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MEMORANDUM FOR: The Record

From: Albert E. Fontenot, Jr. **(Signed January 10, 2022)**
Associate Director, Decennial Census Programs

Subject: Updates to the Geographic Programs Operation, Geographic Delineations Detailed Operational Plan

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This memorandum documents specific updates that have been made to the plan for the Geographic Programs Operation (GEOP)—Geographic Delineations (GD) component since the release of the Geographic Programs operation—Geographic Delineations Detailed Operation Plan (DOP) on December 31, 2018. The Geographic Delineations component of the Geographic Programs operation is responsible for the scope, schedule, and budget for the geographic delineations to support the 2020 Census. This includes the creation of collection and tabulation geographies and associated products. This component is responsible for the creation of the Special Land-Use areas, Basic Collection Units (BCUs), Type of Enumeration Areas (TEAs), and Field Management Areas that constitute collection geography. The tabulation geography consists of Tabulation Blocks, Urban Areas (UAs), and Zone Improvement Plan Code Tabulation Areas. The delineations of these areas are created to support 2020 Census data collection, dissemination, and products, such as the Master Address File Extract, map products, and Geographic Reference Files.

The changes to the baselined DOP and clarifications documented in this memorandum are based on continued planning and development to support the Geographic Programs operation for the 2020 Census. No changes to this operational component are related to the COVID-19 pandemic.

The following table indicates the modifications that have occurred since the DOP was baselined:

Section No.	Section Name	Page	Change Rationale	Original Wording	Update
2.2	Background	2	The Census Bureau will no longer provide separate designations for Urbanized Areas and Urban Clusters. There will be just one designation identifying Urban Areas.	While there are additional types of tabulation geography mentioned in the 2020 Census Operational Plan, this document focuses on the following three—Tabulation Blocks, Urban or Urbanized Areas (UAs), and Zone Improvement Plan (ZIP) Code Tabulation Areas (ZCTAs).	While there are additional types of tabulation geography mentioned in the 2020 Census Operational Plan, this document focuses on the following three—Tabulation Blocks, Urban Areas (UAs), and Zone Improvement Plan (ZIP) Code Tabulation Areas (ZCTAs).
2.2	Background, Key Innovations	4	The 2020 Urban Area criteria were modified to include housing units in addition to population criteria.	To qualify as an urban area, the territory identified according to criteria must encompass at least 2,500 people, at least 1,500 of which reside outside institutional group quarters. In the 2010 Census the Census Bureau identified two types of urban areas: •Urbanized Areas (UAs) of 50,000 or more people. •Urban Clusters (UCs) of at least 2,500 and less than 50,000 people.	To qualify as an urban area, the territory identified must encompass **a minimum number of housing units or population. This criterion for the 2020 Census is published in the Federal Register Notice. The Census Bureau will no longer provide separate designations for Urbanized Areas and Urban Clusters. There will be just one designation identifying Urban Areas.**

Section No.	Section Name	Page	Change Rationale	Original Wording	Update
2.3.1	High-Level Operational Design, Basic Collection Unit (BCU) Delineation	5	Since BCUs will not be used in operations outside the decennial, the 2020 BCUs will not be maintained. It is anticipated that new BCUs will be created using the most recent features and boundaries in support of the 2030 Census.	While the primary purpose of the BCU is to support 2020 Census operations, the BCU can also support other census programs like current survey fieldwork. BCUs are designed to survive beyond the 2020 Census and endure for future decennial censuses. Their delineation is driven by criteria defined by various Census Bureau stakeholders and by batch software designed to implement the criteria in an effective and efficient manner. They are interactively reviewed using standard procedures and maintained using business rules and legal value checks.	The primary purpose of the BCU is to support 2020 Census operations**.** Their delineation is driven by criteria defined by various Census Bureau stakeholders and by batch software designed to implement the criteria in an effective and efficient manner. They are interactively reviewed using standard procedures and maintained for use during the 2020 Census using business rules and legal value checks. (This includes maintaining nesting relationships and ensuring current boundaries are consistent)

Section No.	Section Name	Page	Change Rationale	Original Wording	Update
2.3.1	High-Level Operational Design, Type of Enumeration Area (TEA) Delineation	5	After review of administrative records provided by the military, it was determined that Self-Response and Update Leave should be used for the enumeration of housing units in military areas. In 2019, areas originally assigned to TEA 5 (Military) were reassigned to TEA 1 (Self-Response) or TEA 6 (Update Leave).	The 2020 Census TEAs are: • TEA 1 – Self-Response • TEA 2 – Update Enumerate • TEA 3 – Island Areas • TEA 4 – Remote Alaska • TEA 5 – Military • TEA 6 – Update Leave	The 2020 Census TEAs are: • TEA 1 – Self-Response • TEA 2 – Update Enumerate • TEA 3 – Island Areas • TEA 4 – Remote Alaska • TEA 6 – Update Leave **Note that TEA 5 has been removed** (as noted in Memo Series document 2019.14).
2.3.1	High-Level Operational Design, Additional Tabulation Geography Delineations	6	The Census Bureau will no longer provide separate designations for Urbanized Areas and Urban Clusters. There will be just one designation identifying Urban Areas.	Additional Tabulation Geography Delineations: The "additional tabulation geographies" included in this category are Urban or Urbanized Areas (UAs) and ZIP Code Tabulation Areas (ZCTAs).	Additional Tabulation Geography Delineations: The "additional tabulation geographies" included in this category are Urban Areas (UAs) and ZIP Code Tabulation Areas (ZCTAs).

Section No.	Section Name	Page	Change Rationale	Original Wording	Update
2.5	GEOP/GD Design Assumptions, Collection Geography, Basic Collection Units (BCU)	23	Since BCUs will not be used in operations outside the decennial, the 2020 BCUs will not be maintained. It is anticipated that new BCUs will be created using the most recent features and boundaries in support of the 2030 Census.	The BCU will persist beyond the 2020 Census. The BCU has the granularity to support 2020 TEA and field management area delineations.	***Remove sentence:*** The BCU will persist beyond the 2020 Census.
3.1.2.5	Prepare to Perform BCU Interactive Review [GEOP/GD 6-1.1.2.5]	37	Multiple Interactive Reviews were required to split BCUs that had a large number of housing units, as software limitations did not allow for multiple listers to be assigned a BCU.	The current plan is to conduct BCU Interactive Review and Interactive Review QA/QC trainings in January 2018 with HQ staff.	The current plan is to conduct BCU Interactive Review and Interactive Review QA/QC trainings in January 2018 with HQ staff. **Additional Interactive Reviews were performed to split BCUs with a large number of housing units, to minimize the burden to field staff.**

Section No.	Section Name	Page	Change Rationale	Original Wording	Update
3.1.2.5	Prepare to Perform BCU Interactive Review [GEOP/GD 6-1.1.2.5]	38	Staff at NPC assisted with additional BCU interactive review	Staff at HQ performs BCU Interactive Review and BCU Interactive Review QA/QC.	Staff at HQ **and NPC perform** BCU Interactive Review and BCU Interactive Review QA/QC.
3.1.3.1	Develop TEA Criteria [GEOP/GD 6-1.1.3.1]	43	After review of administrative records provided by the military, it was determined that Self-Response and Update Leave should be used for the enumeration of housing units in military areas.	Military is designed to occur in areas on military installations.	Military enumeration was intended to identify areas on military installations **but that distinction was determined to be unnecessary.**
3.2	Tabulation Geography Delineation, Table 7	59	The Census Bureau will no longer provide separate designations for Urbanized Areas and Urban Clusters. There will be just one designation identifying Urban Areas.	Urban or Urbanized Areas (UA)	Urban Areas (UA)

Section No.	Section Name	Page	Change Rationale	Original Wording	Update
3.2.2.2	Perform Batch Delineations for Additional Tabulation Geography [GEOP/GD 6-1.2.2.2]	69	The 2020 Urban Area criteria was modified to include housing units in addition to population criteria.	UA Batch Delineation determines urban areas based on population thresholds. The areas delineated will be similar to the 2010 Census which included: • Urbanized Areas (UAs) of 50,000 or more people. • Urban Clusters (UCs) of at least 2,500 and fewer than 50,000 people. • "Rural" encompasses all population, housing, and territory not included within an urban area. Both UAs and UCs are defined primarily on the basis of population density with additional measures to account for non-residential urban land uses.	• UA Batch Delineation determines urban areas based on **housing unit or population criteria.** • Urban Areas (UAs) • "Rural" encompasses all population, housing, and territory not included within an urban area. **Urban Clusters, created during the 2010 Census, will not be created for the 2020 Census.**

Section No.	Section Name	Page	Change Rationale	Original Wording	Update
Appendix A	Acronyms and Terminology, Table 8	80	The Census Bureau will no longer provide separate designations for Urbanized Areas and Urban Clusters. There will be just one designation identifying Urban Areas.	Urbanized Area or Urban Area	Urban Area

The 2020 Census Memorandum Series

The 2020 Census Memorandum Series documents significant decisions, actions, and accomplishments of the 2020 Census Program for the purpose of informing stakeholders, coordinating interdivisional efforts, and documenting important historical changes.

A memorandum generally will be added to this series for any decision or documentation that meets the following criteria:

1. A major program-level decision that will affect the overall design or have significant effect on 2020 Census operations or systems.

2. A major policy decision or change that will affect the overall design or significantly impact 2020 Census operations or systems.

3. A report that documents the research and testing for 2020 Census operations or systems.

Visit 2020 Census on Census.gov to access the Memorandum Series, the 2020 Census Operational Plan, and other information about preparations for the 2020 Census.

2020 Census Detailed Operational Plan for: 6. Geographic Programs Operation (GEOP) – 6-1. Geographic Delineations Component (GEOP/GD)

A New Design for the 21st Century

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Approvals

This GEOP/GD Detailed Operational Plan has been reviewed and approved for use.

Electronically Signed	12/20/2018
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1. Document Purpose

The 2020 Census Detailed Operational Plan for the Geographic Programs operation (GEOP) Geographic Delineations Component (GEOP/GD) is intended for use by U.S. Census Bureau managers, staff, contractors, and other internal and external stakeholders working on the 2020 Census. The document presents the detailed operational design for the Geographic Delineations work of the 2020 Census GEOP operation and includes a summary of the operational processes involved; their inputs, outputs, and controls; and the basic mechanisms employed to conduct the operational work. GEOP/GD is one of three components that comprise the overall 2020 Census Geographic Programs operation (GEOP). The design of the other two components, the Geographic Partnership Component (GEOP/GP) and the Geographic Data Processing Component (GEOP/GDP) are described in separate documents.

Anticipated uses of this document include the following:

- Communication – Documents operational design details for internal and external stakeholders.
- Planning – Documents planning assumptions and key milestones.
- Staffing – Documents staffing needs and strategies.
- Design – Describes operations and flows, which inform design of IT systems, manual processes, and training.
- Development – Identifies business rules and required capabilities to be developed.
- Testing – Provides a basis for developing integrated test plans for IT systems and processes.

This document complements the 2020 Census Operational Plan, which presents the initial baseline version of the 2020 Census operational design and covers all operations required to execute the 2020 Census, starting with precensus address and geographic feature updates and ending once census data products are disseminated and coverage and quality are measured.

This document will be updated over time to reflect changes in strategies that result from 2020 Census planning, research, and testing activities. The intended audience for this document includes both internal and external 2020 Census Bureau stakeholders. The content of this plan is appropriate for business, technical, governance, oversight, and project management stakeholders.

2. Operational Overview

2.1 Operation Purpose

The Geographic Programs operation (GEOP) provides the geographic foundation in support of the 2020 Census data collection and tabulation activities within the Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) system. The MAF/TIGER system (software applications and databases) serves as the national repository for all of the spatial, geographic, and residential address data needed for census and survey data collection, data tabulation, data dissemination, geocoding services, and map production.

The Geographic Delineation component of the Geographic Programs determines, delineates, and updates the geographic area boundaries to serve two purposes during the 2020 Census: data collection and data tabulation. The Census Bureau divides the nation into these geographies to manage 2020 Census field operations and tabulation activities.

2.2 Background

Collection Geography

Census data collection relies on the delineation of various geographic areas, known as "collection geography," to support the capture of data during census activities. These areas include Special Land-Use areas (SLUs), Basic Collection Units (BCUs), Type of Enumeration Areas (TEAs), and Field Management Areas (FMAs).

Tabulation Geography

Census results are dependent on the delineation of various geographic areas to tabulate individual and household statistics. The delineation of these geographic areas, known as "tabulation geography," is based on input from external partnership programs or internally defined tabulation criteria. While there are additional types of tabulation geography mentioned in the 2020 Census Operational Plan, this document focuses on the following three—Tabulation Blocks, Urban or Urbanized Areas (UAs), and Zone Improvement Plan (ZIP) Code Tabulation Areas (ZCTAs). See Section 0, Table 7 for a list of tabulation geographies and their associated Geographic Programs Detailed Operational Plan.

Key Innovations

In keeping with a more efficient design for the 2020 Census, the GEOP/GD component realized opportunities to improve both collection and tabulation geographies.

For collection geography, the main area of innovation involves the development and delineation of a new collection geography—the BCU. The BCU eliminates the need for unique Assignment Areas for every operation, as were used in the 2010 Census. The BCU incorporates

homogeneity, stability, size, and navigability into its criteria. This creates an area that is both cost-effective and easier to manage in the field. Similar characteristics in the geographic area will lead to straightforward operational and address canvassing decisions.

TEA assignment is based on area characteristics and is focused on maximizing respondent participation. The 2020 Census TEAs are primarily based on mailability, not city-style addressing as was the primary criteria for the 2010 Census TEAs. Mailability characteristics are heavily influenced by United States Postal Service (USPS) collected and supplied mail delivery statistics and other USPS data. For the 2020 Census, TEAs are built using whole BCUs. Multiple TEAs cannot exist within a single BCU.

This decade, the term FMA describes all of the sublevel geographies needed for field management: census field manager areas (CFMs), area census offices (ACOs), regional census centers (RCCs), and potentially an area geographically smaller than the CFM for use in recruiting. The names have changed from the 2010 Census, but their geographic definitions remain similar. Note that CFM is also used to denote census field manager, who is the person supervising the enumerators assigned to a census field manager area.

For tabulation geography, the main area of innovation involves Tabulation Block delineation. Tabulation blocks 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. Generally, tabulation blocks are small in area; for example, a block in a city bounded on all sides by streets. Census blocks cover the entire territory of the United States, Puerto Rico, and the Island Areas. They are the smallest geographic area for which decennial census data are disseminated.

In preparation for the 2020 Census, the Census Bureau has continued developing the process used to create the tabulation blocks. The Census Bureau is working closely with stakeholders to improve the algorithm and develop software for a better delineation of tabulation blocks for the 2020 Census. The focus of this revision is as follows:

- To attempt to reduce the overall number of tabulation blocks;
- To reduce the number of very small tabulation blocks; and
- To discover systematic data issues in the MAF/TIGER system that create unnecessary tabulation blocks.

The Urban Areas program provides a physical, objective delineation of the nation into urban and rural areas and provides a crucial outline of reference for several government programs.

The Census Bureau's urban-rural classification is fundamentally a delineation of geographical areas, identifying both individual urban areas and the rural areas of the nation. The Census Bureau's urban areas represent densely developed territory and encompass residential,

commercial, and other non-residential urban land uses. An urban area comprises a densely settled core of census tracts and/or census blocks that meet minimum population density requirements, along with adjacent territory containing non-residential urban land uses as well as territory with low population density included to link outlying densely settled territory with the densely settled core. To qualify as an urban area, the territory identified according to criteria must encompass at least 2,500 people, at least 1,500 of which reside outside institutional group quarters.

In the 2010 Census the Census Bureau identified two types of urban areas:

•Urbanized Areas (UAs) of 50,000 or more people.

•Urban Clusters (UCs) of at least 2,500 and less than 50,000 people.

"Rural" encompasses all population, housing, and territory not included within an urban area.

ZIP Code Tabulation Areas (ZCTAs) are approximate area representations of USPS ZIP Code service areas. The ZCTA delineation process assigns a five-digit ZCTA code to areas. A ZCTA may not exist for every USPS ZIP Code.

2.3 Design Overview

The sections below present the high-level design for the GEOP Geographic Delineations Component (GEOP/GD). Please refer to the 2020 Census Operational Plan for a complete inventory of design decisions for all 2020 Census operations.

2.3.1 High-Level Operational Design

The design of the GEOP/GD operational component for the 2020 Census includes two major operational activity areas:

- Collection Geography Delineation
- Tabulation Geography Delineation

Each of these major activity areas is summarized below. Together, these activities represent the complete set of work that needs to be performed to conduct this operation.

Collection Geography Delineation

Collection geographies are delineated to provide a framework from which data is collected for the 2020 Census as well as other decennial-related tests. Collection Geography Delineation is comprised of five operational subactivities.

Special Land-Use Area Delineation: A key component of collection geography is the identification of special land use areas. For the 2020 Census, military areas and national parks are the focus of this effort, because their external boundaries will be held as BCU boundaries. These boundaries are updated in MAF/TIGER on a regular basis to reflect the most recent information available. Military areas are used to identify restricted areas, within which appropriate permissions may be needed to conduct census activities. The national park boundaries often provide important reference areas that can be used to divide large geographic areas or indicate where different housing situations can be expected.

Basic Collection Unit (BCU) Delineation: The BCU serves as the smallest unit of collection geography for all 2020 Census listing operations. The BCU replaces both the collection block and assignment area geographies used for the 2010 Census. While the primary purpose of the BCU is to support 2020 Census operations, the BCU can also support other census programs like current survey fieldwork. BCUs are designed to survive beyond the 2020 Census and endure for future decennial censuses. Their delineation is driven by criteria defined by various Census Bureau stakeholders and by batch software designed to implement the criteria in an effective and efficient manner. They are interactively reviewed using standard procedures and maintained using business rules and legal value checks.

Type of Enumeration Area (TEA) Delineation: In an effort to ensure the most cost-effective and efficient process to enumerate households, every BCU in the U.S. is assigned to one specific type of enumeration area (TEA). The TEA reflects the predominant methodology used to enumerate the households within the BCU.

Similar to 2010, the TEA value is assigned by a national batch delineation process that uses consistent criteria. The BCUs carry this TEA value as an attribute. Definitions of the individual TEAs are included in Section 3 of this document. The 2020 Census TEAs are:

- TEA 1 – Self-Response
- TEA 2 – Update Enumerate
- TEA 3 – Island Areas
- TEA 4 – Remote Alaska
- TEA 5 – Military
- TEA 6 – Update Leave

Field Management Area (FMA) Delineation: This component of collection geography includes delineation of geographic areas other than BCU and TEA, which are necessary to manage and accomplish fieldwork for the 2020 Census. BCUs are the building block of all FMAs. These areas include regional census center (RCC), area census office (ACO), census field manager area (CFM).

Collection Geography Delineation Closeout: Upon completion of all collection geography delineations, final product creation occurs, and a detailed Lessons Learned document is created. These two activities close out the collection geography delineations.

Tabulation Geography Delineation

Tabulation geographies are used to tabulate results once the data has been collected and processed.

Tabulation Block Delineation: Tabulation blocks are delineated once a decade. Prototype tabulation blocks are delineated to support the Redistricting Data Program operation (RDP). Creation of tabulation blocks assists the Census Bureau in complying with requirements of Public Law 94-171 (P.L. 94.171), which outlines the process to gather data from designated government officials and provide the governor and legislature in each state with the data they need to redraw congressional and state legislative districts. Since their creation in 1980, in addition to data tabulation, tabulation blocks are used in geocoding of addresses in the Master Address File (MAF), statistical sample design and selection, special tabulations and user-defined geographic areas

The Census Bureau is creating tabulation block criteria and batch delineation software with the stakeholders in mind to allow for maximum flexibility of use.

Additional Tabulation Geography Delineations: The “additional tabulation geographies” included in this category are Urban or Urbanized Areas (UAs) and ZIP Code Tabulation Areas (ZCTAs).

Tabulation Geography Delineation Closeout: Upon completion of all tabulation geography delineations, the creation of a detailed Lessons Learned document closes out the tabulation geography delineations.

The full hierarchy of activities for the GEOP/GD operational component is provided in Appendix C in the form of an Activity Tree. In the Activity Tree, each major operational activity area listed above is numbered and then decomposed into a numbered set of subactivities, some of which are further decomposed into more detailed numbered subactivities or steps.

For a full description of the operational subactivities that comprise the GEOP/GD operational component, see the Detailed Process Description discussions in Section 3 below.

2.3.2 GEOP/GD Operational Context

The GEOP/GD operational activities described above are conducted within the context of other 2020 Census operations and other programs or data sources that are external to the 2020 Census Program. One way to depict an operational context is by using a "Context Diagram," which shows the boundary of the operational process, the operational activities it contains, and the information exchanged with its neighbor operations (or other entities) as well as the resources (mechanisms) needed to conduct the operational work.

Figure 1 is a top-level context diagram for the GEOP/GD operational component represented as an Integrated Definition, Level 0 (IDEF0) model. An IDEF0 Model of a process (or operation) shows the Inputs, Controls, Outputs, and Mechanisms of the process. These IDEF0 model elements are summarized below and described further in the sections that follow.

The yellow box in the center of the IDEF0 model lists the major operational activity areas for the operation, numbered as given in the GEOP/GD operational component Activity Tree in Appendix C. Specific Information Exchanges (IE) are shown in different colored boxes to represent the Inputs (green boxes on left side), Outputs (orange boxes on right side), Controls (purple boxes on top) and Mechanisms (blue boxes on the bottom). Boxes to the left of the Inputs indicate the *Provider* of the inputs to the operation (typically another 2020 Census operation or an external source). The Provider of the Controls is noted in the box itself. Boxes to the right of the Outputs indicate the *Receiver* of the outputs (typically another 2020 Census operation or external entity). Each Information Exchange has a name and a unique number for identification purposes.

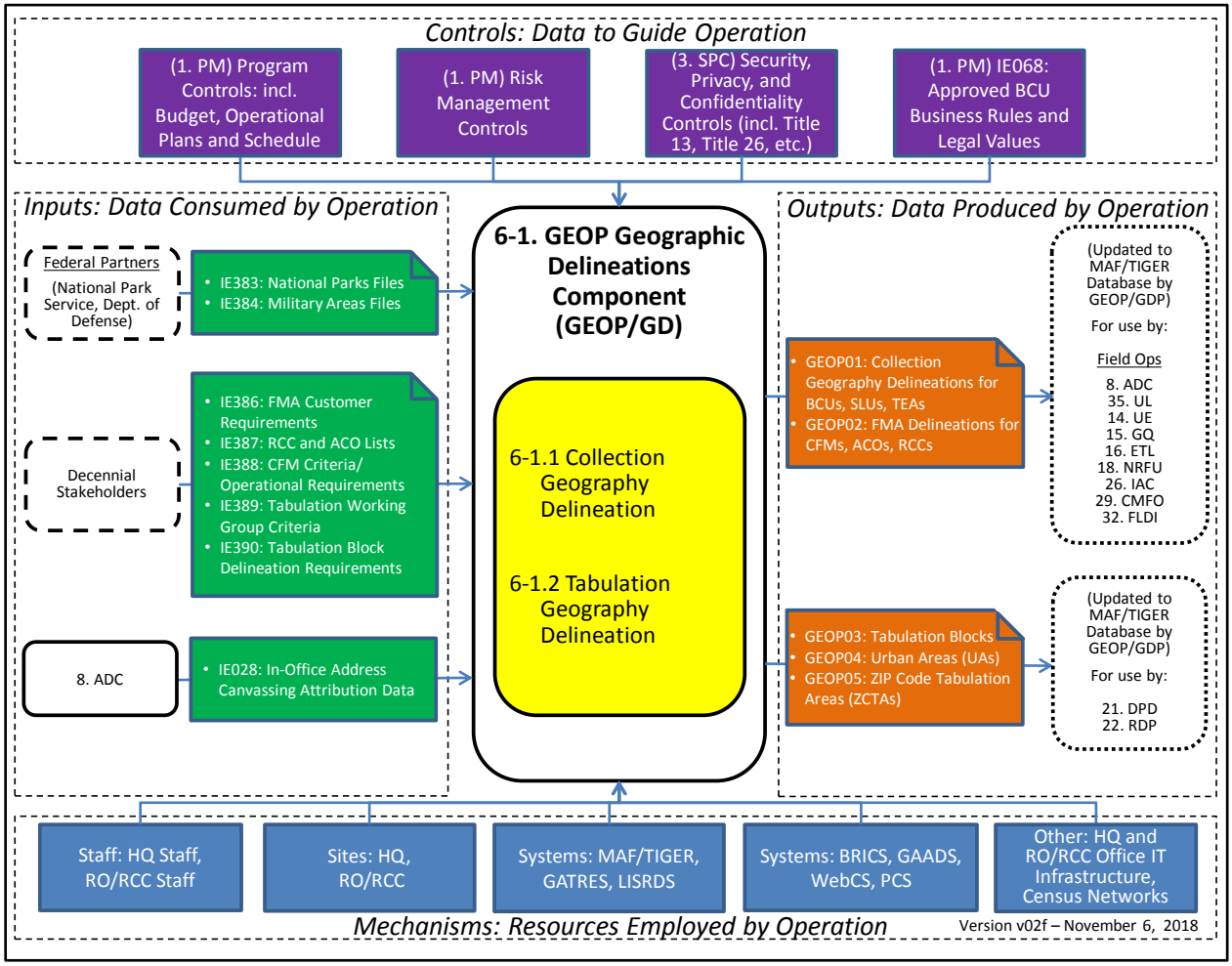

Figure 1: GEOP Geographic Delineations Component (GEOP/GD) Context Diagram

For detailed descriptions of the Inputs, Controls, Outputs, and Mechanisms used by the GEOP/GD operational component, see the sections that follow.

2.3.2.1 GEOP/GD Operational Inputs

Inputs are the data that are consumed by the operation. The inputs define the amount of operational work that needs to be performed.

Table 1 lists the inputs to the GEOP/GD operational component.

