Spatial Analysis and Modeling (GIST 4302/5302)

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Address Matching

What is Geocoding?

- Convert lists/spreadsheets to geographical features
- Needs a mechanism to calculate the geographic coordinate for the address
- **Address matching**: uses street address database, created from a streets layer.

Address Matching Geocoding

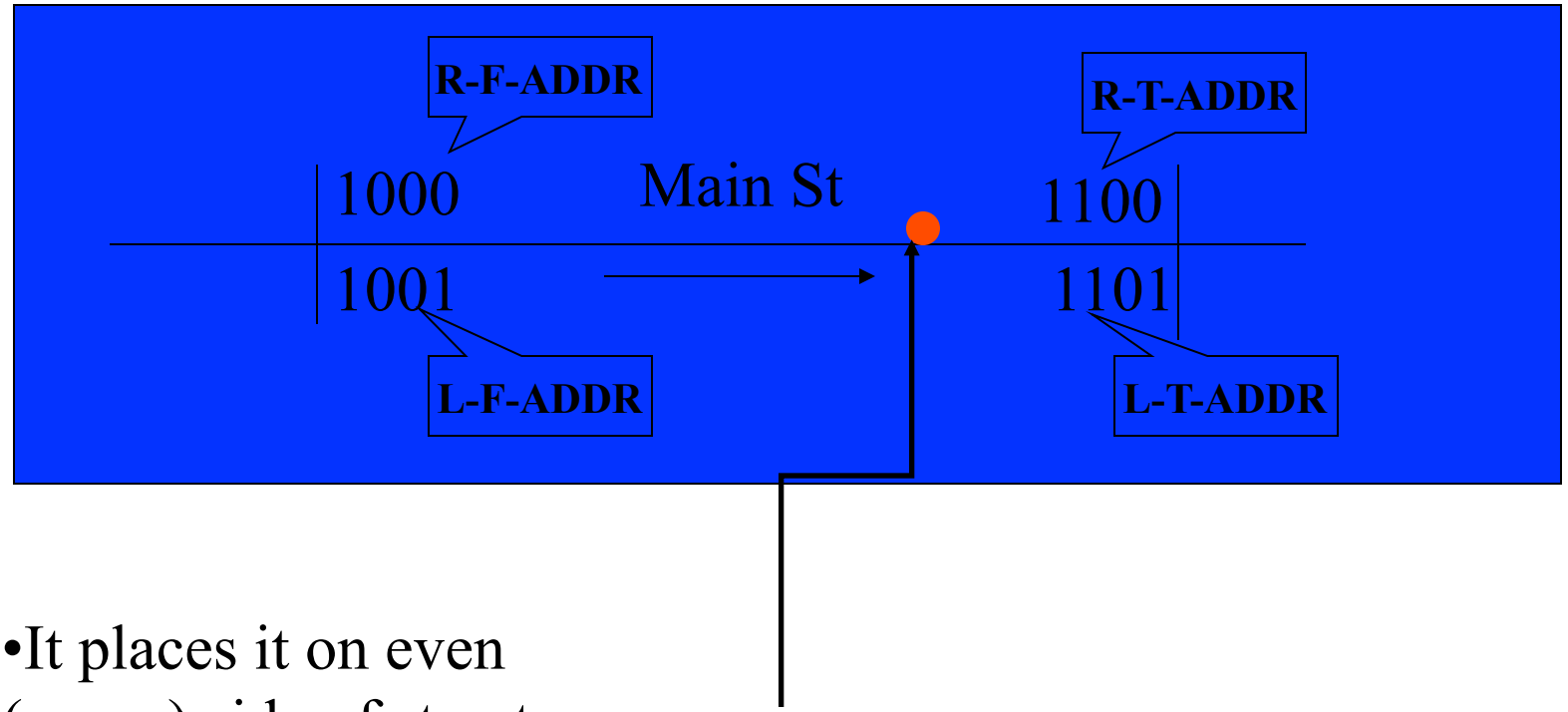
- Two inputs:
  - 1) a DBF or text table with the address records to be geocoded and
  - 2)a geographic reference layer, like streets
- Output: a point file, where each point represents an address record

How are addresses matched?

