esri

THE SCIENCE OF WHERE

ArcGIS Pro Editing: An Introduction

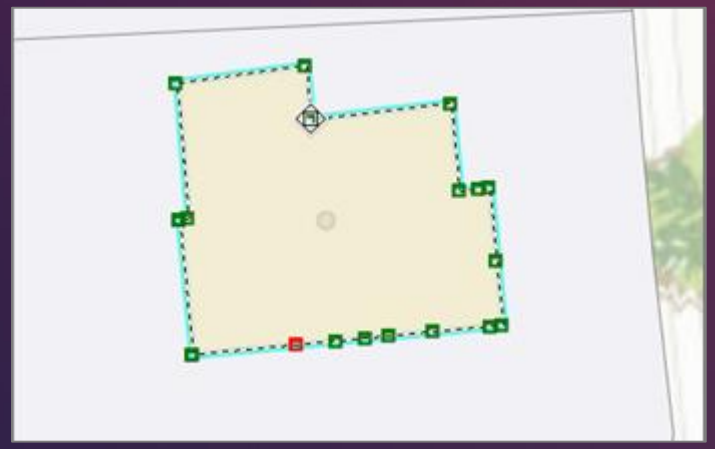
Jennifer Cadkin & Phil Sanchez

See Us Here

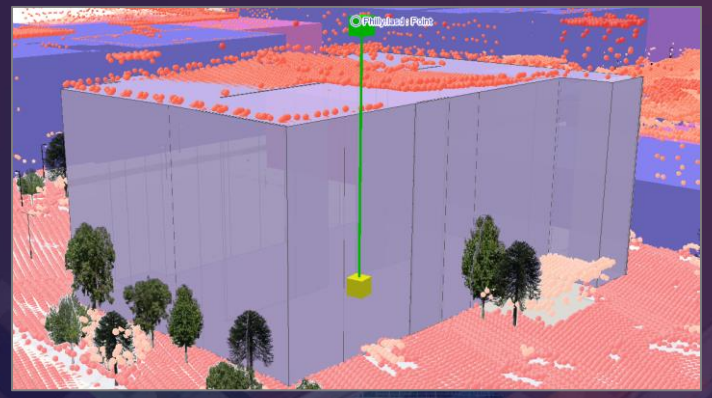
WORKSHOP	LOCATION	TIME FRAME
• ArcGIS Pro Editing: An Introduction	• SDCC - Ballroom 20 D	• Thursday 10:00 – 11:00
• ArcGIS Pro: 3D Editing	• SDCC - Ballroom 20 D • SDCC - Room 31 B	• Tuesday 10:00 – 11:00 • Wednesday 1:00 – 2:00
• ArcGIS Pro: Data Alignment and Topology	• SDCC - Ballroom 06 F • SDCC - Room 32 A/B	• Tuesday 2:30 – 3:30 • Wednesday 2:30 – 3:30
• ArcGIS Pro Editing: Tips and Tricks	• SDCC - Room 07 A/B • SDCC - Room 10	• Tuesday 1:00 – 2:00 • Wednesday 4:00 – 5:00

ArcGIS Pro Editing – Overview

- Provides tools that allow you to maintain, update, and create new data
  - Modifying geometry, drawing new features
  - Entering and updating feature attributes



- Supports editing features in 2D maps and 3D scenes
  - View and edit features at their real-world elevation
  - Construct features on surfaces and at a constant elevation



- Edit multiple workspaces simultaneously
  - File GDBs, Enterprise GDBs, Feature Services, Shapefiles
  - Set layer editability, configure autosave

What’s new in Pro Editing 2.1 & 2.2

- Pro 2.1

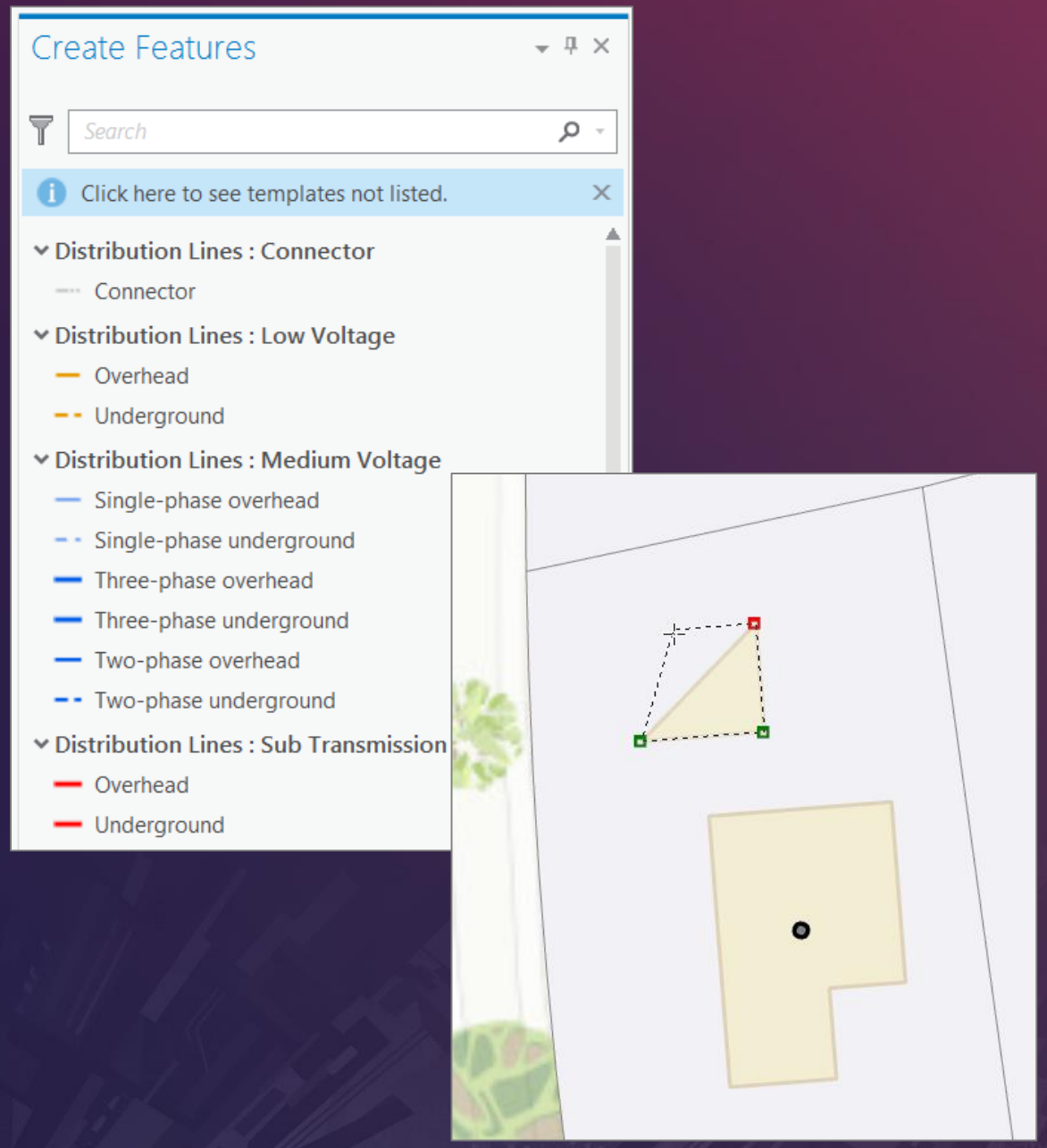
- Annotation Tools
  - Constructors: Find Text, Straight, Curved
  - Modify: Leader, Curved, Stack, Flip, Multiparts
- Construct Polygons
- Editing Grid (3D)
- Densify Lines
- Utility Network Topology

- Pro 2.2

- Annotation Tools
  - Follow Feature Modify
- Copy Parallel
- Split By Value (lines)
- Multipatch tools
  - Texture Editing, Vertex Editing, Distance Constraints,
- Explode Parts
- Customizable Tools Gallery

Data Creation

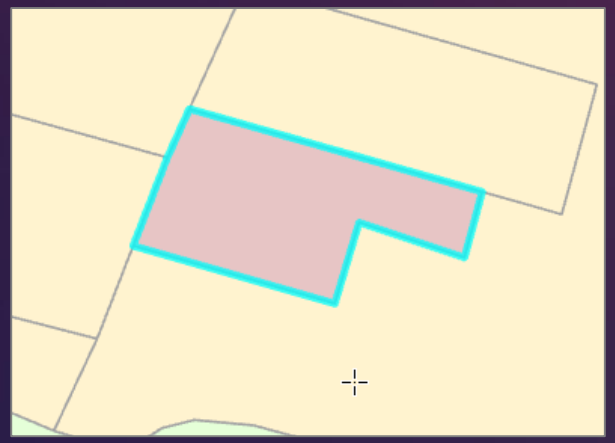
- Relies on feature templates to create new data
- They are layer based, matching the symbology authored in the map
- Default attributes and attribute overrides provide efficient ways for pre-populating newly created features

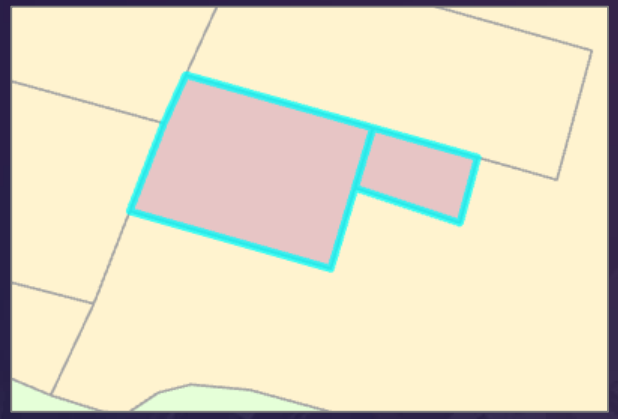


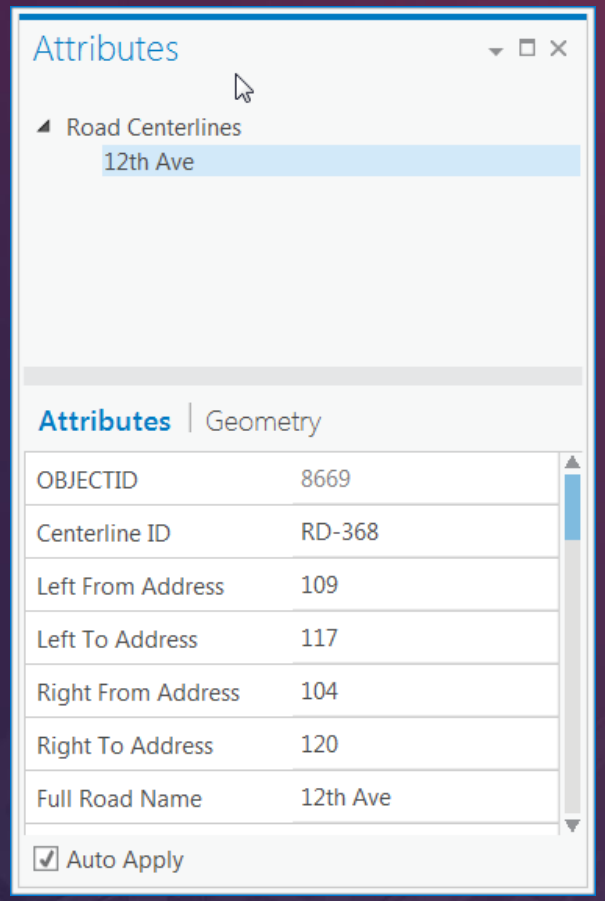
Data Modification

- Core edit operations such as…
  - Move/Rotate/Scale
  - Edit Vertices
  - Reshape
  - Split
  - Merge

- Update feature attributes in grid/cell format
  - Use of Domains to constrain valid data
  - Apply edits instantly or use batch mode to reduce number of transactions

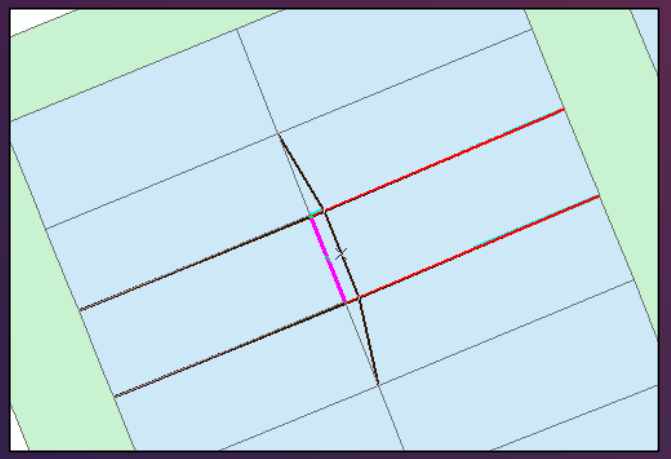




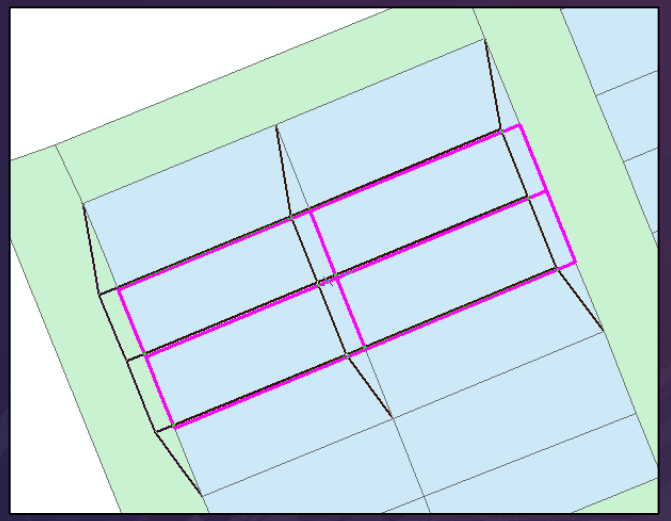


Topological Editing

- Map Topology enables users to preserve contiguous data through topological editing
  - Work with the entire feature or with individual edges
- Geodatabase topology allows you to detect errors based on defined rules
  - Use Error Inspector window for managing errors

