

Note: For Output Extent, you can use selected features within the map as the clipping extent. If you select a single feature in the feature class, check Use Input Features For Clipping Geometry to clip out the areas that are selected. If a feature in the feature class is selected but Use Input Features For Clipping Geometry is not checked, the output clips out the minimum bounding rectangle for that feature.

Note: For Rectangle, the clipped area is specified either by using a minimum and maximum x,y coordinates that you set, or set automatically by the area of an output extent file.

Note: For Output Raster Dataset, setting the output to a geodatabase location will automatically create a raster dataset. If you specify a raster format type—for instance, BIL, BIP, BMP, BSQ, DAT, Esri Grid, GIF, IMG, JPEG, JPEG 2000, PNG, TIFF, MRF, CRF— you will need to set this to a folder location, not a geodatabase, and add the appropriate file extension.

6.     Click Run.

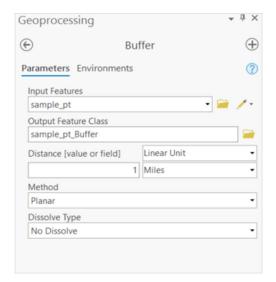Your new raster dataset chip (subset) will be added to your map.
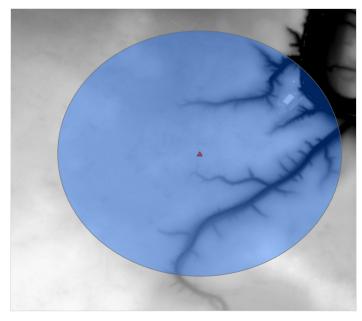
# CREATE MAP CHIPS by Point

This workflow will result in a chip, or subset, of a raster dataset or mosaic dataset centered around a specific point. The first element of this workflow will create a new feature class of a buffered distance— that you specify—around your point of interest.

1.  In the Catalog pane, expand Databases, and from your desired geodatabase, add a raster dataset or a mosaic dataset and a point feature class to your map.

2.  From the Map tab, in the Selection group, click Select .

3.  In the map, select the point you want to use to create a chip.

4.  From the Analysis tab, in the Geoprocessing group, click Tools .

5.  In the Geoprocessing pane, in the search field, type Buffer.

6.  In the search results, click Buffer (Analysis Tools).

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7. In the Geoprocessing pane, set the following parameters:
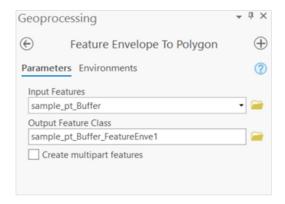
- Input Features: The point feature class with your selected point
- Output Feature Class: Name and location of your new output feature class
- Distance [Value Or Field]: Type in a distance, and select a distance unit of the buffer
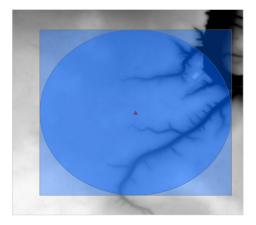- Keep all other options on the default settings

Now that you have created a new feature class around your selected point, you can use the buffer polygon to create a rectangle to use as your clip extent. The second element of this workflow will create this rectangle polygon.
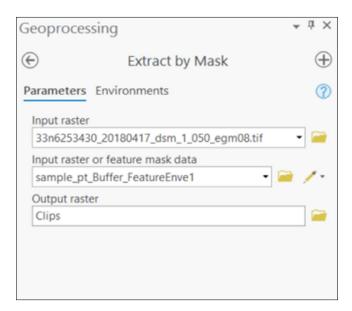
8. In the Geoprocessing pane, click the Back button ⊖ .

9. In the search field, type Feature Envelope To Polygon, and then click Feature Envelope To Polygon (Data Management Tools).

10. In the Geoprocessing pane, set the following parameters:

- • Input Features: Select the Buffer feature class previously created
- • Output Feature Class: Name and location of your new output feature class
- • Check the Create Multipart Features box if you have multiple features

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The final element of this workflow uses your newly created rectangle polygon to clip your raster dataset or mosaic dataset.

11. In the Geoprocessing pane, click the Back button ⊙ .

12. In the search field, type Extract By Mask, and then click Extract By Mask (Spatial Analyst Tools).

13. In the Geoprocessing pane, set the following parameters:

- Input Raster Select your raster dataset or mosaic dataset
- Input Raster Or Feature Mask Data: Select the polygon feature class created previously created from the Feature Envelope To Polygon tool
- Output Raster: Name and location of your new output feature class

The final output is a raster dataset chip (subset) of your raster dataset or mosaic dataset based on the distance from the point you specified earlier.
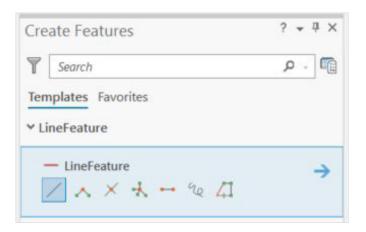
# Working with Range Rings, Ellipses, and Arcs

## ADD ARCS by Creating a New Feature
## ADD ARCS from Database (existing feature class)

1.  In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2.  From the Edit tab, in the Features group, click Create 📝 .

