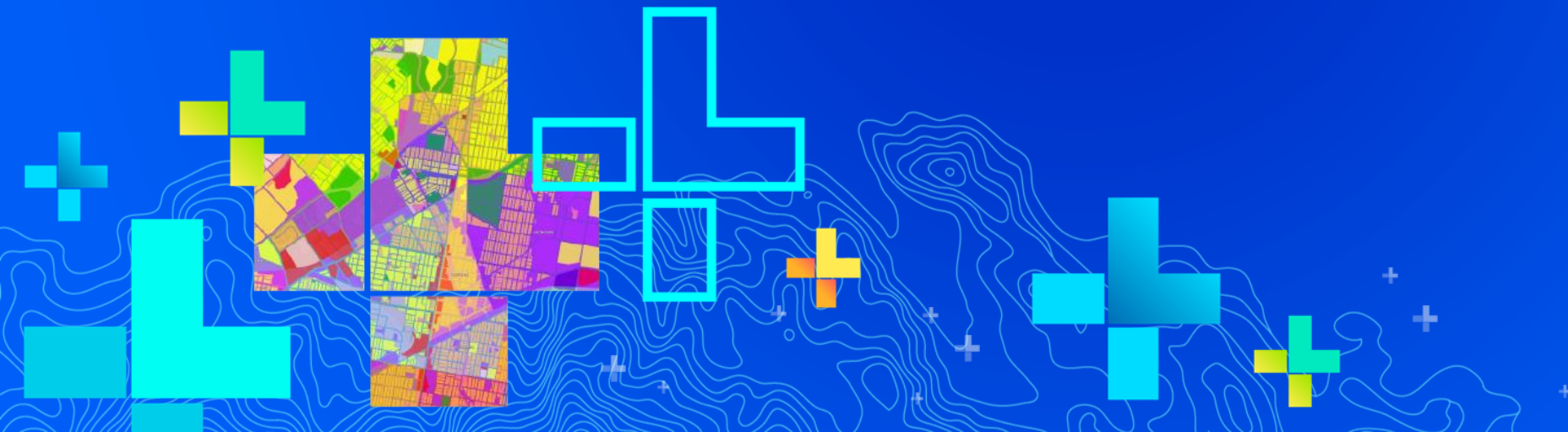


# Creating New ArcGIS Locators

Jeff Rogers and Brad Niemand



# Introduction



## ArcGIS World Geocoding Service

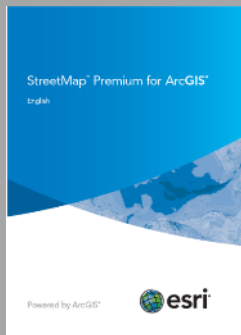


## World Geocoder for ArcGIS

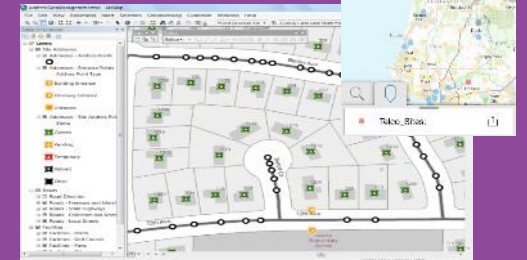


# Products

## StreetMap Premium



## Build your own



# Goals

- **Introduce you to new locators and why they are recommended**
- **Show you where to find helpful information about building new locators**
- **Introduce you to the tools and workflow to create locators**
- **Provide key information, strategies and best practices**
- **Illustrate how and where the new locators can be used**

# New Locators

# New Locators

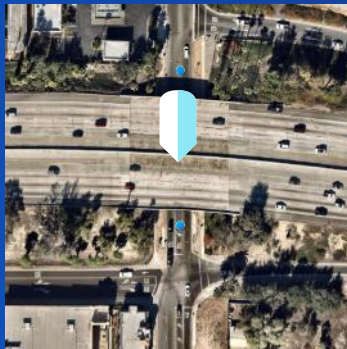
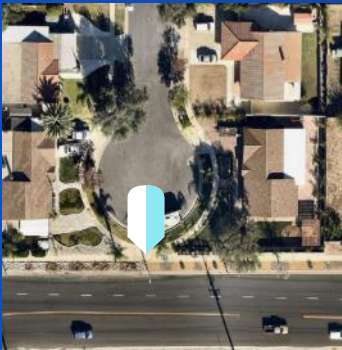
- We reached the limits of classic locators (style based locators)
- Project to develop a new locator from everything we learned
- New locators first deployed to ArcGIS Online in May 2017
  - <https://developers.arcgis.com/rest/geocode/api-reference/whats-new-world-geocoding-service.htm>



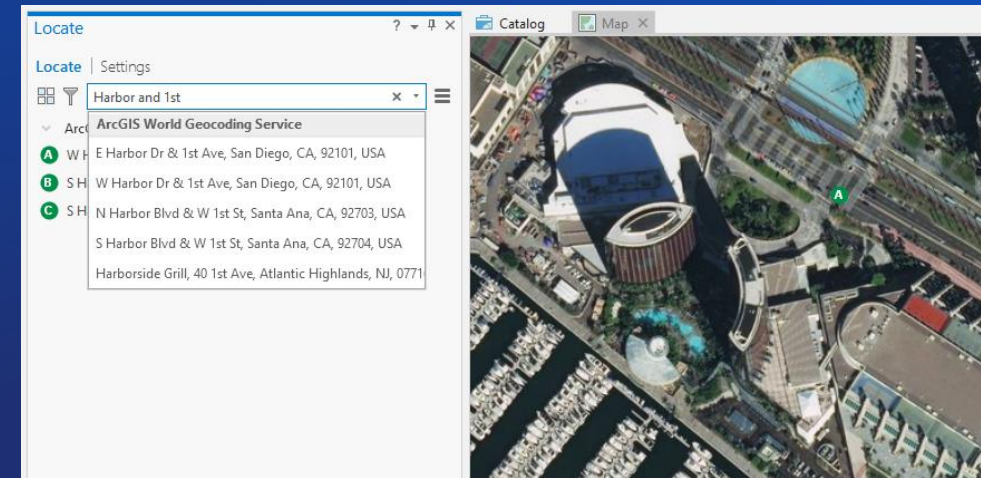
# Why New Locators?

Find for more types of places

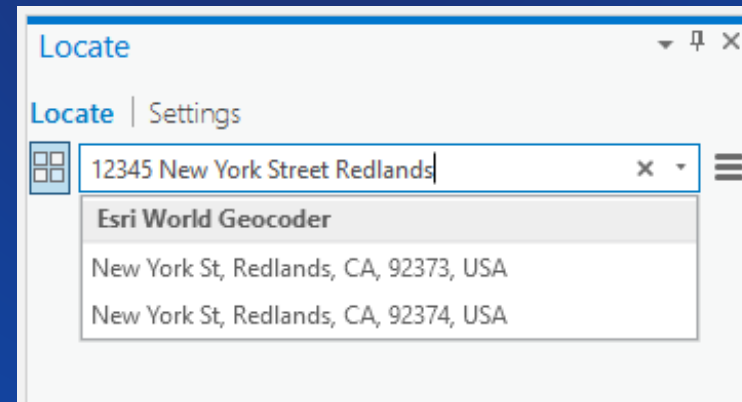
## Logical Intersections



## Suggestions for Intersections



Suggestions match valid house numbers as you type



## Batch Geocode POIs

Esri New York St

Esri Vienna VA

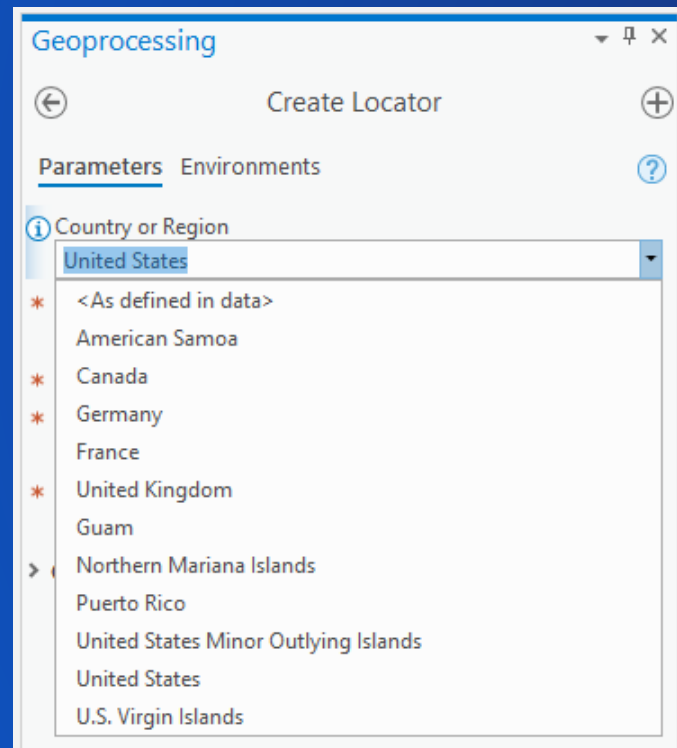
Prospect Park Redlands

Marina Park San Diego

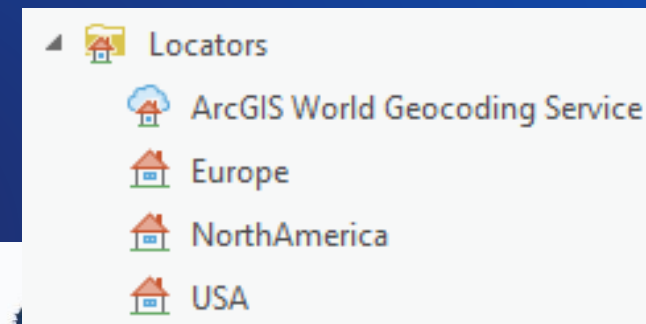
# Why New Locators?

