



Protocol for Converting Student Addresses to Census Tract and Block Identifiers for 2022-2023

Document History

Version	Date	Summary of Changes
0.1	12/1/2020	Creation of Document, section headers, and introduction body.
0.2	12/8/2020	General guidance section started.
0.3	12/11/2020	Worked on the “How will data be transmitted” section, and the beginning of “How to convert and submit...” section.
0.4	12/14/2020	Restructured the document
0.5	12/21/2020	Edited Errors and Flags section
0.6	01/07/2021	Edits to all sections; prepared for Workgroup review
0.7	01/15/2021	Edits to all sections based on Workgroup meeting feedback
1.0	01/29/2021	Enhanced Purpose section
1.1	02/23/2021	Revised Background section
2.0	08/03/2021	Added draft language for utility use
2.1	08/13/2021	Added approximate length per 1,000 records (1 per 4 seconds)
2.2	10/05/2021	Updated Workgroup section
2.3	01/14/2022	Changed all references of ‘LSS’ to ‘LEA’ Added GUI mockup and replaced older screenshot images
2.4	02/25/2022	Added PowerSchool user note about report
2.5	06/15/2022	Added directions for alternative method requests
2.6	08/23/2022	Final edits; added screenshots from most recent utility build

About the MLDS Center

The Maryland Longitudinal Data System Center (MLDS Center) is an independent state agency that develops and maintains the Maryland Longitudinal Data System (MLDS) that contains student and workforce data from all levels of education and the State’s workforce. The MLDS Center uses the MLDS to generate timely and accurate information about student performance that can be used to improve the State’s education system and guide decision makers at all levels.” (see Education Article, § 24-702(d)(1), Annotated Code of Maryland).

The MLDS Center’s data sharing partners include the Maryland State Department of Education, Maryland Higher Education Commission, Maryland Department of Labor, Maryland Department of Juvenile Services, Maryland Department of Human Services, and the Motor Vehicle Administration. More information about the MLDS Center can be found at <https://mldscenter.maryland.gov/Aboutus.html#>.

The MLDS Center draws on data sources that cover the full student lifecycle: early childhood, K-12, postsecondary, and workforce with the earliest data in the system from the 2007-2008 academic year. The following are types of data collected by the MLDS Center: courses taken; grades achieved; test results; participation; completion; grade point average; transitions; degree, diploma, or credential attainment; enrollment; demographics; employment status; wage information; and type of employment. The MLDS Center uses this data to provide information about student performance that can be used to improve education policy.

Contact Information

Contact Name	Position / Title (Agency)	Contact Information
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Purpose

In 2019, the Maryland General Assembly passed [House Bill 1206](#). This law requires each local education agency (LEA) to convert student home addresses into a U.S. Census Bureau tract or block number using a process developed by the MLDS Center.

Each county board shall convert a student’s home address and geolocation information into census tract and block numbers in a manner and format that are consistent with the protocol developed by the Maryland Longitudinal Data System Center under § 24-703.3 of this article. - Ed. Art. § 4-113.1(a)

This document sets forth the process to be followed by each LEA to identify census tract and block numbers for their student populations. This protocol will help guide LEAs through the process of converting student home addresses and provide the knowledge, resources, and tools necessary to complete the legislated task.

Background

Using Census Tract and Block

What is a Census Tract and Census Block?

*Census Tracts*¹ are small, relatively permanent statistical subdivisions of a county or equivalent entity that are updated by local participants prior to each decennial census as part of the Census Bureau's Participant Statistical Areas Program. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of statistical data.

Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. A census tract usually covers a contiguous area; however, the spatial size of census tracts varies widely depending on the density of settlement. Census tract boundaries are delineated with the intention of being maintained over a long time so that statistical comparisons can be made from census to census. Census tracts occasionally are split due to population growth or merged because of substantial population decline.

