

2020 Census Detailed Operational Plan for: 19. Response Processing Operation (RPO)

A New Design for the 21st Century

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Approvals

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1. Document Purpose

The 2020 Census Detailed Operational Plan for the Response Processing Operation (RPO) 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 2020 Census RPO and includes a summary of the operational processes involved, their inputs, outputs, and controls, and the basic mechanisms employed to conduct the operational work.

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 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.

2. Operational Overview

2.1 Operation Purpose

The Response Processing Operation (RPO) supports the three major components of the 2020 Census: pre-data collection activities, data collection activities, and post-data collection activities.

Specifically, the operation supports the following:

- Create and distribute the initial 2020 Census enumeration universe of living quarters (LQ).
- Assign the specific enumeration strategy for each LQ based on case status and associated paradata.
- Create and distribute workload files required for enumeration operations.
- Track case enumeration status.
- Run post-data collection processing actions in preparation for producing the final 2020 Census results.
- Perform self-response quality assurance activities.

2.2 Background

Processing of all census responses is at the hub of census activities. The entire operation requires many steps entailing key functionality for producing census results.

The initial stage of response processing is described as establishing where to count. Every enumerated person must be associated with a specific geographic area, usually a block. Census counts are produced for every geographic area, from the block to the entire nation. Therefore, this initial stage is key to managing both the census enumerations and the field operations where data are collected. People are counted within LQs, and field operations are managed by the list of LQs within geographic areas. LQs are designated as either housing units (HUs) or group quarters (GQs), which are LQs where people who are usually unrelated share housing and are often receiving some type of service. Examples of GQs include college dormitories, group homes, and nursing homes.

2.2.1 Relevant Terms and Concepts

Below we define and describe some of the key terms that are integral to having a full understanding of this operation.

Type of Enumeration Area

Type of Enumeration Area (TEA) is a concept that has been applied to censuses since 1970, when the enumeration methodology moved away from listing and enumerating all LQs at the same time during the census. This original methodology is now known as List/Enumerate. Starting with the 1970 Census, United States Postal Service (USPS) mailout of questionnaires intended to be returned by respondents through the mail became a major enumeration methodology. By necessity, this questionnaire delivery methodology is used in conjunction with a field operation called Nonresponse Followup (NRFU) to get the enumerations at LQs where the questionnaire was not returned by mail.

This Mailout/Mailback methodology cannot be used everywhere because of undeliverability of mail to particular types of addresses or expected low response rates. In addition, in order to meet the purposes of the census, there is a requirement to attribute LQs and enumerated people to the geographic level of a block. For these reasons, it is necessary to have a block-level address list for tracking which questionnaires are returned by mail and determining where to go to enumerate in person. This requires a block-level designation of TEA. Traditionally, TEAs have been assigned in large groups of blocks in order to streamline field assignments. Other TEAs used in previous censuses and the 2020 Census, in addition to those described above, include:

- Update/Leave: Canvass in the field to update the address list and drop off (i.e., leave) a questionnaire to be returned by mail.
- Urban Update/Leave: Canvass in the field to update the address list and drop off a questionnaire to be returned by mail in urban areas, possibly with mailable addresses but other enumeration or location challenges.
- Update/Enumerate: Canvass in the field to update the address list and enumerate at each housing unit, where self-response is not feasible.
- Remote Alaska: Canvass a designated area in Alaska to list living quarters and enumerate people before the population begins a nomadic stage.

The term Mailout/Mailback has been changed to Self-Response for the 2020 Census because of the emphasis on internet self-response, a major initiative for the 2020 Census. For the 2020 Census, Update/Leave and Urban Update/Leave are delineated only as Update Leave, while Update Enumerate and Remote Alaska methodology are largely unchanged from prior censuses. List Enumerate is still used in the enumeration of the Island Areas.

Living Quarters

A foundational concept for the census and for managing the census is the list of LQs. LQs are either HUs or GQs. HUs are everything from single family homes on individual lots to apartments in a large multiunit complex, while GQs are group living situations where residents are generally not related to one another and are often receiving some type of service. Categories designating the type are assigned to group quarters, whereas HUs, by definition, are LQs that are not GQs. It is possible for GQs and HUs to change designations over time. For example, a group home could become college student housing, or an assisted living facility could become a nursing home, thereby transitioning from multiunit housing to a GQ.

Transitory locations are geographic areas identified to contain temporary living quarters during some times. Examples include recreational vehicle parks, campgrounds, racetracks, circuses, carnivals, marinas, hotels, and motels. When people reside in these areas during the census and do not have a usual home elsewhere, they are counted at the transitory location. The individual living quarters in which people are counted in transitory locations are considered HUs for the purposes of the census enumeration.

Universe and Workload

The list of LQ addresses for units currently considered valid for the census is known as the universe. The universe is created before Census Day (traditionally April 1) for the purpose of printing materials for delivery to LQs. The universe changes throughout the census as status codes and enumeration data are gathered. Operations can add LQs to the universe file. In general, geographic areas—such as TEAs—will have an associated address universe.

In contrast, the workload indicates which units in the universe are on the list to be worked at a given point in time. Examples include units in the Self-Response TEA for which no response has yet been received and are therefore in the NRFU workload, and units in the Self-Response or Update Leave TEA for which a response has not been received by a date prior to NRFU and are, potentially, designated to receive one or more additional mailings. Each mailing is part of the forms printing workload.

Mailing Contact Strategy

The mailing contact strategy defines the set of mailings designated for LQs, depending on geographic factors like TEA, area factors like levels of internet connectivity, and on statistical processes that determine areas or units receiving an experimental treatment for use in the Evaluations and Experiments operation. During the census, additional mailings in the Self-Response TEA are sent based on whether a response has been received from the unit. Mailings are intended to elicit self-response or cooperation with enumerators who come to the door during the NRFU operation.

Pre-data Collection

The Census Bureau created the Master Address File (MAF) using the housing unit addresses that were enumerated through Mailout/Mailback in the 1990 Census and updating the file with mail delivery point addresses from the USPS. This allows for some uniformity and consistency in the address file between censuses, as well as its use for other Census Bureau surveys. It has been updated extensively since its creation through census operations, American Community Survey operations, and other census surveys, as well as significant updating through USPS files and work with governmental units through various geographic partnerships. The MAF has become increasingly complete and robust through these various efforts.

The MAF contains a full record of almost every address that has been collected and deemed valid at any point since its creation. For this reason, an extract of only those addresses considered to be currently valid needs to be specified whenever a universe is created for a census or survey. In particular, in order for the Census Bureau to mail or hand-deliver census questionnaires and other materials, the list of LQs on the MAF considered to be valid for the census must be created before production census activities. Response processing receives this census MAF extract and creates a Census ID for each record in this LQ universe. Additional information such as the assigned TEA and mailing contact strategy are appended to the LQ records.

Data Collection

All LQ records on this initial universe are tracked through the entire census. Response data from questionnaires mailed back or submitted through the internet, telephone response data, and data from field operations are collected and associated with an LQ record in the universe through the Census ID. Field operation data includes data about the status of an LQ.

The universe of LQs grows throughout the census as a result of census operations. In other words, the file containing the LQs—considered as a horizontal bar containing all the address records—can grow through the census process but never shrink.

The responses and LQ statuses are connected to the address record corresponding to the response as blocks added on top of the horizontal bar at the record that corresponds to the Census ID.

Post-data Collection

At the end of census data collection, the horizontal bar contains all LQs that were tracked through the census, whenever they entered the file. The vertical dimension of collected data contains a variety of inputs, including to the LQ status and enumeration data. For example, a NRFU case could have a designation that the HU does not exist on the ground, the HU exists but

is vacant, or the HU exists and is occupied by the people who have been enumerated at that HU. The field operations relevant for particular LQs are assigned by TEA and whether the LQ is for a HU or a GQ.

For every enumerated person, there would ideally be data in every one of the data fields that corresponds to a question on the census questionnaire, such as name, age, and sex. However, for every one of these person records, some of the data fields might be blank or contain data that does not make sense or is inconsistent with other data. The count of household members provided in the data field for that question might not be equivalent to the count of household members created by counting the listed household members. Additionally, there may be more than one enumeration at a household, for a variety of reasons. At some types of group quarters, it is allowable for a resident to have another address that is considered to be the person's permanent residence (usual home elsewhere) and for the resident to designate this address on the enumeration record.

The census ultimately produces an enumeration record and HU status for every HU and a set of data about the people in every occupied GQ. Therefore, inconsistent data needs to be resolved in a postprocessing phase before final counts and data files are produced. In other words, for each record on the horizontal bar, one vertical block of information about the people enumerated there is selected from the set of information on the file. This process is called the Primary Selection Algorithm (PSA). After this stage, the final list of valid LQs is determined based on all data that were collected during the census from all the contributing operations. HUs found to be vacant are included along with their vacancy status, while group quarters found to be vacant are not included.

It is possible that there are still missing or inconsistent data items after this stage. For example, a NRFU enumerator may have collected only last resort data indicating that a housing unit is occupied by two people, but no other information about these people is known. In these cases, imputation procedures are required to complete the household enumeration record, using a variety of data inputs and statistical processes. When the final enumeration data are determined for all LQ records considered to be valid, the resulting dataset is the Census Unedited File (CUF). The CUF provides the final census count of people and LQs. It is combined with state-level administrative records data for federally affiliated persons serving the United States overseas to create the apportionment distribution.

After the census count and apportionment data are produced, the next step is further postprocessing activities, such as editing of relationship and age data for consistency, filling in missing race and Hispanic origin responses, and coding of write-in responses. This produces the data necessary for delivery of products for redistricting. Further postprocessing consists of Disclosure Avoidance procedures, a statistical process that ensures that the final statistics

released to the public do not disclose characteristics of any identifiable individual enumerated in the census.

2.2.2 Changes Introduced in the 2020 Census

The RPO fits into the planned design of the 2020 Census at a number of key junctures. In the step “Establish Where to Count,” RPO maintains the database of census addresses that are the census universe. For the step “Counts the Population,” RPO receives the enumeration and operational data that allow the mailed and hand-delivered printed materials to be distributed correctly, the count to be produced, and the census operations to perform their various functions. Finally, RPO creates the files that are ultimately used in the step “Release the 2020 Census results” by producing the files that are used for apportionment, redistricting, and public distribution.

With major innovations to the census design in other operations, major opportunities for innovation are available for response processing for the 2020 Census. For example, the automation of NRFU allows the NRFU workload and universe to be dynamic. In particular, responses received through other means such as the internet can result in the case being removed from the NRFU workload even after NRFU has begun. The NRFU workload and universe can also increase, to account for address records added in other operations, where these addresses have not yet received an invitation to respond to the census.

The Response Processing Operation takes advantage of new technology and data sources to support the innovation areas optimizing self-response and the use of administrative records and third-party data.

Opportunities to innovate include the following:

- In an effort to optimize self-response, RPO uses enterprise-developed tools to facilitate intelligent business decisions before and during data collection.
- To optimize self-response, the enterprise-developed operational control system serves as the overall integration “manager” of response data collection for internet, telephone, and paper to conduct mode-level case assignment activities. A single operational control system manages the status of the entire universe daily with data and updates received from all operations, including Internet Self-Response, Paper Data Capture of mailed paper questionnaires, Census Questionnaire Assistance for inbound calls, Nonresponse Followup, Group Quarters, Update Leave, and smaller operations. Daily updates from the operational control system also interface with all printing systems for production and distribution of paper products (i.e., questionnaires, reminder postcards, etc.). This creates a more efficient mailing strategy, eliminates the need for costly blanket

mailings, and minimizes future mailings to housing units that have already provided a response.

- Administrative records (AdRec) Modeling and AdRec Enumeration use libraries from past surveys, censuses, and other sources of administrative records and third-party data. Administrative records and third-party data create models based on established business rules to determine the appropriate course of enumeration action for cases. However, RPO's primary use of administrative records and third-party data supports reducing the need to conduct expensive in-person follow-up with those households by applying models using AdRec Modeling. AdRec Modeling applies established business rules to determine the appropriate course of enumeration action for cases and assign each case to the specific mode.
- Post-data collection activities include using administrative records and third-party data to supplement response data using AdRec Enumeration methodology. AdRec Enumeration may be used in whole or in part where there is high confidence during post-processing to enhance imputation processes and potentially the PSA. Use of administrative records will also support editing and coding, imputation, self-response quality assurance, and coverage improvement (CI).

2.3 Design Overview

The sections below present the high-level design for the RPO. Please refer to the 2020 Census Operational Plan for a complete inventory of design decisions for all 2020 Census operations.

The RPO will create and distribute the initial 2020 Census enumeration universe, assign the specific enumeration strategy for each living quarter based on case status and associated paradata, create and distribute workload files required for enumeration operations, track case enumeration status, run post-data collection processing actions in preparation for producing the final 2020 Census results, and ensure all self-response data collected are analyzed for quality assurance purposes.

2.3.1 High-Level Operational Design

The design of the RPO for the 2020 Census includes three major operational activity areas:

- RPO Pre-Data Collection Phase.
- RPO Data Collection Phase.
- RPO Post-Data Collection Phase.

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.

RPO Pre-Data Collection Phase

The Pre-Data Collection Phase of RPO's operation creates and populates a respondent data collection universe of LQs for use during the later data collection and post-data collection phases of RPO's operation. This universe contains census addresses and geographic attributes for all known HUs and GQs within the boundaries of the United States and Puerto Rico. Each known LQ in the universe is populated with address information, a Census ID, geocoding information (assignment to a block), case management information, and a contact strategy. The Census ID will be used during later phases to associate a particular set of response data back to a specific LQ.

RPO Data Collection Phase

For data collection activities, the RPO starts with receiving and managing updates to the initial 2020 Census universe. These updates come from various address frame update operations including Address Canvassing, Local Update of Census Addresses (LUCA), Count Review (Federal-State Cooperative for Population Estimates), and some Geographic Programs activities. The results from the address updates establish a revised 2020 Census enumeration universe. The RPO uses this universe to control and track questionnaire response data. As responses are received, cases containing a Census ID are designated in the universe as received. Cases returned without Census IDs are sent to the Non-ID Processing operation for matching and geocoding. All cases are returned to the Response Processing Operation, and those that were successfully resolved are removed from further enumeration follow-up.

For nonresponding cases, the RPO supports the NRFU operation by facilitating administrative records modeling techniques to determine the most effective and efficient enumeration strategy, including removal of vacant and deleted cases after one visit, provision of a "best time to contact" recommendation to be used by the operational control system, and reducing the number of contacts based on established "stopping rules" to maximize efficiency in the NRFU operation.

Additionally, the RPO provides response collection support to the Update Leave operation (UL), Update Enumerate operation (UE), Group Quarters operation (GQ), and Enumeration at Transitory Locations operation (ETL). In general, the activities include creating and managing the enumeration workloads and follow-up universes, as well as the enumeration and, as applicable, address listing quality control functions.

RPO Post-Data Collection Phase

The RPO Post-Data Collection Phase begins with processing activities in preparation for final enumeration universe reconciliation. In an effort to reduce costs associated with field follow-up operations and to ensure optimal coverage, response data cases determined as having

sufficient administrative records information for enumeration after one unsuccessful field enumeration attempt are considered enumerated. Administrative records are also used to support resolving final response case record status issues associated with producing the final census output files (DRF, CUF, and CEF). RPO is also responsible for leading a review of these files with designated subject matter experts.

RPO is responsible for the Island Areas Post-Data Collection Phase. The RPO will utilize the Decennial Response Processing System: Island Areas Response Processing (DRPS:IARP) to process response data from the four Island Areas—American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the U.S. Virgin Islands (USVI)—and facilitate the analysis of microdata files.

DRPS:IARP is capable of receiving, storing, coding, and editing the response data. DRPS:IARP transforms the records so they are compatible with current production ACS software. They then perform autocoding on write-in response data and send files to the National Processing Center (NPC) to perform residual (clerical) coding. After the response data is coded, DRPS:IARP creates the following deliverables for which RPO is responsible: Decennial Response File (IA-DRF) for Island Areas, the Census Unedited File (IA-CUF) for Island Areas, the Census Edited File (IA-CEF) for Island Areas, and the Microdata Detail Files (IA-MDFs) for Island Areas. To support DRPS:IARP core functionalities, an interface between iCADE, CDL, MAF/TIGER and Clerical Coding Systems is required.

The hierarchy of activities for the RPO operation 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 RPO, see the Detailed Process Description discussions in Sections 3, 4, and 5 below.

[Figure 1](#) is a top-level Business Process Model (BPM) that shows these Level 1 activity areas. BPMs for the 2020 Census follow industry-standard Business Process Model and Notation (BPMN). An explanation of how to read the BPMN notations and a full-sized copy of all of the BPMN diagrams for this operation are provided under separate cover.

This top-level BPM serves as the Context Model for RPO.

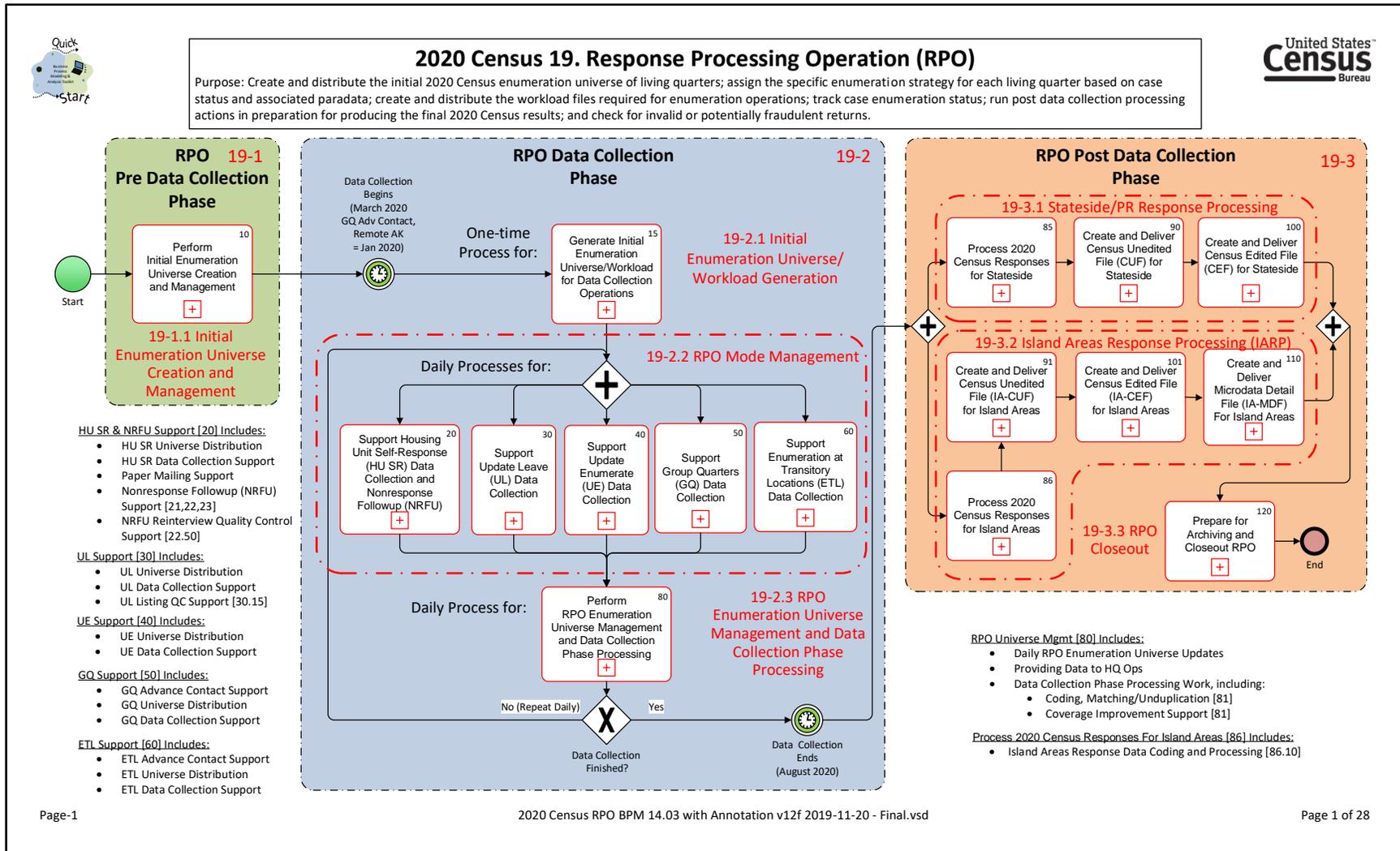


Figure 1: RPO Operational Context Model

2.4 RPO Data Flow and Operational Influences

Figure 2 is an Integrated Operations Diagram (IOD), which describes the design concepts for the response data collection operations for the 2020 Census (stateside and Puerto Rico). This diagram assumes that the frame has been developed and address canvassing operations are complete. The diagram shows the RPO as the hub of data collection and RPO's interactions with all the other 2020 Census operations that have a role in data collection. The discussion below walks the reader through the diagram, using the circled numbers to help the reader follow the flow.

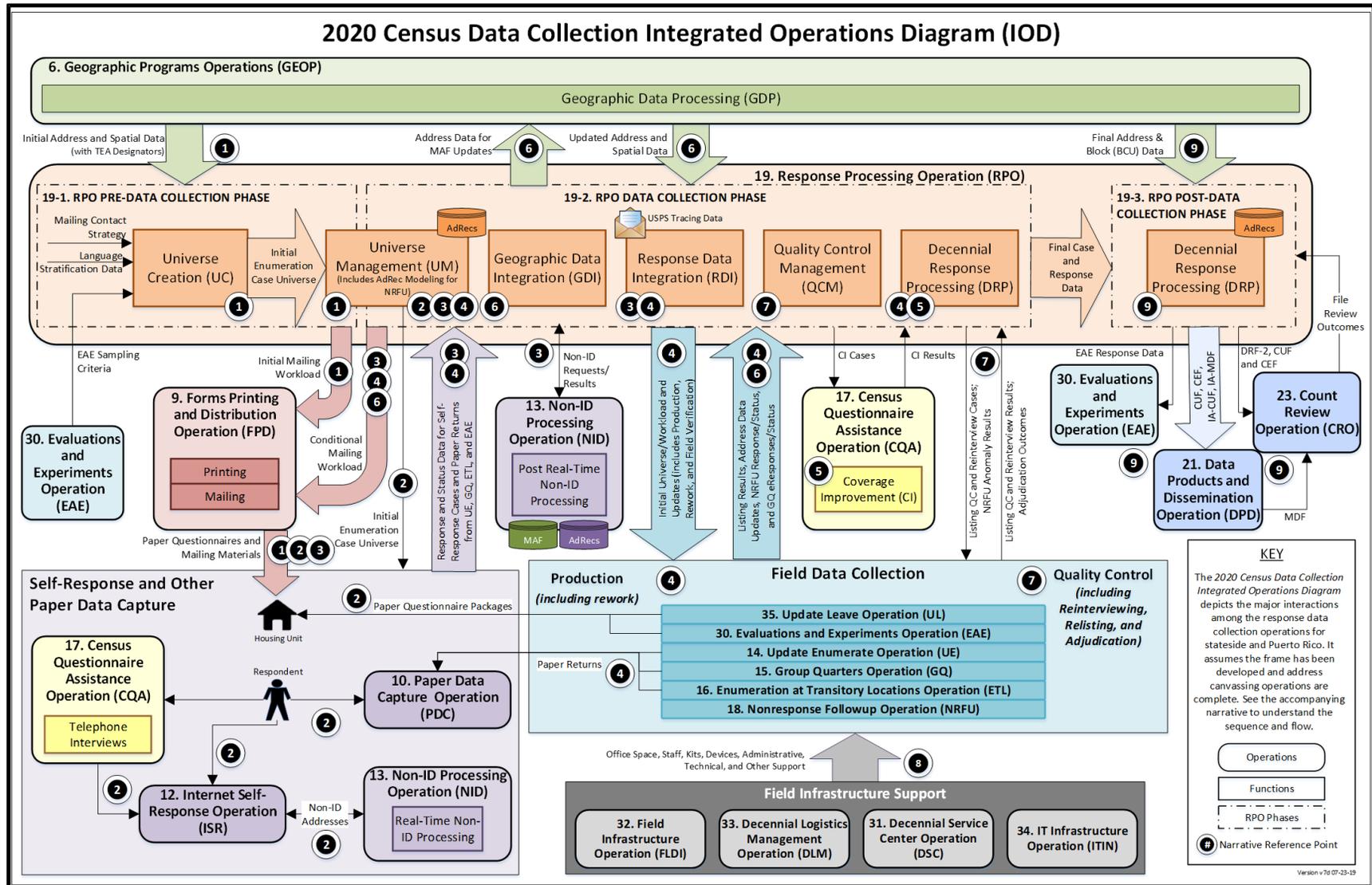


Figure 2: 2020 Census Data Collection Integrated Operations Diagram (IOD)

Pre-Data Collection

1 Before the start of data collection, the Geographic Data Processing (GDP) component of the Geographic Programs operation (GEOP) sends initial Address and Spatial Data, including the Type of Enumeration Area (TEA) designations, to RPO so it can create the Initial Enumeration Case Universe. RPO also receives the mailing contact strategy (i.e., strategy for self-response stratification) so it can identify which housing units receive which kinds of mailings, language stratification information so it knows which language to use, and experimentation stratification data so it knows which housing units are to be included in what types of experiments. The creation of the Initial Enumeration Case Universe and application of the stratification data are done as part of the RPO Universe Creation function.

Based on the stratifications, the RPO Universe Management function creates the initial mailing workload and sends it to the Forms Printing and Distribution operation (FPD), which prints and then mails the appropriate materials to mailable housing units for the Self-Response (SR) TEA. The first two of the five potential mailings for the SR TEA are sent unconditionally to all housing units in this TEA. These mailings are sent in English or English and Spanish based on the language stratification data and may include letters or—based on the self-response stratification—questionnaires.

During Data Collection

2 Once the RPO Universe Creation work is complete, the Initial Enumeration Case Universe is managed by the RPO Universe Management function, which tracks changes to the enumeration universe for future mailings and for the data collection operations.

People living in housing units are encouraged to self-respond through a partnership and communications campaign (not shown on this diagram), through mailings sent by FPD, and through paper questionnaires left at housing units as part of the Update Leave operation (UL).

To make it easy for people to respond and to reduce the paper workload, the Census Bureau is using an *Internet First* strategy for most housing units. Respondents can go to the internet and enter their response using the internet instrument as part of the Internet Self-Response operation (ISR). The internet option offers additional flexibility and allows people to respond in multiple languages. If a respondent calls the Census Questionnaire Assistance operation (CQA), a customer service representative may offer to collect the respondent's information by telephone. The information collected from these telephone interviews is entered by a customer service representative using an ISR instrument similar to the public-facing instrument used by respondents.

Respondents can also mail paper questionnaire forms. These forms are received by the Paper Data Capture operation (PDC), which uses scanning and imaging technology to capture the information from these forms.

ISR receives the Initial Enumeration Case Universe from the RPO Universe Management function and uses the Enumeration Case Universe to link responses provided through the internet instrument to the appropriate case. If respondents do not have their unique Census ID available, they are still able to complete the census questionnaire as a Non-ID response using the ISR instrument. The Non-ID Processing operation (NID) first attempts to match the address entered by the respondent or customer service representative to a known census address in real-time. For addresses that do not match, the response is still collected and is subject to later Non-ID Processing.

 Response and status data collected through the various self-response data collection operations are sent (in digital format) to RPO's Response Data Integration function. Any responses collected through PDC or ISR that are submitted in languages other than English or Spanish are translated by staff at the Tucson call center on behalf of these operations before being sent to RPO. RPO's Universe Management function uses the response status data to determine the appropriate actions for the case.

During the self-response data collection time-period, reminder mailings are sent to housing units in the SR TEA. The first reminder is sent to all housing units in the SR TEA using the initial mailing workload as discussed above. Subsequent reminders are conditional and are only sent to those housing units that have not yet responded. The RPO Universe Management function sends a Conditional Mailing Workload to the FPD operation for these nonresponding units. FPD also receives from the RPO Universe Management function a list of mailable housing units in the UL TEA and mails two reminders to these housing units.

Any remaining Non-ID cases are sent by RPO to NID for post real-time Non-ID processing, which attempts to match addresses provided by respondents to known addresses in the Master Address File (MAF) using automated and clerical procedures. As needed, administrative records (AdRecs) are used to supplement the matching process. Most of these Non-ID cases will be from internet responses that could not be matched during real-time Non-ID processing. In addition, post data capture Non-ID processing will be required for paper forms for which the Census ID could not be read during data capture. The results of post real-time Non-ID matching are sent back to RPO. Based on predefined business rules, some of the responses that are not able to be matched through NID are sent to the field for verification as part of the Nonresponse Followup operation (NRFU).



The discussion above covers self-responses for people living in housing units. Special operations also exist to collect data from people living in other types of living quarters or for whom self-response is not a viable option:

- The Group Quarters operation (GQ) enumerates people living in group quarters (e.g., dormitories, correctional facilities, and nursing/skilled-nursing facilities) as well as people experiencing homelessness and receiving services at service-based locations such as soup kitchens. GQ also enumerates people living on maritime and military vessels and living in group quarters on military bases and other military installations using specialized procedures.
- The Enumeration at Transitory Locations operation (ETL) enumerates people who are living in special locations—such as recreational vehicle parks, campgrounds, racetracks, circuses, carnivals, marinas, hotels, and motels—and who do not have a Usual Home Elsewhere.
- The Update Enumerate operation (UE) lists and enumerates housing units in areas that pose unique challenges to the standard self-response data collection operations. These housing units are in the UE and Remote Alaska TEAs, which cover remote areas of the country and other small selected areas.

NRFU is another special operation whose primary purposes are to determine the housing unit status of addresses in the SR and UL TEAs for which a self-response was not received and to enumerate those that are believed to be occupied. As mentioned in number 3 above, NRFU also performs a field verification activity to verify selected addresses for Non-ID self-responses that could not be matched to known addresses through NID.

Based on the universe case type (derived from TEA and living quarter type), RPO sends the Initial Enumeration Case Universe/Workload to the GQ, ETL, and UE operations. GQ uses this universe to perform an advance contact activity to collect general information and determine the preferred method of enumeration. ETL also performs an advance contact activity to schedule appointments for enumerating its universe of cases.

NRFU does not require advance contact activities. For NRFU, the RPO Universe Management function creates an Initial Case Universe/Workload comprising all housing units in the SR and UL TEAs for which a self-response was not received. The NRFU contact strategy is dependent on the results of an AdRec modeling activity. Four possible status outcomes result from this modeling for a given address:

- AdRec Vacant: No one lives there.

- AdRec Delete: There is no housing unit at that address.
- AdRec Occupied: There is a high probability that someone lives there and that the Census Bureau has high-quality data about that housing unit.
- AdRec No Determination: Administrative data are not sufficient to help determine the housing unit status, and a full contact strategy is required.

An initial attempt to enumerate is made for all addresses in the NRFU workload. NRFU sends to RPO information regarding the success of this and any subsequent enumeration attempts as part of the response status data.

AdRec Vacant and AdRec Delete housing units also receive an additional mailing from FPD. The RPO Universe Management function provides this AdRec mailing workload to FPD (as another type of Conditional Mailing).

RPO removes from the follow-up workload any AdRec Occupied cases that cannot be successfully resolved during the first attempt and triggers one final mailing (from FPD) to these addresses to encourage these households to self-respond. RPO also removes AdRec Vacant and AdRec Delete cases that cannot be successfully resolved during this first attempt, provided that those cases do not appear occupied and that information from the United States Postal Service (USPS) about the additional mailing indicates that the unit is either vacant or nonexistent. For all other cases, NRFU continues to attempt to enumerate the housing unit until the attempt is successful or the maximum number of attempts has been reached. Additional attempts are made for selected units during the NRFU Closeout phase based on a reassessment of the AdRec modeling results using a relaxed, lower quality threshold.

Self-responses can continue to arrive at any time during NRFU. Accordingly, RPO flags housing units in the follow-up workload for which RPO has received a self-response or tracing information from the USPS that indicates that a return is on its way to one of the paper data capture facilities. NRFU is notified about these flagged households as soon as the information is available so that it can remove the housing units from the daily workload, if possible. Any self-responses that are flagged but later found by RPO to have insufficient enumeration data are added back to the NRFU workload for continued enumeration attempts. The RPO Universe Management function tracks this information and uses it to determine what to include in the next day's follow-up workload. Housing units that have been successfully enumerated are not included in subsequent follow-up workloads.

For NRFU, field data are collected by electronic devices. The electronic data are sent to the RPO Response Data Integration function, which subsequently provides this information to the Decennial Response Processing function for further processing. Paper questionnaires are used to enumerate at living quarters during UE and at housing units during ETL. These paper

questionnaires are checked-in at area census offices (ACOs) and then sent to the paper data capture facilities, where they are scanned and imaged by PDC. PDC sends the captured data and case status information to RPO in digital format.

GQ is primarily a paper operation. Group quarter responses collected on paper questionnaires are checked-in at the ACOs and sent to PDC for scanning and imaging before being transmitted to RPO. Case status updates are sent to RPO as part of the check-in process. GQ data provided in electronic files (eResponses) require additional processing to prepare the data before they are electronically transmitted to RPO. GQ data collected on paper rosters are entered by ACO clerks into the same file format that is used for eResponses. These response data are then sent electronically to RPO.

As part of the Evaluations and Experiments operation (EAE), the Census Bureau may test different questionnaire content and data collection methodologies during the 2020 Census to help evaluate content and modes for the 2020 Census and inform design changes for the 2030 Census. Addresses that are selected to be part of these experiments are identified in the initial universe (see number 1 above). For those addresses, the EAE operation sends households questionnaires with various experimental items, packaging, etc. to assess the impact made on the response or lack thereof. Respondents receiving EAE questionnaires and notices will respond through paper questionnaires, ISR, CQA, or NRFU.

