

CENSUS 2020 LUCA NOTES FROM CAMBRIDGE GIS

Census 2020 LUCA Final Numbers

- Reviewed an original list of 53,694 addresses and made the following updates:
 - Added 4,775 addresses
 - Corrected 1,638 addresses
 - Deleted or flagged as non-residential or extra jurisdictional 2,053 addresses
 - Verified the accuracy of 5,846 addresses
- Our final submission to the Census Bureau included 58,471 addresses

2018 LUCA Methodology for Census 2020

Address Cleanup Process

- The first phase of the address cleaning process consists of a series of comparisons between the LUCA list and each of the other lists, comparing elements such as street names, street numbers and unit numbers.
- Comparison of address databases was undertaken using SQL.

Address Review Process

The LUCA address review process consists of comparing the LUCA list to various databases maintained by the City of Cambridge and to other data sources, such as the universities. Three major comparisons were made by Cambridge

1. Compare LUCA to the City's Master address Database (MAL)
 - a. Compare street addresses
 - b. Compare condominium unit designations
 - c. Group Quarters correction
 - d. Assign addresses to correct Census Tract and Block
2. Compare LUCA to the University of Massachusetts Donahue Institute (UMDI) Address List
3. Compare LUCA to the Cambridge Election Database

Working Databases:

- Cambridge Master Address List (MAL) – definitive list of street addresses in use for property throughout the city, includes deprecated addresses (secondary addresses, retired addresses). Includes unit data for condominiums and some rental properties though not many

- Cambridge Elections Address List - from of Secretary of State system used to maintain street listing and voter registration list. Includes all unit numbers, but note that unit numbers no longer in use or found to be spurious are not purged from the list, inflating the number of addresses.
- University of Massachusetts Donahue Institute (UMDI) Address List – compiled by UMDI from various sources believed to include the Secretary of State address database and group quarters information submitted by universities, among others.

Addressing Resources

- **Assessing Database:** This data is available through two channels
 - On-Line Property Database: <https://www.cambridgema.gov/propertydatabase>

Here you can search for a property if you know the address

- The full version of the VISION CAMA database. Only Assessing staff and Cliff Cook have access to the VISION client as of this writing. VISION data is also available through SDE. The VISION database covers all the data available through the on-line database and more and is easier to navigate, particularly when looking up information related to condominiums. In addition, the VISION mapping module includes the address points found on the AxisGIS Address Map.
- **Master Address List (MAL):** MAL database includes all street addresses recorded by GIS staff based on databases and fieldwork. Units are also included taken from the Elections database and Condo units from the Assessing database. The unit data is helpful but not determinative.
- **Election Commission Database:** Listing of all addresses that have been used for voter registration purposes. Includes all unit numbers. Again helpful but not determinative. One shortcoming is that, currently, addresses determined to be no longer in use cannot be purged from the database.
 - **Street Listing:** This is a book published every year by the Election Commission that lists by address and name every person who has responded to the annual City census. Most helpful with low rise residential buildings which often have more unit records than there are units in the building. Here one can learn which addresses the residents use for receiving mail. Coverage is not 100% but very helpful. Current and prior year copies are both useful.
- **Google Maps Street View:**
 - <https://www.google.com/maps>
 - While coverage is not 100% includes street level imagery of almost all buildings in Cambridge. By zooming in one can sometime read the street number posted on the building and count mailboxes, doorways, and electric meters to determine number of units.
- **AxisGIS Address Map:**
 - <https://www.axisgis.com/cambridgema>

- Cambridge GIS application that shows all addresses associated with a parcel. Includes equipment in street right of way assigned an address and which might be flagged as residential.
- **myCambridge:**
 - <http://gis.cambridgema.gov/myCambridge/>
 - Web application assembled by Cambridge GIS that lists and links to a variety of information about each address in the MAL. Includes links to Google Maps, Property Database, and the AxisGIS Address application

Recent Construction and New Addresses

New construction and official addresses changes, which may or may not be related, can be tracked through the following resources:

- DPW Address Assignments: Official city address changes. In 2018 reviewed all changes from past 10 years against LUCA and made numerous edits to list.
- Housing Starts Listing: Maintained by CDD, lists all instances where a construction permit added or subtracted units from the City's housing stock.
- Development Log: Tracks progress of recently completed and ongoing development projects. Probably more useful for the New Construction program which will allow for further updates to the official decennial census address listing.

Group Quarters

A key portion of the LUCA review process is locating and verifying the addresses of all group quarters locations, primarily dormitories. In 2018 LUCA incorporated many errors to group quarter designations, including wildly incorrect addresses in a few cases.