*Census Blocks*² are statistical areas bounded by visible features, such as streets, roads, streams, and railroad tracks, and by nonvisible boundaries, such as selected property lines and city, township, school district, and county limits and short line-of-sight extensions of streets and roads. Generally, census blocks are small in area; for example, a block in a city bounded on all sides by streets. Census blocks in suburban and rural areas may be large, irregular, and bounded by a variety of features, such as roads, streams, and transmission lines. In remote

¹ Read the entire definition of Census Tracts at: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_13

² Read the entire definition of Census Blocks at: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_5

areas, census blocks may encompass hundreds of square miles. Census blocks cover the entire territory of the United States, Puerto Rico, and the Island Areas. Census blocks nest within all other tabulated census geographic entities and are the basis for all tabulated data.

For more information go to [census.gov](https://www.census.gov).

How are census tracts and blocks used by the U.S. Census Bureau?

The U.S. Census Bureau uses census tract and block to describe geographic areas. Census tracts and blocks describe geographic boundaries/areas in more detail than the general names of cities, towns, or states. The Census Bureau releases demographic, economic, housing, and social information annually on census tract and blocks such as annual incomes for households and number of students living in the tract/block.

Why is census tract and block being collected?

The U.S. Census Bureau conducts the *American Community Survey (ACS)* that provides detailed information about the nation and its people. Through the ACS, more is known about jobs and occupations, educational attainment, language other than English spoken at home, veteran status, whether people own or rent their homes, race and ethnicity, and other topics. The information is gathered and reported at the census block and tract level. By assigning Maryland students to their block and tract, the MLDS Center can use the ACS to have more in-depth information about the student backgrounds.

For many years, education research has relied on imperfect measures of socioeconomic status (SES). Historically, the education community has used free and reduced price meals (FARMs) eligibility status under the National School Lunch Program as a proxy for poverty. Using FARMs eligibility as a proxy may not correctly identify students experiencing poverty and treats all students as experiencing the same level of poverty. Using FARMs participation as a proxy for student poverty has a number of known limitations and data is only reported on student eligibility at a point in time.

How will the MLDS Center use census tract and block information and how will the information benefit LEAs?

The MLDS Center aims to use census tract and block number to investigate and develop a more accurate measure of socioeconomic status. Access to this sort of socioeconomic data is of interest to the MLDS Center, policymakers, education professionals, and the public. By having the local education agencies convert their student addresses to census tracts and blocks, and then sending that data to MSDE, the MLDS Center will be able to combine student geolocation data with the census tract and block aggregated data. This data can serve as an indicator for socioeconomic status at the individual level and provide the opportunity to perform quality academic research and draw new insights on this topic.

The MLDS Center is committed to working with LEAs to better understand the student and school population characteristics within the LEA. Previous research and policy engagement the MLDS Center has conducted on poverty can be found here:

<https://mldscenter.maryland.gov/ResearchReports.html>. Presentations to the Commission on Innovation and Excellence in Education (Kirwan Commission) can be found here: <https://mldscenter.maryland.gov/Presentations.html>.

Timeline and Due Dates

Date	Event
Workgroup Established	August 2020
Pilot Administration	May 2021 - September 2021
Process Finalization	October 2021 - September 2022
Full Implementation	October 2022 - December 2022
Data Collection Window Opens	October 3, 2022
Data Collection Window Closes	November 11, 2022
Final Verification	November 15, 2022

Guidance for Submitting this File

Data Reporting Guidelines

This section contains guidance for submitting this file in the format of questions and answers.

General

What students should be included?

Every student in grades PK-12 who was enrolled in the LEA as of September 30th. September 30th matches the as-of-date for MSDE's September Attendance file used for enrollment purposes.

How many records per student?

The file must contain only one record per student.

What format must the file be in?

The file must be in fixed length format. [Please see the link below for the complete file format.](#)

Addresses

What is a Student Address?

A student address includes a street number, street name, city, state abbreviation, and 5-digit zip code. This is the student's primary address used by the LEA to confirm residency.