Table 1: GEOP/GD Operational Inputs

Provider	Information Exchange	Description
Federal Partners (National Park Service, Department of Defense)	IE383: National Parks Files	National park boundary information used for Special Land-Use areas (SLU) delineation purposes.
	IE384: Military Areas Files	Military areas boundary information used for SLU delineation purposes.
Decennial Stakeholders	• IE385: Decennial Workload Estimates • IE386: FMA Customer Requirements • IE387: RCC and ACO Lists • IE388: CFM Criteria/ Operational Requirements	Inputs from Decennial Census stakeholders used for Collection Geography Delineation purposes.
Decennial Stakeholders	• IE389: Tabulation Working Group Criteria • IE390: Tabulation Block Delineation Requirements	Inputs from Decennial Census stakeholders and Redistricting Data Program operation (RDP) to be used for Tabulation Geography Delineation purposes. Note: Tabulation Working Group Criteria include criteria for: • Block Boundary Suggestion Program (BBSP) sample • BBSP • BBSP verification tabulation
8. Address Canvassing operation (ADC)	IE028: In-Office AdCan Attribution	Attribution data derived from in-office address canvassing activities.

2.3.2.2 GEOP/GD Operational Controls

Controls are the data that guide the behavior of the operation. They are not consumed by the operation, but rather they provide guidance, models, limits, criteria, cutoff dates, or other information that controls the way in which the operational work is performed.

Table 2 lists the controls for the GEOP/GD operational component.

Table 2: GEOP/GD Operational Controls

Provider	Information Exchange	Description
1. Program Management operation (PM)	Program Controls	Program Control information including: • Budget • Operational plans and schedule • Risk management
3. Security, Privacy, and Confidentiality operation (SPC)	Security, Privacy, and Confidentiality Controls	Laws, policies, regulations, and guidelines related to physical security, IT security, data security and privacy and confidentiality impacts, analyses, and processes. These include but are not limited to Title 13, Title 26, and other laws and policies related to protection of personally identifiable information.
1. Program Management operation (PM)	IE068: Approved BCU Business Rules and Legal Values	Approved business rules and legal values used to control BCU delineation

2.3.2.3 GEOP/GD Operational Outputs

Outputs are the data produced by the operation. The outputs constitute the results of operational work that has been performed. Outputs produced may be used as inputs or controls to other operations.

Table 3 lists the outputs from the GEOP/GD operational component.

Table 3: GEOP/GD Operational Outputs

Consumer	Information Exchange	Description
(Updated MAF/TIGER Database by GEOP/GDP) For Use by Field Operations: 8. Address Canvassing operation (ADC) 35. Update Leave operation (UL) 14. Update Enumerate operation (UE) 15. Group Quarters operation (GQ) 16. Enumeration at Transitory Locations operation (ETL) 18. Nonresponse Followup operation (NRFU) 26. Island Areas Censuses operation (IAC) 29. Coverage Measurement Field operations (CMFO) 32. Field Infrastructure operation (FLDI)	• GEOP01: Collection Geography Delineations for BCUs, SLUs, TEAs • GEOP02: FMA Delineations for CFMs, ACOs, RCCs	Delineated collection geography polygons updates to Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) database by GEOP/GDP for use by field operations. Includes: • Basic Collection Units (BCU) • Special Land Use Areas (SLU) • Type of Enumeration Areas (TEA) • Field Management Areas (FMA) FMA types include: • Census Field Manager (CFM) areas • Area Census Office (ACO) boundaries • Regional Census Center (RCC) boundaries

Consumer	Information Exchange	Description
(Updated MAF/TIGER Database by GEOP/GDP) For use by: 21. Data Products and Dissemination operation (DPD) 22. Redistricting Data Program operation (RDP)	• GEOP03: Tabulation Blocks • GEOP04: Urban Areas (UAs) • GEOP05: ZIP Code Tabulation Areas (ZCTAs)	Delineated Tabulation Geography polygons updates to MAF/TIGER database by GEOP/GDP for use by the DPD operation during tabulation of 2020 Census data products and for use by the Census Redistricting and Voting Rights Data Office (CRVRDO) during the RDP operation.

2.3.2.4 GEOP/GD Operational Mechanisms

Mechanisms are the resources (people, places, and things) that are used to perform the operational processes. They include staff resources, infrastructure sites, and systems and other technology infrastructure.

Staff Resources

Table 4 identifies the staff resources employed for the GEOP/GD operational component.

Table 4: Staff Resources Used Within GEOP/GD Operational Activities

Staff Resources	Description/Role
Headquarters (HQ) staff	HQ staff to manage GEOP/GD activities, to oversee the various working groups, to coordinate activities with Regional Offices/Regional Census Centers (ROs/RCCs) and stakeholders and to participate in batch processes for collection and tabulation activities. Develop and conduct training for ROs/RCCs.
RO/RCC staff	Regional geography staff to conduct and manage Type of Enumeration Area (TEA) Interactive Review and Interactive Review Quality Assurance/Quality Check (QA/QC) and Field Management Area (FMA) Interactive Review and Interactive Review QA/QC.

Infrastructure Sites

Table 5 identifies the infrastructure sites employed for the GEOP/GD operational component.

Table 5: Infrastructure Sites for GEOP/GD Operational Activities

Infrastructure Site	Description/Role
Headquarters (HQ)	HQ Site for office work.
RO/RCC	Regional office/regional census center (RO/RCC) Site for field data collection and regional geography office activities.

Systems and Other Technology Infrastructure

Table 6 identifies the systems employed for the GEOP/GD operational component.

Table 6: Systems Used Within GEOP/GD Operational Activities

System	Description
Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER)	A Census Bureau system that provides address and spatial data products for participants and a mechanism for applying updates made by participants. MAF/TIGER includes a number of component systems and utilities that are used for GEOP/GD work. These include Geographic Acquis-Based Topological Real-Time Editing System (GATRES), Live Individual Shapefile Request and Delivery Software (LISRDS), and Business Rules and Legal Values Integrated Control System (BRICS).
Geographic Acquis-Based Topological Real-Time Editing System (GATRES)	GATRES is a Census Bureau system used to interactively update information in the MAF/TIGER system. GATRES allows concurrent access to the MAF/TIGER system by multiple simultaneous interactive users and is accessible from multiple sites, including Headquarters (HQ) and Regional Office/Regional Census Center (RO/RCCs). For the BCU delineation, GEO will enhance GATRES to enable staff to modify BCUs.
Live Individual Shapefile Request and Delivery Software (LISRDS)	The LISRDS allows users to request shapefile and/or dBase III table extracts (layers) from the tables in the MAF/TIGER system. The system consists of a graphical user interface (webpage) that resides on a web application server and application software that resides on a batch server.
Business Rules and Legal Values Integrated Control System (BRICS)	BRICS is an interactive internet application that allows the user to submit and monitor spatial validation and legal value checks of the MAF/TIGER system. Correction of failures is critical to maintaining the integrity of the MAF/TIGER system. The Workflow Control Branch controls this system.

System	Description
Basic Collection Unit Geographic Area Analysis and Delineation System (bGAADS)	The Basic Collection Unit Geographic Area Analysis and Delineation System (bGAADS) is a tool that uses ArcGIS software from Environmental Systems Research Institute (ESRI) to manipulate geographies outside of the MAF/TIGER system environment, prior to insertion into the MAF/TIGER database. Decennial Information Technology Division (DITD) enhanced bGAADS to enable RO/RCC staff to modify Type of Enumeration Areas (TEAs) and Field Management Area (FMA) geographies.
Web Enabled Batch Control System (WebCS)	A Census Bureau web-based control system used only for batch processing. This system holds information about any given batch processing universe and tracks the status of production processing.
Production Control System (PCS)	A Census Bureau system to control and monitor the workflow and progress of materials for programs.

Other technology infrastructure employed for the GEOP/GD operational component includes:

- HQ and RO/RCC Office IT Infrastructure for conducting GEOP/GD operational work.
- Census Network connectivity for data transmission between operational systems and operational sites.

2.4 GEOP/GD Data Flow and Operational Influences

Geographic Delineations use address and spatial data from the MAF/TIGER system to perform delineations for both Collection Geography and Tabulation Geography. The results of these delineations are to be applied to MAF/TIGER as updates and form the basis of the spatial collection framework for the 2020 Census operations and the spatial tabulation framework for 2020 Census data products.

Figure 2 is an Integrated Operations Diagram (IOD), which depicts the major interactions among the operations and external entities involved in the development of the 2020 Census Frame (address and spatial data). This diagram shows the Geographic Programs operation (GEOP) as the hub of frame development and GEOP's interactions with the other 2020 Census operations that have a role in frame development. GEOP is composed of three components: Geographic Delineations component (GEOP/GD), Geographic Partnerships component (GEOP/GP), and

Geographic Data Processing component (GEOP/GDP). Also shown are the upstream and downstream operational influences, including the Field Infrastructure operation (FLDI), Address Canvassing operation (ADC), Local Update of Census Addresses operation (LUCA), New Construction program (NC), Redistricting Data Program operation (RDP), Count Review operation (CRO), Response Processing Operation (RPO), Update Leave operation (UL), Update Enumerate operation (UE), Group Quarters operation (GQ), Enumeration at Transitory Locations operation (ETL), Nonresponse Followup operation (NRFU), Data Products and Dissemination operation (DPD), and Archiving operation (ARC).

This diagram covers frame development for the 2020 Census (stateside and Puerto Rico). It does not cover development of the frame for the Island Areas Censuses or Post-Enumeration Survey (Coverage Measurement) operations.

The discussion below walks the reader through the diagram, using the circled numbers to help the reader follow the flow.

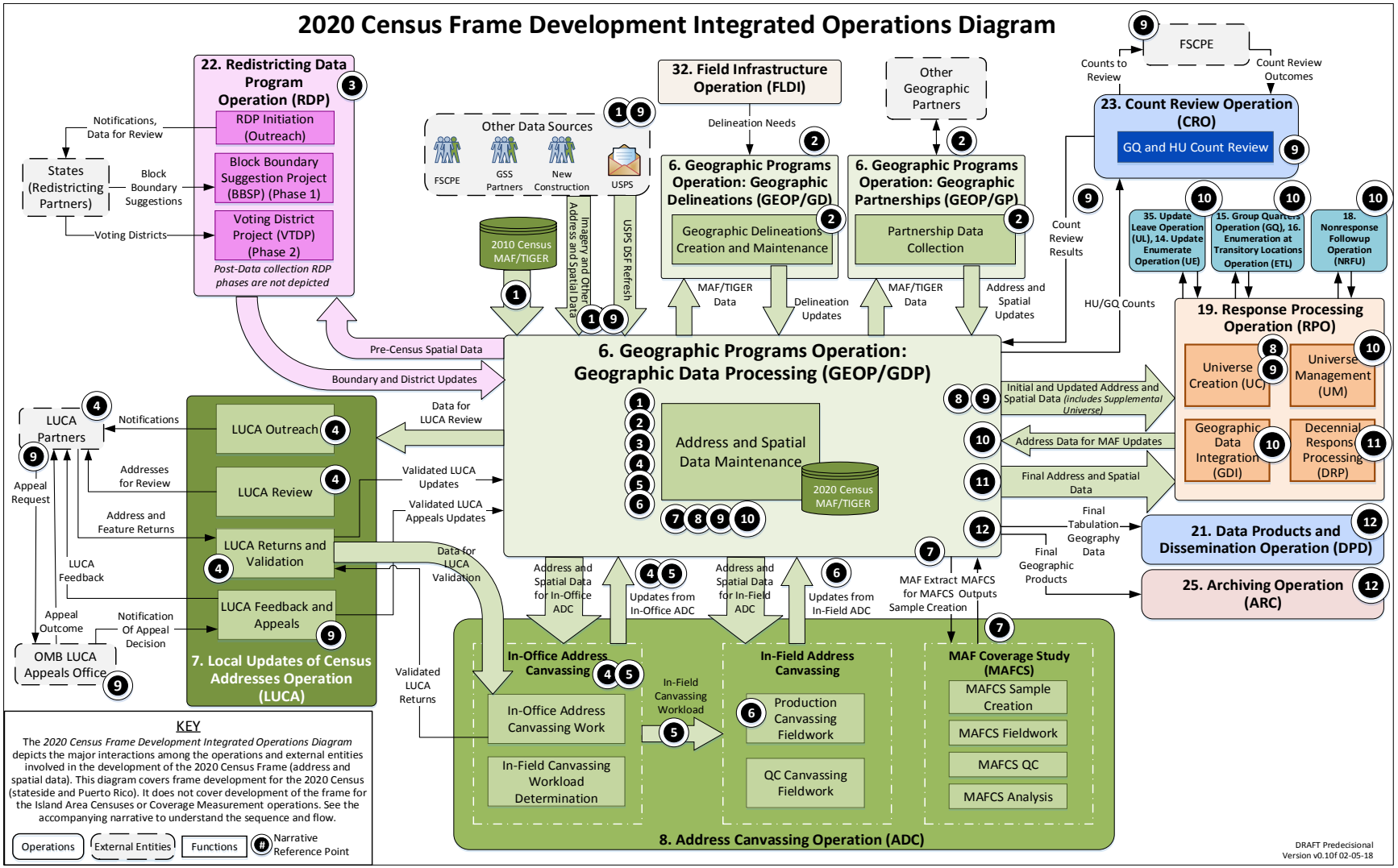

Figure 2: 2020 Census Frame Development Integrated Operations Diagram (IOD)

❶ Frame development for the 2020 Census includes, as a starting point, the 2010 Census address and spatial data from the Master Address File/Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) database and any ongoing updates that have been performed throughout the early part of the decade. Frame development takes inputs from various external sources to update the address and spatial data in the MAF/TIGER system.

The United States Postal Service (USPS) typically provides data to the Census Bureau twice a year, in the spring and the fall, through the Delivery Sequence File (DSF). The DSF is the list of all addresses (and some related data) maintained by the USPS for mail delivery and is the most complete USPS address database available. GEOP processes the DSF with other data from the USPS through an activity collectively known as the "DSF Refresh."

Other sources, such as Federal-State Cooperative for Population Estimates (FSCPE) and Geographic Support System (GSS) Partners provide data to GEOP/GDP, which is used in validating and updating the MAF/TIGER data. Based on data from all these sources, GEOP/GDP updates the MAF/TIGER data throughout the decade.

❷ The GEOP/GP performs outreach activities to encourage and motivate participation in the Geographic Partnership Programs. Partner groups, including tribal, state, and local governments, and coordinating agencies, provide address and spatial data updates to GEOP/GP, which sends them to GEOP/GDP to update the MAF/TIGER data.

The GEOP/GD determines, delineates, and updates the geographic area boundaries for 2020 Census data collection and tabulation. GEOP/GD performs the delineation of various Collection Geography areas, based on the Basic Collection Unit (BCU), the smallest unit of collection geography for all 2020 Census listing-based operations. In an effort to ensure the most cost-effective and efficient process to enumerate households, every BCU in the United States is assigned to one specific Type of Enumeration Area (TEA). The TEA assignment for a given BCU is based on address types and other characteristics of the BCU, including an assessment of the likelihood of residents to self-respond and accessibility of the BCU. The TEA assignment determines the methodology used for frame creation and enumeration of the households within the BCU. Based on the needs of the FLDI operation, GEOP/GD also supports Field Management Area delineation, which includes delineation of geographic areas necessary to manage and accomplish the fieldwork for the 2020 Census. In addition to the collection geography delineation work described above, GEOP/GD is also responsible for 2020 Census Tabulation Geography delineation. Tabulation Geography delineation data are used by DPD at the conclusion of the 2020 Census during the creation of the 2020 Census data products. GEOP/GDP updates the MAF/TIGER data to reflect both these kinds of delineations.

GEOP/GP and GEOP/GD activities began in 2016 and are ongoing throughout frame development.

❸ In addition to inputs provided by partners through the GEOP/GP component, the 2020 Census includes an operation, RDP, which provides each state the opportunity to identify the small area geographies needed for legislative redistricting and the legally required Public Law (P.L.) 94-171 redistricting data tabulations by the mandated deadline of April 1, 2021, one year from Census Day. RDP includes activities to update the frame with current block boundary suggestions (2015 – 2017) and voting district project inputs (2017 – 2020).

Once RDP establishes which states will participate, it sends those states packages, including pre-census spatial data that reflect the boundaries and features in the MAF/TIGER data. The participants update these shapefiles and provide them back to RDP, which reviews them and resolves any issues. Once reviewed, the updated files are provided to GEOP/GDP for use in updating the MAF/TIGER data.

❹ Another operation is Local Update of Census Addresses (LUCA). LUCA provides an opportunity for tribal, federal, state, and local governments to review and improve the address lists and maps as required by P.L. 103-430. LUCA sends an advance notice package to approximately 39,000 state, local, and tribal governments informing them about LUCA. Participating LUCA partners that have signed an agreement to protect the Title 13 data contained in the Census Bureau address files are provided review materials, including shape files and address data from MAF/TIGER for review. The material provided for LUCA review includes some MAF/TIGER updates from the ongoing In-Office Address Canvassing (ADC) work. The LUCA partners review the materials and provide any updates as address and feature returns. Address matching is used to match and flag returns for validation as needed. 2020 Census LUCA addresses that are not validated during address matching are sent to ADC for in-office validation. In-office validation results are returned to LUCA. LUCA provides updates for validated addresses from LUCA partner returns to GEOP/GDP for use in updating the MAF/TIGER data. Addresses that were not validated are subsequently sent back to LUCA partners as part of the LUCA feedback activity.

❺ A critical part of frame development is Address Canvassing (ADC). ADC's purpose is to deliver a complete and accurate address list and spatial database for enumeration and determine the type and address characteristics for each living quarter. ADC comprises three main functions: In-Office Address Canvassing, In-Field Address Canvassing, and the MAF Coverage Study (MAFCS).

In-Office Address Canvassing is a continuous process that measures, assesses, and ensures the completeness and accuracy of the MAF and associated attributes and geospatial data. In-Office Address Canvassing, which began in September 2015 and continues during the frame development process, receives address and spatial data from GEOP/GDP. External updates to these data that occur during ADC are sent on an ongoing basis from GEOP/GDP as new information is provided by activities such as GEOP/GP and LUCA.

Any updates to address and spatial data resulting from In-Office Address Canvassing are provided to GEOP/GDP for incorporation into the MAF/TIGER data.

The BCUs that cannot be validated through In-Office Address Canvassing procedures or for which address characteristics cannot be adequately determined are sent to the field for in-person canvassing and become part of the In-Field Address Canvassing workload.

6 In-Field Address Canvassing is the process of having field staff visit specific geographic areas to identify every place where people could live or stay. Field staff compare what they see on the ground to the existing census address list and either verify or correct the address and location information. Listers knock on every door to verify address information, collect associated mailing address information, and collect information about any additional housing units present at the address. Field staff also classify each living quarter as a housing unit or group quarter. The results are made available to GEOP/GDP to update the MAF/TIGER data.

7 The MAF Coverage Study (MAFCS) is a recurring address canvassing operation to statistically determine the over/under coverage for the entire frame. MAFCS began in April 2016 and work continued into 2017. GEOP/GDP provides an extract of addresses from the MAF for the MAFCS to sample. The MAFCS performs fieldwork and analyzes the sample to determine any over-coverage and under-coverage issues resulting from the In-Office Address Canvassing work. The results of the MAFCS are used to improve In-Office Address Canvassing procedures. The MAFCS was conducted in Fiscal Year (FY) 2016 and during part of FY 2017. Based on funding uncertainty and reprioritization of critical components of the 2020 Census, the MAFCS was discontinued in April 2017. 8 GEOP/GDP provides initial address and spatial data, including the TEA designations and the field management area delineations to RPO so it can create the initial enumeration case universe. RPO uses this information to create workload for each of the response data operations, including Forms Printing and Distribution operation (FPD), Internet Self-Response operation, Census Questionnaire Assistance operation, as well as UL, UE, GQ, ETL, and NRFU.

9 Additional updates to the MAF/TIGER data may be identified after the initial universe is sent to RPO as a result of the LUCA appeals, New Construction, CRO, and subsequent refreshes of USPS DSF data. These data are provided to RPO in what is known as the Supplemental Universe.

LUCA includes an appeals process to allow participants to contest the Census Bureau's responses to their inputs. Once LUCA participants receive their feedback materials in the summer of 2019, they have 30 calendar days to file an appeal with the LUCA Appeals Office within the Office of Management and Budget (OMB). Upon receipt of a LUCA appeal, the LUCA Appeals Office uses the supporting documentation sent by the participant to decide whether to accept or reject an appeal. Once OMB makes a determination on a LUCA appeal, it notifies the participant of the determination. The LUCA Appeals Office delivers accepted LUCA appeals to GEOP/GDP, which processes the appealed addresses, updating the MAF/TIGER data accordingly.

The New Construction program utilizes the expertise of tribal, state, and local governments to improve the accuracy and completeness of the address list used for the 2020 Census. The purpose of the New Construction program is to obtain city-style addresses for newly built housing units (HU) in blocks where census questionnaires are delivered through the self-response method. New addresses for units outside the self-response area will be added to the address list at the time of questionnaire delivery in UL areas or during the enumeration attempt in UE areas. The Census Bureau asks participants in the New Construction program to submit addresses of any HU for which basic construction (closing the structure to the elements) will be completed by or before Census Day (April 1, 2020).

CRO, in partnership with FSCPE, enhances the accuracy of the 2020 Census through remediating potential gaps in coverage by implementing an efficient and equitable process to identify missing housing units, and identifying and correcting missing or geographically misallocated large group quarters (GQ) and their population. For frame development, GEOP/GDP sends HU and GQ counts to CRO for validation. Any address changes resulting from CRO are incorporated into the MAF/TIGER data by GEOP/GDP.

10 Additional frame development support is provided by address updates from UL, UE, GQ, and ETL, and from NRFU's field verification activities. As noted above, universe and address updates occur during field operations. All listing results and other address changes identified through the field data collection operations are sent back to GEOP/GDP through the RPO Geographic Data Integration function.

11 Once data collection is complete, the final address and spatial data are sent from GEOP/GDP to the RPO Decennial Response Processing Function, which uses the geographic data to prepare the response data for subsequent tabulation and data products creation activities.

12 The final geographic data files (Tabulation Geography data) are sent from GEOP/GDP to DPD to be used in the creation of the various 2020 Census data products. DPD uses this geographic data to determine how to structure and layer the data by geographic area (e.g., state, city, and tract).

At the conclusion of the 2020 Census, ARC receives final geographic products from GEOP/GDP frame development to be transferred to the National Archives and Records Administration (NARA) as required.

2.5 GEOP/GD Design Assumptions

Collection Geography assumptions are as follows:

Basic Collection Units (BCU)

- The BCU replaces the collection block and assignment area geographies used in past censuses.
- Special Land-Use Areas are finalized in the MAF/TIGER system before BCU delineation.
- The BCU delineation covers the entire country, including the 50 states, District of Columbia, Puerto Rico, and the Island Areas.
- Stakeholders use the BCU as a planning tool for the 2020 Census.
- BCUs are used as the basis for assigning work to individuals in the field.
- The data definition of the BCU allows designated staff to suffix or merge BCU entities throughout the decade under a limited set of circumstances.
- Delineators will build field management area geographies for managing data collection from whole BCUs.
- The maintenance of the BCU leverages the MAF/TIGER database, Geographic Support System Program (GSS) updates, geographic partnership programs, and the USPS Delivery Sequence File (DSF) to update operational attribution.
- There will be an initial BCU delineation as well as an update before the 2020 Census.
- BCU delineation includes both batch and interactive processes.

- The BCU will persist beyond the 2020 Census. The BCU has the granularity to support TEA and field management area delineations.
- All systems supporting field-listing operations are able to ingest BCU and its relevant attribution.

Type of Enumeration Areas (TEAs)

- The preliminary TEA calculations (2015 to 2017) are a temporary TEA calculation for cost estimating or planning purposes.
- Operational needs drive the TEA criteria.
- TEAs are built using BCU as their base.
- Delineators must create TEAs using whole BCUs. Multiple TEAs cannot exist within a single BCU.
- BCUs must be available before TEA delineation to hold TEA attribution.
- Delineators create the TEAs through batch and interactive processes and assign a TEA to all areas of the 50 States, District of Columbia, Puerto Rico, and Island Areas.
- Subject matter experts optimize the TEA design to minimize the costs of conducting the census, while maximizing the opportunity for respondents to receive a direct invitation to participate in the 2020 Census.
- A log of changes made during interactive TEA delineation and the rationale for each change will be maintained.
- Determining where In-Field Address Canvassing will occur is out of scope for the collection geography team.
- The TEAs are based primarily on mailability (not city-style addressing as was the primary criteria in 2010.)
- Rather than only one TEA delineation, annual updates leading up to the census will be conducted. These annual updates provide reference points for census teams for planning purposes as well as incremental improvements to the TEA delineation.
- Field Division can operationalize patchwork assignments, and there will be less smoothing to reassign a TEA to match surrounding areas than in the 2010 Census.
- Regional geographers will be trained so that a consistent approach is implemented during the interactive TEA delineation
- Consultations with federally-recognized tribal governments will also inform the final TEA assignment.

Special Land-Use Areas (SLU)

- Public lands data are obtained from federal sources (Department of Defense and National Park Service).
- Special Land-Use areas are updated before final BCU delineation.

Field Management Areas (FMA)

- Stakeholders require the delineation of RCC, ACO, and CFM boundaries to support the 2020 Census.
- Delineators will create high-level field management areas using the BCU as the smallest unit of geography.
- BCUs must be available in order to delineate FMAs.

Tabulation Geography assumptions are as follows:

Tabulation Blocks

- The Geographic Areas Reconciliation Project (GARP) completes before the tabulation block delineation. GARP is discussed in GEOP/GDP Detailed Operational Plan (DOP).
- The geographic data, including roads, rivers, lakes, railroads, MAF units, and geographic boundaries, stored in the MAF/TIGER system are accurate.

3. GEOP Geographic Delineations Component (GEOP/GD) Detailed Process Description

Figure 3 is a top-level Business Process Model (BPM) showing the first level activity areas within the GEOP/GD operational component. BPMs for the 2020 Census follow industry-standard Business Process Model and Notation (BPMN). Refer to Appendix D for an explanation of how to read the BPMN notations and a copy of all of the BPMN diagrams for this operation.