Enhanced international support

Build Custom Locators for More Countries



Build a single locator for Multiple Countries





# Goals for New Locators

Enhanced quality, performance and deployment

- **Optimized match quality**
- **Higher performance and scalability**
- **Faster build times (Up to 10x)**
- **Smaller locator footprint for offline deployments (4x to 10x smaller)**
- **And more...**

# New Locator Support

- **Created with Create Locator Tool introduced at Pro 2.3**
  - Recommend using the latest Pro for best results
- **New locators supported in Pro 2.2+ and Enterprise 10.6.1+**
- **Supported in Runtime Update 5+**
  - Author in Mobile Map Packages (Pro 2.3)
- **Available as part of Esri Solutions including World Geocoder and StreetMap**

# Build Your Own Locator

Create Locator Tool

# Resources

- ArcGIS Pro help: <https://pro.arcgis.com/en/pro-app/help/data/geocoding/>

The screenshot shows the ArcGIS Pro help interface. The top navigation bar includes links for Home, Get Started, Help (which is active), Tool Reference, Python, and SDK. Below this is a search bar labeled 'Search ArcGIS Pro help'. The breadcrumb trail reads 'Help / Data / Geocoding / Build your own locator'. On the left, a sidebar lists topics under 'Build your own locator', with 'Fundamentals of creating a locator' selected. The main content area is titled 'Fundamentals of creating a locator' and contains a paragraph explaining the process of creating a locator. To the right of the text is a box titled 'In this topic' with a link to 'Components of a locator'. At the bottom, a diagram illustrates the components of a locator: Reference Data (represented by three colored diamond icons), Role (represented by a table icon), Field Map (represented by a list icon), and Locator (represented by a house icon). Plus signs are placed between the Reference Data, Role, and Field Map icons, and a large blue arrow points from the resulting combination to the Locator icon.

Home Get Started **Help** Tool Reference Python SDK

Search ArcGIS Pro help

Help / Data / Geocoding / Build your own locator

> What is geocoding?  
> Geocoding with ArcGIS Pro  
> What is a locator?  
✓ Build your own locator

Introduction to custom locators  
Fundamentals of creating a locator  
Tips for preparing reference data  
Introduction to locator roles  
Fundamentals of alternate name tables  
Create a locator

## Fundamentals of creating a locator

One of the first processes in geocoding with your own data is creating a locator. Before you start creating a locator, it is helpful to learn about the major components and properties that go into creating one. Creating a locator involves selecting reference data, such as street centerlines, tax parcels, or building name layers, and the correct locator role for the reference data and mapping the appropriate data fields to the fields from the selected locator role or roles. A single locator can be created using multiple reference datasets and roles, which can be used to search for multiple types of locations at once.

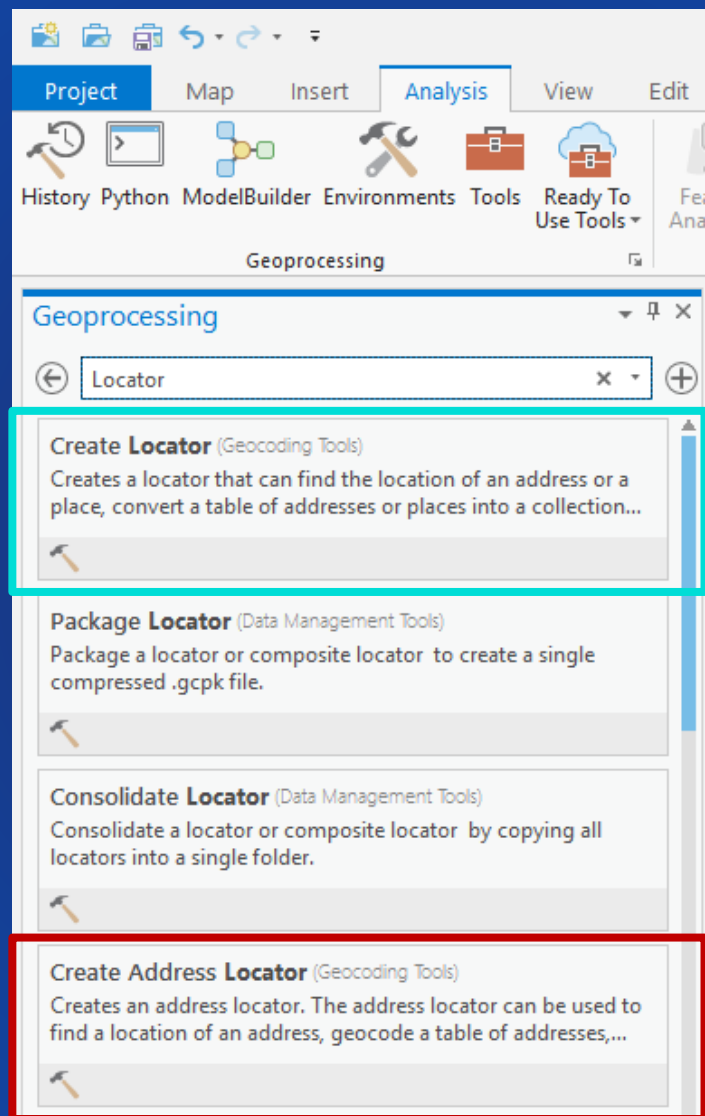
In this topic  
[Components of a locator](#)

Reference Data Role Field Map Locator

```
graph LR; RD[Reference Data] -- "+" --> R[Role]; R -- "+" --> FM[Field Map]; FM -- "+" --> L[Locator];
```

# “Create Locator” Tool

✓ Create Locator  
Geoprocessing Tool →



← Create Address  
Locator (Classic Tool)