To undertake this part of the process begin by collecting data on group quarters locations from the following sources:

- Harvard Planning –dorms, also collected all apartment addresses at the same time
- Lesley University campus planner – dorms and apartments addresses
- MIT community relations staff - dorms, fraternities/sororities and family housing
- Cambridge Housing Authority group homes
- Welmet project - group homes
- Homeless services staff at DHSP for residential shelter locations – many locations that provide day services to the homeless were mistakenly flagged as group quarters in 2018
- VISION database – all records with use codes 121, 957 and 9571. Not all of these properties will meet the criteria for group quarters but some will.
- Nursing Homes – includes Sancta Maria, Neville Center, Cambridge Rehab & Nursing Center, may include Spaulding Cambridge
- Religious group quarters – includes convent at Sancta Maria, Cambridge Zen Center, St John the Evangelist Episcopal Monastery as well as parsonages

All records flagged as group quarters should be reviewed for accuracy. In 2018 over one third of such addresses provided by the Census Bureau were incorrect.

It is also worth noting what is not a group quarters residence

- SROs (include the YWCA and YMCA residences in this category)
- Elderly assisted living units that allow for independent or assisted living and do not provide dementia care or skilled nursing care. Assisted living is found at Neville Place, Youville House, Cambridge Homes and Cadbury Commons
- Single apartments leased by programs such as Transition House, Heading Home and CASCAP, among others.

Other Considerations

Certain locations have posed repeated challenges during past iterations of LUCA:

- There are two Elm Streets in Cambridge, one running through The Port and Wellington-Harrington and second running along the border with Somerville north of Porter Square. Addresses from these locations get confused, are incorrectly assigned to Somerville or given the wrong census tract and block.
- Other properties along the Somerville line often appear to be incorrectly assigned to one city or the other based on the location of the front door. In making edits the rule we used is that the city of residence is the one where the bedrooms are located, the same rule used for voter registration.
- Some addresses are assigned a zip code outside of Cambridge. These either need correction or they are not Cambridge addresses and should be marked as belonging to another jurisdiction.
- Harvard and MIT family housing might be included as group quarters. If non-students can reside in institution owned housing then it should be treated as housing units rather than group quarters.
- Obtain address data from the Cambridge Housing Authority and ensure that all public housing units are properly accounted for under their current address.
- Specific addresses that have proven troublesome in the past:
 - Linwood Court, an affordable housing development located along Broadway
 - 205-225 Walden Street – the Census Bureau made major mistakes counting units at this location in 2010 and the 2018 address list was also problematic.

Field Checks

Inevitably there will be many address questions that cannot be resolved in the office. In 2018 over 1000 addresses were designated for field checking throughout the City.

Census Tract/Block Update

A key part of the LUCA update is verifying the accuracy of the census tract and block provided for each LUCA address. This can be accomplished by geocoding the LUCA list and comparing the reported tract and block to those found through GIS. In 2018 about 1,600 records required correction.

TIGER File Updates

In addition to updating the address list LUCA also calls for updates to the TIGER line file used by the Census Bureau to incorporate changes to the street network in Cambridge, and to correct existing errors in the data. Changes are limited to flagging a line for deletion, adding a new line, or changing the attributes of a line (such as its name or its classification). LUCA does not provide for edits to the address ranges associated with street segments.

In 2018, new streets were added around Jefferson Park (Clifton Cir and Clifton Pl) and in North Point (including streets that are planned but not yet laid out). Walkways, private roads and parking lot driveways were added to the TIGER file in the Concord-Alewife area in anticipation of population growth there requiring the establishment of new Census blocks. The bike path in Alewife Brook Reservation was also realigned to help draw a more accurate picture of the area. Other corrections to existing data mainly consisted of adjusting the location of short dead-end streets so that the street lines fall near the appropriate address points.

Recommended Additional Steps in Future Iterations

- If time allows, coordinating with Somerville on the proper allocation of border addresses would be helpful.
- Add VISION land use codes to MAL at outset of work and confirm residential status of addresses.
- Also helpful would be taking the time to normalize addresses from all databases into a shared set of data fields to more readily enable comparisons across databases. Both address ranges and addresses that included letters (eg, A, B, R) or words (eg, Rear) proved particularly difficult to compare across databases.