5 RPO's Decennial Response Processing function performs self-response quality assurance activities as well as coding and other preparation steps on incoming self-response data.

The RPO Universe Management function also supports a Coverage Improvement (CI) activity, the goal of which is to ensure a high-quality census by conducting telephone follow-up for households where there could be coverage issues on submitted responses. CI is a follow-up activity and is therefore considered a component of NRFU, however, the CI telephone interviews are performed by CQA. CQA receives from the RPO Universe Management function a set of cases with potential coverage issues and provides the results of these cases back to RPO's Response Data Integration function.

6 As noted above, universe and address updates occur during field operations. Census Bureau field staff may uncover changes to addresses as they perform their daily assignments in any field operation. For example, a UL or UE lister may add an address or find an error in the address or geographic data based on the listing activities, or a NRFU enumerator or a UL lister may go to an address and find an additional unit such as a garage apartment located on the premises. All listing results and other address changes are sent to the RPO Geographic Data Integration function, which passes the information on to the GDP function in GEOP.

Changes to the address list may also come from other sources such as appeals from the Local Update of Census Addresses operation (LUCA), the review of addresses performed by the Count Review Operation (CRO), and updated files from the postal service. The GDP function within GEOP updates the address data and sends these data to RPO's Universe Management Function, which provides these cases to the appropriate operation. Depending on the timing, living quarter type, and TEA designation, RPO may initiate one or more mailings to these new addresses through FPD to encourage self-response.

7 All field operations (GQ, UL, ETL, UE and NRFU) include quality control (QC) functions. For GQ, the field operational control system creates a sample of the field enumeration cases for QC by ACO staff, who conduct telephone reinterviews for this sample set of cases to confirm that a GQ enumerator visited the site and that the total population count is correct.

For UL, the RPO Quality Control Management function selects a sample set of basic collection units (BCUs) for relisting. The QC Listing Results are sent back to the RPO Quality Control Management function for further processing. RPO does not send any changes resulting from UL listing to GEOP until the lister has passed the QC check. Further, if the QC activities result in a hard fail, BCUs already worked may require relisting. RPO includes this rework in subsequent UL production workloads.

QC methods for ETL and UE are performed primarily in the field, tailored to meet the circumstances of these unique paper-based operations.

NRFU includes multiple methods for ensuring high-quality data collection. Several of these are integrated into the staff management activities. In addition, samples of field follow-up cases are selected for reinterview (RI), a process whereby the response data are collected again and compared with the original collected data. The RPO Quality Control Management function creates the RI workload and sends it to the NRFU operation. The RI cases are handled by NRFU field staff. The RI results are sent to the RPO Quality Control Management function, which performs an automated comparison of the RI data against the original data. Anomalies are sent back to NRFU, where additional research is conducted to determine how these cases should be handled. The results of this review (adjudication outcomes) are sent back to the RPO Quality Control Management function. In some cases, the adjudication requires that prior cases performed by the enumerator at fault be reworked. RPO puts these cases back into the NRFU workload as appropriate.

8 NRFU, UE, UL, ETL, and parts of the GQ operation are performed in the field. Several operations provide the support for these field data collection activities. The Field Infrastructure operation (FLDI) recruits, hires, onboards, and trains the staff needed to conduct these

operations and also operates the field offices during production. The Decennial Logistics Management operation (DLM) provides the space and logistics support (e.g., supplies and kits) for the offices and the field staff. The Decennial Service Center operation (DSC) provides technical support for field and field office staff. Finally, the IT Infrastructure operation (ITIN) provides the hardware and software used by the field staff and field offices.

Post-Data Collection



Once data collection is complete, additional processing occurs to prepare the counts for use in apportionment, and the data used by the Data Products and Dissemination operation (DPD) to create data products for redistricting and other purposes. The RPO Decennial Response Processing function handles this post-data collection processing, which includes multiple activities:

- Supplementing response data with administrative records for those cases that had been identified as AdRec Occupied but for which a Nonresponse Followup attempt was unsuccessful and no subsequent self-response was received.
- Determining the final enumeration universe by reconciling or applying final address and block data from the GDP component of GEOP
- Determining the returns of record for situations where multiple responses have been received for the same housing unit.
- Performing count and status imputations.
- Performing consistency editing and characteristic allocation supplemented with administrative records data.
- Applying tabulation geography.
- Performing disclosure avoidance. (Note: This is done by RPO for Island Areas Censuses data only. Disclosure avoidance for stateside/PR data is handled by DPD.)

Similar processing occurs for responses from group quarters. Responses collected through the EAE operation may require slightly different activities.

Through these processing activities, the RPO Decennial Response Processing function creates multiple files for stateside/PR response data, including the Decennial Response File (DRF), the Census Unedited File (CUF), and the Census Edited File (CEF). RPO also creates an Island Areas CUF (IA-CUF), Island Areas CEF (IA-CEF), and Island Areas Microdata Detail Files (IA-MDF) for the Island Areas Censuses (IAC) response data. Each of these files is reviewed within the Census Bureau before the data are sent to the next stage of processing. Some of these reviews are

done as part of the CRO. The CUF, the CEF, the IA-CUF, and the IA-MDF are sent to DPD via the Census Data Lake (CDL). DPD uses these files as inputs for data products creation and also creates the stateside/PR MDFs using the CEF as input. RPO also sends data collected as part of EAE back to the EAE operation for further analysis.

2.5 RPO Operational Context

As discussed in the previous section, the RPO 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. [Figure 3](#) shows these interactions using a more formal representation known as an Integrated Definition, Level 0 (IDEF0) model. Referred to as a “Context Diagram,” an IDEF0 model 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. A Context Diagram is different from the BPMN Context Model shown in Section 2.3. The Context Diagram 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, whereas the BPMN Context Model displays the high-level activities within the operation and relationships between them.

The yellow box in the center of the IDEF0 model lists the major operational activity areas for the operation, numbered as given in the RPO Activity Tree in Appendix C. Specific Information Exchanges (IEs) 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.

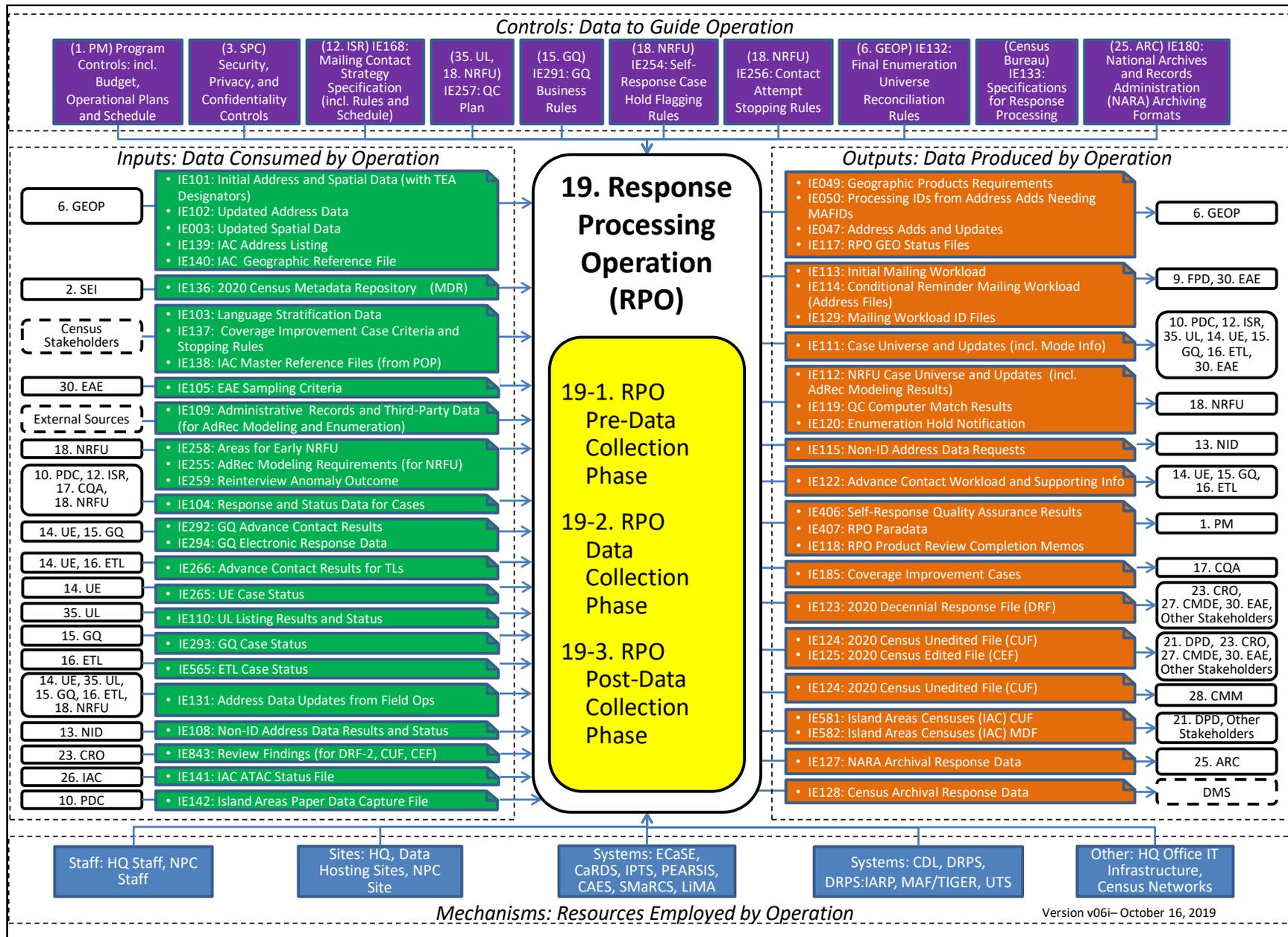


Figure 3: Response Processing Operation (RPO) Context Diagram

As discussed in Section 2.3.1, RPO is divided into three phases: RPO Pre-Data Collection Phase, RPO Data Collection Phase, and RPO Post-Data Collection Phase. For detailed descriptions of the Inputs, Controls, Outputs, and Mechanisms used by the three phases of the RPO, refer to Sections 3.2, 4.2, and 5.2.

3. RPO Pre-Data Collection Phase [RPO 19-1]

This section describes the details of how the RPO Pre-Data Collection Phase [RPO 19-1] will be conducted in the 2020 Census. An overview of the activity is presented, followed by a Context Diagram for this activity with its associated inputs, controls, outputs, and mechanisms. Each subactivity is then described in detail, using BPMN to depict the steps in the activity and the key information flows. Refer to the Activity Tree in Appendix C for a list of all of the major operational activities and subactivities associated with the RPO.

3.1 Design Overview

Figure 4 shows the BPM for the RPO Pre-Data Collection Phase [RPO 19-1] activity area (area within the gray rounded rectangle) and its constituent activities within the overall context of the RPO.

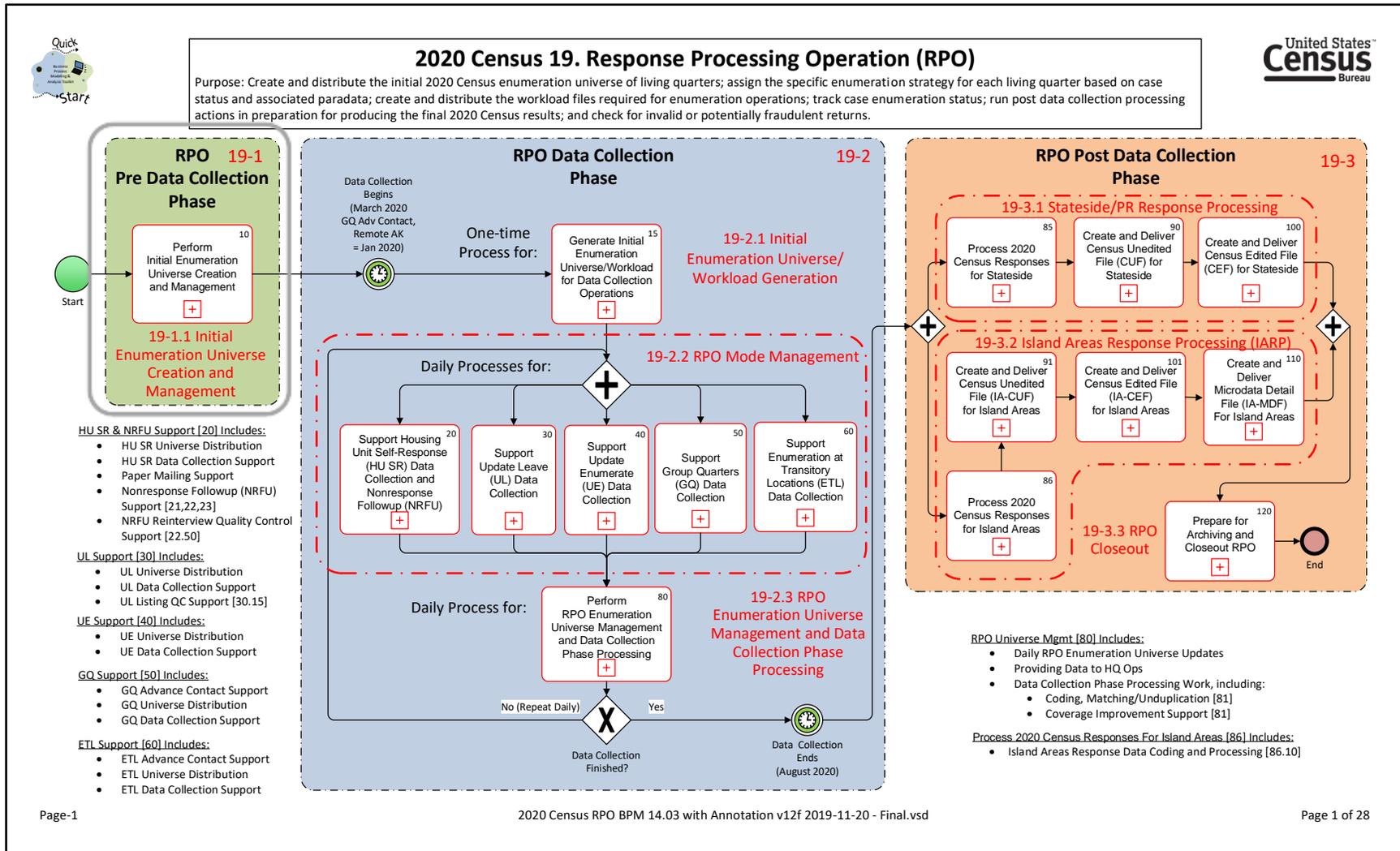


Figure 4: RPO Pre-Data Collection Phase [RPO 19-1] within Top-Level RPO Context Model

The RPO Pre-Data Collection Phase involves receiving universe inputs from the Geographic Programs operation and other sources, creating the universe, delivering it to the Universe Management Function with RPO and sending workload information to the Forms Printing and Distribution operation (FPD) for pre-data collection self-response paper mailings.

The RPO Pre-Data Collection Phase operational activity [RPO 19-1] is comprised of one activity area.

- Initial Enumeration Universe Creation and Management [RPO 19-1.1].

Subsequent sections describe this activity in more detail.

3.2 Operational Context

Figure 5 is a top-level context diagram for the RPO Pre-Data Collection Phase represented as an Integrated Definition, Level 0 (IDEF0) Model. Note that the major operational activity described above is shown in the yellow box in the center of the diagram. Also note that the Information Exchanges (IEs) internal to the RPO are identified with RPO as the prefix, e.g., RPO01.

Not all census operations begin on the same day. Different census operations each need their own version of the overall data collection universe.

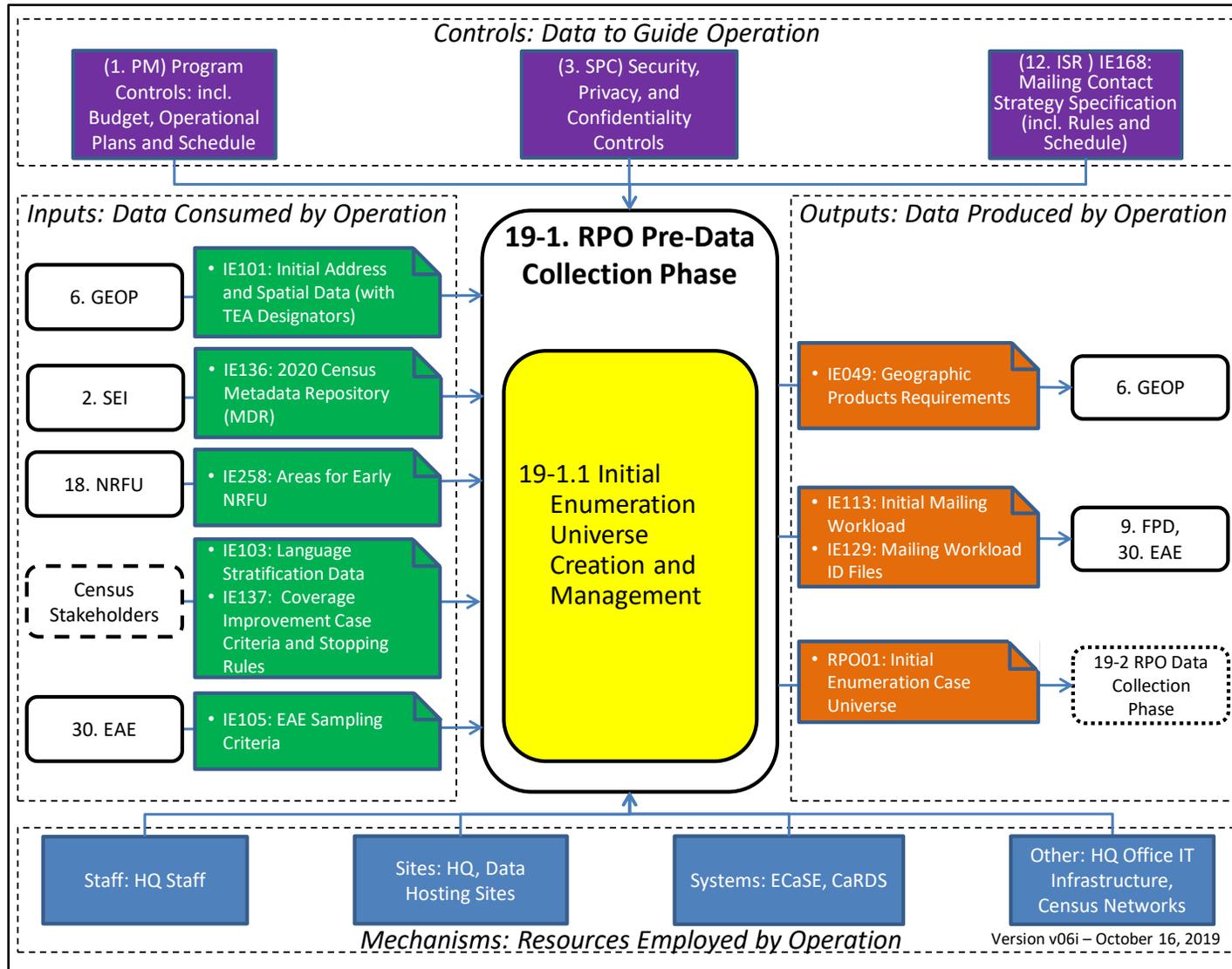


Figure 5: Context Diagram for RPO Pre-Data Collection Phase Activity

3.2.1 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 RPO Pre-Data Collection Phase.

Table 1: RPO Pre-Data Collection Phase Inputs

Provider	Information Exchange	Description
6. Geographic Programs operation (GEOP)	IE101: Initial Address and Spatial Data (with TEA Designators)	Address and spatial data from MAF/TIGER. GEOP defines the initial geography of where counting will be done. For the decennial census, this geography covers all living quarters (LQs) within the boundaries of the United States and Puerto Rico. GEOP provides RPO with addresses, spatial data, Type of Enumeration Area (TEA) designators, and IDs from the MAF/TIGER system (known as MAFIDs) where known.
2. Systems Engineering and Integration operation (SEI)	IE136: 2020 Census Metadata Repository (MDR)	The 2020 Census Metadata Repository (MDR) contains information used by RPO to perform a Subject Matter Expert test of response instrument outputs during the Pre-Data Collection Phase.
18. Nonresponse Followup operation (NRFU)	IE258: Areas for Early NRFU	Areas such as those with high concentrations of off-campus college housing where NRFU must be performed early because the residents are unlikely to be there during the standard NRFU timeframe. Rather than waiting until May to start trying to collect from areas with high proportions of off-campus student residents, NRFU instead has an Early NRFU operation in early April to try to collect responses while schools are

Provider	Information Exchange	Description
		still in session. NRFU provides the data, and at the start of Early NRFU, receives a data collection universe containing just those targeted LQs where the residents are unlikely to be available later.
Census Stakeholders	IE103: Language Stratification Data	Language data for stratifying the universe based on the need for bilingual English and Spanish forms. Census stakeholders analyze language and population data to determine where bilingual forms are appropriate for the population.
Census Stakeholders	IE137: Coverage Improvement Case Criteria and Stopping Rules	Case criteria and stopping rules used to determine Coverage Improvement (CI) workload and control the CI data collection process.
30. Evaluations and Experiments operation (EAE)	IE105: EAE Sampling Criteria	Criteria to be used for allocating data collection cases within the 2020 Census universe based on Census Experimental Program requirements. EAE designs and performs experiments and evaluations during the 2020 Census as the first step in planning for the 2030 Census. A sample of living quarters will be selected for each of the experiments and evaluations as needed.

3.2.2 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 RPO Pre-Data Collection Phase.

Table 2: RPO Pre-Data Collection Phase Controls

Provider	Information Exchange	Description
1. Program Management operation (PM)	Program Controls	<p>Program control information including:</p> <ul style="list-style-type: none"> • Budget. • Operational plans and schedule.
3. Security, Privacy, and Confidentiality operation (SPC)	Security, Privacy, and Confidentiality Controls	<p>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.</p>
12. Internet Self-Response operation (ISR)	IE168: Mailing Contact Strategy Specification (incl. Rules and Schedule)	<p>Business rules that define the sequence and timing of materials to be mailed to housing units inviting and reminding people to respond. The contact strategy rules are designed to encourage self-response through the internet.</p> <p>These rules also apply to additional mailings sent to nonresponding housing units based on administrative records modeling.</p> <p>During pre-data collection, these rules are used by RPO to create the initial mailing workload for Self-Response and Update Leave (UL) TEAs.</p> <p>ISR provides RPO with specifications to assign mailing contact strategies. Different populations can respond in different ways to the same mailing. For example, a</p>

Provider	Information Exchange	Description
		mailing encouraging a respondent to use the internet may not work well for a population with low internet usage. RPO uses these strategies when creating the initial data collection universes for Self-Response and UL TEAs.

3.2.3 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 RPO Pre-Data Collection Phase.

Table 3: RPO Pre-Data Collection Phase Outputs

Consumer	Information Exchange	Description
6. Geographic Programs operation (GEOP)	IE049: Geographic Products Requirements	Requirements for the Geographic Products that will be needed to support RPO activities including the Universe Creation, Universe Management and Decennial Response Processing functions.
9. Forms Printing and Distribution operation (FPD) 30. Evaluations and Experiments operation (EAE)	IE113: Initial Mailing Workload	The set of addresses that are to be mailed 2020 Census materials before the start of data collection. This includes all addresses in the Self-Response Type of Enumeration Area (TEA) and all mailable addresses in the Update Leave (UL) TEA. The workload includes the timing, sequence, and type of paper material (letter, questionnaire, language, etc.) to be included in the mailing for each address.

Consumer	Information Exchange	Description
9. Forms Printing and Distribution operation (FPD) 30. Evaluations and Experiments operation (EAE)	IE129: Mailing Workload ID Files	The mailable items for the Self-Response and UL TEAs will contain case IDs (Census IDs or Document IDs) that the respondent can use for internet or telephone self-response. RPO provides these IDs to FPD and EAE for use in printing these items.
19-2 RPO Data Collection Phase	RPO01: Initial Enumeration Case Universe	The initial set of addresses for all known living quarters that are to be enumerated for the 2020 Census. Each operation receives an initial data collection universe that is appropriate to that operation.

3.2.4 Mechanisms

Mechanisms are the resources (people, places, and things) that are used to perform the operational processes. They include Staff Resources, Infrastructure Sites, Systems, and Other Technology Infrastructure.

Staff Resources

Table 4 identifies the Staff Resources employed for the RPO Pre-Data Collection Phase.

Table 4: Staff Resources Used Within RPO Pre-Data Collection Phase

Staff Resources	Description/Role
Headquarters (HQ) Staff	HQ staff who manage the RPO and coordinate activities.

Infrastructure Sites

Table 5 identifies the Infrastructure Sites employed for the RPO Pre-Data Collection Phase.

Table 5: Infrastructure Sites for RPO Pre-Data Collection Phase

Infrastructure Site	Description/Role
Headquarters (HQ)	Site for office work conducted in support of the RPO.
Data Hosting Sites	Secure facilities that are used to host 2020 Census data and perform associated data processing.

Systems and Other Technology Infrastructure

Table 6 identifies the Systems employed for the RPO Pre-Data Collection Phase.

Table 6: Systems Used Within RPO Pre-Data Collection Phase

System	Description
Enterprise Censuses and Surveys Enabling (ECaSE) Platform	Enterprise solution that supports 2020 Census operational work. For RPO, ECaSE is used to manage the universe for all enumeration operations and maintain operational workloads as data collection proceeds via ECaSE-OCS (Operational Control System).
Control and Response Data System (CaRDS)	The CaRDS system is used to create the Enumeration Universe and associated control information, which is provided to the enumeration operation via ECaSE-OCS.

Other Technology Infrastructure employed for the RPO Pre-Data Collection Phase includes:

- HQ Office IT Infrastructure for conducting RPO Pre-Data Collection Phase operational work.
- Census network connectivity for data transmission between operational systems and operational sites.

3.3 Initial Enumeration Universe Creation and Management [RPO 19-1.1]

The initial enumeration universe includes address and geographic attributes for all known living quarters within the boundaries of the United States, including Puerto Rico.

- RPO receives universe input data.
- RPO creates the initial enumeration universe of all living quarters (LQ) to be included in the frame.

Figure 6 shows the BPM for the Initial Enumeration Universe Creation and Management [RPO 19-1.1] activity area and its constituent activities.

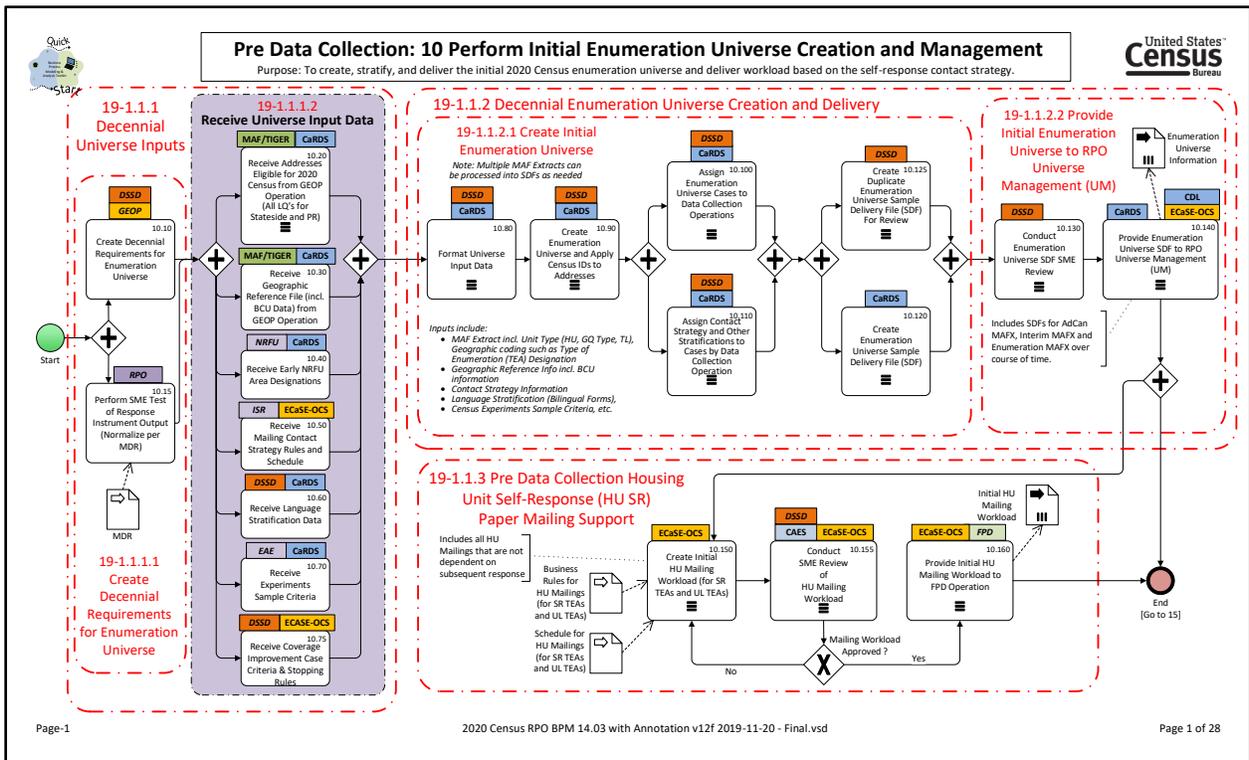


Figure 6: Initial Enumeration Universe Creation and Management [RPO 19-1.1]

The “Initial Enumeration Universe Creation and Management” operational subactivity is subdivided into the following constituent activities:

- Initial Enumeration Universe Creation and Management [RPO 19-1.1].
 - Decennial Universe Inputs [RPO 19-1.1.1].
 - Decennial Enumeration Universe Creation and Delivery [RPO 19-1.1.2].
 - Pre-Data Collection Housing Unit Self-Response (HUSR) Paper Mailing Support [RPO 19-1.1.3].

RPO supports the creation, stratification, and delivery of the initial 2020 Census enumeration universe and delivers workload based on the self-response contact strategy.

RPO receives and integrates inputs from a number of sources in order to create the initial data collection universe needed for each data collection operation.

Subsequent sections describe the “Initial Enumeration Universe Creation and Management” operational subactivities in detail.

3.3.1 Decennial Universe Inputs [RPO 19-1.1.1]

The “Decennial Universe Inputs” operational subactivity is subdivided into the following constituent activities:

- Decennial Universe Inputs [RPO 19-1.1.1].
 - Create Decennial Requirements for Enumeration Universe [RPO 19-1.1.1.1].
 - Receive Universe Input Data [RPO 19-1.1.1.2].

A detailed view of the constituent activities that make up the “Decennial Universe Inputs” operational subactivity is given in [Figure 7](#) below.

Customer requirements provided to the Geography Division (GEO) and pre-data collection specifications from the Decennial Statistical Studies Division (DSSD) staff are used as inputs to define the 2020 Census requirements.

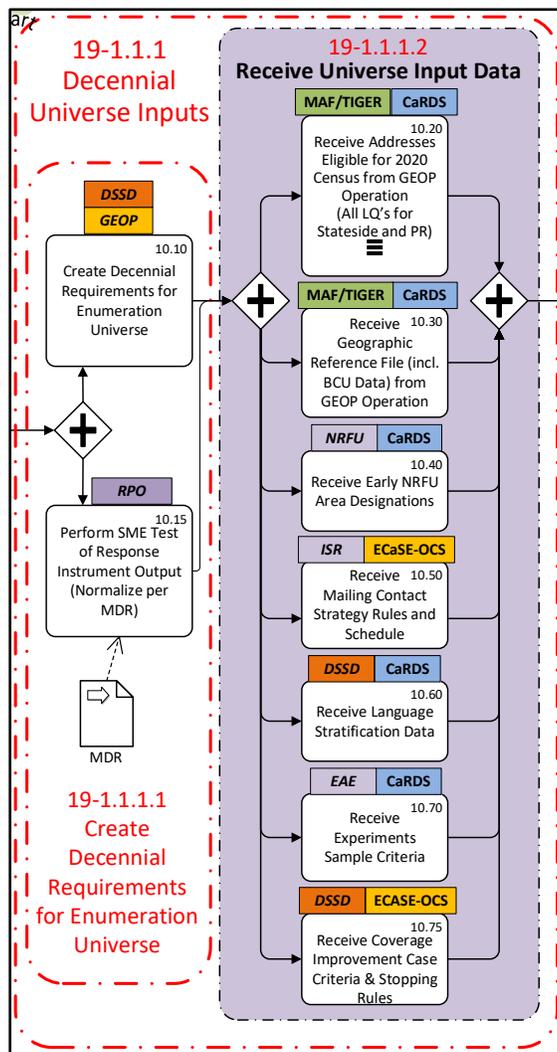


Figure 7: Decennial Universe Inputs

3.3.1.1 Create Decennial Requirements for Enumeration Universe [RPO 19-1.1.1.1]

A detailed view of the activities that make up this subactivity is given in Figure 7 above.

Decennial requirements are used to identify criteria for identifying addresses eligible for the enumeration universe. These requirements are passed to the corresponding systems for inclusion in the universe created by CaRDS.

Data are also reviewed and compared to the Metadata Registry (MDR) to ensure compliance. The MDR is the dictionary of all represented variables that are used during the 2020 Census.

3.3.1.2 Receive Universe Input Data [RPO 19-1.1.1.2]

A detailed view of the activities that make up this subactivity is given in Figure 7 above.

MAF/TIGER, NRFU, ISR, and EAE deliver inputs (e.g., address composition, extract of addresses from the MAF, contact frame supplement, experimental and evaluation program sampling ID, Census ID and processing ID structure, language stratum input file, sample, workload management and NRFU contact strategy specifications) for CaRDS to format the universe.