# Tool Workflow:

## Create Locator Tool

1: Select a Region

3: Select data for the Role

5: Define the output locator location and name

8: Select data for the Alternate Name Role

9: Define Custom Output Fields

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

\* Primary Table(s) Role

\* Field Mapping

\* Output Locator

\* Language Code

Optional parameters

Alternate Name Tables Role

Alternate Data Field Mapping

Custom Output Fields  
CustomOutputField1  
CustomOutputField2

2: Select a Role

4: Select fields in your data mapping to the expectations for the role

6: Select the default language

7: Select an Alternate Name Role

# 1) Select a Region

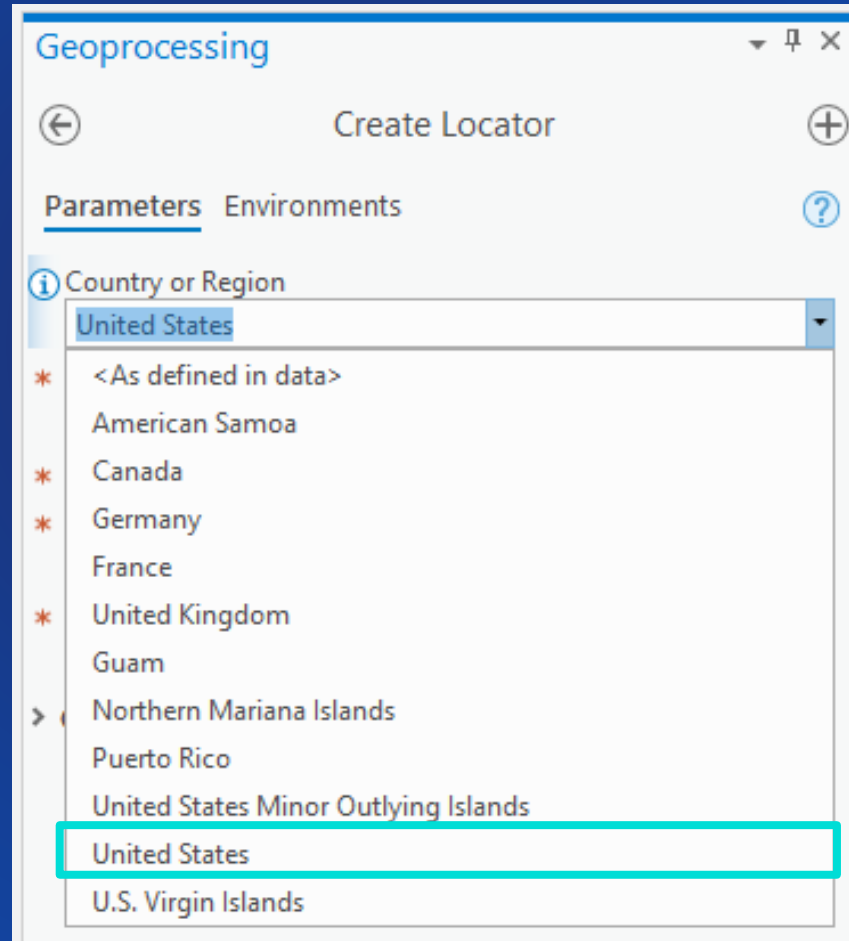
## Create Locator Tool

Option 1: Select a specific Region

Use when you are building a locator for a single region

More regions added in future releases

1

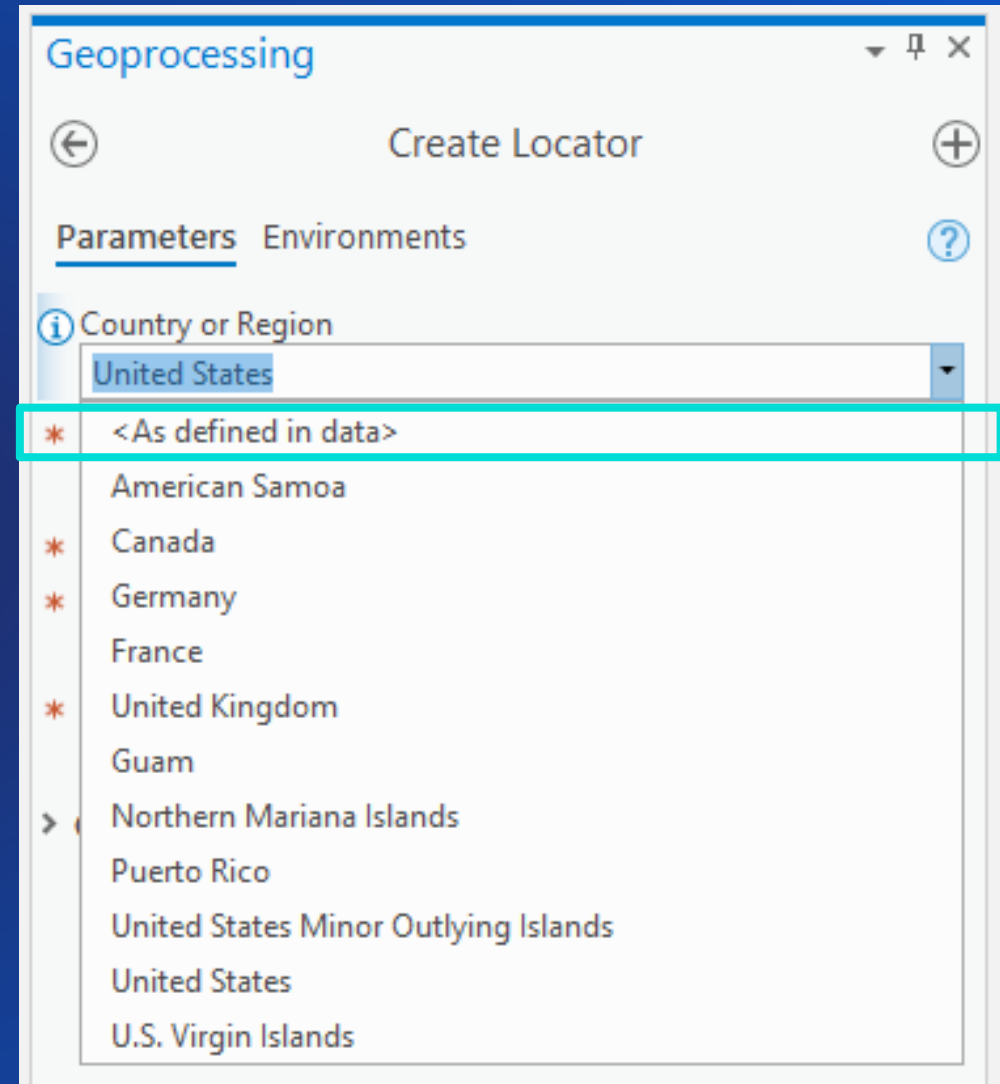


# 1) Select a Region

## Create Locator Tool

- Option 2: <As Defined in Data>
  - Use when you are building a locator that includes data for more than one region
  - Data must have a Country field with individual records coded by country example (USA or CAN)
- Note: Multiple region locators must have all records in a single feature class for each Role

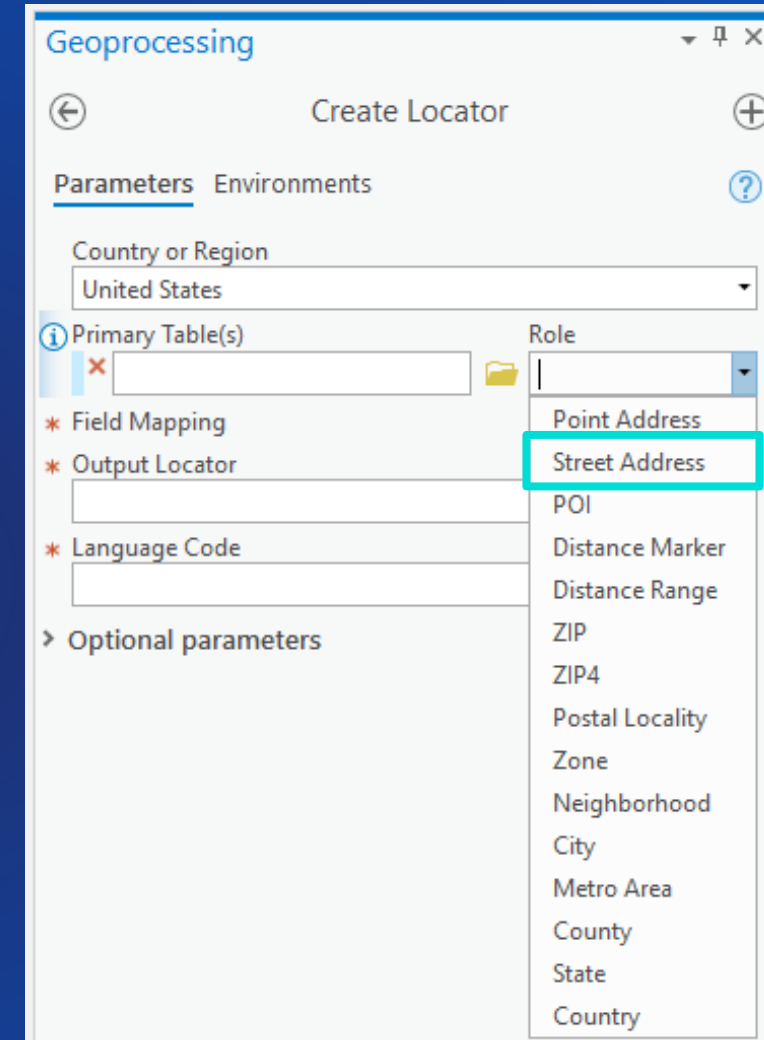
1



## 2: Select a Role(s)

### Create Locator Tool

- Roles (similar to styles for classic locators)
- Select one or more Roles
- Point Address
  - Rooftops, Parcels, Side of Street points
  - Also supports Sub Addresses in a single role
- Street Address
  - Street Ranges, Street Names, Intersections
- POI
  - Points of interest, places, assets
- Zone, an area not part of an administrative hierarchy



2

<https://pro.arcgis.com/en/pro-app/help/data/geocoding/introduction-to-locator-roles.htm>

## 2: Select a Role(s) - Multiple Role Locator

### Create Locator Tool

- When you choose multiple roles
- Multiple roles are built into a single output locator
- What are some of the benefits:
  - Reduce redundant information and candidates
  - Locators will be Smaller
  - Locators can be Faster

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s)

| Primary Table(s) | Role           |
|------------------|----------------|
| PointAddress     | Point Address  |
| StreetAddress    | Street Address |
| City             | City           |
|                  |                |

2



# 3: Select data for the Role

## Create Locator Tool

- Select Table(s) - Feature Classes supporting each role
  - Address features such as rooftop points
  - Street features with address ranges and street names
  - Administrative boundaries and attributes

3

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s)

StreetAddress

Role  
Street Address

\* Field Mapping

Role: Street Address

| Field Name               | Alias Name |
|--------------------------|------------|
| Street Join ID           | <None>     |
| *Left House Number From  | <None>     |
| *Left House Number To    | <None>     |
| *Right House Number From | <None>     |
| *Right House Number To   | <None>     |
| Left Parity              | <None>     |
| Right Parity             | <None>     |

## 4: Select fields in your data mapping to the expectations for the role

### Create Locator Tool

- Chose the fields in your data that meet the expectations for the role
- Note: there are required fields for each role
- Fields do not auto map, you need to select them
- More on the specifics of expected field content later.....

