

The Geocoding Service for the 2020 Census Local Update of Census Addresses Operation (LUCA)

1. What is the LUCA Geocoding Service?

For the 2020 Census Local Update of Census Addresses Operation (LUCA), the Census Bureau offers a LUCA-specific Geocoding service. The LUCA Geocoding service allows the user the ability to submit an unlimited number of addresses to determine their geocodes, or the geographic codes (Census Block, Tract, County, and State) for the area in which the addresses are found. In addition to geocoding the input addresses, the LUCA Geocoding service provides a total count of each matched, unmatched, or tied address and provides an address count based on those addresses that were geocoded. **The public geocoder does not provide this information.** Unlike the public geocoder, the LUCA Geocoding service is **not** limited to 10,000 addresses. Used in conjunction with the LUCA Address Count List, the LUCA Geocoding service allows the user to compare their digital address list to the Census Bureau's count of addresses by census block. This allows the user to focus their address review on the census blocks with the greatest address count differences between their address list and the Census Bureau's.

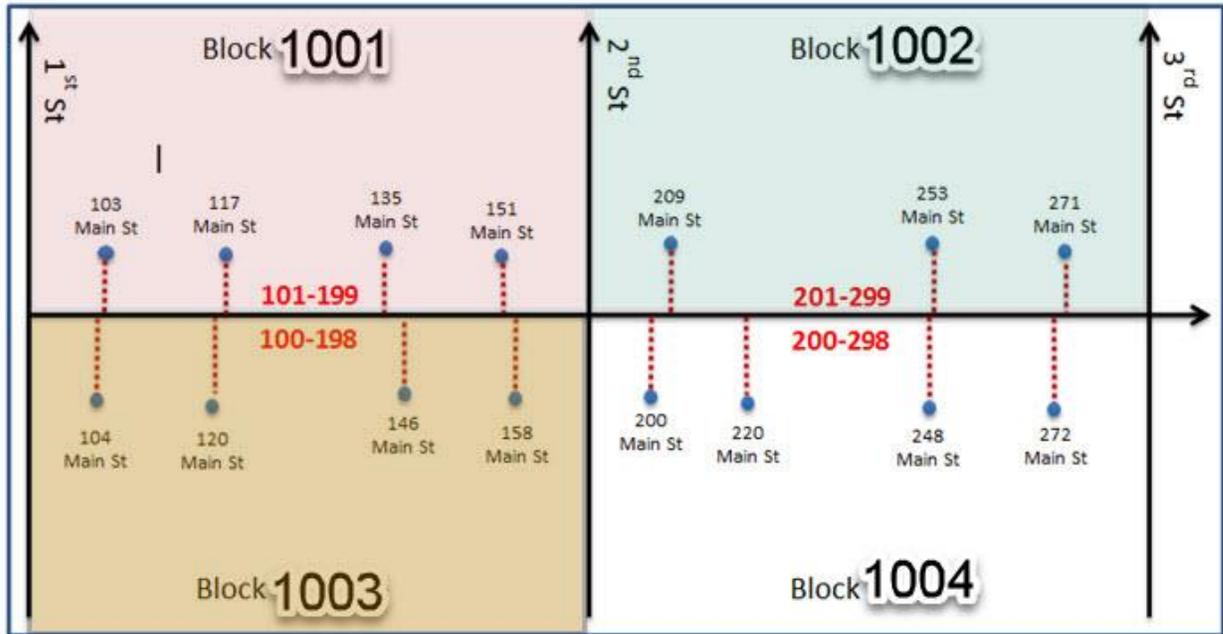
2. What is Geocoding?

Geocoding is an attempt to provide the geographic location (latitude, longitude) of an address by matching the address to an address range (addresses displayed in this document are fictitious and are used to provide an example of how address ranges are constructed). If we look at Block 1001 in the following example (Figure 1), the address range in red, **101-199**, is the range of numbers that overlap the actual individual house numbers associated with the **blue** circles (e.g. 103, 117, 135 and 151 Main St) on that side of the street (i.e., the Left side; note the arrow is pointing to the right on Main Street.) Based on this logic, the **“from”** address would be **101** and the **“to”** address would be **199** for this address range. Besides providing a user with the geographic location of an address, the Census Geocoder also provides all of the additional Census geographic information associated with a location, for example a Census Block, Tract, County, and State.

For a definition of many of the Census terms discussed in this document please refer to the Census Bureau's Geography Reference page at <http://www.census.gov/geo/reference/terms.html>.