The Create Features pane opens, showing each of the editable layers in the map. These layers are the feature templates that contain construction tools to create features.

3.  In the Create Features pane, expand the existing feature that you would like to add arcs to, and click the Line construction tool ✏️ .



When you clicked the Line construction tool, a construction toolbar appeared at the bottom of the map. This toolbar contains frequently used construction tools.

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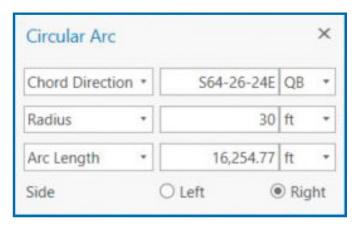
4.  On the construction toolbar, click the Arc Segment construction tool  .



5.  Create the start point by using one of the following methods:

    • Click the map.
    • Right-click the map, click Absolute X,Y,Z…, and in the Absolute X,Y dialog box, type the values of your desired new point, and press Enter.

6.  Create a second point that defines the path of the arc using one of the following methods:

    • Click the map.
    • Right-click the map, click Absolute X,Y,Z…, and in the Absolute X,Y dialog box, type the values of your desired new point, and press Enter.

This action locks the path of the arc to the new point. No new point will be created on the map. You must create an endpoint and specify a radius to finish the arc segment.

7.  Create the endpoint and specify the radius by using one of the following methods:

- Sketch the radius by moving the pointer and click the map to create the endpoint.
- Press R, type the radius, press Enter, and click the map to create the endpoint.
- Right-click the map, click the Circular Arc button ⌒ , specify the radius and other geometry values, and press Enter to close the dialog box and create the arc.

| Circular Arc | | ✕ |
|---|---|---|
| Chord Direction ▾ | S64-26-24E | QB ▾ |
| Radius ▾ | 30 | ft ▾ |
| Arc Length ▾ | 16,254.77 | ft ▾ |
| Side | ○ Left | ◉ Right |

To continue creating other segments, use the tools on the construction toolbar.

8.  To undo an edit, on the Quick Access Toolbar, click the Undo button ↺ .

9.  On the construction toolbar, click the Finish button 🗹 , or press F2.

Next you will save your edits.

10. From the Edit tab, in the Manage Edits group, click Save 🖫 .

11. In the Save Edits dialog box, click Yes to save your edits.
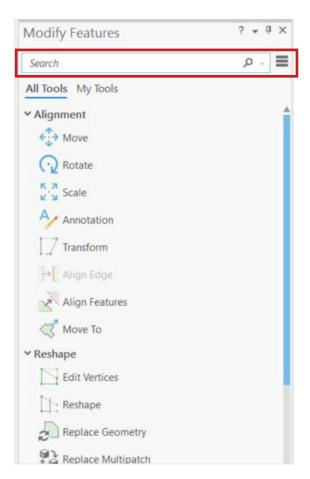
## EDIT ARCS

1. In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

Because of the feature geometry of arcs, they will be part of a line (polyline) feature class.

2. From the Edit tab, in the Features group, click Modify .

3. In the Modify Features pane, expand a tool category, and click a specific editing tool.

You can type a function into the Search field to help identify an appropriate tool.

When you clicked a specific tool and selected your feature, an editing toolbar appeared at the bottom of the map. This toolbar contains frequently used editing tools for that specific tool.

4.  In the Modify Features pane, click Select A Feature  , and in your map, select the feature or features you want to modify.

Once selected, the feature or features will turn cyan. The selected features are also listed in the Modify Features pane.

5.  Edit the feature following the steps prescribed by the specific tool.

6.  To finish the modification, right-click and click the Finish button  , or press F2.

7.  To undo an edit, on the Quick Access Toolbar, click the Undo button  .

Next you will save your edits.

8.  On the Edit tab, in the Manage Edits group, click the Save button  .

9.  In the Save Edits dialog box, click Yes to save your edits.

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## DELETE ARCS

1.  From the Edit tab, in the Features group, click Select 🖱️ and in the map, select the arc feature you want to delete.

    Note: Press and hold Shift while making your selections to select more than one arc feature.

Once selected, the arc feature(s) will turn cyan.



2.  Delete the selected arc feature(s) using one of the following methods:

    • From the Edit tab, in the Features group, click the Delete button ✖
    • Right-click and choose Delete ✖
    • Press Delete.

Next you will save your edits.

3.  On the Edit tab, in the Manage Edits group, click Save 💾.

4.  In the Save Edits dialog box, click Yes to save your edits.

# CREATE ELLIPSES INTERACTIVELY

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

1. From the Insert tab, in the Measurements group, click Distance and Direction 🔗.

2. In the Distance and Direction pane, click the Ellipse tab.

3. For Units, click the down arrow to select your desired map unit.

4. Click the Map Point Tool button 📍.

5. In the map, click a location to designate the center point of the ellipse.

As you move the pointer in the map, the Center Point field updates automatically.

6. In the map, click a location to designate the orientation and vertex of the major axis.

Moving the pointer in the map updates the distance units of the major axis automatically in the Major field.

7. In the map, click a location to designate the vertex along the minor axis to complete the ellipse.

Similarly, as you move the pointer in the map to specify the minor axis distance, the Minor field updates automatically.