3.3.2 Decennial Enumeration Universe Creation and Delivery [RPO 19-1.1.2]

The “Decennial Enumeration Universe Creation and Delivery” operational subactivity is subdivided into the following constituent activities:

- Decennial Enumeration Universe Creation and Delivery [RPO 19-1.1.2].
 - Create Initial Enumeration Universe [RPO 19-1.1.2.1].
 - Provide Initial Enumeration Universe to RPO Universe Management (UM) [RPO 19-1.1.2.2].

A detailed view of the constituent activities that make up the “Decennial Enumeration Universe Creation and Delivery” operational subactivity is given in Figure 8 below.

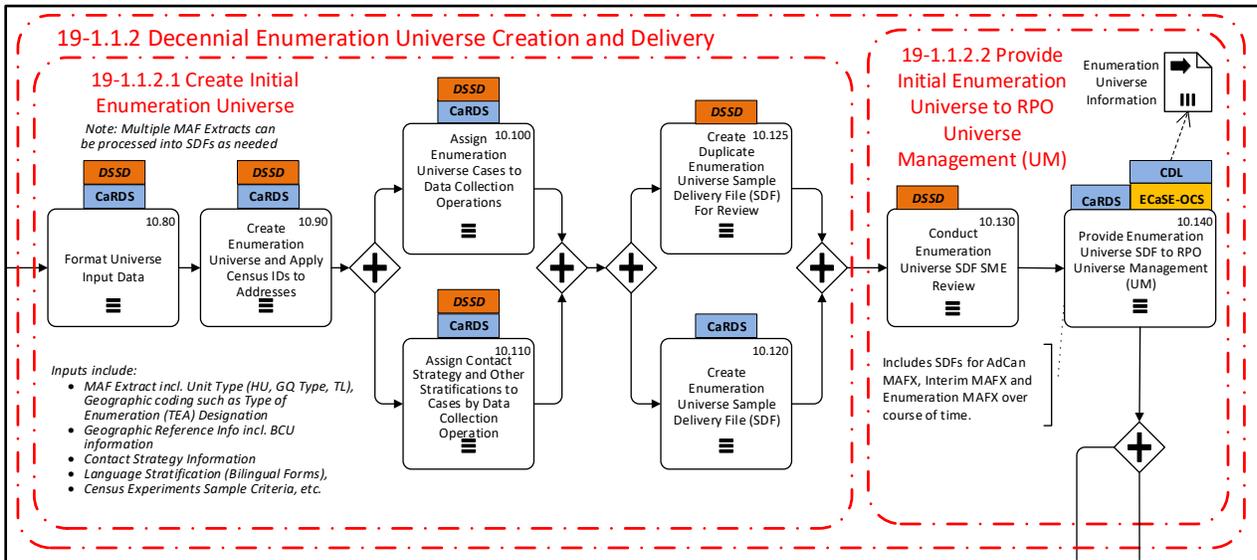


Figure 8: Decennial Enumeration Universe Creation and Delivery

3.3.2.1 Create Initial Enumeration Universe [RPO 19-1.1.2.1]

A detailed view of the activities that make up this subactivity is given in Figure 8 above.

Addresses are standardized, census IDs are applied to addresses, and enumeration cases are assigned to each data collection operation based on contact strategy to create the Sample Delivery File (SDF).

3.3.2.2 Provide Initial Enumeration Universe to RPO Universe Management (UM) [RPO 19-1.1.2.2]

A detailed view of the activities that make up this subactivity is given in [Figure 8](#) above.

RPO will conduct a Subject Matter Expert (SME) review of the SDF with DSSD. This will ensure that the requirements of the sample specification are met before delivering the SDF to the ECaSE-OCS for universe management.

3.3.3 Pre-Data Collection Housing Unit Self-Response (HU SR) Paper Mailing Support [RPO 19-1.1.3]

A detailed view of the constituent activities that make up the “Pre-Data Collection Housing Unit Self-Response (HUSR) Paper Mailing Support” operational subactivity is given in [Figure 9](#) below.

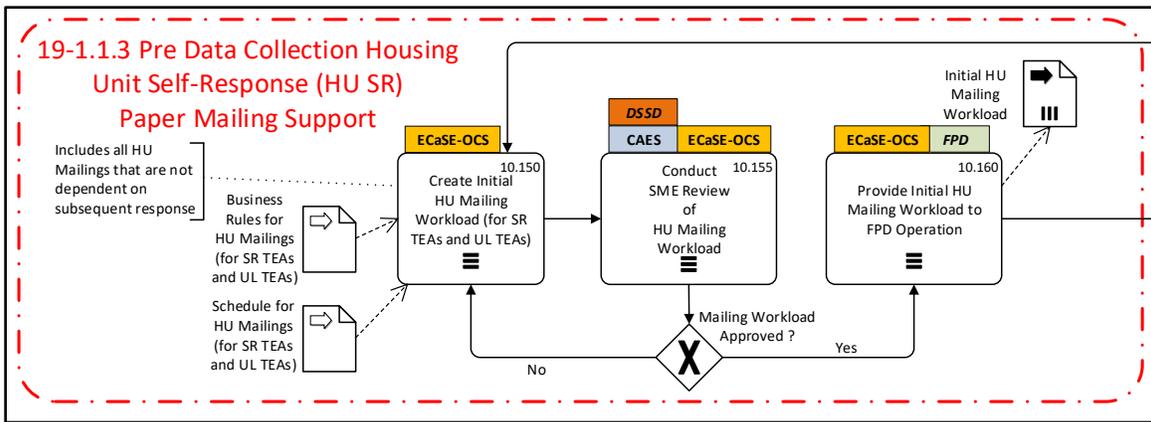


Figure 9: Pre-Data Collection Housing Unit Self-Response (HU SR) Paper Mailing Support

RPO supports optimized self-response by applying business rules and schedules to create an initial workload for FPD for mailing notifications and other supporting information to housing units.

4. RPO Data Collection Phase [RPO 19-2]

This section describes the details of how the RPO Data Collection Phase [RPO 19-2] will be conducted in the 2020 Census. An overview of the activity is presented followed by a context diagram for this activity with its associated inputs, controls, outputs, and mechanisms. Each subactivity is then described in detail, using BPMN to depict the steps in the activity and the key information flows. Refer to the Activity Tree in Appendix C for a list of all of the major operational activities and subactivities associated with the RPO operation.

4.1 Design Overview

Figure 10 shows the BPM for the RPO Data Collection Phase [RPO 19-2] activity area (area within the gray rounded rectangle) and its constituent activities within the overall context of the RPO operation.

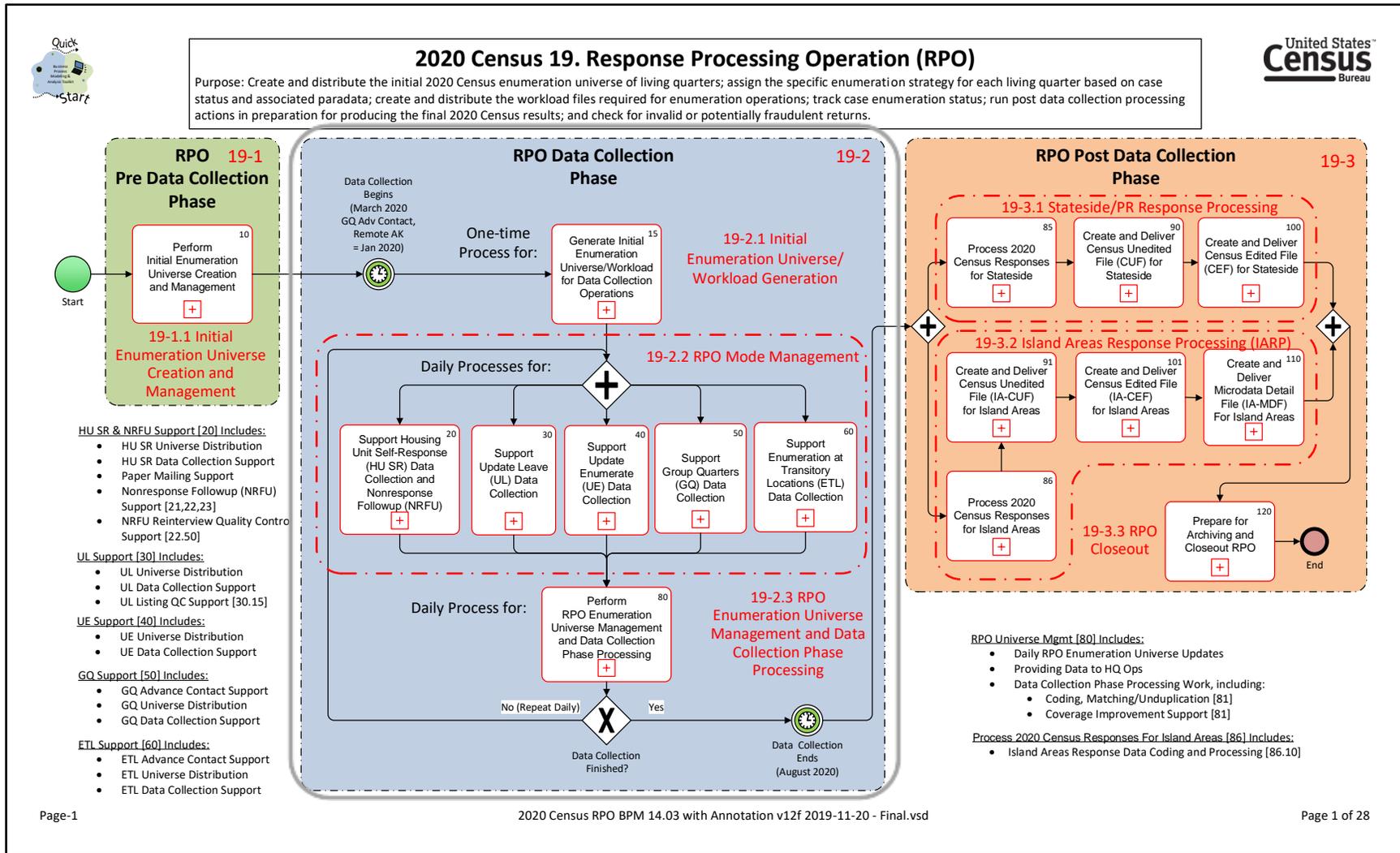


Figure 10: RPO Data Collection Phase [RPO 19-2] Within Top-Level RPO Context Model

The RPO Data Collection Phase is the second and central phase within RPO. This phase concentrates on collecting data (hereafter called response data) from people who respond (hereafter called respondents) to decennial census questionnaires. RPO treats all response data equally regardless of what mode (internet self-response, phone interview, mailing in a filled paper questionnaire, in-person interview) the respondent has chosen to use.

During the first phase of RPO operations, a universe of cases needing enumeration (hereafter called initial enumeration universe or just the universe) was created. In the Data Collection Phase, this universe will now be used daily by five major data collection operational areas:

- HU Self-Response data collection operations including NRFU operation shown on BPM 20.
- UL operation shown on BPM 30.
- UE operation shown on BPM 40.
- GQ operation shown on BPM 50.
- ETL operation shown on BPM 60.

Some operations may begin or end on an earlier date than other operations. Each operation's schedule is tightly managed and coordinated with the schedules of other operations for efficiency.

During data collection, each of the five operations operates on a daily cadence. The general daily cadence pattern for all five data collection operations is:

- At start of each operation and, as applicable, at the start of each of day, the operation receives a workload of cases specific to just that operation. For example, the GQ operation would only receive cases where each LQ address is for a group quarter.
- The operation distributes cases in its workload to its workforce of enumerators. For operations with daily updates, enumerators who work in the field that day will receive a new set of cases as part of their data collection work.
- During the day, the operation's enumerators work on cases and attempt to collect response data.
- At end of day, the operation passes accumulated data back to RPO to help manage the next day's workload. The data that each operation sends back to RPO include:
 - Response data collected by the operation's enumerators.
 - LQ type changes.

- Dangerous address data (threats to enumerators, large animals, etc.).
- At end of day, RPO collects the data returned by each operation and performs a variety of processing steps on it. If a LQ was determined to need a type change (e.g. a former group quarter has now been changed into a collection of individual apartments), then the case may be moved from one operation's workload to another operation's workload.
- Before morning, RPO distributes to each operation a new workload, as applicable, and the daily cadence starts over.

During the Data Collection Phase, RPO's goals are:

- Give each operation the workload it needs initially and, as applicable, for the coming day.
- Collect and process nightly status and response data coming from each operation.
- Manage the entire enumeration universe, track each case, and ensure that all possible cases are enumerated within the prescribed timeframe.

During the Data Collection Phase, each operation's goal is to work daily to reduce the number of uncompleted cases remaining in the universe. A successful operation would have few remaining uncompleted cases in the universe at the end of data collection.

The RPO Data Collection Phase operational activity [RPO 19-2] is subdivided into the following subactivities:

- Initial Enumeration Universe/Workload Generation [RPO 19-2.1].
- RPO Mode Management [RPO 19-2.2].
 - Support Housing Unit Self-Response (HUSR) Data Collection and Nonresponse Followup (NRFU) [RPO 19-2.2.1].
 - Support Update Leave (UL) Data Collection [RPO 19-2.2.2].
 - Support Update Enumerate (UE) Data Collection [RPO 19-2.2.3].
 - Support Group Quarters (GQ) Data Collection [RPO 19-2.2.4].
 - Support Enumeration at Transitory Locations (ETL) Data Collection [RPO 19-2.2.5].
- RPO Enumeration Universe Management and Data Collection Phase Processing [RPO 19-2.3].

Subsequent sections describe the "RPO Data Collection Phase" operational activities in detail.

4.2 Operational Context

Figure 11 is a top-level context diagram for the RPO Data Collection Phase represented as an Integrated Definition, Level 0 (IDEF0) model. Note that the major operational activities described above are listed in the yellow box in the center of the diagram. Also note that the Information Exchanges internal to the RPO operation are identified with RPO as the prefix, (e.g., RPO01).

During the Data Collection Phase, RPO prepares specific data collection universes for operations including mailings to elicit self-response and workloads for CI, NRFU, Field Verification (FV), and other field operations work as applicable. RPO creates and delivers the specific initial data collection universe to each operation according to that operation's schedule and daily updates, as applicable, for specific operations as needed.

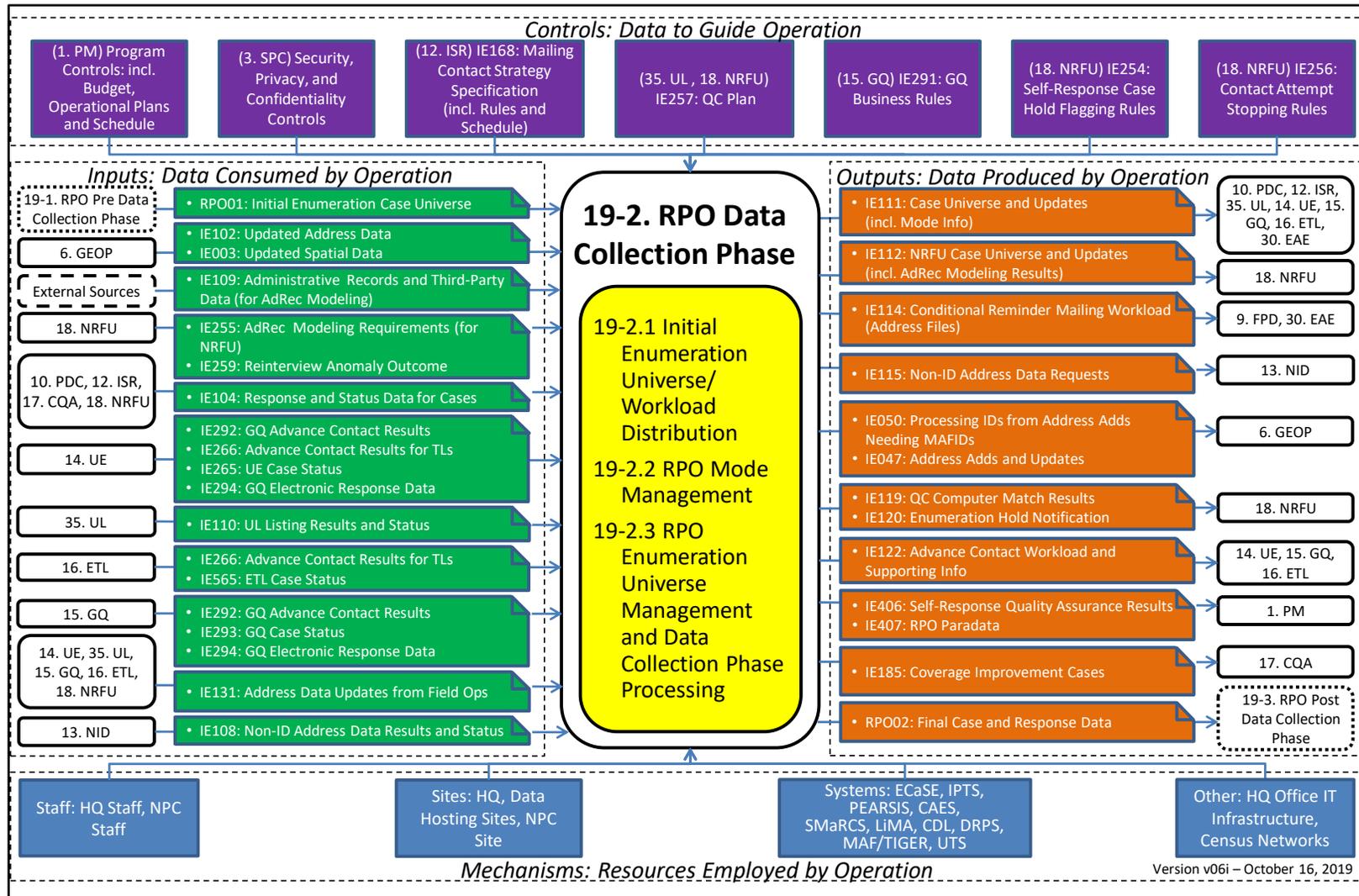


Figure 11: Context Diagram for RPO Data Collection Phase Activity

4.2.1 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 7 lists the inputs to the RPO Data Collection Phase.

Table 7: RPO Data Collection Phase Inputs

Provider	Information Exchange	Description
19-1 RPO Pre-Data Collection Phase	RPO01: Initial Enumeration Case Universe	The initial set of addresses for all known living quarters that are to be enumerated for the 2020 Census.
6. Geographic Programs operation (GEOP)	<ul style="list-style-type: none"> • IE102: Updated Address Data • IE003: Updated Spatial Data 	Updates to Address and Spatial data from MAF/TIGER are received by RPO at specific points during the Data Collection Phase.
External Sources	IE109: Administrative Records and Third-Party Data (for AdRec Modeling)	Data from administrative records from other government sources or third-party data from commercial sources that are used by the Administrative Records modeling function to determine the occupied status of a living quarter (Occupied, Vacant, Delete, or Undetermined) and to determine the best time of day to contact the household to improve the likelihood of a successful contact attempt.
18. Nonresponse Followup operation (NRFU)	IE255: AdRec Modeling Requirements (for NRFU)	Requirements for performing the administrative record modeling to be applied to the NRFU follow-up universes. These requirements include the administrative record sources and modeling methodology.

Provider	Information Exchange	Description
18. Nonresponse Followup operation (NRFU)	IE259: Reinterview Anomaly Outcome	Results of the clerical and field staff reviews of reinterviews where the automated comparison indicated anomalies between the reinterview response and the production response. The outcome indicates whether or not the analysis resulted in a hard fail that requires the stoppage of all pending work for the enumerator in question and possible rework of previous cases.
10. Paper Data Capture operation (PDC) 12. Internet Self-Response operation (ISR) 17. Census Questionnaire Assistance operation (CQA) 18. Nonresponse Followup operation (NRFU)	IE104: Response and Status Data for Cases	Response data and associated status information that result from enumeration of cases in the 2020 Census Enumeration Case Universe. For PDC, the response data are captured from paper questionnaires that have been scanned and imaged. Examples of PDC status data include: Forms Checked in through iCADE, and Data Delivered. For ISR, the response data are captured online. Examples of ISR status data include complete, partially complete, and blank. In addition to online self-response, telephone self-responses collected by CQA customer service representatives are captured within the ISR operation. For CQA, the response data are captured during Coverage Improvement telephone interviews. Examples of CQA Status data include respondent not contacted and interview completed.

Provider	Information Exchange	Description
		For NRFU, the response data are captured through interviews conducted by the enumerators. This includes production and rework cases as well as data collected from reinterviews conducted in the field. Examples of case status information for NRFU include: Not Attempted, Attempted, Completed with Household, Completed with Proxy, Vacant, and Delete.
14. Update Enumerate operation (UE)	IE292: GQ Advance Contact Results	Information gathered during advance contact that is required by RPO to process Group Quarters (GQ) cases. UE performs group quarters data collection only in TEA 4, which covers Remote Alaska.
14. Update Enumerate operation (UE)	IE266: Advance Contact Results for TLs	Information gathered during advance contact that is required by RPO to process Transitory Location (TL) cases. UE performs TL data collection only in TEA 4, which covers Remote Alaska.
14. Update Enumerate operation (UE)	IE265: UE Case Status	Status information that result from enumeration of UE cases in the 2020 Census Enumeration Case Universe.
14. Update Enumerate operation (UE)	IE294: GQ Electronic Response Data	Data results from group quarter cases provided through electronic files or paper files keyed in by the GQ Enumeration. This information exchange does not include any GQ responses

Provider	Information Exchange	Description
		<p>collected on paper forms that are processed by PDC.</p> <p>UE performs group quarters data collection only in TEA 4, which covers Remote Alaska.</p>
35. Update Leave operation (UL)	IE110: UL Listing Results and Status	Listing results for all housing units included in UL TEAs. This includes production and relisting cases as well as data collected during Production Listing and Listing QC. Listing results are provided at the BCU level.
16. Enumeration at Transitory Locations operation (ETL)	IE266: Advance Contact Results for TLs	Information gathered during advance contact that is required by RPO to process TL cases.
16. Enumeration at Transitory Locations operation (ETL)	IE565: ETL Case Status	Status information that results from enumeration of TL cases in the 2020 Census Enumeration Case Universe.
15. Group Quarters operation (GQ)	IE292: GQ Advance Contact Results	Information gathered during advance contact that is required by RPO to process GQ cases.
15. Group Quarters operation (GQ)	IE293: GQ Case Status	Status information that results from enumeration of GQ cases in the 2020 Census Enumeration Case Universe.
15. Group Quarters operation (GQ)	IE294: GQ Electronic Response Data	Data results from group quarter cases provided through electronic files or paper files keyed in by the GQE operation. This information exchange does not include any GQ responses

Provider	Information Exchange	Description
		collected on paper forms that are processed by PDC.
14. Update Enumerate operation (UE) 35. Update Leave operation (UL) 15. Group Quarters operation (GQ) 16. Enumeration at Transitory Locations operation (ETL) 18. Nonresponse Followup operation (NRFU)	IE131: Address Data Updates from Field Ops	Address data updates provided by the field operations. This could include newly identified addresses for hidden units, in-movers, or respondents with a Usual Home Elsewhere, deletes when an address listed in the MAF is determined to no longer exist, and changes in living quarter type (e.g., housing unit to group quarter). RPO provides these data updates to GEOP as part of the Address Update (ADDUP) process.
13. Non-ID Processing operation (NID)	IE108: Non-ID Address Data Results and Status	Non-ID matching and geocoding results from post real-time Non-ID processing.

4.2.2 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 8 lists the controls for the RPO Data Collection Phase.

Table 8: RPO Data Collection Phase Controls

Provider	Information Exchange	Description
1. Program Management operation (PM)	Program Controls	Program Control information including: <ul style="list-style-type: none"> Budget.

Provider	Information Exchange	Description
		<ul style="list-style-type: none"> Operational Plans and Schedule.
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.
12. Internet Self-Response operation (ISR)	IE168: Mailing Contact Strategy Specification (incl. Rules and Schedule)	<p>Business rules that define the sequence and timing of materials to be mailed to housing units inviting and reminding people to respond. The contact strategy rules are designed to encourage self-response online.</p> <p>These rules also apply to additional mailings sent to nonresponding housing units based on administrative records modeling.</p> <p>During data collection, these rules are used by RPO to create the conditional mailing workload for the Self-Response and UL TEAs based on response status and housing unit status.</p>
35. Update Leave operation (UL) 18. Nonresponse Followup operation (NRFU)	IE257: QC Plan	<p>Plans for conducting Field Data Collection quality control.</p> <p>For UL, this includes the rules for selecting the UL Listing QC sample and</p>

Provider	Information Exchange	Description
		<p>for generating the UL Listing QC workload.</p> <p>For NRFU, this includes sample selection methodologies and rates for reinterviews of original cases, thresholds for automated detection of reinterview anomalies, and procedures for comparing and resolving reinterview cases and determining required rework.</p>
<p>15. Group Quarters operation (GQ)</p>	<p>IE291: GQ Business Rules</p>	<p>Rules that provide guidance on how GQ cases should be processed for production and quality control purposes.</p>
<p>18. Nonresponse Followup operation (NRFU)</p>	<p>IE254: Self-Response Case Hold Flagging Rules</p>	<p>Rules for determining which cases to temporarily withhold from the NRFU field follow-up workload pending receipt of sufficient self-responses for those cases.</p> <p>For example, postal tracking data indicate paper responses will be arriving for cases in the NRFU follow-up workload.</p>
<p>18. Nonresponse Followup operation (NRFU)</p>	<p>IE256: Contact Attempt Stopping Rules</p>	<p>The number of attempts required before a case should be removed from the follow-up workload. The number of attempts will vary depending on the results of the AdRec Modeling.</p>

4.2.3 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 9 lists the outputs from the RPO Data Collection Phase.

Table 9: RPO Data Collection Phase Outputs

Consumer	Information Exchange	Description
10. Paper Data Capture operation (PDC) 12. Internet Self-Response operation (ISR) 35. Update Leave operation (UL) 14. Update Enumerate operation (UE) 15. Group Quarters operation (GQ) 16. Enumeration at Transitory Locations operation (ETL) 30. Evaluations and Experiments operation (EAE)	IE111: Case Universe and Updates (including Mode Info)	The set of cases (i.e., living quarters) to be enumerated and the expected response mode (internet, paper, update/enumerate) for each case. For PDC and ISR, this includes the entire self-response universe. For UL, this includes the listing workload for the UL TEA. For UE, this also includes the listing workload and only covers cases in the UE and Remote Alaska TEAs. For GQ and ETL, this only includes cases for the corresponding living quarter type. For EAE, this includes cases from the self-response universe designated for experimental treatment.
18. Nonresponse Followup operation (NRFU)	IE112: NRFU Case Universe and Updates (including AdRec Modeling Results)	The set of NRFU cases (i.e., housing units) to be enumerated and the parameters associated with those cases

Consumer	Information Exchange	Description
		<p>(e.g., AdRec modeling results, maximum number of contacts).</p> <p>The initial NRFU Case Universe is provided when the NRFU operation begins. The NRFU Case Universe supports both Early NRFU and Production NRFU data collection. Updates to the universe are sent on a regular (e.g., daily) basis to reflect changes in case status (e.g., self-response and address changes).</p> <p>The NRFU case universe also includes cases selected for QC reinterview and field verification cases.</p>
<p>9. Forms Printing and Distribution operation (FPD)</p> <p>30. Evaluations and Experiments operation (EAE)</p>	<p>IE114: Conditional Reminder Mailing Workload (Address Files)</p>	<p>The set of nonresponding addresses in the Self-Response and UL TEAs that are to be mailed reminders and other materials during data collection. The workload includes the timing, sequence, and type of paper material (letter, questionnaire, language, etc.) to be included in the mailing for each address.</p> <p>Conditional Reminder Mailings include: Self-Response Reminder Workload for Self-Response (SR) and UL TEAs, AdRec (Administrative Records) Occupied Removals, and AdRec Vacant/Delete Removals.</p>

Consumer	Information Exchange	Description
13. Non-ID operation (NID)	IE115: Non-ID Address Data Requests	Non-ID addresses from Response Processing that need resolution of their Census ID.
6. Geographic Programs operation (GEOP)	IE050: Processing IDs from Address Adds Needing MAFIDs	<p>RPO uses processing IDs for Response Data collected from addresses newly added during the field data collection operations.</p> <p>These processing IDs will need to be assigned with the corresponding new MAFIDs when RPO receives the updated address data from GEOP for the new addresses.</p>
6. Geographic Programs operation (GEOP)	IE047: Address Adds and Updates	Updated address data from field operations to be used for MAF Updates.
18. Nonresponse Followup operation (NRFU)	IE119: QC Computer Match Results	Differences found by the Sampling, Matching, Review, and Coding System (SMaRCS) during an automated comparison of response data collected for reinterview cases with response data collected for production cases.
18. Nonresponse Followup operation (NRFU)	IE120: Enumeration Hold Notification	<p>Notification that a self-response has been received or has generated postal tracking data and therefore should be temporarily withheld from the NRFU field follow-up workload (i.e., the field staff's daily assignments).</p> <p>This notification is sent to the field operation as soon as RPO receives the self-response indication. If the self-</p>

Consumer	Information Exchange	Description
		response is later found to be insufficient, it will be added back into the follow-up workload at that time.
<p>14. Update Enumerate operation (UE)</p> <p>15. Group Quarters operation (GQ)</p> <p>16. Enumeration at Transitory Locations operation (ETL)</p>	IE122: Advance Contact Workload and Supporting Info	Advance Contact workload and supporting information for UE (for Remote Alaska GQs and TLs), GQ, and ETL used to verify and update the contact information that was collected during the In-Office Address Canvassing.
1. Program Management operation (PM)	IE406: Self-Response Quality Assurance Results	Results and paradata on self-response quality assurance activities.
1. Program Management operation (PM)	IE407: RPO Paradata	Status and progress data related to RPO data collection activities.
17. Census Questionnaire Assistance operation (CQA)	IE185: Coverage Improvement Cases	<p>Requests for follow-up outbound calls for specific Coverage Improvement cases as identified in the Response Processing Operation based on quality follow-up criteria.</p> <p>These requests include case identification information, contact information, previous response data, and all other data needed by the CQA CSR to conduct the outbound call.</p>

Consumer	Information Exchange	Description
19-3. RPO Post-Data Collection Phase	RPO02: Final Case and Response Data	The final set of cases and corresponding response data that have been through preliminary data processing (e.g., matching, unduplication, coverage improvement (CI), and coding)

4.2.4 Mechanisms

Mechanisms are the resources (people, places, and things) that are used to perform the operational processes. They include Staff Resources, Infrastructure Sites, Systems, and Other Technology Infrastructure.

Staff Resources

Table 10 identifies the Staff Resources employed for the RPO Data Collection Phase.

Table 10: Staff Resources Used Within RPO Data Collection Phase

Staff Resources	Description/Role
Headquarters (HQ) Staff	HQ staff who manage the RPO and coordinate activities.
National Processing Center (NPC) Staff	Staff at the NPC who support clerical data processing activities (e.g., coding) that occur during the RPO Data Collection Phase.

Infrastructure Sites

Table 11 identifies the Infrastructure Sites employed for the RPO Data Collection Phase.

Table 11: Infrastructure Sites for RPO Data Collection Phase

Infrastructure Site	Description/Role
HQ	HQ site for office work conducted in support of the RPO.

Infrastructure Site	Description/Role
Data Hosting Sites	Secure facilities that are used to host 2020 Census data and perform associated data processing.
NPC Site	NPC is located in Jeffersonville, Indiana.

Systems and Other Technology Infrastructure

Table 12 identifies the Systems employed for the RPO Data Collection Phase.

Table 12: Systems Used Within RPO Data Collection Phase

System	Description
Enterprise Censuses and Surveys Enabling (ECaSE) Platform	Enterprise solution that supports 2020 Census operational work. For RPO, ECaSE is used to manage the universe for all enumeration operations and maintain operational workloads as data collection proceeds (ECaSE-OCS).
Intelligent Mail Barcode (IMb) Confirm Service® Postal Tracking System (IPTS)	IPTS is a mail tracking system developed by the Census Bureau / USPS to trace individual mail pieces through USPS. Received mail is scanned at the postal center, and receipt information is sent to the Census Bureau before opening and scanning within the PDC operation.
Production Environment for Administrative Records Staging, Integration and Storage (PEARSIS)	A system to manage administrative records and provide services associated with those records.
Concurrent Analysis and Estimation System (CAES)	An enterprise modeling platform that stores data and uses it to execute statistical models in support of survey flow processing, analysis, and control.