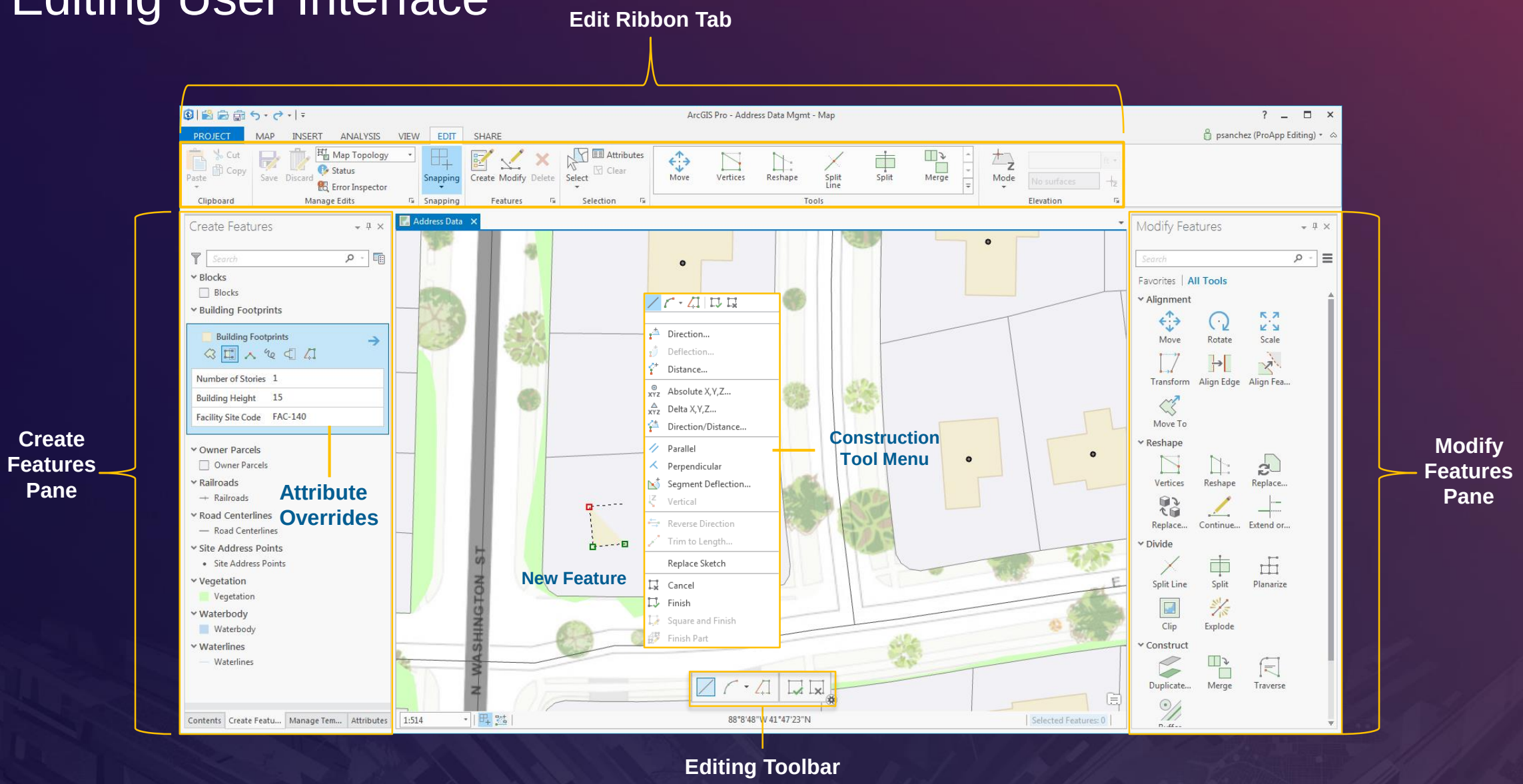


Moving an node; connected edges reacting



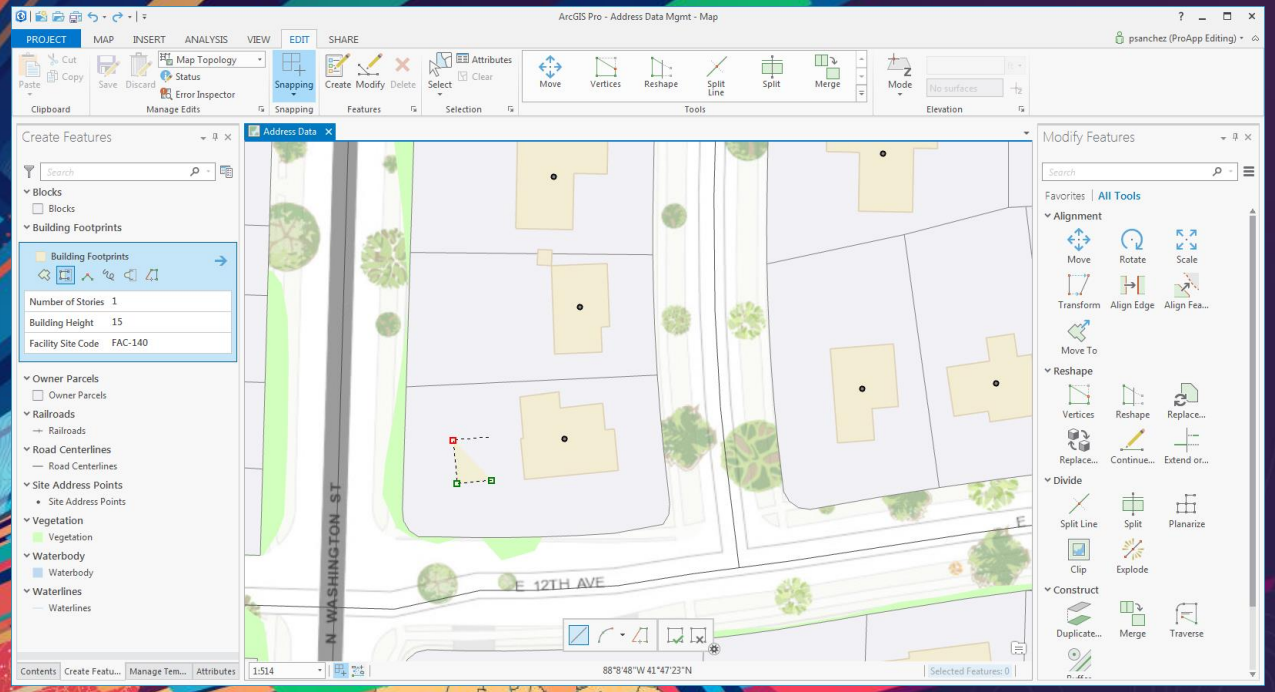
Moving multiple features with the move tool

Editing User Interface



ArcGIS Pro Editing – Session Demos

- Creating Features
  - Templates: Feature, Group, Preset
- Modifying Features
  - Topological and non-topological editing
- Editing Guides
  - Grid, Constraints
- Editing in 3D



Demo – Overview of the Editor

Supporting Text

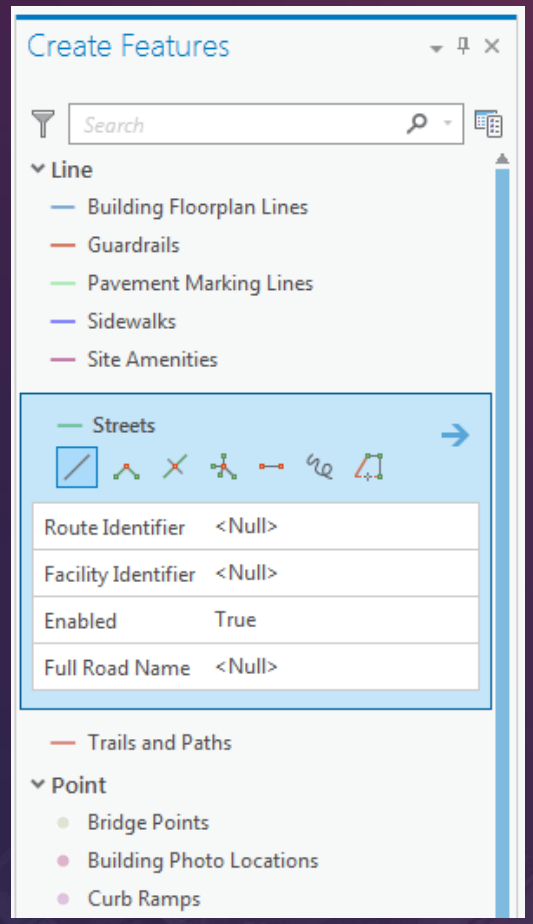
Creating Features - Overview

- There are three ways to create new features with the editor:
  - Feature Templates
  - Copy & Paste
  - Output from modify tools

- You can create the following feature types:
  - Points, Polylines, Polygons
  - Multipatch
  - Annotation

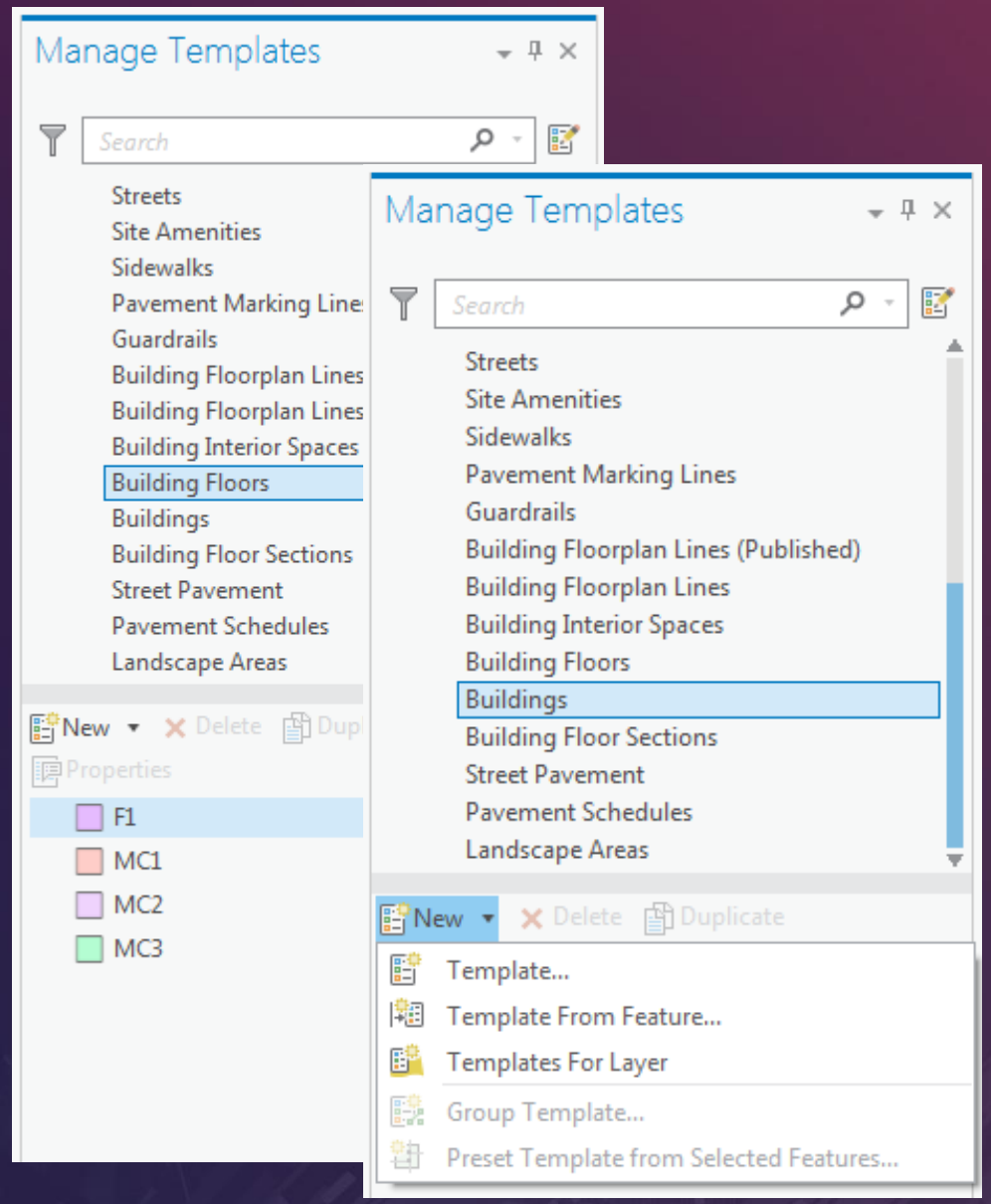
Templates Overview

- Templates are used to create new features and records
  - Hosted in the Create Features pane
  - Can be configured to meet your workflow requirements
- They store references to attributes
  - Default values (defined in the Geodatabase)
  - Attribute Overrides
    - Set through Template Properties window
    - On the fly in the Create Features pane (as shown in the graphic)
- They also store references to tools
  - Templates can be configured to only show tools that apply to the edit



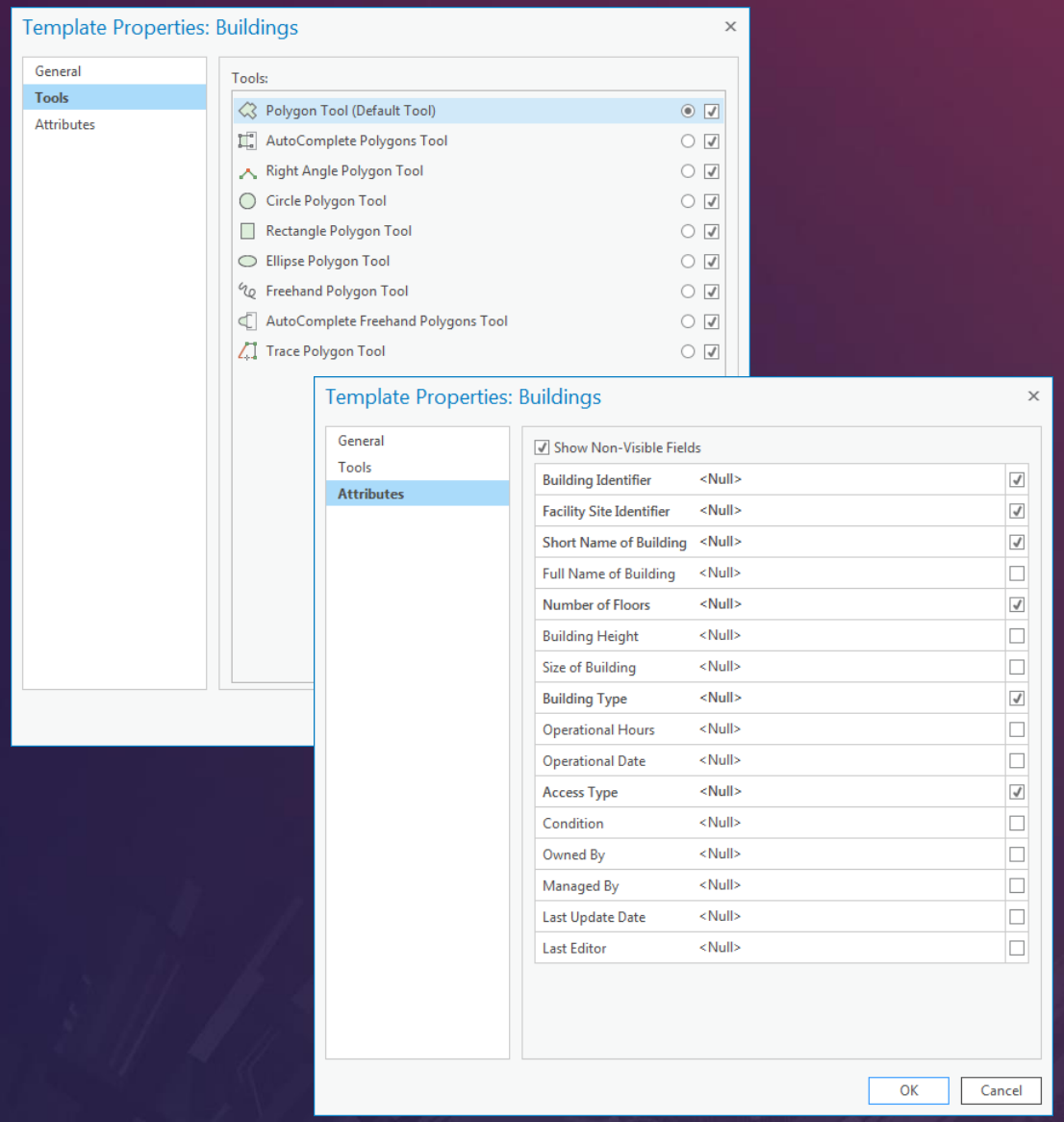
Managing Feature Templates

- The Manage Features pane allows you to create, duplicate and delete templates
  - Displays lists of all templates associated with a layer
- You can also access template properties from this pane
- Manage Templates is also the entry point for creating Group Templates and Preset Templates