4

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s) Role  
StreetAddress Street Address

Field Mapping  
Role: Street Address

| Field Name               | Alias Name           |
|--------------------------|----------------------|
| Street Join ID           | StreetId             |
| *Left House Number From  | LeftHouseNumberFrom  |
| *Left House Number To    | LeftHouseNumberTo    |
| *Right House Number From | RightHouseNumberFrom |
| *Right House Number To   | RightHouseNumberTo   |
| Left Parity              | LeftParity           |
| Right Parity             | RightParity          |
| Prefix Direction         | PrefixDirection      |
| Prefix Type              | PrefixType           |

Output Locator  
Streets\_Locator

# 5: Define the output location and locator name

## Create Locator Tool

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s) Role

|               |                |
|---------------|----------------|
| StreetAddress | Street Address |
|               |                |

Field Mapping

Role: Street Address

| Field Name               | Alias Name           |
|--------------------------|----------------------|
| Street Join ID           | StreetId             |
| *Left House Number From  | LeftHouseNumberFrom  |
| *Left House Number To    | LeftHouseNumberTo    |
| *Right House Number From | RightHouseNumberFrom |
| *Right House Number To   | RightHouseNumberTo   |
| Left Parity              | LeftParity           |
| Right Parity             | RightParity          |
| Prefix Direction         | PrefixDirection      |
| Prefix Type              | PrefixType           |

Output Locator  
Streets\_Locator

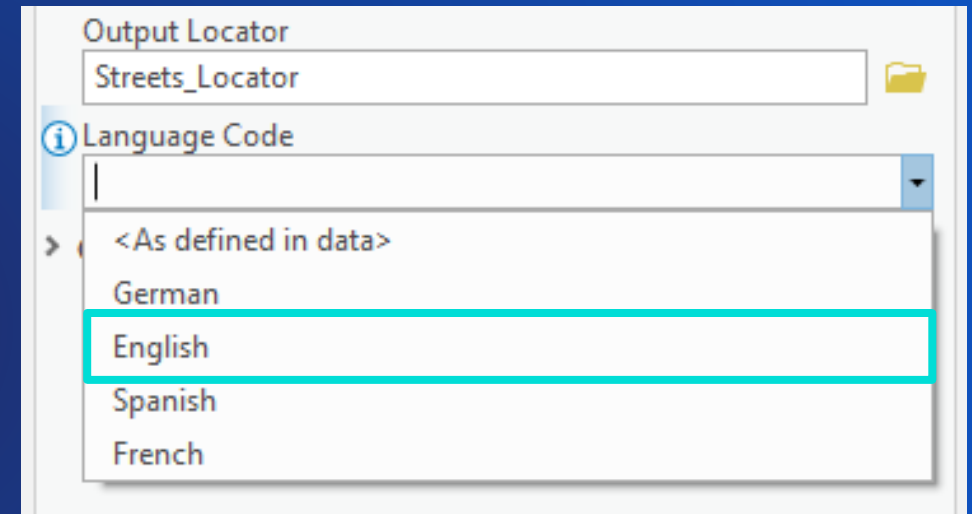
5

## 6: Select the default language

### Create Locator Tool

- In some regions there is an expectation that results are formatted uniquely based on language
- If you know your data is for a specific language select the language from the list
- If you don't set this value a default language will be used for that region

6



## 6: Select the default language

### Create Locator Tool

- If your data has records for more than one language, you can use a language value for each record from a language field
- To use this information select <As Defined in Data>
- Then map the language field in each role

6.1

| Field Mapping   |              |
|-----------------|--------------|
| Right ZIP4      | <None>       |
| Country Code    | <None>       |
| Country Join ID | <None>       |
| Country         | <None>       |
| *Language Code  | LanguageCode |
| Rank            | <None>       |
| Min X           | <None>       |
| Max X           | <None>       |
| Min Y           | <None>       |
| Max Y           | <None>       |

Output Locator  
Streets\_Locator

Language Code  
<As defined in data>

6.2

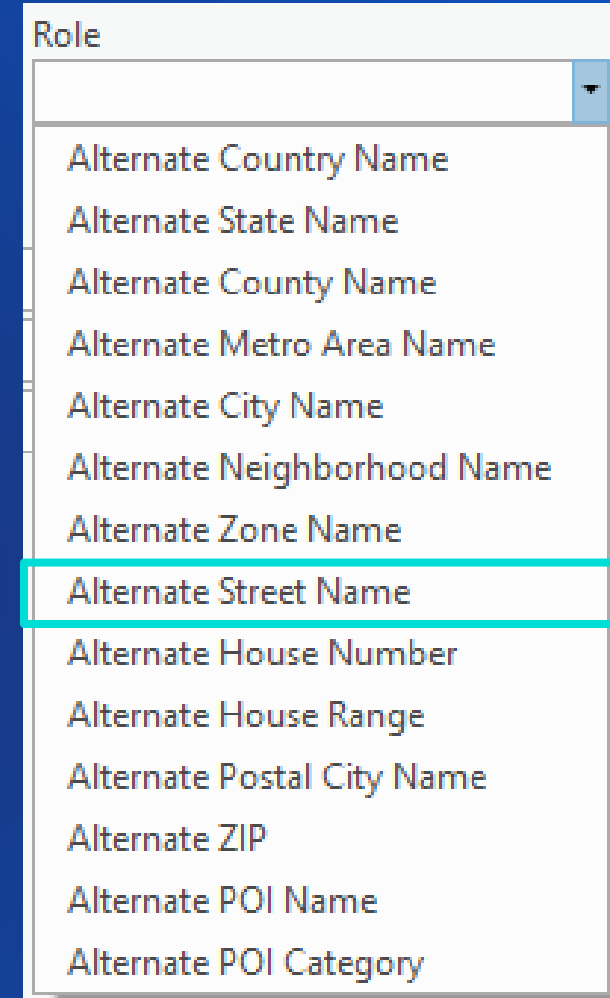
For more information about supported languages and values see:  
<https://developers.arcgis.com/rest/geocode/api-reference/geocode-coverage.htm>



## 7: Select an Alternate Name Role

### Create Locator Tool

- Attributes of an address can have more than one name
  - Main St = US Hwy 60
- To model and use these additional names when geocoding you can use alternate name tables that are linked to each feature by a role and ID
- Select an alternate names Role that links to a Primary Role



Role

- Alternate Country Name
- Alternate State Name
- Alternate County Name
- Alternate Metro Area Name
- Alternate City Name
- Alternate Neighborhood Name
- Alternate Zone Name
- Alternate Street Name**
- Alternate House Number
- Alternate House Range
- Alternate Postal City Name
- Alternate ZIP
- Alternate POI Name
- Alternate POI Category

## 8: Select data for the Alternate Name Role

### Create Locator Tool

- Select the table that has the alternate names information
- Repeat field mapping steps (same as step 4) to define ID and Names fields
- Note: Street Join ID field is the field that links the alternate name to a feature in the Primary table

8

Optional parameters

Alternate Name Tables

AlternateStreetName Role: Alternate Street Name

Alternate Data Field Mapping

Role: Alternate Street Name

| Field Name             | Alias Name      |
|------------------------|-----------------|
| *Street Join ID        | StreetId        |
| Prefix Direction       | PrefixDirection |
| Prefix Type            | PrefixType      |
| *Street Name           | StreetName      |
| Suffix Type            | SuffixType      |
| Suffix Direction       | SuffixDirection |
| Full Street Name       | FullStreetName  |
| Language Code          | LanguageCode    |
| Primary Name Indicator | <None>          |

# 9: Define Custom Output Fields

## Create Locator Tool

- New locators support output of additional fields not used in searching
- These fields could be useful metadata associated with the feature such as a local zone or name etc.
- Custom Output fields can be configured under Optional Parameters

| ServiceAreaLeft | ServiceAreaRight |
|-----------------|------------------|
| Depot 1         | Depot 1          |
| Depot 1         | Depot 1          |
| Depot 1         | Depot 1          |
| Depot 1         | Depot 1          |
| Depot 1         | Depot 1          |
| Depot 1         | Depot 1          |
| Depot 1         | Depot 2          |
| Depot 1         | Depot 2          |
| Depot 2         | Depot 2          |
| Depot 2         | Depot 2          |
| Depot 2         | Depot 2          |
| Depot 2         | Depot 2          |
| Depot 2         | Depot 2          |
| Depot 2         | Depot 2          |
| Depot 2         | Depot 2          |

9

Output Locator  
Streets\_Locator

Language Code  
English

Optional parameters

Alternate Name Tables Role

Alternate Data Field Mapping

Custom Output Fields

ServiceArea

# 9: Define Custom Output Fields

## Create Locator Tool

- 9.1: Type a name (ServiceArea) in the Custom Output Fields box and hit enter
- Keep adding custom fields until you have all the expected fields entered
- 9.2: Now you can go back to the field mapping for the Roles and map these additional custom fields from your data

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s) Role  
StreetAddress Street Address

Field Mapping

|                   |                  |
|-------------------|------------------|
| Country Join ID   | <None>           |
| Country           | <None>           |
| Language Code     | <None>           |
| Rank              | <None>           |
| Min X             | <None>           |
| Max X             | <None>           |
| Min Y             | <None>           |
| Max Y             | <None>           |
| ServiceArea_left  | ServiceAreaLeft  |
| ServiceArea_right | ServiceAreaRight |