- Common method: matching address to street **ranges**.
- Urban areas: usually each street segment (arc) corresponds to a block.
- Each segment has attributes for the left **from and to** and right **from and to** addresses.
- Hence computer knows the left address and right address and the beginning and end of the block.
- Computer matches street name, address range
- Interpolates the position of the address point on segment

Geocoding with streets: Address ranges

It looks for Main street, than for the 1000-1100 block



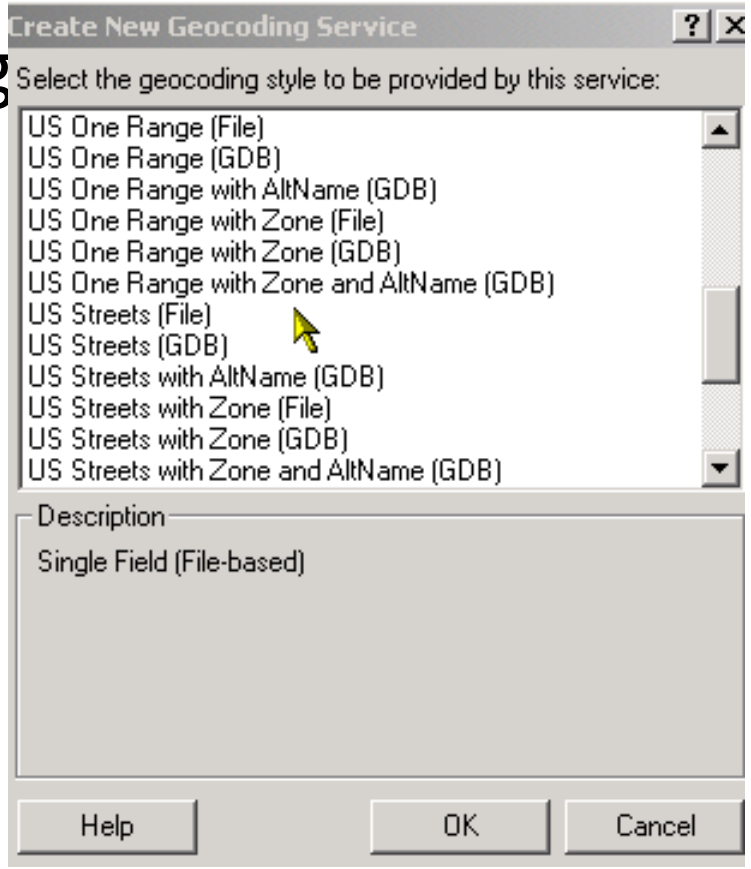
- It places it on even (upper) side of street
- Position of 1060 is interpolated

Address Matching in ArcGIS

- First create a **address locator**
- Defines reference layer
- Also where you specify information about your reference layer that ArcGIS might not know, allowing for more efficient geocoding

Geocoding in Arc GIS

- We create our address locator in Arc Catalog.
- This will bring up a dialog asking for the geocoding style for that geocoding service



Geocoding Service

- Geocoding styles are necessary because
  - Reference layers come in many forms and formats. For instance, a reference layer may have the from right address attribute as fr_rt_add or add_rt_frm)
  - There are other types of geocoding, besides address geocoding, like geocoding points to the center of zip codes, and there are other types of address geocoding besides street address geocoding, like using a property parcel layer as reference.