Your new ellipse is added to the map.



The Distance and Direction tool also created a new feature dataset containing several new feature classes. You can see this new feature dataset and the new feature classes in the Contents pane.

You can remove ellipses if you make errors while interactively creating them.

8.   In the Distance and Direction pane, click Delete Ellipses.

You can export these ellipses to a new feature class or a KMZ file.

9.   In the Distance and Direction pane, click Export.

10. In the Select Output dialog box, choose Feature Class/Shapefile or KMZ, and click OK.

11. In the Select Output dialog box, set the location and name of your new feature class, shapefile, or KMZ file, and click Save.

Your new feature class will be added to your map.

# CREATE ELLIPSES from Copied/Pasted or typed text (known coordinates)

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

1. From the Insert tab, in the Measurements group, click Distance and Direction 🔗.

2. In the Distance and Direction pane, click the Ellipse tab.

3. For Units, click the down arrow to select your desired map unit.

4. In the Center Point field, type or paste a coordinate.

5. In the Major field, type a value.

6. In the Minor field, type a value.
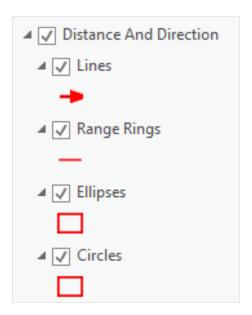
7.   In the Angle field, type a value.

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8.   Press Enter.

A new ellipse is created and added to the map.

The Distance and Direction tool also created a new feature dataset containing several new feature classes. You can see this new feature dataset and the new feature classes in the Contents pane.



You can remove ellipses if you make errors while creating them.

9.   In the Distance and Direction pane, click Delete Ellipses.
You can export these ellipses to a new feature class or a KMZ file.

10. In the Distance and Direction pane, click Export.

11. In the Select Output dialog box, choose Feature Class/Shapefile or KMZ, and click OK.

12. In the Select Output dialog box, set the location and name of your new feature class, shapefile, or KMZ file, and click Save.

Your new feature class will be added to your map.

## DELETE ELLIPSES

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

1. From the Edit tab, in the Features group, click Select , and in your map, select the ellipse feature you want to delete.

Once selected, the ellipse will turn cyan.



Major: 2,071 m
Minor: 1,181 m
Angle: 35.61 °

2. Delete the selected ellipse using one of the following methods:

   • From the Edit tab, in the Features group, click the Delete button ✖ .
   • In the map, right-click, and click the Delete button ✖ .
   • Press Delete.

Next you will save your edits.

3. On the Edit tab, in the Manage Edits group, click Save .

4. In the Save Edits dialog box, click Yes to save your edits.

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## UPDATE/EDIT ELLIPSES

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

Based on how ellipses are created using the Distance and Direction tools, they can be moved, but they cannot be updated or edited. To make changes to an ellipse you must do the following:

1. Delete the ellipse you would like to update.

2. Repeat the steps to re-create the ellipse with your updated specifications.

# CREATE RANGE RINGS INTERACTIVELY

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.
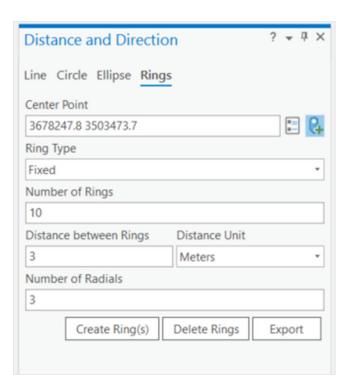
This workflow demonstrates how to interactively create range rings by clicking the map.

1. From the Insert tab, in the Measurements group, click Distance and Direction ⬚.

2. In the Distance and Direction pane, click the Rings tab.

3. For Ring Type, click the down arrow, and choose Interactive.

4. Click the Map Point Tool button ⬚.
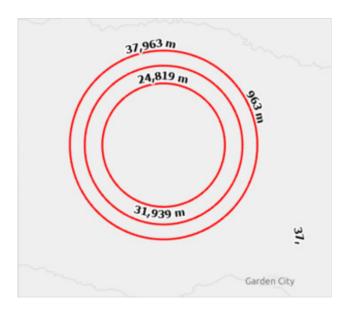
As you move the pointer in the map, the Center Point field updates automatically.

5. In the map, click a location to designate the center point of the ring.

Moving the pointer in the map updates the distance units of the radius automatically.

6. Click the map to designate the diameter of the ring.

7. Add rings as necessary and double-click to finish.

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The new range rings are created and added to the map.



The Distance and Direction tool also created a new feature dataset containing several new feature classes. You can see this new feature dataset and the new feature classes in the Contents pane.



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**05** CREATING
MAP CHIPS

**06** RANGE RINGS,
ELLIPSES, ARCS

**07** MAP
COORDINATES

You can remove range rings if you make errors while interactively creating them.

8. In the Distance and Direction pane, click Delete Rings. You can export these range rings to a new feature class or a KMZ file.

9. In the Distance and Direction pane, click Export.

10. In the Select Output dialog box, choose Feature Class/Shapefile or KMZ, and click OK.

11. In the Select Output dialog box, set the location and name of your new feature class, shapefile, or KMZ file, and click Save.