This top-level BPM serves as the Context Model for the GEOP/GD operational component. A BPMN Context Model displays the high-level activities within the operation and relationships between them, whereas the IDEF0 Context Diagram shown earlier depicts the boundaries of the operation or activity and the interfaces between the operation or activity and other operations and activities with which it is associated.

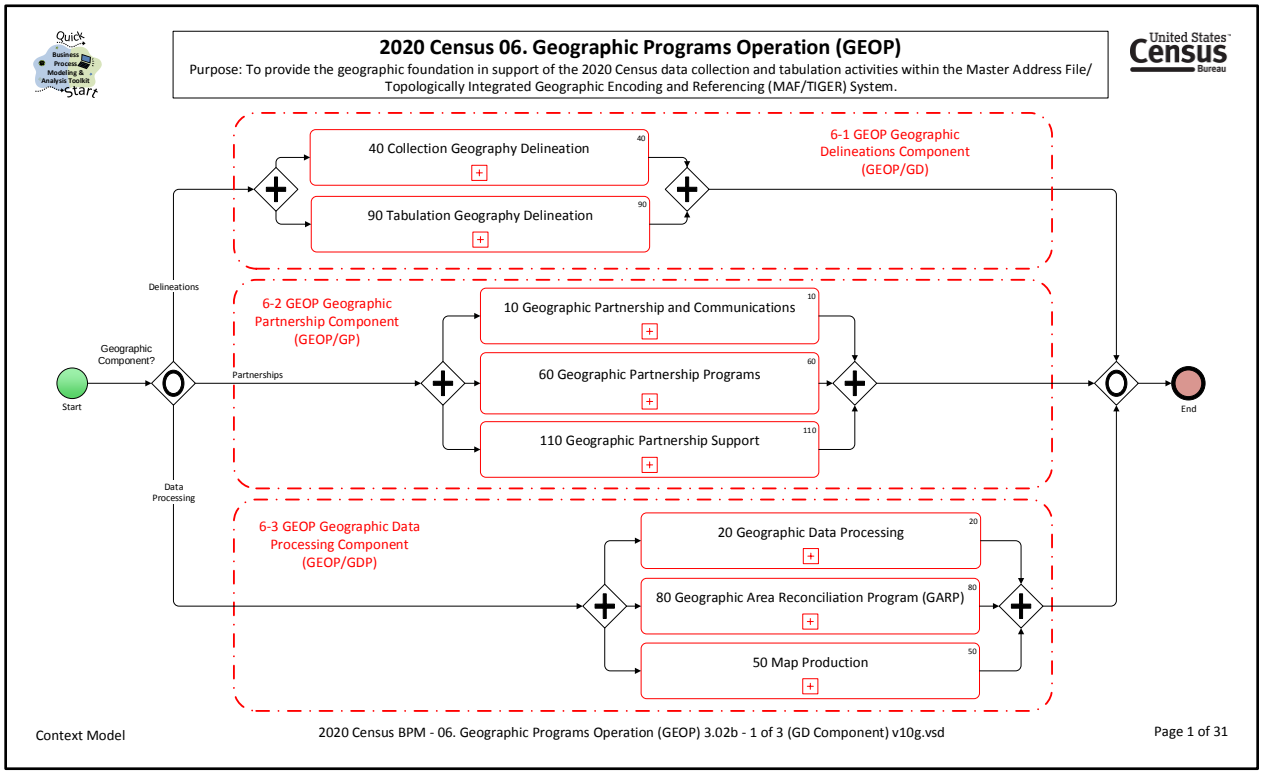

Figure 3: GEOP/GD Operational Component Context Model

The GEOP/GD operational component is subdivided into the following first level activity areas.

- Collection Geography Delineation [GEOP/GD 6-1.1]
- Tabulation Geography Delineation [GEOP/GD 6-1.2]

The business processes for each of these first level activity areas are discussed along with their inputs and outputs in the following subsections.

3.1 Collection Geography Delineation [GEOP/GD 6-1.1]

Figure 4 shows the BPM for the Collection Geography Delineation [GEOP/GD 6-1.1] activity area and its constituent activities within the overall context of the GEOP/GD operational component.

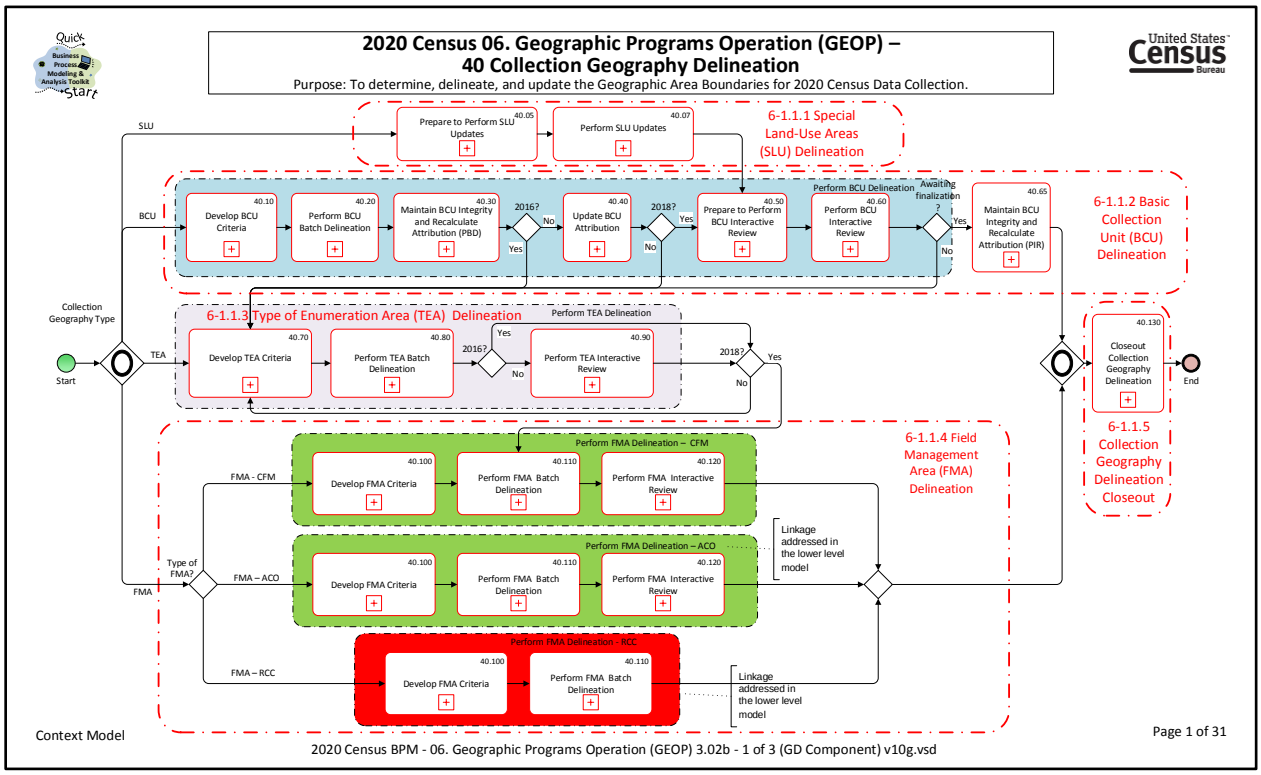

Figure 4: Collection Geography Delineation [GEOP/GD 6-1.1] Constituent Activities

The Collection Geography Delineation activity area is subdivided into the following operational subactivities:

- Collection Geography Delineation [GEOP/GD 6-1.1].
  - Special Land-Use Areas (SLU) Delineation [GEOP/GD 6-1.1.1].

- Basic Collection Unit (BCU) Delineation [GEOP/GD 6-1.1.2].
- Type of Enumeration Area (TEA) Delineation [GEOP/GD 6-1.1.3].
- Field Management Area (FMA) Delineation [GEOP/GD 6-1.1.4].
- Collection Geography Delineation Closeout [GEOP/GD 6-1.1.5].

Census data collection relies on the delineation of various geographic areas, known as "collection geography," to support the capture of data during census activities. It is an extensive process comprised of the operational subactivities listed above.

The delineation of these collection geography areas is based on internally defined collection criteria and is rooted in the BCU. The BCU serves as the smallest unit of collection geography for all 2020 Census listing-based operations, including: In-Field Address Canvassing; Update Enumerate; Update Leave; Island Areas enumeration; and Coverage Measurement. The shape of BCUs is influenced by the presence of SLUs. BCUs hold the TEA as an attribute for the 2020 Census. BCUs serve as the fundamental unit of work assignment for 2020 Census operations. The BCUs serve as the building block for all FMAs, including RCCs, ACOs, and CFMs.

After criteria are defined, the collection geographies are delineated in the MAF/TIGER system through a series of batch and interactive delineations that involve a series of geographic integrity validations and attribution checks. Once the collection geography areas are loaded into the MAF/TIGER database, they are used for the 2020 Census data collection and field operations and as the base for various geographic data products that support the 2020 Census.

Subsequent sections describe the Collection Geography Delineation operational subactivities in detail.

3.1.1 Special Land-Use Areas (SLU) Delineation [GEOP/GD 6-1.1.1]

A detailed view of the "Special Land-Use Areas (SLU) Delineation" operational subactivity (area within the gray rounded rectangle) is given in Figure 5 below.

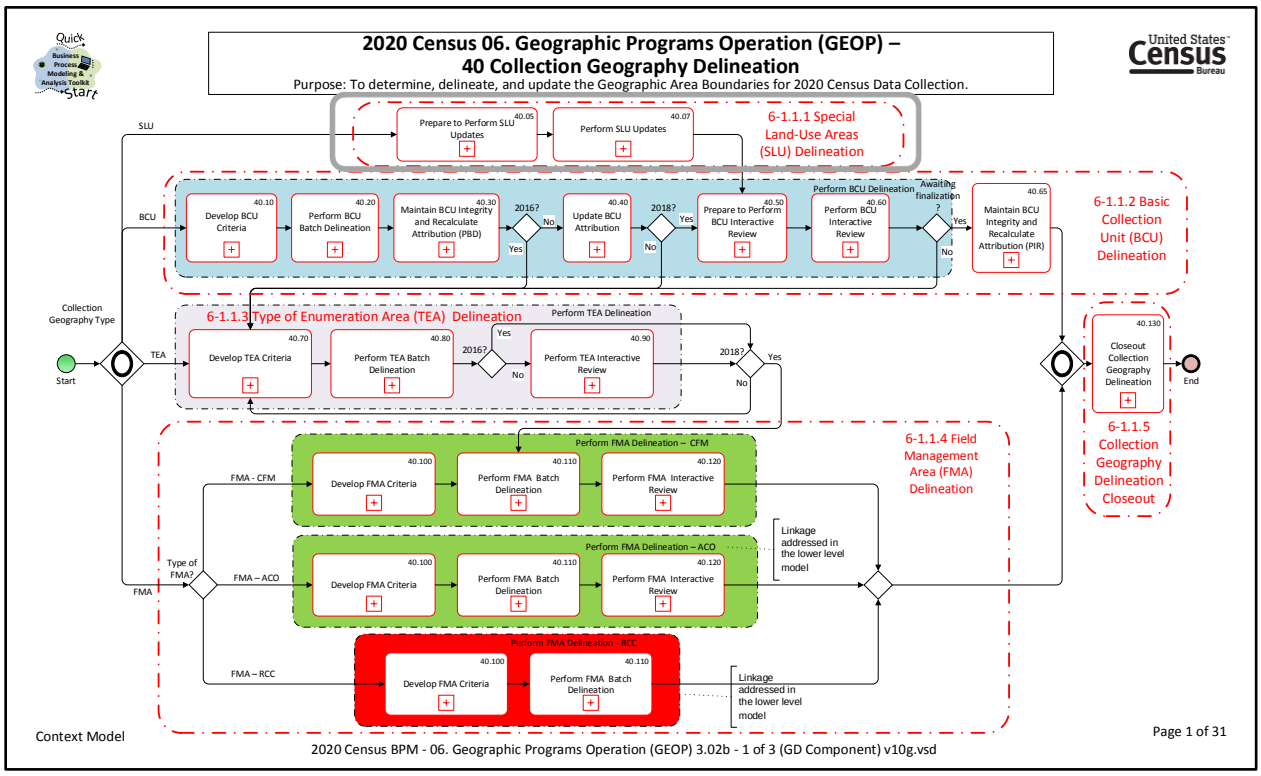

Figure 5: Special Land-Use Areas (SLU) Delineation

The "Special Land-Use Areas (SLU) Delineation" operational subactivity is subdivided into the following constituent activities:

- Special Land-Use Areas (SLU) Delineation [GEOP/GD 6-1.1.1].
  - Prepare to Perform SLU Updates [GEOP/GD 6-1.1.1.1].
  - Perform SLU Updates [GEOP/GD 6-1.1.1.2].

Military areas and public lands are considered SLUs. These SLUs are incorporated into the BCU batch delineation.

Some of the SLU areas will be updated prior to the interactive BCU delineation. Military areas and national park boundaries will be updated in FY 2017. Revisions to BCUs impacted by these

SLU updates occur during BCU Interactive Review and are vital in maintaining the BCU/SLU relationship.

Subsequent sections describe the "Special Land-Use Areas (SLU) Delineation" operational subactivities in detail.

3.1.1.1 Prepare to Perform SLU Updates [GEOP/GD 6-1.1.1.1]

Figure 6 shows the work to prepare to perform SLU updates.

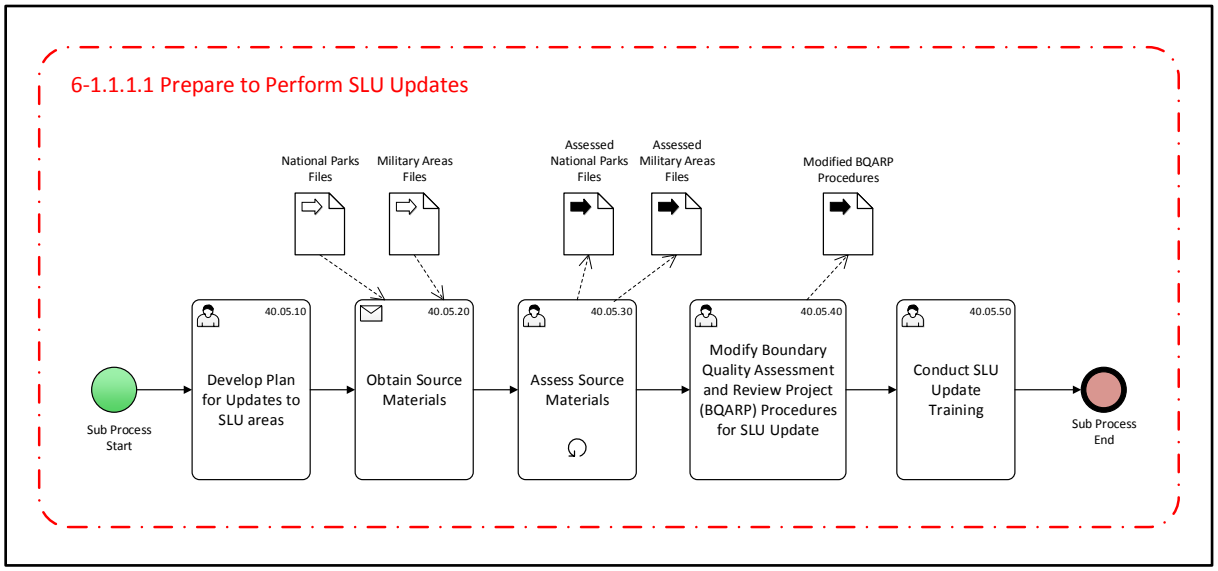

Figure 6: Prepare to Perform SLU Updates

After developing the plan for SLU updates, acquisition of new source data from federal partners (Department of Defense and National Park Service) is required in order to complete the update process. Once obtained, the source materials are assessed and existing Boundary Quality Assessment and Review Project procedures modified. These procedures are well established and easy to adapt for the SLU update work. From the revised procedures, SLU update training is conducted for staff in preparation for performing the SLU updates.

3.1.1.2 Perform SLU Updates [GEOP/GD 6-1.1.1.2]

Figure 7 shows the work to perform SLU updates.

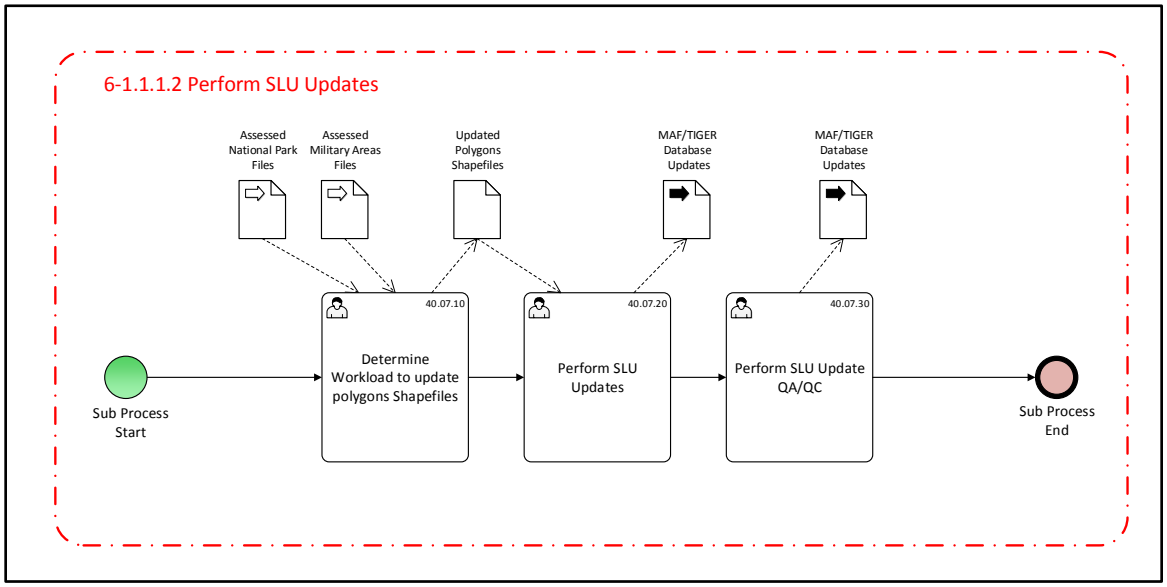

Figure 7: Perform SLU Updates

ArcGIS software is used to compare the existing MAF/TIGER system boundaries of military areas and the national parks to the new source information to determine the workload by county. The results of this comparison are GIS shapefiles termed "Change Polygons." The Change Polygons shapefiles are a reference from which to perform the SLU updates directly to the MAF/TIGER system using the Census Bureau's GATRES software. SLU update work will complete in 2017 to ensure the most current boundaries of military areas and national park SLUs are in the MAF/TIGER system for use as 2020 Census BCU boundaries.

Because SLU boundaries formed BCU boundaries during the BCU batch delineation, the SLU/BCU relationships may be lost where SLU boundaries change. The BCU Business Rules and Legal Values checks (discussed within the Maintain BCU Integrity and Recalculate Attribution section of this Detailed Operational Plan) identify all SLU/BCU discrepancies. These discrepancies are resolved during BCU Interactive Review.

3.1.2 Basic Collection Unit (BCU) Delineation [GEOP/GD 6-1.1.2]

A detailed view of the "Basic Collection Unit (BCU) Delineation" operational subactivity (area within the gray rounded rectangle) is given in Figure 8 below.

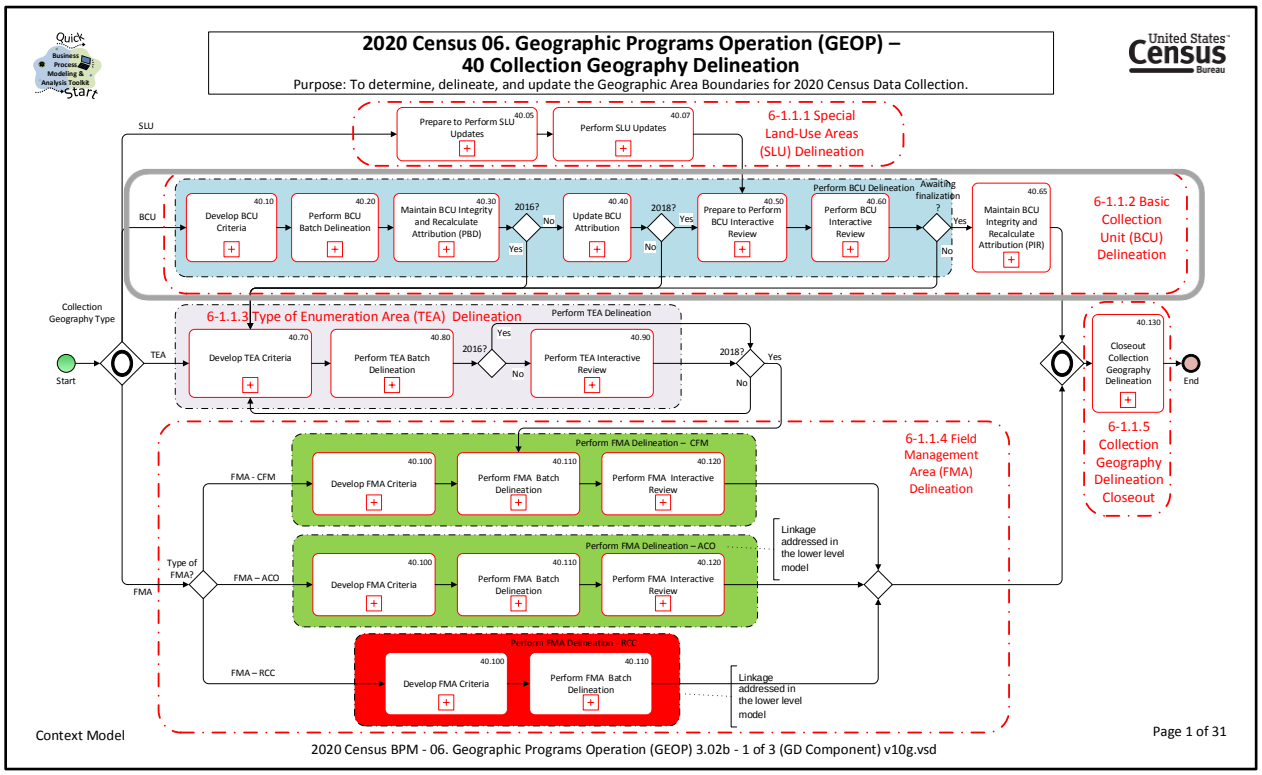

Figure 8: Basic Collection Unit (BCU) Delineation

The "Basic Collection Unit (BCU) Delineation" operational subactivity is subdivided into the following constituent activities:

- Basic Collection Unit (BCU) Delineation [GEOP/GD 6-1.1.2].
  - Develop BCU Criteria [GEOP/GD 6-1.1.2.1].
  - Perform BCU Batch Delineation [GEOP/GD 6-1.1.2.2].
  - Maintain BCU Integrity and Recalculate Attribution (Post Batch Delineation) [GEOP/GD 6-1.1.2.3].
  - Update BCU Attribution [GEOP/GD 6-1.1.2.4].
  - Prepare to Perform BCU Interactive Review [GEOP/GD 6-1.1.2.5].
  - Perform BCU Interactive Review [GEOP/GD 6-1.1.2.6].

- Maintain BCU Integrity and Recalculate Attribution (Post Interactive Review) [GEOP/GD 6-1.1.2.7].

The BCU delineation process requires planning to define, prepare, create, modify, and maintain the new BCU collection geography. Numerous processes associated with BCU collection geography have been identified, including criteria development, batch delineation, interactive review, and various maintenance/update activities scattered throughout the 2020 Census timeframe.

Subsequent sections describe the "Basic Collection Unit (BCU) Delineation" operational subactivities in detail.

3.1.2.1 Develop BCU Criteria [GEOP/GD 6-1.1.2.1]

Figure 9 shows the work to develop BCU criteria.

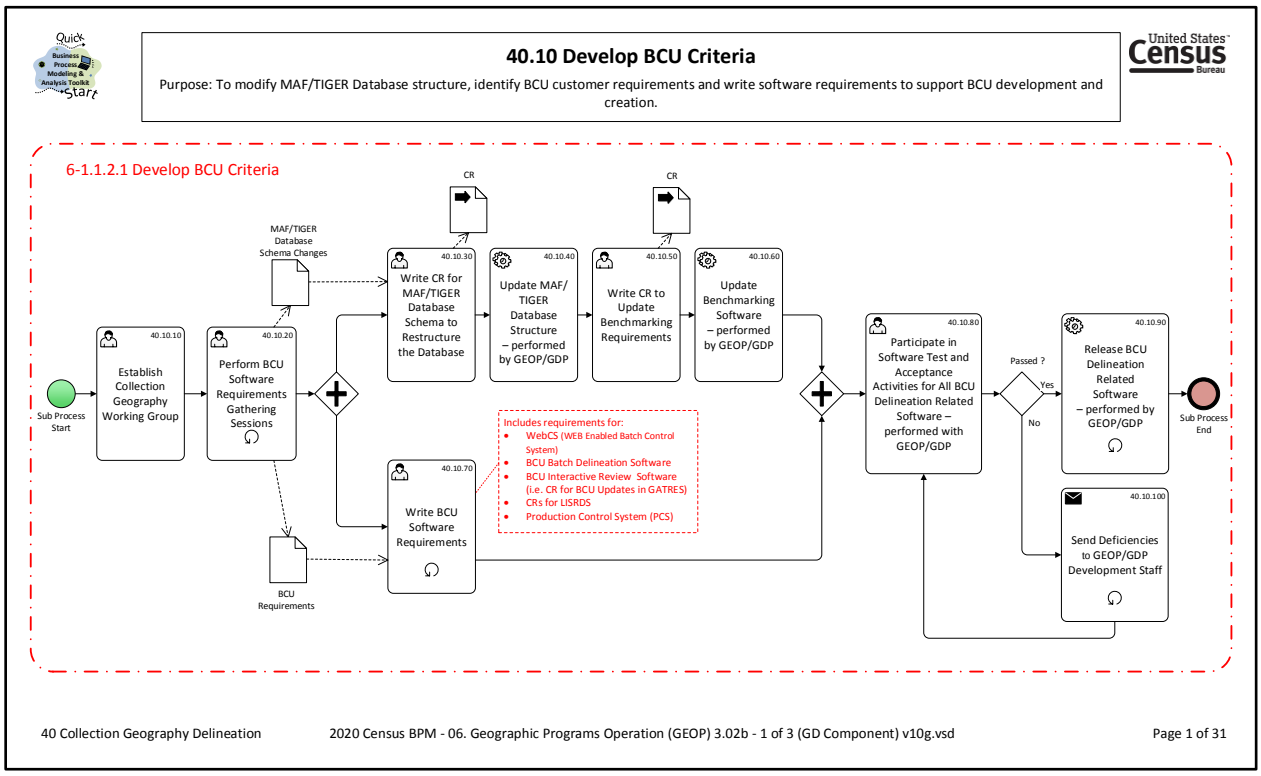

Figure 9: Develop BCU Criteria

The first step in the development of criteria for BCU collection geography is the establishment of a Collection Geography Working Group. Comprised of members from Decennial Census Management (DCMD), Field (FLD), and Geography (GEO) divisions, the working group

conducts customer requirement gathering sessions to identify the necessary changes to the MAF/TIGER system schema in order to store the BCU geography as well as identify the necessary software and system needs.