Anticipated upcoming Census projects/ tasks for Cambridge

- Block Boundary Suggestion Program:
 - Review current Census block boundaries with an eye towards areas which have had growth with particular attention in blocks which could exceed 1000 units. We suggest additions or deletions of Census linework which need improvement from the 2020 final census blocks
 - *When: Anticipated to begin around February 2026*
- Local Update of Census Addresses (LUCA)
 - Review existing State address database and suggest additions, corrections, and deletions as well as verifying the accuracy of Cambridge addresses to the residential address dataset from the City's address repositories
 - *When: Anticipated to begin around February 2027*
- Participant Statistical Area Program
 - Census asks us to adjust census tract geography to account for population growth
 - *When: Anticipated to begin around March, 2029*
- New Construction Program
 - Opportunity to make further amendments to the address list shortly before the launch of the decennial census
 - *When: Anticipated to begin around April, 2029*

Detailed Cambridge Steps in LUCA Address Cleanup and Review

- Master Address Database Review
 - MAL to LUCA
 - Street name in LUCA, Not in MAL
 - Error: Street name in LUCA with misspellings, missing street extension, in other towns, and bogus streets
 - Action: Correct LUCA street names as needed
 - Comment: Most of these errors consisted of misspellings or failure to use any or the correct street name extension (eg, st, ave). Very few were for streets not in Cambridge.
 - Street Name in MAL, not in LUCA
 - Error: Street name in MAL with residential records but street name not in LUCA
 - Action: Correct LUCA list by adding residential addresses as needed
 - Residential Address in MAL, Address Missing from LUCA
 - Error: Street address in MAL with residential address but not in LUCA (Street is in LUCA)
 - Action: Correct LUCA list by adding residential addresses as needed
 - Street number range in LUCA, Not in MAL
 - Error: MAL does not allow street number ranges; many LUCA street number ranges duplicate single number MAL addresses
 - Action: Compare starting and ending number in range to MAL to see if these are legitimate addresses. Where address cannot be matched to MAL investigate each case and make corrections to LUCA as needed
 - Note: The inclusion or lack of street number ranges in different databases posed a challenge in a number of cases
 - LUCA Addresses flagged as nonresidential in MAL
 - Error: Possible nonresidential address in LUCA, new construction addresses not in MAL as residential
 - Action:
 - Add parcel number (ie map-lot) to MAL to facilitate land use data looks

- Compare MAL to Land Use GIS layer and determine again which addresses are possibly non-residential
 - Compare revised joined MAL/Land Use data to LUCA and filter for only those records in LUCA still not shown as residential in MAL/Land Use
 - Investigate each address and make corrections as needed
- More Units in MAL than LUCA
 - Error: MAL includes more unit records than LUCA does for same address
 - LUCA Action: Compare unit records and add missing addresses to LUCA. Also clean up LUCA unit numbers as needed.
- More Units in LUCA than MAL
 - Decided not to review these cases in depth, determining that the Census Bureau will catch any errors during their fieldwork.
- Addresses in LUCA but Retired in MAL
 - Error: Units are included in LUCA but are no longer active addresses in MAL
 - Action: Delete addresses from LUCA and make sure they have a more current replacement, if there is one.
- University of Massachusetts Donahue Institute (UMDI) Address List Review
 - UMDI to LUCA Comparison
 - Compare UMDI to LUCA and MAL
 - Filter for addresses in UMDI and not in MAL
 - Separate into records with a dash in street number range and those without
 - Comment: overall, the UMDI analysis yielded very address issues that were not uncovered by the MAL analysis. If pressed for time I would skip this step in future iterations of LUCA, unless UMDI data quality substantially improves.
 - Address in UMDI and Not in LUCA or MAL
 - Error: Addresses In UMDI, not in LUCA or MAL
 - LUCA Action: Flagged both individual records that were duplicates or otherwise inactive and street address ranges where the starting or ending number match a LUCA address, leaving 143 individual records and 2 street address ranges in neither LUCA nor MAL

- Action: Review against LUCA and make changes or flag for field follow up
- Street Number Range in UMDI, Not in LUCA
 - Error: Street number range in UMDI not found in LUCA; neither starting and ending street number found in LUCA record.
 - Action: All records matched to LUCA on starting or ending street number, no further review needed.
- Single Street Number in UMDI, not in LUCA
 - Did not find any such instances
- Cambridge Elections Database Review
 - Elections to LUCA Comparison
 - Election street addresses not in LUCA or MAL
 - Error: Street address is not present in either MAL or LUCA
 - Action: Elm Street addresses and two others needed additional investigation.
 - More units in Elections than in LUCA
 - Error: When comparing unit count addresses have more units in Elections than are listed in LUCA
 - Action:
 - 1301 street addresses differ by one or two units – ignored these due to resource constraints
 - 371 street addresses differ by 3 or more units investigated and LUCA corrected as needed or addresses sent for field review