Your new feature class will be added to your map.

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# CREATE RANGE RINGS Using a Fixed Ring Number and Distance from Copied/Pasted Text

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.
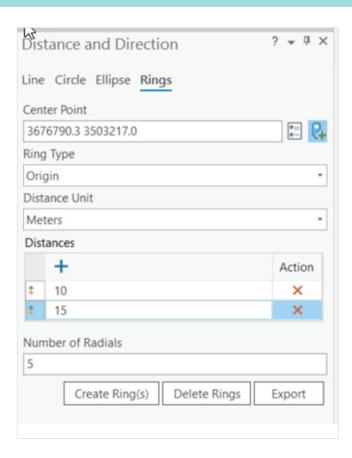
This workflow demonstrates how to create range rings with a fixed number of rings at a specified distance.

1. From the Insert tab, in the Measurements group, click Distance and Direction ⬚.

2. In the Distance and Direction pane, click the Rings tab.

3. For Ring Type, click the down arrow, and choose Fixed.

4. Enter a coordinate in the Center Point text box, or click the Map Point Tool button ⬚ to set a center point for the ring or rings.

As you move the pointer in the map, the Center Point field updates automatically.
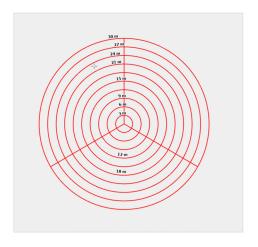
5. In the Number of Rings field, type the value for how many rings to create.

6. For Distance Unit, click the down arrow to select your desired linear unit.

7. In the Distance Between Rings field, type the value for how far apart the rings must be based on your distance units.

8. In the Number of Radials field, type the value for how many radials to create.
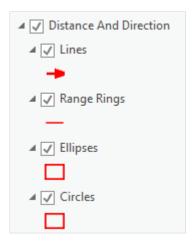


9. Press Enter.

Range rings are created and added to the map. For this example, 10 rings were created with three radial segments. Each ring is three meters apart.

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The Distance and Direction tool also created a new feature dataset containing several new feature classes. You can see this new feature dataset and the new feature classes in the Contents pane.
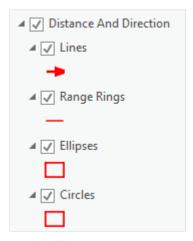


You can remove range rings if you make errors while creating them.

10. In the Distance and Direction pane, click Delete Rings.

You can export these range rings to a new feature class or a KMZ file.

11. In the Distance and Direction pane, click Export.

12. In the Select Output dialog box, choose Feature Class/Shapefile or KMZ, and click OK.

13. In the Select Output dialog box, set the location and name of your new feature class, shapefile, or KMZ file, and click Save.

Your new feature class will be added to your map.

# CREATE RANGE RINGS by Distance from an Origin from Copied/Pasted Text

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

This workflow demonstrates how to create range rings based on an origin and set distance from that specified origin.

1. From the Insert tab, in the Measurements group, click Distance and Direction ⬡.

2. In the Distance and Direction pane, click the Rings tab.

3. For Ring Type, click the down arrow, and choose Origin.

4. Enter a coordinate in the Center Point text box, or click the Map Point Tool button 🔲 to set a center point for the ring or rings.

As you move the pointer in the map, the Center Point field updates automatically.

5. For Distance Unit, click the down arrow to select your desired linear unit.
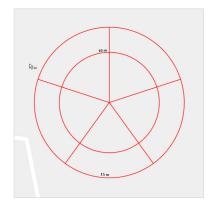
6. Enter a value in the Distances table to set how far the first ring entered will be from the origin point.

7. Click the Add Distance button ➕ to add a new row to the Distances table.

8. As necessary, add additional distances.

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9.  In the Number of Radials field, type in the value for how many radials to create.



10.  Press Enter.

Range rings are created and added to the map. For this example, two rings were created with five radial segments. The first ring is 10 meters from the origin and the second ring is 15 meters from the origin.

The Distance and Direction tool also created a new feature dataset containing several new feature classes. You can see this new feature dataset and the new feature classes in the Contents pane.



You can remove range rings if you make errors while creating them.

11. In the Distance and Direction pane, click Delete Rings.
You can export these range rings to a new feature class or a KMZ file.

12. In the Distance and Direction pane, click Export.

13. In the Select Output dialog box, choose Feature Class/Shapefile or KMZ, and click OK.

14. In the Select Output dialog box, set the location and name of your new feature class, shapefile, or KMZ file, and click Save.

Your new feature class will be added to your map.

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# CREATE RANGE RINGS by Distance Between Rings from Copy/Pasted Text

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

This workflow demonstrates how to create range rings based on an origin and a distance from a previously created ring.
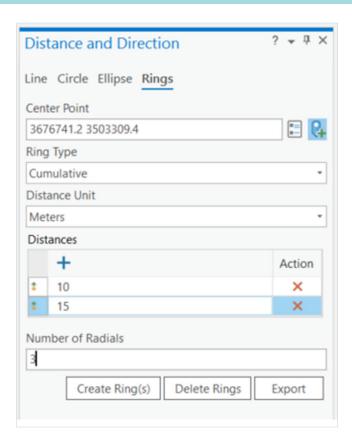
1.  From the Insert tab, in the Measurements group, click Distance and Direction 🔗.