Change requests (CRs) are written to restructure the MAF/TIGER system to support the new BCU geography. Once the benchmark software modifications are confirmed correct, the new BCU geography is incorporated into the MAF/TIGER system benchmarks.

Various documents are necessary to create or modify software and systems for use in the development, tracking, and maintenance of BCU geography. Specific tasks include:

- Creation of software requirements for a WEB-Enabled Batch Control System (WebCS)

  Used to identify counties ready for batch delineation and submits states/counties for delineation.

- Creation of software requirements for BCU Batch Delineation software
  - Assigns priorities to MAF/TIGER system edges using two inputs
    - Creation of General Priority List table
    - Creation of Parameters table
  - New concept for 2020
    - Adds flexibility to develop and test software and BCU criteria repeatedly and earlier in decade
    - Allows opportunity to change BCU criteria and test change without software modification
- Creation of software requirements for a Collection Geography Production Control System BCU module

  Used to track both BCU Batch Delineation and Interactive Review phases

- Modification of the existing software solution (Geographic Acquis-Based Topological Real-Time Editing System - GATRES) by a CR

  Used to perform changes to batched BCUs during the Interactive Review phase

- Modification of the existing software solution (Live Individual Shapefile Request and Delivery Software - LISRDS) by a CR

  Used for on-demand creation of geographic information system (GIS) output files (e.g. ESRI shapefiles) once BCUs incorporated into the MAF/TIGER system

The goal is to successfully identify, document, program, test, and release the aforementioned tasks in support of BCU creation and containment in the MAF/TIGER system.

3.1.2.2 Perform BCU Batch Delineation [GEOP/GD 6-1.1.2.2]

Figure 10 shows the work to perform BCU batch delineation.

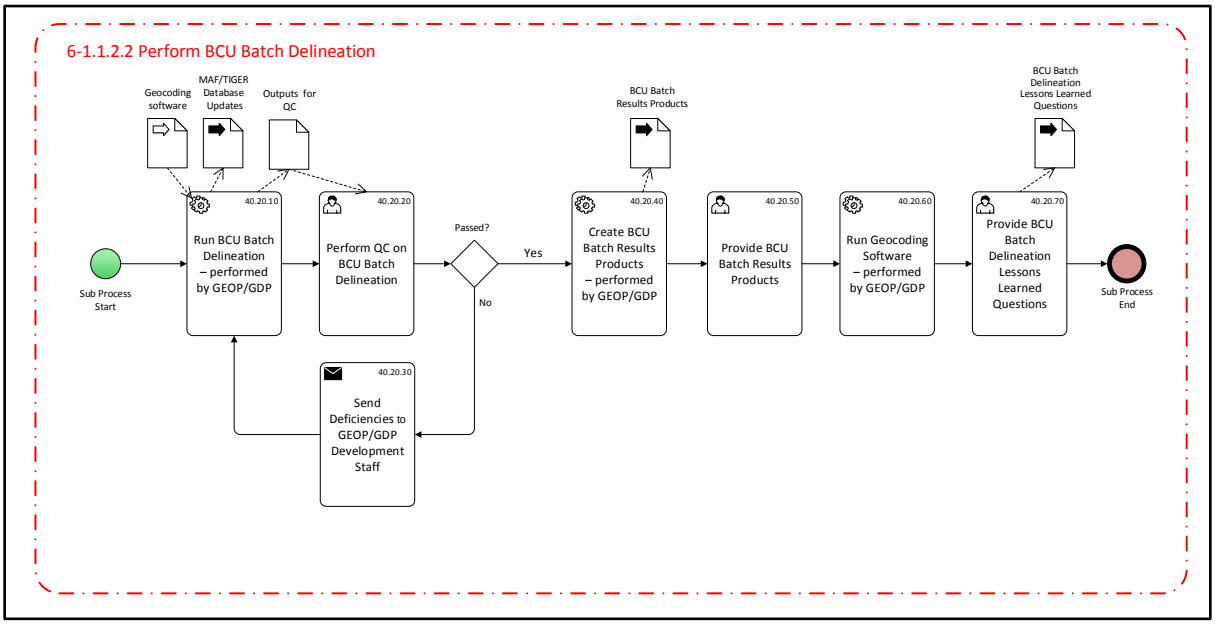

Figure 10: Perform BCU Batch Delineation

With the BCU criteria developed and new software created, execution of existing geocoding software prepares the MAF/TIGER system with address intelligence from the Master Address File (MAF). Once prepared, the BCU Batch Delineation software runs and generates output files for quality checks. The output files are reviewed to determine if the batch delineation software returned the expected results.

Upon approval, standardized, county-based BCU batch delineation results products are created. These products include GIS shapefiles of the batched BCUs and county-based text files of batch delineation attribution. Using these products, tallies and statistics of the newly batched BCUs are provided for management and the ArcGIS shapefiles are staged for use during BCU Interactive Review. As one of the last steps of the batch delineation process, geocoding software is executed to assign the newly created BCU identification code back to the MAF.

BCU Batch Delineation concludes with the distribution of Lessons Learned questions. Answers provided are reviewed and summarized for potential inclusion into the Collection Geography closeout.

3.1.2.3 Maintain BCU Integrity and Recalculate Attribution (Post Batch Delineation) [GEOP/GD 6-1.1.2.3]

Figure 11 shows the work to maintain BCU integrity and recalculate attribution (post batch delineation).

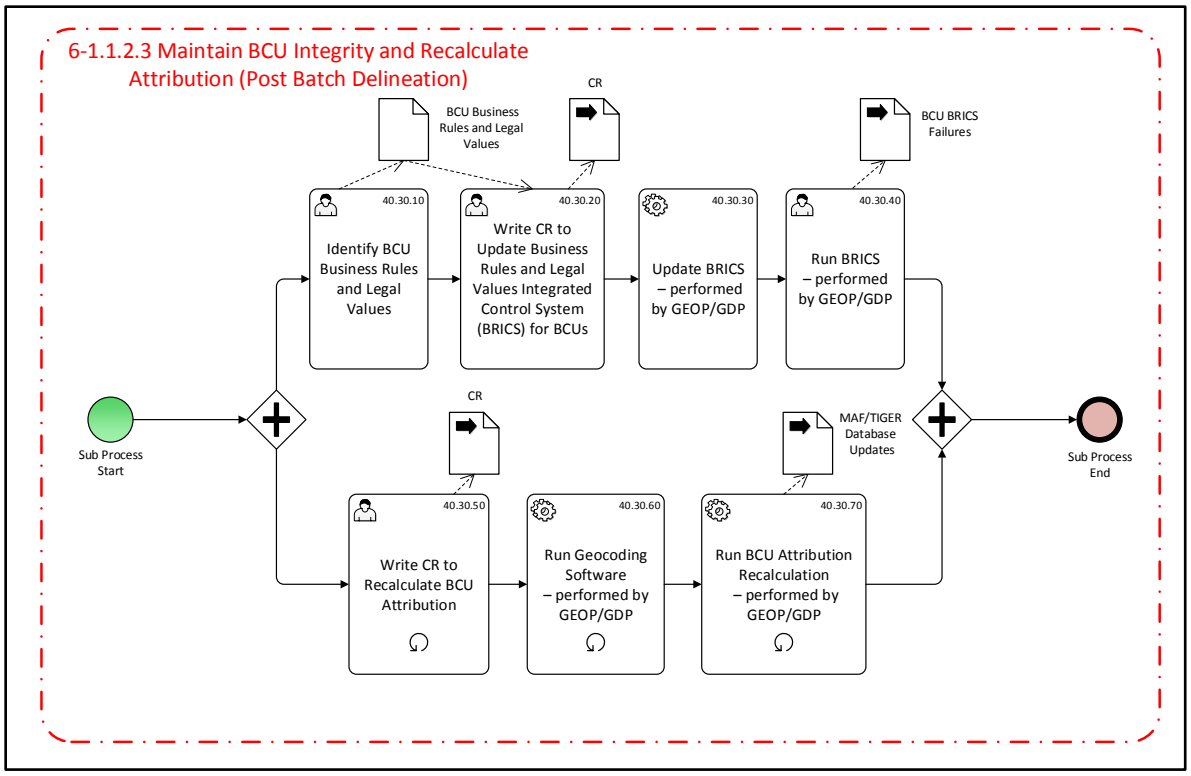

Figure 11: Maintain BCU Integrity and Recalculate Attribution (Post Batch Delineation)

Once the BCUs are incorporated into the MAF/TIGER system, their geographic integrity must be maintained. Business Rules and Legal Values are identified to ensure the BCUs remain intact with regard to the original specifications. CRs are written to update the Business Rules and Legal Values Integrated Control System (BRICS). BRICS identifies BCUs that no longer comply with the BCU requirements and/or have invalid Legal Values. Once updated, the execution of BRICS can occur at any time. The BCU Interactive Review phase corrects the BRICS failures. Should failures be discovered outside of the Interactive Review timeframe, the working group performs the corrections to the BCUs.

The BCU batch delineation process sets the BCU attribution, but the MAF/TIGER system and the MAF continue to receive modifications and updates through various programs and processes. CRs are the method to request an update to the BCU attribution. When necessary, a CR detailing specific instructions to recalculate BCU attribution is written. Recalculation may be necessary

because of observed discrepancies in the BCU attribution or for a refresh of outdated attribution. Before recalculation, the geocoding software runs to provide an update from the MAF to the BCU. The recalculation process is repetitive, but occurs, at a minimum, before and after BCU Interactive Review.

3.1.2.4 Update BCU Attribution [GEOP/GD 6-1.1.2.4]

Figure 12 shows the work to update BCU attribution.

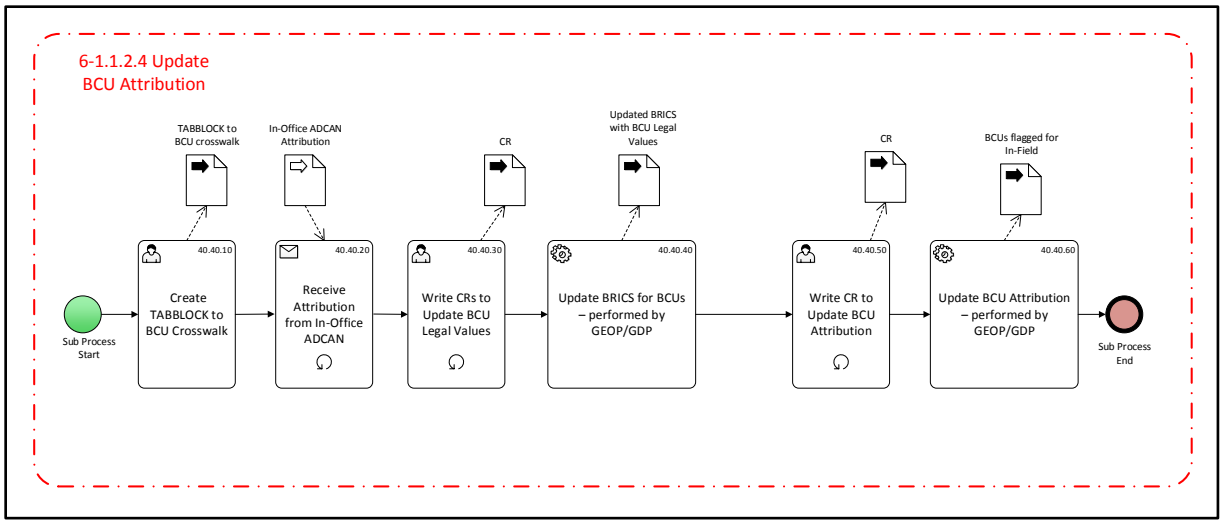

Figure 12: Update BCU Attribution

At the time of BCU batch delineation, some of the BCU attribute data will be unavailable, and will not be populated during the batch delineation process.

Once data is available from In-Office Address Canvassing (IOAC), the BCU attributes will be updated. CRs are implemented to update BCU legal values and generated to specify the requirements to calculate and apply missing attributes to the BCU. These two CR steps are necessary to update the BCU attribution since legal values for the missing information were unknown at the time of the BRICS update performed in the "Maintain BCU Integrity and Recalculate Attribution" section. In this case, the update to the BCU is for new information, not a recalculation of existing information. Because receipt of attribute information may occur on a flow basis, these processes are potentially repetitive; however, all updates of missing BCU attribution must complete before BCU Interactive Review.

3.1.2.5 Prepare to Perform BCU Interactive Review [GEOP/GD 6-1.1.2.5]

Figure 13 shows the work to prepare to perform BCU interactive review.

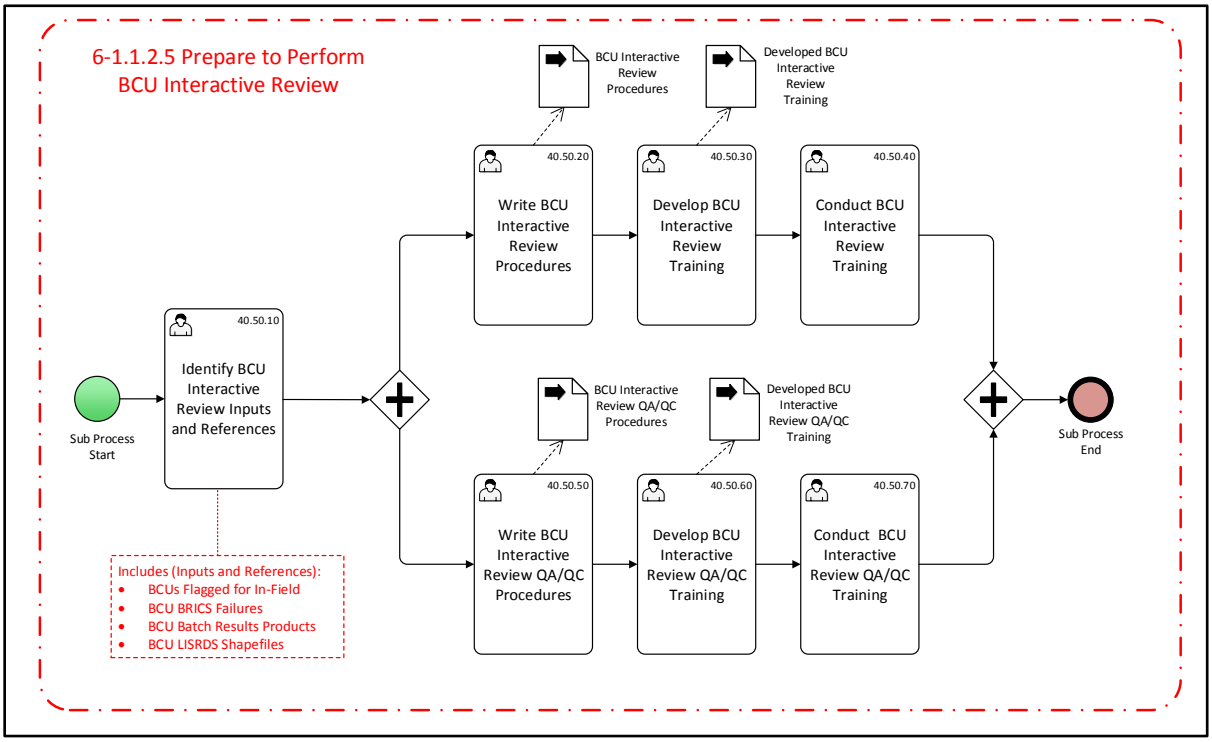

Figure 13: Prepare to Perform BCU Interactive Review

In preparation for conducting BCU Interactive Review, BCU Interactive Review inputs and references are identified in order to write the BCU Interactive Review procedures and BCU Interactive Review QA/QC procedures. The current plan is to conduct BCU Interactive Review and Interactive Review QA/QC trainings in January 2018 with HQ staff.

- Inputs.
  - BCUs flagged for In-Field operations*.
    - Includes BCUs with In-Field Address Canvassing attribution.
    - Includes BCUs with an Update Enumerate, Update Leave, Remote Alaska or Island Areas TEA value.
  - BCU BRICS failures.
- References.
  - BCU Batch Results products.
  - BCU LISRDS shapefiles.

** BCU attribution (TEA and Address Canvassing Flag [ADCANFLG])*

3.1.2.6 Perform BCU Interactive Review [GEOP/GD 6-1.1.2.6]

Figure 14 shows the work to perform BCU interactive review.

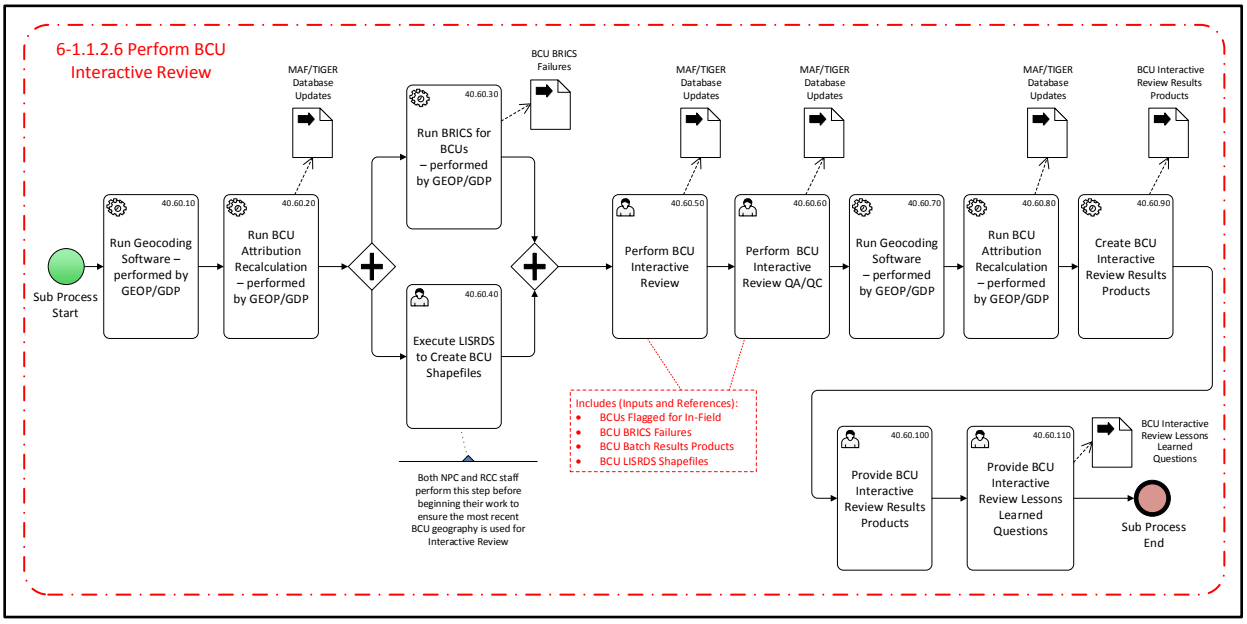

Figure 14: Perform BCU Interactive Review

Staff at HQ performs BCU Interactive Review and BCU Interactive Review QA/QC.

The BCU Interactive Review process begins with execution of existing geocoding software to supply MAF updates to the BCUs in advance of running BCU attribution recalculation, then BRICS runs to identify Business Rule and Legal Value failures and stages the failure information for use during BCU Interactive Review process.

Staff at HQ updates the Production Control System (PCS) – BCU module. BCUs with a large number of housing units are reviewed. Staff interactively review the BCUs to determine if additional boundaries could be utilized to reduce the size of the BCU. They also receive BCU failure information. They must correct all BCU nesting failures and review discontiguous failures in order to maintain the integrity of the BCU geography. When both sets of inputs (large housing unit BCUs, and BCU failures) complete Interactive Review, staff at HQ updates the PCS – BCU module to reflect completion. This PCS action alerts staff to begin BCU Interactive Review QA/QC.

The HQ staff members then query the PCS – BCU module to identify the available BCU Interactive Review QA/QC universe. Staff members conduct a review to determine if they agree with the actions and make changes based on their knowledge and training. Once they complete their work, they update the PCS – BCU module to reflect completion. Address geocoding and BCU attribution recalculation executes thereafter, so that any changed BCU geography has accurate attribution.

Upon completion of attribution recalculation, Interactive Review results products are generated. These products are available to stakeholders and management for use in planning and preparation for 2020 Census related activities. These interactively reviewed BCUs feed TEA batch delineation and ultimately are the geographies used for the 2020 Census.

BCU Interactive Review concludes with the distribution of Lessons Learned questions. Answers provided are reviewed and summarized for potential inclusion into the Collection Geography closeout.

3.1.2.7 Maintain BCU Integrity and Recalculate Attribution (Post Interactive Review) [GEOP/GD 6-1.1.2.7]

Figure 15 shows the work to maintain BCU integrity and recalculate attribution (post interactive review).

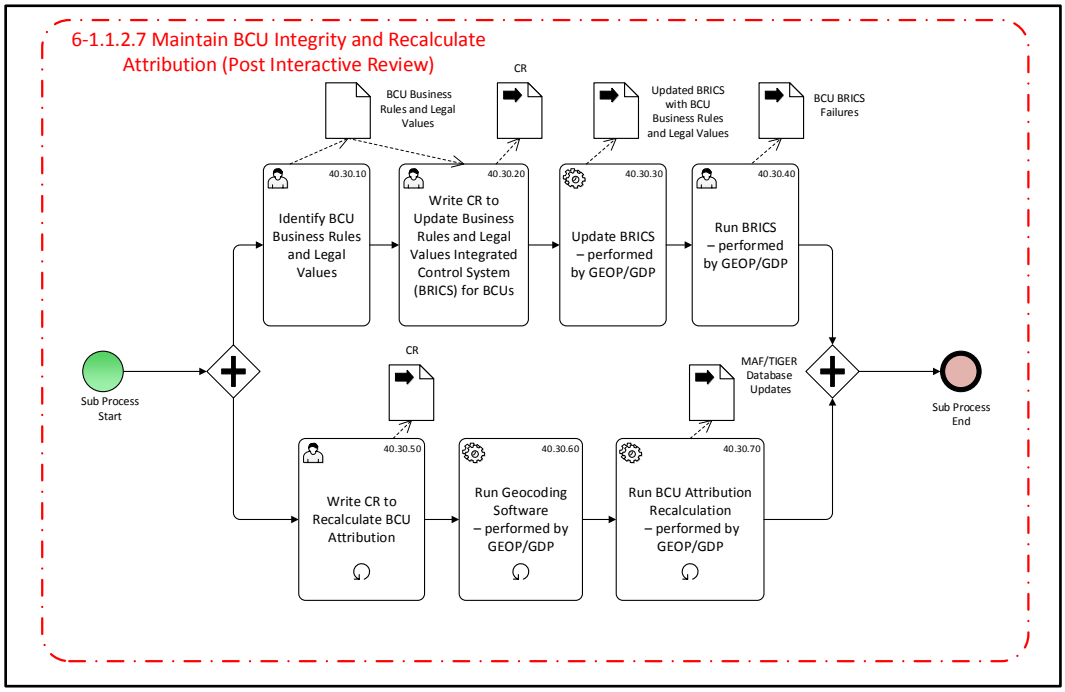

Figure 15: Maintain BCU Integrity and Recalculate Attribution (Post Interactive Review)

The MAF/TIGER system and the MAF continue to receive updates internally and from various external partners beyond BCU Interactive Review; therefore, it is important to have the opportunity to recalculate BCU attribution and ensure BCUs remain geographically sound. The process used in GEOP/GD 6-1.1.2.3 is repeated for this section.

If new Business Rules and Legal Values are identified, then the entire flow (40.30.10 – 40.30.40) must occur, but if no new rules or legal values are identified, then only 40.30.40 is necessary to check for BCU integrity. BRICS BCU failures discovered outside of the Interactive Review timeframe are corrected before any delivery of collection geography products.

A CR detailing specific instructions to recalculate BCU attribution is required to recalculate before collection geography being locked for 2020 Census operations. Before recalculation, the geocoding software runs to provide an update from the MAF to the BCU. Attribution recalculation may run with an accompanying CR at any time before finalizing collection geography.

3.1.3 Type of Enumeration Area (TEA) Delineation [GEOP/GD 6-1.1.3]

A detailed view of the "Type of Enumeration Area (TEA) Delineation" operational subactivity (area within the gray rounded rectangle) is given in Figure 16 below.

