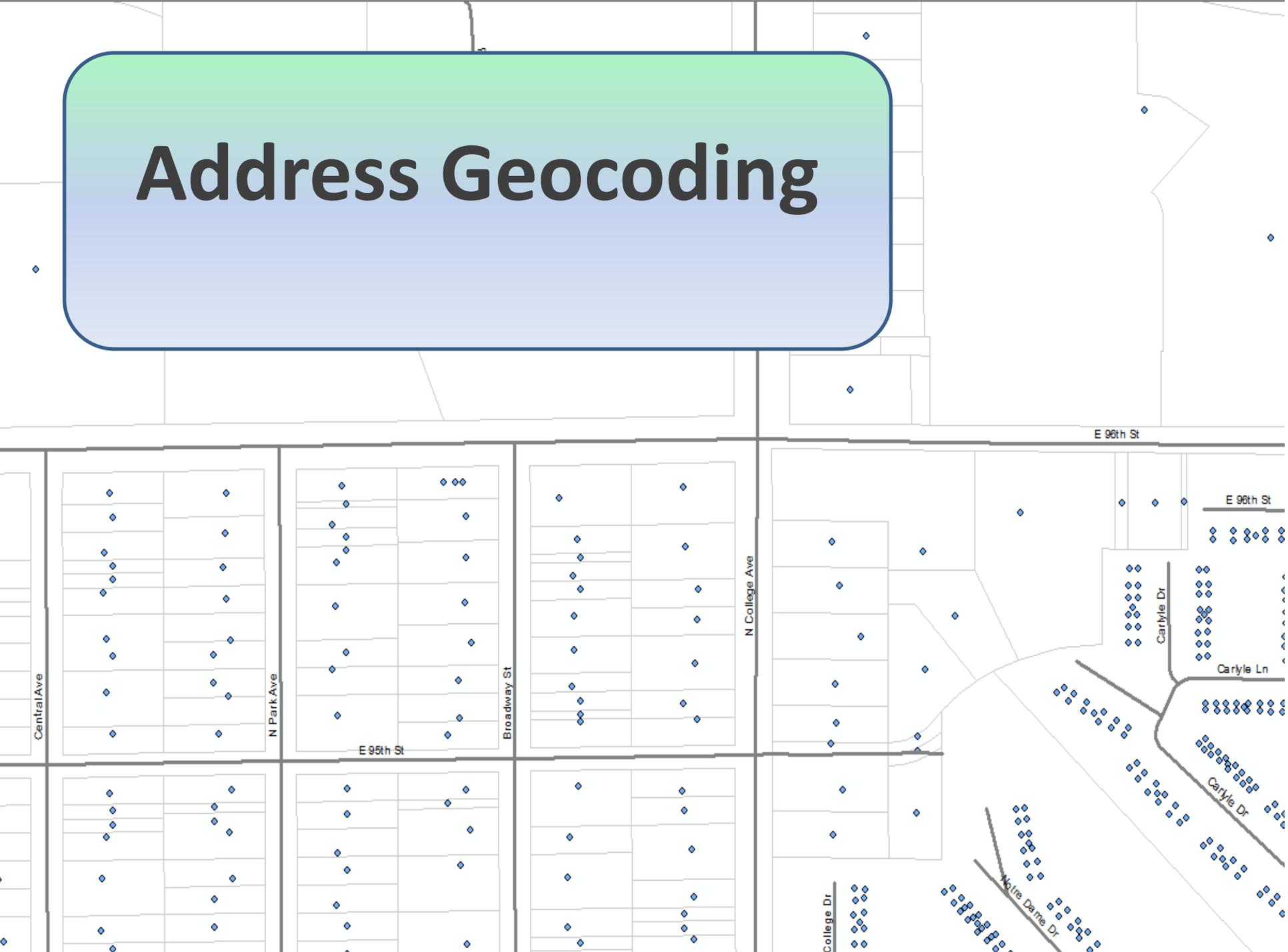


# Address Geocoding



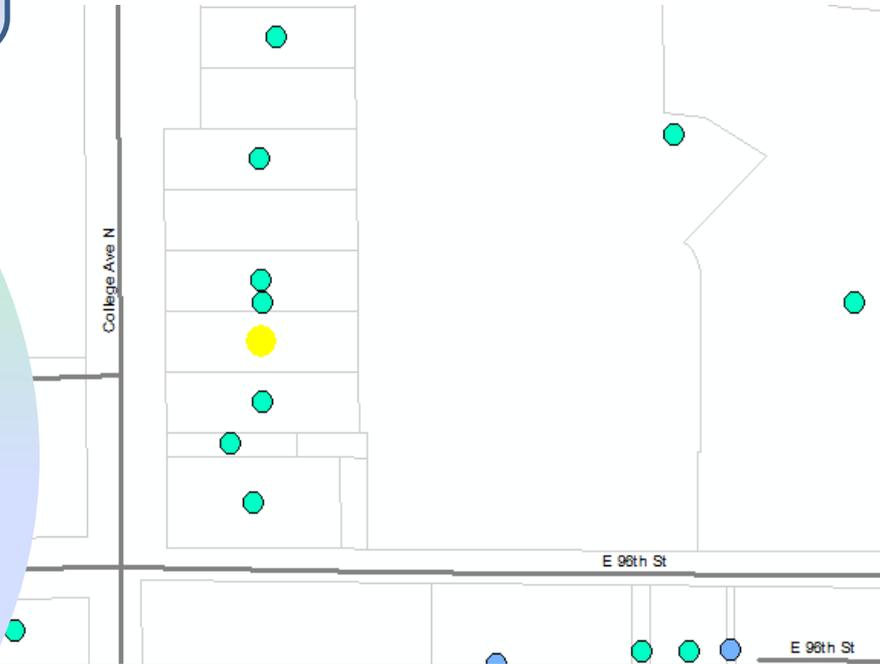
# Outline

- Definitions
- Data
- Address Locators
- Geocoding
- Demonstration

# What is an address?

(from a GIS perspective)

- An address is simply a method used to describe and reference a location
- A location is based on an existing feature in a GIS database.
- A location can be a street address (*9609 College Ave*)
- Place-name (*Indianapolis*)
- A specific location that has been identified and/or defined (*9609 College Ave, Indianapolis, IN 46280*)