The [Maryland Student Records System Manual of 2020](#) defines a student address as "The complete mailing address (city, state, and zip code) where the student resides." The U.S. Census Bureau is more detailed: "The address used by a living quarters, special place, business establishment, and the like for mail delivery by the U.S. Postal Service. It can be a house number and street or road name, which may be followed by an apartment, unit, or trailer lot designation; a building or apartment complex name and apartment designation; a trailer park name and lot number; a special place/GQ facility name; a post office box or drawer; a rural route or highway contract route, which may include a box number; or general delivery. A mailing address includes a post office name, state abbreviation, and ZIP code. A mailing address may serve more than one living quarters, establishment, and so on."

Does the student address have to be a residential address?

Yes, the address must be a valid residential address. This means it contains a street number, street name, city, state abbreviation, and 5-digit zip code.

Can a P.O. box be used as a valid address?

No. While P.O. boxes are a valid *mailing address*, they are not valid residential addresses and should not be provided.

If the address contains a directional (N, S, E, W), should the period be included?

No. We recommend excluding the period after a directional as the Census Geocoder does not appear to process addresses with them included.

Can a group home or other facility be used as the student address?

Typically, the address will represent a single household. However, a group home address may be used when that address is reported as the student's primary residence. Examples of group home addresses include residential child care centers, like those that are part of the foster care system.

Which student address should be used?

The student information system you are using as a source of student address data may have multiple address records for any given student. Please use the following guidance:

1. Use the student's reported "home" address, as of **September 30th**, for the current academic year.
2. If the student has two or more current home addresses on file:
 - a. Use the address that has the latest effective date.
 - b. If your student information system does not associate address records with their effective date range, then use the most recently added address on the school record listed for residency purposes.

What address should be used if the student is part of the [Maryland Safe at Home Address Confidentiality Program \(ACP\)](#)?

According to the [Safe at Home website](#) "each ACP participant is allowed to use our [Safe at Home] Post Office Box address - P.O. Box 2995, Annapolis, Maryland 21404-2995. This legal, substitute address has no relation to the participant's actual *residential* address. The participant may also use the substitute address as a return address on mail sent". Because P.O. Box numbers are not valid residential addresses, do not report an address.

What if the student is homeless?

The [2020 Maryland Student Records System Manual](#) (page 15) defines a student's primary nighttime residence as:

- Shelters, transitional housing
- Doubled-up means sharing the housing of other persons due to economic hardship, loss of housing or other reasons (such as domestic violence)
- Unsheltered includes cars, parks, campgrounds, temporary trailers including FEMA trailers, or abandoned buildings
- Hotels/Motels

Use the available address as of September 30th.

What if the student is a migrant student?

Use the available address as of September 30th.

What if the student address is outside of Maryland?

Please include a student if their address is from outside of Maryland using street number, street name, city, state abbreviation, and 5-digit zip code.

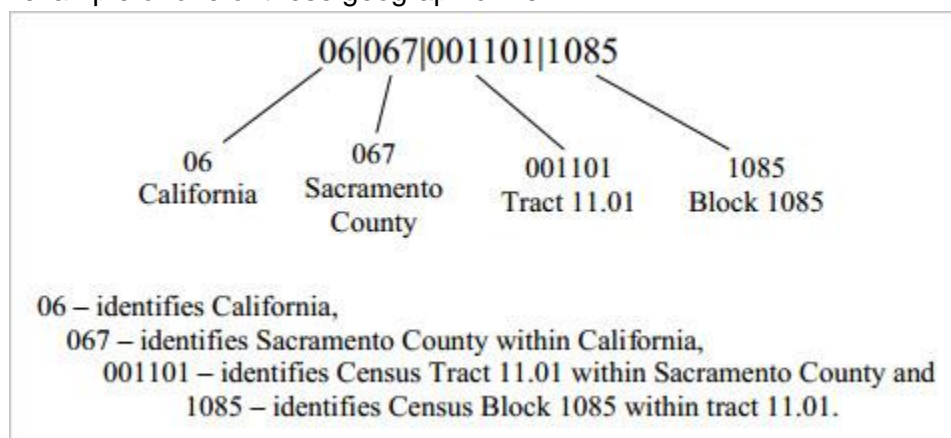
Geographic Identifiers: How census tract and blocks are identified

Census tract and blocks, like all other geographic areas that are defined by the US Census, are assigned a unique **Geographic ID**. This data collection uses geographic IDs, 15-digit integers, to identify addresses down to the census block level³.