System	Description
Sampling, Matching, Review, and Coding System (SMaRCS)	<p>An application supporting quality control (QC) for field operations during the 2020 Census Research and Testing program and the 2020 Census. SMaRCS specifically supports QC activities designed to determine whether field listers and enumerators are using validated procedures and collecting accurate data. SMaRCS facilitates QC activities by providing a mechanism for selecting quality control samples, validating production interview data against administrative records sources, and by providing a tool for clerical matching to compare the production interview data against Reinterview (RI) data. SMaRCS also serves as a major control component for QC activities by managing the selection of quality control samples for field follow-up related to 2020 Census and Coverage Measurement (or Post-Enumeration Survey) operations and tracking the progress of the RI work through the matching, field, and resolution processes.</p> <p>For RPO, SMaRCS is used to select the QC samples, conduct an automated matching of production interview data with reinterview data and track progress of the RI work. SMaRCS is also used to support Listing QC needs.</p>
Listing and Mapping Application (LiMA)	<p>A single, scalable, automated corporate instrument that enables listers and enumerators to capture and provide accurate listing and mapping updates to the MAF/TIGER System. LiMA will display an address record for each known living quarter in the assigned BCU. LiMA will also display a map of the BCUs in the surrounding area to orient the FR and allow for the collection of a MAF structure point (MSP), or “map spot.”</p>
Census Data Lake (CDL)	<p>The CDL serves as the centralized repository for decennial response data and paradata. It allows distributed processing capabilities for cost and progress reports and other downstream consumers. CDL is a flexible data</p>

System	Description
	management platform intended to provide the Census Bureau with a next-generation scaling capability to fulfill data management, storage, reporting, analytics, and security requirements while reducing costs associated with duplicative data silos.
Decennial Response Processing System (DRPS)	<p>This system processes response data from the 50 states, the District of Columbia, and Puerto Rico.</p> <p>The system:</p> <ul style="list-style-type: none"> • Provides Data Collection Phase response processing. <ul style="list-style-type: none"> ○ Stores Response Data. ○ Performs Auto Coding. ○ Performs Manual Coding. • Provides Post-Data Collection Phase response processing. <ul style="list-style-type: none"> ○ Creates 2020 Census CUF and CEF. • Interfaces to ECaSE-OCS and other external systems.
Master Address File/Topologically Integrated Geographic Encoding and Reference (MAF/TIGER)	The MAF/TIGER system provides the corporate address list, the map data, the geocoding service, and the distribution of related geographic and address products either by electronic or paper means.
Unified Tracking System (UTS)	The UTS provides reports made available to management.

Other Technology Infrastructure employed for the RPO Data Collection Phase includes:

- HQ Office IT Infrastructure for conducting RPO Data Collection Phase operational work.
- Census network connectivity for data transmission between operational systems and operational sites.

4.3 Initial Enumeration Universe/Workload Generation [RPO 19-2.1]

As shown in [Figure 10](#), the first activity in the RPO Data Collection Phase is “Initial Enumeration Universe/Workload Generation.” This operational subactivity is subdivided into the following constituent activities:

- Initial Enumeration Universe/Workload Generation [RPO 19-2.1].
 - Generate Initial Enumeration Universe Case List for HU Self-Response Operations [RPO 19-2.1.1].
 - Generate Initial UL Universe/Workload for UL Operation Control (OC) [RPO 19-2.1.2].
 - Generate Initial UE Universe/Workload for UE Operation Control (OC) [RPO 19-2.1.3].
 - Generate Initial GQ Universe/Workload for GQ Operation Control (OC) [RPO 19-2.1.4].
 - Generate Initial ETL Universe/Workload for ETL Operation Control (OC) [RPO 19-2.1.5].

A detailed view of the activities that make up the “Initial Enumeration Universe/Workload Generation” operational subactivity is given in [Figure 12](#) below.

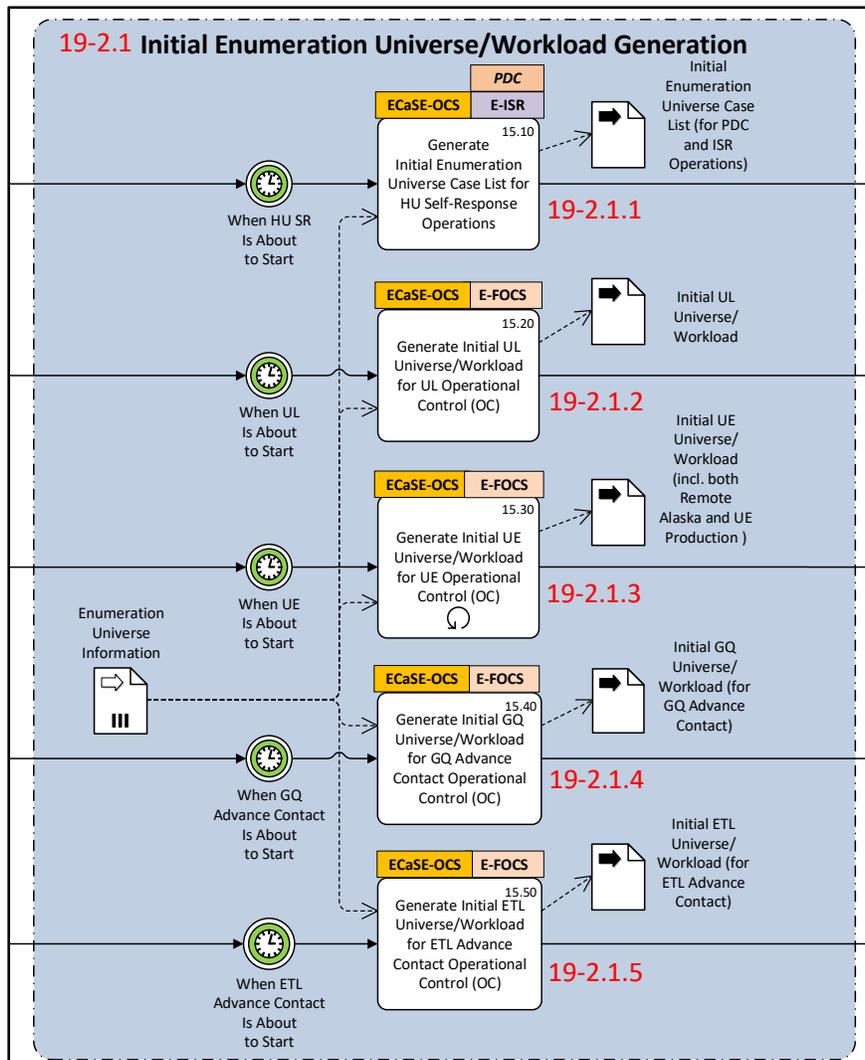


Figure 12: Initial Enumeration Universe/Workload Generation [RPO 19-2.1]

When each data collection operation is ready to start, RPO uses the enumeration universe information provided from the Pre-Data Collection Phase to generate initial enumeration universe/workload information for the operations.

Subsequent sections describe the “Initial Enumeration Universe/Workload Generation” operational subactivities in detail.

4.3.1 Generate Initial Enumeration Universe Case List for HU Self-Response Operations [RPO 19-2.1.1]

A detailed view of the activity that makes up this subactivity is given in [Figure 12](#) above.

The initial self-response enumeration universe is generated to support the Self-Response operations. This initial universe includes the PDC universe that is delivered to the iCADE System, as well as the ISR universe that is delivered to the ECaSE Internet Self-Response System.

4.3.2 Generate Initial UL Universe/Workload for UL Operation Control (OC) [RPO 19-2.1.2]

A detailed view of the activity that makes up this subactivity is given in [Figure 12](#) above.

The initial Update Leave workload is generated to support the UL operation. The workload is then delivered to the ECaSE Field Operational Control System for distribution. This initial workload includes the (UL) Production Universe (blocks and addresses).

4.3.3 Generate Initial UE Universe/Workload for UE Operation Control (OC) [RPO 19-2.1.3]

A detailed view of the activity that makes up this subactivity is given in [Figure 12](#) above.

The initial Update Enumerate workload is generated to support the operation (UE). The workload is then delivered to the ECaSE Field Operational Control System for distribution. This initial workload includes the UE Remote Alaska Universe as well as the (UE) Production Universe (blocks and addresses).

4.3.4 Generate Initial GQ Universe/Workload for GQ Operation Control (OC) [RPO 19-2.1.4]

A detailed view of the activity that makes up this subactivity is given in [Figure 12](#) above.

The initial Group Quarters enumeration workload is generated to support the GQ operation. The workload is then delivered to the ECaSE Field Operational Control System for distribution. This initial workload includes the cases specified for the GQ Advance Contact activity.

4.3.5 Generate Initial ETL Universe/Workload for ETL Operation Control (OC) [RPO 19-2.1.5]

A detailed view of the activities that make up this subactivity is given in [Figure 12](#) above.

The initial Enumeration at Transitory Locations (ETL) workload is generated to support the ETL operation. The workload is then delivered to the ECaSE Field Operational Control System for distribution. This initial workload includes the cases specified for the ETL Advance Contact activity.

4.4 Support Housing Unit Self-Response (HU SR) Data Collection and Nonresponse Followup (NRFU) [RPO 19-2.2.1]

As shown in [Figure 10](#), the second activity in the RPO Data Collection Phase is “Support Housing Unit Self-Response (HU SR) Data Collection and Nonresponse Followup (NRFU).” This activity is one of a set of operation-specific support activities collected under the “RPO Mode Management” Activity Area [RPO 19-2.2]. The RPO operational subactivity 19-2.2.1 is subdivided into the following constituent activities.

- Support Housing Unit Self-Response (HU SR) Data Collection and Nonresponse Followup (NRFU) [RPO 19-2.2.1].
 - Distribute HU SR Universe Case List Information [RPO 19-2.2.1.1].
 - Receive HU SR Status and Response Data [RPO 19-2.2.1.2].
 - Manage HU SR and NRFU Response Results [RPO 19-2.2.1.3].
 - Provide HU SR Data Collection Paper Mailing Support [RPO 19-2.2.1.4].
 - Provide Nonresponse Followup (NRFU) Support [RPO 19-2.2.1.5].

A detailed view of the constituent activities that make up the “Support Housing Unit Self-Response (HU SR) Data Collection and Nonresponse Followup (NRFU)” operational subactivity is given in [Figure 13](#) below.

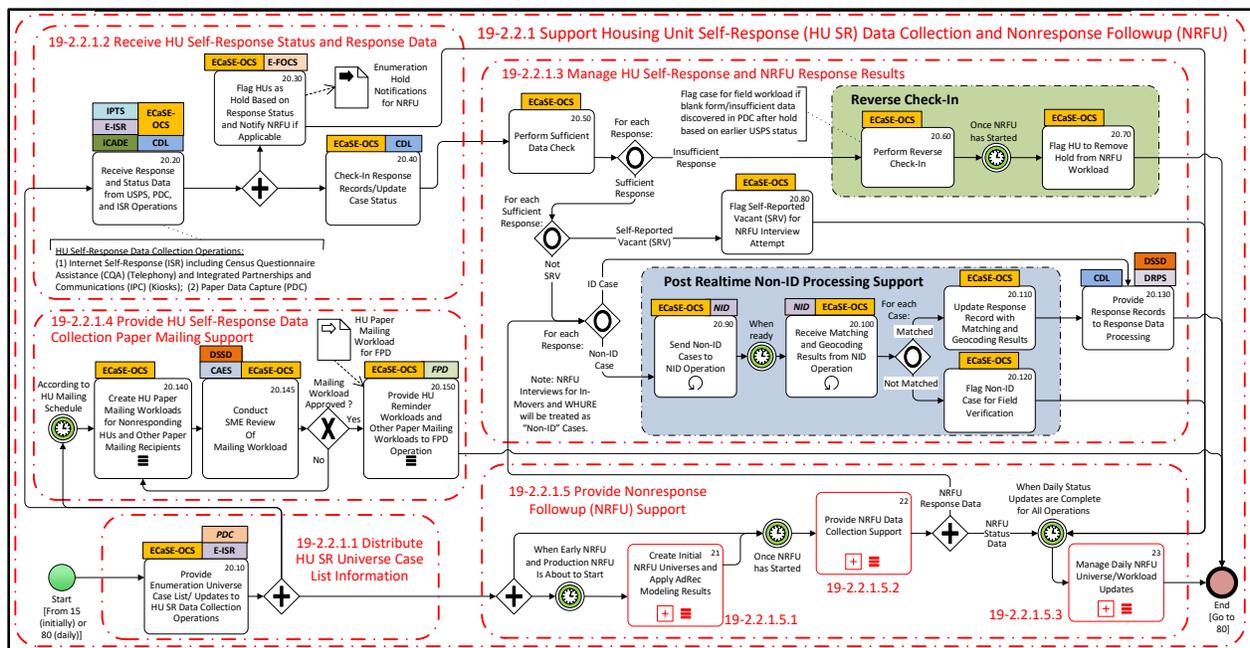


Figure 13: Support Housing Unit Self-Response (HU SR) Data Collection and Nonresponse Followup (NRFU)

RPO receives and processes data from self-response modes (internet and paper) and, based on case status, provides reminder mailing workload and field follow-up support for nonresponding HUs.

Subsequent sections describe the “Support Housing Unit Self-Response (HUSR) Data Collection and Nonresponse Followup (NRFU)” operational subactivities in detail.

4.4.1 Distribute HU SR Universe Case List Information [RPO 19-2.2.1.1]

A detailed view of the activity that makes up this subactivity is given in [Figure 14](#) below.

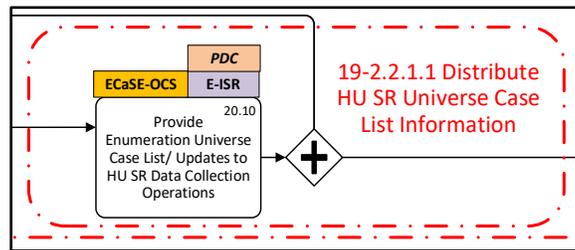


Figure 14: Distribute HU SR Universe Case List Information

As shown in the BPM above, there is one step involved in this activity:

- Provide Enumeration Universe Case List/Updates to HU SR Data Collection Operations [20.10].

ECaSE Survey OCS (SOCS) receives events from mail tracking systems (IPTS) and data collection systems (ISR and iCADE) to determine which housing units have responded and which will need Nonresponse Followup. SOCS then provides the nonresponse housing units to field operational control systems (FOCS) to perform Nonresponse Followup activities. As additional events and data are provided, such as late mail returns, SOCS updates field data collection systems so they can stop work on cases that no longer need Nonresponse Followup.

4.4.2 Receive HU Self-Response Status and Response Data [RPO 19-2.2.1.2]

A detailed view of the activities that make up this subactivity is given in [Figure 15](#) below.

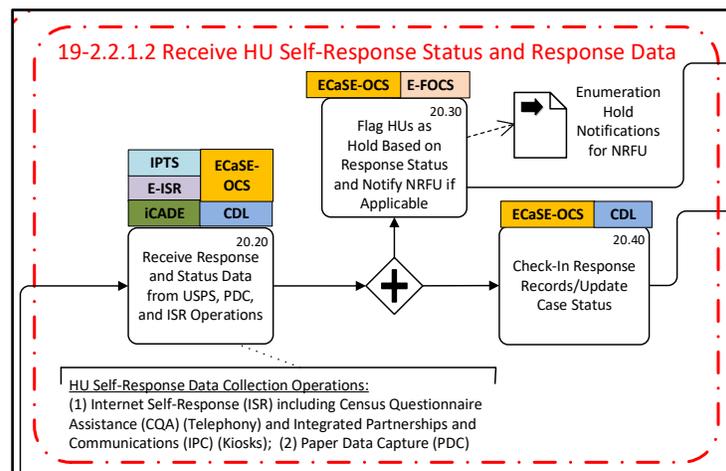


Figure 15: Receive HU Self-Response Status and Response Data

As shown in the BPM above, there are three steps involved in this activity:

- Receive Response and Status Data from USPS, PDC, and ISR Operations [20.20].
- Flag HUs as Hold based on Response Status and Notify NRFU or UE of Hold if Applicable [20.30].

- Check-In Response Records/Update Case Status [20.40].

RPO receives response data from the self-response data collection operations: PDC, ISR, and CQA. All responses received by RPO are either in English or Spanish. Any translation required has already been performed prior to receipt by RPO. Non-English, Non-Spanish, and unknown language responses are sent by the appropriate self-response data collection operation to the Decennial Translation Branch for translation before being sent to RPO.

Self-responses can continue to arrive during the NRFU field operation. Accordingly, RPO flags HUs in the follow-up workload for which RPO has received a self-response or tracking information from the USPS that indicates that a return is on its way to one of the paper data capture facilities. The NRFU operation is notified about these flagged HUs as soon as the information is available so that those operations can remove the HUs from the daily workload if possible. Any self-responses that are flagged but later found to be insufficient are added back to the NRFU workload for continued enumeration attempts.

RPO checks in all responses and updates the case status to reflect that the case has been received.

4.4.3 Manage HU Self-Response and NRFU Response Results [RPO 19-2.2.1.3]

A detailed view of the activities that make up this subactivity is given in [Figure 16](#) below.

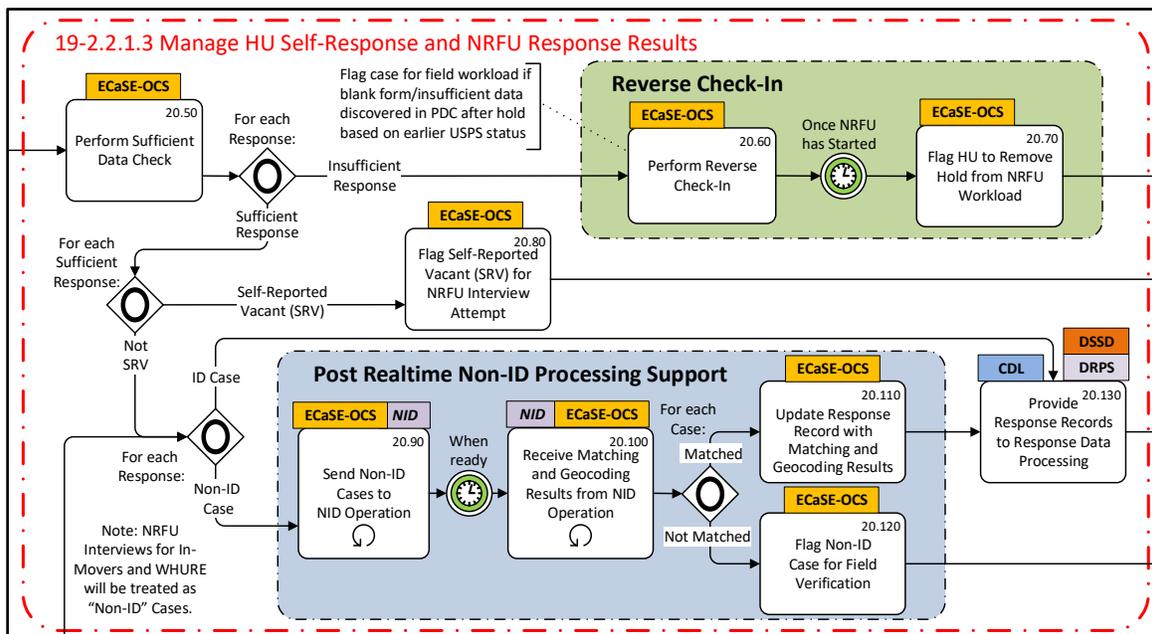


Figure 16: Manage HU Self-Response and NRFU Response Results

As shown in the BPM above, there are multiple steps involved in this activity:

- Perform Sufficient Data Check [20.50].
- Reverse Check-In.
 - Perform Reverse Check-In [20.60].
 - Flag HU to Remove Hold from NRFU Workload [20.70].
- Flag Self-Reported Vacant (SRV) for Field Verification [20.80].
- Post Realtime Non-ID Processing Support.
 - Send Non-ID Cases to NID Operation [20.90].
 - Receive Matching and Geocoding Results from NID Operation [20.100].
 - Update Response Record with Matching and Geocoding Results [20.110].
 - Flag Non-ID Case for Field Verification [20.120].
- Provide Response Records to Response Data Processing [20.130].

Response and status data collected through the various self-response data collection operations are sent (in digital format) to RPO's Response Data Integration (RDI) function, which uses the response status data to determine the appropriate actions for that case.

RPO performs a check on all response data to determine if the responses are sufficient based on predefined RPO business rules. For responses that are not sufficient, RPO performs a reverse check-in to indicate that a sufficient response has not yet been received. RPO also flags the case to remove the hold from the field follow-up workload. For sufficient responses, RPO flags any HUs that are reported by the respondent as vacant (SRVs). These units must be verified as vacant in the field and will be part of the NRFU workload in a subsequent activity. Responses that are not SRV and are considered Non-ID cases (i.e., they were not able to be matched a known address during real-time Non-ID processing), are sent to Post Realtime NID for matching and geocoding using administrative records and clerical procedures.

Non-ID cases are sent by RPO to NID for post data-capture Non-ID processing, which attempts to match addresses provided by respondents to addresses with Census IDs by AdRecs and clerical procedures, including the MAF/TIGER database. The results of these attempts are sent back to RPO.

If these cases are matched to a record and geocoded, RPO updates the response record with the results. Those responses that are not able to be matched through Non-ID are sent to the

field for verification as part of NRFU. RPO sends response records for all ID Cases and all matched Non-ID cases to the Response Data Processing function for further processing.

4.4.4 Provide HU Self-Response Data Collection Paper Mailing Support [RPO 19-2.2.1.4]

A detailed view of the activities that make up this subactivity is given in [Figure 17](#) below.

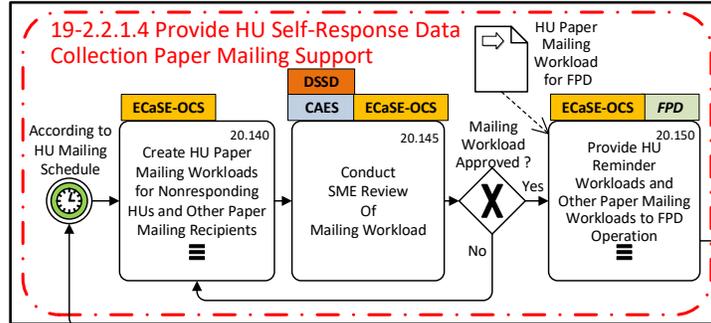


Figure 17: Provide HU Self-Response Data Collection Paper Mailing Support

As shown in the BPM above, there are three steps involved in this activity:

- Create HU Paper Mailing Workloads for Nonresponding HUs and Other Paper Mailing Recipients [20.140].
- Conduct SME Review of Mailing Workload [20.145]
- Provide HU Reminder Workloads and Other Paper Mailing Workloads to FPD Operation [20.150].

RPO creates a paper mailing workload for reminders for nonresponding HUs and other paper mailing recipients. Once created, the workload is reviewed and verified by DSSD to ensure accuracy and completeness. These reminders are conditional and are only sent to those HUs that have not yet responded. This paper mailing workload includes HUs that have been output from administrative records modeling as vacant or deleted (AdRec Vacant/Delete). It also includes HUs that have been output from administrative records modeling as occupied (AdRec Occupied), provided that one unsuccessful field contact attempt has been completed. The type of reminder mailing is indicated in the paper mailing workload, which is sent to the FPD operation.

4.4.5 Provide Nonresponse Followup (NRFU) Support [RPO 19-2.2.1.5]

The “Provide Nonresponse Followup (NRFU) Support” operational subactivity is subdivided into the following constituent activities:

- Provide Nonresponse Followup (NRFU) Support [RPO 19-2.2.1.5].
 - Create Initial NRFU Universes and Apply AdRec Modeling Results [RPO 19-2.2.1.5.1].
 - Provide NRFU Data Collection Support [RPO 19-2.2.1.5.2].
 - Manage Daily NRFU Universe/Workload Updates [RPO 19-2.2.1.5.3].

A detailed view of the constituent activities that make up the “Provide Nonresponse Followup (NRFU) Support” operational subactivity is given in [Figure 18](#) below.

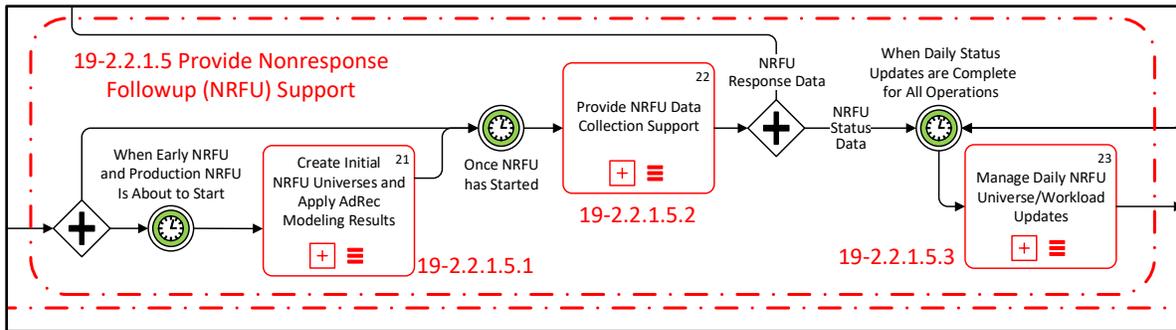


Figure 18: Provide Nonresponse Followup (NRFU) Support

Prior to Early NRFU and Production NRFU, RPO creates initial NRFU universes and applies previously determined AdRec modeling results.

As NRFU attempts to enumerate households, results are fed back to the operational control system for processing.

On a daily basis, the universe is updated to remove successful enumerations as well as any cases where completed census forms were received.

RPO will update the universe to include:

- Removal of self-responding addresses and other work status changes, for example, stop works and temporary holds on cases.
- More current administrative record modeling information.
- Characteristic updates for cases, for example, language requirements for enumeration, dangerous situations, etc.
- RI cases and cases identified for rework based on QC results. A RI case will be assigned to a different enumerator from the one who conducted the original interview.

4.4.5.1 Create Initial NRFU Universes and Apply AdRec Modeling Results [RPO 19-2.2.1.5.1]

The “Create Initial NRFU Universes and Apply AdRec Modeling Results” operational subactivity is subdivided into the following activity areas:

- Create Initial NRFU Universes and Apply AdRec Modeling Results [RPO 19-2.2.1.5.1].
 - Create Early NRFU Universe [RPO 19-2.2.1.5.1.1].
 - Create Initial Production NRFU Universe (incl. FV Workload) [RPO 19-2.2.1.5.1.2].

A detailed view of the activities that make up the “Create Initial NRFU Universes and Apply AdRec Modeling Results” operational subactivity is given in [Figure 19](#) below.

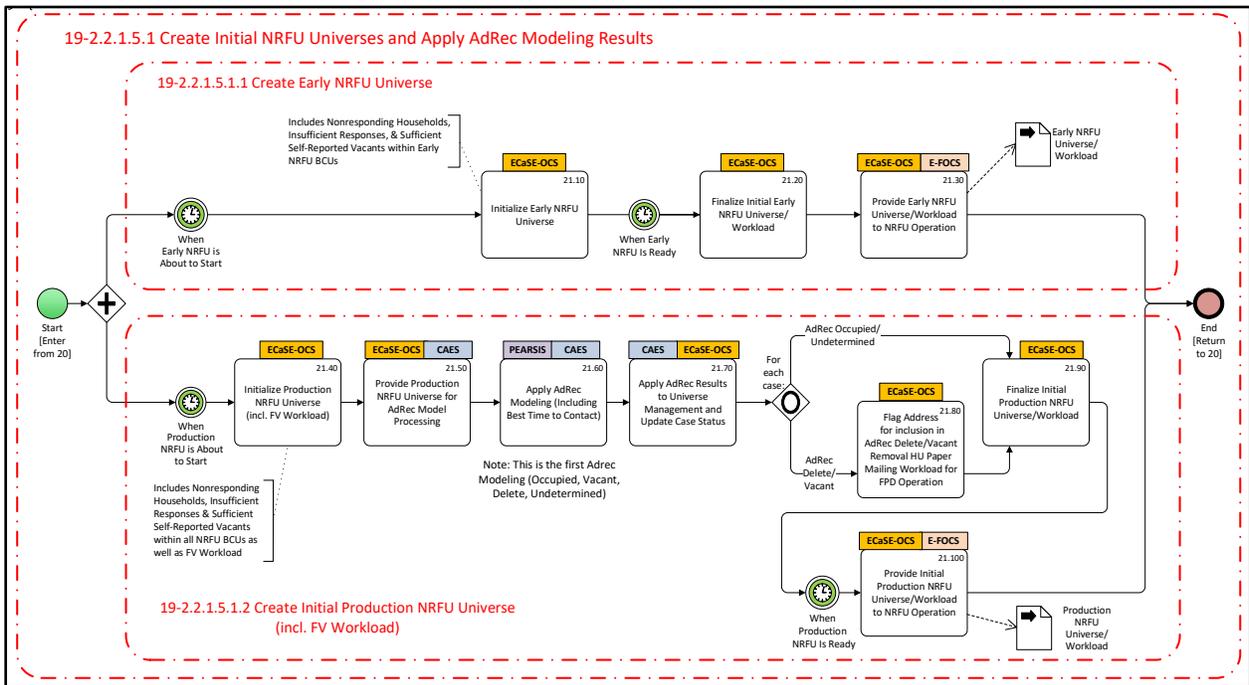


Figure 19: Create Initial NRFU Universes and Apply AdRec Modeling Results

The Response Processing Operation provides the NRFU operation with its universe as well as any necessary updates.

RPO sends an Early NRFU case universe/workload to the NRFU operation around early April (as described below); at this point Early NRFU enumeration begins.

The initial Production NRFU universe consists of nonresponding addresses and addresses from other operations requiring field work including any uncompleted NRFU cases from Early NRFU field work. RPO applies AdRec modeling and contact strategies with business rules to set parameters for each address, such as the maximum number of contact attempts, and defining proxy eligibility.

For nonresponding cases, the RPO supports NRFU by facilitating administrative records modeling techniques to determine the most effective and efficient enumeration strategy, including provision of a “best time to contact” recommendation to be used by the operational control system, and removal of cases from the workload based on established “stopping rules” to maximize efficiency in the NRFU operation.

Based on the universe case type (derived from TEA and living quarter type), RPO sends the initial enumeration case universe/workload to the NRFU operation and provides updates to these universes as data are collected and cases are completed.

4.4.5.1.1 Create Early NRFU Universe [RPO 19-2.2.1.5.1.1]

A detailed view of the activities that make up this subactivity is given in [Figure 19](#) above.

Colleges and universities present special challenges to NRFU, since certain colleges and universities close before NRFU begins. To address this challenge, NRFU will start earlier in these areas to increase the chance of interviewing the residents at their Census Day address. Early NRFU will occur from April 9 through mid-May. Locations requiring early NRFU are identified with the help of field managers who are knowledgeable about the local areas. With input from the GEO, NRFU will confirm and provide these requirements to RPO to create the universe for early NRFU.

4.4.5.1.2 Create Initial Production NRFU Universe (incl. FV Workload) [RPO 19-2.2.1.5.1.2]

A detailed view of the activities that make up this subactivity is given in [Figure 19](#) above.

NRFU will provide the following to RPO to use for delivering the NRFU universe:

- Contact strategies and associated business rules that RPO applies to the NRFU universe.
- Quality Control plan that NRFU uses to determine the selection by SMARCS of cases for NRFU-RI.
- Administrative record modeling sources and methodologies for the production of the administrative record modeling results that AdRec applies to the NRFU universe.

These contact strategies and business rules are sent to RPO to be applied to the universe that RPO provides for NRFU to create case assignments. See Section 4.4.5.1 for more information about the receiving of the NRFU universe from RPO.

Response and status data collected through the various self-response data collection operations are sent (in digital format) to RPO’s RDI function, which uses the response status data to determine the appropriate actions for that case.

4.4.5.2 Provide NRFU Data Collection Support [RPO 19-2.2.1.5.2]

The “Provide NRFU Data Collection Support” operational subactivity is subdivided into the following activity areas.

- Provide NRFU Data Collection Support [RPO 19-2.2.1.5.2].
 - Receive NRFU Response and Status Data [RPO 19-2.2.1.5.2.1].
 - Manage NRFU Response Results [RPO 19-2.2.1.5.2.2].

A detailed view of the activities that make up the “Provide NRFU Data Collection Support” operational subactivity is given in [Figure 20](#) and [Figure 21](#) below.

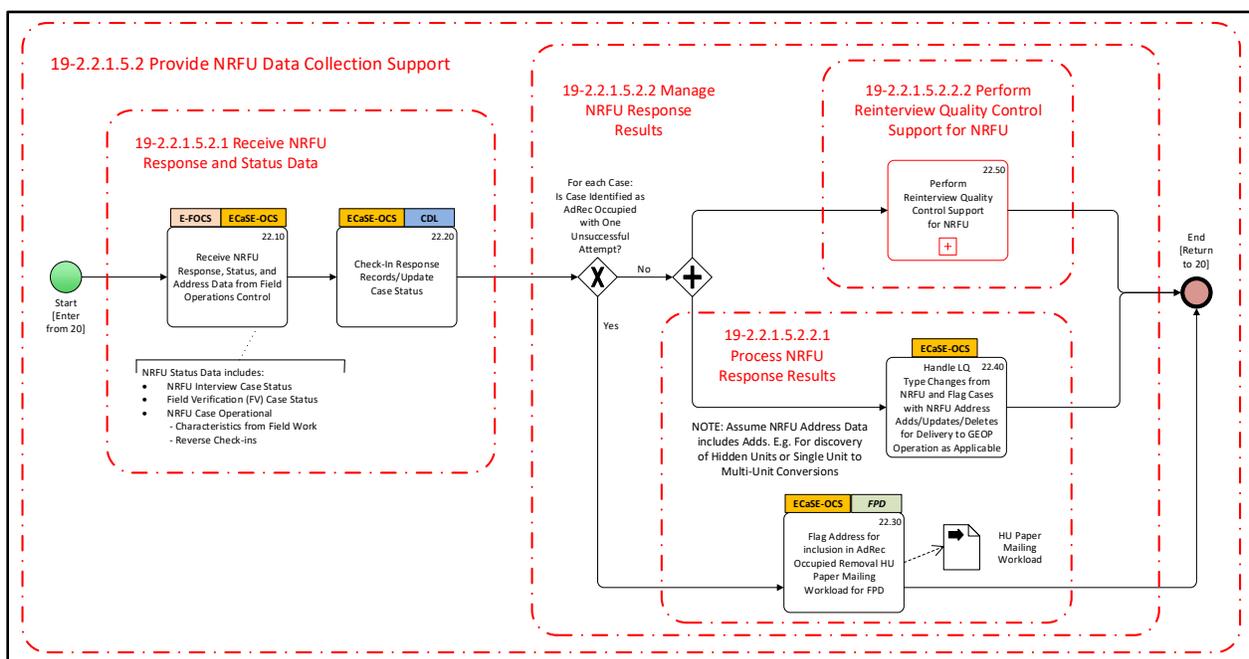


Figure 20: Provide Nonresponse Followup (NRFU) Data Collection Support

After each completed attempt (including completed interviews), NRFU sends the following types of data to RPO:

- **Status (operational data):** Response status describes the result of the attempt, for example, no one home, insufficient partial, or completed interview with the household. These data determine the next action for the attempt, if needed. Other operational data include the language that the interview was conducted in, whether an interpreter was present, proxy eligibility status, and case notes.