Table

ADRPNTS\_8192014

OBJECTID*	SHAPE	NAME	ZCTA5CE10	LAT_DD	LON_DD	CERTIFIED	FULL_ADDR	STD_ADDR	STD_PD	STD_P
2098185	Point		46240	39.926788	-86.1432	True	803 E 96TH ST	803 E 96th St	E	<Null>
2585754	Point		46240	39.926788	-86.143426	True	803 E 96TH ST	803 E 96th St	E	<Null>
1271245	Point	Hamilton County	46280	39.928359	-86.142419	True	900 96TH ST	900 E 96th St	E	<Null>
3101184	Point	Marion County	46240	39.926812	-86.147225	True	9565 BROADWAY ST	9565 Broadway St	<Null>	<Null>
1429570	Point	Marion County	46240	39.926907	-86.147872	True	9590 BROADWAY ST	9590 Broadway St	<Null>	<Null>
1726431	Point	Marion County	46240	39.926906	-86.147919	True	9590 BROADWAY ST	9590 Broadway St	<Null>	<Null>
2577659	Point	Hamilton County	46280	39.927459	-86.145259	True	9601 COLLEGE AVE	9601 N College Ave	N	<Null>
2277763	Point	Hamilton County	46280	39.927721	-86.145363	True	9603 COLLEGE AVE	9603 N College Ave	N	<Null>
1793085	Point	Hamilton County	46280	39.927912	-86.145218	True	9607 COLLEGE AVE	9607 N College Ave	N	<Null>
1271326	Point	Hamilton County	46280	39.928187	-86.14522	True	9609 COLLEGE AVE	9609 N College Ave	N	<Null>
1160017	Point	Hamilton County	46280	39.928362	-86.145211	True	9611 COLLEGE AVE	9611 N College Ave	N	<Null>
2577533	Point	Hamilton County	46280	39.928461	-86.145223	True	9613 COLLEGE AVE	9613 N College Ave	N	<Null>
1904434	Point	Hamilton County	46280	39.929011	-86.145228	True	9615 COLLEGE AVE	9615 N College Ave	N	<Null>

# What is Geocoding?

Geocoding is the process of transforming a description —such as a pair of coordinates, an address, or a name of a place—to a location on the earth's surface. (ESRI)

Addresses



Find Locations



Address Locator

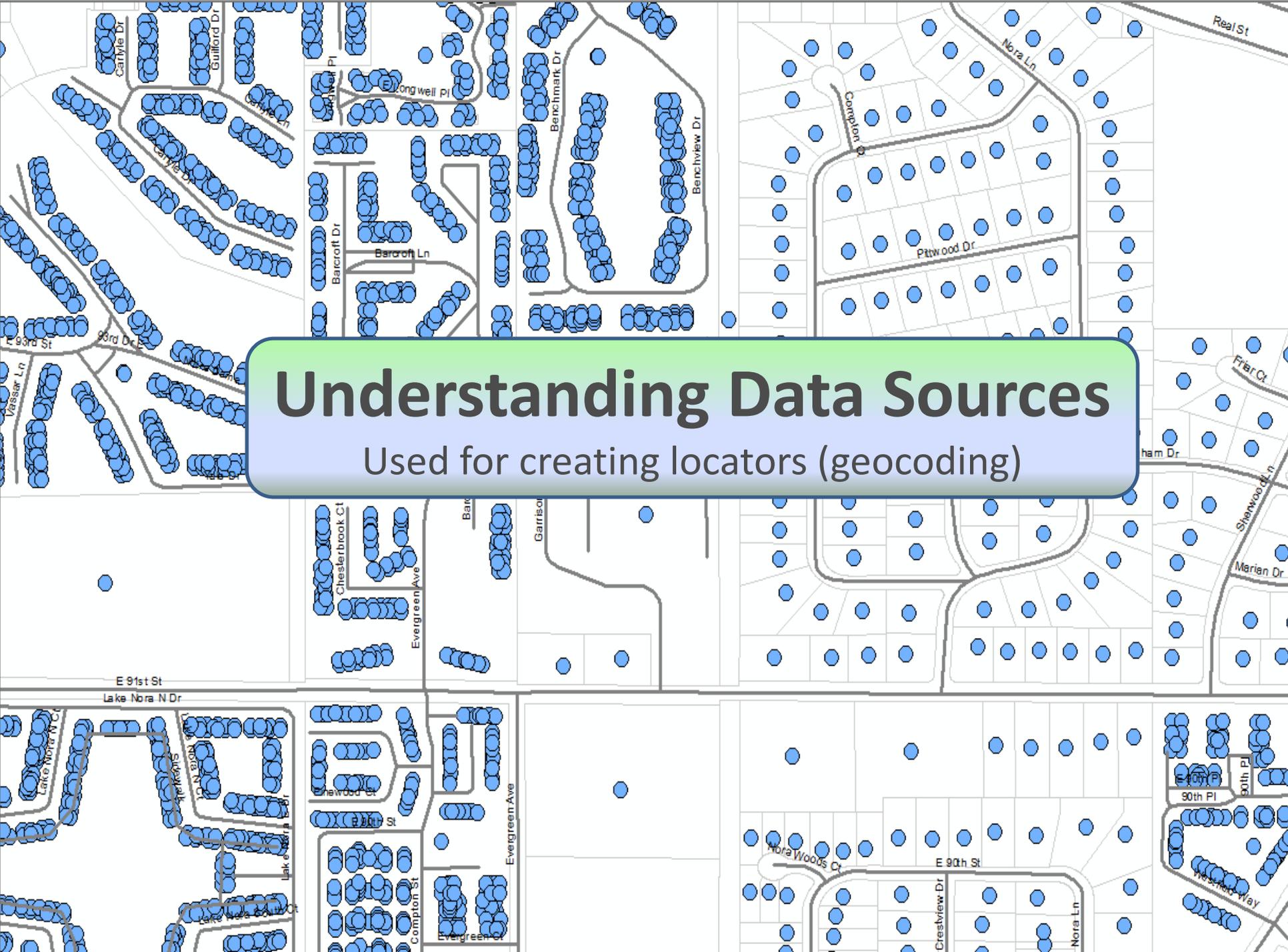
Creates Points



## Address Locator

An ESRI tool used to execute the geocoding process within the ArcGIS environment.