Figure 1

Building Address Ranges



* Simulated - not real address data

3. How do I create a digital file so that I can submit my addresses for batch geocoding using the LUCA Geocoding Service?

The first step in preparing your file for batch geocoding is to create and format a spreadsheet of your addresses into five columns as shown in the following example (Figure 2).

Figure 2

	A	B	C	D	E
	Record				
1	ID	Street Address	City	State	ZIP Code
2	1	111 Test St	Any City	Any State	12345
3	2	456 Main St	Any City	Any State	12345
4	3	789 North Ave	Any City	Any State	12345
5	4	890 West Ave	Any City	Any State	12345

The LUCA Geocoding service accepts input files in text (.csv, .txt, .dat) and Excel format (.xls, .xlsx). The output file is provided in the same format as the input file. Many database software products have the option of saving your file in these formats. Once

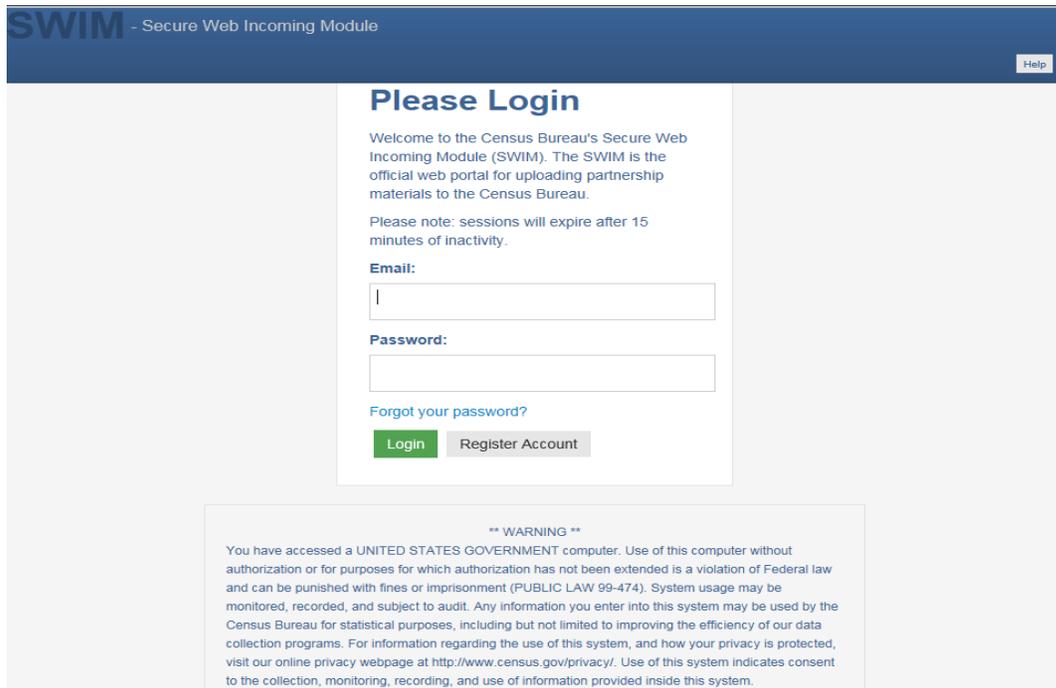
you have created your digital file, you must zip the file and use the Secure Web Incoming Module (SWIM) tool to securely upload zipped files to the Census Bureau.

After your file has uploaded, the Census Bureau will process your file and create a set of two output files: a geocoded address list and an address count list. In most situations the geocoding process will happen overnight, making the output files available the next day. The service will post the output files to the Commerce Department—Office of the Chief Information Officer (OCIO) secure File Sharing Website, and send an email message to the user that includes a link to the output files. The user accesses the link and downloads their files from this secure site.

4. Instructions for Uploading your Address Submissions through SWIM

Step 1

If you are a participant in another Census Bureau partnership program and already have a SWIM account, access <https://respond.census.gov/swim/> and enter your Email address and Password. Then click the Login button. The Welcome screen opens. Go to Step 7.



Step 2

If you do not yet have a SWIM Account, contact the Census Bureau to receive your Registration Token. The token is a 12-digit, single use, unique number, and each user who needs an account must have their own token in order to register. You can register at <https://respond.census.gov/swim/>. Once the login screen opens, click the **Register Account** button. The **Account Registration** screen opens.