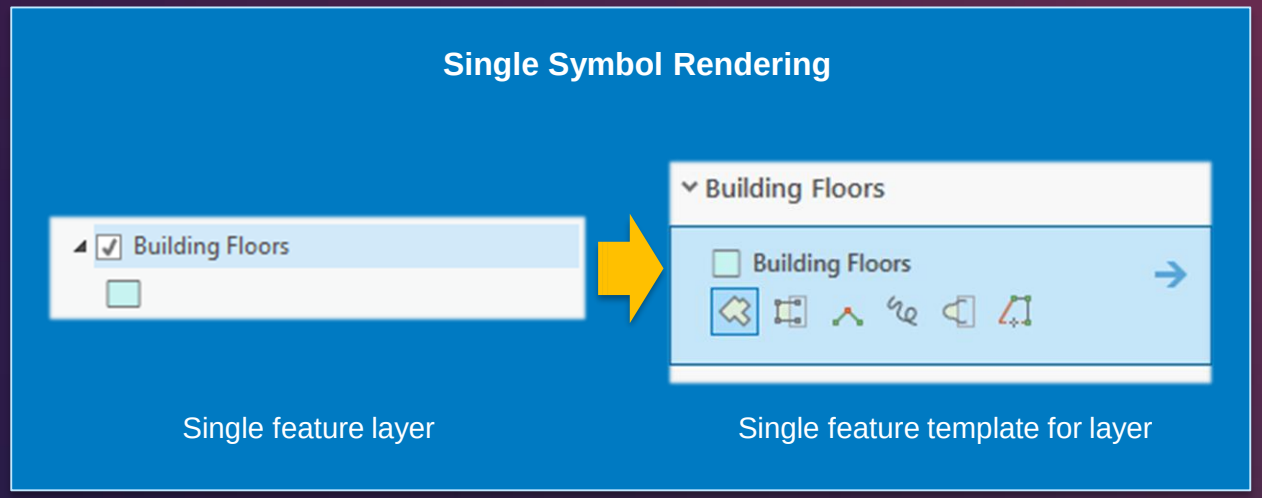
Feature Template Properties

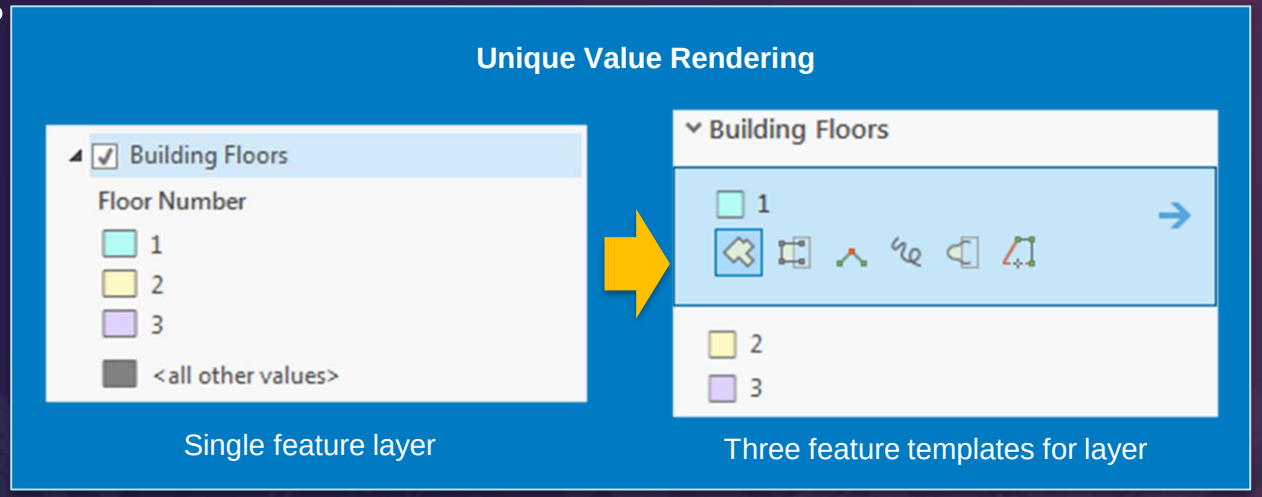
- Allows authoring of feature templates for editors
  - Assign name, description, and tags
- Tools
  - Choose which tools should be available to editors
- Attributes
  - Choose which attributes should be available as overrides



Feature Templates

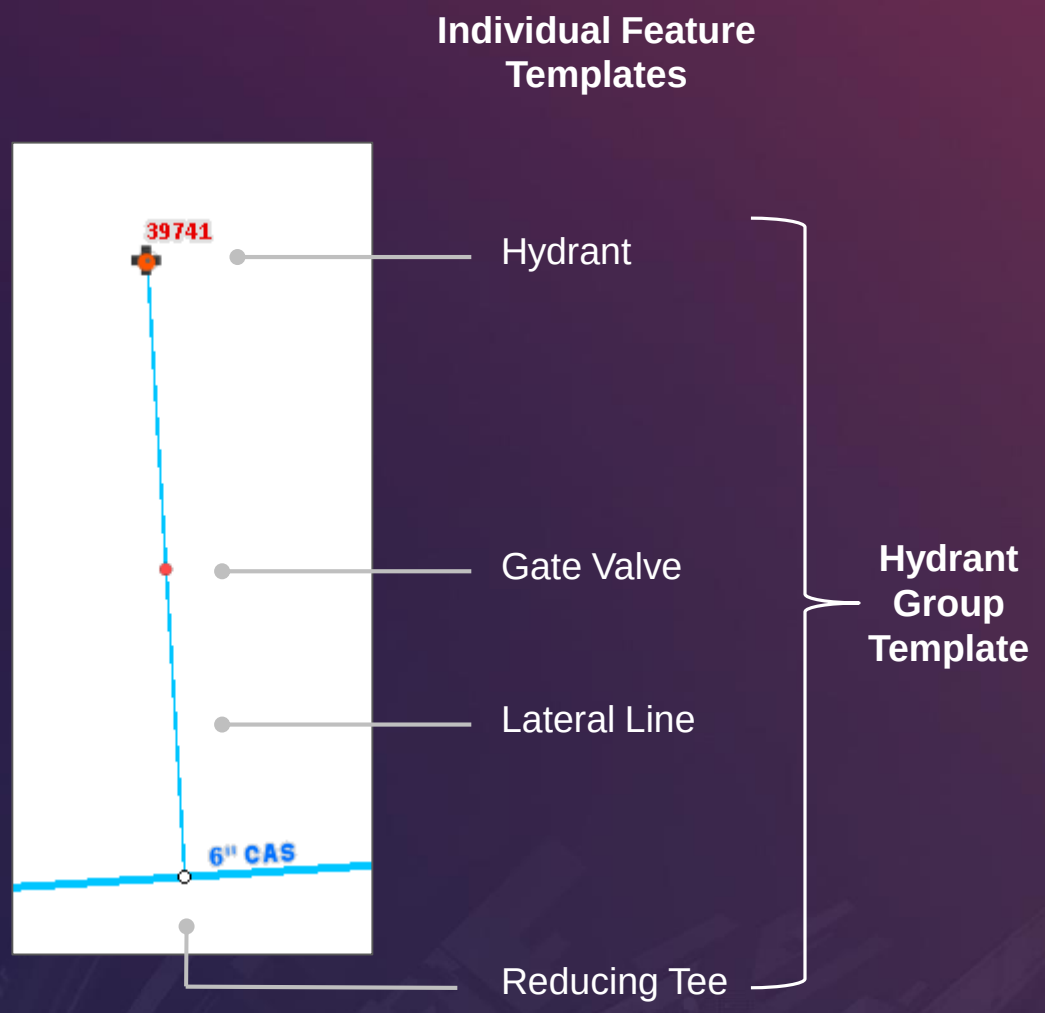
- Feature Templates can be used to create features for a single layer
  - One or more templates can reference the same layer
- Automatically generated when a layer is added to a map or scene
  - Can be modified, deleted, recreated
- Usees the layer's symbology
  - Will automatically update when rendering method is changed





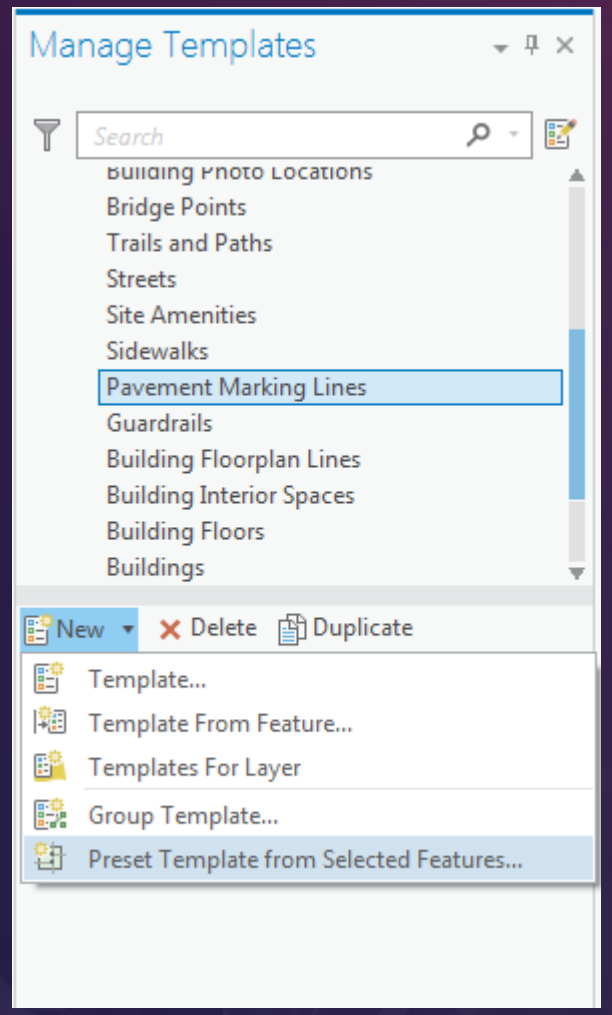
Group Templates

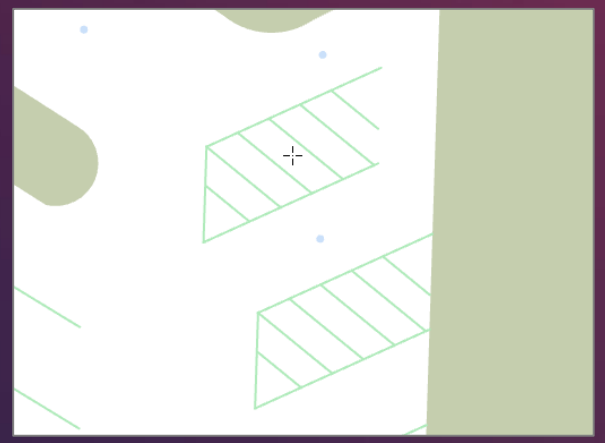
- Create multiple features with a single sketch
- Examples:
  - Pole at every vertex of electrical line
  - Address point at center of building
- Options depend on primary template
  - Polygon – add other polygons, lines, and points
  - Line – add other lines and points
  - Point – add other points (can use line sketch)



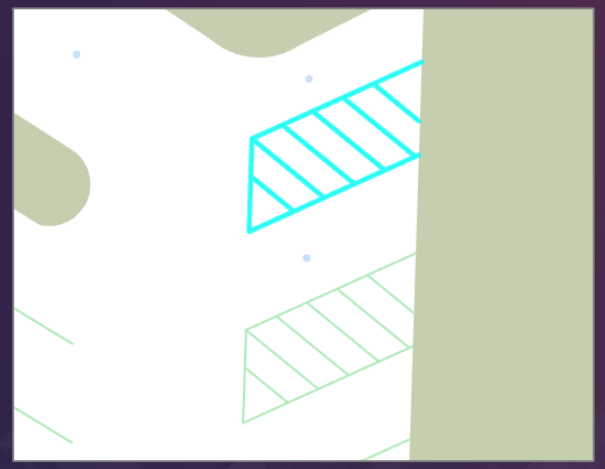
Preset Templates

- Preset Templates are generated from a collection of selected features
- Can contain multiple features from multiple layers
  - Geometry type = point
- Useful for workflows that require replicating collections of features throughout a map





Placing features with a preset template

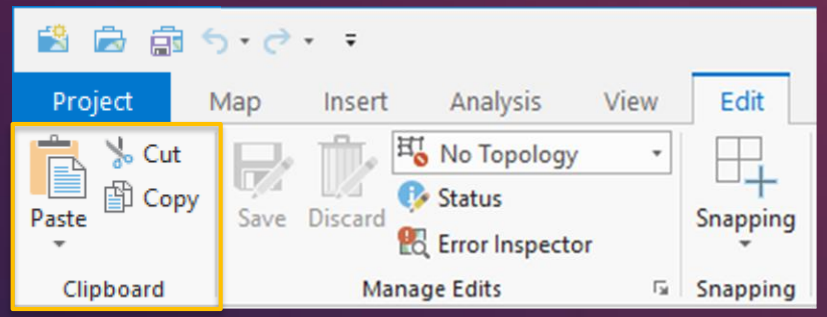


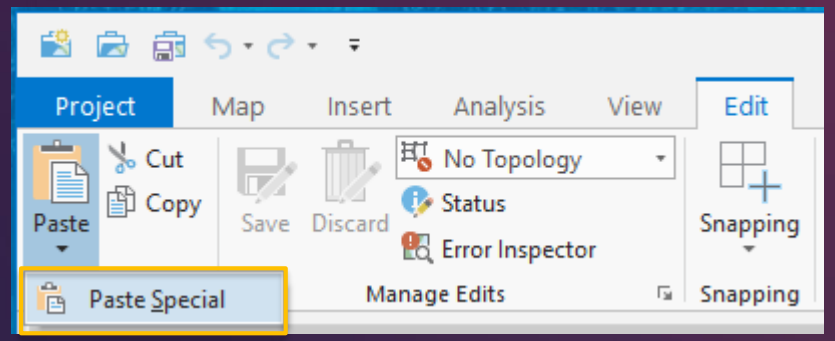
Multiple features created

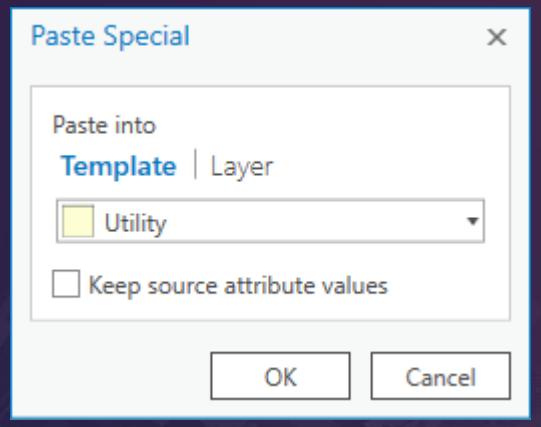
Copy & Paste/Paste Special

- Copying and pasting features is a quick way to create new features
  - Features will be placed in the same location as the original feature
  - Move mode will be automatically invoked to reposition feature