- Can be built by any user
- Built using location data
- Standardized address search



# Understanding Data Sources

Used for creating locators (geocoding)

# Point Data

Represents the address location

- May be a point near to an exact location (Option A)
  - Roof-top accuracy
  - Driveway/entrance
  - Parcel Centroid
- May be approximate (Option B)
  - Interpolated from a street segment
  - Zip Code or Place centroid (Option C)

200

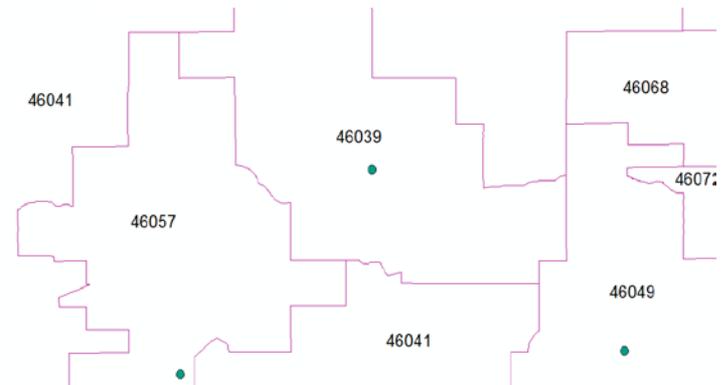
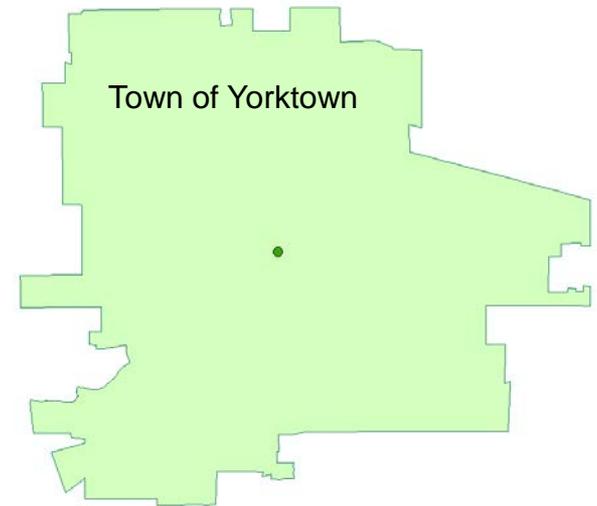
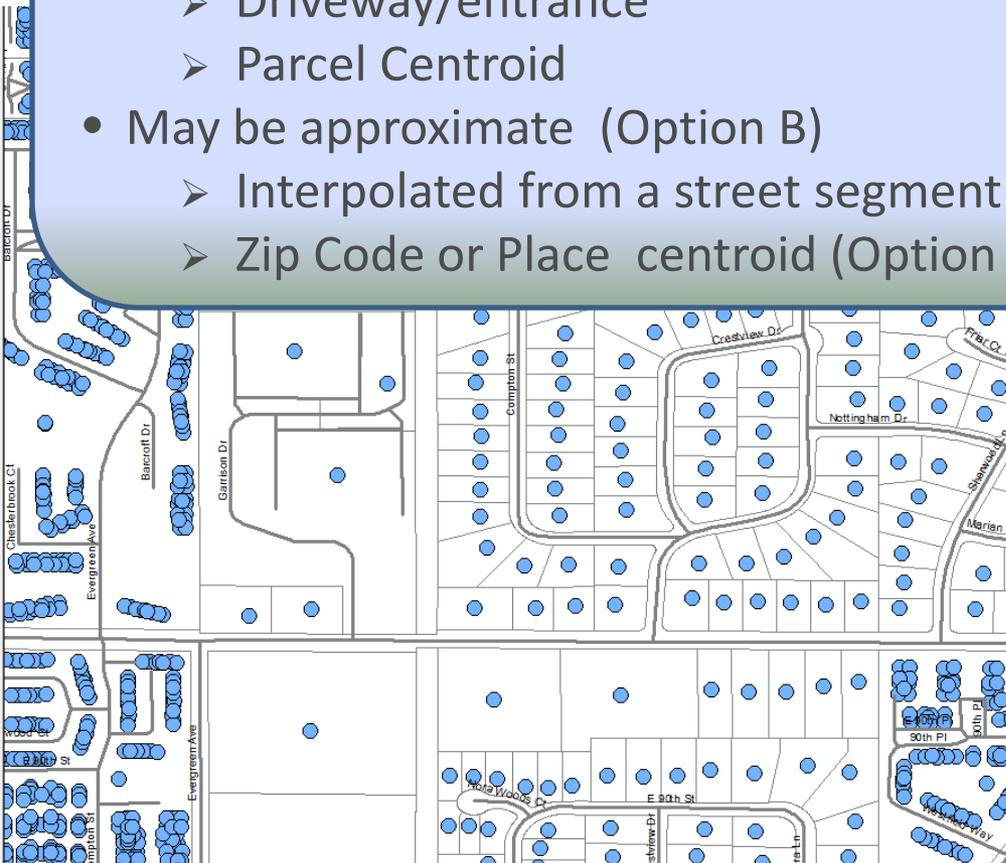
250 W College Ave