What is a valid Geographic ID?

A census block must be identified by: state/territory (2-digit code), county within a state (3-digit code), tract within a county (6-digit code), and a block within a tract (4-digit code).

Below is an example of one of these geographic IDs:



An example of a geographic ID.

What is a Census Tract Number?

A census tract number is a four-digit number, which may be followed by a two-digit decimal suffix, used to identify a census tract uniquely within a county or statistically equivalent entity.

What is a Census Block Number?

A census block number is a unique four-digit census number from 0000 to 9999 within a census tract, which nests within state and county.

³ For more information, read the Census Bureau’s documentation titled “Understanding Geographic Identifiers (GEOIDs)”. The section “GEOID Structure for Geographic Areas” explains the structure of geographic IDs down to the Census Block level: <https://www.census.gov/programs-surveys/geography/guidance/geo-identifiers.html>

How to Convert Student Addresses

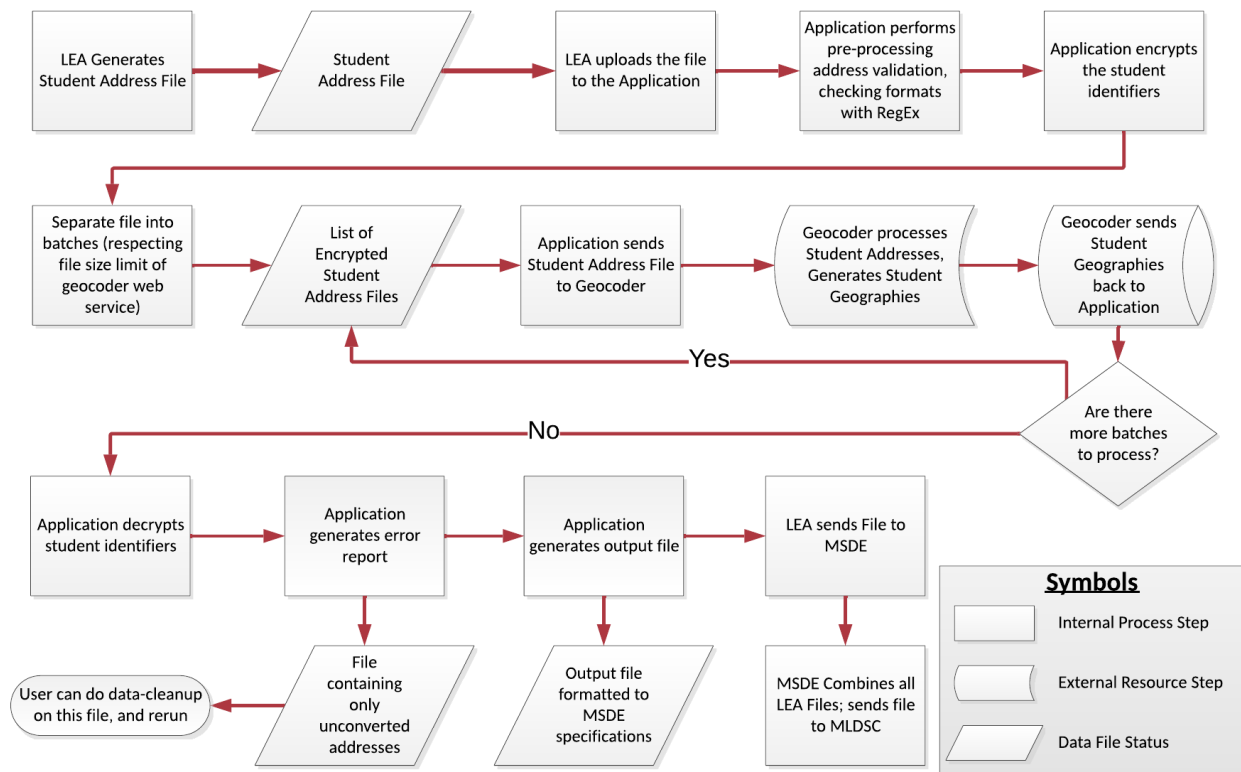
The LEAs have two options for converting student addresses into a census tract and block number:

1. Use the utility (described in detail below) provided by the MLDS Center
2. Use other available methods/tools approved by the MLDS Center

Using the Utility Provided by the MLDS Center

The MLDS Center has created a utility that will assist an LEA with the student address conversion process. The utility takes the LEA provided list of student addresses, anonymizes the student identifiers, and then geocodes the student addresses using the batch processing feature of the U.S. Census Bureau's Geocoder Web Service.

The utility will automate the process of anonymizing the data, batching the provided student address file, and then feeding it to the geocoder. The process flowchart is below.



Student Address File Layout And Utility Instructions

The LEA must prepare and provide a file of student addresses for batch geocoding to the MLDS Center utility.

1. Use the specifications below to Create the student address input file. Refer to the General Guidance section for details on what students and addresses to include.

Data Element	Start Position (inclusive)	Length	End Position (inclusive)	Type	Permitted Values / Comment
Unique Record ID Number	1	6	6	Integer	000000-999999
MSDE Standard Demographic String ⁴	7	200	206	See comment	See footnote 4, at the bottom of this page.
Street Number and Name	207	48	254	Character	The number and name portion of the street address. Ex: 100 Main Street
City	255	40	294	Character	The name of the city / town.
State Abbreviation	295	2	296	Character	The two digit abbreviation of the state.
Zip Code	297	5	301	Character	A five digit zip code.