2.  In the Distance and Direction pane, click the Rings tab.

3.  For Ring Type, click the down arrow, and choose Cumulative.

4.  Enter a coordinate in the Center Point text box or click the Map Point Tool button and set a center point for the ring or rings.

As you move the pointer in the map, the Center Point field updates automatically.

5.  For Distance Unit, click the down arrow to select your desired linear unit.

6.  Enter a value in the Distances table to set how far the first ring will be from the origin point.

7.  Click the Add Distance button to add a new row to the Distances table.

8.  As necessary, add additional distances.
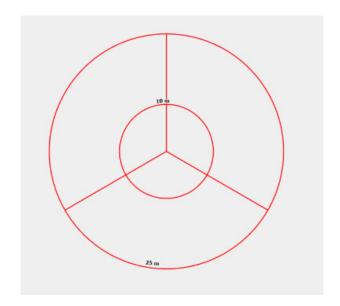
When creating rings using the Cumulative option, the rings are created based on the order of rows in the Distances table and based on the previous row. For example, values in the table of 100, 350, and 75 result in rings created at distances of 100, 450, and 525 from the origin.

9.  Enter a value in the Number of Radials text box.



10. Press Enter.

Range rings are created and added to the map. For this example, two rings were created with three radial segments. The first ring is 10 meters from the origin and the second ring is 15 meters from first ring and—because the cumulative option is selected—25 meters from the origin.

The Distance and Direction tool also created a new feature dataset containing several new feature classes. You can see this new feature dataset and the new feature classes in the Contents pane.



You can remove range rings if you make errors while creating them.

11. In the Distance and Direction pane, click Delete Rings.
You can export these range rings to a new feature class or a KMZ file.

12. In the Distance and Direction pane, click Export.

13. In the Select Output dialog box, choose Feature Class/Shapefile or KMZ, and click OK.

14. In the Select Output dialog box, set the location and name of your new feature class, shapefile, or KMZ file, and click Save.

Your new feature class will be added to your map.

# CREATE RANGE RINGS from CSV, Spreadsheet, Database, or Features

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.
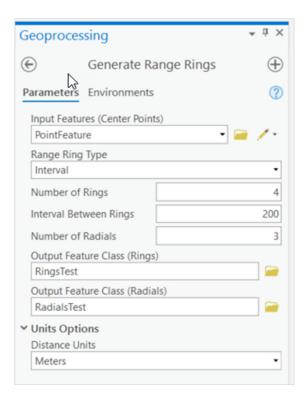
If your point data is in the form of a CSV file or spreadsheet, import the points to create a new feature class (see Import point by CSV, Spreadsheet).

1.  In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2.  From the Analysis tab, in the Geoprocessing group, click Tools  .

3.  In the Geoprocessing pane, in the search field, type Generate Range Rings.

4.  In the search results, click Generate Range Rings (Defense Tools).

5.  In the Input Features (Center Points), click the down arrow and choose the point feature class.

6.  For Range Ring Type, verify that Interval is the selected type.

7. For the remaining values, set the following parameters:

- Number of Rings: Enter values for the desired number of rings
- Interval Between Rings: Enter values for the desired distance between rings based on your distance units
- Number Of Radials: Enter values for the desired number of radials
- Output Feature Class (Rings): Name and location of the feature class for the rings
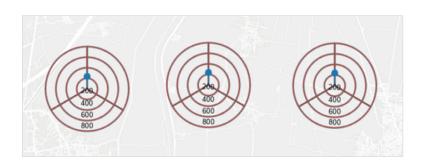- Output Feature Class (Radials): Name and location of the feature class for the rings

Note: Two separate feature classes will be generated for both the rings and the radials.

8. If necessary, expand Units Options, and click the Distance Units down arrow to set the desired units.

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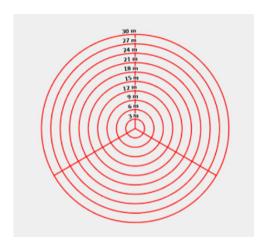
9.   Click Run.

Two new feature classes are created and added to the map. For this example, the input features included three center points. Each ring contains four rings, with internal rings 200 meters apart. Additionally, each range ring has three radial segments.

# DELETE RANGE RINGS

1.  From the Edit tab, in the Features group, click Select 🖱, and in your map, select the ring or rings you want to delete.



Once selected, the ellipse will turn cyan.

2. Delete the selected ring feature using one of the following methods:

- From the Edit tab, in the Features group, click the Delete button ✖ .
- In the map, right-click, and click the Delete button ✖ .
- Press Delete.

Next you will save your edits.