298

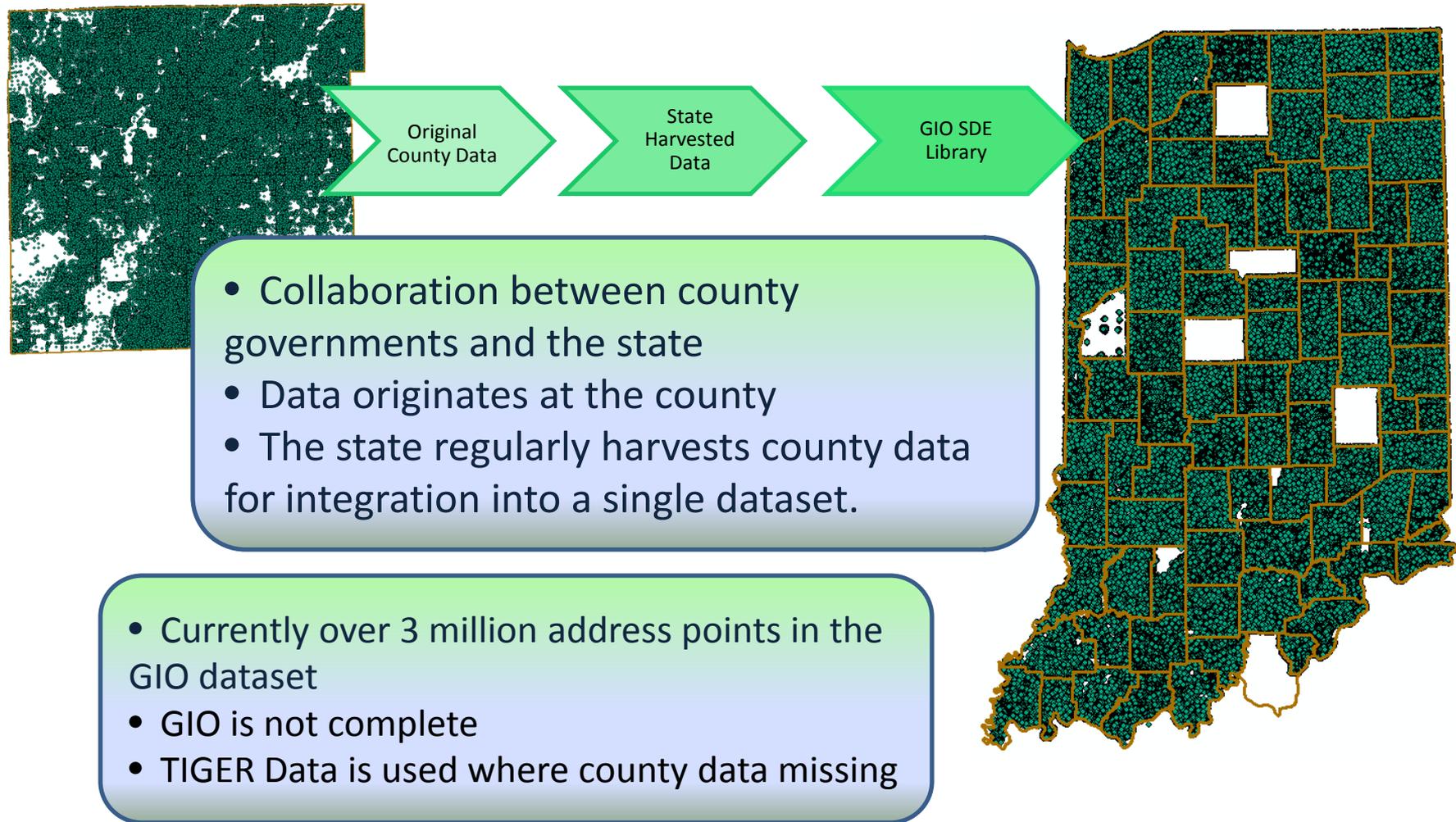
201

W College Ave

299



# Where does point data come from?



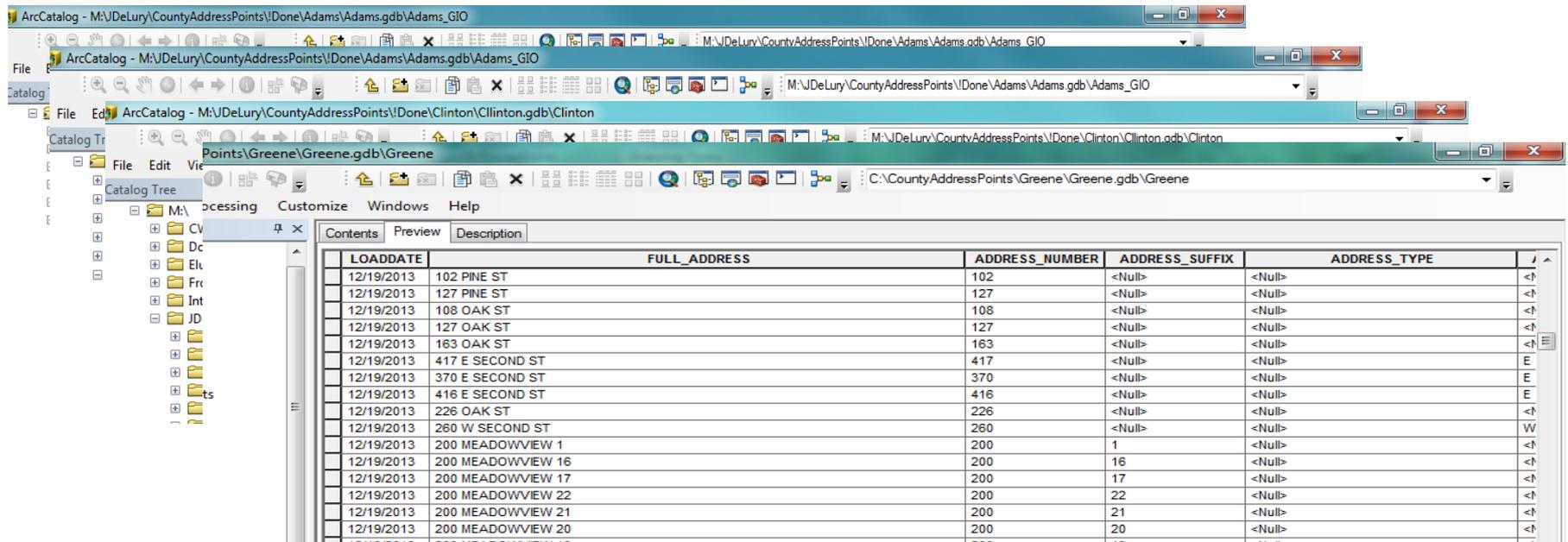
# “Cleaning up” Data

(AKA: Locator)

- Locator updated last fall
- <https://gis.in.gov/arcgis/services> (State)
- Currently being updated again
- Location data has multiple errors