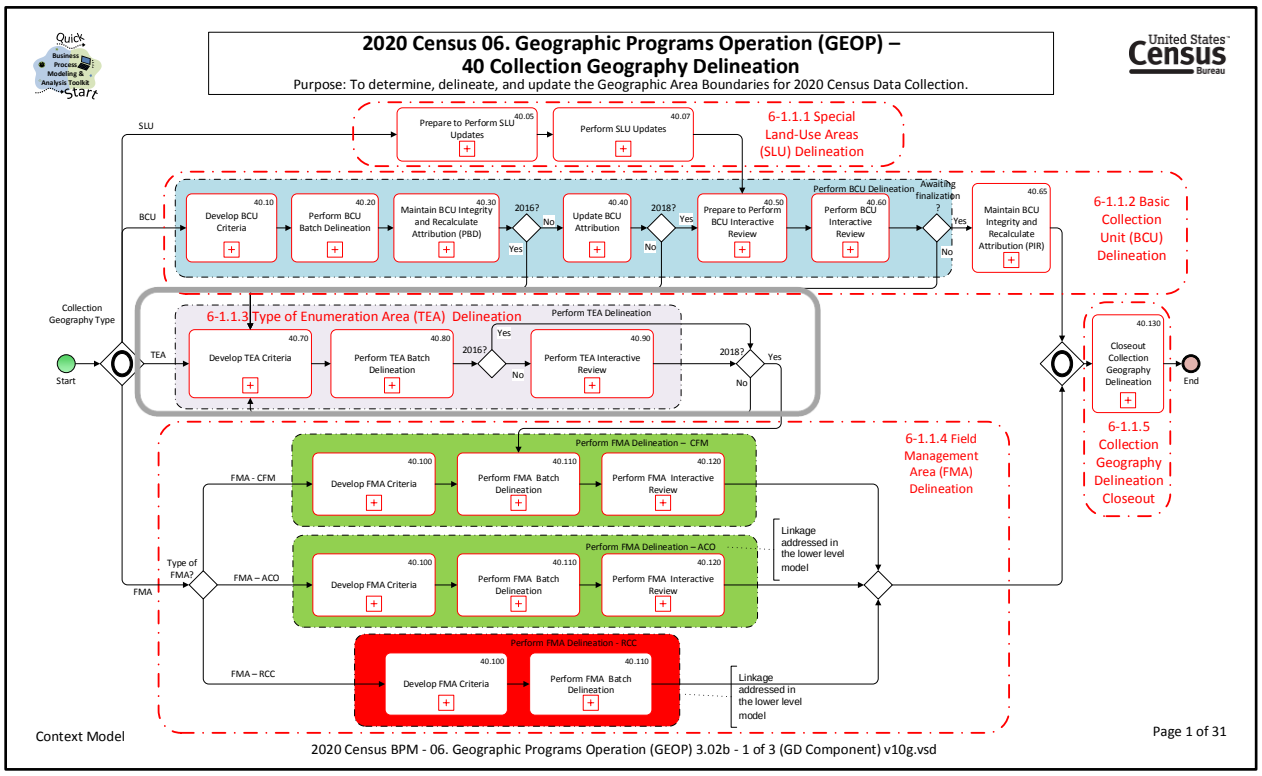

Figure 16: Type of Enumeration Area (TEA) Delineation

The "Type of Enumeration Area (TEA) Delineation" operational subactivity is subdivided into the following constituent activities.

- Type of Enumeration Area (TEA) Delineation [GEOP/GD 6-1.1.3].
  - Develop TEA Criteria [GEOP/GD 6-1.1.3.1].
  - Perform TEA Batch Delineation [GEOP/GD 6-1.1.3.2].
  - Perform TEA Interactive Review [GEOP/GD 6-1.1.3.3].

Significant research and preliminary testing of TEA criteria serve as the starting point for TEA delineation. A national batch delineation process assigns a TEA value to each BCU based on consistent criteria and instructions detailed in the TEA software requirements. These batched TEAs are interactively reviewed twice, in 2017 and 2018, using strict guidelines for change. This

delineation directly impacts the cost of performing the census because of the different enumeration methodologies that will be used. Census Bureau senior management reviews the interactively reviewed TEAs to confirm that the delineation is in line with cost projections to support TEAs before distribution and implementation for 2020 Census purposes.

Subsequent sections describe the "Type of Enumeration Area (TEA) Delineation" operational subactivities in detail.

3.1.3.1 Develop TEA Criteria [GEOP/GD 6-1.1.3.1]

Figure 17 shows the work for Develop TEA Criteria.

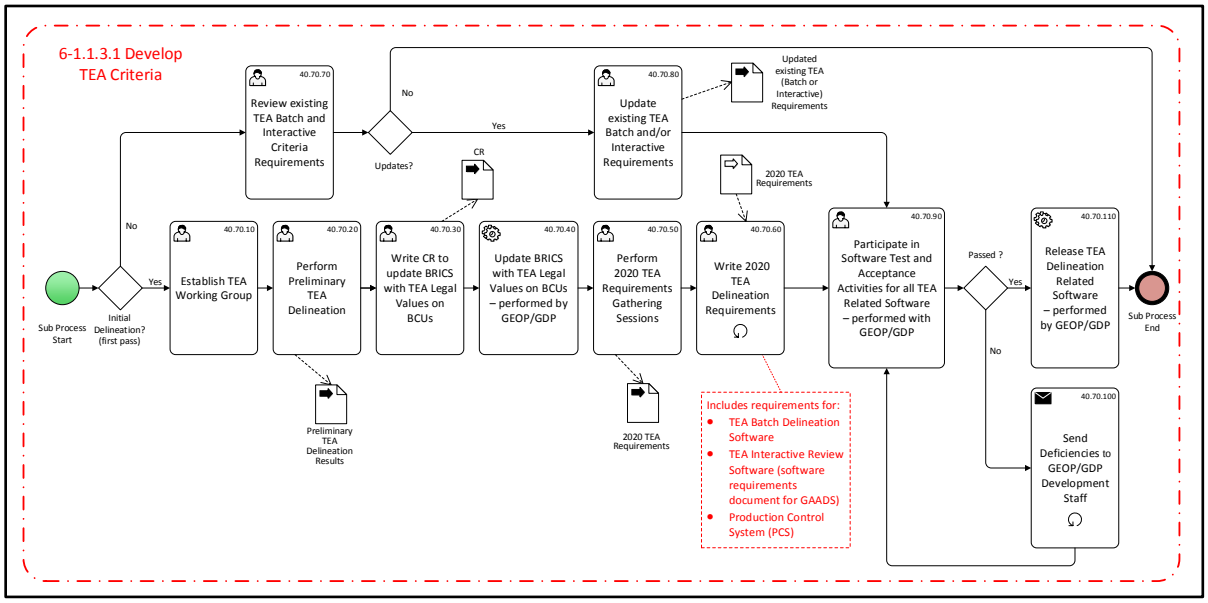

Figure 17: Develop TEA Criteria

The first step in the development of TEA criteria is the establishment of a TEA Working Group. The working group, comprised of members from DCMD, Decennial Statistical Studies Division, FLD, and GEO, initiates the processes required to develop the TEA criteria.

The working group oversees preliminary TEA criteria research and tests to generate a preliminary TEA delineation. Their findings serve as the foundation for TEA criteria development and are used to write and update the TEA legal values within the BCU attribution.

The Initial 2020 Census TEAs are as follows:

- **Self-Response** is designed to occur in areas where the majority of housing units (HUs) have mail delivered to the physical location of the HU. Self-Response is the primary enumeration methodology for the 2020 Census.

- **Update Enumerate (UE)** is designated to occur in areas where the initial visit requires enumerating while updating the address frame. UE will occur in areas that were part of the 2010 Census Remote UE operation, such as northern parts of Maine and southeast Alaska, as well as select American Indian areas that request to be enumerated in person during the initial visit.

- **Island Area Enumeration** is designed to occur in American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands.

- **Remote Alaska (RA)** is designated to occur in areas where the initial visit requires enumerating while updating the address frame. The majority of the operation will occur in remote geographic areas that have unique challenges associated with accessibility in Alaska.

- **Military** is designed to occur in areas on military installations.

- **Update Leave (UL)** is designed to occur in areas where the majority of housing units (HUs) either do not have mail delivered to the physical location of the HU, or the mail delivery information for the HU cannot be verified.

Additional requirements and documents may be necessary to create or modify software and systems for use in the development, tracking, and maintenance of BCU geography for TEA delineation. Each of the Census Bureau's field operations contributes criteria to determine the universe to be included in each TEA. This includes the Self-Response, Update Leave, Update Enumerate, and Island Areas Censuses' Integrated Project Teams (IPTs).

Specific tasks include:

- Creation of software requirements for TEA Batch Delineation software.
- Modification of the existing software solution (Geographic Area Analysis and Delineation System - GAADS) by a CR.
    - Customizes ArcGIS used to perform changes to batched TEAs during the Interactive Review phase.
- Creation of software requirements for Collection Geography Production Control System TEA modules.

- Used to track TEA Batch Delineations and Interactive Review phases.

After the Initial TEA delineation, a review of the established TEA criteria occurs in 2017 and again in 2018. Existing TEA criteria are reviewed to determine if modifications are necessary. If so, changes to the TEA criteria and associated software are made. Software testing and acceptance activities follow to ensure a successful release of modified software.

3.1.3.2 Perform TEA Batch Delineation [GEOP/GD 6-1.1.3.2]

Figure 18 shows the work to perform TEA batch delineation.

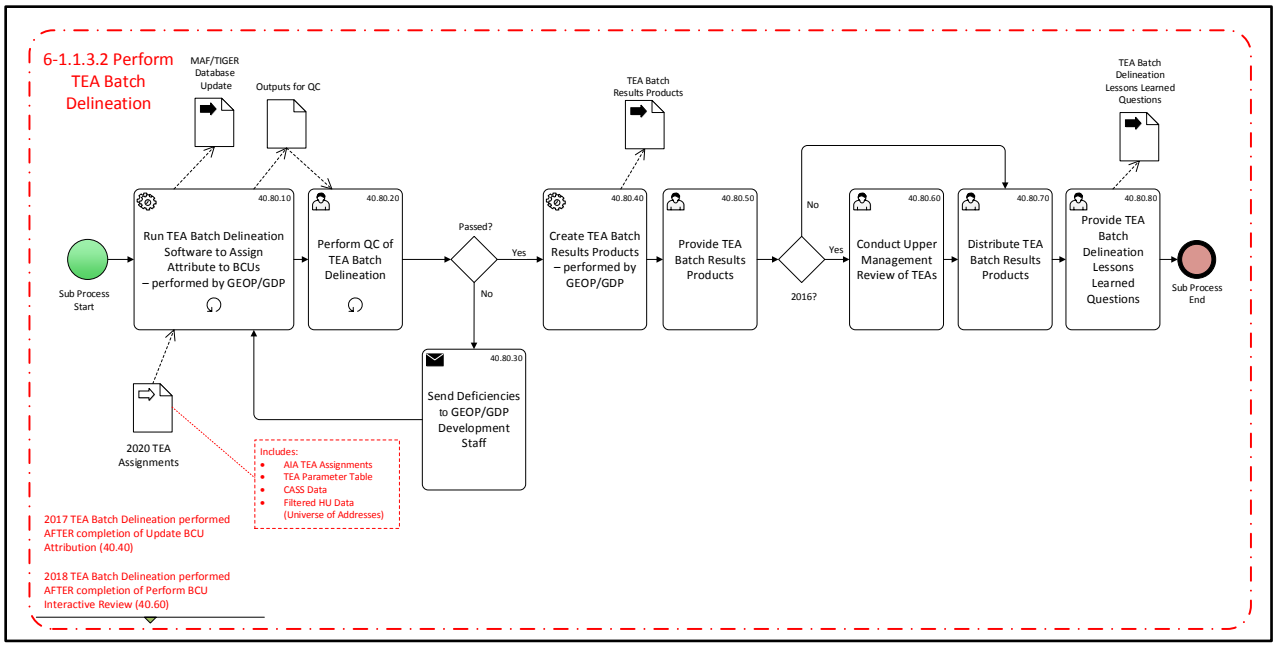

Figure 18: Perform TEA Batch Delineation

The TEA batch delineation software batch assigns a TEA to each BCU based on a specific geographic priority (Island Areas, 2010 Census Remote Alaska TEAs, and military reservations) and, with influence from various inputs such as proposed American Indian Areas (AIA) TEA values, BCU attribution related to mailability and application of Coding Accuracy Support System™ (CASS) software. The use of these inputs is similar to those used for 2010 Census TEA batch delineation. *(The TEA Software Requirements Specification explains mailability and CASS software; therefore, they are not included in this document.).* The batch delineation software then performs a smoothing operation, reassigning TEAs where appropriate. Finally, the batch software updates the TEA attribute for each BCU in the MAF/TIGER system.

The TEA batch delineation process occurs three times before the 2020 Census.

- In 2016, TEA batch delineation software runs using the batched BCUs. Upon completion, the process is QC reviewed. If this initial TEA batch assignment is successful and approved during the QC step, TEA batch results products are created. These products include shapefiles, maps, and tallies used to conduct a Census Bureau senior management review of the 2016 TEA batch results. The purpose of the review is to confirm that decennial funding is available to support the proposed TEAs and to inform senior management before broad distribution of TEAs to other stakeholders.
- In 2017, after the existing TEA criteria are reviewed, including adjustments as necessary based on management suggestion and/or programmatic changes, the TEA batch delineation software runs on the batched BCUs following the Update BCU Attribution action. QC of the batch process occurs as in 2016. Upon QC approval, TEA batch results products are created, including shapefiles, reports, tallies, and statistics that illustrate the 2017 TEA batch delineation results. These products are staged for use in the 2017 TEA Interactive Review.
- In 2018, again, after existing TEA criteria review and adjustments based on management suggestions and/or programmatic changes, the TEA batch delineation software runs following BCU Interactive Review. The QC process is as in the previous two years. Upon QC approval, the TEA batch results products are created (shapefiles, reports, tallies, and statistics) that illustrate the 2018 TEA batch delineation results. These products are staged for use in 2018 TEA Interactive Review.

TEA Batch Delineation concludes with the distribution of Lessons Learned questions. Answers provided are reviewed and summarized for potential inclusion into the Collection Geography closeout.

3.1.3.3 Perform TEA Interactive Review [GEOP/GD 6-1.1.3.3]

Figure 19 shows the work to prepare to perform TEA interactive review.

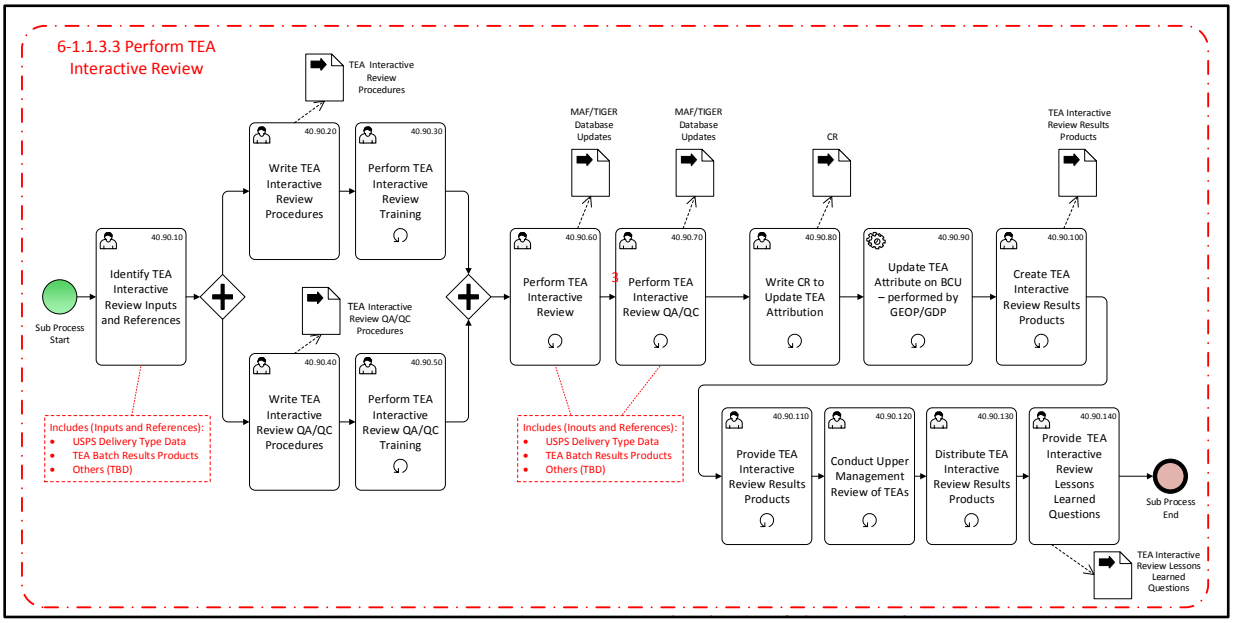

Figure 19: Perform TEA Interactive Review

TEA Interactive Review occurs twice before the 2020 Census, in 2017 and 2018. To prepare for 2017 TEA Interactive Review, inputs and references are identified in advance of training to use during preparation of TEA Interactive Review procedures and TEA Interactive Review QA/QC procedures. RO/RCC staff performs both the TEA Interactive Review and the TEA Interactive Review QA/QC.

Anticipated inputs and references for the Interactive Review process include the TEA Batch Results Products, USPS Delivery Type data, and input from local post offices, as well as other inputs and references identified as the procedures are written. Details for performing TEA Interactive Review are still under development. All reasons for change to the TEA value assigned during batch delineation are tracked.

Following completion of TEA Interactive Review and QA/QC, a CR is used to update the TEA attribution and to update the TEA attribute on the BCU in MAF/TIGER system. Following the update, TEA Interactive Review results products are created and made available for senior management review. This delineation directly impacts the cost of performing the census because of the different enumeration methodologies that will be used. Census Bureau senior management reviews the interactively reviewed TEAs to confirm that the delineation is in line with cost projections to support TEAs before distribution and implementation for 2020 Census purposes. TEA Interactive Review results products are available to generate tallies, maps, statistics, and reports as needed.

To prepare for the 2018 TEA Interactive Review, refresher training is conducted. The Census Bureau anticipates changes in TEAs between 2017 and 2018. The 2018 TEA Interactive Review follows the same flow as described for the 2017 TEA Interactive Review and culminates in the final TEA attribute on the BCU.

TEA Interactive Review concludes with the distribution of Lessons Learned questions. Answers provided are reviewed and summarized for potential inclusion into the Collection Geography closeout.

3.1.4 Field Management Area (FMA) Delineation [GEOP/GD 6-1.1.4]

A detailed view of the "Field Management Area (FMA) Delineation" operational subactivity (area within the gray rounded rectangle) is given in Figure 20 below.

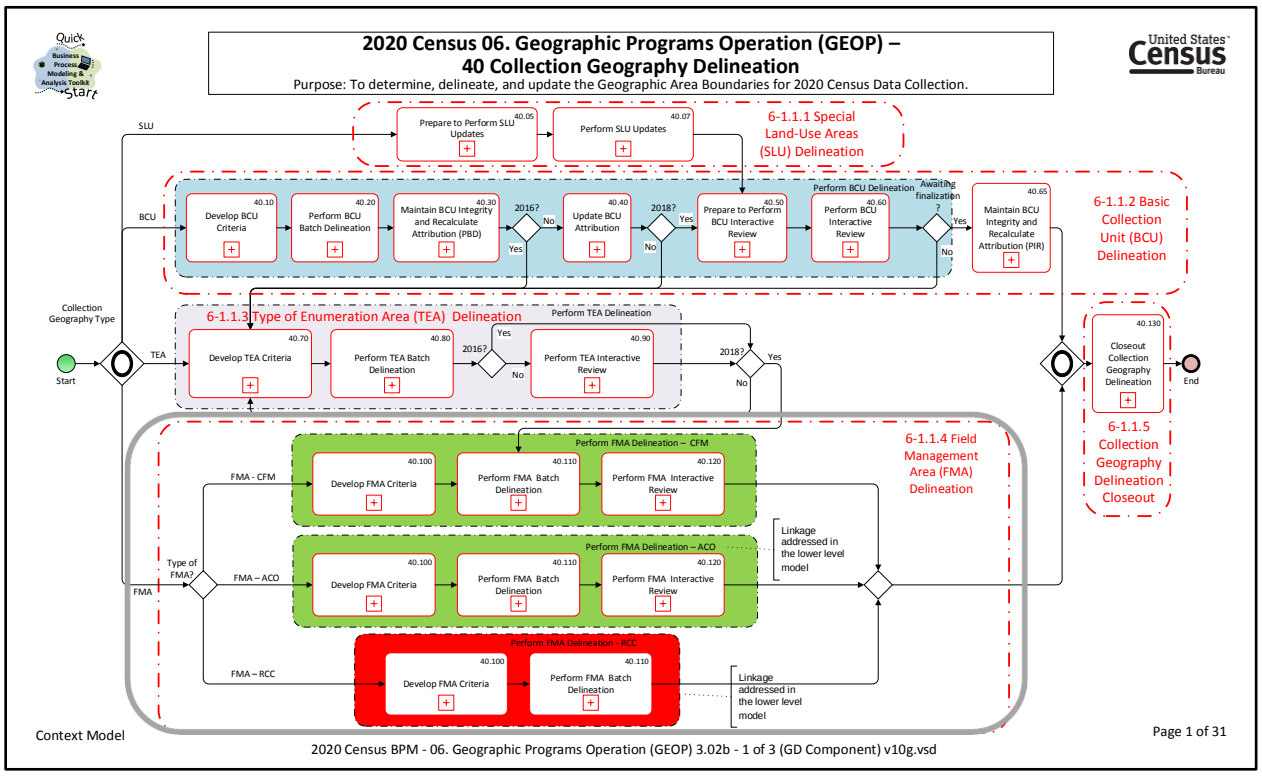

Figure 20: Field Management Area (FMA) Delineation

The "Field Management Area (FMA) Delineation" operational subactivity is subdivided into the following constituent activities:

- Field Management Area (FMA) Delineation [GEOP/GD 6-1.1.4].
    - Perform FMA Delineation - CFM [GEOP/GD 6-1.1.4.1].

- Perform FMA Delineation - ACO [GEOP/GD 6-1.1.4.2].
- Perform FMA Delineation - RCC [GEOP/GD 6-1.1.4.3].

Each of the "Perform FMA Delineation" subactivities employs the same generalized process steps to accomplish its work.

The generalized subactivities for "Perform FMA Delineation" are as follows:

- Perform FMA Delineation.
  - Develop FMA Criteria.
  - Perform FMA Batch Delineation.
  - Perform FMA Interactive Review.

These generalized FMA Delineation subactivities are discussed in detail below.

Develop FMA Criteria

Figure 21 shows the work to prepare to develop FMA Criteria.

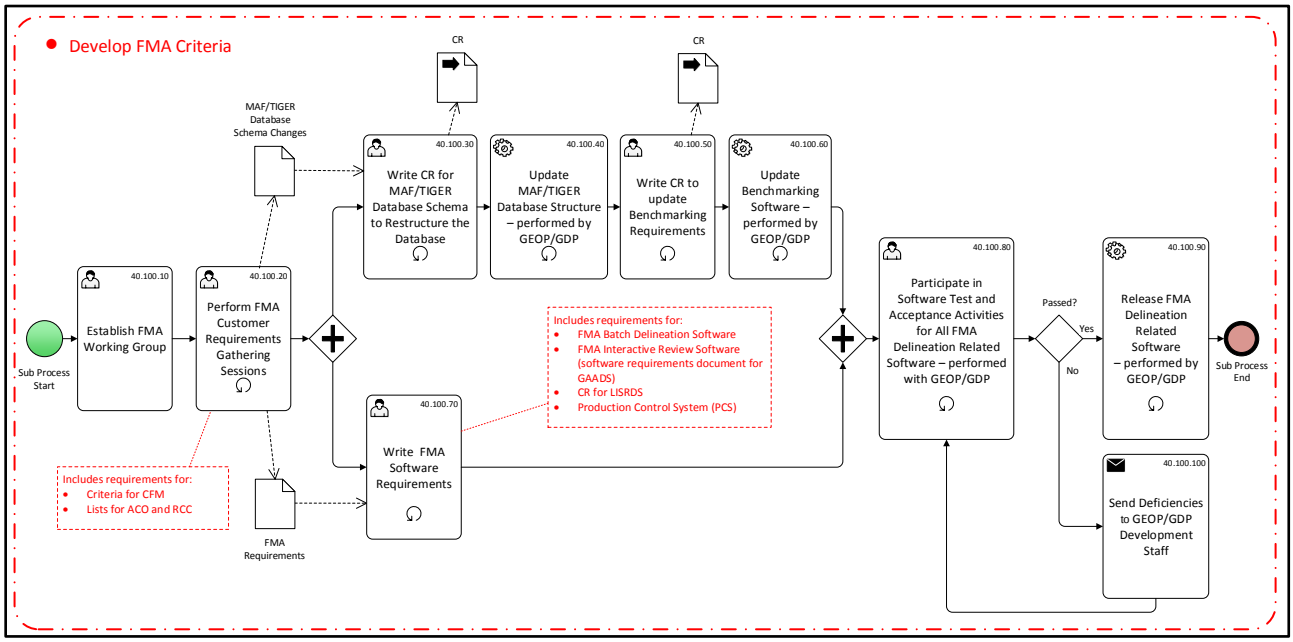

Figure 21: Develop FMA Criteria

The first step in the development of FMA criteria is the establishment of a FMA Working Group. The working group, comprised of members from DCMD, FLD, and GEO divisions, gathers requirements and initiates the processes required to develop the various FMA criteria and Customer Requirements Documents (CRDs). CRDs specify the universe of housing units or

group quarters in each operation, target sizes, and additional details for each FMA using BCUs, the foundation of FMA geographies. Each of the 2020 Census operational areas contributes to the FMA CRDs.

Necessary changes to the MAF/TIGER system schema in order to store the various FMA geographies are identified, and CRs to restructure the MAF/TIGER system are written to ensure the restructure succeeds and supports the FMA geographies. Once the benchmark software modifications are confirmed as correct, the new geography is incorporated into the MAF/TIGER system benchmarks.

Additional requirements and documents may be necessary to create or modify software and systems for use in the development, tracking, and maintenance of the various FMA geographies. Specific tasks include:

- Creation of software requirements for FMA Batch Delineation.
- Modification of the existing software solution (Geographic Area Analysis and Delineation System - GAADS) by a CR.
    - Customizes ArcGIS used to perform changes to batched FMAs during the Interactive Review phase.
- Modification of the existing software solution (LISRDS) by a CR.
    - Used for on-demand creation of geographic information system (GIS) output files (e.g. ESRI shapefiles) once BCUs incorporated into the MAF/TIGER system.
- Creation of software requirements for Collection Geography Production Control System FMA modules.
    - Used to track FMA Batch Delineations and Interactive Review phases.