- Paste Special allows you to paste features from one layer to another layer
  - By Template or by Layer
  - Option to keep attribute values from the source feature





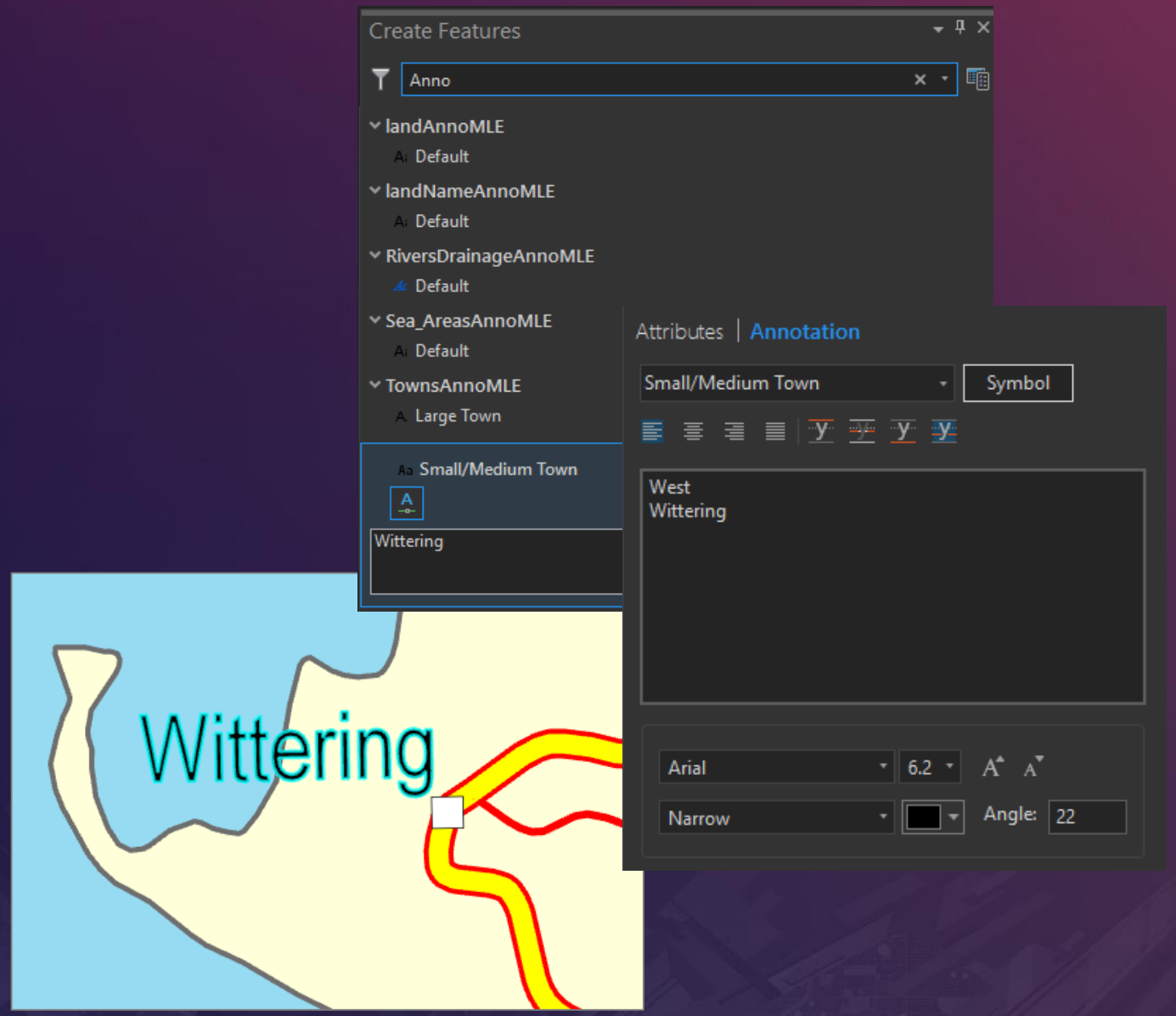


Annotation

Annotation

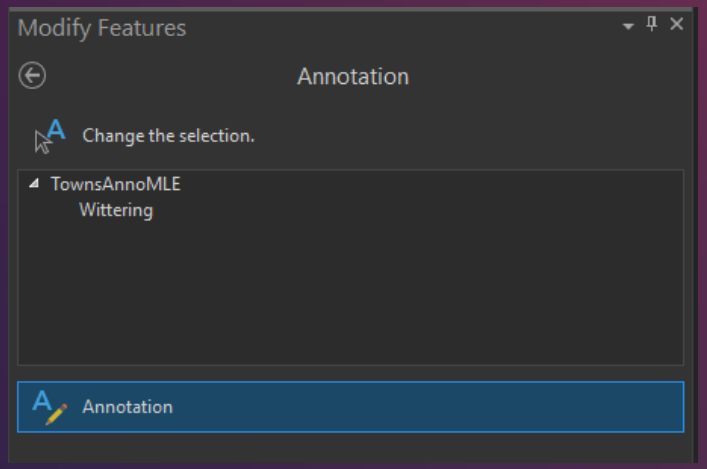
- Create via:
  - Annotation feature templates
  - Feature linked annotation
  - Copy/Paste

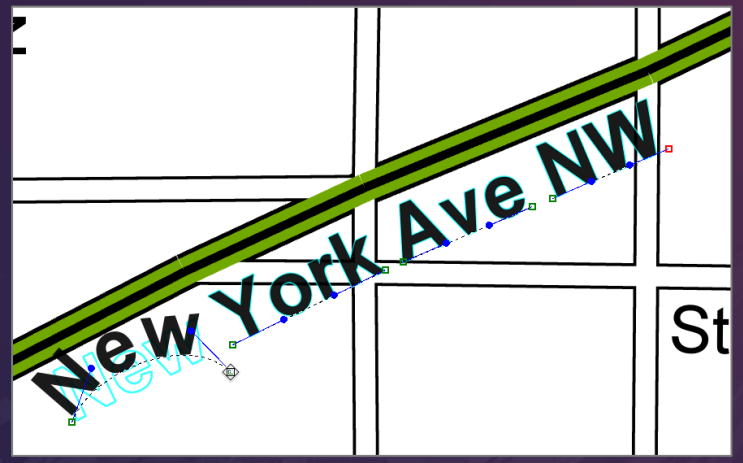
- Use Attributes pane's Annotation tab for updating text and formatting



Annotation Edit Tool

- On-screen text editing
  - Enter text strings directly on the map
- Use standard transformation tools for repositioning text
  - Move
  - Rotate
  - Scale
- Edit the baseline using Edit Vertices tool



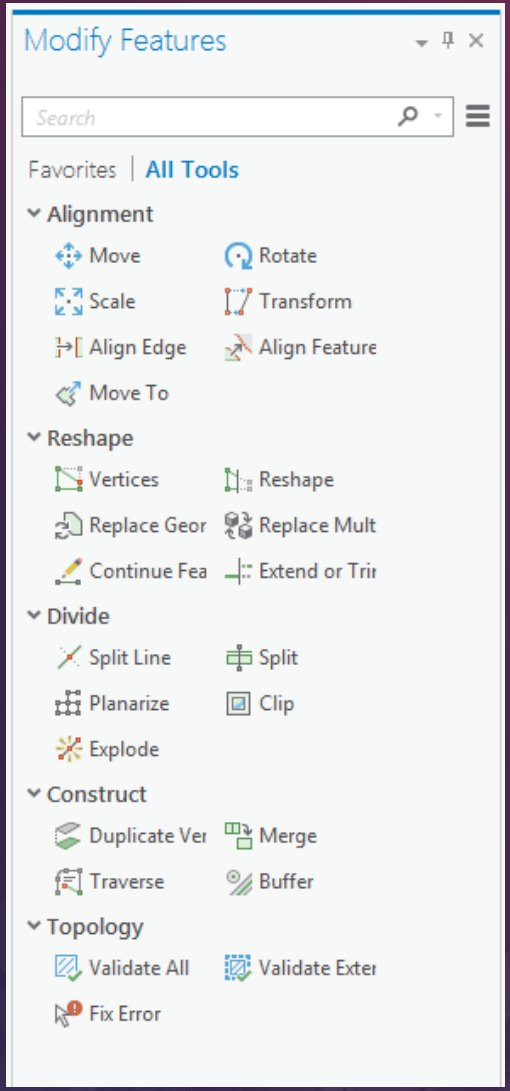


Modifying Features

Modifying Features

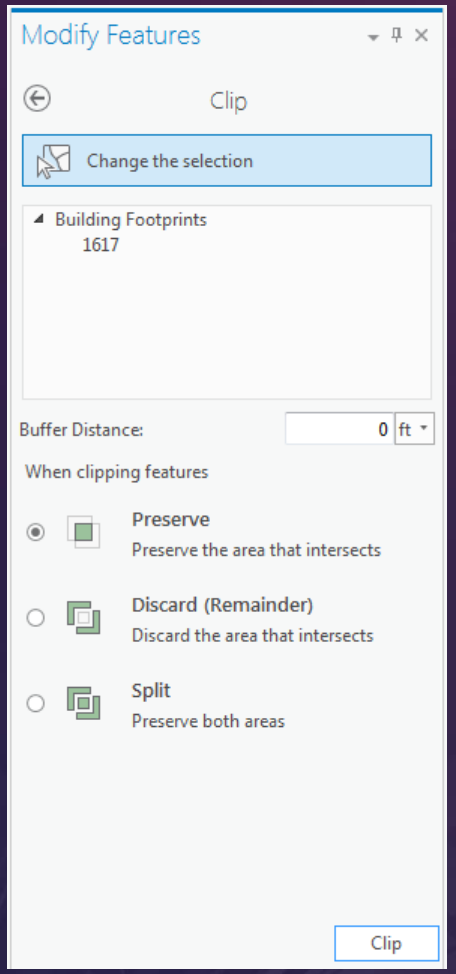
- Pro provides tools to update feature geometry and their attributes
  - You can modify an entire feature or the parts that comprise a feature
  - You can use other features to modify a target feature

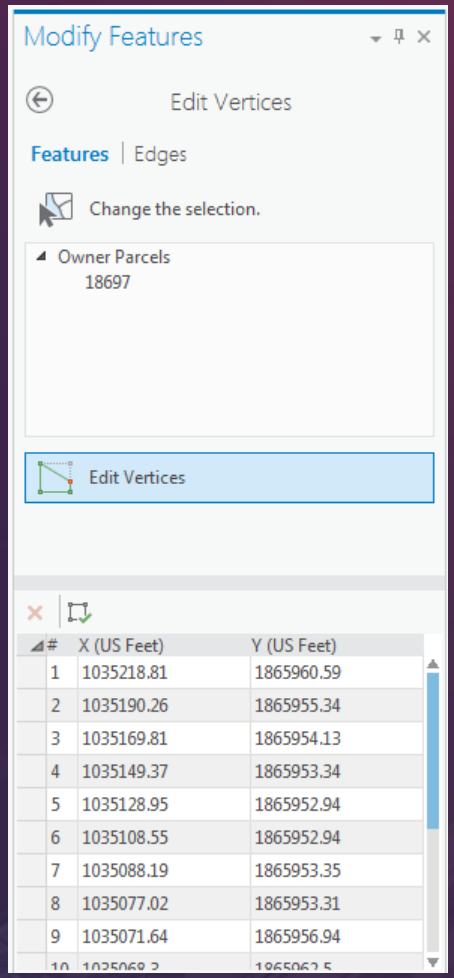
- Tools organized into the following categories:
  - Alignment
  - Reshaping
  - Division
  - Construction



Modify Features Pane

- The Modify Features pane hosts the controls for the active tool
  - Types of controls vary between tools
- Select tool is hosted and always the top most control
- Tree view lists the currently selected features
  - Context menu allows you to manage items
- Additional parameters and input boxes



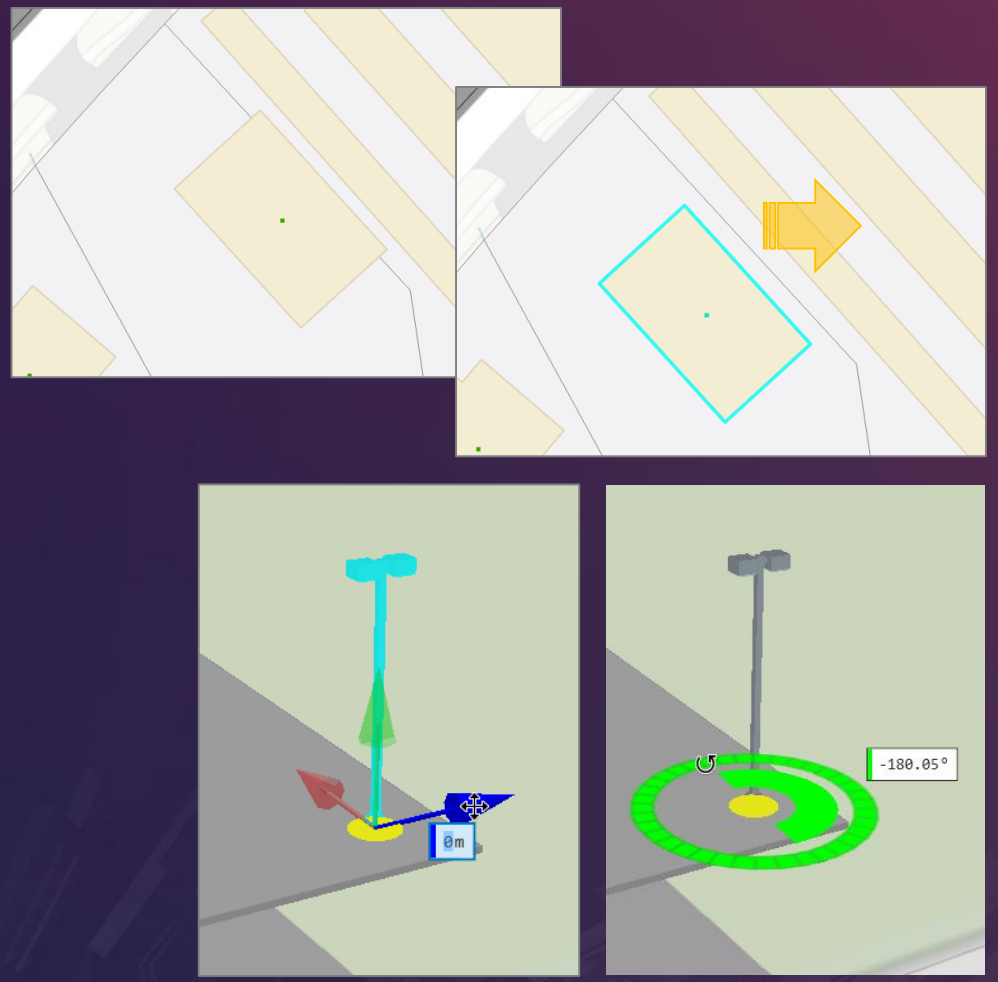


Aligning Features

- Tools for repositioning features and edges

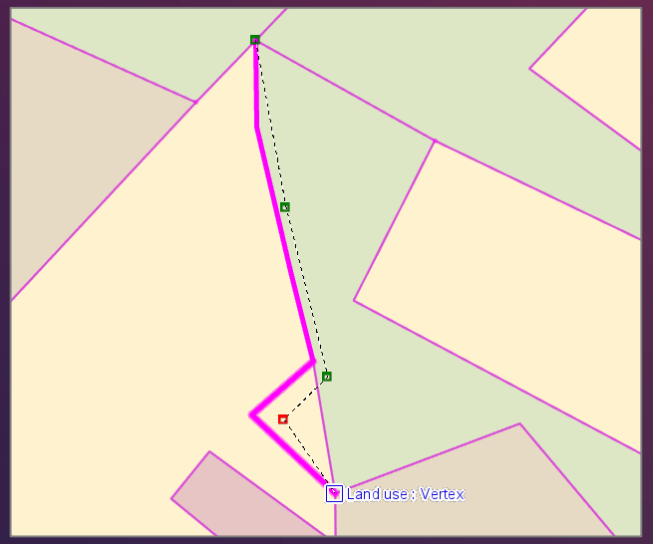
- Can be performed using the following methods:
  - Interactively with the mouse pointer - Move, Rotate, Scale
  - By entering absolute coordinates or offset values 0 Move To
  - By defining source and destination coordinates - Transform