## Errors:

- ✓ No data
- ✓ Incomplete Data
- ✓ Unusable Data
- ✓ Varied standardization



The screenshot shows the ArcCatalog interface with a table of address data. The table has the following columns: LOADDATE, FULL\_ADDRESS, ADDRESS\_NUMBER, ADDRESS\_SUFFIX, and ADDRESS\_TYPE. The data is as follows:

LOADDATE	FULL_ADDRESS	ADDRESS_NUMBER	ADDRESS_SUFFIX	ADDRESS_TYPE
12/19/2013	102 PINE ST	102	<Null>	<Null>
12/19/2013	127 PINE ST	127	<Null>	<Null>
12/19/2013	108 OAK ST	108	<Null>	<Null>
12/19/2013	127 OAK ST	127	<Null>	<Null>
12/19/2013	163 OAK ST	163	<Null>	<Null>
12/19/2013	417 E SECOND ST	417	<Null>	<Null>
12/19/2013	370 E SECOND ST	370	<Null>	<Null>
12/19/2013	416 E SECOND ST	416	<Null>	<Null>
12/19/2013	226 OAK ST	226	<Null>	<Null>
12/19/2013	260 W SECOND ST	260	<Null>	<Null>
12/19/2013	200 MEADOWVIEW 1	200	1	<Null>
12/19/2013	200 MEADOWVIEW 16	200	16	<Null>
12/19/2013	200 MEADOWVIEW 17	200	17	<Null>
12/19/2013	200 MEADOWVIEW 22	200	22	<Null>
12/19/2013	200 MEADOWVIEW 21	200	21	<Null>
12/19/2013	200 MEADOWVIEW 20	200	20	<Null>

# Improving Point Data

## The Standardization Process

- Addresses are reformatted
  - Use an in house algorithm (ISDH) developed for our GeoRunner web service
- Not all addresses standardize well
  - Addresses with ½
  - Streets with odd names
- Reformatted data is checked for accuracy

**Standardized data =  
better address locator**

Improves address  
matching rate

19544 Lake Site Drive

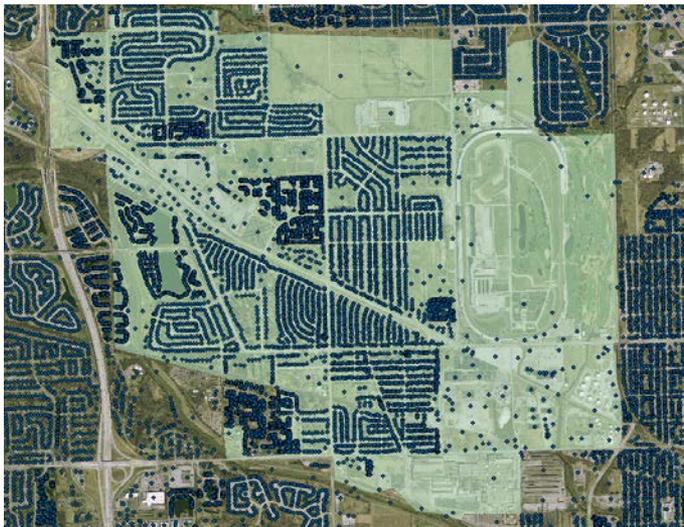
▶ 19544 E LAKE STE DR	19544	E		LAKE			STE DR
4323 W 700 S	4323	W		700	S		

# Enhancing Point Data

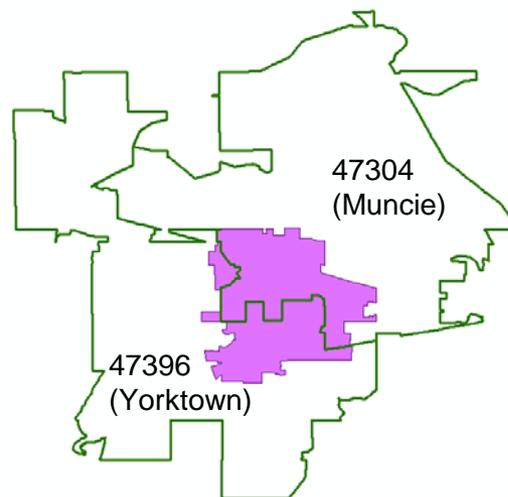
## Finding missing Data

- Spatial join with the county parcels (property address)
- Spatial join with census ZCTA (Zip Code Tabulated Area) data (2010)
- When ZCTA data is used the USPS preferred city is assigned
- Time management: Unusable data is deleted
- Usable data goes through the reformatting process
- Additional Information