The goal is to successfully identify, document, program, test, and release the aforementioned software and associated requirements and solutions in support of the various FMA geographies creation and containment in MAF/TIGER system.

Perform FMA Batch Delineation

Figure 22 shows the work to prepare to perform FMA batch delineation.

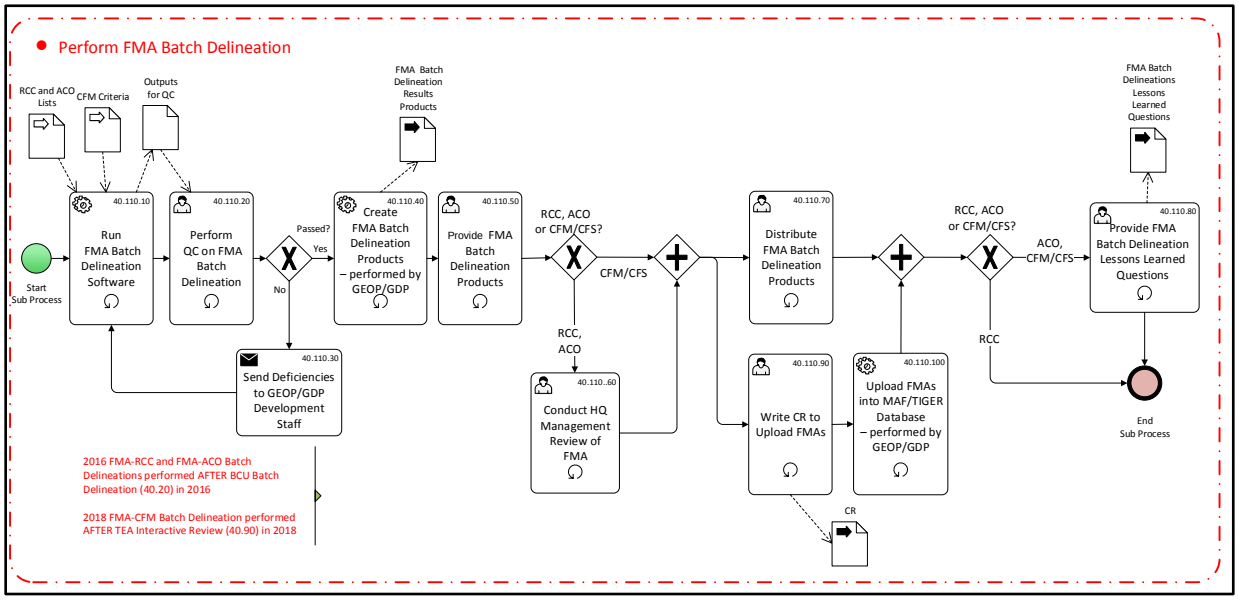

Figure 22: Perform FMA Batch Delineation

The batch delineation process runs for the three FMA geographies at different times in the 2020 Census schedule.

The RCC "delineation" is the upload of a file into the MAF/TIGER system that contains census tracts and/or BCUs coded for each respective RCC. FLD and regional management review the RCC boundaries after upload to ensure the upload process succeeds.

The batch ACO delineation uses ArcGIS to assign ACO codes to a GIS shapefile of census tracts. These delineation results are not uploaded into the MAF/TIGER system until later. Census Bureau FLD staff create the Batch ACO delineation results products in the form of shapefiles, maps, and tallies for FLD and regional management review and for use during FMA-ACO Interactive Review. ACO codes are uploaded into the MAF/TIGER system following FMA-ACO Interactive Review.

The entire FMA Batch Delineation process concludes with the distribution of Lessons Learned questions. Answers provided are reviewed and summarized for potential inclusion into the Collection Geography closeout.

Perform FMA Interactive Review

Figure 23 shows the work to prepare to perform FMA interactive review.

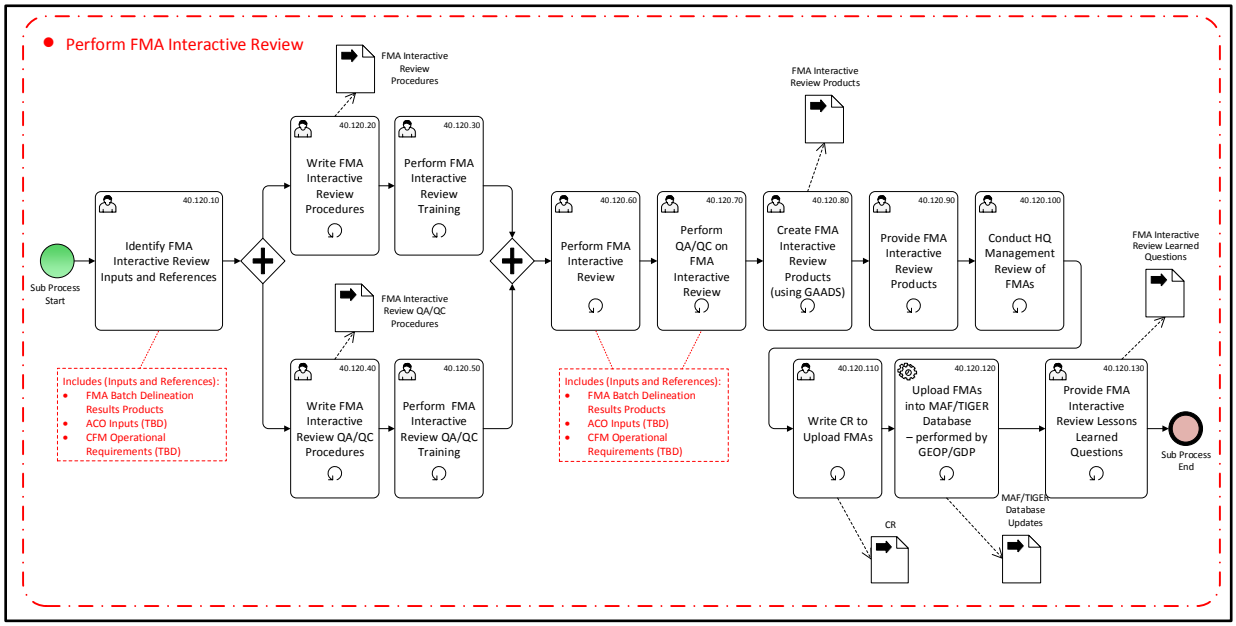

Figure 23: Perform FMA Interactive Review

RO/RCC staff performs all of the FMA Interactive Review and FMA Interactive Review QA/QC work.

Inputs and references for the Interactive Review process include the FMA batch results products (shapefiles and tallies) and operational requirements. Other inputs and references may be identified as the procedures are written.

FMA Interactive Review and FMA Interactive Review QA/QC anticipate utilization of the GAADS software to perform their work outside of the MAF/TIGER system. When complete, HQ staff produce tallies output from GAADS to support a headquarters management review of the interactive review work. With management concurrence, a CR authorizes the upload of each of the FMA geographies into the MAF/TIGER system and provides instructions to perform the upload.

FMA Interactive Review concludes with the distribution of Lessons Learned questions. Answers provided are reviewed and summarized for potential inclusion into the Collection Geography closeout.

Subsequent sections describe the specific “Field Management Area (FMA) Delineation” operational subactivities for CFM, ACO, and RCC in detail.

3.1.4.1 Perform FMA Delineation - CFM [GEOP/GD 6-1.1.4.1]

Figure 24 shows the work to prepare to perform FMA delineation - CFM.

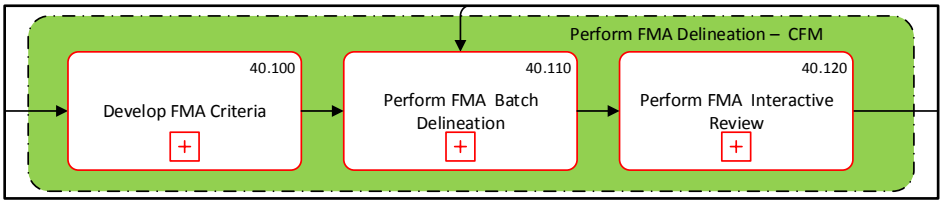

Figure 24: Perform FMA Delineation - CFM

The "Perform FMA Delineation - CFM" operational subactivity is subdivided into the following constituent activities:

- Perform FMA Delineation - CFM [GEOP/GD 6-1.1.4.1].
  - Develop FMA Criteria – CFM [GEOP/GD 6-1.1.4.1.1].
  - Perform FMA Batch Delineation – CFM [GEOP/GD 6-1.1.4.1.2].
  - Perform FMA Interactive Review – CFM [GEOP/GD 6-1.1.4.1.3].

The section above outlines the FMA Delineation process steps. In general terms, CFM geography is needed to support at least eight field operations. Each operation has its own specifications for criteria, creation, and interactive review. CFM delineation is conducted following the process outlined in general for FMAs. As an important reminder, BCUs are the building block for all FMA geography.

Develop FMA Criteria – CFM [GEOP/GD 6-1.1.4.1.1]

Development of FMA Criteria – CFM follows the process steps outlined in Develop FMA Criteria above.

Perform FMA Batch Delineation – CFM [GEOP/GD 6-1.1.4.1.2]

The various FMA batch delineations for CFMs occur after the BCU Interactive Review and TEA Delineation and consist of individual specifications defined during FMA – CFM criteria development. The batch delineation process steps are outlined in the Perform FMA Batch Delineation section above. Batch delineation is planned to create CFMs for the following operations:

- In-Field Address Canvassing.
- Update Enumerate, including remote Alaska.
- Update Leave.

- Coverage Measurement Operations.
- Nonresponse Followup.
- Enumeration at Transitory Locations.
- Group Quarters.
- Island Areas Censuses.

Various CFM batch delineation results products (shapefiles and tallies) are used during Perform FMA – CFM Interactive Review.

Perform FMA Interactive Review – CFM [GEOP/GD 6-1.1.4.1.3]

Refer to the Perform FMA Interactive Review section for the process steps. To prepare for the Interactive Review of the CFM FMA, geography, inputs, and references are identified to assist with writing the FMA Interactive Review and FMA Interactive Review QA/QC procedures, as well as to prepare for training.

3.1.4.2 Perform FMA Delineation - ACO [GEOP/GD 6-1.1.4.2]

Figure 25 shows the work to prepare to perform FMA delineation – ACO.

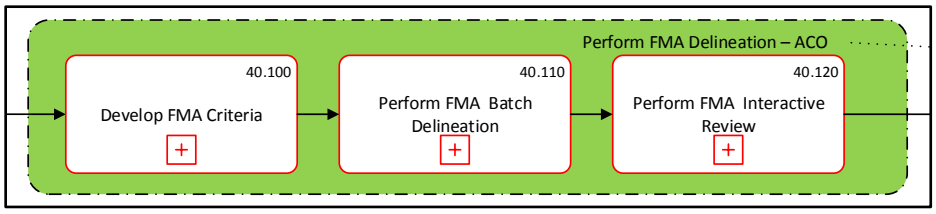

Figure 25: Perform FMA Delineation - ACO

The "Perform FMA Delineation - ACO" operational subactivity is subdivided into the following constituent activities:

- Perform FMA Delineation - ACO [GEOP/GD 6-1.1.4.2].
    - Develop FMA Criteria – ACO [GEOP/GD 6-1.1.4.2.1].
    - Perform FMA Batch Delineation – ACO [GEOP/GD 6-1.1.4.2.2].
    - Perform FMA Interactive Review – ACO [GEOP/GD 6-1.1.4.2.3].

ACO delineation is required to support 2020 Census data collection and field operations at a geographic level beneath the RCC. As with RCCs, they become temporary offices with a sole purpose of supporting the decennial census. ACO delineation occurs in two stages: Initial ACO

delineation (thought of as a manual or "batch delineation"), which uses ArcGIS to code shapefiles of Census Tracts with unique ACO codes, and ACO Interactive Review that revises the initial or batch ACO delineations. ACO Interactive Review begins after training completes. Once interactive review completes, the ACOs are uploaded into MAF/TIGER system.

Develop FMA Criteria – ACO [GEOP/GD 6-1.1.4.2.1]

Refer to the Develop FMA Criteria process steps above. Numerous success criteria and guidelines are identified and agreed upon by FLD, GEO, and DCMD for use during the Batch ACO delineation. Instructions and procedures are prepared for use during ACO Interactive Review to ensure the criteria remain intact.

Perform FMA Batch Delineation – ACO [GEOP/GD 6-1.1.4.2.2]

Refer to the Perform FMA Batch Delineation process steps above. The delineation process uses ArcGIS to assign ACO codes to a GIS shapefile of Census Tracts following specific success criteria and guidelines. These Batch ACO delineation results are not uploaded into the MAF/TIGER system until later. Census Bureau FLD staff creates the initial ACO batch delineation results products, in the form of shapefiles, maps, and tallies, for FLD and regional management review and for use during FMA – ACO Interactive Review.

Perform FMA Interactive Review – ACO [GEOP/GD 6-1.1.4.2.3]

Refer to the Perform FMA Interactive Review process steps above. ACO Inputs for interactive review are similar to those used for the initial (batch) ACO delineation. Upon approval of headquarters management, ACOs are uploaded into the MAF/TIGER system.

To prepare for the Interactive Review of the ACO FMA geography, inputs and references are identified to assist with writing FMA Interactive Review and FMA Interactive Review QA/QC procedures, as well as to prepare for training.

3.1.4.3 Perform FMA Delineation - RCC [GEOP/GD 6-1.1.4.3]

Figure 26 shows the work to prepare to perform FMA delineation – RCC.

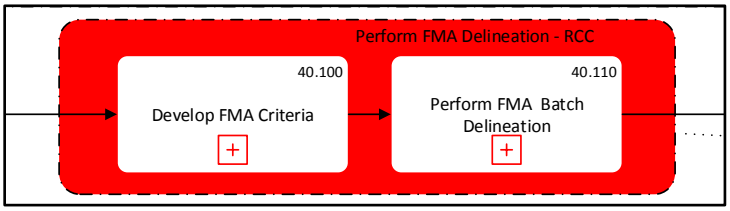

Figure 26: Perform FMA Delineation - RCC

The "Perform FMA Delineation – RCC" operational subactivity is subdivided into the following constituent activities:

- Perform FMA Delineation - RCC [GEOP/GD 6-1.1.4.3].
  - Develop FMA Criteria – RCC [GEOP/GD 6-1.1.4.3.1].
  - Perform FMA Batch Delineation – RCC [GEOP/GD 6-1.1.4.3.2].

RCC delineation requires identification of states or census tracts and BCUs (where necessary to maintain AIA relationships) for each RCC. Most RCC boundaries mimic current RO boundaries. Once defined, a GIS shapefile is coded with the appropriate RCC codes and ultimately uploaded into the MAF/TIGER system.

3.1.4.4 Develop FMA Criteria – RCC [GEOP/GD 6-1.1.4.3.1]

Refer to the Develop FMA Criteria section above for an overview of the process steps. RCCs mimic RO boundaries except in cases where a state would split an AIA or military area. In those cases, census tract and/or BCU geography is used to split the state and assign it to the appropriate RCC.

Perform FMA Batch Delineation – RCC [GEOP/GD 6-1.1.4.3.2]

Refer to the Perform FMA Batch Delineation above for an overview of the process steps. This "delineation" uploads a file into the MAF/TIGER System that contains Census Tracts and BCUs coded for each respective RCC. Headquarters FLD and regional management review the RCC boundaries after upload to ensure the upload process succeeds.

3.1.5 Collection Geography Delineation Closeout [GEOP/GD 6-1.1.5]

A detailed view of "Collection Geography Delineation Closeout" operational subactivity (area within the gray rounded rectangle) is given in Figure 27 below.

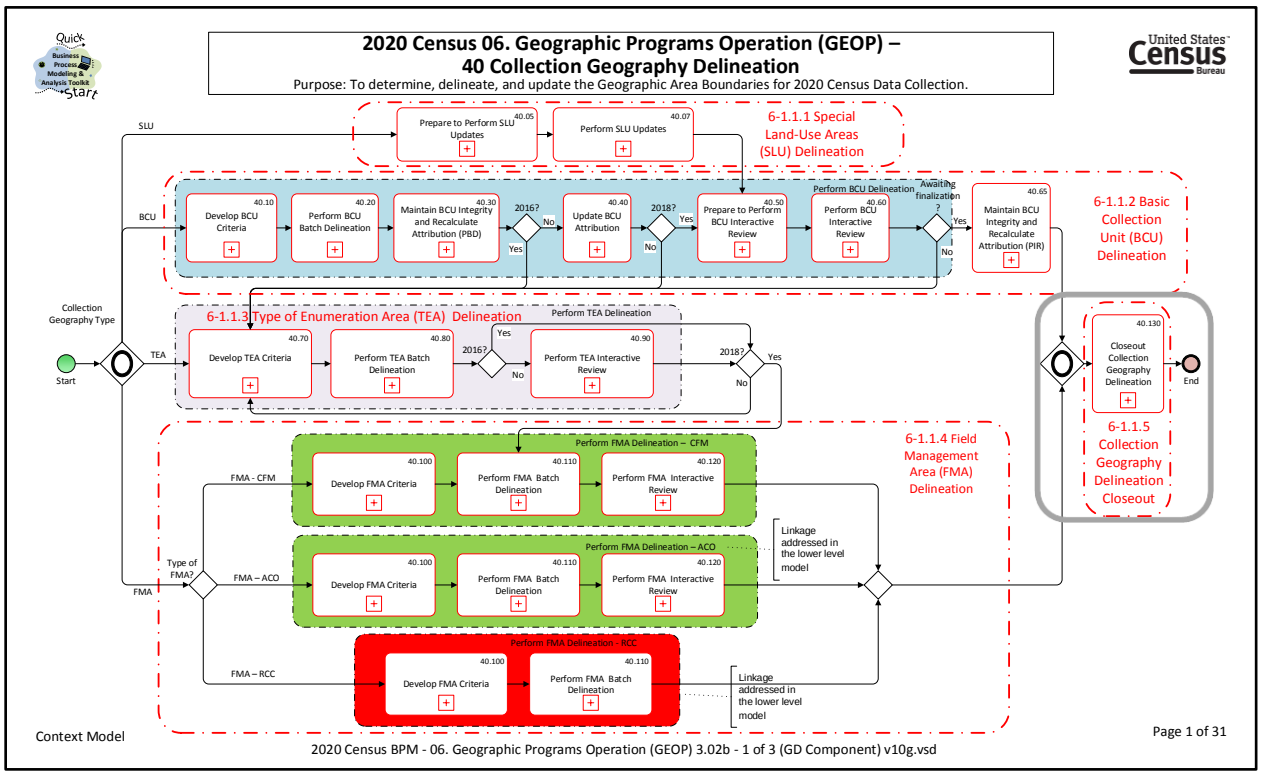

Figure 27: Collection Geography Delineation Closeout

The "Collection Geography Delineation Closeout" operational subactivity is subdivided into the following constituent activities:

- Collection Geography Delineation Closeout [GEOP/GD 6-1.1.5].
  - Create Final Collection Geography Data Products [GEOP/GD 6-1.1.5.1].
  - Compile and Document Overall Collection Geography Lessons Learned [GEOP/GD 6-1.1.5.2].

Figure 28 shows the subactivities that make up Collection Geography Delineation Closeout.

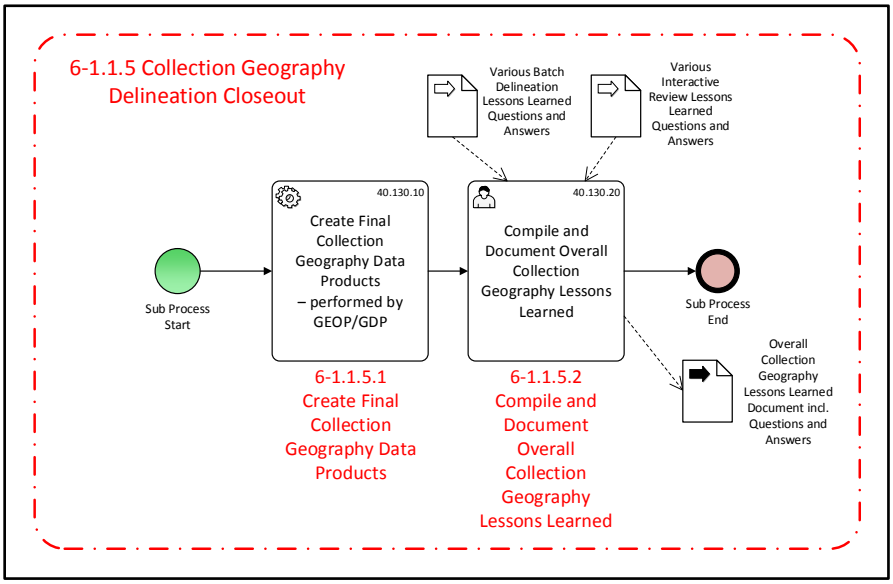

Figure 28: Collection Geography Delineation Closeout Constituent Activities

Subsequent sections describe the Collection Geography Delineation closeout operational subactivities in detail.

3.1.5.1 Create Final Collection Geography Data Products [GEOP/GD 6-1.1.5.1]

When all phases of Collection Geography operations are complete, final Collection Geography products are created by GEOP/GDP in Geographic Data Processing *(GEOP BPM section 20)* and Map Production *(GEOP BPM section 50).* The Census Bureau anticipates products to include Geographic Equivalency Files, Geographic Reference Files (GRFs), GIS shapefiles, map products, and products to serve internal Census Bureau stakeholders.

3.1.5.2 Compile and Document Overall Collection Geography Lessons Learned [GEOP/GD 6-1.1.5.2]

A comprehensive Lessons Learned document is prepared to document all stages of the collection geography delineation. The document is a compilation of answers to questions provided with each section of collection geography delineations.

3.2 Tabulation Geography Delineation [GEOP/GD 6-1.2]

Figure 29 shows the BPM Context Model for the Tabulation Geography Delineation [GEOP/GD 6-1.2] activity area, including its constituent activities.

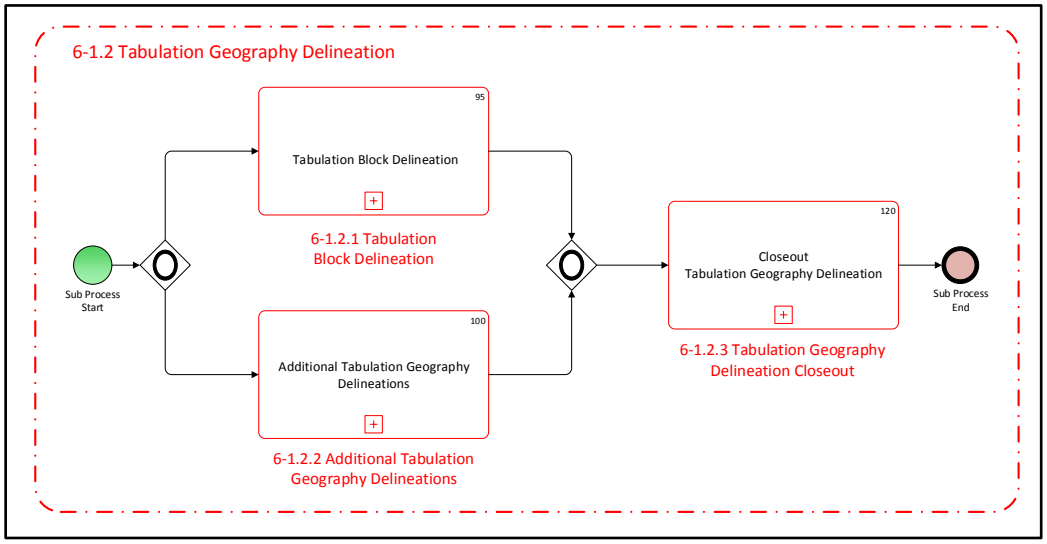

Figure 29: Tabulation Geography Delineation [GEOP/GD 6-1.2] Constituent Activities

The "Tabulation Geography Delineation" activity area is subdivided into the following operational subactivities:

- Tabulation Geography Delineation [GEOP/GD 6-1.2].
  - Tabulation Block Delineation [GEOP/GD 6-1.2.1].
  - Additional Tabulation Geography Delineations [GEOP/GD 6-1.2.2].
  - Tabulation Geography Delineation Closeout [GEOP/GD 6-1.2.3].

Census results are dependent on the delineation of various geographic areas to both tabulate and report individual and household statistics. The delineation of these geographic areas, known as "tabulation geography," is based on input from external partnership programs or internally defined tabulation criteria. Each of the partnership programs has criteria for legal or statistical areas and is described further in the GEOP/GP Detailed Operational Plan.

After rules are defined or tabulation geographies are proposed by partners, the tabulation geography is delineated in the MAF/TIGER system through a series of batch delineations and then followed by a series of data integrity validations, renumbering, and certification steps. Once the tabulation geographic areas are certified, they are loaded into the MAF/TIGER database and

used for the tabulation of statistical data and as the base for various geographic data products that support the 2020 Census.

All of these tabulation geographies (and others discussed in other GEOP Detailed Operational Plans) are used to tabulate and disseminate data from the decennial census, the American Community Survey, and other censuses and surveys, and are used outside of the Census Bureau by other government agencies in program administration and in determining program eligibility and fund allocation.

Table 7 lists Tabulation Geographies and References.

Table 7: Tabulation Geographies and References

Tabulation Geography	Reference
American Indian Areas	Geographic Partnership Programs DOP (BAS-Boundary and Annexation Survey)
Metropolitan and Micropolitan Statistical Areas and Related Statistical Areas	https://www.census.gov/geo/maps-data/maps/statecbsa.html Note: The Office of Management and Budget (OMB) defines Core Based Statistical Areas (CBSAs).
Counties	Geographic Partnership Programs DOP (BAS)
County Subdivisions	Geographic Partnership Programs DOP (PSAP-Partnership Statistical Areas Program)
Census Designated Places	Geographic Partnership Programs DOP (PSAP)
Census Tracts	Geographic Partnership Programs DOP (PSAP)
Block Groups	Geographic Partnership Programs DOP (PSAP)
Blocks	Geographic Delineations DOP (Tabulation Block)
Congressional Districts	Redistricting Data Program DOP
State Legislative Districts	Redistricting Data Program DOP
Voting Districts	Redistricting Data Program DOP
School Districts	https://www.census.gov/geo/partnerships/sdrp.html Note: School District Review Program (SDRP) is a reimbursable project.
Zone Improvement Plan Code Tabulation Areas (ZCTA)	Geographic Delineations DOP (ZCTA)
Urban or Urbanized Areas (UA)	Geographic Delineations DOP (UA)

Subsequent sections describe the Tabulation Geography Delineation operational subactivities in detail.