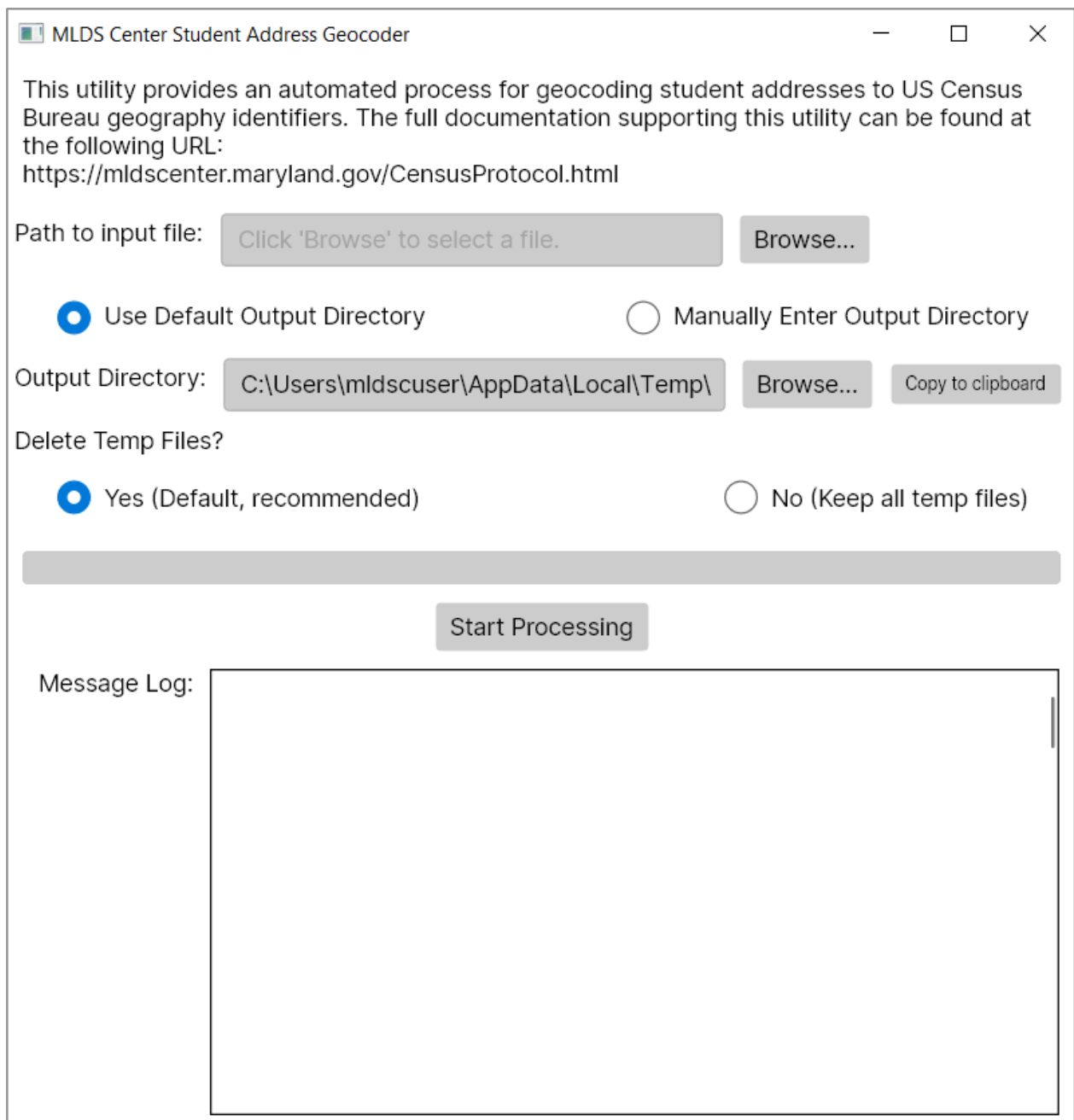
2. Use the following link to access the utility: <https://mldscenter.maryland.gov/CensusProtocol.html>. On that page, you can download "**MLDSC Census Utility.zip**".
 - a. If using MacOSX, go to Finder, view in the upper bar, right click "Show Path Bar", and then right click and copy the last segment.
3. Open the folder where the .zip folder was downloaded and extracted.
4. Open the MLDSC_Census_Utility_Aug2022 v3 file folder.
5. Double-click the MLDSC_Census_Geocoder application.

⁴ The Maryland Student Records System Manual states that all data collections passing through MSDE's Division of Assessment, Accountability, and Information Technology (DAAIT) must contain the Standard Demographic String. The manual for 2020 defines the specifications of this string, here (page 35): <http://marylandpublicschools.org/about/Documents/OCP/Publications/StudentRecordsSystemManual2020.pdf>

6. Select "Extract All"
7. Select a destination for the extracted files
8. Select "Extract"
9. Open the MLDSC_Census_Utility_Aug2022 v3 file folder again
10. Double-click the MLDSC_Census_Geocoder application.

NOTE: The MLDS Center procured an extended validation code signing certificate to enhance the security of the utility. When opening the utility, *a windows security prompt will likely appear, informing you that the publisher of the utility is the MLDS Center.* You should **NOT** run unsigned software, where the publisher is unknown or unspecified, unless you are absolutely certain the file is authentic.

11. The application, when opened, should look something like the following:



12. Once open, select “Browse” to provide the full path to your input file.
13. After you provide the path of the input file, you will be provided with the option to select the default output directory or manually enter the output directory. This is the path to which files will be written and the location to retrieve your output. Copy the path to your clipboard with the “Copy to Clipboard” button.
14. Next, you have the option to delete the temporary files (recommended) or keep the temporary files.
15. Select the “Start Processing” button to start to process the file, handling 1,000 records at a time. As the utility processes each 1,000 record subset, a message will appear

indicating the processing progress. ***It takes approximately 4 minutes per 1,000 records. For every 15,000 records the estimated processing time is 1 hour.***

16. While the file is processing, a progress bar will indicate the percentage complete.
17. A message indicating the processing has finished will appear. The total processing time, number of records processed, records successfully completed, and records that failed conversion are provided.
18. Go to the aforementioned output directory. (Use the “Copy to Clipboard” button if needed)
19. In this directory, you will see the output of the batch processed. These files contain the processed data (with the Errors and ErrorsSummary files helping LEAs identify and clean up data issues.)
20. All output files, folders, and crash logs (when created) are written to the MLDSC_Census_Geocoder folder.
21. If you run into an issue, please send details of your error to sean.duvall@maryland.gov, along with the relevant crash log file.