- **Response data:** Any questionnaire responses collected in an interview, housing unit status, household characteristics (tenure, population count), individual characteristics (relationship, sex, date of birth/age, race, undercount/overcount questions).
- **Paradata:** Auxiliary data that provide information about the data collection process. Includes, for instance, time spent on an interview, the path through ECaSE ENUM, what specific keys were pressed, length of time on each question, how often help functionality was used. After a completed attempt, UE sends this type of data to Program Management (PM) (to the paradata repository in Unified Tracking System [UTS]).

The operational data that is sent to RPO determines the next action for the case, for example, another contact attempt or reinterview, or whether the case should be removed from future follow-up workload because the maximum number of attempts has been reached. For completed and sufficient partial cases, the response data are sent to RPO for processing. PM tracks paradata for analysis of quality of data and improvement of future census operations.

Status also includes address updates and address verification.

For cases identified as AdRec occupied with one unsuccessful attempt, the address is added to AdRec Occupied Removal HU Paper Mailing Workload and sent a final paper mailing reminder for self-response. Cases that are successfully enumerated are marked as completed.

All cases completed by an enumerator are eligible for quality control and can be selected intentionally or by random check. QC cases with problems are re-enumerated at the time of RI, but other cases by that enumerator may be sent back.

Receive NRFU Response and Status Data [RPO 19-2.2.1.5.2.1]

A detailed view of the activities that make up this subactivity is given in [Figure 20](#) above.

As discussed above, RPO receives NRFU response and status data as they are sent from NRFU data collection activities. These data include NRFU interview case status, field verification case status, and NRFU case operational characteristics from field work, including from housing units added to the census universe. These data will be received through the operational control system through a nightly feed.

NRFU's primary purpose is to determine the housing unit status of addresses that did not self-respond to the 2020 Census and enumerate those that did not respond and are believed to be occupied.

4.4.5.2.1 Manage NRFU Response Results [RPO 19-2.2.1.5.2.2]

The “Manage NRFU Response Results” operational subactivity is subdivided into the following activity areas:

- Manage NRFU Response Results [RPO 19-2.2.1.5.2.2].
 - Process NRFU Response Results [RPO 19-2.2.1.5.2.2.1].
 - Perform NRFU Reinterview Quality Control Support for NRFU [RPO 19-2.2.1.5.2.2.2].

A detailed view of the activities that make up the “Manage NRFU Response Results” operational subactivity is given in [Figure 20](#) above.

4.4.5.2.1.1 Process NRFU Response Results [RPO 19-2.2.1.5.2.2.1]

A detailed view of the activities that make up this subactivity is given in [Figure 20](#) above.

HUs that have been determined to be occupied using administrative record enumeration data of sufficiently high quality through administrative records modeling are only visited once during NRFU. If these cases have not been successfully enumerated from this one visit (attempt), then RPO triggers one final mailing to these homes (by FPD) to encourage these households to self-respond. These HUs are removed from the future follow-up workload. HUs that are successfully enumerated are also removed from the future follow-up workload. NRFU sends to RPO information regarding the success of an enumeration attempt as part of the Response Status Data. RPO RDI function tracks this information and uses it to determine what to include in the next day’s follow-up workload.

Census Bureau field staff may uncover changes to addresses or living quarter type assignments as they perform their daily assignments. For example, a NRFU enumerator may go to an address and find that it is a group quarter that was mistakenly identified as a HU. All listing results and other address information are sent to the RPO GDI function, which passes the information on to the GDP function in GEOP.

4.4.5.2.1.2 Perform Reinterview Quality Control Support for NRFU [RPO 19-2.2.1.5.2.2.2]

[Figure 21](#) shows the BPM for the “Perform NRFU Reinterview Quality Control Support for NRFU” activity area and its constituent activities.

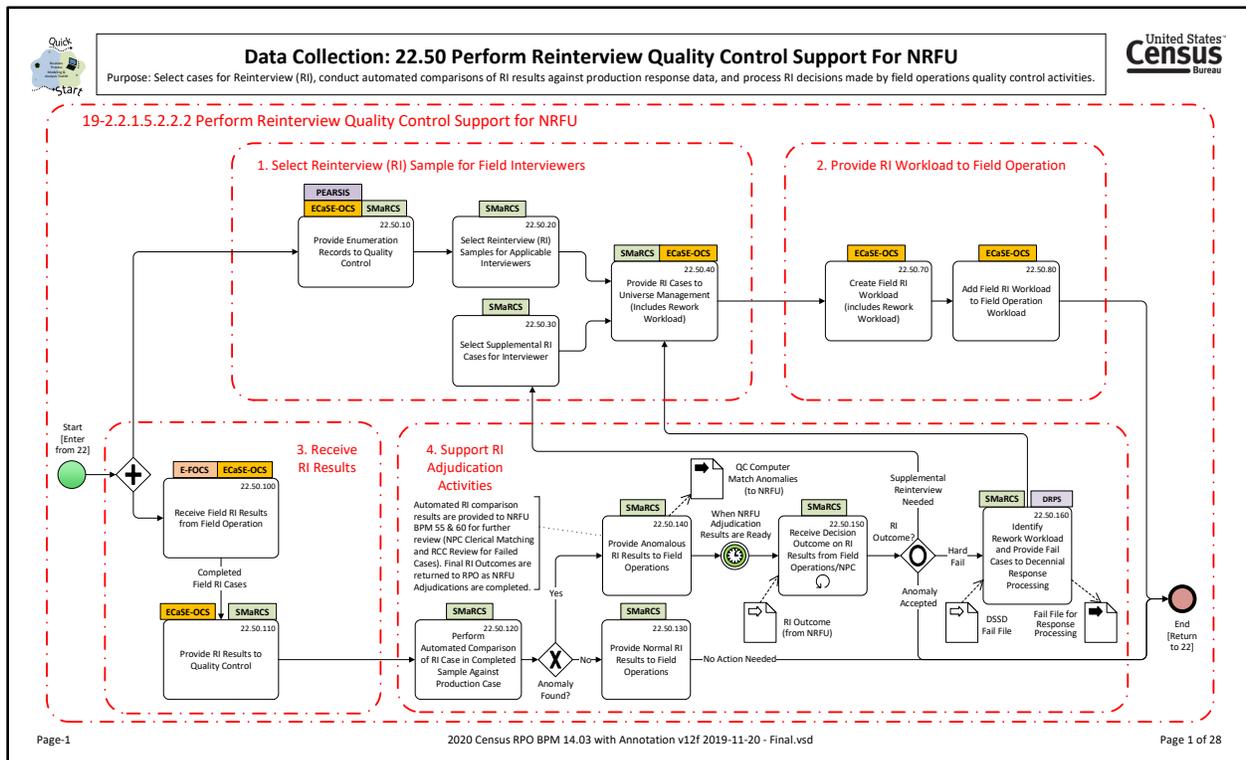


Figure 21: Perform Reinterview Quality Control Support for NRFU

The Census Bureau performs QC activities to ensure the quality of interviews that are conducted by NRFU interviewers. The purpose is to ensure that each NRFU interviewer is performing their duties correctly and recording valid response data. All cases completed by an enumerator are eligible for quality control and can be selected intentionally or by random check. QC cases with problems are re-enumerated at the time of RI, but other cases by that enumerator may be sent back.

RPO includes a Quality Control Management (QCM) function to support efforts that ensure that staff perform the work as expected and that the data collected are correct. The RPO QCM function selects sample cases for reinterview (RI).

The NRFU RI IPT has developed a plan for selecting the sample of NRFU interview cases for RI as described below. Any completed NRFU interview case (with a census household respondent or by proxy) is a candidate for RI selection, including cases with a vacant or delete status by proxy interview, field verification, and multiunit manager visits.

To select cases for RI, RPO samples the completed cases using the SMarCS makes the following selections from the sufficient or completed NRFU production interviews:

- **Random:** Random selection from the eligible cases completed by every NRFU enumerator. For each enumerator, SMarCS will randomly select one of the first three

eligible cases completed and thereafter every n th eligible case, where n depends on the percentage of cases NRFU wants to select for Random RI for each enumerator. For example, if approximately 5 percent is selected for Random RI, then $n=20$.

- **Analytic:** Selections based on a variety of outlier tests, such as GPS distance, interview length, and missing phone number, which focus the sample on cases that appear suspicious.
- **Supplemental:** Selection of an enumerator's future cases or manual selection of previously completed cases based on a case having computer-matching anomalies and the NRFU Clerical Resolution staff requesting more cases for further investigation of potential falsification.
- **Rework:** Selection of an enumerator's previously completed cases when the matching of a RI case with the enumerator's original case resulted in a determination of enumerator falsification.

NRFU Quality Control plan includes information for RPO on:

- RI Sample Completion Rules.
- RI Anomalies Determination Rules (thresholds).
- RI Rework Rules (selection of cases for rework).

Automation allows for a smarter QC sample using paradata from ECaSE ENUM.

The results from reinterview are compared to the original results, and the appropriate actions are taken depending on the results. For reinterviews, SMaRCS does an automated comparison of the original results against the results from the reinterviews. If there are anomalies, these are sent to the NPC, where additional research is conducted to determine how these cases should be handled. The results of this review (Adjudication Outcomes) are sent back to the RPO QCM function. In some cases, the adjudication requires that prior cases performed by the Enumerator at fault be reworked. RPO puts these cases back into the NRFU workload as appropriate.

The "Perform Reinterview Quality Control Support for NRFU" operational subactivity discussed above is subdivided into the following constituent activities:

- Perform Reinterview Quality Control Support for NRFU.
 - Select Reinterview (RI) Sample for Field Interviewers.
 - Provide RI Workload to Field Operation.
 - Receive RI Results.

- Support RI Adjudication Activities.

Subsequent sections describe the “Perform Reinterview Quality Control Support for NRFU” operational subactivities in detail.

Select Reinterview (RI) Sample for Field Interviewers

A detailed view of the activities that make up this subactivity is given in [Figure 22](#) below.

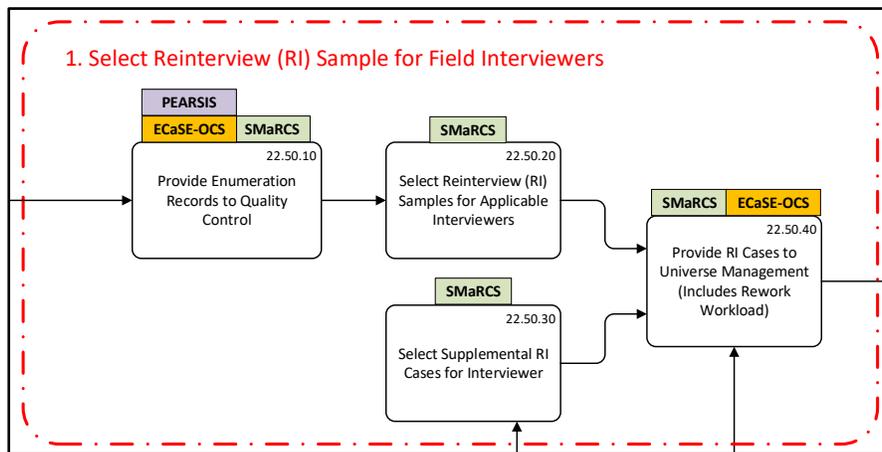


Figure 22: Select Reinterview (RI) Sample for Field Interviewers

In this subactivity, samples of an interviewer’s work (cases where the interviewer has conducted an interview) are selected for review. The cases are provided to universe management to create a workload of cases to be reviewed. If the interviewer’s work has been found to be suspect for the cases reviewed, then other cases that interviewer has worked are also suspect. Supplemental cases may also be provided to universe management for review and/or rework.

Provide RI Workload to Field Operation

A detailed view of the activities that make up this subactivity is given in [Figure 23](#) below.

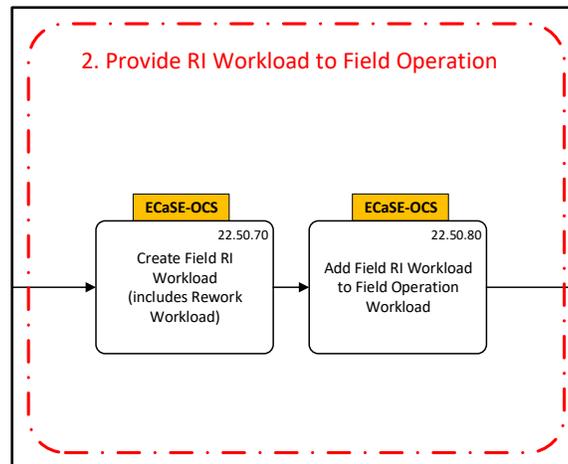


Figure 23: Provide RI Workload to Field Operation

The cases provided to universe management are used to create a workload of cases to be reviewed. Cases are added to the field RI workload to be handled by the field operation through independent in-person reinterviews.

Receive RI Results

A detailed view of the activities that make up this subactivity is given in [Figure 24](#) below.

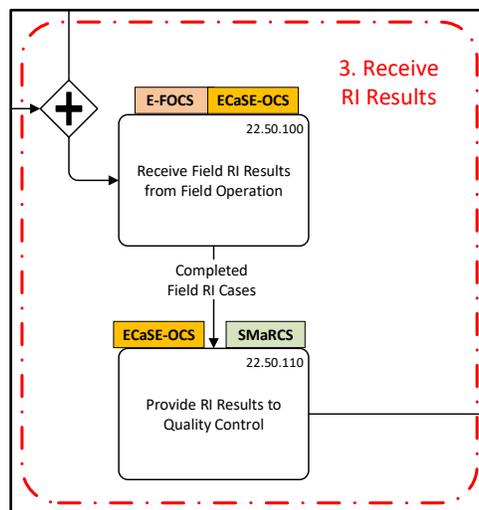


Figure 24: Receive RI Results

Field operation attempts reinterviews to verify the quality of the results for the cases selected for review. Each operation has a limited number of attempts per case. Final results of the field operations work for each case in the workload are passed back to quality control.

Support RI Adjudication Activities

A detailed view of the activities that make up this subactivity is given in [Figure 25](#) below.

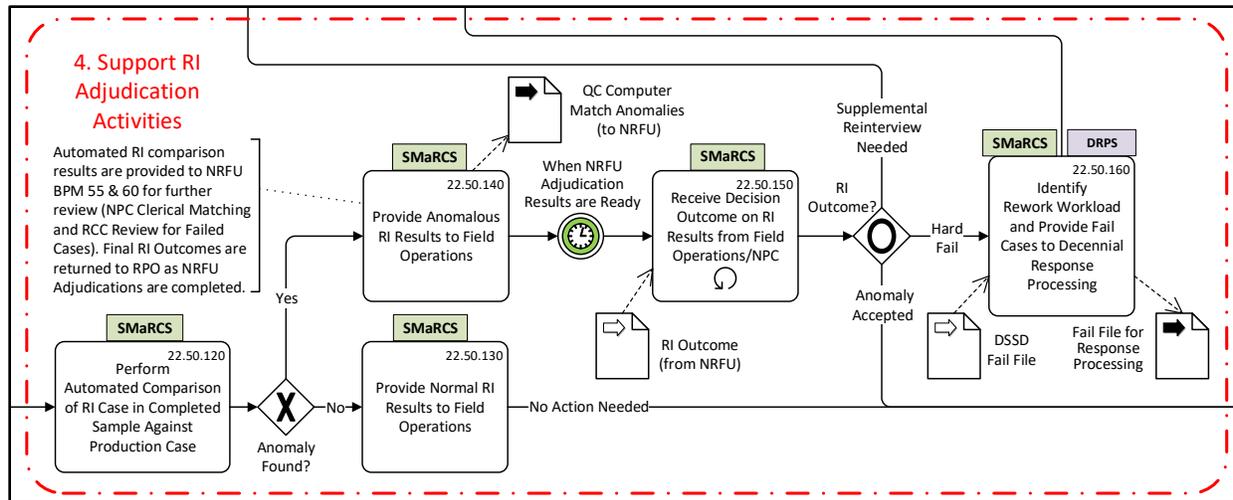


Figure 25: Support RI Adjudication Activities

Adjudication activities attempt to make a decision about the quality of an interviewer’s case work. Results from field QC are run through a series of automated checks and human review. RI cases are compared against production cases. When anomalies are detected, they are flagged for further review. Some anomalies are accepted, some are flagged for supplemental RI, and some are marked as “Hard Fail,” where the results do not appear to match reality. Hard fails end up in the “Fail File” for further action by RPO.

4.4.5.3 Manage Daily NRFU Universe/Workload Updates [RPO 19-2.2.1.5.3]

The “Manage Daily NRFU Universe/Workload Updates” operational subactivity is subdivided into the following activity areas:

- Manage Daily NRFU Universe/Workload Updates [RPO 19-2.2.1.5.3].
 - Manage Daily NRFU Case Updates [RPO 19-2.2.1.5.3.1]
 - Apply Additional AdRec Modeling Results to Production NRFU Universe [RPO 19-2.2.1.5.3.2]

A detailed view of the activities that make up the “Manage Daily NRFU Universe/Workload Updates” operational subactivity is given in [Figure 26](#) below.

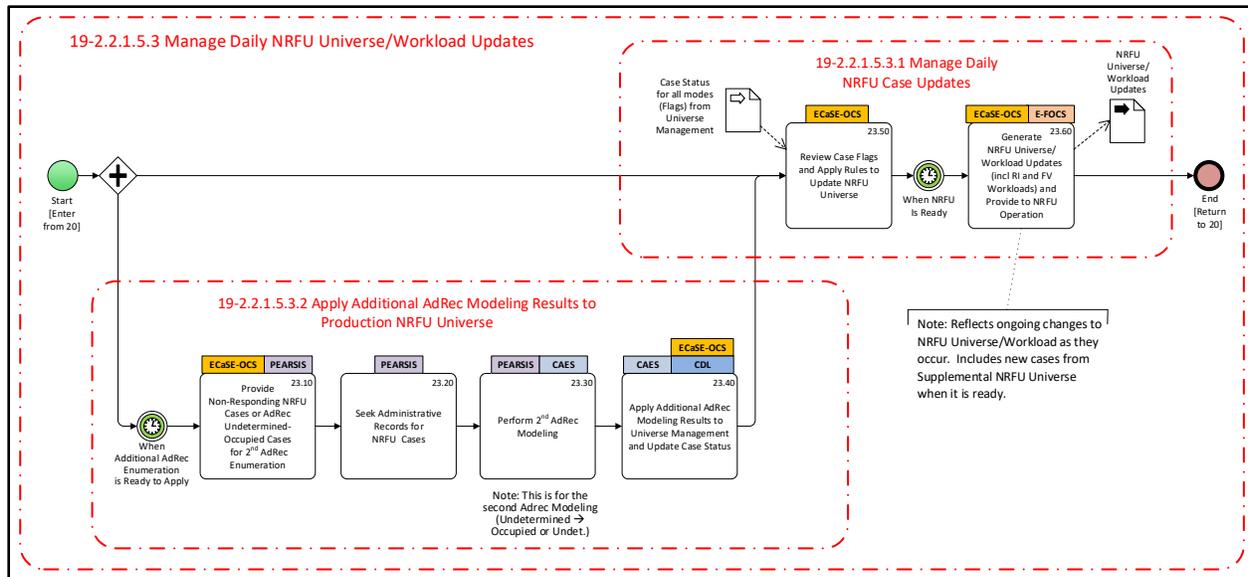


Figure 26: Manage Daily NRFU Universe/Workload Updates

Manage Daily NRFU Case Updates [RPO 19-2.2.1.5.3.1]

A detailed view of the activities that make up this subactivity is given in [Figure 26](#) above.

Daily NRFU case status updates that occur when updates from all operations are complete. All cases will be updated accordingly with this new data, and, if appropriate, removed from the outstanding NRFU workload. As the updates are received, case flags are set and rules are applied to update the NRFU case universe/workload. As mentioned above, NRFU workload will also include field verification cases needed to verify addresses for self-responses that could not be matched to known addresses through the NID operation.

When NRFU is ready, the universe/workload updates are provided to the NRFU operation for the next day’s workload.

Apply Additional AdRec Modeling Results to Production NRFU Universe [RPO 19-2.2.1.5.3.2]

A detailed view of the activities that make up this subactivity is given in [Figure 26](#) above.

After receiving updates of new administrative record information in early June, additional administrative record results are applied to the production NRFU universe. This includes identifying additional occupied addresses that can receive fewer contacts in the NRFU operation. An additional enhancement for the 2020 Census will be the identification of

additional NRFU addresses where administrative records could be utilized instead of field collection during the closeout phase of the NRFU operation.

4.5 Support Update Leave (UL) Data Collection [RPO 19-2.2.2]

As shown in Figure 10, the third activity in the RPO Data Collection Phase is “Support Update Leave (UL) Data Collection.” This activity is one of a set of operation-specific support activities collected under the “RPO Mode Management” Activity Area [RPO 19-2.2]. The RPO operational subactivity 19-2.2.2 is subdivided into the following constituent activities:

- Support Update Leave (UL) Data Collection [RPO 19-2.2.2].
 - Distribute UL Universe/Workload Information [RPO 19-2.2.2.1].
 - Receive UL Listing and UL Case Status Data [RPO 19-2.2.2.2].
 - Manage UL Listing and Case Status Results [RPO 19-2.2.2.3].

A detailed view of the constituent activities that make up the “Support Update Leave (UL) Data Collection” operational subactivity is given in Figure 27 below.

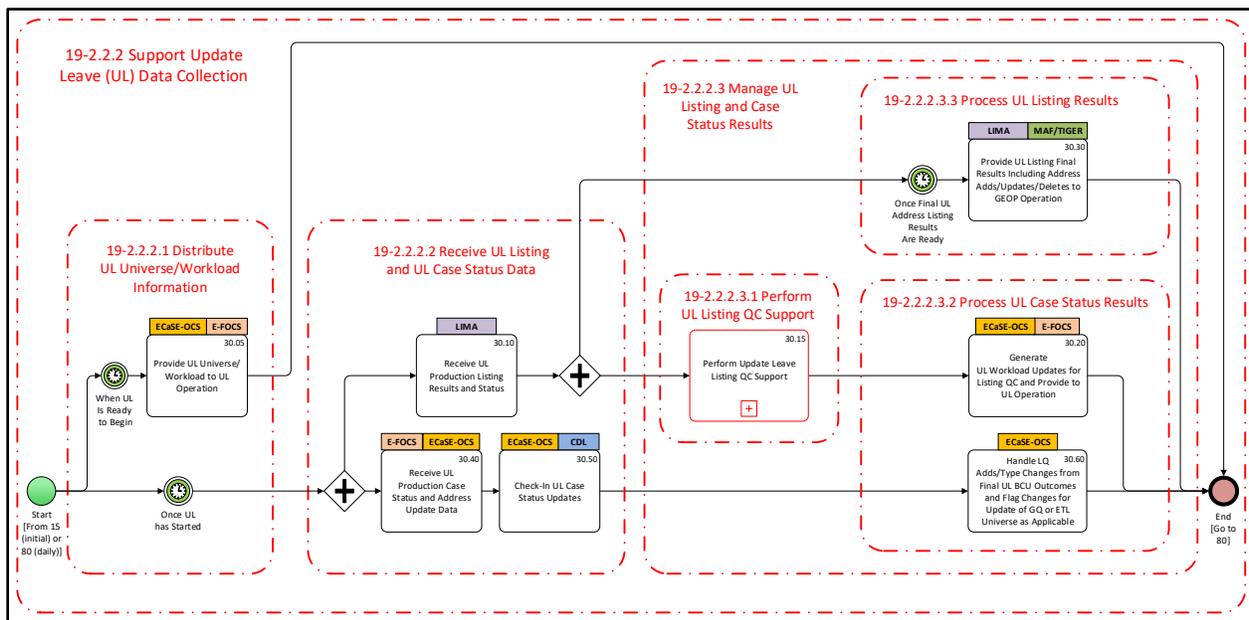


Figure 27: Support Update Leave (UL) Data Collection

RPO receives and processes listing and response data from the Update Leave operation (UL). RPO also supports UL listing and paper questionnaire (PQ) delivery quality control activities. The initial UL Universe/Workload is distributed for UL Production. During Update Leave Production, the work is distributed in BCUs and requires the completion of canvassing and delivery of a 2020 Internet Choice Questionnaire Package. Update Leave submits updated listings, PQ linking

data, and status to Response Processing Operation on a daily basis. Updates and verifications to the address list are managed and updated on a daily basis.

Subsequent sections describe the “Support Update Leave (UL) Data Collection” operational subactivities in detail.

4.5.1 Distribute UL Universe/Workload Information [RPO 19-2.2.2.1]

A detailed view of the activities that make up this subactivity is given in [Figure 28](#) below.

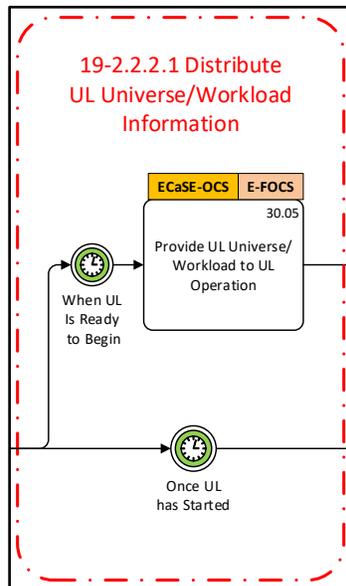


Figure 28: Distribute UL Universe/Workload Information

The initial UL Universe/Workload is distributed for UL Production. During Update Leave Production, the work is distributed in BCUs and requires the completion of both listing and the delivery of 2020 Census internet choice paper questionnaire package. In order to successfully work a HU, UL enumerators will need to update the address data and deliver a 2020 Census Internet Choice Paper Questionnaire Package.

4.5.2 Receive UL Listing and UL Case Status Data [RPO 19-2.2.2.2]

A detailed view of the activities that make up this subactivity is given in [Figure 29](#) below.

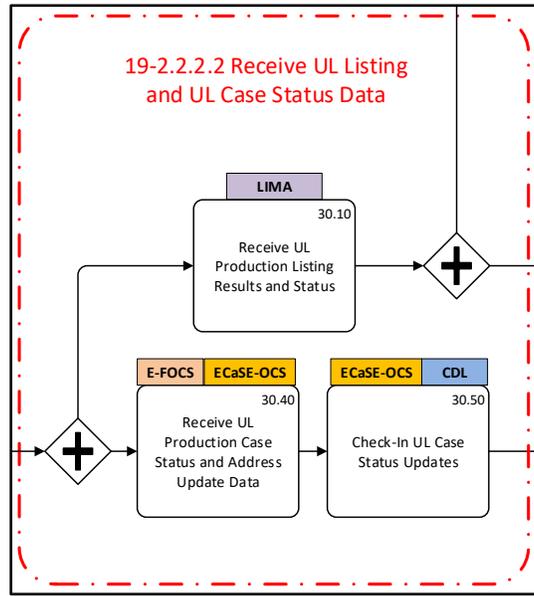


Figure 29: Receive UL Listing and UL Case Status Data

Update Leave submits updated listings, PQlinking data, and workload completion status to Response Processing Operation on a daily basis. RPO will submit Address Updates/Listing Updates (ADDUPs and Structure Point File (STRUCT)/Map Spot) and Paper Questionnaire linking data to downstream processing systems.

4.5.3 Manage UL Listing and Case Status Results [RPO 19-2.2.2.3]

The “Manage UL Listing Results and Case Status” operational subactivity is subdivided into the following activity areas:

- Manage UL Listing and Case Status Results [RPO 19-2.2.2.3].
 - Perform UL Listing QC Support [RPO 19-2.2.2.3.1].
 - Process UL Case Status Results [RPO 19-2.2.2.3.2].
 - Process UL Listing Results [RPO 19-2.2.2.3.3].

A detailed view of the constituent activities that make up the “Manage UL Listing Results and Case Status” operational subactivity is given in [Figure 30](#) below.

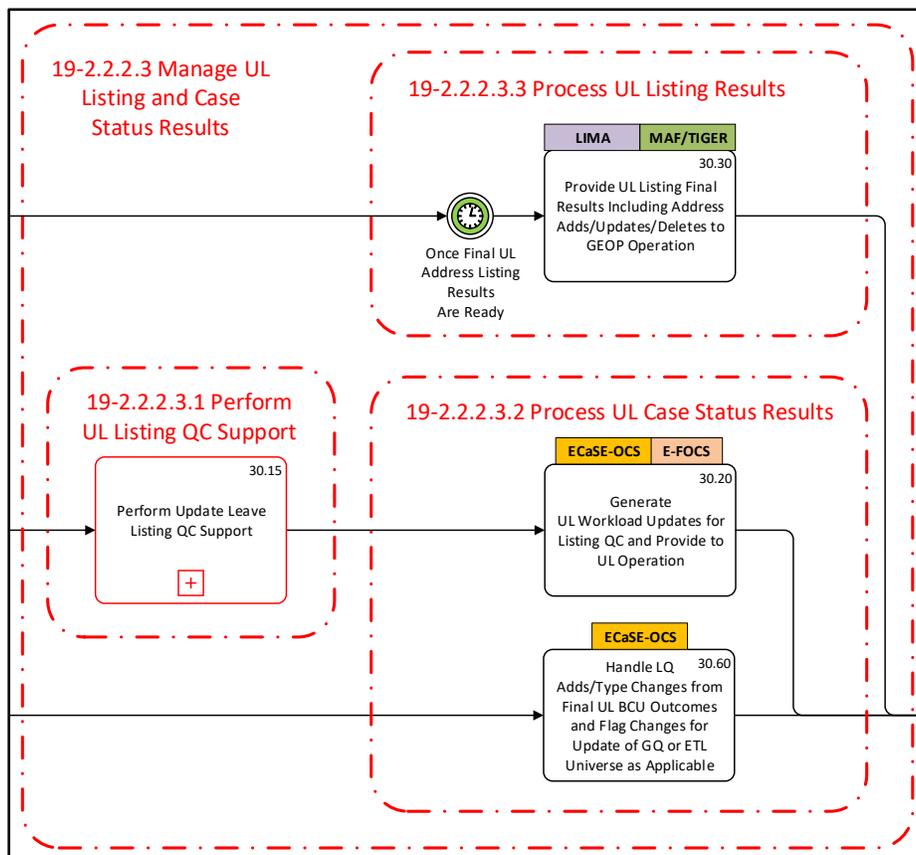


Figure 30: Manage UL and Case Status Listing Results

UL listing data will be transmitted to both CDL and ECaSE SOCS. SOCS will only take action and perform specific processing procedures on LQs that have undergone a change, including all updates to the address and map spot of the LQ, adds, deletes, and conversions (HU to TL or HU to GQ). If there are not changes to a LQ, Listing and Mapping Application (LiMA) will transmit the collected field data directly to CDL. After a BCU is complete, it may be selected for QC. UL BCUs will be selected for the QC sample according to the specifications in the 2020 UL QA plan. Nonresponding UL cases will be added to the NRFU workload.

4.5.3.1 Perform UL Listing QC Support [RPO 19-2.2.2.3.1]

Refer to [Figure 30](#) for a view of the overall context for the “Perform UL Listing QC Support” subactivity

A detailed view of the activities that make up this subactivity is given in [Figure 31](#) below.

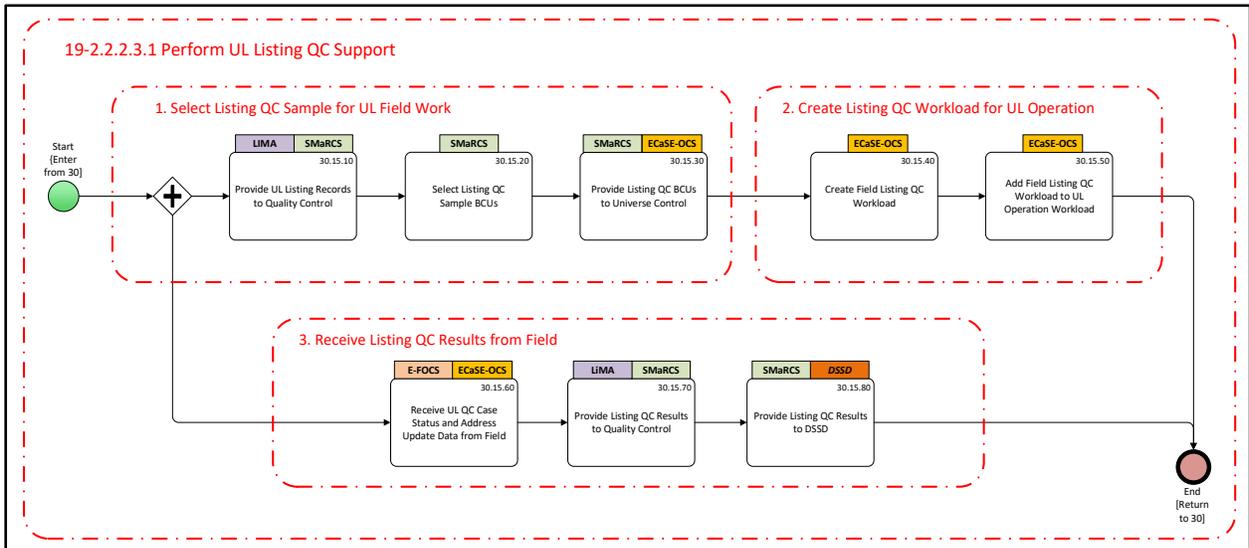


Figure 31: Perform UL Listing QC Support

SMaRCS selects the UL Listing QC sample from completed UL BCU listing records. After a UL BCU is selected to be a part of the QC sample, it will be sent to back out for field work. The selected sample BCU will be sent to FOCS and then to MCM for assignment. Based on the UL QA plan, in order for the BCU to pass QC, it must pass both the string and delete check. If a BCU fails either the string check or the delete check (reworks will need to travel through the various systems to be reassigned back for field work), the enumerator will need to conduct a complete rework of the entire BCU. When Listing QC field work is complete, the results are returned to RPO.