Output Locator  
Streets\_Locator

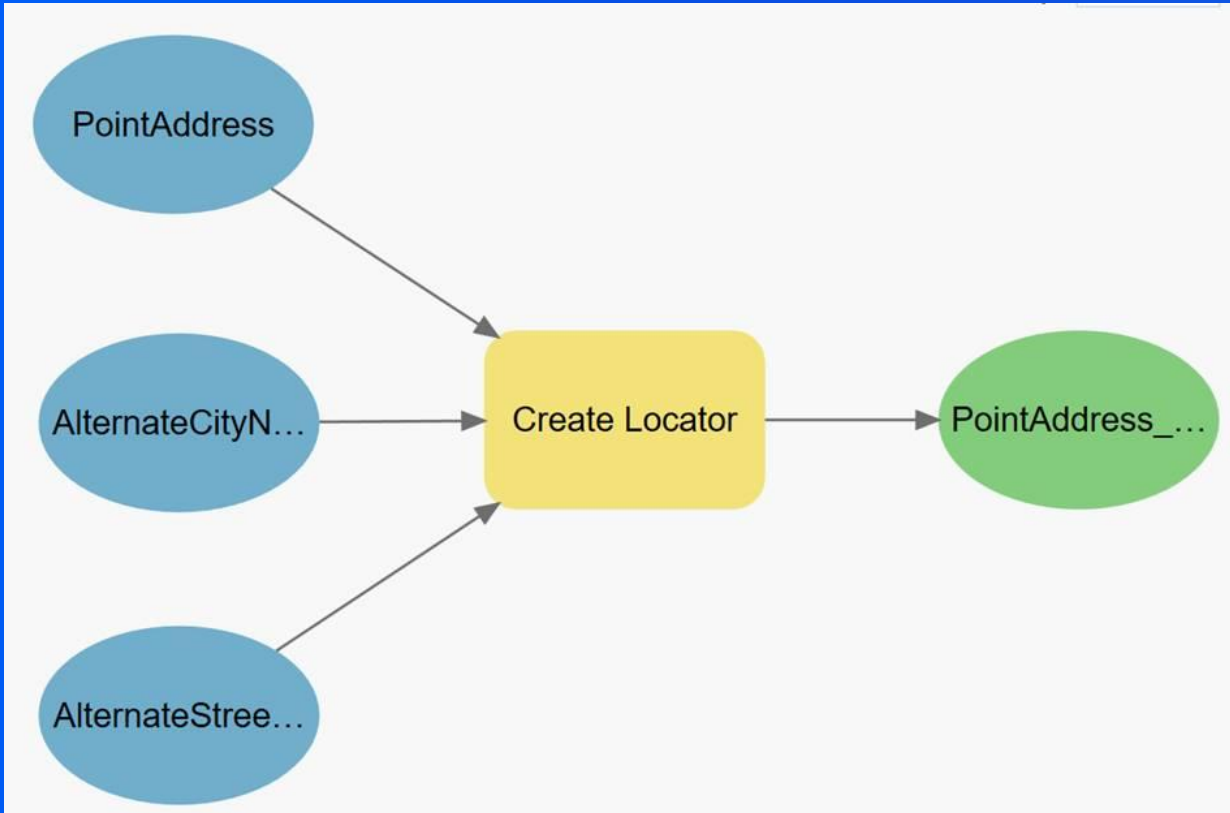
Language Code  
English

Optional parameters

Alternate Name Tables Role

Alternate Data Field Mapping

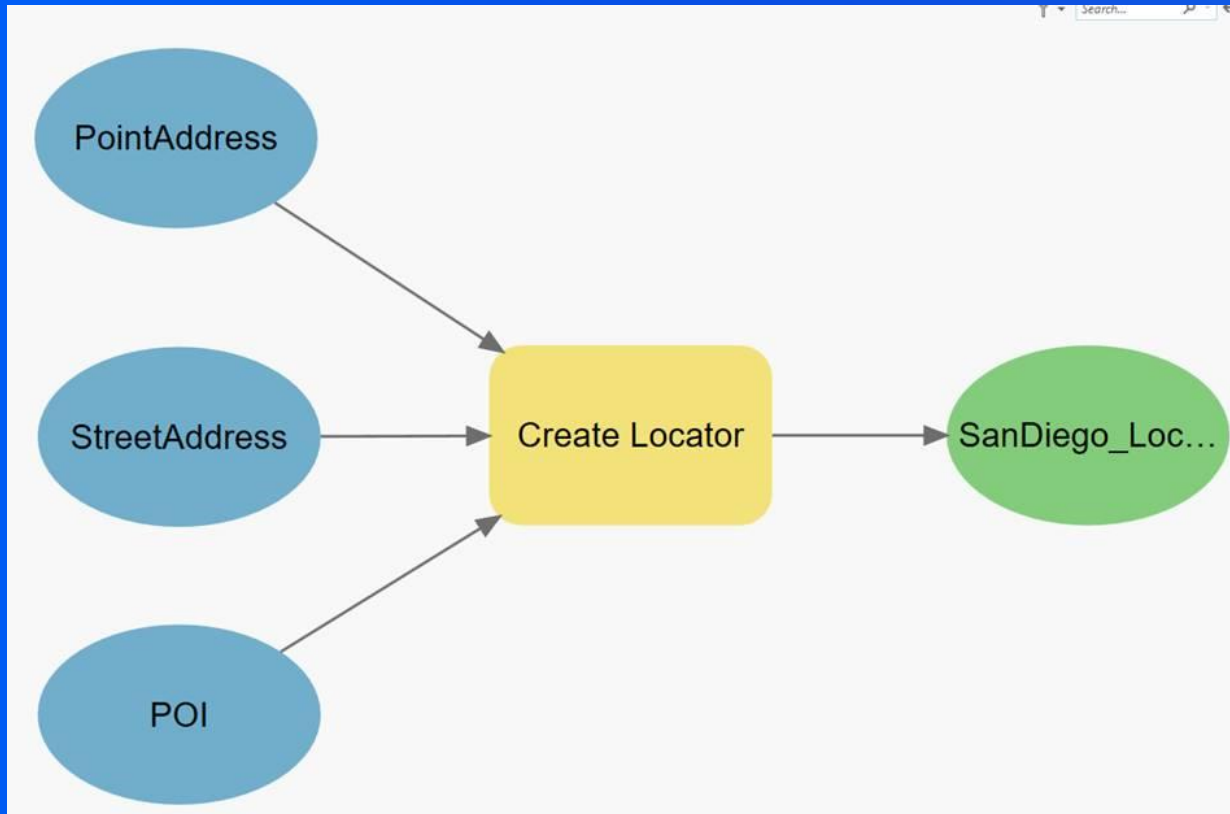
Custom Output Fields  
ServiceArea



# Locator with Alternate Names

Brad Niemand





# Multi Role Locator

Brad Niemand

# Additional Concepts

Create Locator Tool

# ID Fields

## Optimize geocoding results with content

- IDs can be used to link features and attributes across roles
  - Example: Street Join ID – Link Point Address, Street Address and POI data
- IDs can be used to identify and store one instance of a geometry where duplicate geometries are used to represent alternate names
  - Reduces the size of a locator

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s) Role

Streets Street Address

Field Mapping

Role: Street Address

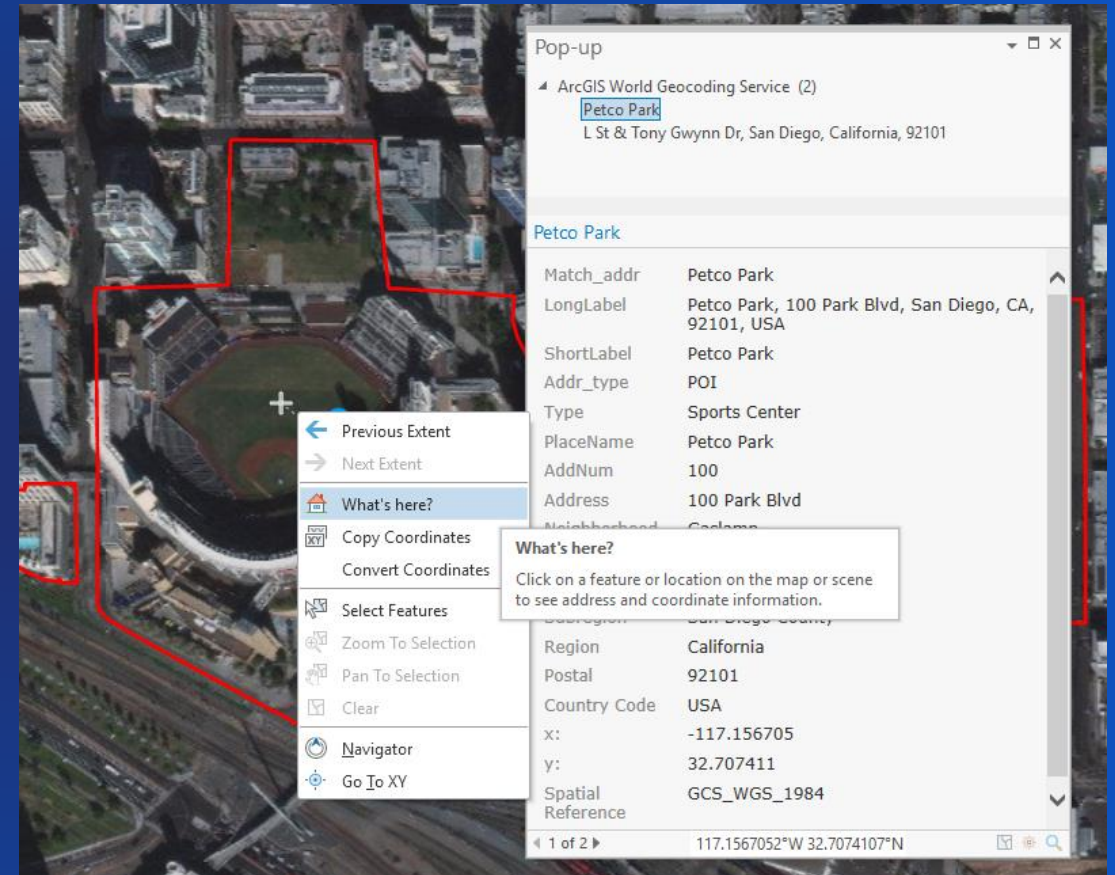
| Field Name               | Alias Name |
|--------------------------|------------|
| Street Join ID           | <None>     |
| *Left House Number From  | LFROMADD   |
| *Left House Number To    | LTOADD     |
| *Right House Number From | RFROMADD   |
| *Right House Number To   | RTOADD     |
| Left Parity              | <None>     |
| Right Parity             | <None>     |
| Prefix Direction         | <None>     |
| Prefix Type              | <None>     |