Account Registration

Registration Token:

First Name:

Last Name:

Phone Number: - - #

Agency:

Email:

Confirm Email:

Password:

Confirm Password:

Security Question: 

Answer:



All fields on the **Account Registration** screen are required. You will not be able to move to the next screen until you have completed all fields.

Step 3

On the **Account Registration** screen, first, enter the 12-digit token provided by the Census Bureau. Then enter your name, agency, and email in the appropriate fields.

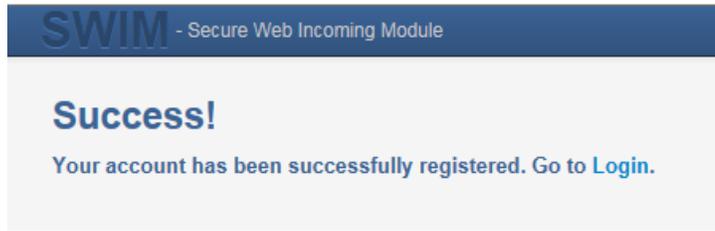
Step 4

Next, create a password. The password must meet the five criteria below:

1. It must be 8 characters in length
2. It must have at least one upper case character
3. It must have at least one lower case character
4. It must have at least one number
5. It must have at least one special character (valid special characters are: #, !, \$, *, &, ?, ~).
Note: commas in the special characters list are for spacing purposes only; the comma is not a valid character for the password.

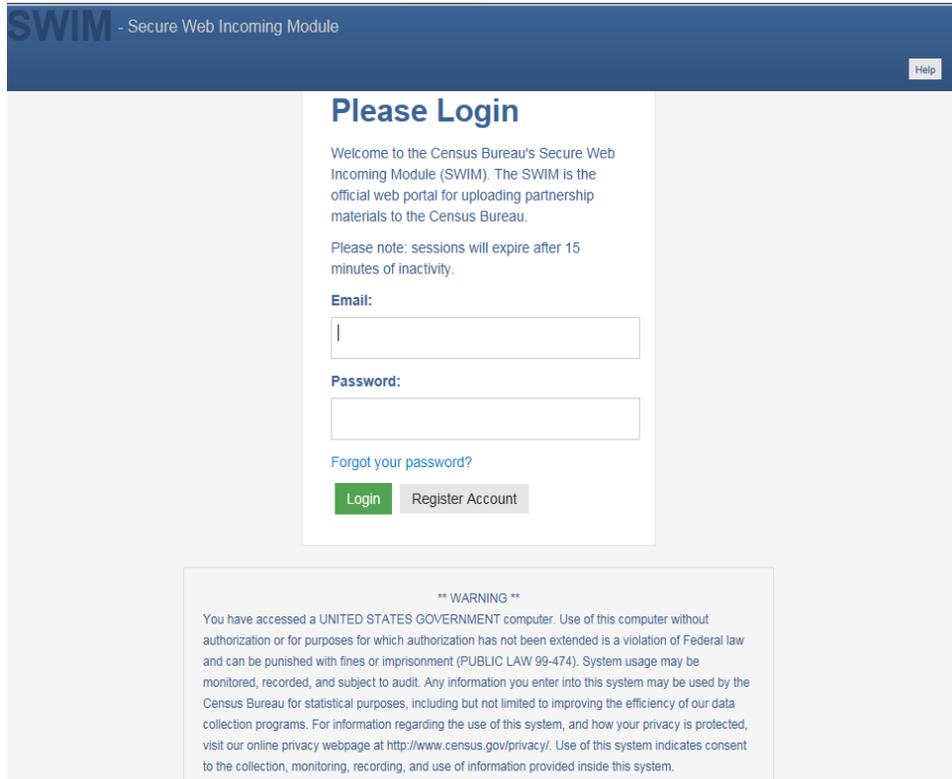
Step 5

Set up a security question (click the arrow on the right of the **Security Question** box and select a question in the drop-down list, then enter an answer in the **Answer** box). When you have finished, click the **Submit** button. A screen opens to confirm that you have successfully registered.



Step 6

On the **Confirmation** screen, click 'Login' in the phrase 'Go to Login'. You will return to the login screen.



Step 7

On the **Login** screen, enter your email and password, and then click the green **Login** button. The **Welcome** screen opens. You will see the list of files you have previously uploaded, the date the file was created, the name of the file, and its corresponding zip size. If you need to make modifications, click on the file you want to edit and then select the **Start Now Upload** button.