RPO provides support for the following UL Listing Quality Control activities. These activities are discussed in detail in the following sections.

- Select Listing QC Sample for UL Field Work.
- Create Listing QC Workload for UL Operation.
- Receive Listing QC Results from Field.

Select Listing QC Sample for UL Field Work

A detailed view of the activities that make up this subactivity is given in [Figure 32](#) below.

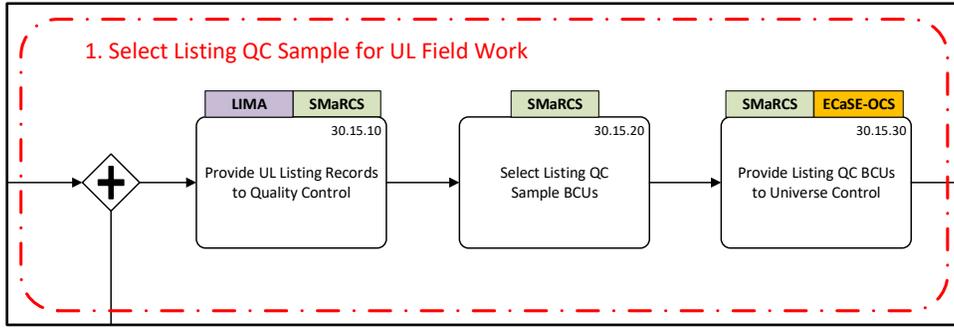


Figure 32: Select Listing QC Sample for UL Field Work

RPO provides listing records to Quality Control. BCUs can be selected for listing QC for two reasons:

- **Analytic:** Based on statistical calculations, BCUs that contain housing units that are historically prone to increased listing error or show enumerator production listing procedural error will be sampled. BCUs completed by these enumerators will be chosen for Listing QC to investigate if these enumerators are following proper enumeration procedures.
- **Random:** Random Listing QC verifies a random sample of the eligible BCUs completed by every enumerator.

Create Listing QC Workload for UL Operation

A detailed view of the activities that make up this subactivity is given in Figure 33 below.

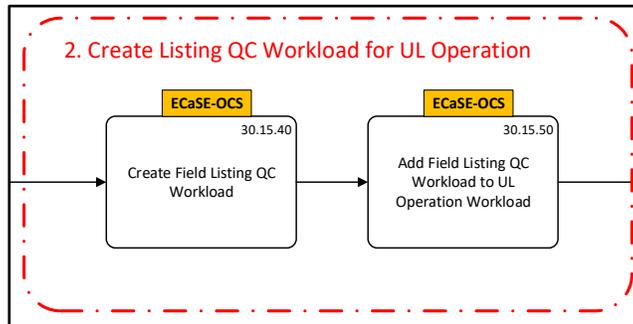


Figure 33: Create Listing QC Workload for UL Operation

RPO provides a workload once a BCU is selected for Listing QC. Once the QC workload is received by UL, it will be assigned to a QC lister.

Receive Listing QC Results from Field

A detailed view of the activities that make up this subactivity is given in Figure 34 below.

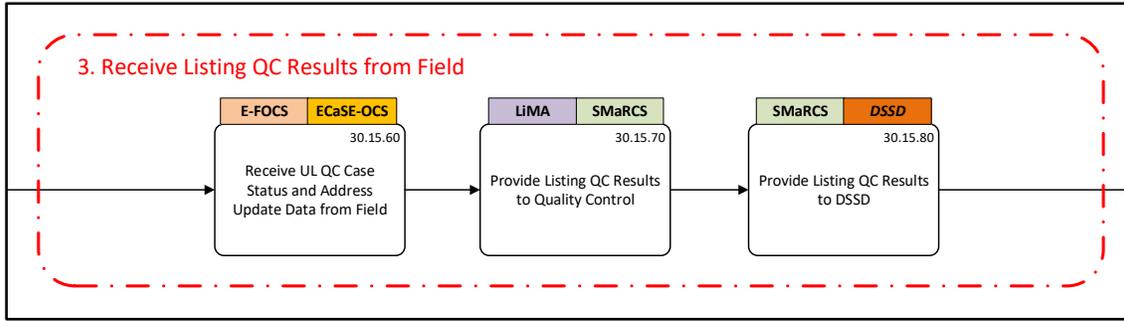


Figure 34: Receive Listing QC Results from Field

Once RPO receives the completed listing QC data for BCUs, RPO will send the listing QC results to SMarCS and DSSD.

4.5.3.2 Process UL Case Status Results [RPO 19-2.2.2.3.2]

A detailed view of the activities that make up this subactivity is given in [Figure 30](#) above.

RPO will process UL Case status results by ensuring successful and timely generation of UL workload updates for Listing QC, and by handling LQ adds/type changes from the final BCU outcomes. RPO must ensure that any LQ adds/type changes from final UL BCU outcomes are flagged and transmitted to update the Universes for GQ, ETL, and NRFU. RPO must also ensure that any Document ID links created during production or QC are documented and transmitted to the correct downstream systems.

4.5.3.3 Process UL Listing Results [RPO 19-2.2.2.3.3]

A detailed view of the activities that make up this subactivity is given in [Figure 30](#) above.

Approximately 5-10 percent of the UL workload will be selected for QC. Data for BCUs not sampled for QC will be immediately transmitted from LiMA to MAF/TIGER. For BCUs selected for QC, once a BCU has passed QC, RPO must ensure that LiMA has successfully transmitted the listing results to MAF/TIGER.

4.6 Support Update Enumerate (UE) Data Collection [RPO 19-2.2.3]

As shown in [Figure 10](#), the fourth activity in the RPO Data Collection Phase is “Support Update Enumerate (UE) Data Collection.” This activity is one of a set of operation-specific support activities collected under the “RPO Mode Management” Activity Area [RPO 19-2.2]. The RPO operational subactivity 19-2.2.3 is subdivided into the following constituent activities:

- Support Update Enumerate (UE) Data Collection [RPO 19-2.2.3].
 - Distribute UE Universe/Workload Information [RPO 19-2.2.3.1].

- Receive UE Listing and UE Response/Status Data [RPO 19-2.2.3.2].
- Process UE Listing Results [RPO 19-2.2.3.3].
- Process UE Response Results [RPO 19-2.2.3.4].

A detailed view of the constituent activities that make up the “Support Update Enumerate (UE) Data Collection” operational subactivity is given in [Figure 35](#) below.

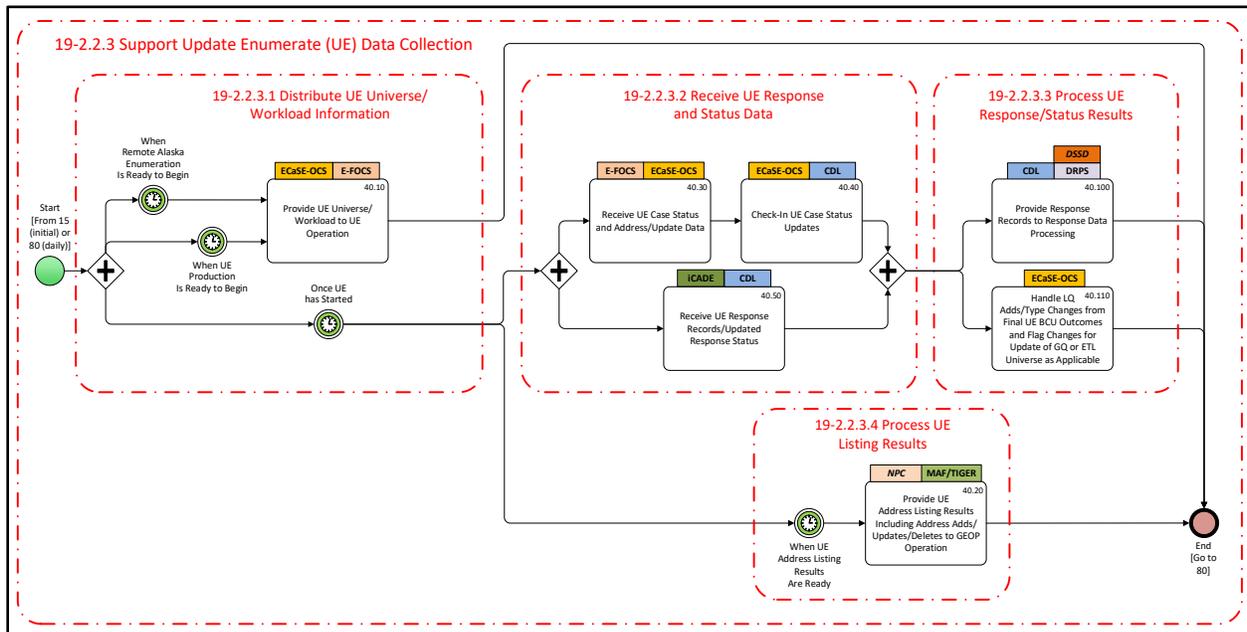


Figure 35: Support Update Enumerate (UE) Data Collection

Receive and process listing and response data from the Update Enumerate (UE) operation and provide field follow-up support for nonresponding cases in the UE TEA. The initial UE Universe/Workload is distributed for UE Production. During Update Enumerate Production, the work is distributed in BCUs and requires the completion of canvassing and enumeration. Update Enumerate submits updated listings, response data, and status to Response Processing Operation on a daily basis. Updates and Verifications to the address list are managed and updated on a daily basis.

Subsequent sections describe the “Support Update Enumerate (UE) Data Collection” operational subactivities in detail.

4.6.1 Distribute UE Universe/Workload Information [RPO 19-2.2.3.1]

A detailed view of the activities that make up this subactivity is given in [Figure 36](#) below.

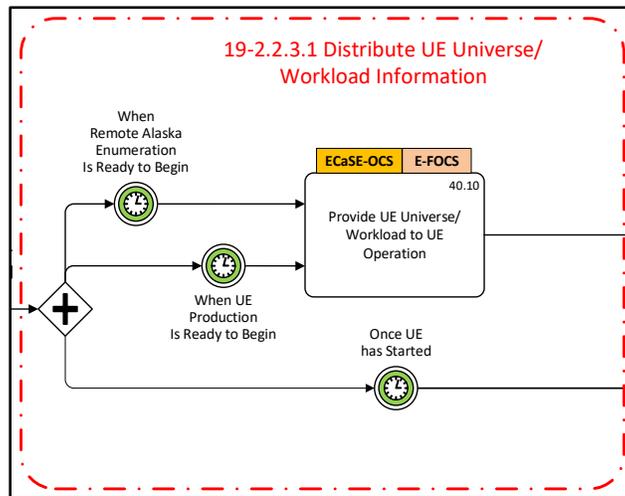


Figure 36: Distribute UE Universe/Workload Information

The initial UE Universe/Workload is distributed for UE Production. During Update Enumerate Production, the work is distributed in BCUs and requires the completion of canvassing and enumeration.

4.6.2 Receive UE Response and Status Data [RPO 19-2.2.3.2]

A detailed view of the activities that make up this subactivity is given in [Figure 37](#) below.

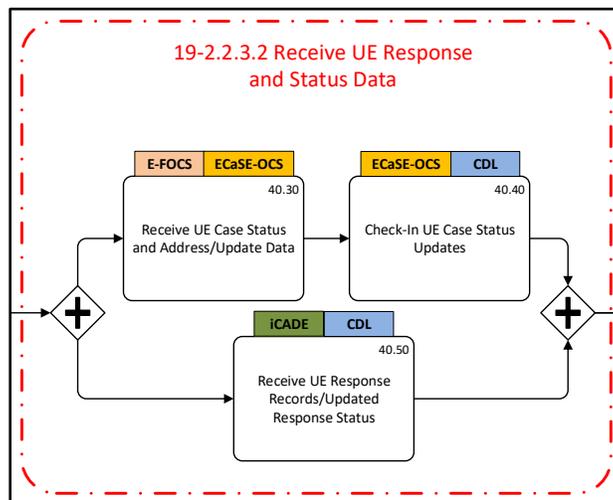


Figure 37: Receive UE Response and Status Data

Update Enumerate submits updated listing, response data, and status to Response Processing Operation on a daily basis.

4.6.3 Process UE Response/Status Results [RPO 19-2.2.3.3]

A detailed view of the activities that make up this subactivity is given in [Figure 38](#) below.

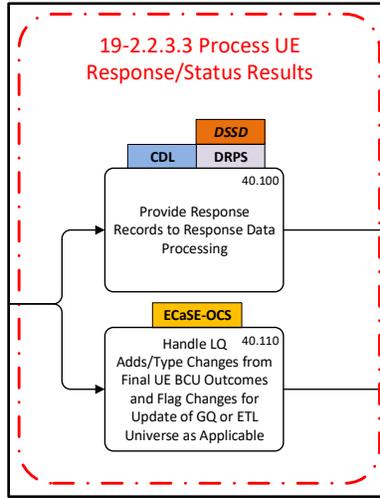


Figure 38: Process UE Response/Status Results

Response records coming from the Update Enumerate field operations are sent to response data processing. In addition, LQ adds/type changes from Update Enumerate address listing are also processed and flagged for delivery to GQ or ETL as needed.

4.6.4 Process UE Listing Results [RPO 19-2.2.3.4]

A detailed view of the activities that make up this subactivity is given in [Figure 39](#) below.

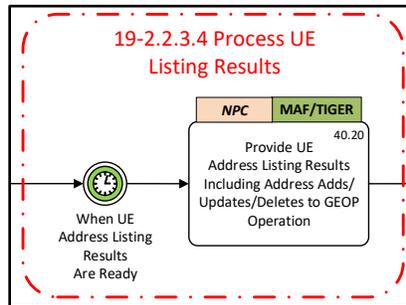


Figure 39: Process UE Listing Results

Address listing results coming from the Update Enumerate field operations are sent to MAF/TIGER. The collected data is updated into the MAF/TIGER database for tabulation and for the accurate geocoding of an address.

4.7 Support Group Quarters Data Collection [RPO 19-2.2.4]

As shown in [Figure 10](#), the fifth activity in the RPO Data Collection Phase is “Support Group Quarters Data Collection.” This activity is one of a set of operation-specific support activities collected under the “RPO Mode Management” Activity Area [RPO 19-2.2]. The RPO operational subactivity 19-2.2.4 is subdivided into the following constituent activities:

- Support Group Quarters (GQ) Data Collection [RPO 19-2.2.4].
 - Provide GQ Advance Contact Data Support [RPO 19-2.2.4.1].
 - Distribute GQ Enumeration Universe/Workload Information [RPO 19-2.2.4.2].
 - Receive GQ Enumeration Response and Status Data [RPO 19-2.2.4.3].
 - Manage GQ Enumeration Response Results [RPO 19-2.2.4.4].
 - Provide Maritime/Military Vessel Enumeration (MVE) Support [RPO 19-2.2.4.5].

A detailed view of the constituent activities that make up the “Support Group Quarters (GQ) Data Collection” operational subactivity is given in [Figure 40](#) below.

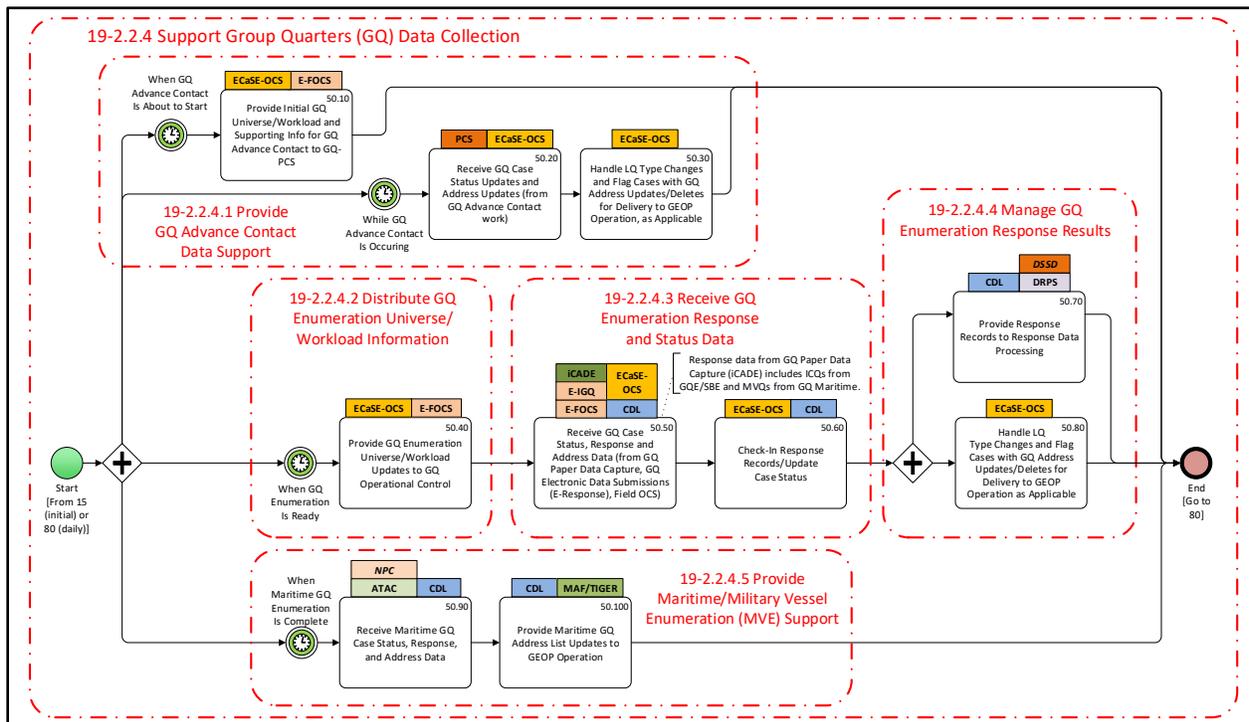


Figure 40: Support Group Quarters (GQ) Data Collection

RPO provides the initial GQ universe for the Group Quarters Advance Contact (GQAC) activity. During GQAC, RPO receives a range of updates, to include case status updates, address updates, LQ type changes, and other changes to the universe prior to enumeration. GQ enumeration activities include Group Quarters Enumeration (GQE), Service-Based Enumeration (SBE), Maritime/Military Vessel Enumeration (MVE), and late GQE data collection activities. RPO receives, processes, and manages response data and events from multiple modes of GQ enumeration. Response data can be received from Electronic Data Submissions (E-Response). GQ response data can also be received from Paper Data Capture instruments such as Individual

Census Questionnaires (ICQs), questionnaires for Maritime/Military vessels (MVQs), or from paper listings of response information.

Subsequent sections describe the “Support Group Quarters (GQ) Data Collection” operational subactivities in detail.

4.7.1 Provide GQ Advance Contact Data Support [RPO 19-2.2.4.1]

A detailed view of the activities that make up this subactivity is given in [Figure 41](#) below.

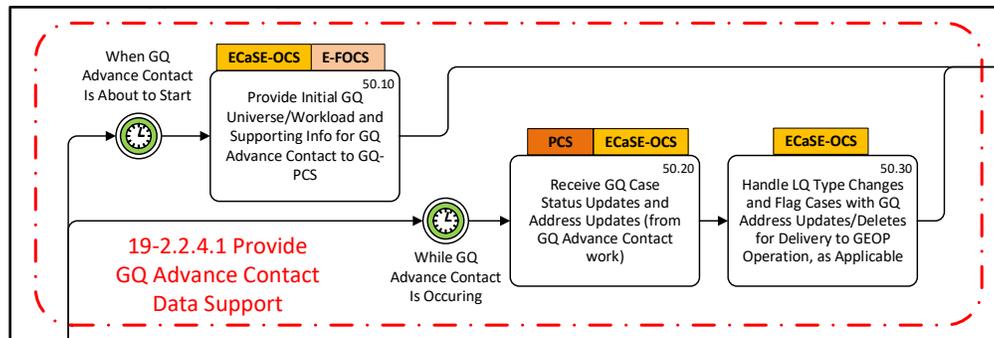


Figure 41: Provide GQ Advance Contact Data Support

Response processing will provide an initial GQ universe/workload for the purpose of advance contact. During this phase, GQ will update the universe in preparation for enumeration.

4.7.2 Distribute GQ Enumeration Universe/Workload Information [RPO 19-2.2.4.2]

A detailed view of the activities that make up this subactivity is given in [Figure 42](#) below.

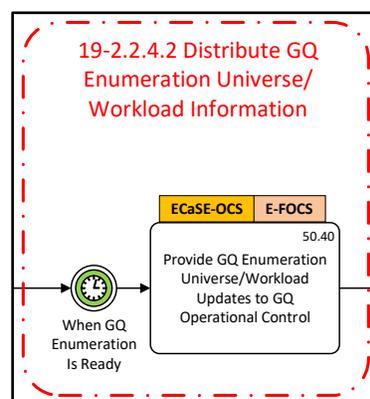


Figure 42: Distribute GQ Enumeration Universe/Workload Information

Once the universe is updated, it is distributed to start GQ enumeration.

4.7.3 Receive GQ Enumeration Response and Status Data [RPO 19-2.2.4.3]

A detailed view of the activities that make up this subactivity is given in [Figure 43](#) below.

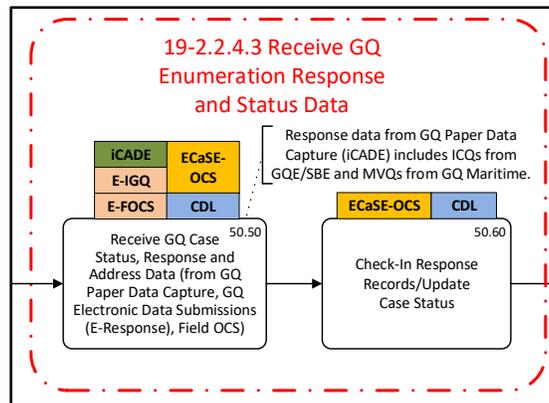


Figure 43: Receive GQ Enumeration Response and Status Data

RPO receives status data and response data back from the GQ enumeration operation. Data are checked in and the statuses of cases are verified.

4.7.4 Manage GQ Enumeration Response Results [RPO 19-2.2.4.4]

A detailed view of the activities that make up this subactivity is given in [Figure 44](#) below.

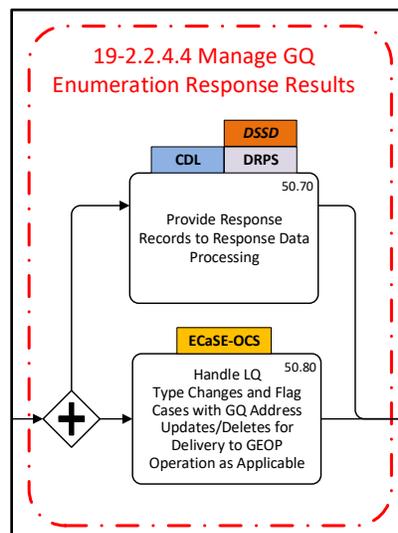


Figure 44: Manage GQ Enumeration Response Results

Updates and verifications to the address list are managed on a daily basis. Response records coming from the GQ field operations are sent to response data processing. In addition, LQ type changes and cases with GQ address updates and deletes are also processed and flagged for delivery to Geographic Programs operations for matching and geocoding.

4.7.5 Provide Maritime/Military Vessel Enumeration (MVE) Support [RPO 19-2.2.4.5]

A detailed view of the activities that make up this subactivity is given in [Figure 45](#) below.

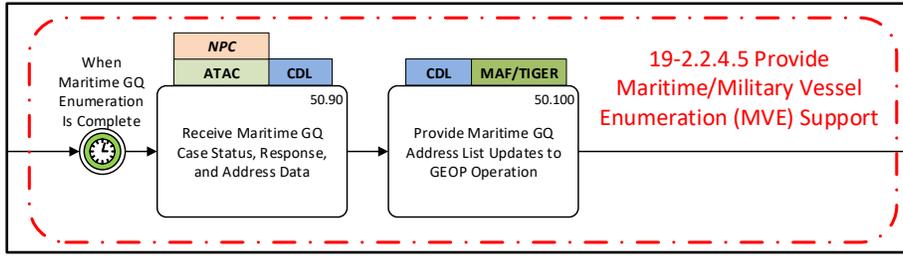


Figure 45: Provide Maritime/Military Vessel Enumeration (MVE) Support

RPO receives status data and response data back from the Maritime/Military Vessel Enumeration (MVE) activity. MVE data are checked in and the statuses of cases are verified.

4.8 Support Enumeration at Transitory Locations (ETL) Data Collection [RPO 19-2.2.5]

As shown in [Figure 10](#), the sixth activity in the RPO Data Collection Phase is “Support Enumeration at Transitory Locations (ETL) Data Collection.” This activity is one of a set of operation-specific support activities collected under the “RPO Mode Management” Activity Area [RPO 19-2.2]. The RPO operational subactivity 19-2.2.5 is subdivided into the following constituent activities:

- Support Enumeration at Transitory Locations (ETL) Data Collection [RPO 19-2.2.5].
 - Provide ETL Advance Contact Data Support [RPO 19-2.2.5.1].
 - Distribute ETL Enumeration Universe/Workload Information [RPO 19-2.2.5.2].
 - Receive ETL Response and Status Data [RPO 19-2.2.5.3].
 - Manage ETL Response Results [RPO 19-2.2.5.4].

A detailed view of the constituent activities that make up the “Support Enumeration at Transitory Locations (ETL) Data Collection” operational subactivity is given in [Figure 46](#) below.

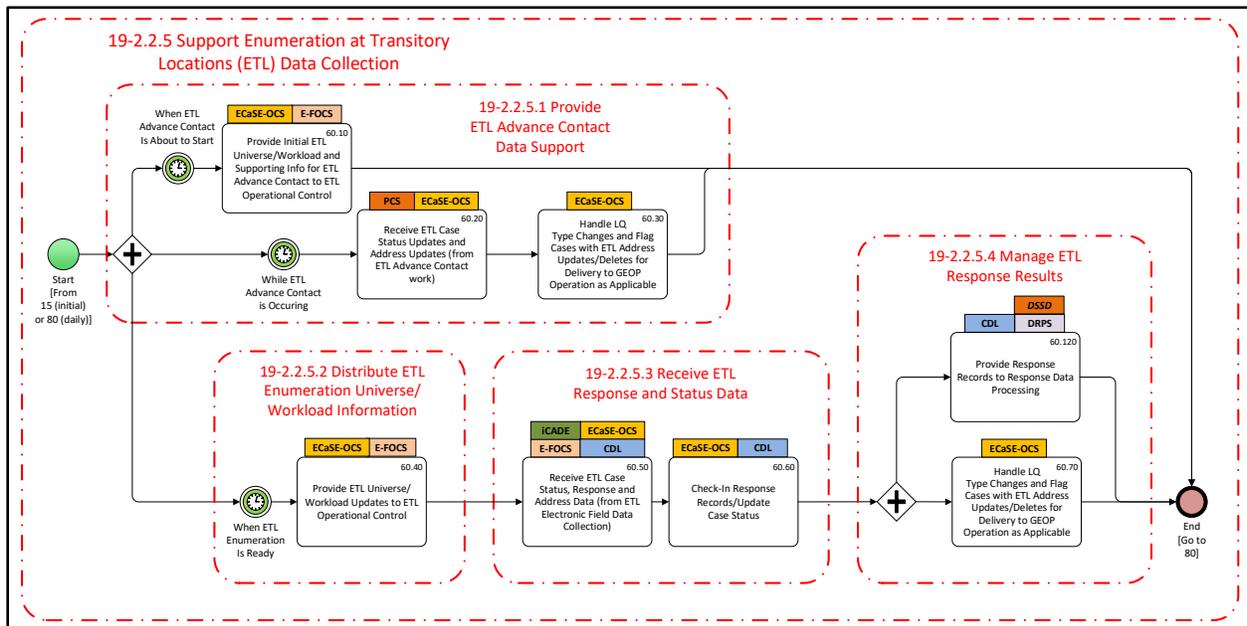


Figure 46: Support Enumeration at Transitory Locations (ETL) Data Collection

RPO provides the initial ETL universe for the Transitory Location Advance Contact (TLAC) activity. During TLAC, RPO receives a range of updates including case status updates, address updates, type code changes, and other changes to the universe prior to enumeration. RPO receives, processes, and manages response data and events from the ETL enumeration. ETL is a paper-based operation; response data is collected using paper questionnaires, the Enumeration Questionnaire, and the Continuation Questionnaire.

Subsequent sections describe the “Support Enumeration at Transitory Locations (ETL) Data Collection” operational subactivities in detail.

4.8.1 Provide ETL Advance Contact Data Support [RPO 19-2.2.5.1]

A detailed view of the activities that make up this subactivity is given in [Figure 47](#) below.

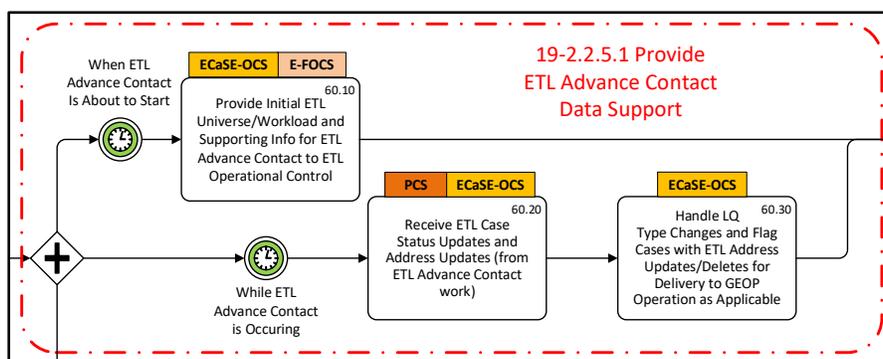


Figure 47: Provide ETL Advance Contact Data Support

RPO will provide an initial ETL Universe/Workload for the purpose of advance contact. During this phase, ETL will update the universe in preparation for enumeration.

4.8.2 Distribute ETL Enumeration Universe/Workload Information [RPO 19-2.2.5.2]

A detailed view of the activities that make up this subactivity is given in [Figure 48](#) below.

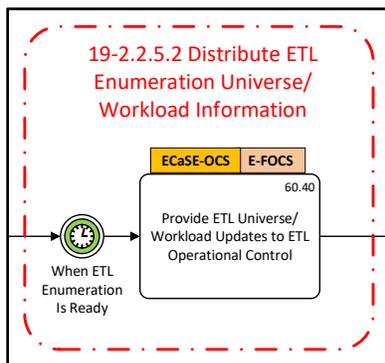


Figure 48: Distribute ETL Enumeration Universe/Workload Information

The initial ETL Universe/Workload gets distributed for ETL Production. During ETL Production, the work is distributed and requires the completion of enumeration.

4.8.3 Receive ETL Response and Status Data [RPO 19-2.2.5.3]

A detailed view of the activities that make up this subactivity is given in [Figure 49](#) below.

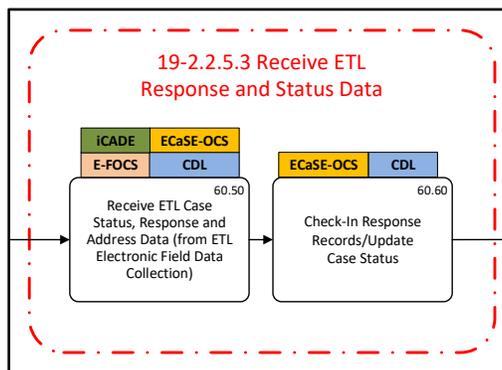


Figure 49: Receive ETL Response and Status Data

RPO receives status data and response data back from the ETL enumeration operation. Data are checked in, and the statuses of cases are verified.

4.8.4 Manage ETL Response Results [RPO 19-2.2.5.4]

A detailed view of the activities that make up this subactivity is given in [Figure 50](#) below.

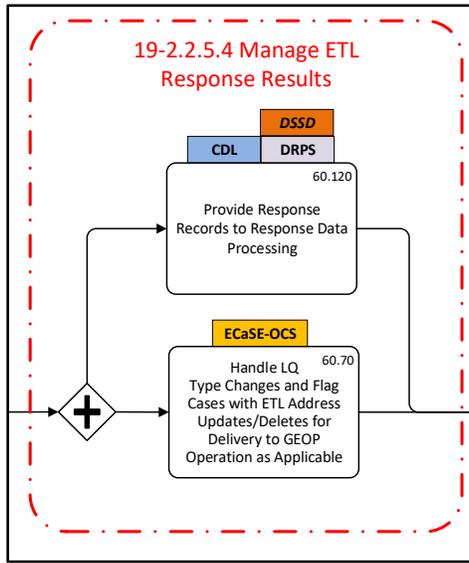


Figure 50: Manage ETL Response Results

Updates and verifications to the address list are managed on a daily basis. Response records coming from the ETL field operations are sent to response data processing. In addition, LQ type changes and cases with ETL address updates and deletes are also processed and flagged for delivery to Geographic operations for matching and geocoding.