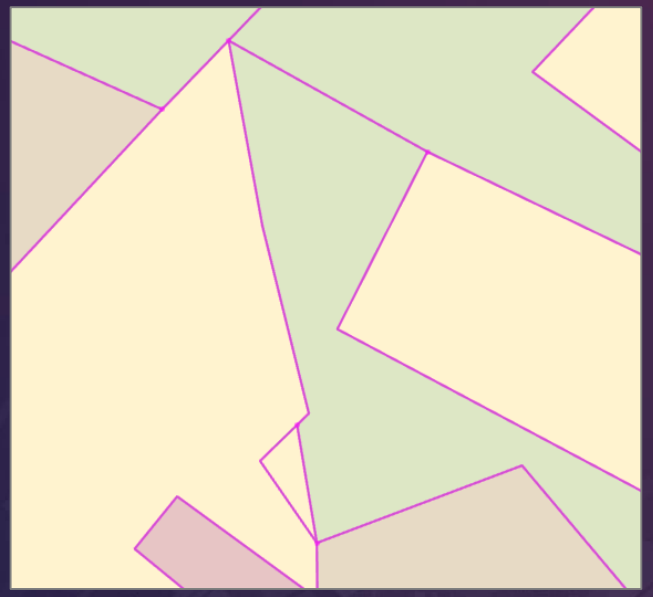
- Features can also be aligned to other features
  - Edges to edges - Align Edge
  - Features to features - Align Features



Reshaping Features

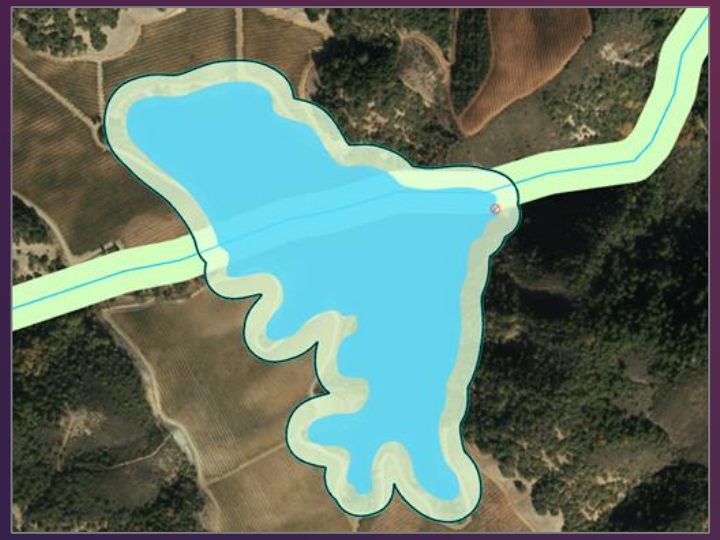
- Feature segments and vertices can be moved, reshaped, and/or replaced
- Edit Vertices allows the editing of individual vertices
  - Add, Delete, Move,
- Reshape allows you to modify a portion of a feature or edge
  - Can be faster than editing the segments





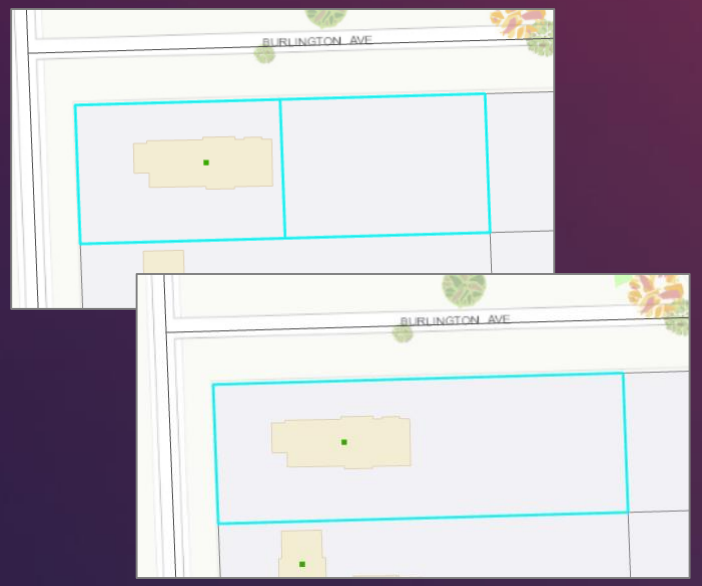
Dividing Features

- Tools that allow you to split, clip, and explode features
- Split allows you to create multiple features from a source feature
  - Split lines at a point
  - Split polygons by lines that intersect it
- Clip allows you cut holes in polygons based on overlapping and neighboring features
  - Options to preserve, discard, or split areas

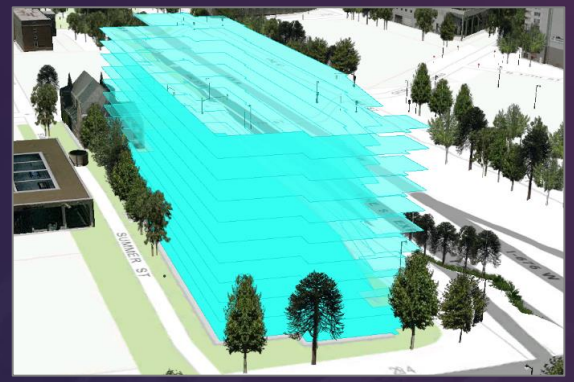


Constructing Features

- Tools that allow you to merge, buffer, and duplicate features
- Merge multiple features into a single feature
  - Option to merge into an existing feature or a new feature
  - Manage attributes for output feature
- Buffer features into existing layer
  - Options to generate rings and dissolve intersections
- Duplicate features vertically in scenes
  - Specify offset distance and units



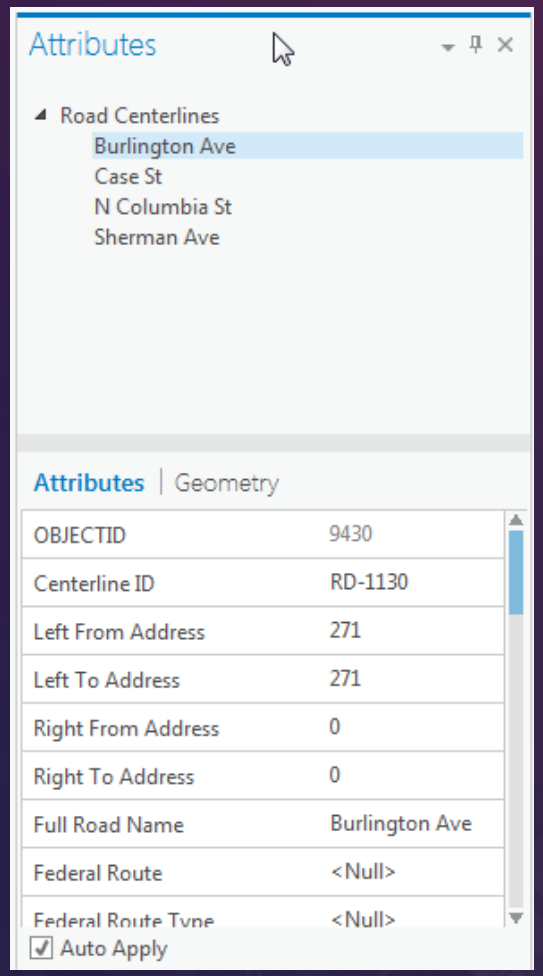
Merging two parcels into one

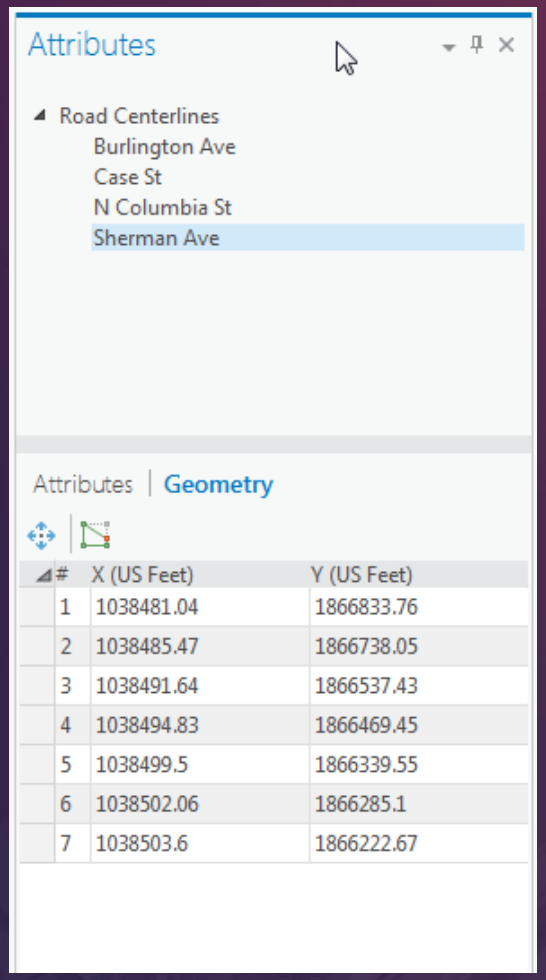


Duplicating a building floor

Updating Attributes

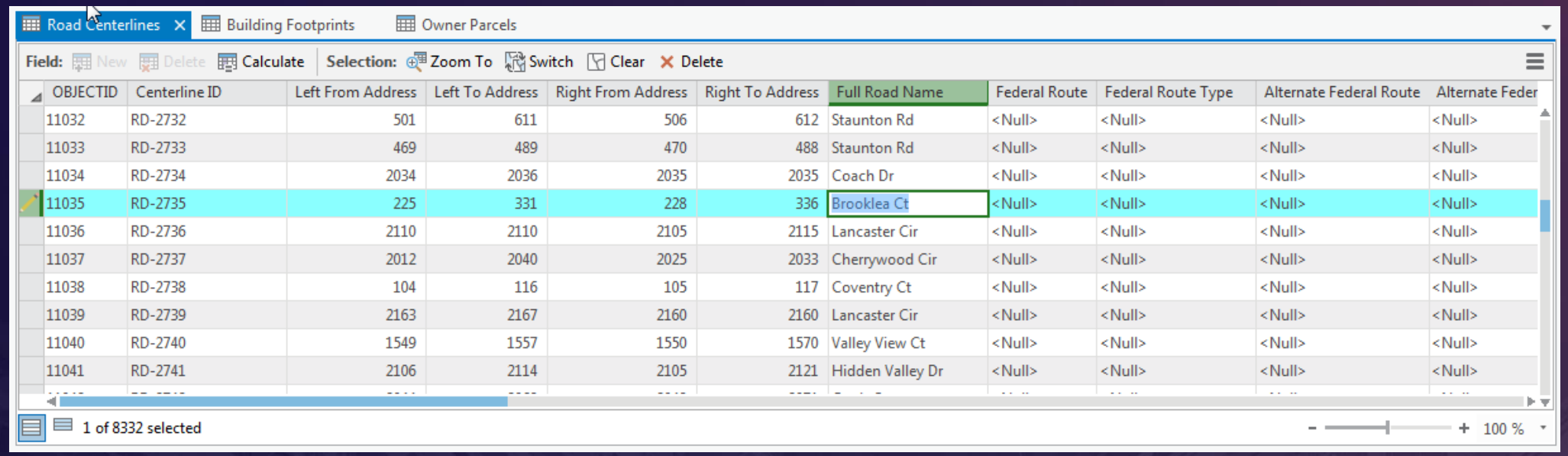
- You can update feature attributes with the Attributes Pane and the Attribute Table
- Tree view displays currently selected features
  - Iterate through each feature
  - Click the layer node to update attributes for entire selection
  - Auto Apply will commit changes as you edit them
- Geometry tab displays vertex coordinates for each segment





Using the Attribute Table

- You can edit feature attributes and stand alone tables with the Attribute Table
- Standard grid/cell based editing user experience
- Toggle selection, use the zoom control to increase size



OBJECTID	Centerline ID	Left From Address	Left To Address	Right From Address	Right To Address	Full Road Name	Federal Route	Federal Route Type	Alternate Federal Route	Alternate Feder
11032	RD-2732	501	611	506	612	Staunton Rd	<Null>	<Null>	<Null>	<Null>
11033	RD-2733	469	489	470	488	Staunton Rd	<Null>	<Null>	<Null>	<Null>
11034	RD-2734	2034	2036	2035	2035	Coach Dr	<Null>	<Null>	<Null>	<Null>
11035	RD-2735	225	331	228	336	Brooklea Ct	<Null>	<Null>	<Null>	<Null>
11036	RD-2736	2110	2110	2105	2115	Lancaster Cir	<Null>	<Null>	<Null>	<Null>
11037	RD-2737	2012	2040	2025	2033	Cherrywood Cir	<Null>	<Null>	<Null>	<Null>
11038	RD-2738	104	116	105	117	Coventry Ct	<Null>	<Null>	<Null>	<Null>
11039	RD-2739	2163	2167	2160	2160	Lancaster Cir	<Null>	<Null>	<Null>	<Null>
11040	RD-2740	1549	1557	1550	1570	Valley View Ct	<Null>	<Null>	<Null>	<Null>
11041	RD-2741	2106	2114	2105	2121	Hidden Valley Dr	<Null>	<Null>	<Null>	<Null>