## Alternate city names (Speedway)



## Alternate zip code names (Town of Yorktown)





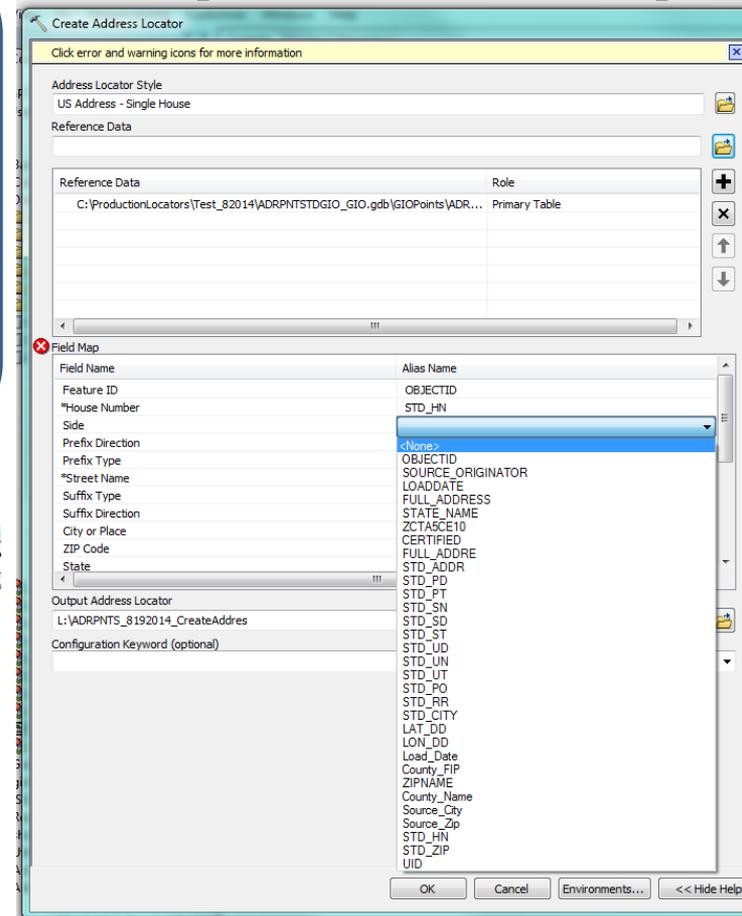
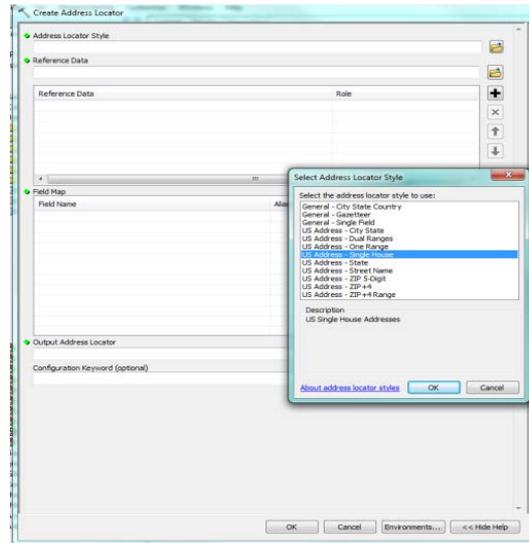
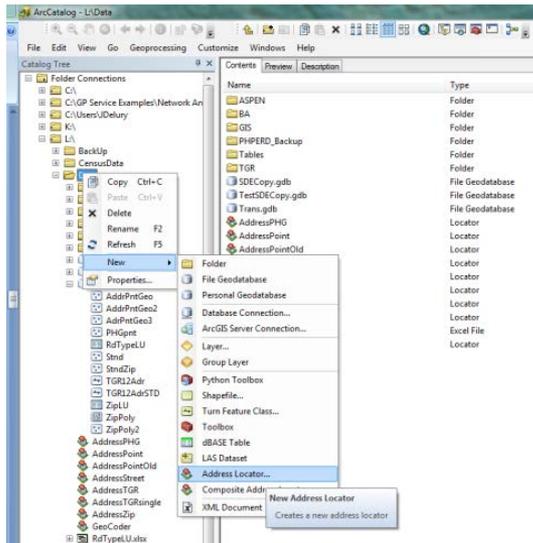


GeoCoder

<Type an address...>

# Creating an Address Locator

- Have a primary reference table with x,y data.
- Created in ArcCatalog from a variety of styles.
- Style depends on the attributes in the primary reference table.
- Reference fields are set using the field map.
- Made from a variety of data types
- Accuracy depends on the primary table



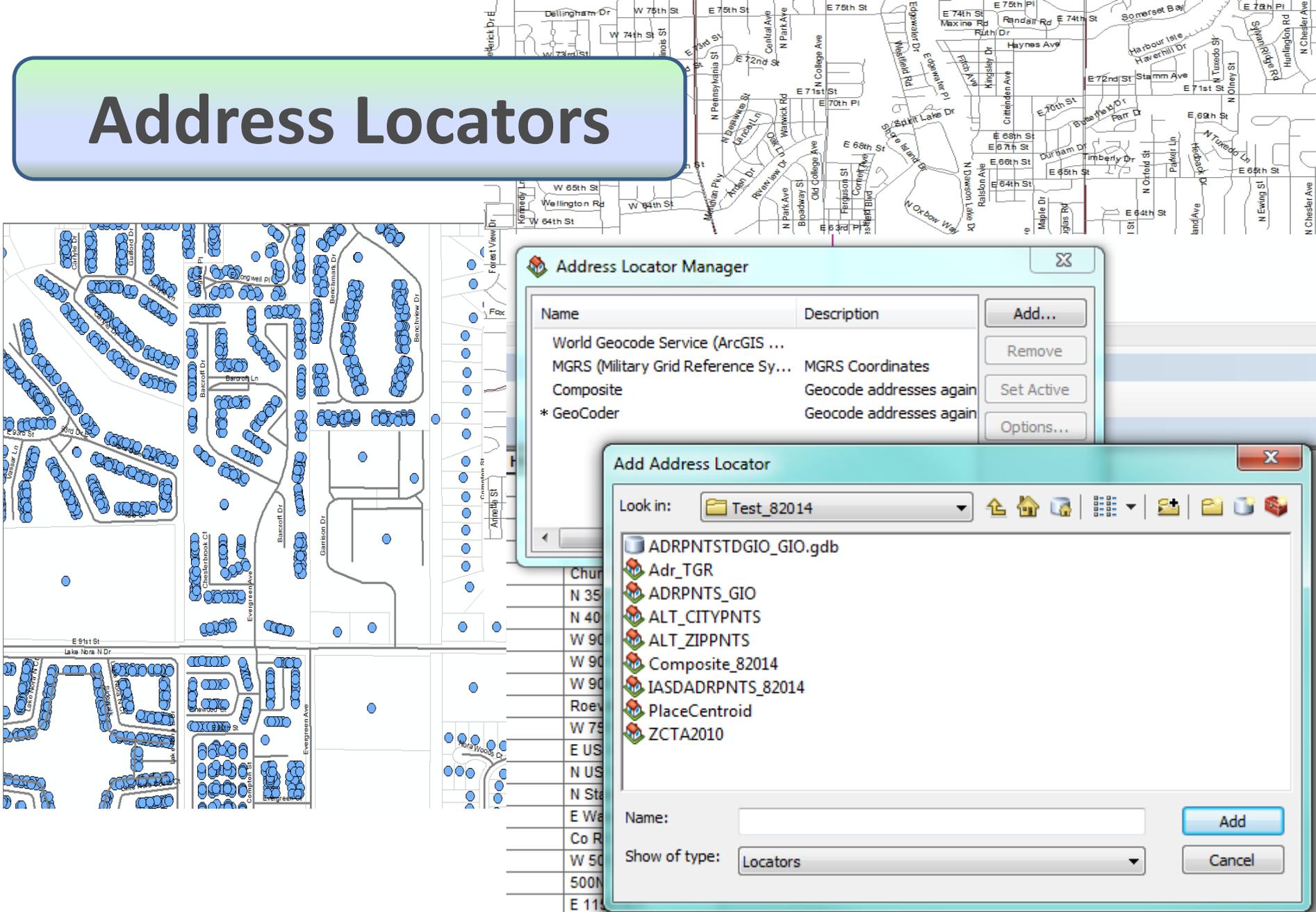
***Address locators also contain projection information!***