Output File for Submission to MSDE

The output file provided will match the input specifications of the MSDE data collection. Please refer to MSDE’s Student Census Tract and Block File Submission Guide.

Data Element	Start Position (inclusive)	Length	End Position (inclusive)	Type	Permitted Values / Comment
Unique Record ID Number	1	6	6	Integer	000000-999999
MSDE Standard Demographic String ⁵	7	200	206	See comment	See footnote 4, at the bottom of this page.
15-digit Geographic ID	207	15	221	Integer	See description of geographic IDs.

⁵ The Maryland Student Records System Manual states that all data collections passing through MSDE’s Division of Assessment, Accountability, and Information Technology (DAAIT) must contain the Standard Demographic String. The manual for 2020 defines the specifications of this string, here (page 35): <http://marylandpublicschools.org/about/Documents/OCP/Publications/StudentRecordsSystemManual2020.pdf>

Using an Alternative Process

Although it is recommended to use the MLDS Center utility, there are numerous tools and means that can be used to meet the requirements of this process. Some alternatives to the utility are listed below.

- The U.S. Census Bureau's Geocoder: <https://geocoding.geo.census.gov/>. An [overview brochure](#) is available.
- The Texas Education Agency has several tools available on their public website: <https://tea.texas.gov/texas-schools/general-information/census-block-group-tools>
- LEAs may utilize available resources within their system.

Alternative methods must be submitted to mollyb.abend@maryland.gov by September 5, 2022 for review and approval. The following information should be included with your request:

- A description of your process for obtaining the 15-digit geolocation ID;
- If the method utilizes the U.S. Census Bureau's data and/or geocoder;
- The year the the source data was collected;
- The validation process and strategies for improving data quality; and
- Details about keeping address data and other personally identifiable information private and secure.
- Using the MLDS Center created utility, LEAs must provide the following information:
 - The number and percentage of how many student address records convert successfully.
 - Of the successfully converted records, the number and percentage of how many records match the 15-digit geolocation id in the LEA's system.
 - The most common errors listed in the error file generated by the utility.

PowerSchool Users Note

PowerSchool SIS users have an advantage because within the LEA's school information system there is a state report called "Census Tract and Block File" that pulls the necessary data using the correct file layout. After selecting the "Census Tract and Block File" report, select all schools and the September 30th date. Below is a screenshot of the report:

Census Tract and Block File

Report Information	
Description	This Creates the Census Protocol file for converting student address to Census tract and Block Identifiers. How the Students are selected for this report: Student in grades PK - 12 Student enrolled on the report date
Version	1.0
Output File Name	Census_Protocol
Category	Maryland State Reports
Published Date	02/12/2022 07:07 PM
Comments	
Report Parameters	(Check box on the right to save as default value) Clear All <input type="checkbox"/>
Select Schools to Report*	<input type="checkbox"/>
Current Selection Students*	<input type="radio"/> The Selected 1 Students Only <input checked="" type="radio"/> All Students <input type="checkbox"/>
Count Date*	<input type="text" value="MM/DD/YYYY"/> <input type="button" value="Calendar"/> <input type="checkbox"/>
Use Alternate School Numbers*	<input type="text" value="No"/> <input type="checkbox"/>

Scheduling

Please select when to run

Run Now Schedule

Submit

Guidance for Submitting the Census Tract and Block File to MSDE

The output file from the MLDS Center utility should match the file format needed to submit to MSDE. See MSDE's Student Census Tract and Block File Submission Guide for file requirements.

How will the data be transmitted in accordance with the law?