3.2.1 Tabulation Block Delineation [GEOP/GD 6-1.2.1]

A detailed view of the "Tabulation Block Delineation" operational subactivity is given in Figure 30 below.

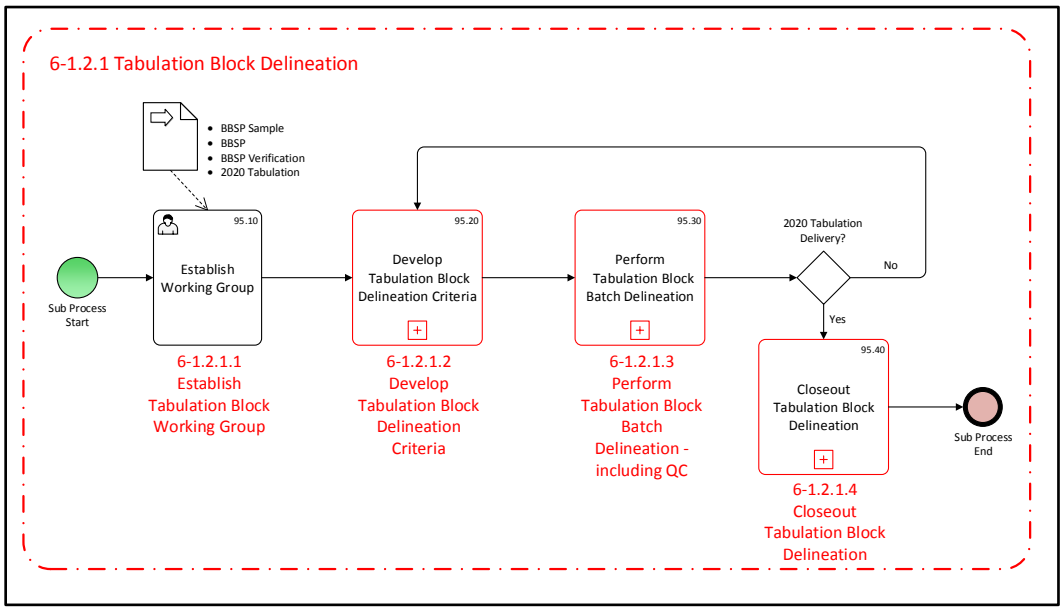

Figure 30: Tabulation Block Delineation

The "Tabulation Block Delineation" operational subactivity is subdivided into the following constituent activities:

- Tabulation Block Delineation [GEOP/GD 6-1.2.1].
  - Establish Tabulation Block Working Group [GEOP/GD 6-1.2.1.1].
  - Develop Tabulation Block Criteria [GEOP/GD 6-1.2.1.2].
  - Perform Tabulation Block Batch Delineation – including QC [GEOP/GD 6-1.2.1.3].
  - Closeout Tabulation Block Delineation [GEOP/GD 6-1.2.1.4].

Working closely with stakeholders, the Census Bureau continues developing the process to create tabulation blocks. New for 2020, the Census Bureau solicited assistance from several previous redistricting partners to review proposed block delineation criteria before the creation of "prototype" blocks used for the Block Boundary Suggestion Project (BBSP). Partners review and modify delineation criteria and delineation software after BBSP completes and again after BBSP Verification completes to prepare the final tabulation block criteria and associated delineation software.

Final tabulation block delineation does not occur until FY20, so specific details do not exist for this process; however, it is expected to follow the flow outlined below in operational subactivities sections. It is important to note that a major goal when defining the delineation criteria for prototype products (and ultimately the tabulation blocks) is to reduce the overall number of blocks, especially very small blocks, from those defined for the 2010 Census.

Subsequent sections describe the Tabulation Block Delineation operational subactivities in detail.

3.2.1.1 Establish Tabulation Block Working Group [GEOP/GD 6-1.2.1.1]

Figure 31 shows the work to prepare to establish a Tabulation Block Working Group.

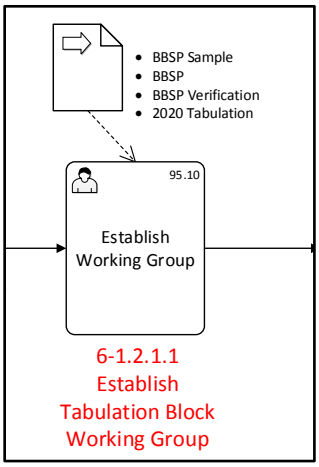

Figure 31: Establish Tabulation Block Working Group

The establishment of a Tabulation Block Working Group, comprised of staff from GEO, DITD, FLD, DCMD, and the Census Redistricting and Voting Rights Data Office (CRVRDO), occurs early in the process in order to conduct multiple working group sessions regarding criteria development for each of the three prototype block phases (BBSP Sample, BBSP, and BBSP Verification) and the final tabulation block phase. The working group is responsible for requirements gathering, creation, and subsequent modification. They are active participants in every aspect of tabulation block delineation as detailed in subsequent sections.

3.2.1.2 Develop Tabulation Block Delineation Criteria [GEOP/GD 6-1.2.1.2]

Figure 32 shows the work to prepare to develop tabulation block criteria.

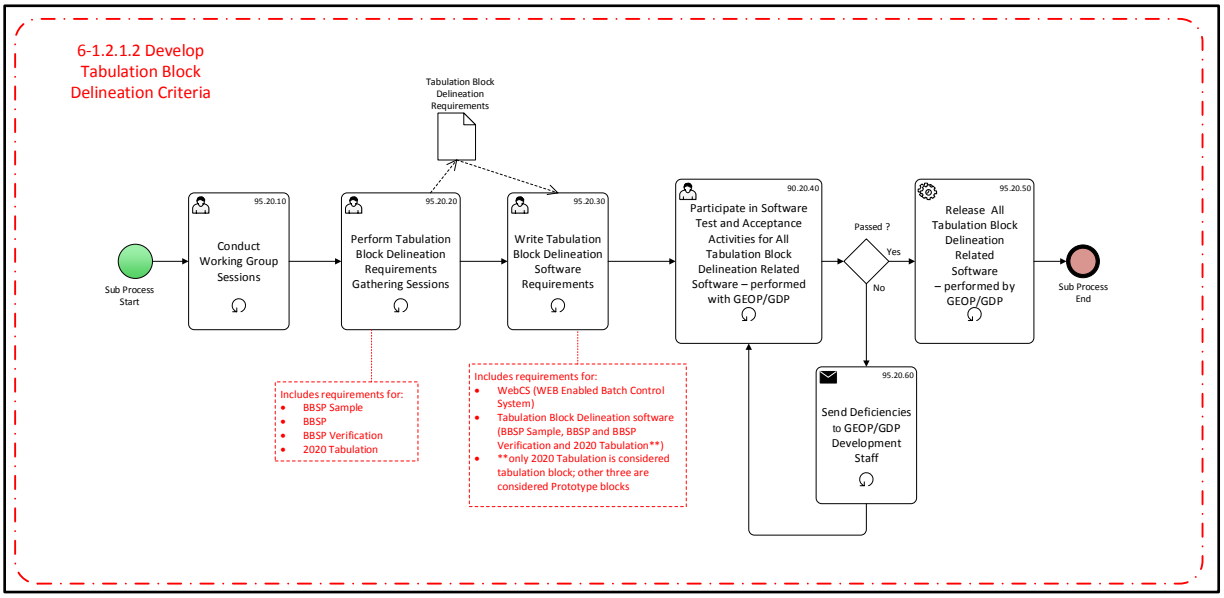

Figure 32: Develop Tabulation Block Delineation Criteria

The Tabulation Geography Working Group develops tabulation block delineation criteria. The working group oversees preliminary tabulation block criteria research and tests. Their findings serve as the foundation for customer requirements and various software criteria necessary to create prototype blocks and final tabulation blocks. Prototype blocks are used to support the Redistricting Data Program. The primary goal for tabulation block delineation criteria is to reduce the number of very small, unnecessary blocks from the 2010 Census while improving their usability for stakeholders.

The Census Bureau has specifically focused on the following types of small blocks for reduction going into the 2020 Census:

- Blocks that were formed with highway ramps as part of their boundary.
- Small blocks that were formed with minor, unnamed roads as part of their boundary.
- Small blocks that were formed with minor, unnamed roads and contained no addresses (e.g., cemetery roads).
- Small, looped road blocks formed completely by a single, minor road with the same name (e.g., cul-de-sacs, traffic circles).
- Enclave blocks (small blocks completely surrounded by a single larger block).
- Relatively small blocks that were composed completely of area water features, by significantly increasing the area threshold for “lines in water,” merging ponds into

adjacent blocks, and merging narrow streams so that only one shoreline is being held as a block boundary.

Documents necessary to create or modify software and systems for use in the development, tracking, and maintenance of tabulation block delineation are generated as needed. Specific software related tasks include:

- Creation of software requirements for a WEB Enabled Batch Control System (WebCS).

  Used to identify counties ready for batch delineation and submits states/counties for delineation.
- Creation of software requirements for Prototype and Tabulation Block Delineation software.
  - Assigns priorities to MAF/TIGER system edges using two inputs.
    - Creation of General Priority List table.
    - Creation of Parameters table.
  - New concept for 2020.
    - Adds flexibility to develop and test software and block criteria repeatedly and earlier in decade.
    - Allows opportunity to change block criteria and test change without software modification.

Criteria development (or review of existing criteria) occurs four times, three to support the Redistricting Data Program and once for the 2020 Census. The blocks created for the Redistricting Data Program are termed “prototype” blocks since they are not the final tabulation blocks.

Opportunities to provide input for change to existing criteria occur three times in advance of the Tabulation Block delineation. The four tabulation block delineations leading up to and including the 2020 Tabulation Block delineation are:

- Block Boundary Suggestion Project (BBSP) Sample
  - Occurs in FY15.
  - Prototype blocks delineated for eight states to solicit input on tabulation block criteria before materials are provided to all BBSP participants in 2016.
  - Eight states and internal stakeholders at Census provide input to block criteria.

- BBSP.
  - Occurs in FY16.
  - Prototype blocks delineated and provided to all state participants using revised criteria from the 2015 BBSP Sample delineation.
  - States and internal stakeholders at Census may provide input to block criteria.
- BBSP verification.
  - Occurs in FY17.
  - Prototype blocks delineated and provided to all state participants based on data collected during BBSP.
  - BBSP Verification serves as the last, planned external stakeholder opportunity to provide input to tabulation block criteria.
  - Internal stakeholders at Census expected to provide input to tabulation block criteria.
- Tabulation – supports 2020 Census.
  - Occurs in FY20.
  - Final tabulation blocks delineated using revised criteria from internal and external stakeholders following BBSP Verification delineation.

For each of the delineations mentioned above, the goal is to successfully identify, document, program, test and release the aforementioned software and associated requirements and solutions in support of tabulation block creation and containment in the MAF/TIGER system.

3.2.1.3 Perform Tabulation Block Batch Delineation – Including QC [GEOP/GD 6-1.2.1.3]

Figure 33 shows the work to prepare to perform tabulation block batch delineation – including QC.

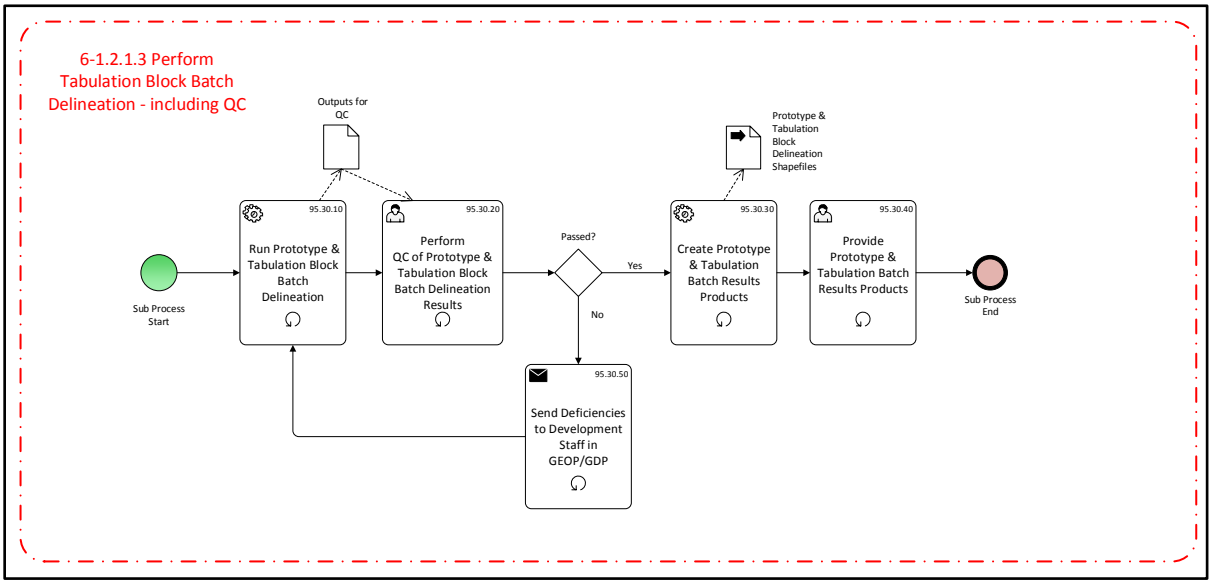

Figure 33: Perform Tabulation Block Batch Delineation – including QC

The Tabulation block delineation has linkage to the Geographic Areas Reconciliation Project (GARP). GARP activities must complete on each specific county and its surrounding counties before tabulation block delineation can begin for that county. The Geographic Programs Operation Geographic Data Processing (GEOP/GDP) Detailed Operational Plan discusses GARP in detail.

With each batch process, a quality check is run to ensure the delineation software ran as expected to produce the anticipated block delineations. Any deficiencies to the batch process are returned for correction. For the first three block delineations, which support the CRVRDO, county-based geographic information system (GIS) output files (e.g. ESRI shapefiles) are created. These products and their delivery vary depending on the phase of block delineation: BBSP Sample products are delivered to the CRVRDO for distribution to the eight states, BBSP and BBSP Verification products are delivered to Spatial Data Collection and Products Branch (SDCPB) for distribution to states by download, and the fourth and final delineation, (the 2020 Census tabulation blocks), is inserted into the MAF/TIGER system for use in several 2020 Census products.

3.2.1.4 Closeout Tabulation Block Delineation [GEOP/GD 6-1.2.1.4]

Figure 34 shows the work to prepare to establish a closeout tabulation block delineation.

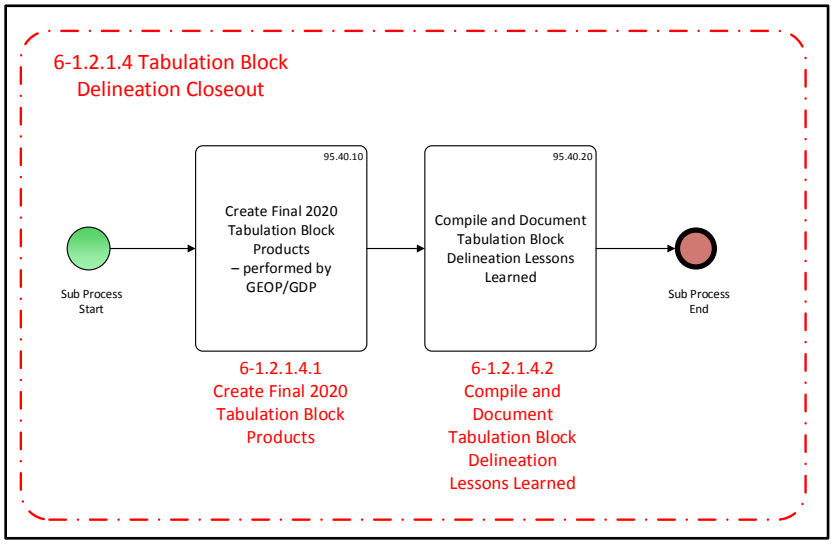

Figure 34: Closeout Tabulation Block Delineation

Tabulation block delineation closeout includes the creation of final tabulation block products and compilation of a comprehensive Lessons Learned document.

Create Final 2020 Tabulation Block Products [GEOP/GD 6-1.2.1.4.1]

With all phases of Tabulation Block Delineation complete, final tabulation block products are created by Geographic Data Processing. Products may include Geographic Reference Files (Codes [GRF-Cs], GIS shapefiles, Governmental Unit [GU] block maps, and products) to serve internal Census Bureau stakeholders.

Compile and Document Tabulation Block Delineation Lessons Learned [GEOP/GD 6-1.2.1.4.2]

A comprehensive Lessons Learned document is prepared to document all stages of tabulation block delineation.

3.2.2 Additional Tabulation Geography Delineations [GEOP/GD 6-1.2.2]

The Additional Tabulation Geography Delineations activity area is subdivided into the following constituent subactivities:

- Additional Tabulation Geography Delineations [GEOP/GD 6-1.2.2].
    - Develop Criteria for Additional Tabulation Geography Delineations [GEOP/GD 6-1.2.2.1].

- Perform Batch Delineation for Additional Tabulation Geography [GEOP/GD 6-1.2.2.2].
- Perform Interactive Delineation for Additional Tabulation Geography [GEOP/GD 6-1.2.2.3].
- Upload Additional Geographic Delineation Results and Create Output Data/Maps [GEOP/GD 6-1.2.2.4].
- Closeout Additional Tabulation Geography Delineations [GEOP/GD 6-1.2.2.5].

A detailed view of the "Additional Tabulation Geography Delineations" operational subactivity is given in Figure 35 below.

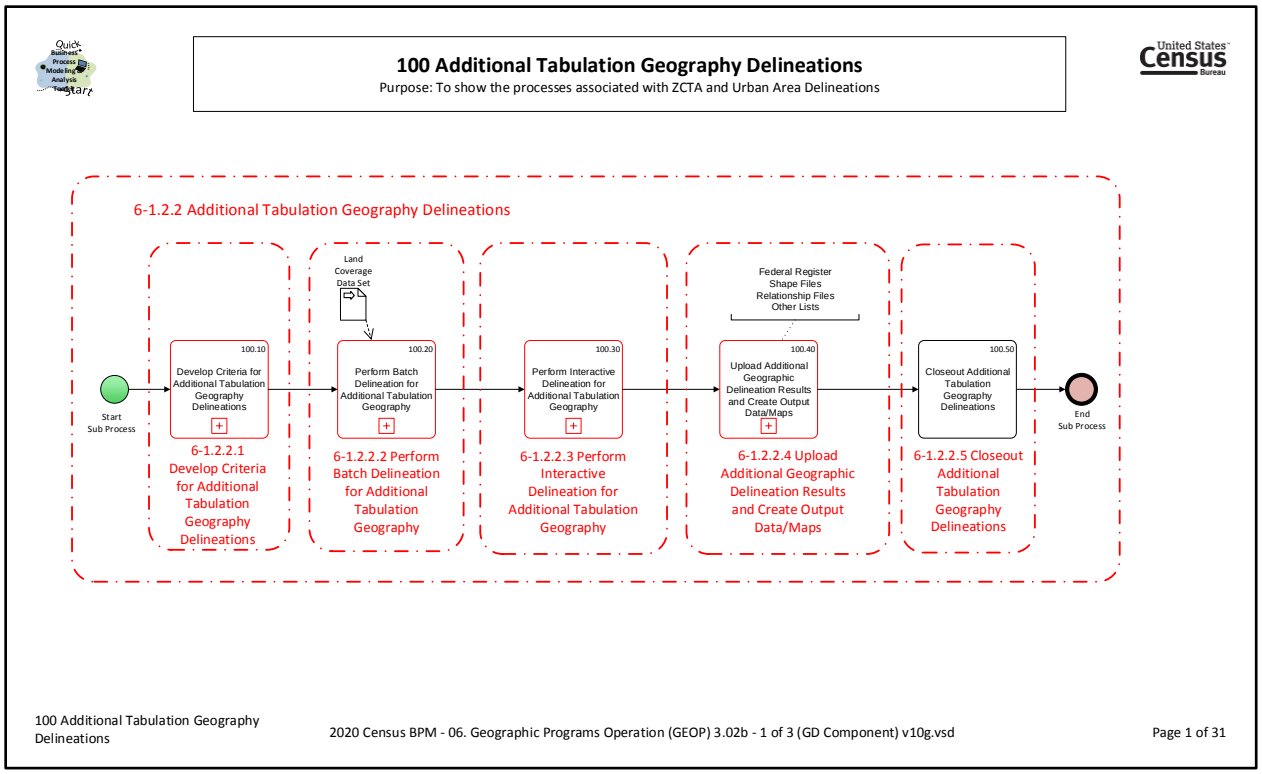

Figure 35: Additional Tabulation Geography Delineations

The scope of the "Additional Tabulation Geography Delineations" operational subactivity includes both ZIP Code Tabulation Areas (ZCTAs) and Urban Areas (UAs).

3.2.2.1 Develop Criteria for Additional Tabulation Geography Delineations [GEOP/GD 6-1.2.2.1]

Figure 36 shows the work to develop criteria for additional tabulation geography delineations.

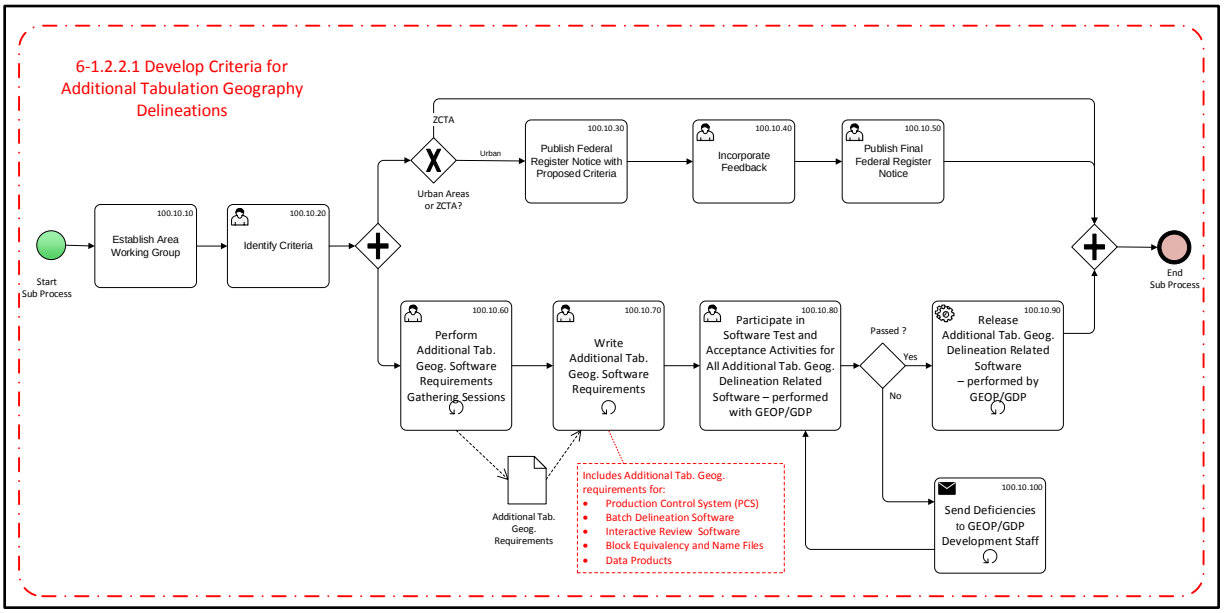

Figure 36: Develop Criteria for Additional Tabulation Geography Delineations

The first step in the development of Additional Tabulation Geography criteria is the establishment of working groups. The working groups initiate the processes required to develop the tabulation geography criteria for UA and ZCTA.

The working groups oversee research to identify criteria for UA and ZCTA.

Prior to final approval of UA proposed criteria, is published in the Federal Register for public comments and feedback. Feedback is collected and incorporated into the criteria and then a final Federal Register Notice is published.

Additional tasks of each working group include the following support:

- Gathering and writing software requirements.
- Participate in software test and acceptance activities
- Release Additional Tabulation Delineation Related Software
- Sending software deficiencies to development staff

3.2.2.2 Perform Batch Delineations for Additional Tabulation Geography [GEOP/GD 6-1.2.2.2]

Figure 37 shows the work to perform batch delineations for additional tabulation geography.

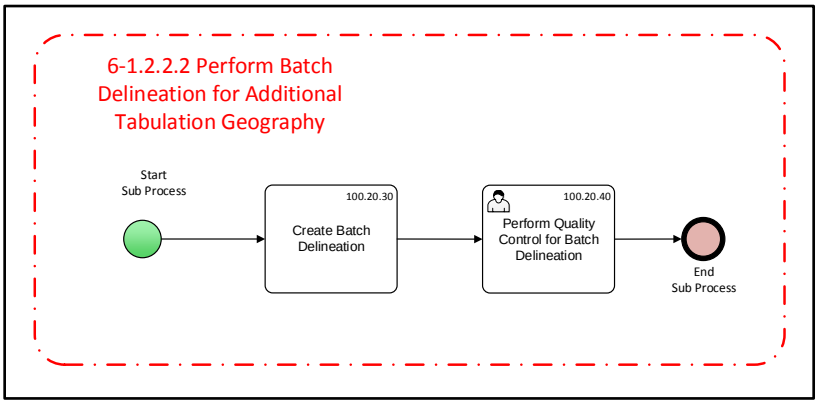

Figure 37: Perform Batch Delineations for Additional Tabulation Geography

UA Batch Delineation determines urban areas based on population thresholds. The areas delineated will be similar to the 2010 Census which included:

- Urbanized Areas (UAs) of 50,000 or more people.
- Urban Clusters (UCs) of at least 2,500 and fewer than 50,000 people.
- "Rural" encompasses all population, housing, and territory not included within an urban area.

Both UAs and UCs are defined primarily on the basis of population density with additional measures to account for non-residential urban land uses.