4.9 RPO Enumeration Universe Management and Data Collection Phase Processing [RPO 19-2.3]

As shown in [Figure 10](#), the seventh activity in the RPO Data Collection Phase is “RPO Enumeration Universe Management and Data Collection Phase Processing.” This operational subactivity is subdivided into the following constituent activities:

- RPO Enumeration Universe Management and Data Collection Phase Processing [RPO 19-2.3].
 - Manage Daily RPO Enumeration Universe/Workload Updates [RPO 19-2.3.1].
 - Provide Data to HQ Ops [RPO 19-2.3.2].
 - Perform Data Collection Phase Processing Work [RPO 19-2.3.3].

A detailed view of the constituent activities that make up the RPO Enumeration Universe Management and Data Collection Phase Processing [RPO 19-2.3] activity area operational subactivity is given in [Figure 51](#) below.

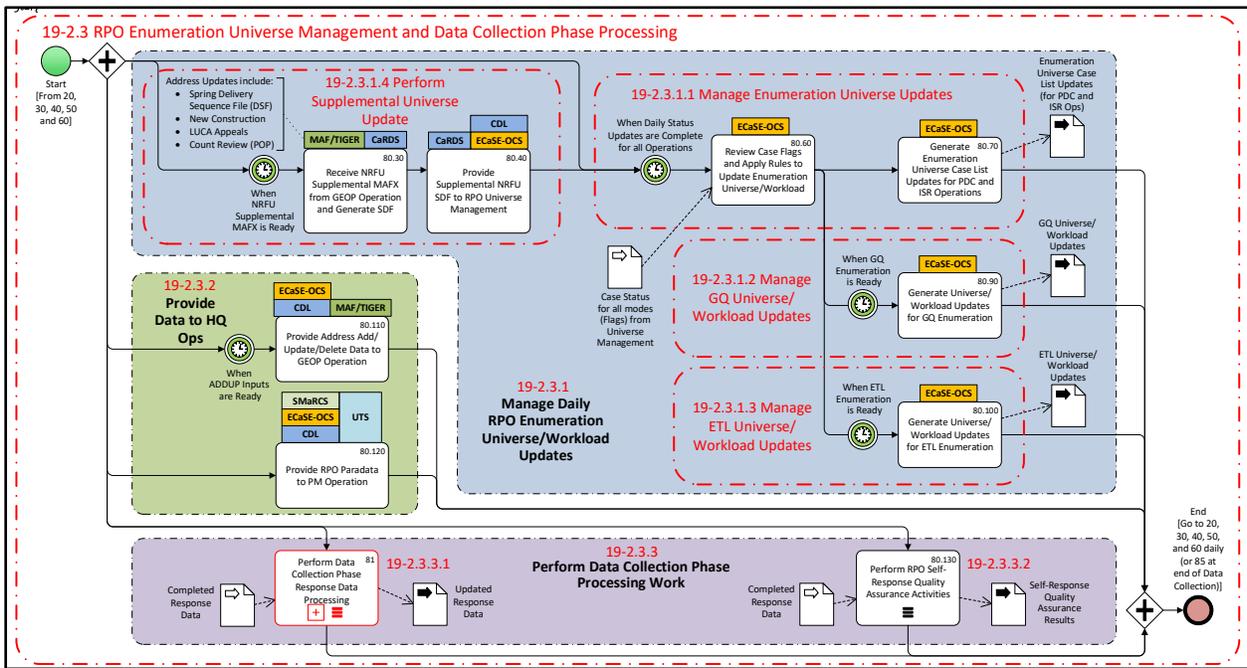


Figure 51: RPO Enumeration Universe Management and Data Collection Phase Processing [RPO 19-2.3]

The activities in RPO 19-2.3 mainly cover the daily universe management and data processing functions of RPO after the initial universe for each data collection operation has been created and delivered.

Subsequent sections describe the “RPO Enumeration Universe Management and Data Collection Phase Processing” operational subactivities in detail.

4.9.1 Manage Daily RPO Enumeration Universe/Workload Updates [RPO 19-2.3.1]

The “Manage Daily RPO Enumeration Universe/Workload Updates” operational subactivity is subdivided into the following constituent activities:

- Manage Daily RPO Enumeration Universe/Workload Updates [RPO 19-2.3.1].
 - Manage Enumeration Universe Updates [RPO 19-2.3.1.1].
 - Manage GQ Universe/Workload Updates [RPO 19-2.3.1.2].
 - Manage ETL Universe/Workload Updates [RPO 19-2.3.1.3].
 - Perform Supplemental Universe Update [RPO 19-2.3.1.4].

A detailed view of the constituent activities that make up the “Manage Daily RPO Enumeration Universe/Workload Updates” operational subactivity is given in Figure 52 below.

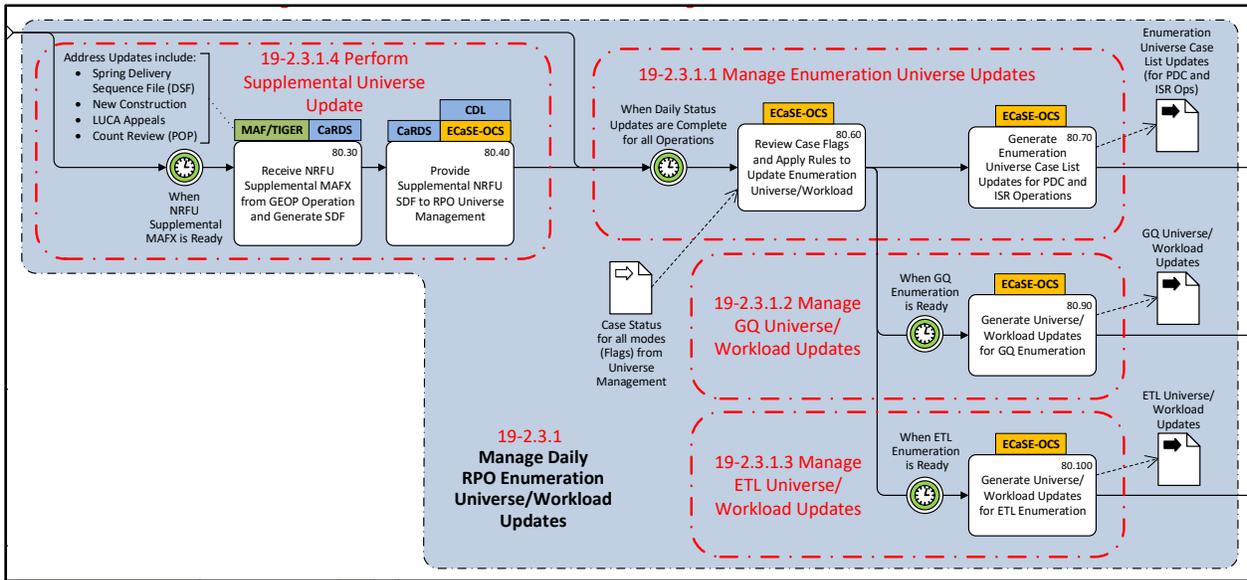


Figure 52: Manage Daily RPO Enumeration Universe/Workload Updates

In RPO 19-2.3.1, the RPO is performing nightly processing after each of the five data collection operations has completed their daily casework and sent that day’s collected response data and other data back to RPO. Case flags are reviewed, rules are applied, and cases are moved from one operation to another as needed. The final result of RPO’s nightly processing is a new workload sent back to each of the five data collection operations so they can begin their next day’s collection activities.

Case status flags are set by each operation to indicate where a specific case needs action from RPO during nightly processing. RPO removes completed cases from the entire collection universe since the data for that case has already been collected. HUs that are determined to be vacant are flagged. Cases that are found to be in the wrong operation are flagged to be moved to the correct operation. RPO checks all flags, takes appropriate action, and generates the appropriate new universe/workload update for each of the five operations.

4.9.1.1 Manage Enumeration Universe Updates [RPO 19-2.3.1.1]

A detailed view of the activities that make up this subactivity is given in Figure 52 above.

This activity covers RPO’s nightly processing cycle for Universe updates for all field data collection operations and case workload updates for the self-response operations (ISR, CQA, and PDC). Any new cases and any case type changes are provided as Case List updates.

4.9.1.2 Manage GQ Universe/Workload Updates [RPO 19-2.3.1.2]

A detailed view of the activities that make up this subactivity is given in Figure 52 above.

This activity covers RPO’s nightly processing cycle for GQ operations. Output to GQ is an updated workload of cases to be assigned to GQ enumerators for them to collect response data on Group Quarters.

4.9.1.3 Manage ETL Universe/Workload Updates [RPO 19-2.3.1.3]

A detailed view of the activities that make up this subactivity is given in [Figure 52](#) above.

This activity covers RPO’s nightly processing cycle for ETL operations. Output to ETL is an updated workload of cases to be assigned to ETL enumerators for them to collect response data at transitory locations.

4.9.1.4 Perform Supplemental Universe Update [RPO 19-2.3.1.4]

A detailed view of the activities that make up this subactivity is given in [Figure 52](#) above.

The NRFU Supplemental Universe will be received from MAF/TIGER. It will contain HUs that are a result of the DSF refresh, LUCA appeals, New Construction, Ungeocoded Resolution, Count Review, and possibly In-Field Address Canvassing updates. This universe will be approximately 2 million addresses. Type of Enumeration Area (TEA) 1 HUs on the Master Address File Extract (MAFX) will be sent the Supplemental NRFU Mailing. This is a bilingual mailing with a questionnaire, letter, FAQ insert, Language insert, and return envelope. TEA 6 cases on the Supplemental NRFU MAFX will need to go downstream to be eligible for NRFU but not the mailing.

4.9.2 Provide Data to HQ Ops [RPO 19-2.3.2]

A detailed view of the activities that make up this subactivity is given in [Figure 53](#) below.

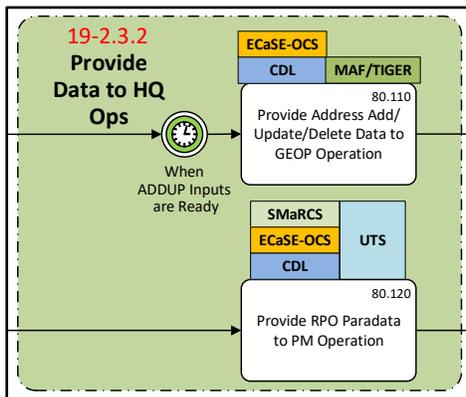


Figure 53: Provide Data to HQ Ops

Data collected nightly from the operations is passed on to other operations that also need it.

Address data collected about LQs is passed to Geographic Programs operations (GEOP). GEOP processes the address data or address list changes and performs the appropriate add, delete, or update operation in MAF/TIGER.

Paradata (mainly data about the responses that is not the data entered by a respondent) is passed to the Program Management (PM) operation for tracking and management.

4.9.3 Perform Data Collection Phase Processing Work [RPO 19-2.3.3]

The “Perform Data Collection Phase Processing Work” operational subactivity is subdivided into the following constituent activities:

- Perform Data Collection Phase Processing Work [RPO 19-2.3.3].
 - Perform Data Collection Phase Response Data Processing [RPO 19-2.3.3.1].
 - Perform RPO Self-Response Quality Assurance Activities [RPO 19-2.3.3.2].

A detailed view of the activities that make up the “Perform Data Collection Phase Processing Work” operational subactivity is given in [Figure 54](#) below.

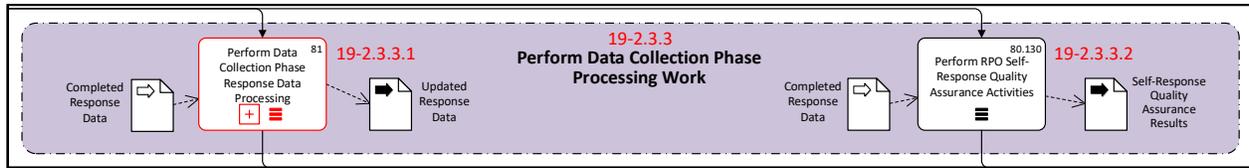


Figure 54: Perform Data Collection Phase Processing Work

This activity covers nightly data processing performed on response data from the data collection operations. This activity includes performing coverage improvement support, coding support, and self-response quality assurance on the collected response data.

4.9.3.1 Perform Data Collection Phase Response Data Processing [RPO 19-2.3.3.1]

The “Perform Data Collection Phase Response Data Processing” operational subactivity is subdivided into the following constituent activities:

- Perform Data Collection Phase Response Data Processing [RPO 19-2.3.3.1].
 - Perform Coverage Improvement (CI) Related Support Activities [RPO 19-2.3.3.1.1].
 - Perform Coding Related Support Activities [RPO 19-2.3.3.1.2].

This activity supports the Coverage Improvement (CI) and the Race and Ethnicity Coding activities.

A detailed view of the constituent activities that make up the “Perform Data Collection Phase Response Data Processing” subactivity is given in [Figure 55](#) below.

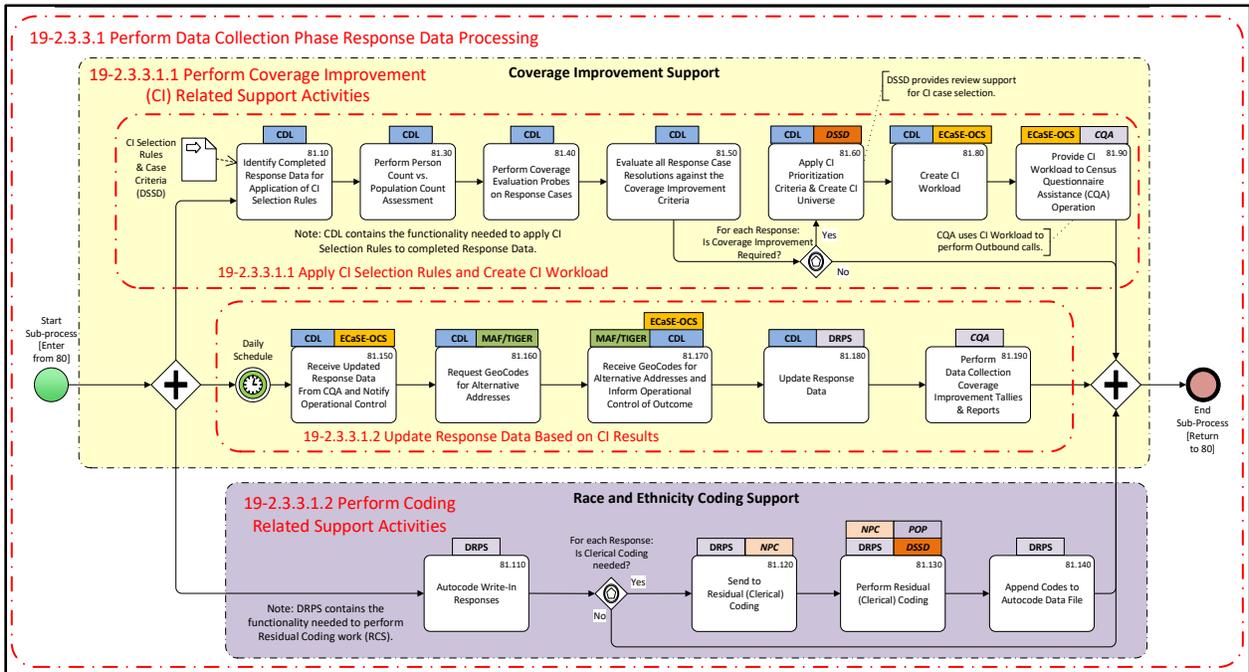


Figure 55: Perform Data Collection Phase Response Data Processing

4.9.3.1.1 Perform Coverage Improvement (CI) Related Support Activities [RPO 19-2.3.3.1.1]

The “Perform Coverage Improvement (CI) Related Support Activities” operational subactivity is subdivided into the following constituent activities:

- Perform Coverage Improvement (CI) Related Support Activities [RPO 19-2.3.3.1.1].
 - 19-2.3.3.1.1.1 Apply CI Selection Rules and Create CI Workload
 - 19-2.3.3.1.1.2 Update Response Data Based on CI Results

The goal of CI is to resolve any erroneous enumerations (people who were counted more than once or in the wrong place) and omissions (people who were missed) from all housing unit data. This will be done through an outbound, computer-assisted telephone interview conducted by CQA.

RPO supports CI by selecting cases that require CI, providing CI workload to CQA, and updating response data based on CI results.

Apply CI Selection Rules and Create CI Workload [RPO 19-2.3.3.1.1.1]

A detailed view of the activities that make up this subactivity is given in [Figure 55](#) above.

DSSD will provide SAS code to CDL that identifies cases eligible for CI and determines the cases to be included in the CI workload. The code will identify cases that have a count discrepancy between the number of people reported to be living at the address and the number of names

that appear on the roster; cases where the response to the undercount question indicates that a person may have been excluded; and cases where it is indicated that a person on the roster usually lives somewhere else.

CDL will identify completed housing unit responses from the self-response (i.e., ISR, Non-ID, paper, CQA), UE, and NRFU operations and run the selection code on these responses. Responses that meet any of the criteria above will be identified as eligible for CI. Additional rules, such as the presence of a valid telephone number, will be applied to determine which cases should be part of the CI workload. DSSD will review these cases and clear them to be sent by CDL to ECaSE-OCS for workload creation. ECaSE-OCS will send the workload to CQA and the NRFU QC CI instrument. CQA Customer Service Representatives (CSRs) will call respondents to conduct the CI interview and collect data using the NRFU QC CI instrument.

Update Response Data Based on CI Results [RPO 19-2.3.3.1.1.2]

A detailed view of the activities that make up this subactivity is given in [Figure 55](#) above.

CDL will receive CI response data from CQA and NRFU QC, including alternate addresses for people who indicate they usually live at another address. CDL will determine if any of the alternate addresses should be sent to MAF/TIGER to be geocoded. Upon receiving the alternate address data from CDL, MAF/TIGER will attempt to geocode the addresses and will send updates from the geocoding process back to CDL. CDL will append the MAFID to the response data, if available and send the updated response data to DRPS. CQA will tally metrics about the data collection process and create reports. CI response data and paradata will be available in CDL for DSSD to monitor the operation and conduct real-time data analysis.

4.9.3.1.2 Perform Coding Related Support Activities [RPO 19-2.3.3.1.2]

A detailed view of the activities that make up this subactivity is given in [Figure 55](#) above.

The Hispanic origin and race coding system consists of three components - autocoding, autocoding supplement, and residual coding.

- The automated coding process is the first attempt to assign unique codes to Hispanic origin and race write-in records collected from the 2020 Census. The Automated Coding system will use the Hispanic Origin and Race Masterfile created by Population Division to code write-in responses. The Hispanic Origin and Race Masterfile is a database that contains actual responses that have accumulated over several decennial censuses and other data collection efforts. The Hispanic Origin and Race Masterfile also contains the codes that were assigned to each response.

- The autocoding supplement is intended to recover from the residual workload cases that are codable but contain extraneous verbiage. To do this, nonmatching write-in parts will be parsed, searching for strings contained within a list of known extraneous verbiage, as compiled by Population Division. The strings contained within this “Ignore List” come from real responses in past data collection efforts. These strings may contain single words or consecutive words, which may be present within a write-in part. Once the identified text has been removed from the comparator, the write-in parts will be re-matched to the Hispanic Origin and Race Masterfile.
- The residual response coding process is the third, and final, attempt to assign unique codes to write-in entries. These write-in records, which could not be matched during the automated coding process, are referred to as “residual responses.” Clerks at NPC, with the assistance of SMEs from Population Division, assign codes to each residual response that could not be coded in the above autocoding processes.

4.9.3.2 Perform RPO Self-Response Quality Assurance Activities [RPO 19-2.3.3.2]

A detailed view of the activity that makes up this subactivity is given in [Figure 54](#) above.

RPO self-response quality assurance activities are performed on a daily basis.

5. RPO Post-Data Collection Phase [RPO 19-3]

This section describes the details of how the RPO Post-Data Collection Phase [RPO 19-3] will be conducted in the 2020 Census. An overview of the activity is presented followed by a context diagram for this activity with its associated inputs, controls, outputs, and mechanisms. Each subactivity is then described in detail, using BPMN to depict the steps in the activity and the key information flows. Refer to the Activity Tree in Appendix C for a list of all of the major operational activities and subactivities associated with the RPO operation.

5.1 Design Overview

Figure 56 shows the BPM for the RPO Post-Data Collection Phase [RPO 19-3] activity area (area within the gray rounded rectangle) and its constituent activities within the overall context of the RPO operation.

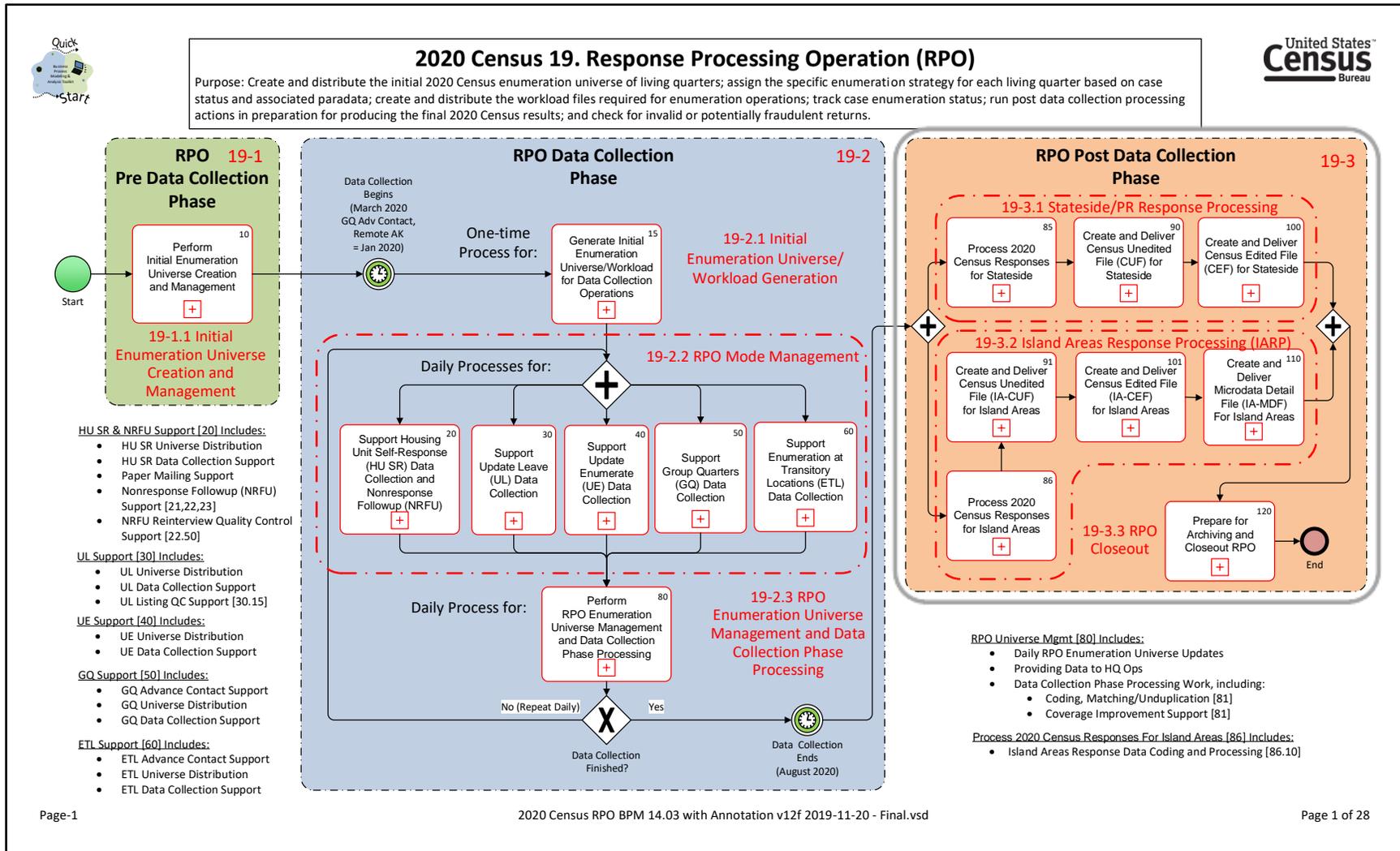


Figure 56: RPO Post-Data Collection Phase [RPO 19-3] Within Top-Level RPO Context Model

Post-data collection processing begins with the processing of 2020 Census response data. As response data are collected the creation of the DRF begins so that subsequent RPO post processing files can be created and delivered.

RPO Post-Data Collection Phase continues with processing activities in preparation for final enumeration universe reconciliation. In an effort to reduce costs associated with field follow-up operations and to ensure optimal coverage, response data cases determined as having sufficient Administrative Records information for enumeration are enumerated. Administrative Records are also used to support resolving final response case record status issues associated with producing the final census output files of the CUF and CEF. RPO is also responsible for leading a review of these files with designated SMEs.

In order to create the Census Unedited File (CUF), a Preliminary Census Unedited File (PCUF) is first created. The PCUF determines if count and status imputation needs to be applied in order to create the CUF. The CUF is used as a data source for coverage measurement operations and the source used to produce the apportionment counts delivered to the President of the United States through the Data Products and Dissemination operation. From the CUF, consistency edits, imputations, and allocations are applied to create the Census Edited File (CEF).

The CEF geography attributes are updated with tabulation entity relational information, preliminary and complex consistency edits are applied, and the Census Edited File (CEF) is delivered to the Census Data Lake (CDL) and other stakeholders. As part of a final closeout, RPO prepares census response data for delivery by the Archiving operation to National Archives and Records Administration (NARA) for the Title 13 prescribed 72-year secured storage. The delivery of the CEF marks the closeout of the RPO stateside processes.

RPO closes out by sending final census output files to NARA and the Census Data Management System (DMS) for archiving.

The RPO Post-Data Collection Phase operational activity [RPO 19-3] is subdivided into the following subactivities:

- Stateside/PR Response Processing [RPO 19-3.1].
- Island Areas Response Processing (IARP) [RPO 19-3.2].
- RPO Closeout [RPO 19-3.3].

Subsequent sections describe the “RPO Post-Data Collection Phase” operational activities in detail.

5.2 Operational Context

Figure 57 is a top-level context diagram for the RPO Post-Data Collection Phase represented as an Integrated Definition, Level 0 (IDEF0) Model. Note that the major operational activities described above are listed in the yellow box in the center of the diagram. Also note that the Information Exchanges internal to the RPO Operation are identified with RPO as the prefix, (e.g., RPO01).

Response Processing Operation (RPO) Post-Data Collection Phase integrates responses collected by data collection modes and field follow-up operations in support of Self-Response operations, NRFU, Update Enumerate, Group Quarters, and Enumeration at Transitory Locations. Responses to the 2020 Census are processed to ensure that complete information is collected, to conduct statistical methods, and to format data files used to produce census results and products. RPO supports post-data collection activities by preparing the data for tabulation and archiving.

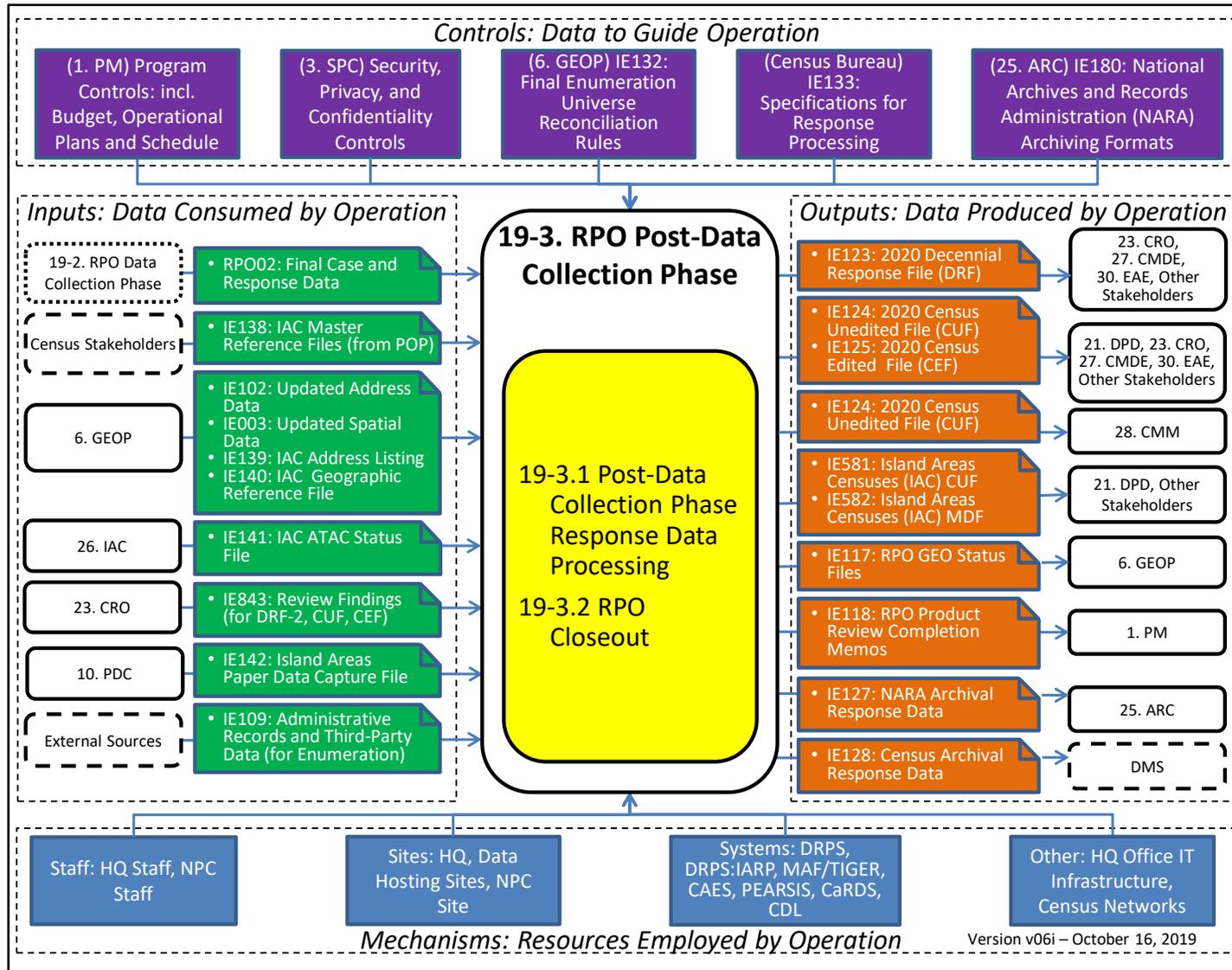


Figure 57: Context Diagram for RPO Post-Data Collection Phase Activity

5.2.1 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 13 lists the inputs to the RPO Post-Data Collection Phase.

Table 13: RPO Post-Data Collection Phase Inputs

Provider	Information Exchange	Description
19-2. RPO Data Collection Phase	RPO02: Final Case and Response Data	The final set of cases and corresponding response data that have been through preliminary data processing (e.g., matching, unduplication, coverage improvement (CI), and coding).
Census Stakeholders	IE138: IAC Master Reference Files (from POP)	<p>The reference files used in the autocoding process are a collection of write-in responses aggregated from previous data collection efforts. The records in this file include a unique string (the previously coded write-in) and its associated codes. It is used to match write-in responses to a code.</p> <p>The reference files used in the residual (clerical) coding activity provide a similar function. These files include common misspellings, terms, word variations, etc. that are associated to a specific write-in code. These files serve as a reference and input tool during the residual (clerical) coding activity.</p> <p>These reference files are provided by the Population Division (POP).</p>
6. Geographic Programs operation (GEOP)	<ul style="list-style-type: none"> • IE102: Updated Address Data • IE003: Updated Spatial Data 	Address and Spatial data from MAF/TIGER are received as a final delivery to RPO. This includes the Final Collection Geography (Address and

Provider	Information Exchange	Description
		Spatial) that is used in RPO DRF creation as well as for the Final Tabulation Geography (Address and Spatial) that is used in RPO CUF creation.
6. Geographic Programs operation (GEOP)	IE139: IAC Address Listing	Address listing data generated from results of the Island Areas Censuses (IAC) data collection operations work.
6. Geographic Programs operation (GEOP)	IE140: IAC Geographic Reference File	Geographic reference data generated for and employed during the Island Areas Censuses (IAC) data collection operations work.
26. Island Areas Censuses operation (IAC)	IE141: IAC ATAC Status File	Status information from the Island Areas Censuses (IAC) data collection work captured by ATAC during IAC office operations check-in activities.
23. Count Review Operation (CRO)	IE843: Review Findings	CRO findings for the Decennial Response File (DRF) (specifically for DRF-2), the Census Unedited File (CUF), and the Census Edited File.
10. Paper Data Capture operation (PDC)	IE142: Island Areas Paper Data Capture File	Response and status information captured by PDC from paper questionnaires employed during the IAC data collection operations work.
External Sources	IE109: Administrative Records and Third-Party Data (for Enumeration)	Data from administrative records from other government sources or third-party data from commercial sources that are used by the Administrative Records modeling function to determine the occupied status of a living quarter (Occupied, Vacant, Delete or

Provider	Information Exchange	Description
		<p>Undetermined) and to determine the best time of day to contact the household to improve the likelihood of a successful contact attempt.</p> <p>These data are also used for supplemental enumeration during the Post-Data Collection Phase.</p>

5.2.2 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 14 lists the controls for the RPO Post-Data Collection Phase.