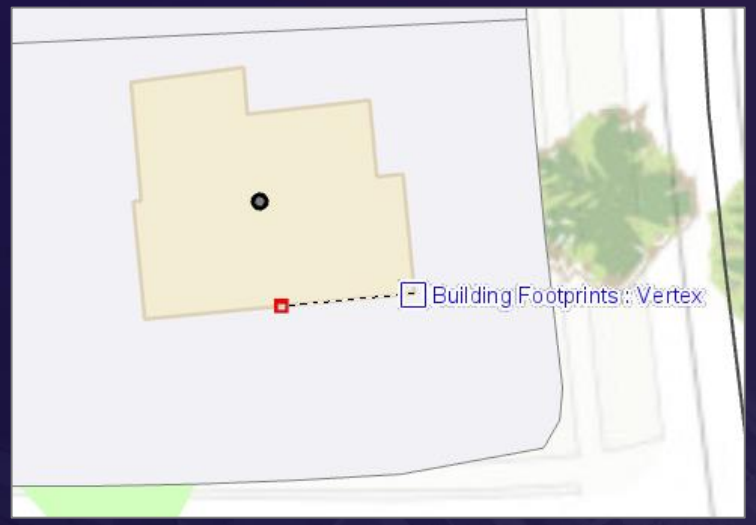
Demo: Creating and Maintaining Data

Editing Guides

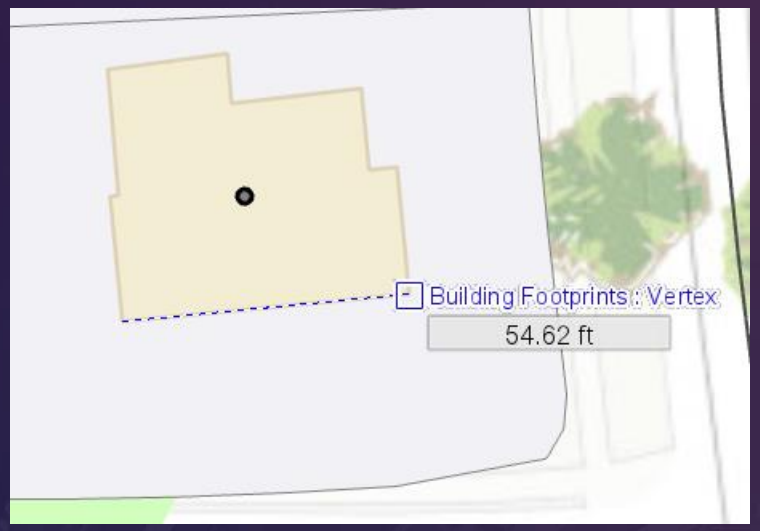
Snapping Overview

- Snapping allows you to connect geometric shapes
  - Ensures connectivity between features

- Available for all create and modify tools



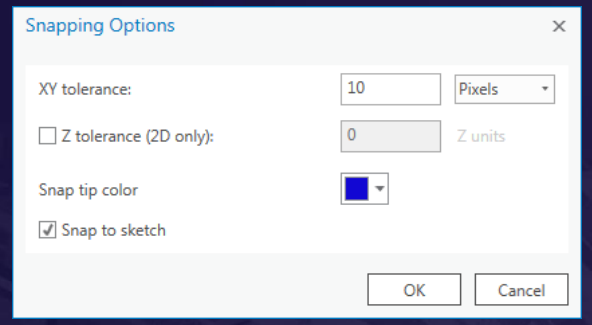
Snapping with feature construction tool



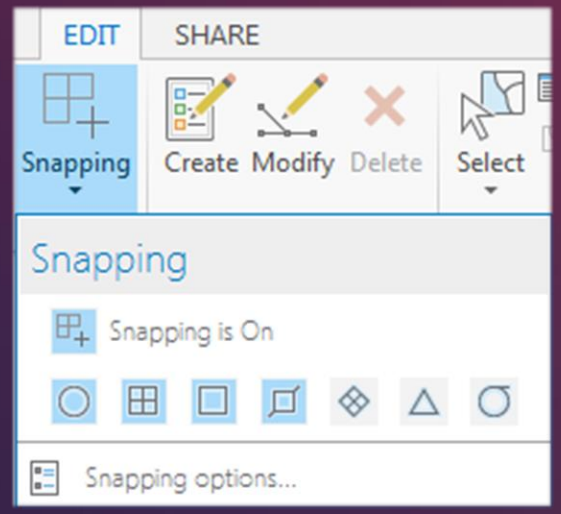
Snapping with Measure tool

Configuring Snapping

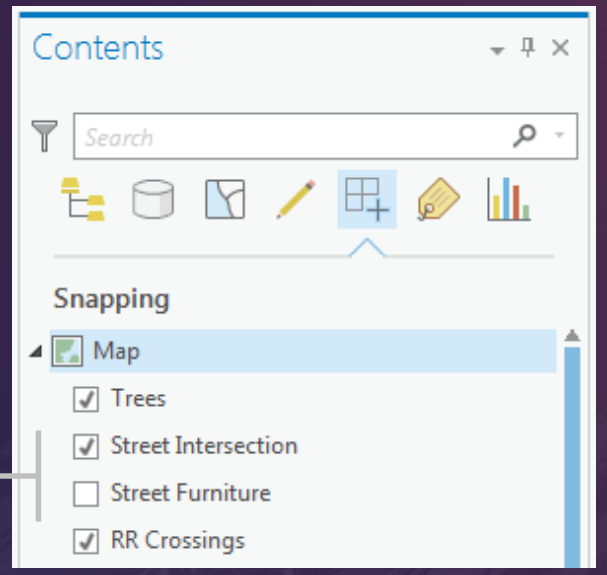
- **Toggle snapping on and off from the ribbon**
- **Control snapping by layer in Contents pane**
- **Snapping Options**
  - **Set tolerance by pixels or map unit**
  - **Must enable Z tolerance for snapping in maps**
  - **Snap to sketch**



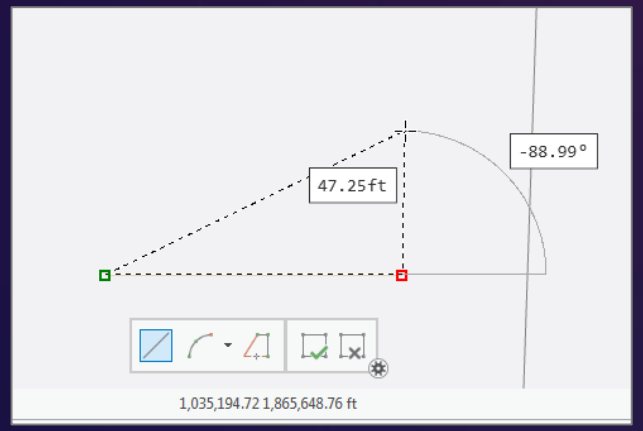
Snapping
On/Off Toggle



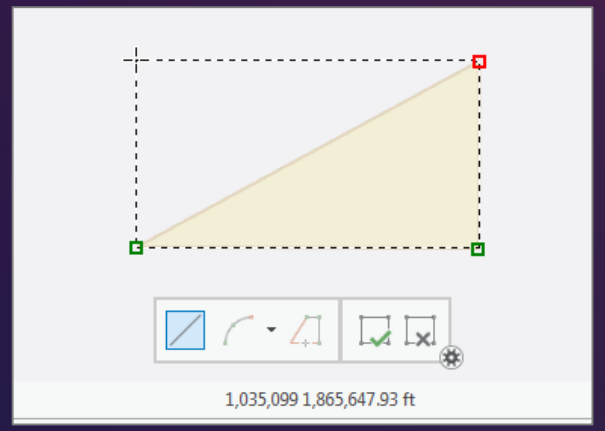
Layer Snapping
Enable/Disable



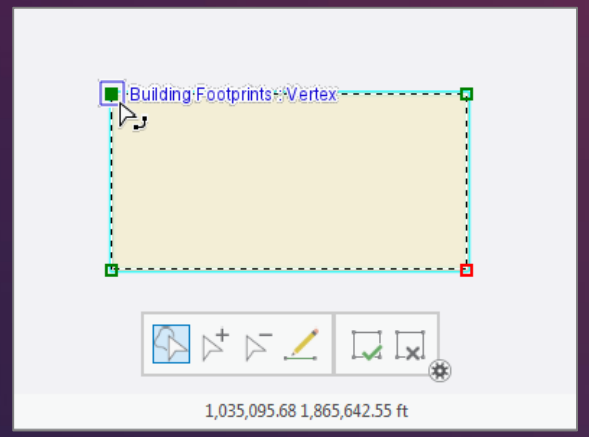
On Screen Controls



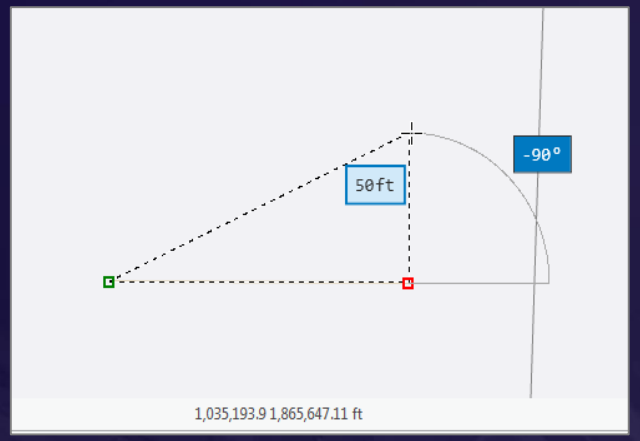
Dynamic Constraints - Display



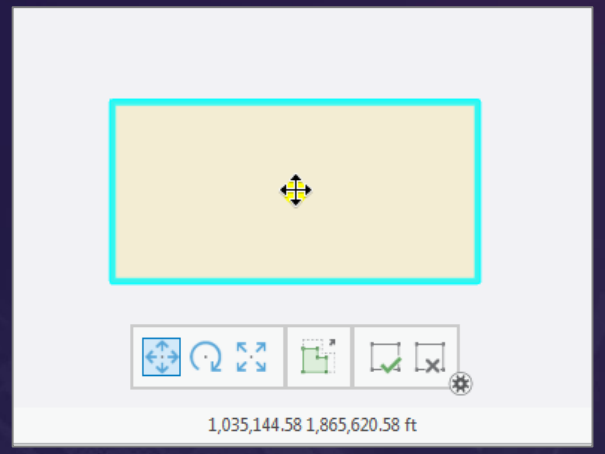
Editing Toolbar – Construct Features



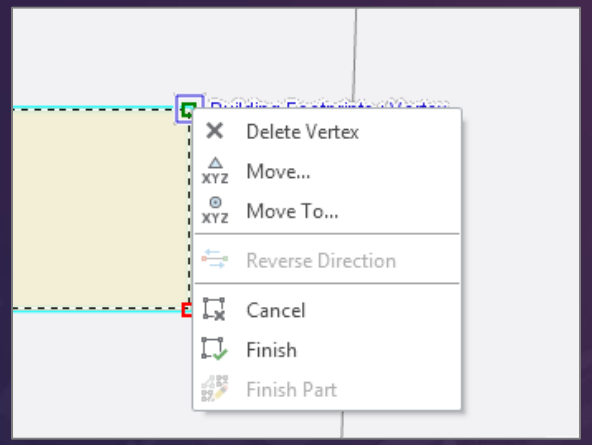
Editing Toolbar – Edit Vertices



Dynamic Constraints – Editing Values



Editing Toolbar – Modify Features



Edit Vertices – Context Menu

Demo: Editing Guides

Topological Editing

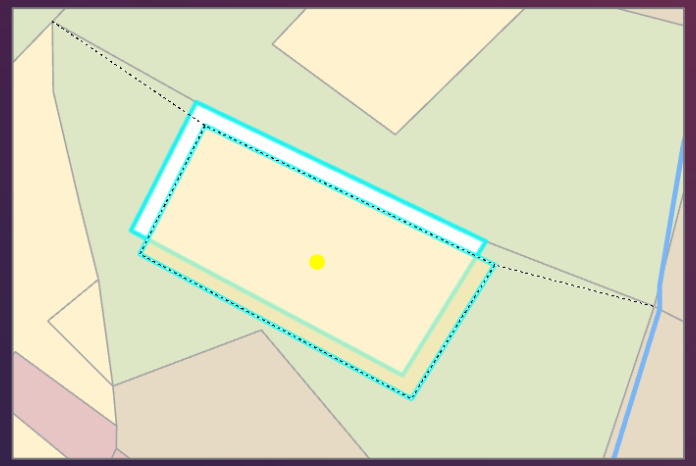
Topological Editing Overview

- Topology assists with the maintenance, updating, and creation of contiguous features, ensuring data integrity

- There are two types of topologies in ArcGIS:

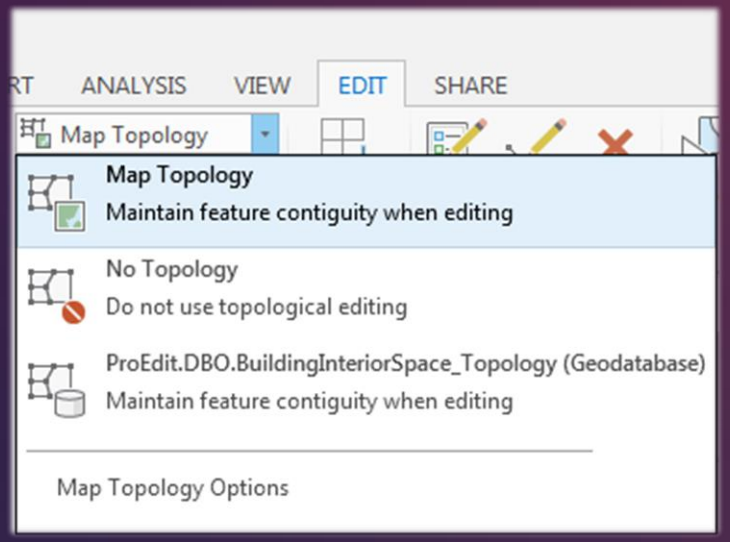
  - Map Topology – allows you to edit shared edges and nodes while maintaining feature contiguity

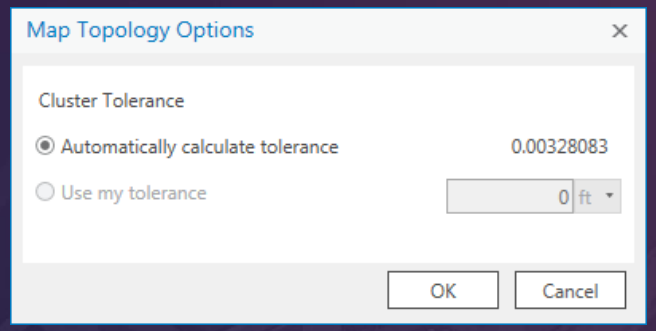
  - Geodatabase Topology - rules-based methodology that involves validating spatial relationships and correcting feature geometry