First delineated for Census 2000, the 2020 Census ZIP Code tabulation areas (ZCTAs) will be generalized areal representations of United States Postal Service (USPS) ZIP Codes. The Census Bureau collects ZIP Code data for housing units and many non-residential addresses from the USPS and from various field operations. Based on this ZIP Code data, the Census Bureau aggregates ZCTAs from addresses contained within each block. This aggregation of data allows a point-based data set (addresses) to be converted into an areal feature dataset (ZCTAs). Not all blocks will be assigned a ZCTA due to gaps in mail delivery.

GEO staff will QC the Batch Delineations for UA and ZCTA and work with GEOP/GDP staff to resolve any discrepancies

3.2.2.3 Perform Interactive Geographic Delineations for Additional Tabulation Geography [GEOP/GD 6-1.2.2.3]

Figure 38 shows the work to perform interactive geographic delineations for additional tabulation geography.

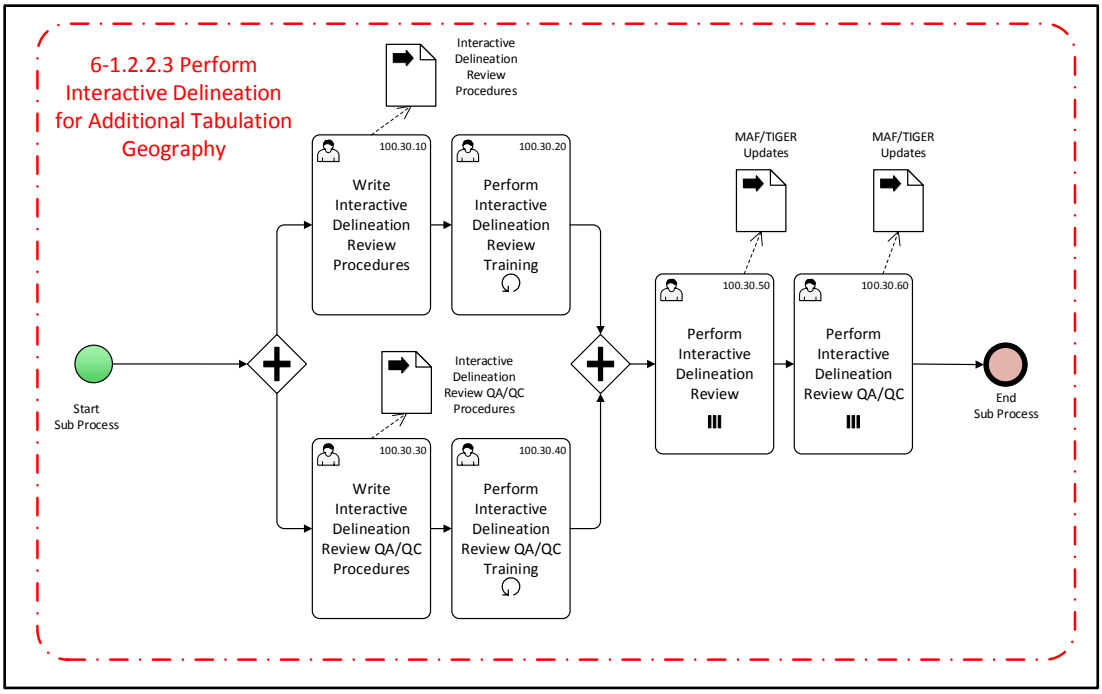

Figure 38: Perform Interactive Geographic Delineations for Additional Tabulation Geography

Interactive review procedures for each Additional Tabulation Geography are written and used to perform Interactive Delineation Review training. In addition, the procedures are used to develop Interactive Delineation Review QA and QC Procedures which are used to conduct QA/QC training. Upon completion of the Batch Delineation, interactive review is performed and QA/QC'ed by GEO.

Once management has approved the delineation, a Federal Register Notice is created and submitted to document the results and inform public stakeholders. The results of the UA

Interactive Review Delineation are then delivered to Population Division for use in the CBSA definition program.

3.2.2.4 Upload Additional Geographic Delineation Results and Create Output Data/Maps [GEOP/GD 6-1.2.2.4]

The Upload Additional Geographic Delineation Results and Create Output Data/Maps activity area is subdivided into the following constituent subactivities:

- Upload Additional Geographic Delineation Results and Create Output Data/Maps [GEOP/GD 6-1.2.2.4].
    - Upload Delineation Results for Additional Tabulation Geography [GEOP/GD 6-1.2.2.4.1].
    - Create Output Data/Maps for Additional Tabulation Geography Delineations [GEOP/GD 6-1.2.2.4.2].

A detailed view of the "Upload Additional Geographic Delineation Results and Create Output Data/Maps" operational subactivity is given in Figure 39 below.

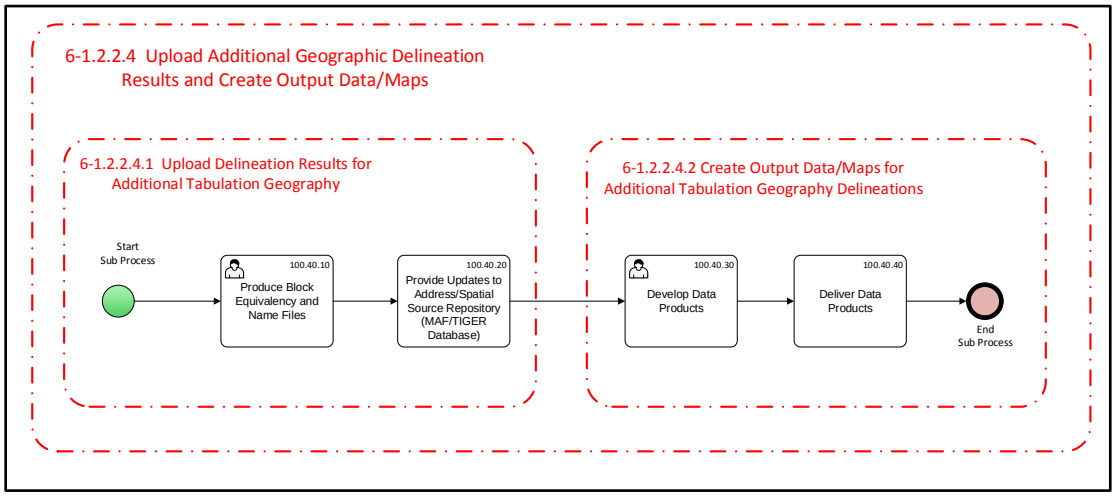

Figure 39: Upload Additional Geographic Delineation Results and Create Output Data/Maps

Results of each Additional Tabulation Geography are uploaded to the MAF/TIGER Database and used to create various data products for internal and external customers.

Upload Delineation Results for Additional Tabulation Geography [GEOP/GD 6-1.2.2.4.1]

Updating the MAF/TIGER database with either Additional Tabulation Geography delineation results is performed using separate upload processes.

Create Output Data/Maps for Additional Tabulation Geography Delineations [GEOP/GD 6-1.2.2.4.2]

When all phases of UA Delineation or ZCTA Delineation are complete, final products are created by Geographic Data Processing. Products may include Block Equivalency and Name Files, Geographic Reference Files, GU block maps, and other products to serve Census Bureau stakeholders.

3.2.3 Tabulation Geography Delineation Closeout [GEOP/GD 6-1.2.3]

The Tabulation Geography Delineation Closeout operational subactivity is subdivided into the following constituent activities:

- Tabulation Geography Delineation Closeout [GEOP/GD 6-1.2.3].
    - Compile and Document Overall Tabulation Geography Lessons Learned [GEOP/GD 6-1.2.3.1].

A detailed view of the constituent activities that make up the “Tabulation Geography Delineation Closeout” operational subactivity is given in Figure 40 below.

3.3.2.1 Compile and Document Overall Tabulation Geography Lessons Learned [GEOP/GD 6-1.2.3.1]

Figure 40 shows the work to compile and document overall tabulation geography lessons learned.

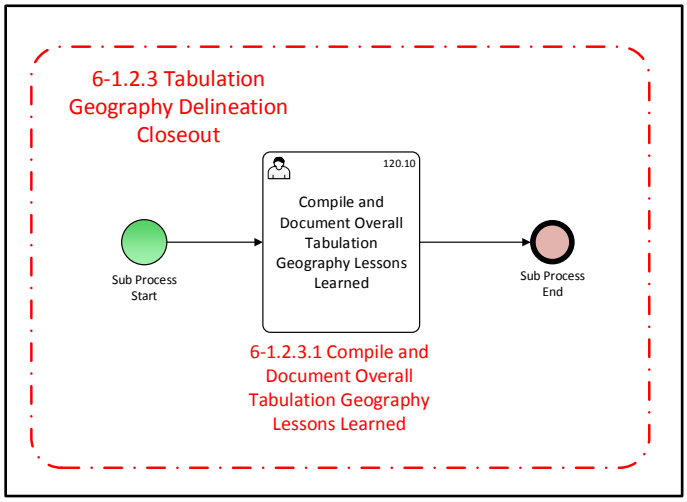

Figure 40: Tabulation Geography Delineation Closeout

A comprehensive Lessons Learned document is prepared to document all stages of the Additional Tabulation Geographies. The document includes answers to questions provided within both UA and ZCTA delineation activities.

4. Cost Model Factors

While the Geographic Delineations component of the Geographic Programs operation(GEOP/GD) is not a major cost driver for the 2020 Census, the following mechanisms from the IDEF0 Context Diagram represent the resources used to support this operation and will therefore impact its cost:

Staff

- HQ staff.
- RO/RCC staff.

Sites

- HQ.
- RO/RCC.

Systems

- MAF/TIGER Database.
- Other MAF/TIGER systems, including:
  - GATRES
  - LISRDS
  - BRICS
  - GAADS
  - WebCS
  - PCS

Other

- HQ and RO/RCC office IT infrastructure for conducting GEOP/GD operational work
- Census Network connectivity for data transmission between operational systems and operational sites

5. Measures of Success

For 2020 Census operations, the corresponding Measures of Success will be documented in the operational assessment study plans and final reports. The operational assessment study plan documents the criteria that will be used to define successful completion of the operation. The operational assessment report will provide results on whether the criteria were met.

In general, operational assessments report on planned to actual variances in budget, schedules, and production and training workloads. The corresponding Measures of Success (as documented in the operational assessment study plan) include variances that exceed established thresholds. See *Preparing for the 2020 Census Operational Assessment Study Plan* for the potential scope of assessment.

Types of success measures include:

- **Process Measures** that indicate how well the process works, typically including measures related to completion dates, rates, and productivity rates.
- **Cost Measures** that drive the cost of the operation and comparisons of actual costs to planned budgets. Costs can include workload as well as different types of resource costs.
- **Measures of the Quality** of the results of the operation, typically including things such as rework rates, error rates, and coverage rates.

See the corresponding operational assessment study plan and report for the GEOP Geographic Delineations component (GEOP/GD) for details on the measures of success.

Appendix A – Acronyms and Terminology

Table 8 lists the acronyms and abbreviations used within this Detailed Operational Plan document.

Table 9 lists a Glossary of Terms used within this Detailed Operational Plan document.

Additional geographic terminology can be found on the following Census website:

https://www.census.gov/geo/reference/terms.html

Table 8: Acronyms and Abbreviations List

Acronym	Meaning
ACO	Area Census Office
AdCan	Address Canvassing
ADCANFLG	Address Canvassing Flag
ADC	Address Canvassing operation
ADREC	Administrative Records
AIA	American Indian Areas
ARC	Archiving operation
BAS	Boundary and Annexation Survey
BBSP	Block Boundary Suggestion Project
BCU	Basic Collection Unit
BEA	Bureau of Economic Analysis
bGAADS	Basic Collection Unit Geographic Area Analysis and Delineation System
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
BPM	Business Process Model
BPMN	Business Process Model Notation

Acronym	Meaning
BRICS	Business Rules and Legal Values Integrated Control System
CASS	Coding Accuracy Support System™
CBSA	Core Based Statistical Area
CFM	Census Field Manager or Census Field Manager Area
CMFO	Coverage Measurement Field operation
CMS	Centers for Medicare and Medicaid Services
CR	Change Request
CRD	Customer Requirements Document
CRO	Count Review operation
CRVRDO	Census Redistricting and Voting Rights Data Office
DCMD	Decennial Census Management Division
DITD	Decennial Information Technology Division
DOP	Detailed Operational Plan
DPD	Data Products and Dissemination operation
DSF	Delivery Sequence File
DSSD	Decennial Statistical Studies Division
ESRI	Environmental Systems Research Institute
ETL	Enumeration at Transitory Locations operation
FLD	Field Division
FLDI	Field Infrastructure operation
FMA	Field Management Area
FPD	Forms Processing and Distribution operation
FSCPE	Federal-State Cooperative for Population Estimates

Acronym	Meaning
FWS	Fish and Wildlife Service
FY	Fiscal Year
GAADS	Geographic Area Analysis and Delineation System
GARP	Geographic Areas Reconciliation Project
GATRES	Geographic Acquis-Based Topological Real-Time Editing System
GD	Geographic Delineations
GDP	Geographic Data Processing
GEF	Geographic Equivalency Files
GEO	Geography Division
GEOP	Geographic Programs operation
GEO/GD	Geographic Programs operation/Geographic Delineations component
GEOP/GDP	Geographic Programs operation/Geographic Data Processing component
GEOP/GP	Geographic Programs operation/Geographic Partnership component
GIS	Geographic Information System
GP	Geographic Partnership
GPL	General Priority List
GRF	Geographic Reference Files
GRF-C	Geographic Reference Files - Codes
GSS	Geographic Support System Program
GU	Governmental Unit
GUPS	Geographic Update Partnership Software
HQ	Headquarters
IAC	Island Areas Censuses operation

Acronym	Meaning
ICAM	Integrated Computer Aided Manufacturing
IDEF0	ICAM Definition for Function Modeling
IFAC	In-Field Address Canvassing
IOAC	In-Office Address Canvassing
IOD	Integrated Operations Diagram
IPT	Integrated Project Team
IRS	Internal Revenue Service
IT	Information Technology
LISRDS	Live Individual Shapefile Request and Delivery Software
LUCA	Local Update of Census Addresses operation
MAF	Master Address File
MAF/TIGER	Master Address File/Topologically Integrated Geographic Encoding and Referencing
MAFCS	MAF Coverage Study
NARA	National Archives and Records Administration
NRFU	Nonresponse Followup operation
OMB	Office of Management and Budget
PCS	Production Control System
PM	Program Management
PSAP	Participant Statistical Areas Program
QA/QC	Quality Assurance/Quality Check
RA	Remote Alaska
RCC	Regional Census Center

Acronym	Meaning
RDP	Redistricting Data Program operation
RO	Regional Office
RO/RCC	Regional Office/Regional Census Center
RPO	Response Processing Operation
SDCPB	Spatial Data Collection and Products Branch
SDRP	School District Review Program
SLU	Special Land-Use Areas
SPC	Security, Privacy and Confidentiality
SRS	Software Requirements Specification
SSA	Social Security Administration
TEA	Type of Enumeration Area
TIGER	Topologically Integrated Geographic Encoding and Referencing
U.S.	United States
UA	Urbanized Area or Urban Area
UC	Urban Cluster
UE	Update Enumerate operation
UL	Update Leave operation
USPS	United States Postal Service
WebCS	Web Enabled Batch Control System
WG	Working Group
ZCTA	ZIP Code Tabulation Areas
ZIP	Zone Improvement Plan

Table 9: Glossary of Terms

Term	Meaning
Administrative Records	Administrative records (ADREC) and administrative record data refer to microdata records contained in files collected and maintained by administrative or program agencies and commercial entities. Government and commercial entities maintain these files for the purpose of administering programs and providing services. Administrative records are distinct from systems of information collected exclusively for statistical purposes, such as data from censuses and surveys that are produced under the authority of Titles 13 or 15 of the United States Code (U.S.C.). For the most part, the Census Bureau draws upon administrative records developed by federal agencies. To a lesser degree, it may use information from state, local, and tribal governments, as well as commercial entities. The primary sources of ADREC data used by the Census Bureau are the Internal Revenue Service (IRS), Social Security Administration (SSA), Bureau of Labor Statistics (BLS), Centers for Medicare and Medicaid Services (CMS), United States Postal Service (USPS), and Bureau of Economic Analysis (BEA). To obtain these data, the Census Bureau must adhere to a number of regulatory requirements.
ArcGIS	GIS software distributed by ESRI.
Area Census Office (ACO)	A temporary office established for data collection and field operations for the 2020 Census.
Assignment Area (AA)	Small geographic units consisting of a collection block or group of collection blocks; established by the Census Bureau as a basic unit for data collection by a single field enumerator for the 2010 Census.
Attribution	Non-spatial information about a geographic feature in a Geographic Information System usually stored in a table and linked to the feature by a unique identifier.

Term	Meaning
BCU	This is the smallest geographic unit for data collection for the 2020 Census. The Basic Collection Unit is the building block for type of enumeration areas and field area delineations.
Coding Accuracy Support System™ (CASS)	A certification process offered to mailers, service bureaus, and software vendors that standardizes addresses in address lists and improves the accuracy of matching each standardized address to the proper delivery point code, ZIP+4 code, five-digit ZIP Code, and carrier route code.
City-style	A city-style address is one that uses a structure number and street name format; for example, 201 Main Street, Anytown, ST 99988. Additionally, city-style addresses usually appear in a numeric sequence along a street and frequently follow parity conventions, such as all odd numbers occurring on one side of the street and even numbers on the other side. They often contain information used to uniquely identify individual units in multiple-unit structures, such as apartment buildings or rooming houses.
Collection Geography	Any geographic area created for use during the decennial census.
Census Field Manager (CFM) or Census Field Manager area (CFM)	The census field manager (CFM) is the immediate supervisor of the 2020 Census enumerators and a person assigned to a specific census field manager area (CFM). The acronym is used to indicate the person or the geography.
Delineation	To draw or identify on a map the specific location of a boundary to create a geographic area. Delineation may include manual or automated processes and may be performed on printed or electronic documents, electronic files, as well as other media.
Delivery Sequence File (DSF)	An Address Management Service that is used to check mailing address accuracy, identify address types, and obtain walk sequence statistics. The DSF is the most complete USPS address database available.

Term	Meaning
Geographic Information System (GIS)	An integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed an analyzed.
Group Quarters (GQ) Areas	A geographic area delineated to represent specific group quarters (prisons and universities) for use in collection geography.
Mailable	In the United States, the requirement for a mailable address is a complete city-style or rural route address. The requirement for a mailable address differs slightly in Puerto Rico. In addition to the criteria for the United States, sample city-style addresses in Puerto Rico also must have an ‘‘urbanización’’ name, building name, or condominium name to be considered mailable. In this document, mailable is also used to indicate anticipated success in mailing with the USPS. The criteria used in the TEA delineation include a match to the USPS DSF or CASS data.
MAF/TIGER System	MAF/TIGER system is the Master Address File/Topologically Integrated Geographic Encoding and Referencing database. This digital geographic database automates the mapping and related geographic activities required to support the Census Bureau’s census and survey programs.
Military Area	A geographic area delineated to represent military installations.
Noncity-style	A noncity-style mailing address is one that uses a rural route and box number format or a post office (PO) box format. Examples of these types of addresses are RR 2, Box 9999, Anytown, ST 99988 and PO Box 123, Anytown, ST 99988. Some noncity-style tallies (such as those utilized for TEA Delineation) include all addresses that do not meet the definition of city-style.

Term	Meaning
Public Law 94-171 (P.L. 94-171)	States/Governments voluntarily participating in this program to obtain population counts for their locally defined voting districts will submit to the Census Bureau specific boundaries for their voting districts, legislative districts, and desired census block boundaries following technical criteria established by the Census Bureau, under the provisions of P.L. 94-171. The Census Bureau will provide small-area population totals to the legislature and governor of each state.
Public Lands	Federally owned Bureau of Land Management (BLM) lands, United States Fish and Wildlife Service (FWS) lands, national parks, and some state lands.
Regional Census Center (RCC)	A temporary office, similar in size to a Regional Office, created to support 2020 Census operations, partnerships, and recruiting.
Regional Office (RO)	Regional offices play a critical role in getting the U.S. Census Bureau's message out to the community. Regional office staff serves as contacts for local media, they meet with local organizations to improve participation in censuses and surveys, and host workshops to teach the public about the use and value of the Census Bureau's data.
Shapefile	A shapefile is a vector data-storage format for storing the location, shape, and attributes of geographic features. A shapefile is stored in a set of related files and contains one feature class.
Special Land-Use Area	A geographic area defined as being part of a military area or national park.
Type of Enumeration Area (TEA)	The Type of Enumeration Area (TEA) represents the predominant approach to conducting the 2020 Census in a given geographic area. The TEA assignment is based on area characteristics to maximize respondent participation.

Appendix B – References

Appendix B lists the documents or other resources used during the development of this Detailed Operational Plan document.

U.S. Census Bureau (2015), "2020 Census Operational Plan," Version 3.0, October 27, 2017.

U.S. Census Bureau (2015), "Geographic Programs: 2020 Collection Geography Detailed Business Proposal," Version 1.0, June, 2015.

U.S. Census Bureau (2016), "2020 Collection Geography Geographic Area Analysis and Delineation System and Upload Software Requirements Specification," Version 1.0, May 20, 2016.

U.S. Census Bureau (2015), "Basic Collection Unit (BCU) Batch Delineation Software Criteria and Requirements," Version 1.0, November 24, 2015.

U.S. Census Bureau (2015), "Geographic Programs: Tabulation Blocks Detailed Business Proposal," Version 1.0, October 21, 2015.

U.S. Census Bureau (2009), "Administrative Records Handbook," Issued May 16, 2001, Revised February 12, 2009.

U.S. Census Bureau (2016), "Operational Assessment Content Guidelines for the 2018 End-to-End Census Test and the 2020 Census," Draft, May 10, 2016.

Appendix C – Activity Tree for GEOP Geographic Delineations Component (GEOP/GD)

This appendix presents the Activity Tree for the GEOP/GD operational component. An Activity Tree uses an outline structure to reflect the decomposition of the major operational activities in the operation. Each activity is numbered according to its position in the outline. For example, for the current operation numbered "6-1", the first activity would be numbered 6-1.1. Subactivities under this activity would be numbered sequentially, starting again with the number one. For example, the first subactivity under the first activity would be numbered 6-1.1.1 the second subactivity as 6-1.1.2. The second activity would be numbered 6-1.2, and so on.

GEOP/GD Activity Tree:

- 6-1 Geographic Delineations Component (GEOP/GD)
  - 6-1.1 Collection Geography Delineation
    - 6-1.1.1 Special Land-Use Areas (SLU) Delineation
      - 6-1.1.1.1 Prepare to Perform SLU Updates
      - 6-1.1.1.2 Perform SLU Updates
    - 6-1.1.2 Basic Collection Unit (BCU) Delineation
      - 6-1.1.2.1 Develop BCU Criteria
      - 6-1.1.2.2 Perform BCU Batch Delineation
      - 6-1.1.2.3 Maintain BCU Integrity and Recalculate Attribution (Post Batch Delineation)
      - 6-1.1.2.4 Update BCU Attribution
      - 6-1.1.2.5 Prepare to Perform BCU Interactive Review
      - 6-1.1.2.6 Perform BCU Interactive Review
      - 6-1.1.2.7 Maintain BCU Integrity and Recalculate Attribution (Post Interactive Review)
    - 6-1.1.3 Type of Enumeration Area (TEA) Delineation
      - 6-1.1.3.1 Develop TEA Criteria
      - 6-1.1.3.2 Perform TEA Batch Delineation
      - 6-1.1.3.3 Perform TEA Interactive Review
    - 6-1.1.4 Field Management Area (FMA) Delineation
      - 6-1.1.4.1 Perform FMA Delineation – CFM
        - 6-1.1.4.1.1 Develop FMA Criteria - CFM
        - 6-1.1.4.1.2 Perform FMA Batch Delineation - CFM
        - 6-1.1.4.1.3 Perform FMA Interactive Review - CFM

        - 6-1.1.4.2 Perform FMA Delineation - ACO
            - 6-1.1.4.2.1 Develop FMA Criteria - ACO
            - 6-1.1.4.2.2 Perform FMA Batch Delineation - ACO
            - 6-1.1.4.2.3 Perform FMA Interactive Review - ACO
        - 6-1.1.4.3 Perform FMA Delineation - RCC
            - 6-1.1.4.3.1 Develop FMA Criteria - RCC
            - 6-1.1.4.3.2 Perform FMA Batch Delineation - RCC
    - 6-1.1.5 Collection Geography Delineation Closeout
        - 6-1.1.5.1 Create Final Collection Geography Data Products
        - 6-1.1.5.2 Compile and Document Overall Collection Geography Lessons Learned
- 6-1.2 Tabulation Geography Delineation
    - 6-1.2.1 Tabulation Block Delineation
        - 6-1.2.1.1 Establish Tabulation Block Working Group
        - 6-1.2.1.2 Develop Tabulation Block Delineation Criteria
        - 6-1.2.1.3 Perform Tabulation Block Batch Delineation - including QC
        - 6-1.2.1.4 Close out Tabulation Block Delineation
            - 6-1.2.1.4.1 Create Final 2020 Tabulation Block Products
            - 6-1.2.1.4.2 Compile and Document Tabulation Block Delineation Lessons Learned
    - 6-1.2.2 Additional Tabulation Geography Delineations
        - 6-1.2.2.1 Develop Criteria for Additional Tabulation Geography Delineations
        - 6-1.2.2.2 Perform Batch Delineation for Additional Tabulation Geography
        - 6-1.2.2.3 Perform Interactive Delineation for Additional Tabulation Geography
        - 6-1.2.2.4 Upload Additional Geographic Delineation Results and Create Output Data/Maps
            - 6-1.2.2.4.1 Upload Delineation Results for Additional Tabulation Geography
            - 6-1.2.2.4.2 Create Output Data/Maps for Additional Tabulation Geography Delineations
        - 6-1.2.2.5 Closeout Additional Tabulation Geography Delineations
    - 6-1.2.3 Tabulation Geography Delineation Closeout
        - 6-1.2.3.1 Compile and Document Overall Tabulation Geography Lessons Learned