**NOTE**

GeoCoder

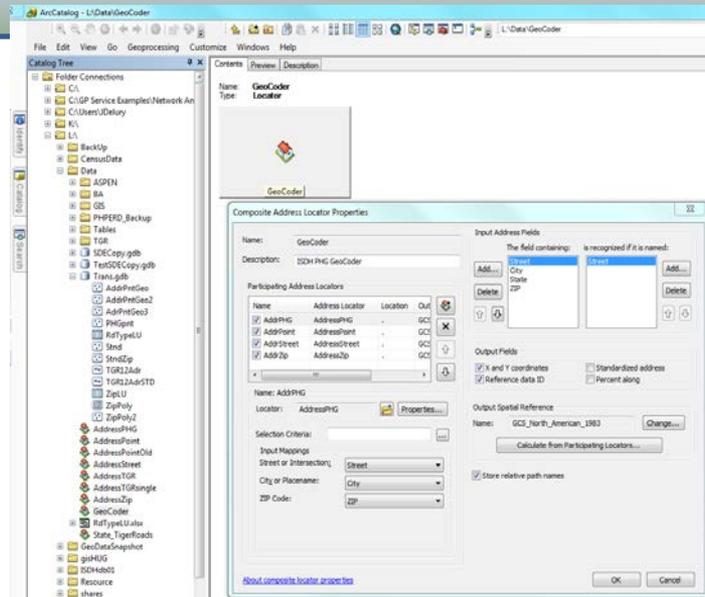
<Type an address...>

# Address Locators



# Composite Locator

- Contains multiple locators
- Allows for more address matching types.
- Order is important...the locators are searched from the top down.
- Once an address is matched searching stops for that address.



Match found

No match found address passed to next locator



Match found

No match found address passed to next locator



Match found

No match found address passed to next locator



Match found

No match found

Find tool can show all possible candidates



NOTE

# Geocoding Addresses

## Why all the work?

\$\$\$\$\$

- Current cost for batch geocoding (ArcGIS online) is \$40/10,000
- In House = unlimited batch geocoding
- The ISDH geocodes ~ 5 million addresses in one year!
- Savings of \$20,000 based on current rates
- ISDH is one agency
- Multiple agencies & users = you do the math

\$\$\$\$\$

- Can make custom locator (ISDH Facilities)
- <https://gis.in.gov/arcgis/services> (State)



# Parts needed for geocoding

Dataset  
With  
addresses



Address  
Locator



Point  
Feature  
Class

RI	ADDRESS_STREET1	ADDRESS_STREET2	ADDRESS_CITY	STATE	ZIP_CODE	COUNTRY
1014 E WESTFIELD AVENUE	<null>	LA PORTE	IN	46330	US	
3000 COLORADO WOOD DR	<null>	INDIANAPOLIS	IN	46220	US	
1712 EAST 1100 NORTH	<null>	OSHAM	IN	46777	<null>	
5102 S 100 E	<null>	LAGANOVE	IN	46781	US	
1077 CO RD 76	<null>	ASHLEY	IN	46705	US	
1006 N 1010 W	<null>	LAGANOVE	IN	46781	US	
1017 N 875 E	<null>	HILL CREEK	IN	46395	<null>	
1044 E 800 S	<null>	LA PORTE	IN	46300	US	
1001 E 400 S	<null>	LA PORTE	IN	46300	<null>	
1006 W 400 E	<null>	LAGANOVE	IN	46781	US	
1417 S BRACKENRITH DR	<null>	SPRINGSBURG	IN	47380	US	
1402 W 1000 N	<null>	ZIONSVILLE	IN	46377	<null>	
1000 W 300 S	<null>	LAGANOVE	IN	46781	US	
1000 MARLYNE DRIVE #82	<null>	CLARKSVILLE	IN	47129	US	
1015 W 650 N	<null>	LAGANOVE	IN	46781	<null>	
1003 W 400 E	<null>	HARTFORD CITY	IN	47348	US	
1041 W 600 S	<null>	HOCKESSVILLE	IN	46785	US	
1000 W 100 S	<null>	LAGANOVE	IN	46781	US	
1740 SOUTH 200 EAST	<null>	LAGANOVE	IN	46781	<null>	
1708 S 200 EAST	<null>	INDIC	IN	46540130	<null>	
1708 S 200 W	<null>	DECATUR	IN	46723	US	
1712 W 200 NORTH	<null>	LA PORTE	IN	46300	US	



# Address Matching Process

Add the  
address table to  
the map

Choose the  
Address Locator

Set the geocoding  
parameters

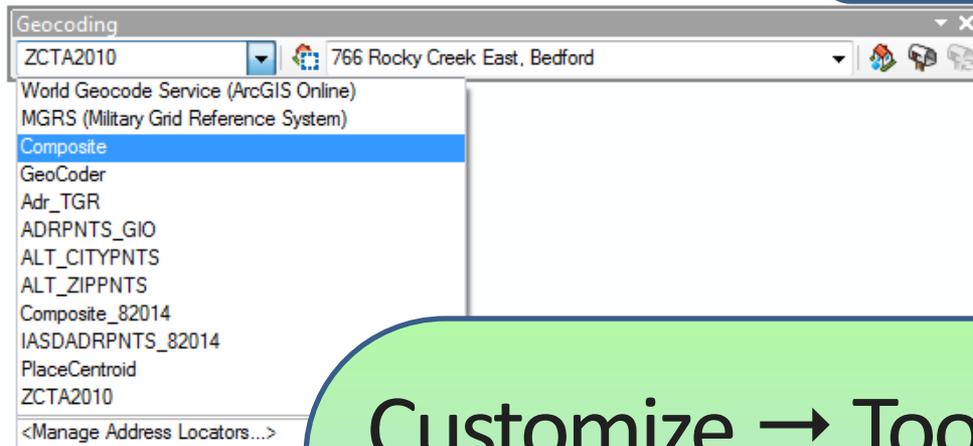
Match the  
Addresses

Adjust  
geocoding  
parameters

Geocoding can be done from  
ArcCatalog or ArcMap.