Step 8

To begin an upload, click the **Start New Upload** button. A screen opens asking which Census program you are reporting data for. On this screen, click **The Local Update of Census Addresses Program (LUCA)** radio button, then click the **Next** button at the bottom of the screen.

What Census program are you reporting data for?

Select the geographic program that you currently wish to submit data for the Census Bureau to review. This selection affects only your current upload. You may select a different option for future uploads. If you are unsure what program to select send an email to geo.swim@census.gov for more guidance.

- Geographic Support System Initiative (GSS-I)
- Boundary Annexation Survey (BAS)
- School District Review Program (SDRP)
- Boundary Quality Assessment and Reconciliation Project (BQARP)
- Federal Agency Updates (FDU)
- Redistricting Data Program - BBSP-VTD (RDP)
- Redistricting Data Program - CD-SLD (RDP)
- Local Update of Census Addresses (LUCA)
- Participant Statistical Areas Program (PSAP)

Next

Step 9

A screen opens asking which type of LUCA data you are reporting. Click the radio button next to the governmental unit for which you are reporting data, and then click the **Next** button. In this example, we will select the **County** radio button.

What type of LUCA entity are you reporting for?

- State
- Place
- County
- Minor Civil Division (MCD)
- Tribal Area
- Consolidated City

Previous Next

Step 10

A screen opens asking you to select your state and county based on your selection in Step 9.

Select a State and County

State:

County:

Previous

Next

Step 11

The **Select a .ZIP file to upload** screen opens. Choose a zip file to upload. To upload a file, click the **+ Add File** button on the screen. **Note:** all files must be a zip file.

Select a .ZIP file to upload.

File submissions must be in "zip format" Please group all related data together into one documentation that you have available. Please include information about how your geos shapefiles, be sure to include all of the component files necessary to use the shapefile (as a MXD file please be sure to include all of the separate data files that are used in the M additional information, as applicable, in the comments box below.

Choose File:

+ Add File

Status:

File(s):

Comments:

Click the "Add File" button

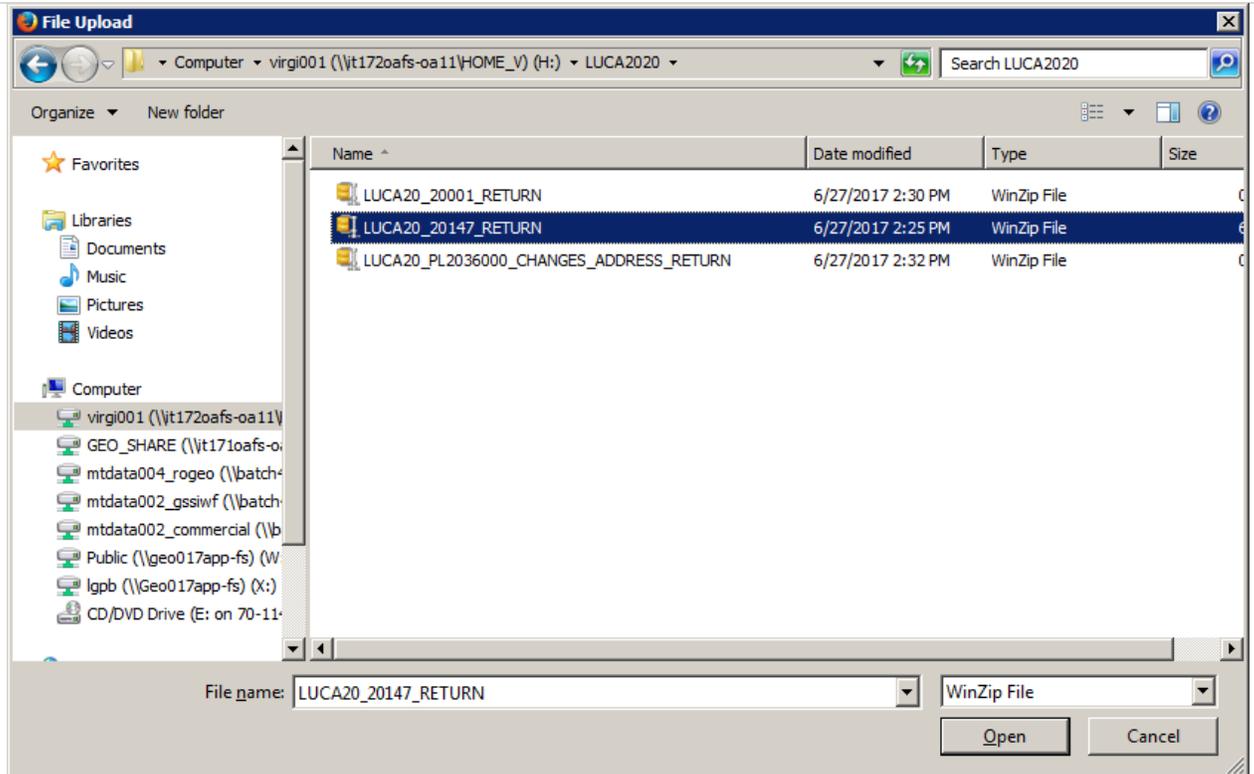
Previous

Next

Step 12

The **Choose File to Upload** window opens and allows you to navigate on your computer to the ZIP file's location. Locate the ZIP file you want to upload, and then double-click it. The **Progress** field on the **Select a .ZIP file to upload** screen shows the progress of the upload.

Note: Files can only be uploaded one at a time.



Select a .ZIP file to upload.

File submissions must be in "zip format" Please group all related data together into one ZIP archive including any metadata or supporting documentation that you have available. Please include information about how your geographic data is projected if applicable. If you are submitting shapefiles, be sure to include all of the component files necessary to use the shapefile (at a minimum .shp, .prj, .dbf, .shx) if you are submitting a .MXD file please be sure to include all of the separate data files that are used in the Map (all of the layers, shapefiles, etc.). Please provide any additional information, as applicable, in the comments box below.

Choose File:

Status: Uploading

Progress: 10%



File(s):

Comments:

Step 13

Once the upload is 100% complete, the **Status** field shows 'Success' and the name of the file appears in the **File(s)** field. After you have uploaded the file, type any comments in the **Comments** field.

	<p>Select a .ZIP file to upload.</p> <p>File submissions must be in "zip format" Please group all related data together into one ZIP archive including any metadata or supporting documentation that you have available. Please include information about how your geographic data is projected if applicable. If you are submitting shapefiles, be sure to include all of the component files necessary to use the shapefile (at a minimum .shp, .prj, .dbf, .shx). If you are submitting a .MXD file please be sure to include all of the separate data files that are used in the Map (all of the layers, shapefiles, etc.). Please provide any additional information, as applicable, in the comments box below.</p> <p>Choose File: <input type="button" value="+ Add File"/></p> <p>Status: Success</p> <p>Progress: 100%</p> <hr/> <p>File(s):</p> <ul style="list-style-type: none"> • LUCA20_20147_RETURN.zip <p>Comments:</p> <div style="border: 1px solid #ccc; padding: 5px; min-height: 60px;"> LUCA Upload for CO20147. There is one Excel file in this submission. </div> <p style="text-align: right;"> <input type="button" value="Previous"/> <input type="button" value="Next"/> </p>
<p>Step 14</p>	<p>Then click the Next button. The Thank You page confirms the receipt of your submission.</p> <div data-bbox="467 919 1318 1293" style="border: 1px solid #ccc; padding: 10px; margin: 10px auto; width: 80%;"> <div style="background-color: #2c5e8c; color: white; padding: 5px; display: flex; justify-content: space-between;"> SWIM - Secure Web Incoming Module Logged in as BAS User Logout Help </div> <div style="text-align: center; padding: 20px 0;"> <h2 style="color: #2c5e8c;">Thank You</h2> <p style="color: green; font-weight: bold;">Your file has uploaded successfully.</p> <p>[LUCA File Name].return.zip</p> <p>You may Log Out or return to the upload form, to submit more files.</p> </div> </div>
<p>Step 15</p>	<p>To add additional files, click on the 'Upload Form' link in the phrase "You may Log Out or return to the upload form, to submit more files." <i>This choice returns you to the Welcome screen.</i></p> <p>Otherwise, to log out, click on Log Out. The Census Bureau will acknowledge the receipt of the uploaded file.</p>



Be aware that after 15 minutes of inactivity, SWIM sessions are deactivated.

Note: While working in SWIM, you may obtain help by clicking on the **Help** button on any screen. When you click the button, a screen opens with links to help resources.

SWIM - Secure Web Incoming Module

Already Registered? [Login](#) [Help](#)

Help

The Secure Web Incoming Module (SWIM) is a single upload page for submitting all local geographic partnership data to the U.S. Census Bureau's Geography Division. Because of the wide variety of geographic partnership programs, the SWIM requires users to answer some basic questions about their data before submitting. These questions direct the incoming data to the right partnership program.