Education Article, § 4-113.1, Annotated Code of Maryland, requires MSDE to collect the census tract and block number data from each LEA as stated below:

(b) The Department [MSDE] shall collect from each county board census tract and block number information for each student in the county.

MSDE will in turn provide the data to the MLDS Center, using Managed File Transfer (MFT). MFT allows secure access and ensures all data submitted remains protected via encryption. To read more about the MLDS Center's [privacy and security policies](#).

(c) The Department [MSDE] shall provide the Maryland Longitudinal Data System Center with the census tract and block number information collected under this section to aid the Maryland Longitudinal Data System Center's goal under § 24-702 of this article of linking student data and workforce data.

How does an LEA access the Census Tract and Block output file?

After the utility runs, the file will be saved and written directly to a file directory located on the computer of the user's choosing. Please reference the [Using the Utility Provided by the MLDS Center section](#) for more information.

Errors and Flags to be Checked by MLDS Center Utility

The MLDS Center Errors File (created by the utility) will be located in the output directory for each batch. As part of a pilot conducted in Fall 2021, the average success rate address conversion was 92%. Using the Errors File, LEAs can identify which areas need cleaning and could help to raise the success rate.

A summary report of all error and warning records, by each Error Code and Warning Code, will be generated as well.

Error Codes and Descriptions

Code	Name	Description
1	Invalid Unique Record ID	Improperly formatted unique record ID; must be an integer with one to six digits.
2	Invalid Street Address Provided	Improperly formatted street address provided (incomplete, non-existent)
3	Invalid City Provided	Improperly formatted city provided (incomplete, non-existent)
4	Invalid State Abbreviation Provided	Improperly formatted state abbreviation provided (incomplete, non-existent)
5	Invalid Zip Code Provided	Improperly formatted zip code provided (incomplete, non-existent)
6	Valid address does not resolve to census tract and/or block.	Non-residential addresses may not resolve census tract and/or block, and thus are invalid.
7	Multiple Record ID Numbers	More than one record ID number is listed; all records must be unique

Warning Codes and Descriptions

Code	Name	Description
8	State Outside Maryland	The address state is outside of Maryland.

Census Tract and Block Data Workgroup

The MLDS Center and MSDE created a Census Tract and Block Data Workgroup made up of local education agency level users of address data. Workgroup members were to assist in establishing protocols and developing technical assistance for local education agencies.

- Andrew Raith, Reporting Specialist, Frederick County Public Schools
- Cheryl Lawrence, Instructional Technology Coordinator, Caroline County Public Schools
- Chris Wohn, Director of Research, Baltimore City Public Schools
- Jason Dykstra, Executive Director, Anne Arundel County Public Schools
- Katherine Tartaglia, GIS Analyst, Baltimore City Public Schools
- Nichole Stewart, Director of Facility Planning, Baltimore City Public Schools

Staff of both the MLDS Center and MSDE also attended:

- Laia Tideman, Program Manager, MSDE
- Matthew Duque, Senior Research and Data Specialist, MSDE
- Molly Abend, Data Management Coordinator, MLDS Center
- Ross Goldstein, Executive Director, MLDS Center
- Sean Duvall, Business Analyst, MLDS Center

Workgroup Timeline

As shown below, in 2020 the Workgroup met twice, drafted and reviewed a draft protocol outline, and created a draft protocol. In subsequent years, meetings occurred about every 2 months, a pilot administration was conducted, and protocols were revised for full implementation to begin in fall 2022.



References

US Census Bureau. "Glossary." *United States Census Bureau*, 16 September 2019, <https://www.census.gov/programs-surveys/geography/about/glossary.html>. Accessed 3 December 2020.

Annotated Code of Maryland, Education Article § 24-702

Annotated Code of Maryland, Education Article § 24-703.3

Annotated Code of Maryland, Education Article § 4-113.1

Texas Education Agency. *Census Block Group Tools*. Texas Education Agency. Retrieved January 15, 2021, from <https://tea.texas.gov/texas-schools/general-information/census-block-group-tools>