Output Locator  
Streets\_Locator

# Polygon Features and Reverse Geocoding

Optimize geocoding results with content

- Polygons can be built into a locator and used to answer "What's near me?"
- Use polygons instead of Points (when available) for Addresses, POI, Admin and Postal Areas



<https://developers.arcgis.com/rest/geocode/api-reference/geocoding-reverse-geocode.htm>



# House Number Ranges (Point Address Role)

Optimize geocoding results with content

- Point Addresses Role supports modelling House Numbers as Ranges
- One location with a Range of Addresses
  - House Number From = 10
  - House Number To = 12
- If you have some House numbers that Are Ranges model all Addresses as Ranges
- For Addresses that do not range use “From” and “To” range values that are the Same
  - House Number From = 100
  - House Number To = 100
- Parity is supported

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s) Role  
PointAddress Point Address

Field Mapping

Role: Point Address

| Field Name        | Alias Name        |
|-------------------|-------------------|
| Address Join ID   | <None>            |
| House Number      | <None>            |
| House Number From | HouseNumberFrom   |
| House Number To   | HouseNumberTo     |
| Parity            | HouseNumberParity |
| Building Name     | <None>            |
| Street Join ID    | <None>            |
| Prefix Direction  | <None>            |
| Prefix Type       | <None>            |

# Sub Addresses (Point Address Role)

Optimize geocoding results with content

- Sub Address and Point Address Data can be modelled using the Point Address Role
- Store both Point Address and Sub Address data in a single feature class
- Records can include Optional Sub Address Attributes
- Units follow same logic as House Numbers for modelling unique values and ranges

Geoprocessing

Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s)  
PointAddress

Role  
Point Address

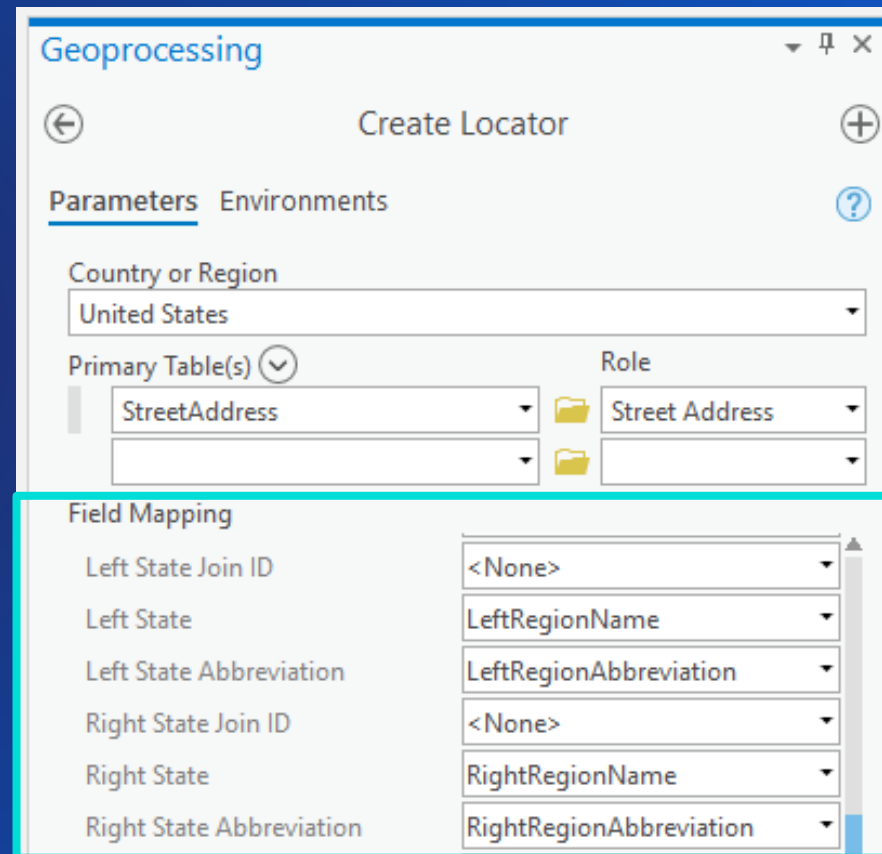
Field Mapping

|                      |          |
|----------------------|----------|
| Unit                 | <None>   |
| Unit From            | UnitFrom |
| Unit To              | UnitTo   |
| Unit Type            | UnitType |
| Level                | <None>   |
| Level Type           | <None>   |
| Building Unit        | <None>   |
| Building Unit Type   | <None>   |
| Side                 | <None>   |
| Neighborhood Join ID | <None>   |



# Providing Regional Information

- If you are a local organization your geocoding quality can be improved by using information such as province or state in your data
- Province or state might be used to help identify appropriate highway conventions for your data CA-20 works for California but not for Alabama
- We encourage you to store and map these additional fields when building locators



**Geoprocessing** Create Locator

Parameters Environments

Country or Region  
United States

Primary Table(s) Role

| Primary Table(s) | Role           |
|------------------|----------------|
| StreetAddress    | Street Address |
|                  |                |

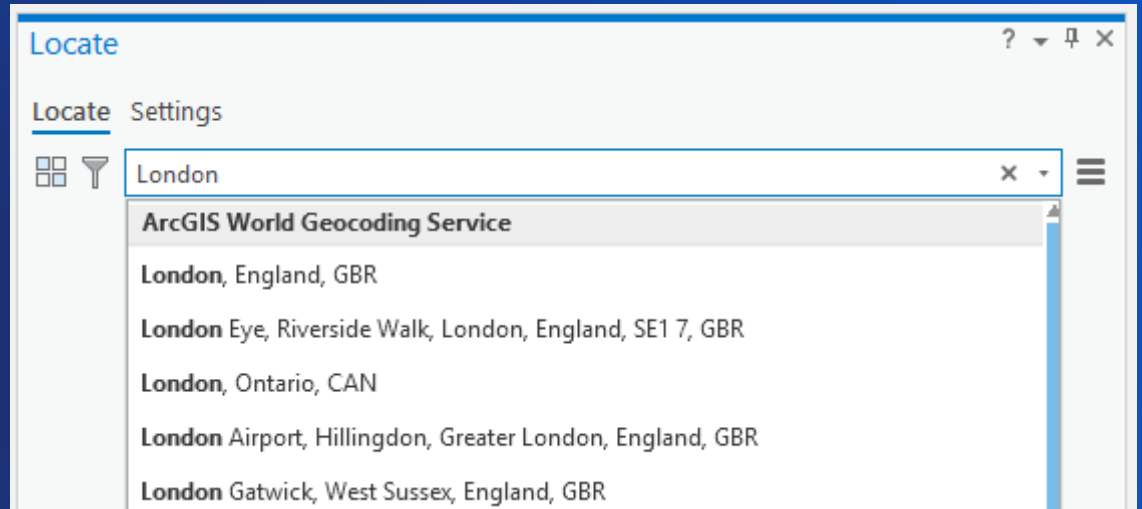
**Field Mapping**

|                          |                         |
|--------------------------|-------------------------|
| Left State Join ID       | <None>                  |
| Left State               | LeftRegionName          |
| Left State Abbreviation  | LeftRegionAbbreviation  |
| Right State Join ID      | <None>                  |
| Right State              | RightRegionName         |
| Right State Abbreviation | RightRegionAbbreviation |

# Ranking Results

## Optimize geocoding results with content

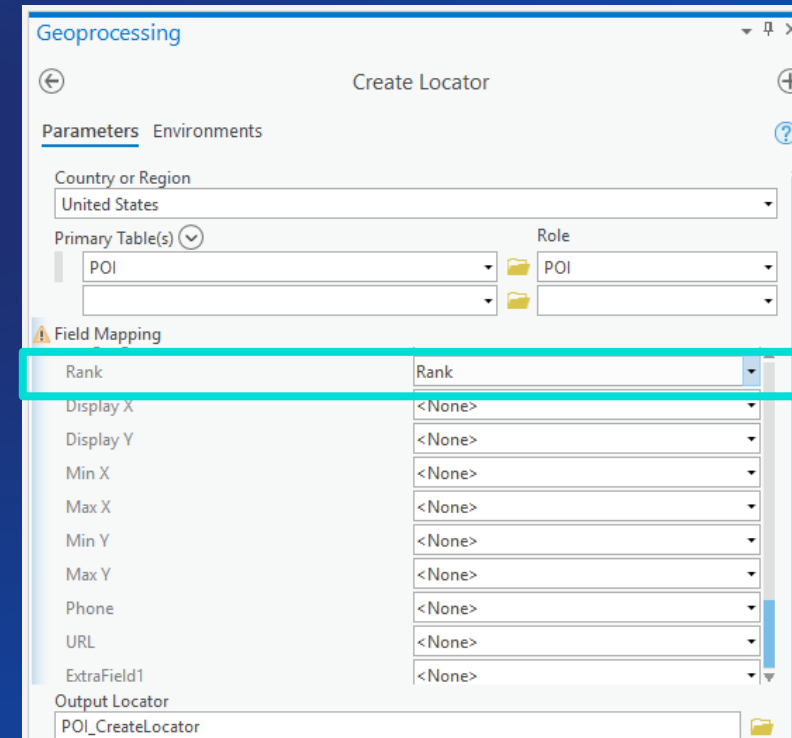
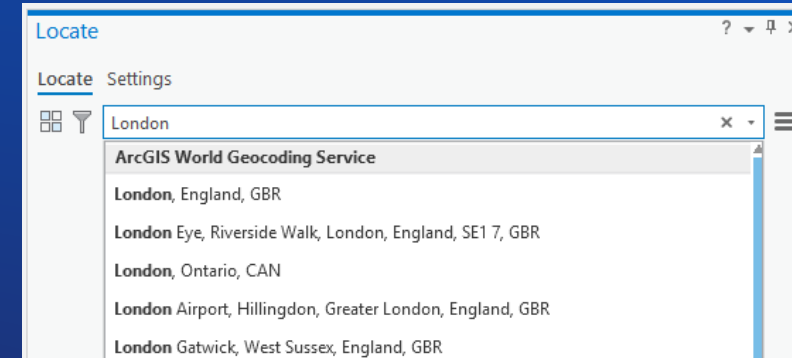
- Features that have the same name may need some context when ordering results
- Some of this context may come from location
  - Such as the center of the Map or a GPS location on a mobile device
- But it can also be important to consider something like population or category