Editing Behavior Settings

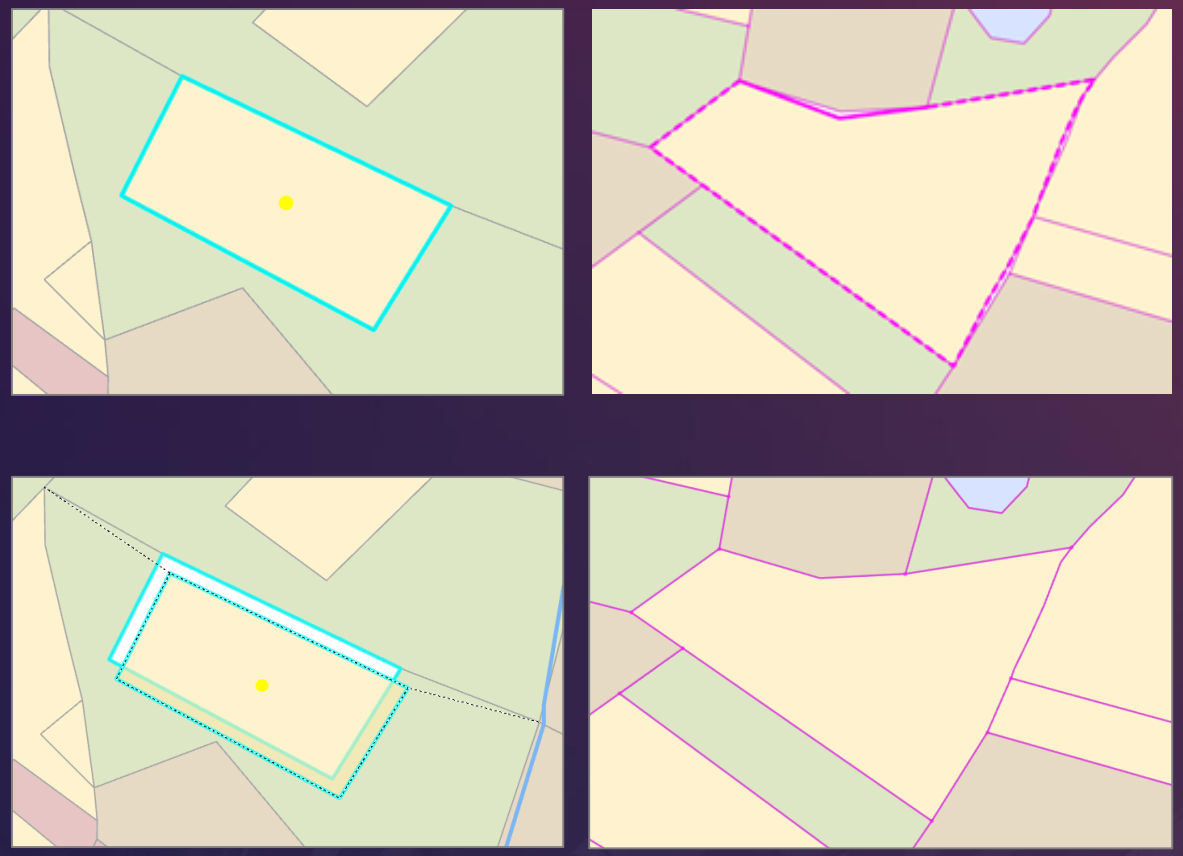
- Map Topology
  - Enables shared edge editing behavior for all editable and visible layers in the map
- Geodatabase Topology
  - Enables shared edge editing behavior for all feature classes that participate in the topology
  - Feature classes do not have to be in the map to be updated
- No Topology
  - Disables topological editing – features can be ‘disconnected’ from adjacent features
  -





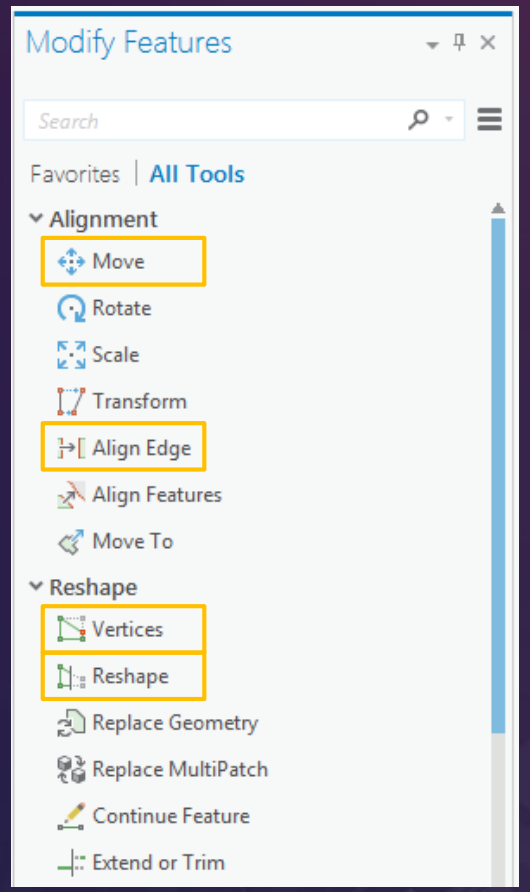
Map Topology - Shared Edge Editing

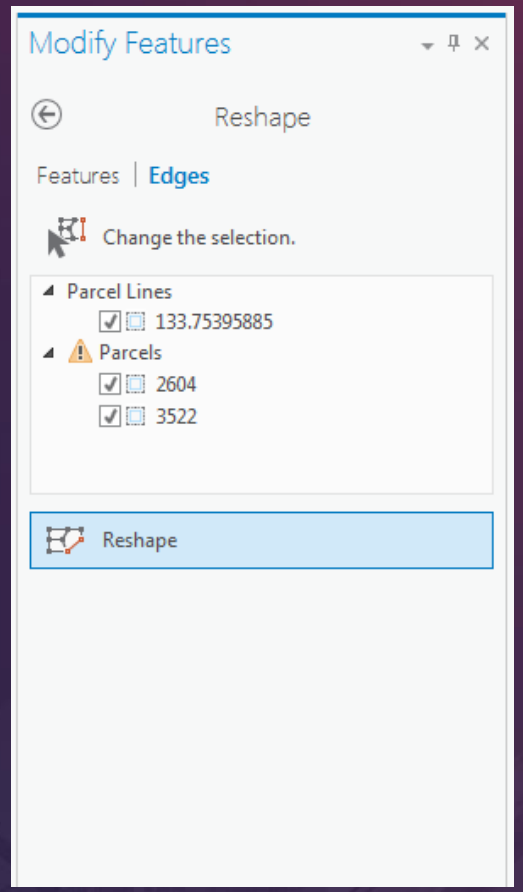
- No Topology setting is default in Pro
- Edge editing is integrated in several tools
  - Supports moving, reshaping, and aligning edges
- Shared edge editing is only available in 2D map views



Edge Editing Mode

- When topological editing is enabled, these tools will display the ‘Edge’ tab
- The selected edge is displayed in the tree view
  - Connected features that will be impacted by the edge edit are also listed in the tree
  - You can omit edges from the edit by unchecking their box



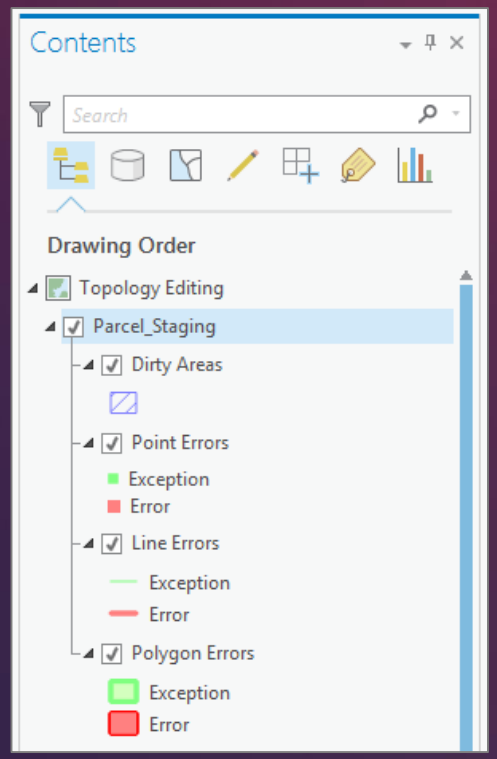


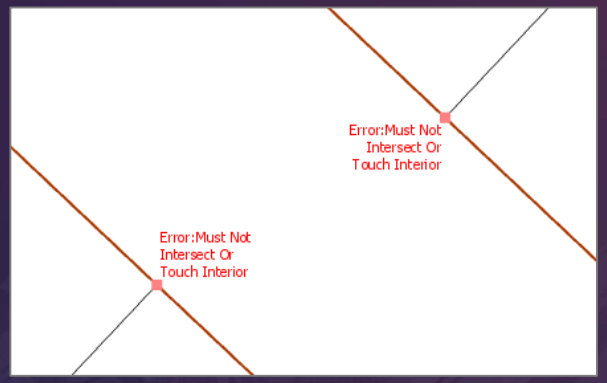
Geodatabase Topology

- **Geodatabase Topology layer is now a group layer in the map**
  - **Allows you to work with errors as standard feature layers**
  - **Can now label errors in the map for visualization**

- **Geodatabase Topology tools are only available in 2D map views**

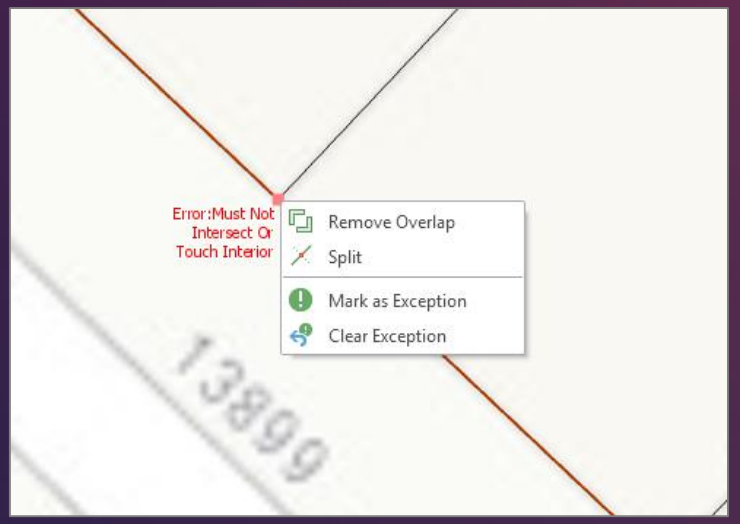
- **Geodatabase Topology Administration**
  - **Geodatabase administration tools in Pro will be available in the next release (1.4)**
  - **Continue to use ArcCatalog/ArcMap for these tasks**

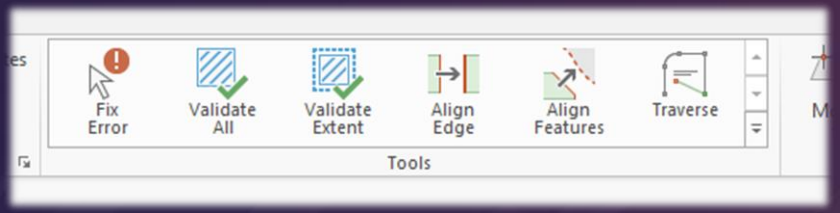




Fixing Errors

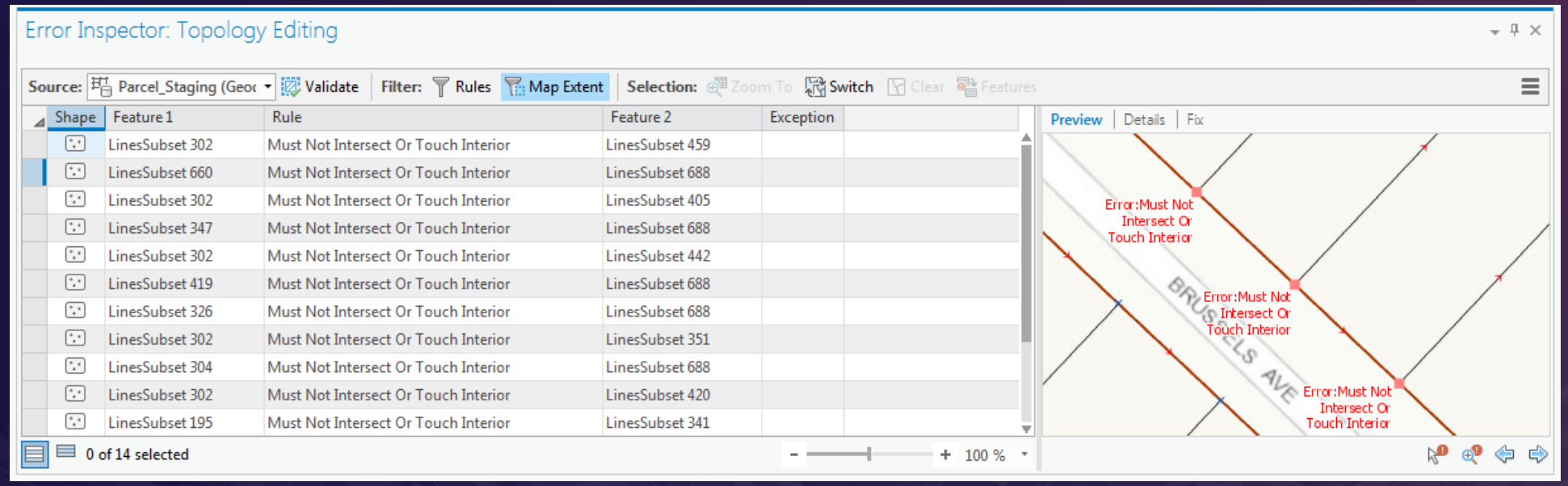
- Fix Error tool provides an quick and easy way to fix topological errors in the map
- Click an error and a context menu will appear with choices to:
  - Resolve error with a suggested fix
  - Mark as exception, clear exception
- Validate current map extent or entire topology





Error Inspector

- Error Inspector displays errors and associated information in a table format
- Ideal for fixing multiple errors at a time (i.e., batch mode)
- Can view all errors or filter by rule; map preview allows inspection of error



Shape	Feature 1	Rule	Feature 2	Exception
	LinesSubset 302	Must Not Intersect Or Touch Interior	LinesSubset 459	
	LinesSubset 660	Must Not Intersect Or Touch Interior	LinesSubset 688	
	LinesSubset 302	Must Not Intersect Or Touch Interior	LinesSubset 405	
	LinesSubset 347	Must Not Intersect Or Touch Interior	LinesSubset 688	
	LinesSubset 302	Must Not Intersect Or Touch Interior	LinesSubset 442	
	LinesSubset 419	Must Not Intersect Or Touch Interior	LinesSubset 688	
	LinesSubset 326	Must Not Intersect Or Touch Interior	LinesSubset 688	
	LinesSubset 302	Must Not Intersect Or Touch Interior	LinesSubset 351	
	LinesSubset 304	Must Not Intersect Or Touch Interior	LinesSubset 688	
	LinesSubset 302	Must Not Intersect Or Touch Interior	LinesSubset 420	
	LinesSubset 195	Must Not Intersect Or Touch Interior	LinesSubset 341	