Geocoding Services

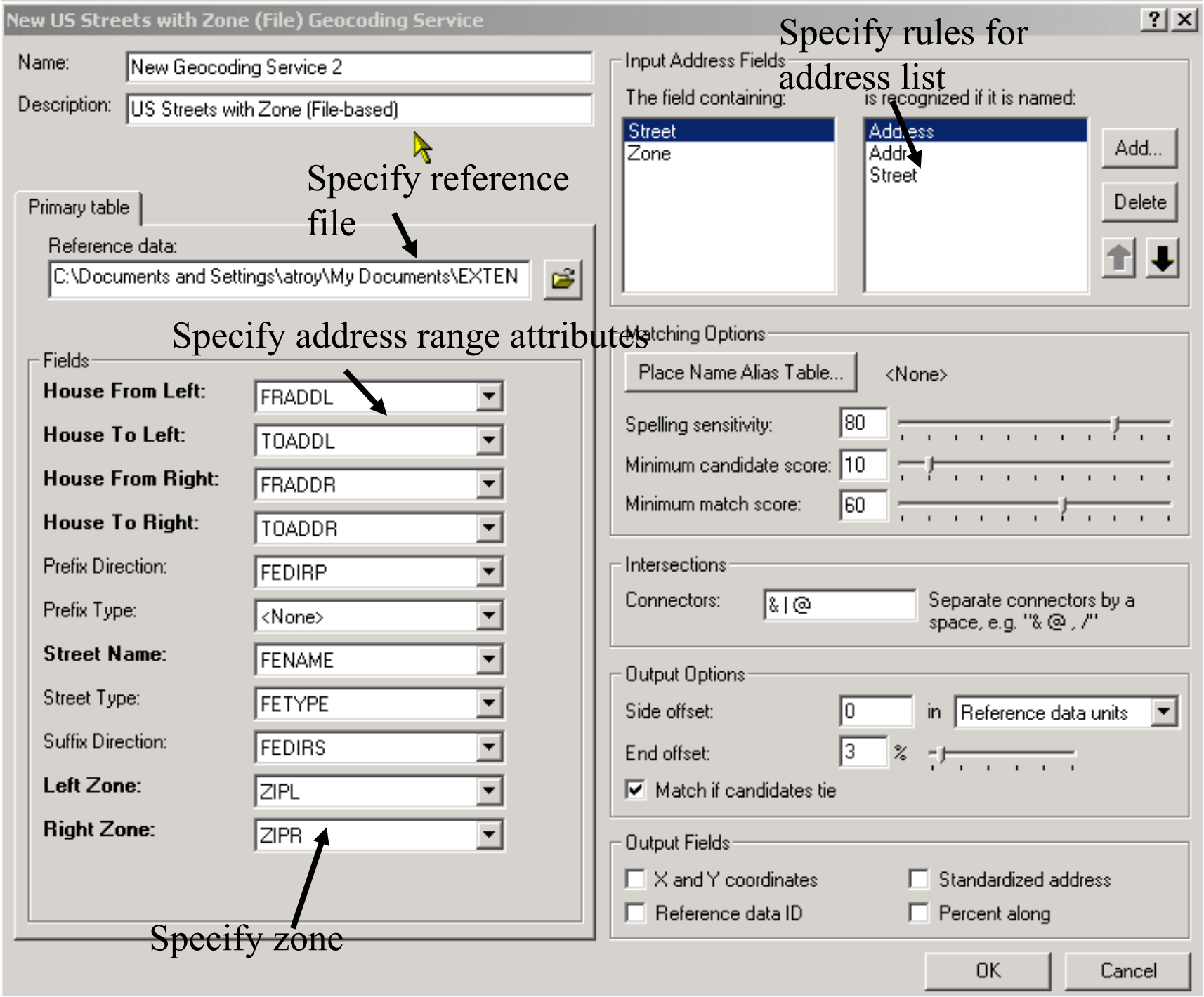
- Web mapping portal
  - Google Place
  - MapQuest
- TAMU geocoding service
- ArcMap

Most Common Geocoding Styles

- US Streets
- US Streets with Zone
- Street Map USA
- Gazetteer

Geocoding in Arc GIS

- In geocoding style interface: choose your reference file and then specify which attributes in the reference layer correspond with the inputs that ArcGIS needs to do geocoding.
- It also asks for some information about what to expect in your geocoding table (what the required attribute headings are called) and how sensitive to be to things like spelling differences