# Ranking Results

## Optimize geocoding results with content

- You can prioritize features for ranking by modeling a rank value in your data
- Small numbers associated with a record move a candidate higher in the list.
- Think of **1** being the top candidate and **99** being a minor candidate.
- In the London example a rank derived from relative population could be used
  - London, England, GBR = Rank 1.75
  - London, Ontario, CAN = Rank = 5.5
- Works for POI and Admin Role locators
- Ranking works across roles



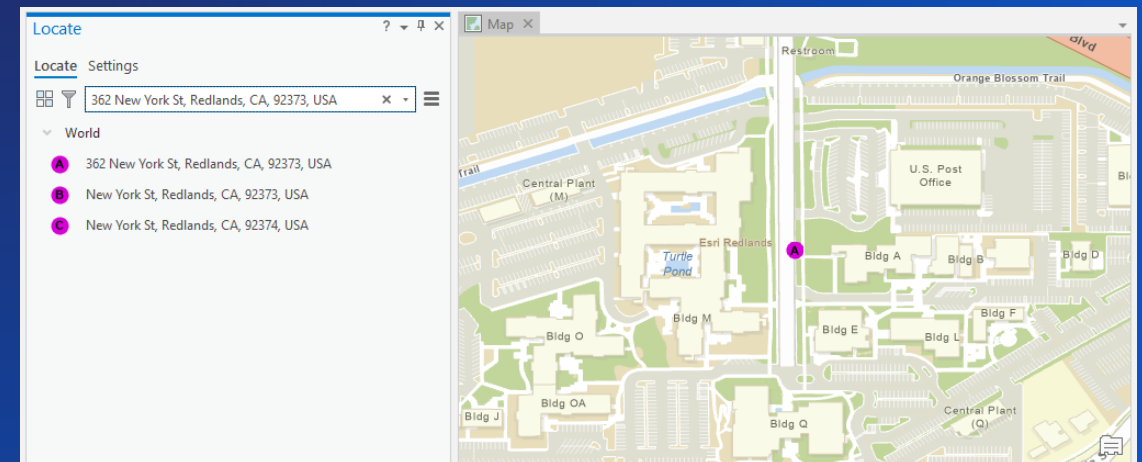
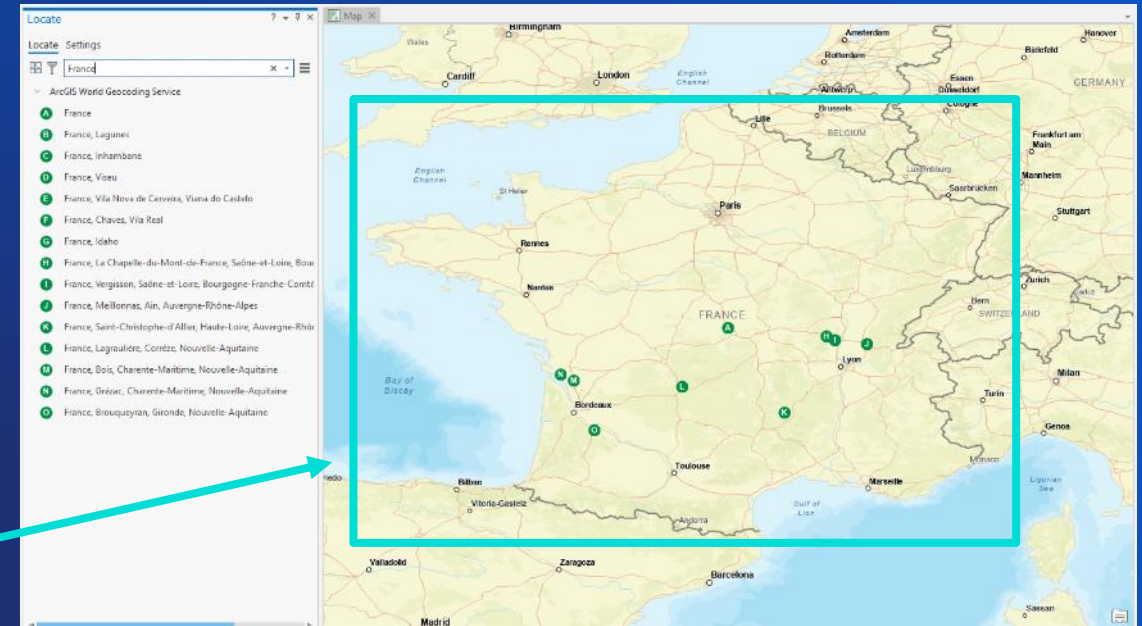
# Zoom Extent

## Optimize geocoding results with content

- When you search for and select a candidate how does an application know where to zoom?
- Geocode results provide extents which applications can use to zoom effectively

xmin: -3.563460  
ymin: 40.445417  
xmax: 8.664539  
ymax: 52.673417

- *Extents are not always consistent with a bounding box for a feature may need to be edited to account for features with interesting shapes such as outlier Islands*



# Zoom Extent

## Optimize geocoding results with content

- You can model extent in your data and geocoding results will return it to applications
- 1: For line and polygon features you can use the “Calculate Geometry Attributes” tool to populate initial values
- You may want to adjust these values for some features
- Coordinates for the Extent should be in the same units as your data

1

The screenshot shows the 'Calculate Geometry Attributes' tool interface. The 'Input Features' dropdown is set to 'PolygonPostal'. The 'Geometry Property' section has 'Target Field' selected, with a table of properties: MinX (Minimum x-coordinate), MaxX (Maximum x-coordinate), MinY (Minimum y-coordinate), and MaxY (Maximum y-coordinate). The 'Coordinate System' is set to 'GCS\_WGS\_1984'.

2

The screenshot shows the 'Create Locator' tool interface. The 'Country or Region' dropdown is set to 'United States'. The 'Primary Table(s)' dropdown is set to 'PointAddress', and the 'Role' dropdown is set to 'Point Address'. The 'Field Mapping' section has a table with the following fields: Country Join ID, Country, Language Code, Rank, Display X, Display Y, Min X, Max X, Min Y, and Max Y. The 'Output Locator' dropdown is set to 'PointAddress\_CreateLocator'.



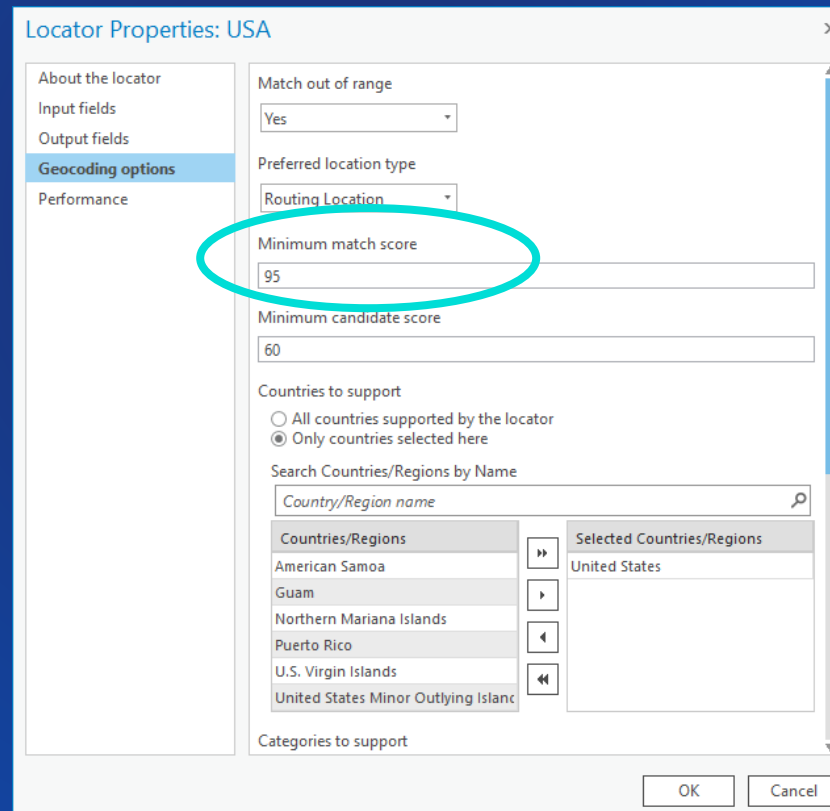
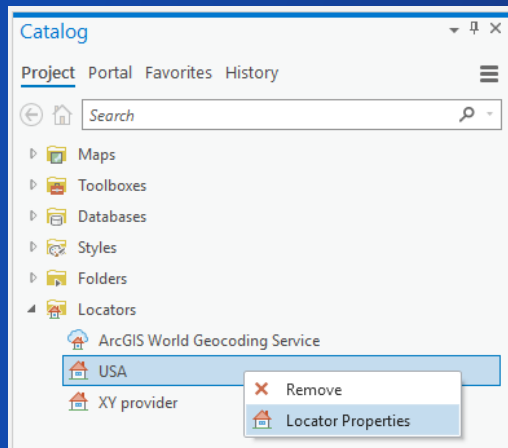
## FAQ – Street Address Role