3. On the Edit tab, in the Manage Edits group, click Save 🖫 .

4. In the Save Edits dialog box, click Yes to save your edits.

## UPDATE/EDIT RANGE RINGS

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Distance and Direction tools and other Defense Tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

Based on how range rings are created using the Distance and Direction tools, they can be moved, but they cannot be updated or edited. To make changes to a range ring you must do the following:
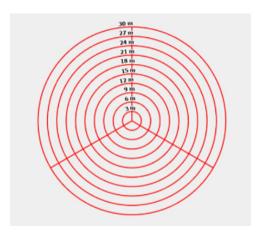
1. Delete the range ring or range rings you would like to update.

2. Repeat the steps to re-create the range rings with your updated specifications.
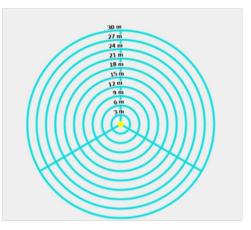
## MOVE RANGE SETS by Entering Center Coordinate

1.  In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2.  From the Edit tab, in the Features group, click Modify .

3.  In the Modify Features pane, expand Alignment, and click Move To .

4.  In the Modify Features pane, click Make A Selection , and in the map, select the range ring feature that you would like to move.

Ensure that you click and drag the select tool over the entire range ring area. Once selected, the range ring will appear cyan.

Note: You can click the Make A Selection down arrow to change the selection type.



5.  For Method, click the down-arrow, and choose Absolute.

Specify the new coordinate location.

6.  For Values, click the Units down arrow, and choose a unit of measure or coordinate system.



7.  Type the new coordinate value in the appropriate field.



Depending on the coordinate system or units chosen, the input field will change. You must input the appropriate coordinate pair or unique coordinate, such as the MGRS coordinate in the example.

8.  Click Move To.

The feature moves or shifts to the new location.

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9.  To undo an edit, on the Quick Access Toolbar, click the Undo button ↺ .

10. To save an edit, from the Edit tab, in the Manage Edits group, click Save.

11. To apply your changes, on the construction toolbar, click the Finish button ⧉ , or press F2.

Next you will save your edits.

12. From the Edit tab, in the Manage Edits group, click Save 💾 .

13. In the Save Edits dialog box, click Yes to save your edits.
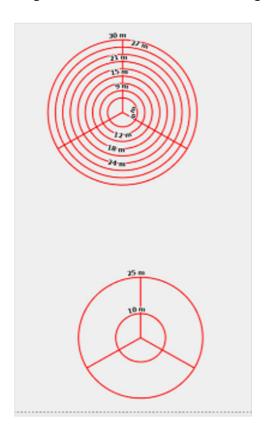
# MOVE SINGLE RANGE SET by Click and Drag
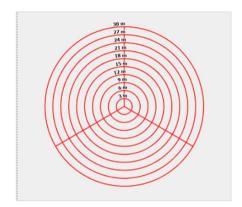
1. In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2. From the Edit tab, in the Features group, click Modify.

3. In the Modify Features pane, expand Alignment, and click Move.

4. In the Modify Features pane, click the Select One Or More Features button, and in the map, select the range ring that you would like to move.
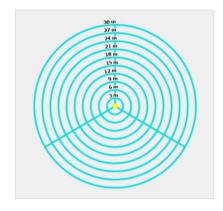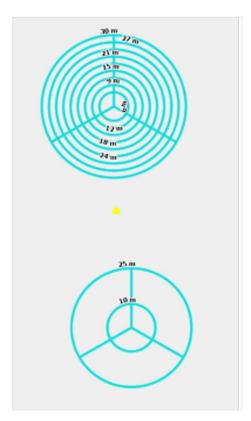
Note: You can click the Select One Or More Features down arrow to change the selection type.

When you clicked the Move button and selected your feature, an editing toolbar appeared at the bottom of the map. This toolbar contains frequently used editing tools.
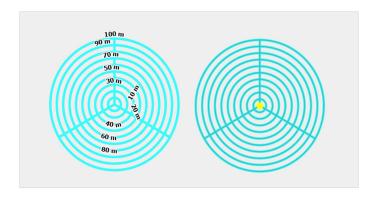
Ensure that you click and drag the select tool over the entire range ring area. Once selected, the range ring will appear cyan.

5. In the map, pause your pointer near your selection until the move pointer ✥ appears, then click and drag the feature to the new location on the map.



6. To undo an edit, on the Quick Access Toolbar, click the Undo button ↶ .

7. To apply your changes, on the construction toolbar, click the Finish button ⬚ , or press F2.

Next you will save your edits.

8. From the Edit tab, in the Manage Edits group, click Save 🖫.

9. In the Save Edits dialog box, click Yes to save your edits.

# MOVE MULTIPLE RANGE SETS by Click and Drag

1. In the Catalog pane, expand Databases, and from your desired geodatabase, add a line feature class to your map.

2. From the Edit tab, in the Features group, click Modify .

3. In the Modify Features pane, expand Alignment, and click Move .

4. In the Modify Features pane, click Select One Or More Features , and in the map, select the range ring that you would like to move.

5. To select additional range rings, press and hold Shift, and in the map, select another range ring.

   Note: You can click the Select One Or More Features down arrow to change the selection type.