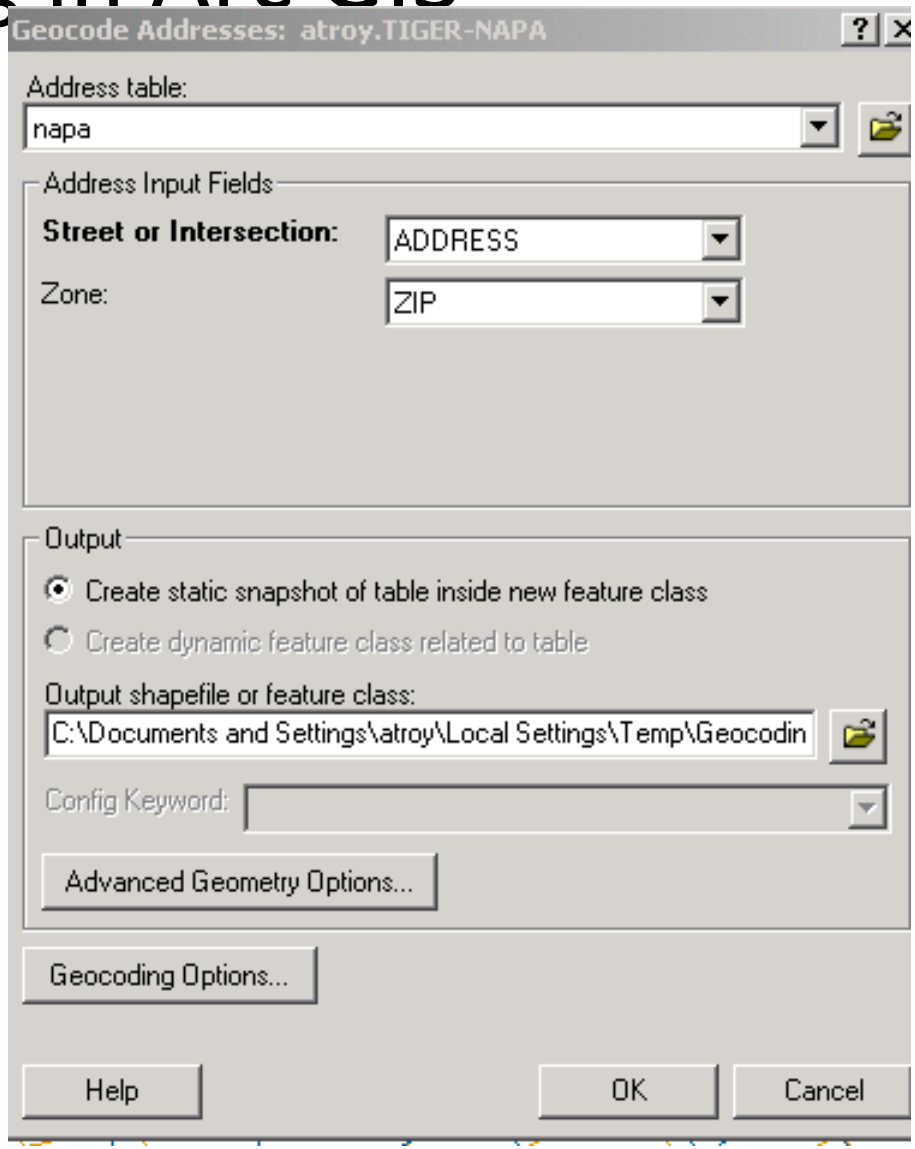

New US Streets with Zone (File) Geocoding Service
Name:
New Geocoding Service 2
Description:
US Streets with Zone (File-based)
Specify rules for address list
Input Address Fields
The field containing:
is recognized if it is named:
Street
Zone
Address
Addr
Street
Add...
Delete
Specify reference file
Primary table
Reference data:
C:\Documents and Settings\atroy\My Documents\EXTEN
Specify address range attributes
Fields
House From Left:
FRADDL
House To Left:
TOADDL
House From Right:
FRADDR
House To Right:
TOADDR
Prefix Direction:
FEDIRP
Prefix Type:
<None>
Street Name:
FENAME
Street Type:
FETYPE
Suffix Direction:
FEDIRS
Left Zone:
ZIPL
Right Zone:
ZIPR
Specify zone
Matching Options
Place Name Alias Table...
<None>
Spelling sensitivity:
80
Minimum candidate score:
10
Minimum match score:
60
Intersections
Connectors:
& | @
Separate connectors by a space, e.g. "& @ , /"
Output Options
Side offset:
0
in
Reference data units
End offset:
3
%
Match if candidates tie
Output Fields
X and Y coordinates
Standardized address
Reference data ID
Percent along
OK
Cancel

Geocoding in Arc GIS

- We have now created a geocoding service, which we should name so we can keep it straight.
- Now, in Arc Map we go to Tools>>Geocode Addresses and we add the geocoding service we want to use

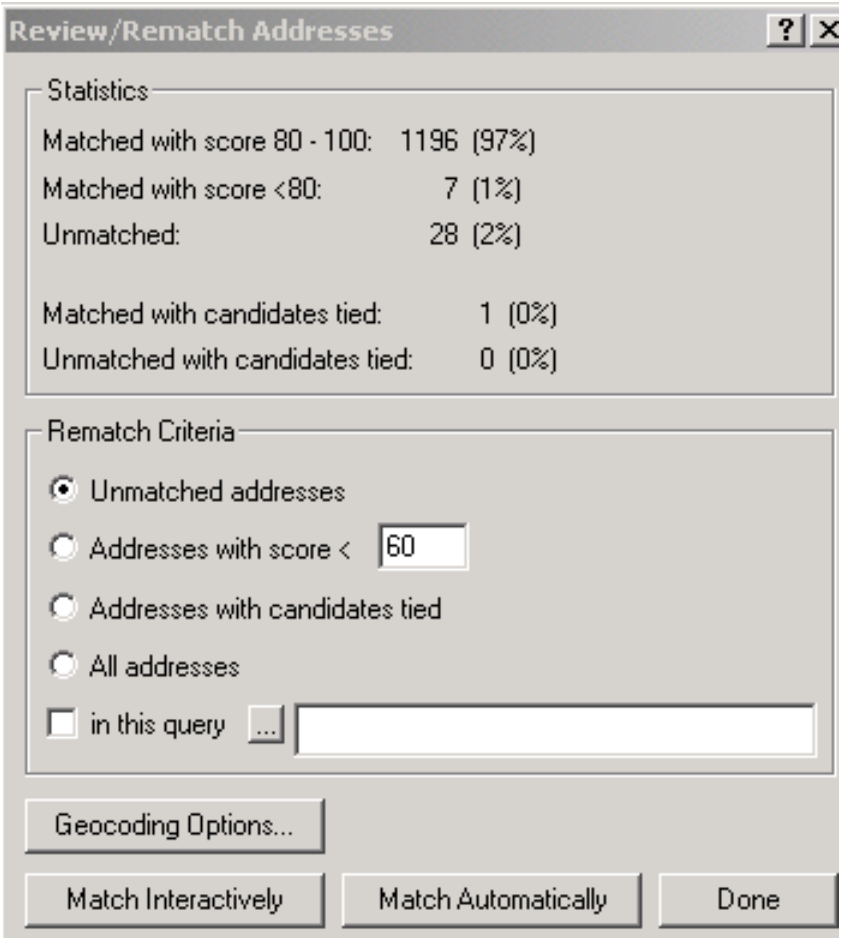
Geocoding in Arc GIS

- This brings up the geocoding interface where we specify which field holds the address and which holds the zone
- Also specify an output shapefile or geodatabase and geocoding sensitivity