**NOTE**

# Geocoding Toolbar



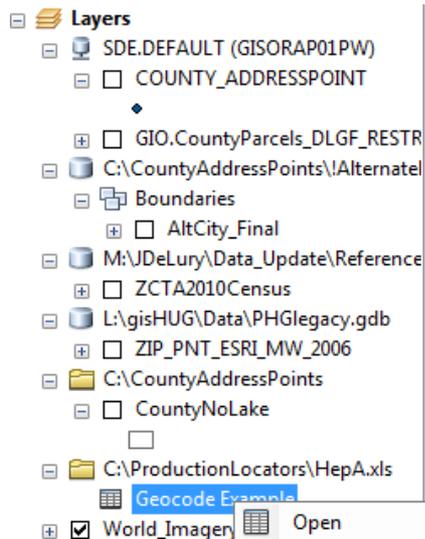
Customize → Toolbars → Geocoding

- Shows available address locators
- Use ArcGIS Online or local locators
- <https://gis.in.gov/arcgis/services> (State)
- Can use the Map Extent to limit search
- Quick way to search and view single address



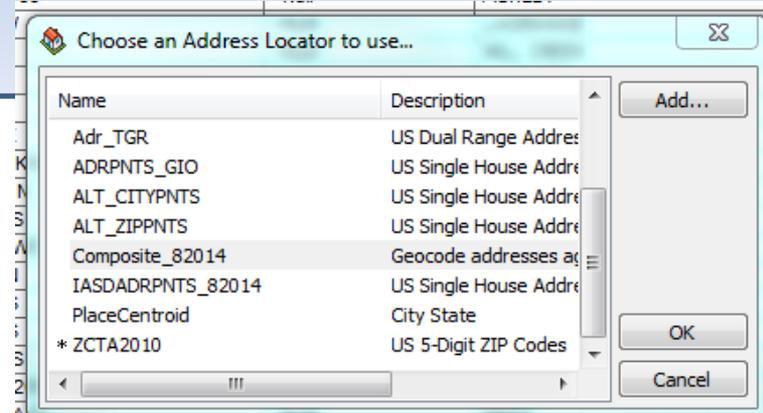
# Start Geocoding

Right-click → Geocode Addresses



## Choose Address Locator

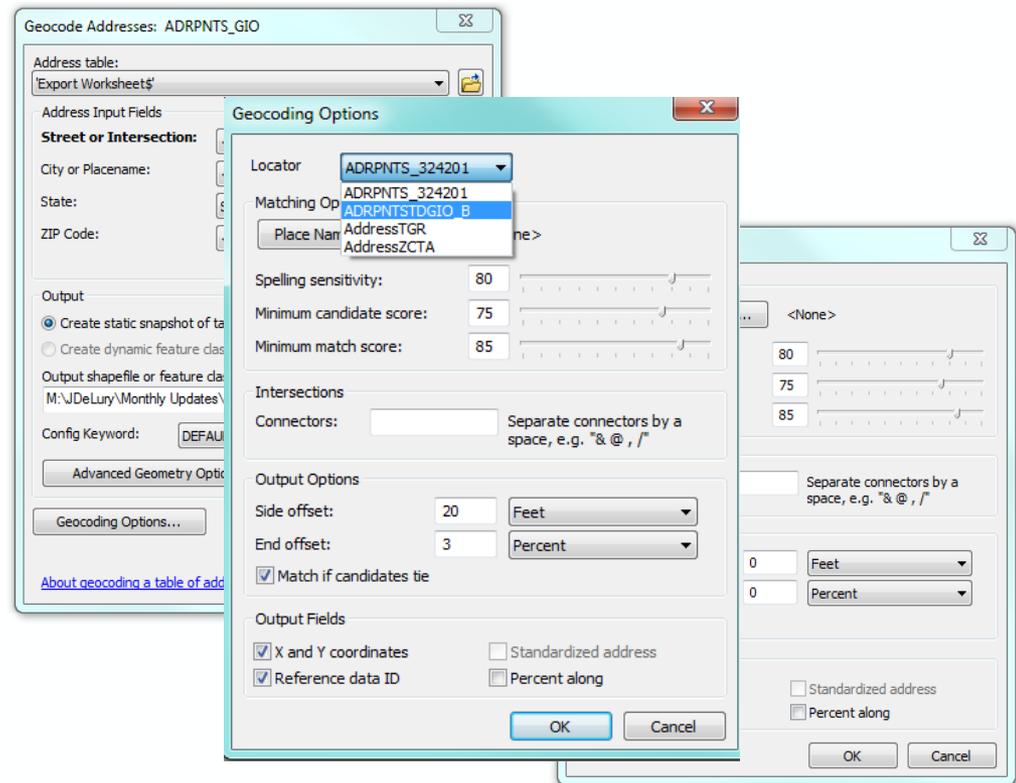
- State (<https://gis.in.gov/arcgis/services>)
- Local
- Custom
- ArcGIS On Line



Check  
Parameters

# Parameters

- Select the address table
- Choose Address Input Fields
- Defaults parameters will be set...they can be changed
- Advanced Geometry: Sets projection
- Geocoding Options:
  - Offsets set at 0
  - Check (✓) X and Y coordinates
  - Check (✓) Reference data ID if needed
  - Composite: Parameters set for each locator
  - Match ties only needed for street segments



Geocoded feature class will have points only for matches and ties

**NOTE**

Some records will not have corresponding points because of errors in the data





**Address Geocoding**  
**Contact GIO Office**

**Questions???**