When you clicked the Move button and selected your feature, an editing toolbar appeared at the bottom of the map. This toolbar contains frequently used editing tools.
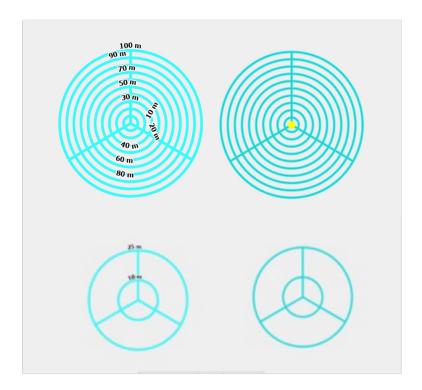
Ensure that you click and drag the select tool over the entire range ring area. Once selected, the range ring will appear cyan.
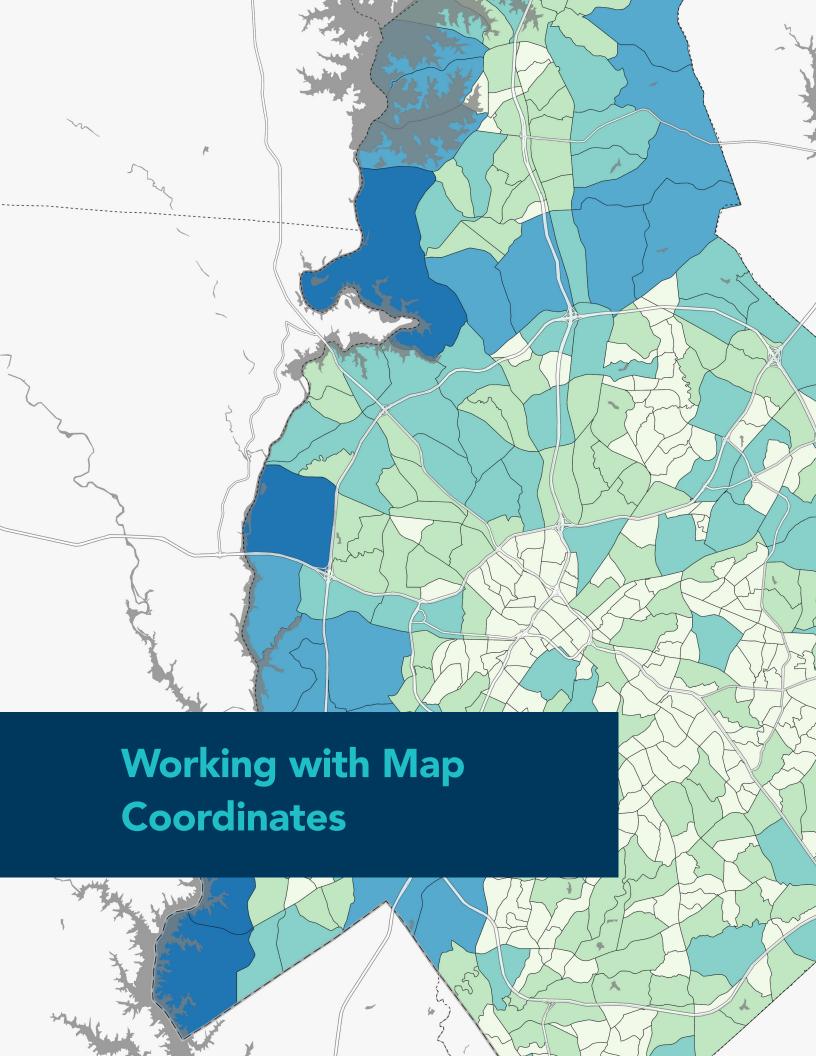
6. In the map, pause your pointer near your selection until the move pointer button ✥ appears, then click and drag the feature to the new location on the map.



7. To undo an edit, on the Quick Access Toolbar, click the Undo button ↺ .

8. To apply your changes, on the construction toolbar, click the Finish button ⬚v, or press F2.
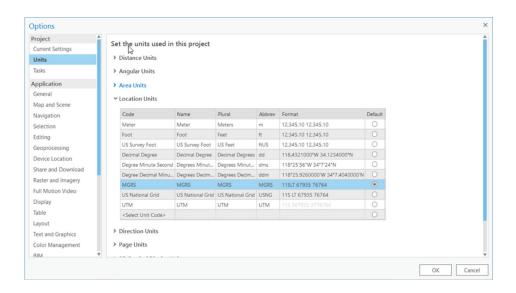
Next you will save your edits.

9. From the Edit tab, in the Manage Edits group, click Save 🖫 .

10. In the Save Edits dialog box, click Yes to save your edits.

# Working with Map Coordinates

# 07
chapter

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## CHANGE DEFAULT COORDINATE FORMAT

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1.  From the ribbon at the top of the app, click the Project tab.

2.  In the left pane, click Options.

3.  In the Options dialog box, under Project, click Units.

4.  From the Units page, expand Location Units.

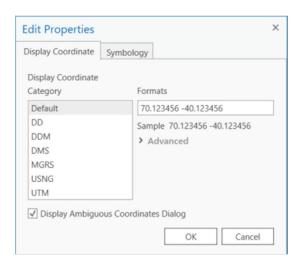5.  Select the Coordinate format that you would like to be the default for your ArcGIS Pro projects.