Geocoding in Arc GIS

- After geocoding, it tells me how many were successfully matched and how many were either totally unmatchable or potentially matchable
- We can interactively match the potential ones if we want

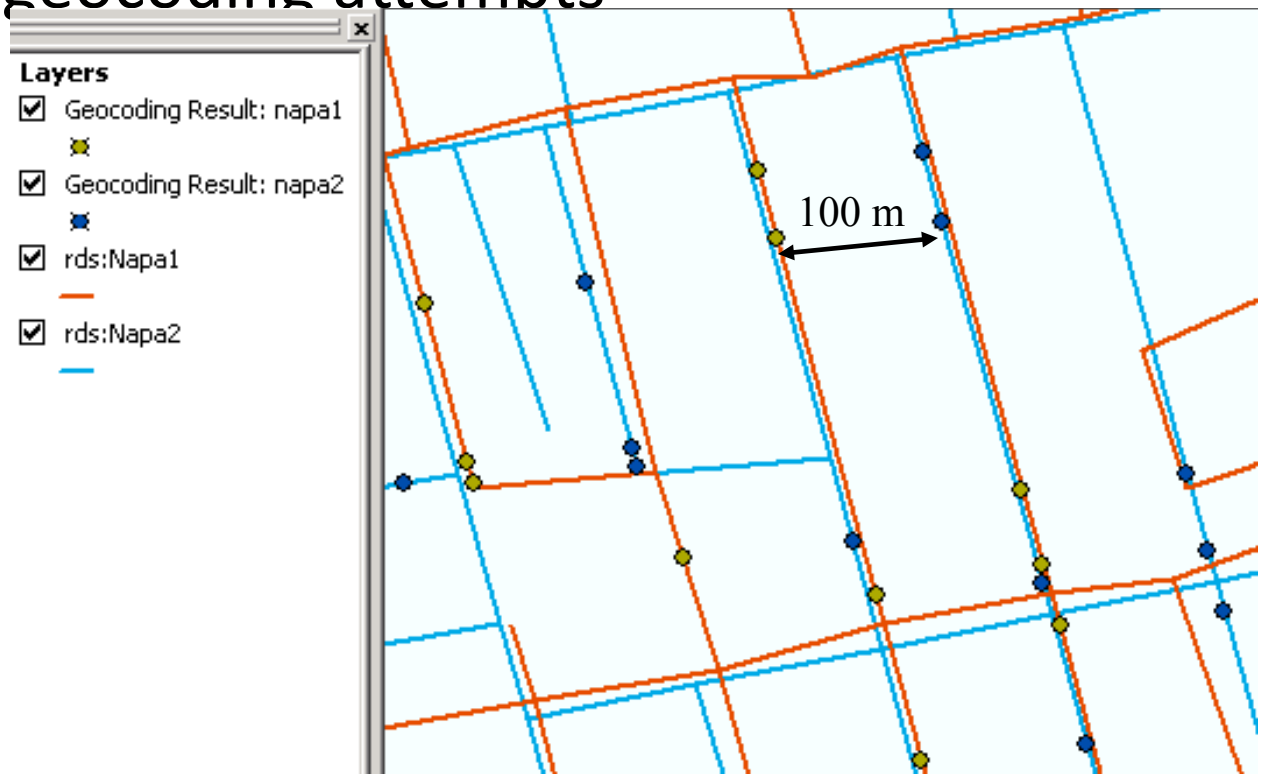


Geocoding and Error

- Your Geocoding result is only as good as your reference data.
- If your streets layer is accurate only to 200 meters of accuracy, so will your geocoded points be
- If your streets are consistently 100 meters to the north, then your points will be the same too
- Some roads layers may have better attributes than other too.