- Supports address ranges, intersections and **street names**
  - Records with and without addressees are used to find street name segments



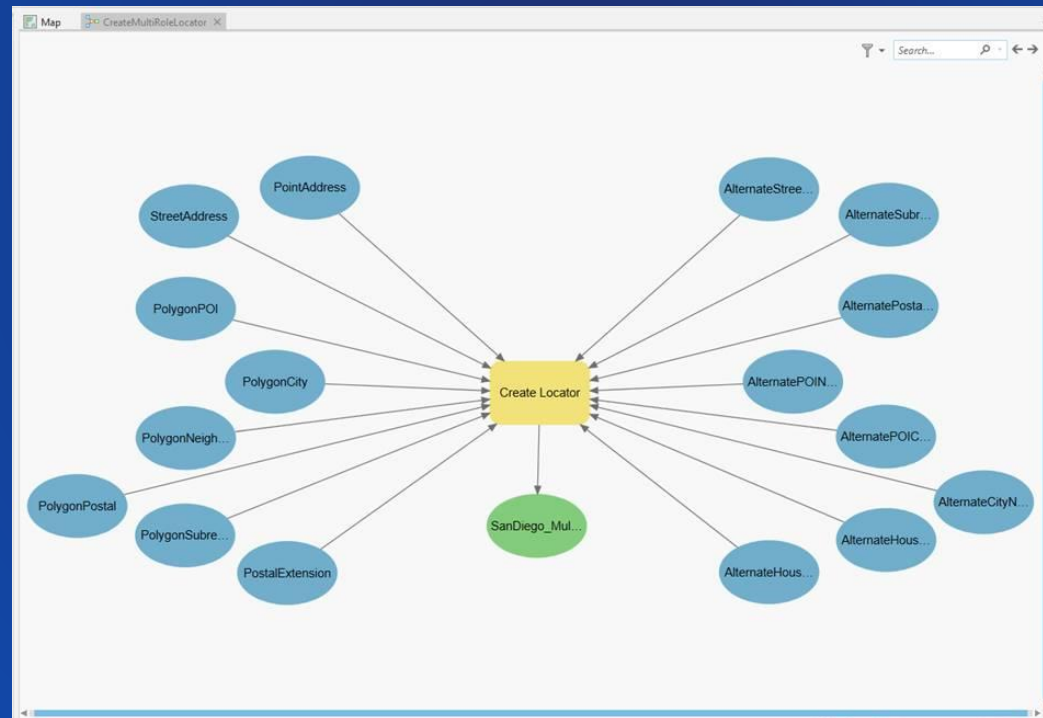
# FAQ – Adjusting Minimum Match Score

- Minimum match score is set by default for a multirole locator
- For single role locators set the match score to meet your needs



# FAQ – Persisting tool settings and automation

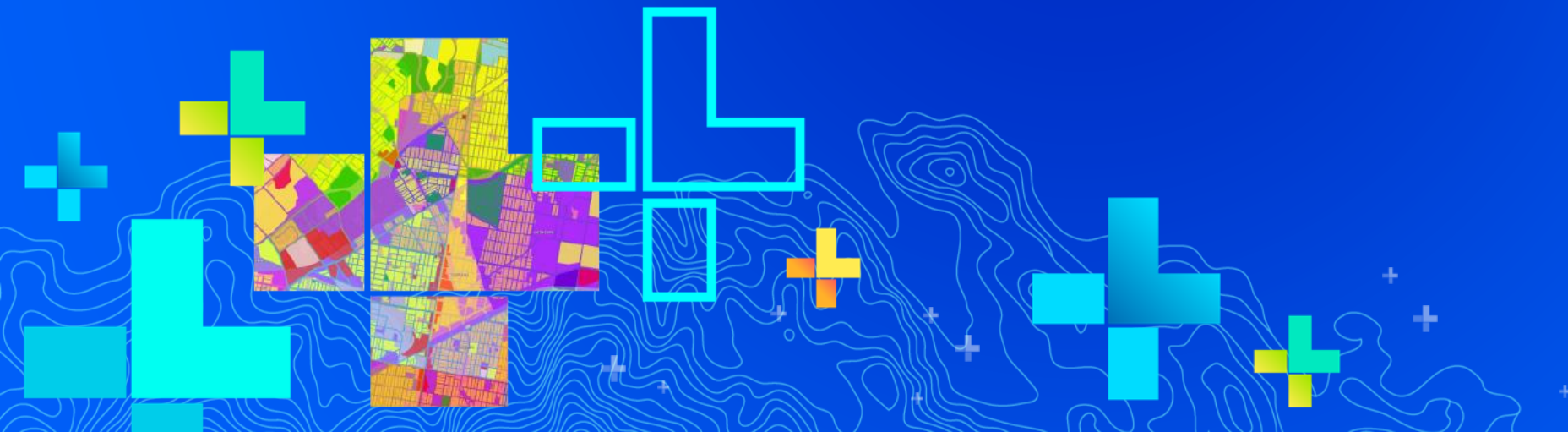
- Create Locator history is saved after running the tool
- Use Model Builder to preserve your work and automate





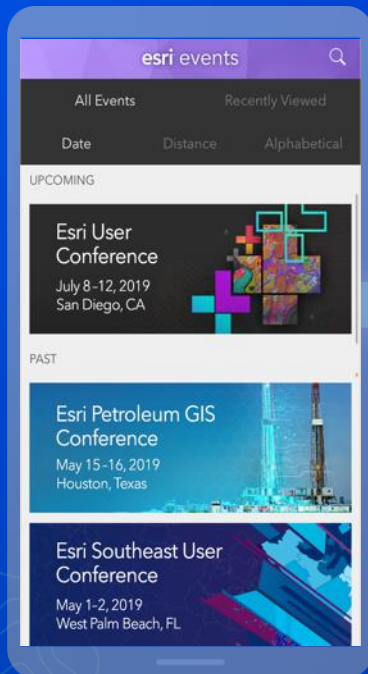
# Questions?

Jeff Rogers and Brad Niemand

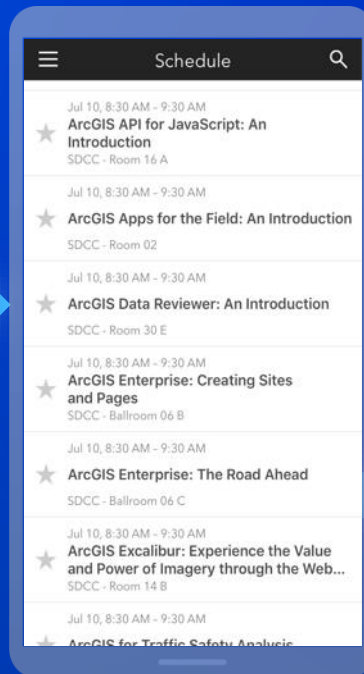


# Please Share Your Feedback in the App

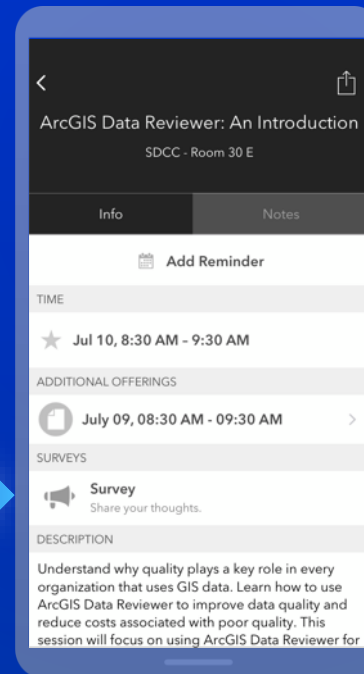
Download the Esri Events app and find your event



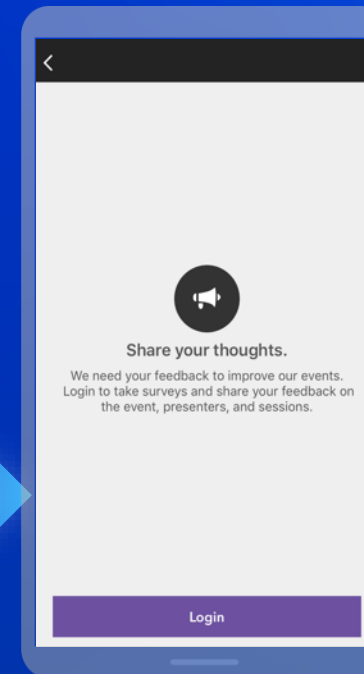
Select the session you attended



Scroll down to "Survey"



Log in to access the survey



Complete the survey and select "Submit"