6.  Click OK.

7.  In the top-left center, click the Back arrow  to return to your project.

**01** NEW FEATURE
CLASS LAYERS

**02** MODIFYING
EXISTING LAYERS

**03** NAVIGATING
IN MAPS

## CHANGE THE DISPLAYED Input Coordinate Format

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Coordinate Conversion tools and other Defense tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.
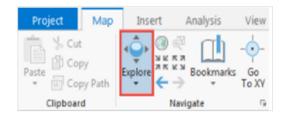
1. From the Map tab, in the Inquiry group, click Coordinate Conversion ⬚ .

2. In the Coordinate Conversion pane, click the Edit Properties button ⬚ .

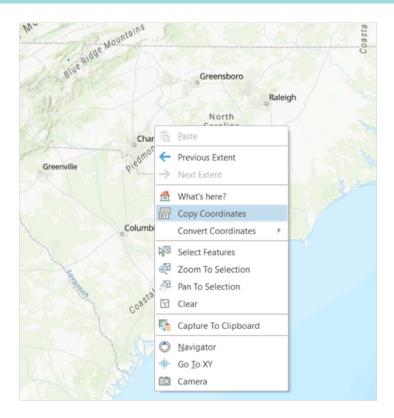3. In the Edit Properties dialog box, for Display Coordinate Category, choose a format from the provided list.



4. Click OK.

## COPY COORDINATE by Clicking Map (Right-Click)

1. From the Map tab, in the Navigate group, ensure that the Explore tool ✛ is selected.



2. In the map, right-click the desired point in Map View and choose Copy Coordinates.
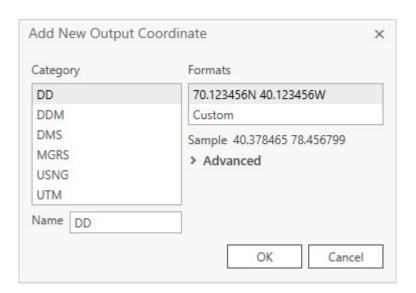


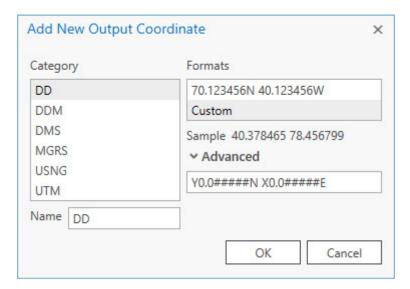3. The coordinate will be copied to your clipboard.

## CUSTOMIZE COPY COORDINATE

For this workflow to be successful, ArcGIS Pro Intelligence must be installed. Once installed, the Coordinate Conversion tools and other Defense tools can be utilized from either ArcGIS Pro or ArcGIS Pro Intelligence.

1. From the Map tab, in the Inquiry group, click Coordinate Conversion 🖳 .

2. In the Coordinate Conversion pane, in the Output table, click the Add button 🗺 .

3. In the Add New Output Coordinate dialog box, choose a coordinate type from the Category list.

4.   Expand Advanced.

**Add New Output Coordinate**    ✕

Category

| DD |
| DDM |
| DMS |
| MGRS |
| USNG |
| UTM |

Name  DD

Formats

| 70.123456N 40.123456W |
| Custom |

Sample  40.378465 78.456799
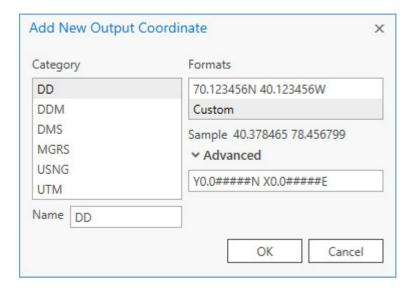
˅ Advanced

Y0.0#####N X0.0#####E

OK    Cancel

5.   In the Advanced text box, insert or delete characters or spaces to change the way the coordinate is displayed.

For DD, DDM, and DMS, 0 represents a digit, whereas # represents a significant digit (not zero). For example, the default format for DD is Y0.0#####N X0.0#####E, which shows a minimum of one decimal point but up to six significant digits. If you have an input coordinate of 45.002N, 40.300W, it defaults to 45.002N, 40.3W in the output because there is only one significant digit.

If you customize the formatting to Y0.0000##N X0.0000##E, the output will be displayed as 45.0020N, 40.30000W.

**01** NEW FEATURE
CLASS LAYERS

**02** MODIFYING
EXISTING LAYERS

**03** NAVIGATING
IN MAPS

Letters and spacing also change the display of the output coordinates. As another example, the default output format for MGRS coordinates is 11SMU4217517182. However, you can add spaces for added reading clarity: 11S MU 42175 17182.



If desired, you can format the output to drop the Grid Zone Designator by removing the letter Z, thus the output: MU4217517182.

6.  In the Name field, enter a name or accept the default.

7.  Click OK.

Now when you select a point on the map, the new format will be output in the Coordinate Conversion pane.

Note: If your Input coordinate system is different from your Output coordinate system, for instance, your Input is MGRS and your Output is DD, the List will record your points in MGRS.

8. In the Output table, click the copy button ▣ to copy the newly formatted coordinate to your clipboard.