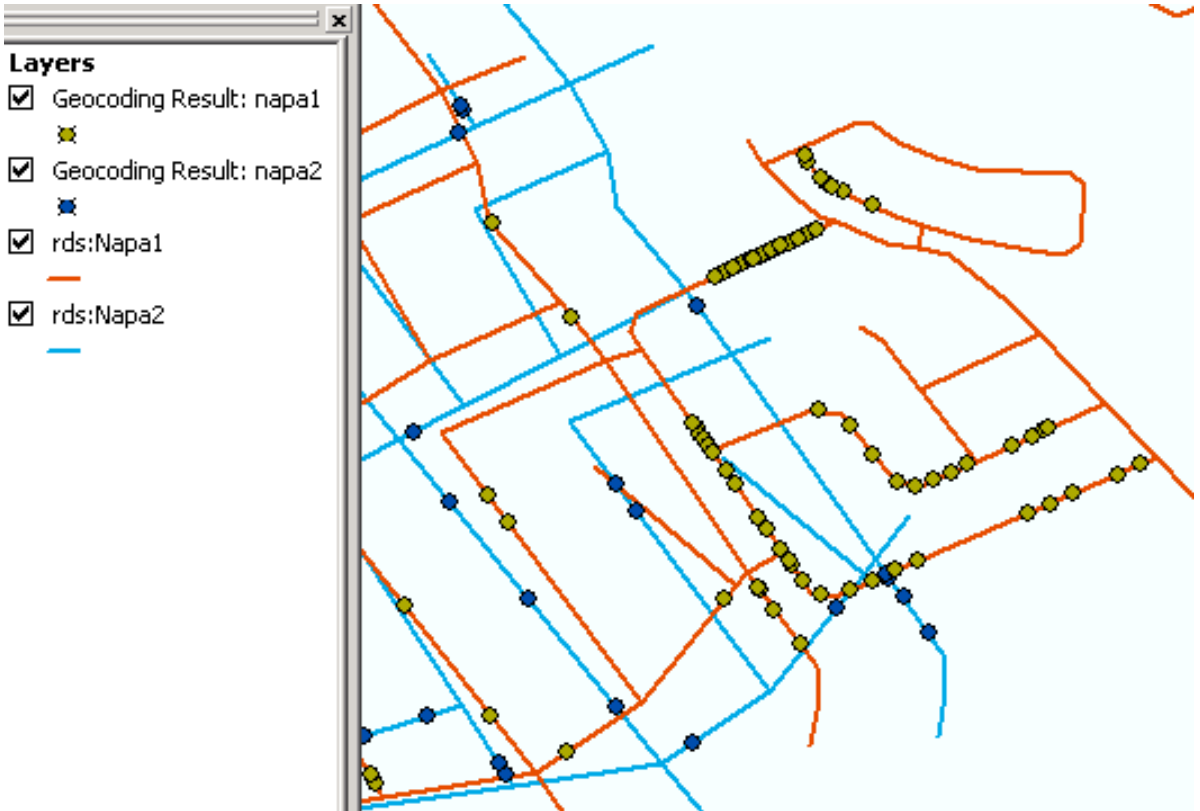
Geocoding and Error

- Here's an example where the same address list was geocoded with two different street layers.
- Note here how the same house is 100 m off between the two geocoding attempts



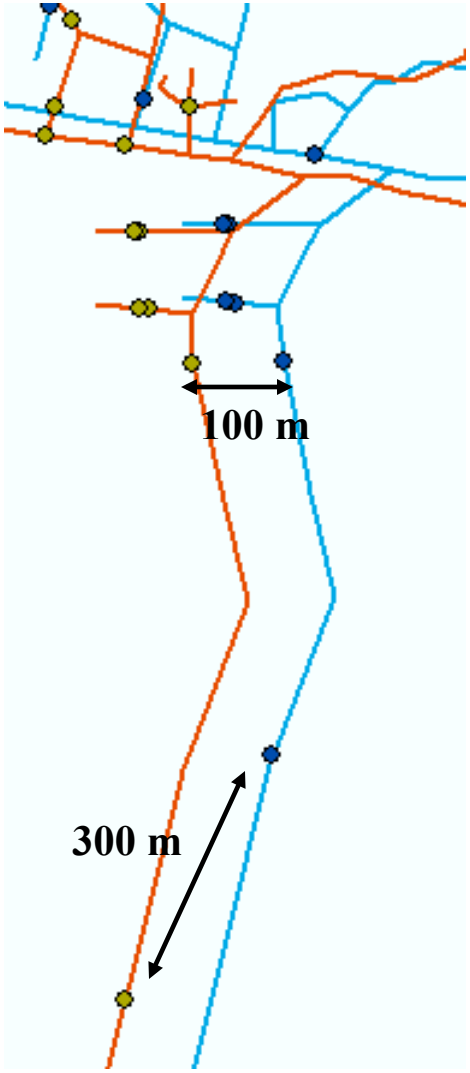
Geocoding and Error

- Here we see that many points were coded for Napa1 that were not coded for Napa2 possibly because Napa1's street reference layer is newer, and has more streets