The general flow of questions is as follows:

1. What geographic partnership program you are submitting data for?
2. What level of government or organization is submitting the data? Many of our geographic programs allow partners from various levels of governments to submit data, which is represented as a geographic entity in the menu selection. For example, when submitting data on behalf of a state government, the submitting entity is the state, even if the data submitted pertains to some other entity within the state, such as a county.
3. What is the name of your entity? A user can select an entity's name from pre-populated drop-down boxes.

After completing the above questions, the user must select a ZIP file to upload. Using a ZIP archive ensures an efficient upload of all submitted files. There are many compression software options where one can do this with relative ease.

For more information about the Census Bureau's Geography Division, please visit our [Geography Homepage](#).

For more information about our geographic partnership programs at the Census, please visit our [Partnerships Homepage](#).

For a glossary of common Census Geography Terms and Concepts, please visit our [Terms and Concepts page](#).

For additional help using the SWIM please contact us by email: geo.swim@census.gov

5. LUCA Geocoding Service Results

As mentioned previously, the geocoding process will typically run overnight and be available the next day. The user will receive an email message from OCIO that includes the link to the output files. The user then accesses this link and downloads their files from this secure site.

Governments that submit address lists through the LUCA Geocoding Service will receive two output files: an address file (Figure 3) and an address count file (Figure 4).

6. Results—Address List File

Note: In the example below (Figure 3), all of the headings to the right of the second column (B) were added to this example to facilitate an understanding of the data.

Figure 3

	A	B	C	D	E	F	G	H	I	J	K	L
1	Record ID Number	Street Address, City, State, ZIP Code	Match Results	Type of Match	Input Address	Longitude, Latitude Coordinates	TIGER Line ID	Side of the Road	State FIPS Code	County FIPS Code	Tract Number	Block Number
2	1	111 Test St, Any City,	No_Match									
3	2	456 Main St, Any City	No_Match									
4	3	789 North Ave, Any Ci	Tie									
5	4	890 West Ave, Any Ci	Match	Exact	890 West	-71.06222,42.486546	86871306	R	99	999	3353.00	1001

The output information is defined in the table below (Figure 4).

Figure 4

Output Fields	Definition
Record ID Number	The unique number for each address submitted. Note the output file may not return the records in the same order as that submitted
Street Address, City, State, Zip Code	The address submitted by the customer.
Match Results	Values in the Match Results column refer to whether the address matched a census address range. The match values are: Match, No_Match, or Tie.
Type of Match	Indicates if the match that occurred was exact (Exact), or equivocated (Equivocate.)
Input Address	The address input by the customer
Longitude, Latitude Coordinates	The Longitude (X) and Latitude (Y) values based on an interpolation on where the address falls along the address range.
TIGER Line ID	The unique Tiger Line Id of the street segment.
Side of Street	The side of the street the address range lies on either L (Left) or R (Right).
State FIPS Code	The State FIPS Code Identifier
County FIPS Code	The County FIPS Code Identifier
Tract Number	Census Tract Number
Block Number	Census Block Number

7. Results—Address Count Output File Layout

In addition to the Address File, the user receives the Address Count Output File (Figure 5).

Figure 5

Address Count Output File Layout					
MATCHED = 'M'	MATCHED = 'T'	MATCHED = 'U'			
Total 'M'	TOTAL 'T'	TOTAL 'U'			
TABSTATE	TABCOUNTY	TABTRACT	TABBLOCK	ADDRESS COUNT	
99	999	335300	1001	100	
99	999	335100	2003	75	
Etc.	Etc.	Etc.	Etc.	Etc.	

8. Possible reasons your address did not geocode.

There are several possible reasons why an address you submit may not geocode to a Census address range.

- The street and address that you submitted truly does not exist or has not been built.
- The street you submitted is stored differently in our address database (i.e., Rt 64 may be in our database with an alternate name like Main Street).
- The address is a newly construction home that has not yet been captured by several of our address capturing techniques.
- The address may have existed at one time but now does not exist (i.e. the housing unit may have been demolished or destroyed by natural or man-made causes, or the housing unit address may have been changed to a non-residential one).
- The house number or street name may have changed because of renaming and/or renumbering due to E911 activities.
- The address submitted matches to a single address range street segment. Because of the Census Bureau's commitment to Title 1, individual address information is considered confidential information and thus cannot be released to the public. A single address range street segment essentially identifies the location and name of a single address which is prohibited and cannot be released.