Demo: Topological Editing

Working with Elevation & 3D

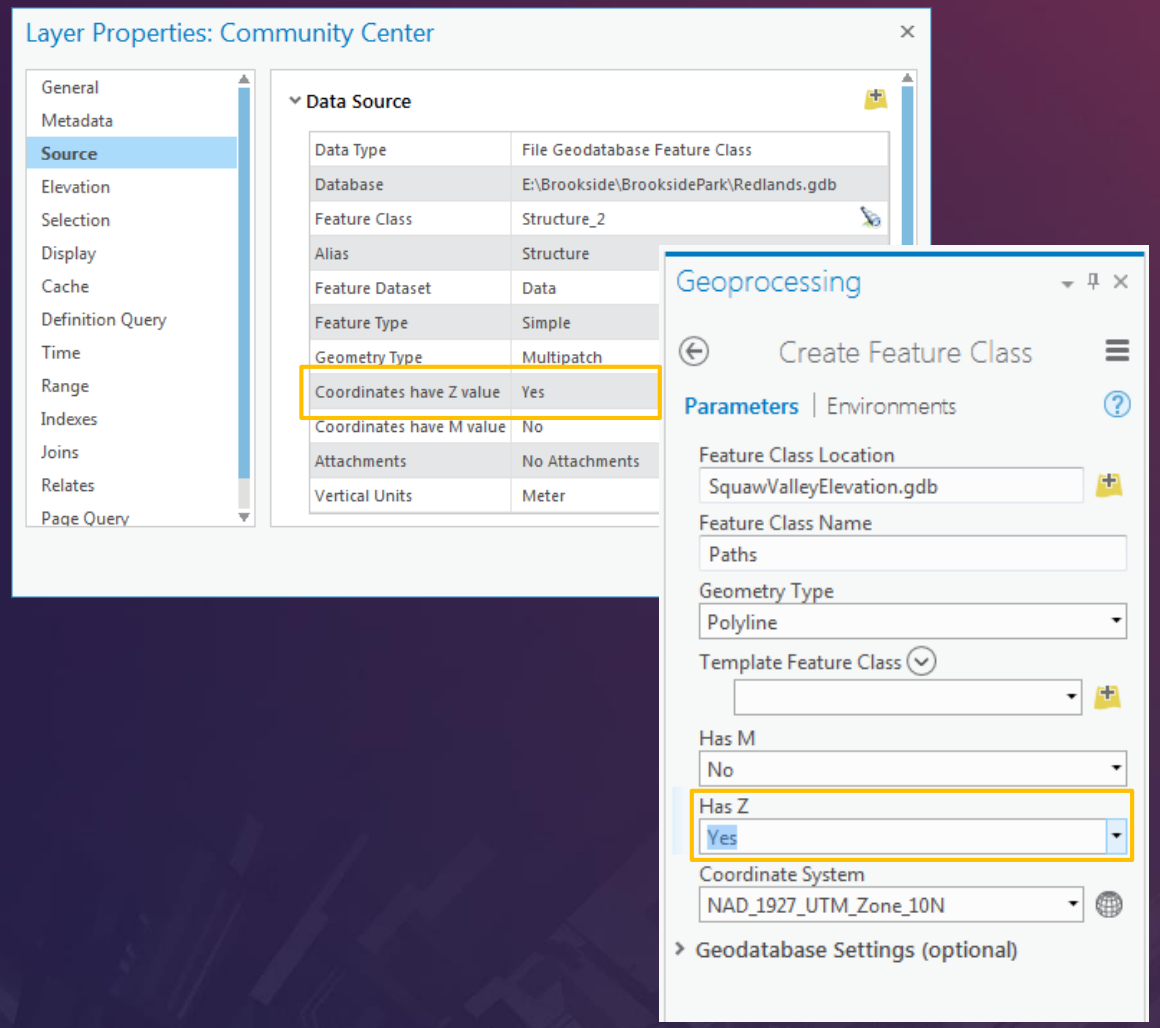
3D Editing Overview

- Create new features in 3D
  - On the surface or at a constant elevation
  - Draw vertical lines or lines with pitch (at any angle)
  - Duplicate features vertically

- Modify features in 3D
  - Respotion features along XYZ axis or freely in 3D space
  - Edit the Z coordinates of individual vertices or all vertices (batch)
  - Use editing tools to divide, reshape, and construct features

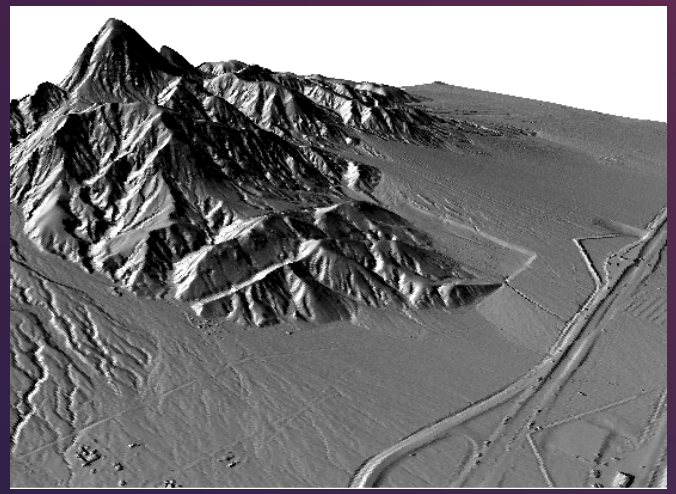
Working with Z-enabled Layers

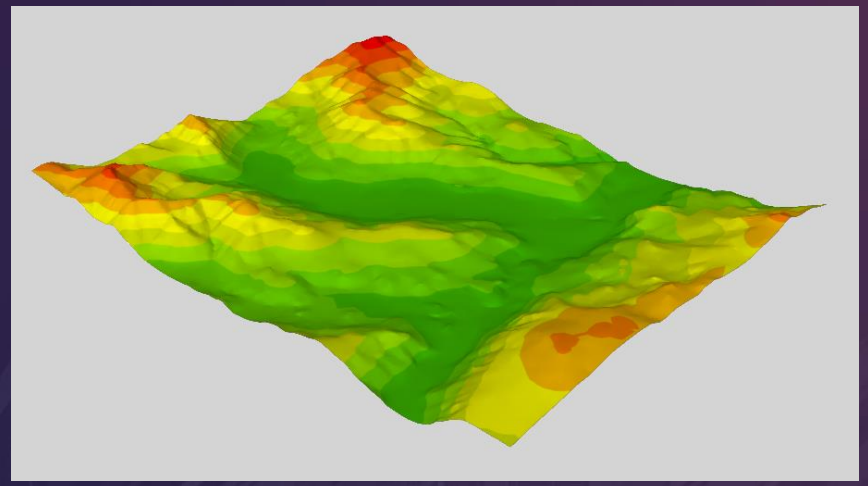
- **Z enabled property reported in Layer Properties window**
  - **Sometimes referred to as a ‘3D Layer’**
- **You can Z enable a layer when creating new feature classes**
  - **Set Has Z = Yes**
- **Z enabled layers allow:**
  - **Editing of Z coordinate values**
  - **Setting layers at an absolute height**



Working with Surfaces

- Elevation surface is a digital representation of features in three-dimensional space
- For editing, a surface can be used to get accurate elevation values (Zs) when creating new features
  - Data can be on, above, or below the surface
- Scenes have ground surface by default from ArcGIS Online (Terrain 3D)
  - You can add your own custom surface
  - DEM, TIN, Terrain, LAS, Raster, LERC



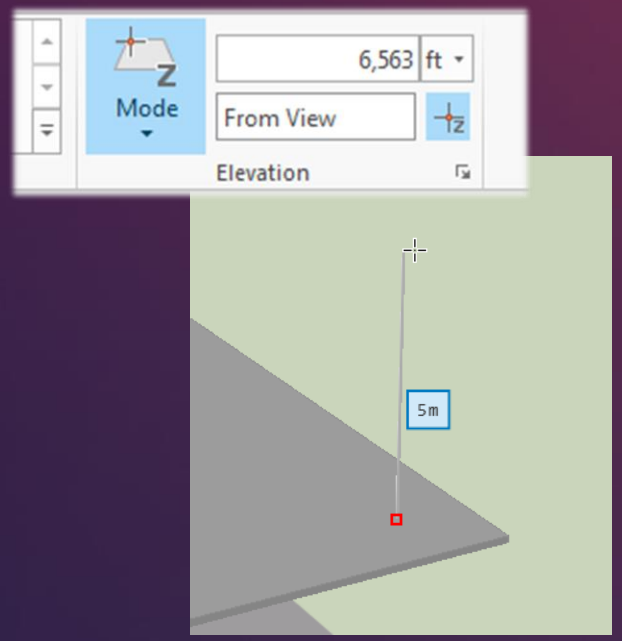


3D Data Creation Tools

- Constant Z allows you to set the elevation so new features inherit Zs
  - Can get Zs from surface or vector features
  - Set elevation by entering a value and units

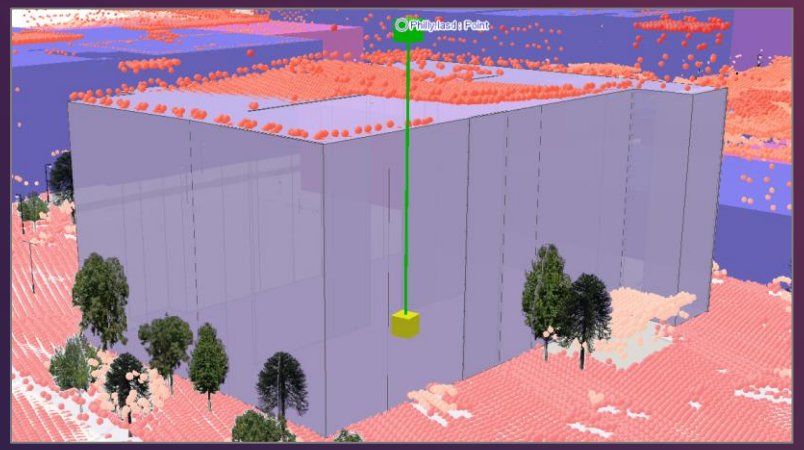
- Draw lines in 3D space
  - Vertical or with a pitch
  - Snapping to other 3D features in scene

- Duplicate features vertically to easily create multiple instances at various heights
  - Specify number of copies and distance between them

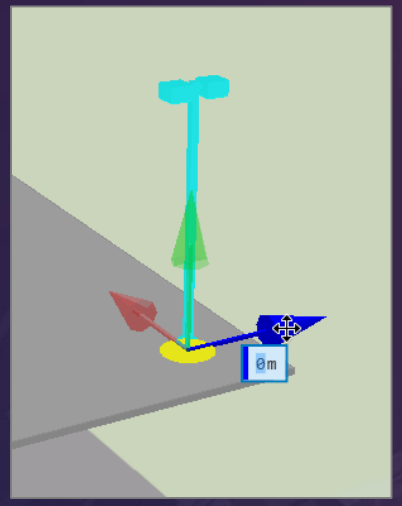


3D Feature Modification

- Move, rotate, and scale features
  - Interactively with handles or by value with constraints
  - Perform a 3D affine transformation of features or entire layers



- Edit vertices of features
  - Interactively with the Edit Vertex tool (Move, Add, Delete)
  - Update XYZ vertex coordinate values in grid



- Replace models directly in a scene
  - Choose a different model from disk with the Replace Multipatch tool

Demo: Working with Elevation & 3D

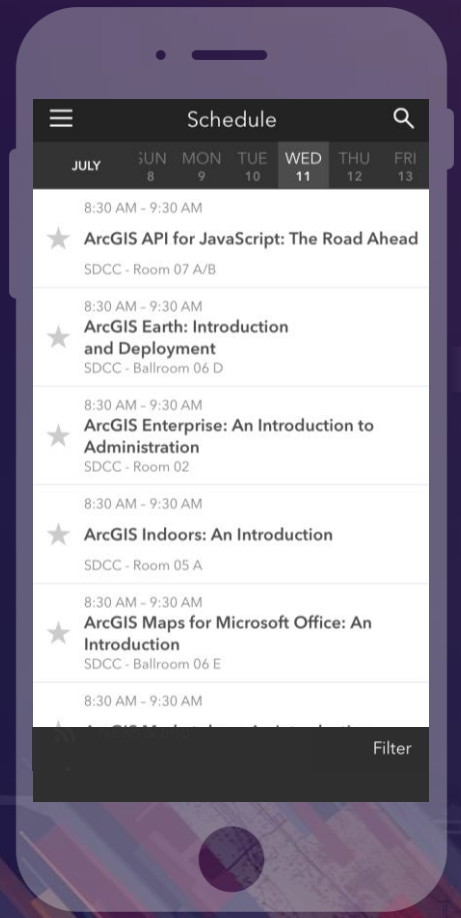
See Us Here

WORKSHOP	LOCATION	TIME FRAME
• ArcGIS Pro Editing: An Introduction	• SDCC - Ballroom 20 D	• Thursday 10:00 – 11:00
• ArcGIS Pro: 3D Editing	• SDCC - Ballroom 20 D • SDCC - Room 31 B	• Tuesday 10:00 – 11:00 • Wednesday 1:00 – 2:00
• ArcGIS Pro: Data Alignment and Topology	• SDCC - Ballroom 06 F • SDCC - Room 32 A/B	• Tuesday 2:30 – 3:30 • Wednesday 2:30 – 3:30
• ArcGIS Pro Editing: Tips and Tricks	• SDCC - Room 07 A/B • SDCC - Room 10	• Tuesday 1:00 – 2:00 • Wednesday 4:00 – 5:00

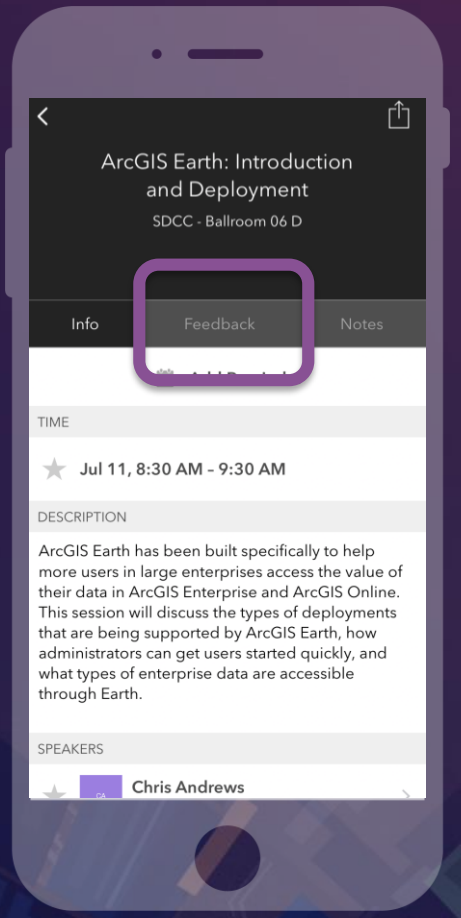
Please Take Our Survey on the App

Download the Esri Events app and find your event

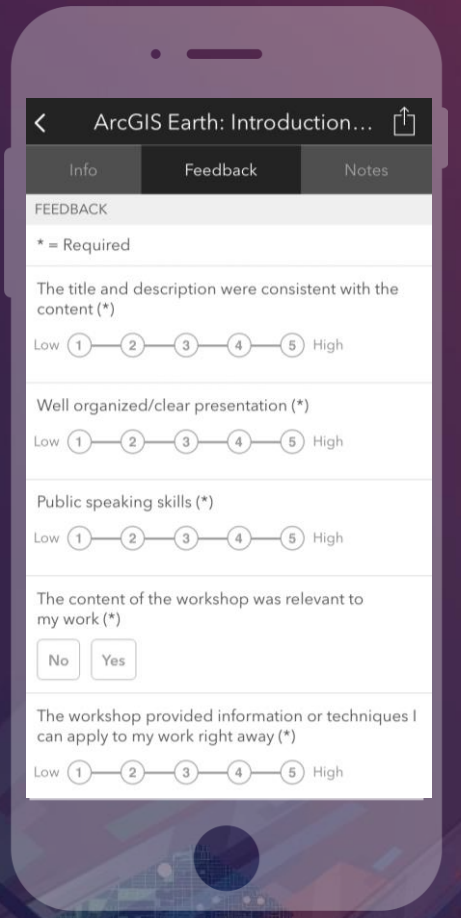
Select the session you attended



Scroll down to find the feedback section



Complete answers and select “Submit”



Questions

Thank you for attending!

esri

THE SCIENCE OF WHERE