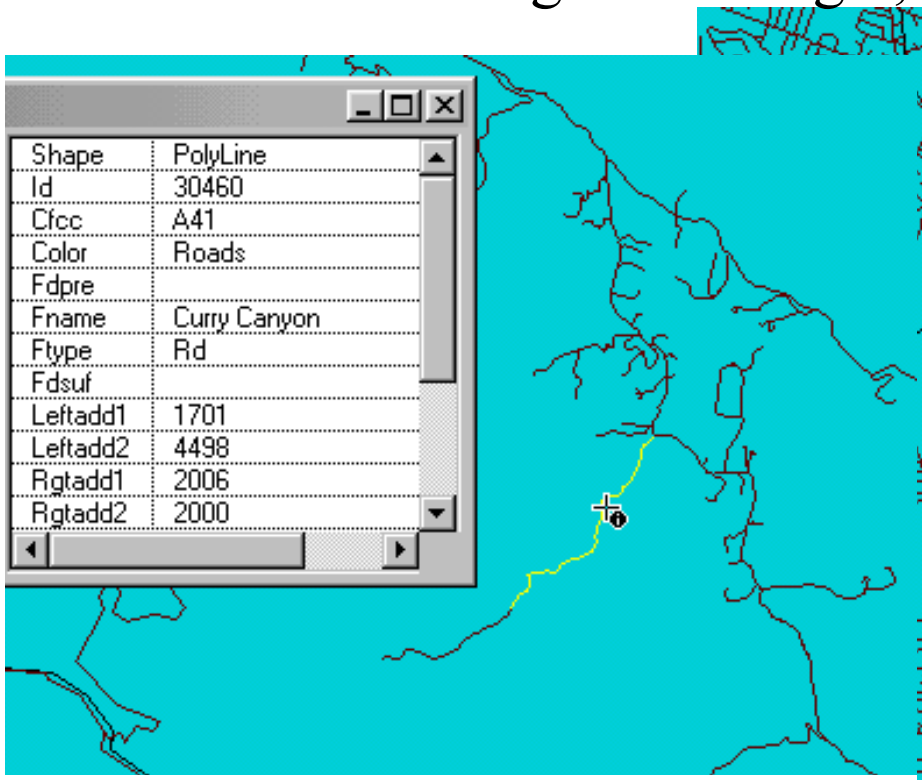
Geocoding and Error

- This error is due to an attribute error in one of the layers which puts that address in the wrong street segment

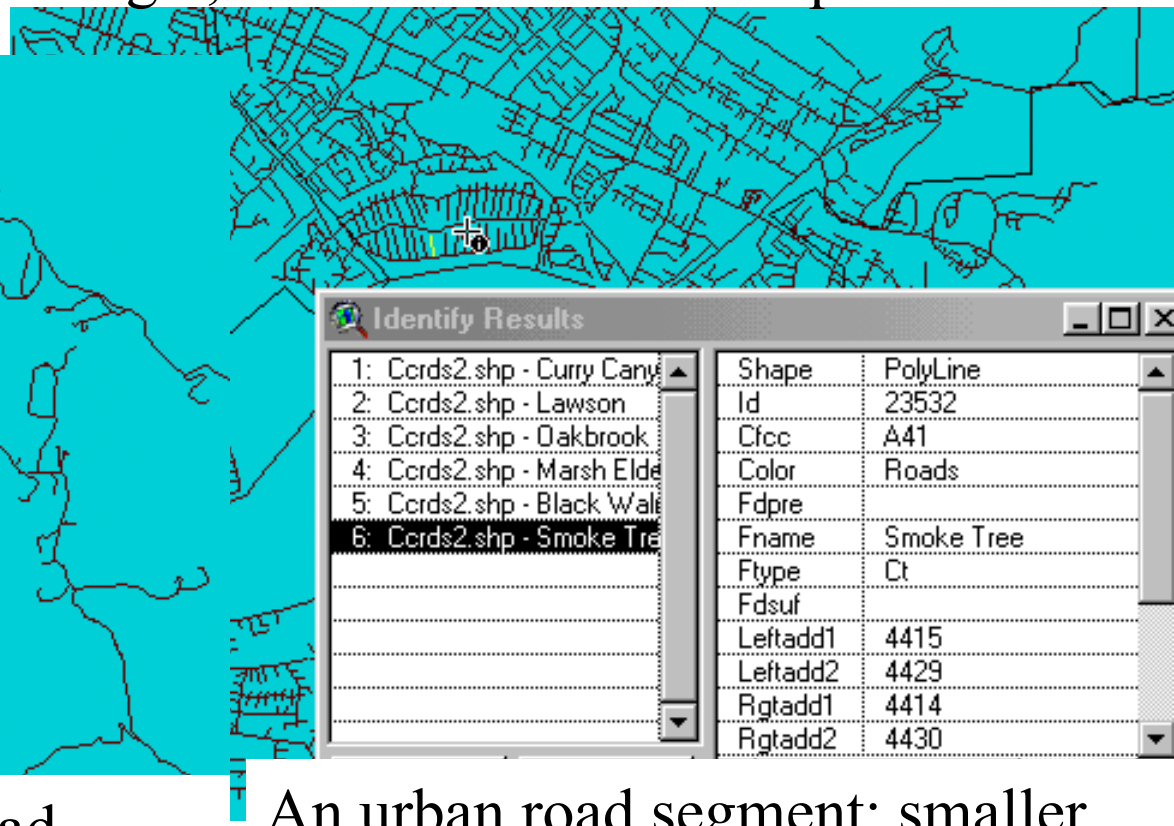


Geocoding and Error

Rural street segments are also more subject to more error because street segments longer, so relies more on interpolation



A rural area with a long road segment: very imprecise



An urban road segment: smaller, more precise

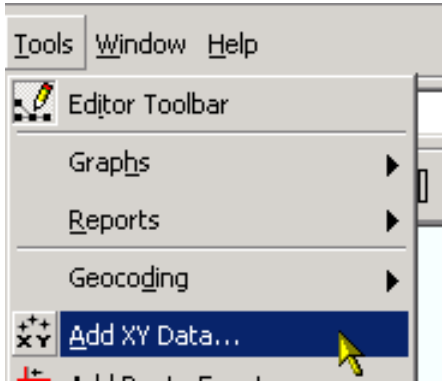
Geocoding and Error

- Name ambiguity
  - Georgia: county or the state of the United States
  - Kansas city: Missouri or Kansas
- Null values
  - http://www.bbc.com/news/technology-37048521
  - Null island: http://www.wsj.com/articles/if-you-cant-follow-directions-youll-end-up-on-null-island-1468422251
    - https://www.youtube.com/watch?v=bjvIpI-1w84

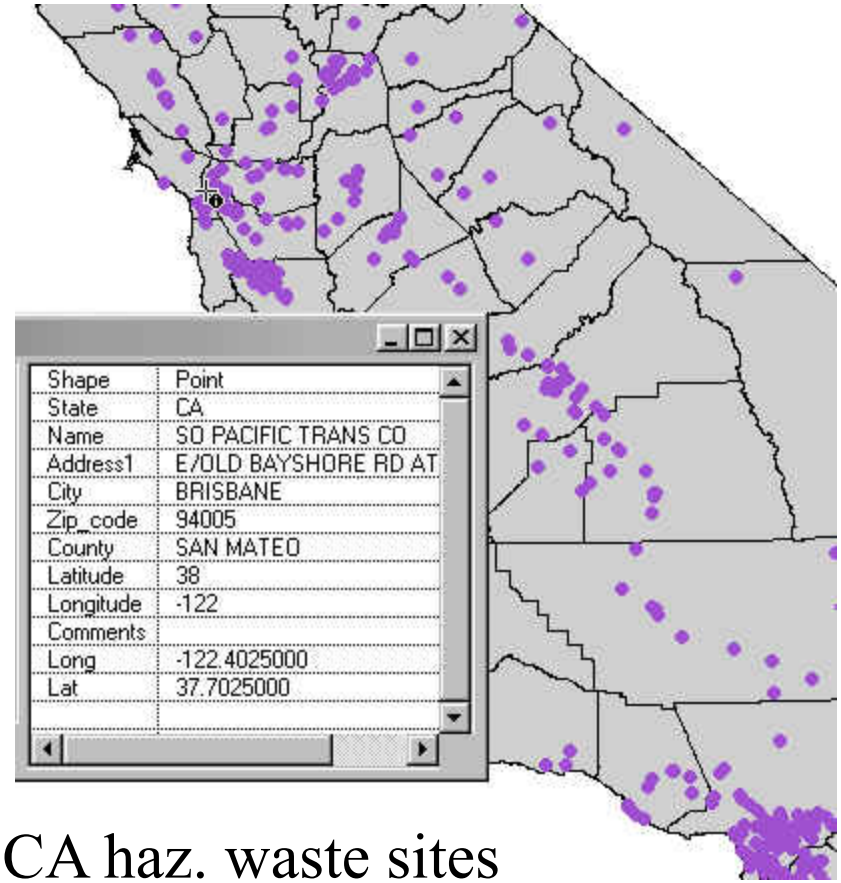
XY Geocoding

We can also create points from a table by their latitude and longitude

Do this by clicking:



- Then we specify the lat and long fields as well as the spatial reference system
- Lat and Long should be in decimal degrees



CA haz. waste sites

- End of this topic