Table 14: RPO Post-Data Collection Phase Controls

Provider	Information Exchange	Description
1. Program Management operation (PM)	Program Controls	<p>Program Control information including:</p> <ul style="list-style-type: none"> • Budget • Operational Plans and Schedule
3. Security, Privacy, and Confidentiality operation (SPC)	Security, Privacy, and Confidentiality Controls	<p>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.</p>

Provider	Information Exchange	Description
6. Geographic Programs operation (GEOP)	IE132: Final Enumeration Universe Reconciliation Rules	Rules for reconciling final address list and Geographic Reference File (GRF) from GEOP operation with RPO enumeration universe (provided through CaRDS).
Census Bureau	IE133: Specifications for Response Processing	Specifications provided by the Census Bureau with applicable controls for use during RPO response processing activities.
25. Archiving operation (ARC)	IE180: National Archives and Records Administration (NARA) Archiving Formats	Acceptable archiving formats to assist in determining how to prepare response records for archiving based on NARA and Census requirements.

5.2.3 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 15 lists the outputs from the RPO Post-Data Collection Phase.

Table 15: RPO Post-Data Collection Phase Outputs

Consumer	Information Exchange	Description
23. Count Review Operation (CRO) 27. Coverage Measurement Design and Estimation operation (CMDE)	IE123: 2020 Decennial Response File (DRF)	The computer file containing all 2020 Census responses for the final enumeration universe after additional data processing, and application of Primary Selection Algorithm (PSA).

Consumer	Information Exchange	Description
<p>30. Evaluations and Experiments operation (EAE)</p> <p>Other Stakeholders</p>		
<p>21. Data Products and Dissemination operation (DPD)</p> <p>23. Count Review Operation (CRO)</p> <p>27. Coverage Measurement Design and Estimation operation (CMDE)</p> <p>27. Coverage Measurement Matching operation (CMM)</p> <p>30. Evaluations and Experiments operation (EAE)</p> <p>Other Stakeholders</p>	<p>IE124: 2020 Census Unedited File (CUF)</p>	<p>The computer file resulting from application of Count and Status Imputation to the DRF to complete the determination of the address and person count data to be used in the census. It is used to generate apportionment data, as well as used in the Coverage Measurement activities.</p>
<p>21. Data Products and Dissemination operation (DPD)</p> <p>23. Count Review Operation (CRO)</p> <p>27. Coverage Measurement Design</p>	<p>IE125: 2020 Census Edited File (CEF)</p>	<p>The computer file resulting from the application of Data Consistency Editing and Characteristic Imputation to the CUF.</p> <p>The edits include consistency edits and imputation for items or people where the data are insufficient for the 100 percent census data items.</p>

Consumer	Information Exchange	Description
and Estimation operation (CMDE) 30. Evaluations and Experiments operation (EAE) Other Stakeholders		
21. Data Products and Dissemination operation (DPD) Other Stakeholders	IE581: Island Areas Censuses (IAC) CUF	All person and household records for the four Island Areas, including GQ records with person records for the 2020 Census. The CUF is the baseline file for the total count of people and the total count of housings units. The final frame for GQ records is also included.
21. Data Products and Dissemination operation (DPD) Other Stakeholders	IE582: Island Areas Censuses (IAC) MDF	The input files for tabulation (four Island Areas), which have been processed through consistency edits and disclosure avoidance modeling to protect privacy and confidentiality.
6. Geographic Programs operation (GEOP)	IE117: RPO GEO Status Files	Status files provided to GEOP including: <ul style="list-style-type: none"> • 2020 CUF Final Count Status File. • IA-CUF Final Count Status File. • 2020 CEF Geo Status File. • IA-CEF Geo Status File.
1. Program Management operation (PM)	IE118: RPO Product Review Completion Memos	Completion memos provided for distribution include the following examples:

Consumer	Information Exchange	Description
		<ul style="list-style-type: none"> • 2020 CUF Review Completion Memo. • IA-CUF Review Completion Memo. • 2020 CEF Review Completion Memo. • IA-CEF Review Completion Memo. • IA-MDF Review Completion Memo.
25. Archiving operation (ARC)	IE127: NARA Archival Response Data	Response files sent to the Archiving operation in accordance with the NARA archiving specifications.
Data Management System (DMS)	IE128: Census Archival Response Data	Response files sent to DMS in accordance with the archival specifications.

5.2.4 Mechanisms

Mechanisms are the resources (people, places, and things) that are used to perform the operational processes. They include Staff Resources, Infrastructure Sites, Systems, and Other Technology Infrastructure.

Staff Resources

Table 16 identifies the Staff Resources employed for the RPO Post-Data Collection Phase.

Table 16: Staff Resources Used Within RPO Post-Data Collection Phase

Staff Resources	Description/Role
HQ Staff	Headquarters (HQ) staff who manage the RPO operation and coordinate activities.

Staff Resources	Description/Role
National Processing Center (NPC) Staff	NPC staff who perform activities for the RPO operations.

Infrastructure Sites

Table 17 identifies the Infrastructure Sites employed for the RPO Post-Data Collection Phase.

Table 17: Infrastructure Sites for RPO Post-Data Collection Phase

Infrastructure Site	Description/Role
HQ	HQ site for office work conducted in support of the RPO operation.
Data Hosting Sites	Secure facilities that are used to host 2020 Census data and perform associated data processing.
NPC Site	NPC is located in Jeffersonville, Indiana, and performs IARP clerical coding work for RPO.

Systems and Other Technology Infrastructure

Table 18 identifies the Systems employed for the RPO Post-Data Collection Phase.

Table 18: Systems Used Within RPO Post-Data Collection Phase

System	Description
<p>Decennial Response Processing System (DRPS)</p>	<p>This system processes response data from the 50 states, the District of Columbia, and Puerto Rico.</p> <p>The system:</p> <ul style="list-style-type: none"> • Provides Data Collection Phase response processing. <ul style="list-style-type: none"> ○ Stores Response Data. ○ Performs Auto Coding. ○ Performs Manual Coding. • Provides Post-Data Collection Phase response processing. <ul style="list-style-type: none"> ○ Creates 2020 Census CUF and CEF. • Interfaces to ECaSE-OCS and other external systems.
<p>Decennial Response Processing Systems for Island Areas Response Processing (DRPS:IARP)</p>	<p>American Community Survey (ACS) and the Applications Development and Operations (ADO) staff develop the DRPS:IARP.</p> <p>This system processes response data from the four Island Areas—American Samoa, Commonwealth of the Northern Mariana Islands (CNMI), Guam, and the U.S. Virgin Islands (USVI).</p> <p>The system:</p> <ul style="list-style-type: none"> • Receives Island Areas response data and geographic data and stores interim files for processing. • Provides Post-Data Collection Phase response processing. <ul style="list-style-type: none"> ○ Performs Auto Coding. ○ Performs Manual Coding. ○ Creates IA-CUF, IA-CEF, IA-MDF.

System	Description
	<ul style="list-style-type: none"> ○ Facilitates the analysis of microdata files. ● Interfaces between iCADE, CDL, MAF/TIGER and Clerical Coding Systems.
Master Address File MAF/Topologically Integrated Geographic Encoding and Reference (MAF/TIGER)	The MAF/TIGER system provides the corporate address list, the map data, the geocoding service, and the distribution of related geographic and address products either by electronic or paper means.
Concurrent Analysis and Estimation System (CAES)	An enterprise modeling platform that stores data and uses it to execute statistical models in support of survey flow processing, analysis, and control.
Production Environment for Administrative Records Staging, Integration and Storage (PEARSIS)	A system to manage Administrative Records and provide services associated with those records.
Control and Response Data System (CaRDS)	The CaRDS system is used to create the Enumeration Universe and associated control information, which is provided to the enumeration operation via ECaSE-OCS.
Census Data Lake (CDL)	The CDL serves as the centralized repository for decennial response data and paradata. It allows distributed processing capabilities for cost and progress reports and other downstream consumers. CDL is a flexible data management platform intended to provide the Census Bureau with a next-generation scaling capability to fulfill data management, storage, reporting, analytics, and security requirements while reducing costs associated with duplicative data silos.

Other Technology Infrastructure employed for the RPO Post-Data Collection Phase includes:

- HQ Office IT Infrastructure for conducting RPO Post-Data Collection Phase operational work.

- Census network connectivity for data transmission between operational systems and operational sites.

5.3 Stateside/PR Response Processing [RPO 19-3.1]

As shown in [Figure 56](#), the first activity in the RPO Post-Data Collection Phase is Stateside/PR Response Processing. This operational subactivity is subdivided into the following activity areas:

- Stateside/PR Response Processing [RPO 19-3.1].
 - Process 2020 Census Responses for Stateside/PR [RPO 19-3.1.1].
 - Create and Deliver Census Unedited File (CUF) for Stateside/PR [RPO 19-3.1.2].
 - Create and Deliver Census Edited File (CEF) for Stateside/PR [RPO 19-3.1.3].

As response data are received, write-in responses are coded for tabulation purposes. Write-in responses can be flagged and sent to translation, if needed, prior to coding. Coding is conducted by both automated and computer-assisted manual processes. Data are methodically processed to create three output files; DRF, CUF, and CEF. In order to create the final CUF, response data are processed through a few subsequent steps known as the Decennial Response File (DRF), Primary Selection Algorithm (PSA) and Count Imputation. PSA is run to establish the single enumeration record for a Census ID when multiple responses are received. Following the PSA, the universe of census living quarters records is determined. Sometimes these results are inconclusive; records with missing living quarters status or population count are imputed during Count Imputation. The output of DRF, PSA, and Count Imputation is called the Census Unedited File (CUF). The CEF is created by implementing Edits and Characteristic Imputation on the CUF.

The objective of edit and characteristic imputation is to ensure that each record in the CEF is filled with a valid value for the following items:

- Group quarters type
- Tenure
- Detailed vacancy status
- Relationship to householder
- Sex
- Age
- Date of birth
- Hispanic origin
- Race

Subsequent sections describe the “Stateside/PR Response Processing” operational subactivities in detail.

5.3.1 Process 2020 Census Responses for Stateside/PR [RPO 19-3.1.1]

The “Process 2020 Census Responses for Stateside/PR” operational subactivity is subdivided into the following constituent activities:

- Process 2020 Census Responses for Stateside/PR [RPO 19-3.1.1].
 - Supplement Enumeration with AdRec Data [RPO 19-3.1.1.1].
 - Determine Final Enumeration Universe [RPO 19-3.1.1.2].
 - Update and Finalize Decennial Response File (DRF) [RPO 19-3.1.1.3].

This activity performs additional data processing on all 2020 Census response data and creates the Decennial Response File (DRF).

A detailed view of the constituent activities that make up the “Process 2020 Census Responses for Stateside/PR” operational subactivity is given in [Figure 58](#) below.

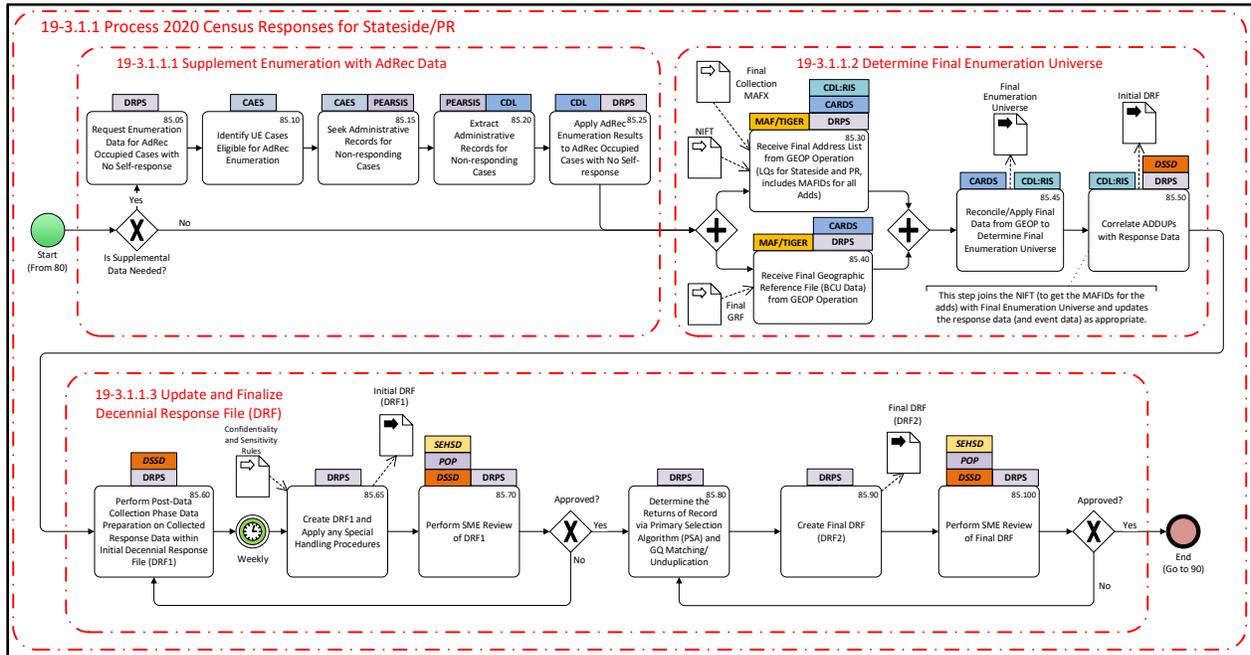


Figure 58: Process 2020 Census Responses for Stateside/PR

5.3.1.1 Supplement Enumeration with AdRec Data [RPO 19-3.1.1.1]

A detailed view of the activities that make up this subactivity is given in [Figure 58](#) above.

In an effort to reduce costs associated with field operations and to ensure optimal coverage, nonresponding cases determined as having sufficient Administrative Records information for enumeration (i.e., AdRec occupied with no self-response) are enumerated in this phase. RPO

performs supplemental enumeration for these cases using data from administrative records and third-party data.

5.3.1.2 Determine Final Enumeration Universe [RPO 19-3.1.1.2]

A detailed view of the activities that make up this subactivity is given in [Figure 58](#) above.

This activity provides RPO with the final complete list of addresses and geographic reference data eligible for the 2020 Census.

5.3.1.3 Update and Finalize Decennial Response File (DRF) [RPO 19-3.1.1.3]

A detailed view of the activities that make up this subactivity is given in [Figure 58](#) above.

During Decennial Response File (DRF) processing, pre-edits are performed to normalize data received from multiple data capture operations. The DRF aggregates response data received from data capture operations. Next, the Primary Selection Algorithm (PSA) is performed to ensure one response per address, selecting one response from multiple responses received for the same census identification number. Finally, RPO conducts a SME review with Social, Economic, and Housing Statistics Division (SEHSD), Population Division (POP), and DSSD of the final DRF, where it is then approved for further processing.

5.3.2 Create and Deliver Census Unedited File (CUF) for Stateside/PR [RPO 19-3.1.2]

A detailed view of the constituent activities that make up the “Create and Deliver Census Unedited File (CUF) for Stateside/PR” operational subactivity is given in [Figure 59](#) below.

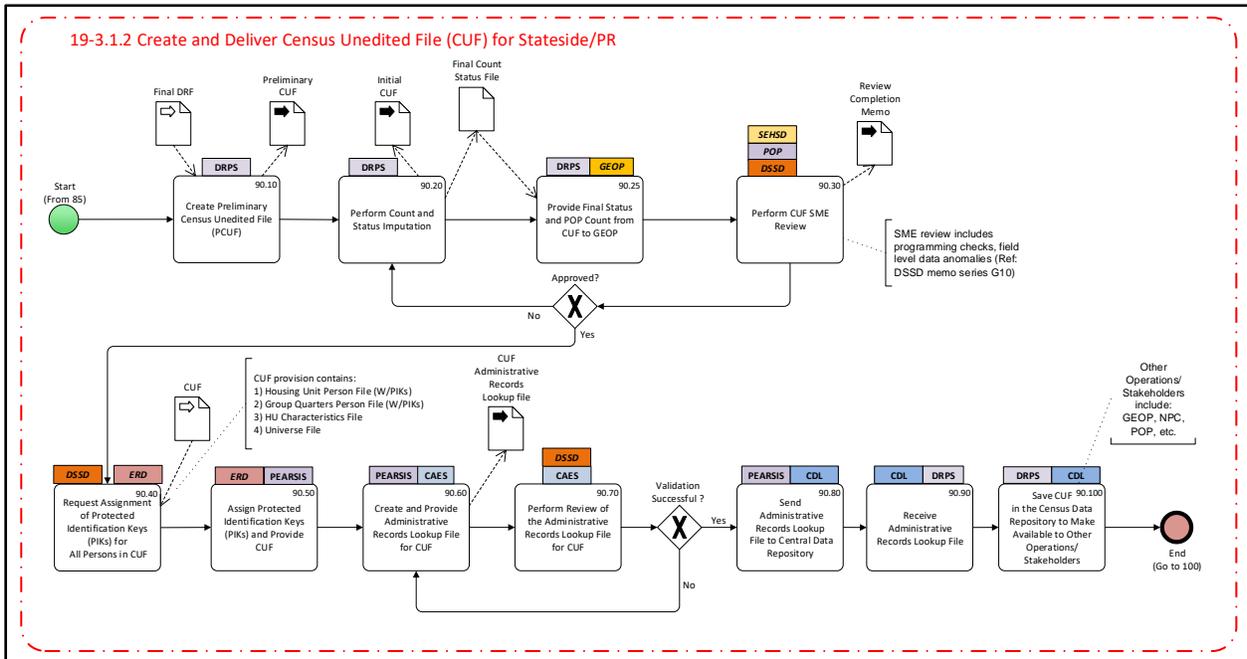


Figure 59: Create and Deliver Census Unedited File (CUF) for Stateside/PR

This activity creates and delivers the CUF that includes population data for apportionment.

Before creating the CUF, the PCUF is created. The PCUF creates the final universe of living quarters by using all the operational and response information collected. This file still includes missing or inconsistent data, so imputation is needed.

Business rules for count imputation are applied to the PCUF, which imputes a population count on unresolved housing units. The CUF gives the final status and population count for each living quarters (housing units and group quarters) included in the 2020 Census, representing the final census universe and the selected final results of the response data collection. RPO conducts a SME review with SEHSD, POP, and DSSD to validate the CUF.

Upon review completion from the SME review, the AdRec file with assignment of Protected Identity Keys is applied to persons in the CUF. Then DRPS sends the final CUF to stakeholders. The CUF is used to support PES estimation and apportionment.

5.3.3 Create and Deliver Census Edited File (CEF) for Stateside/PR [RPO 19-3.1.3]

A detailed view of the constituent activities that make up the “Create and Deliver Census Edited File (CEF) for Stateside/PR” operational subactivity is given in

Figure 60 below.

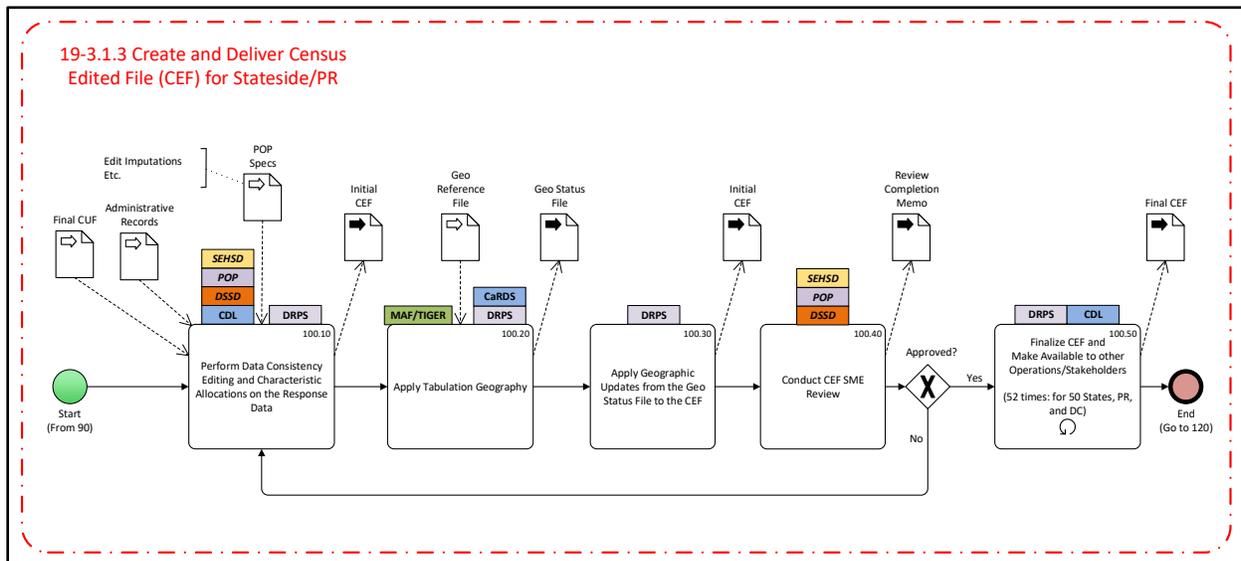


Figure 60: Create and Deliver Census Edited File (CEF) for Stateside/PR

This activity performs final data consistency editing and characteristic imputation of response data and creates and delivers the CEF.

To create the CEF, editing and characteristic imputation are applied as specified. RPO conducts a SME review with SEHSD and POP to validate the CEF.

Upon review completion from the SME review, DRPS sends final CEF to the CDL for use by other stakeholders.

5.4 Island Areas Response Processing (IARP) [RPO 19-3.2]

As shown in Figure 56, the second activity in the RPO Post-Data Collection Phase is Island Areas Response Processing. This operational subactivity is subdivided into the following activity areas:

- Island Areas Response Processing (IARP) [RPO 19-3.2].
 - Process 2020 Census Responses for Island Areas [RPO 19-3.2.1].
 - Create and Deliver a Census Unedited File (IA-CUF) for each Island Areas [19-3.2.2].
 - Create and Deliver a Census Edited File (IA-CEF) for each Island Areas [19-3.2.3].
 - Create and Deliver a Microdata Detail File (IA-MDF) for each Island Areas [19-3.2.4].

Subsequent sections describe the “Island Areas Response Processing” operational subactivities in detail.

5.4.1 Process 2020 Census Responses for Island Areas [RPO 19-3.2.1]

A detailed view of the constituent activities that make up the “Process 2020 Census Responses for Island Areas” operational subactivity is given in [Figure 61](#) and [Figure 62](#) below.

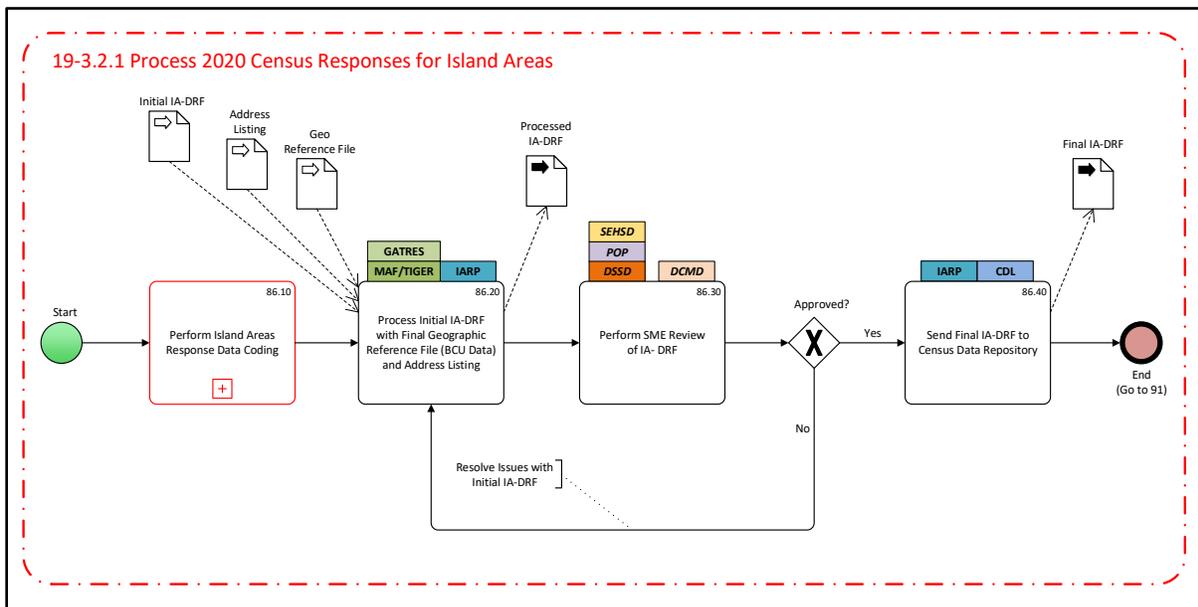


Figure 61: Process 2020 Census Responses for Island Areas

This activity performs additional data processing on all 2020 Census response data within the Decennial Response File (IA-DRF) for Island Areas. This includes using inputs from the initial IA-DRF, Address Listing and the GEO Reference File to process the IA-DRF and performing a SME Review of the IA-DRF before finalizing it and sending it to the CDL.

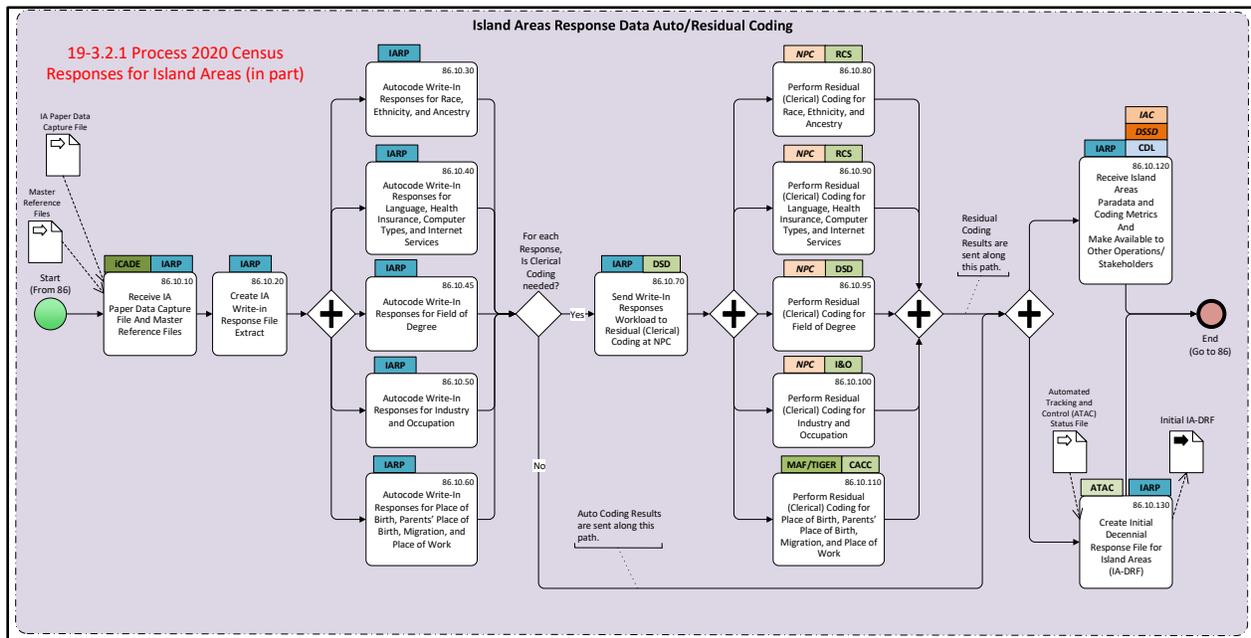


Figure 62: Process 2020 Census Responses for Island Areas (in Part)

In preparation for the 2020 Island Areas Censuses, the American Community Survey Office (ACSO), and the Applications Development and Operations (ADO) staff will develop the Decennial Response Processing Systems for Island Areas Response Processing (DRPS:IARP). The Response Processing Operation (RPO) will utilize the DRPS:IARP to process response data from the four Island Areas—American Samoa, Commonwealth of the Northern Mariana Islands (CNMI), Guam, and the U.S. Virgin Islands (USVI)—and facilitate the analysis of microdata files.

DRPS:IARP will be capable of receiving, storing, coding, and editing the response data. DRPS:IARP will transform the records so they are compatible with current production ACS software. They will then be able to perform auto-coding on write-in response data and send files to the National Processing Center (NPC) to perform residual (clerical) coding. After the response data is coded, DRPS:IARP will create the Decennial Response File (IA-DRF) for each Island Areas.

5.4.2 Create and Deliver Census Unedited File (IA-CUF) for Island Areas [RPO 19-3.2.2]

A detailed view of the constituent activities that make up the “Create and Deliver Census Unedited File (IA-CUF) for Island Areas” operational subactivity is given in [Figure 63](#) below.

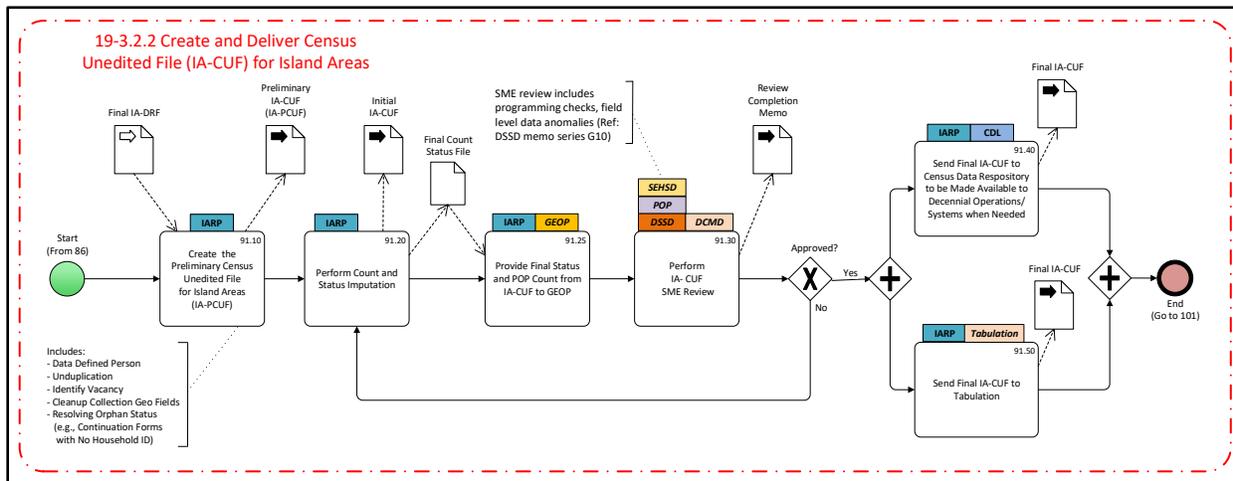


Figure 63: Create and Deliver Census Unedited File (IA-CUF) for Island Areas

The creation and delivery of the Census Unedited File (IA-CUF) for Island Areas starts with an input of the final Island Areas DRF (IA-DRF). IARP will process the final IA-DRF and produce the preliminary Census Unedited File (IA-PCUF) for Island Areas and count and status imputation. POP/ SEHSD and DSSD will perform a SME review on the IA-CUF and DCMD will receive a review completion memo and the final IA-CUF is delivered to CDL.

5.4.3 Create and Deliver Census Edited File (IA-CEF) for Island Areas [RPO 19-3.2.3]

A detailed view of the constituent activities that make up the “Create and Deliver Census Edited File (IA-CEF) for Island Areas” operational subactivity is given in Figure 64 below.

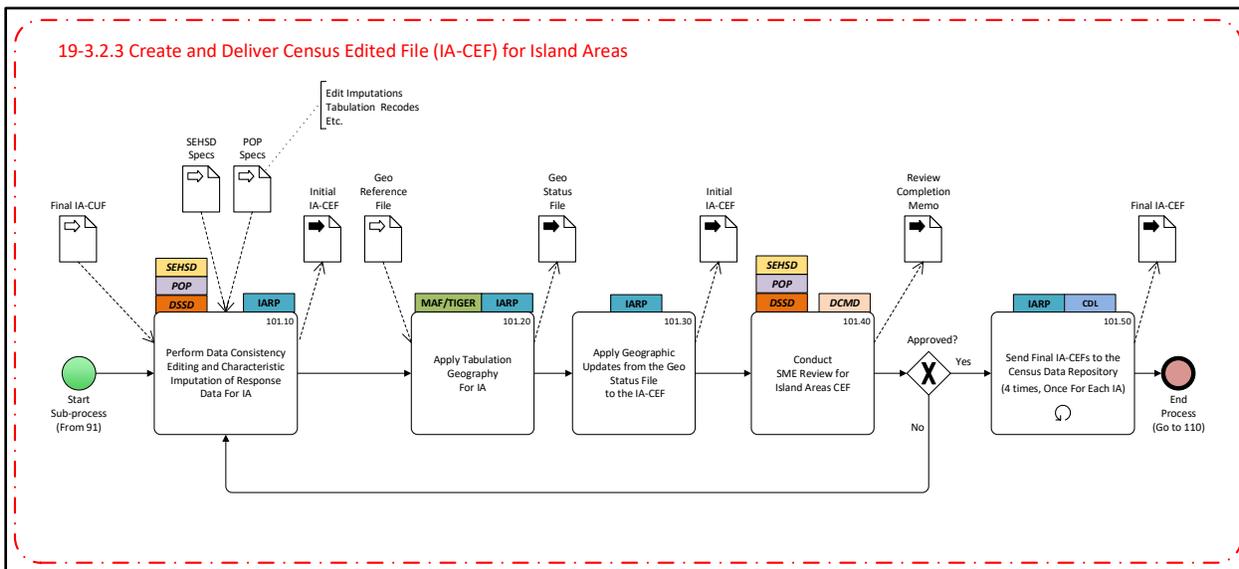


Figure 64: Create and Deliver Census Edited File (IA-CEF) for Island Areas

The Census Edited File (IA-CEF) for Island Areas is created by performing final data consistency editing and characteristic imputation of IA-CUF to create the IA-CEF. Then GEO provides IARP with a geographic reference files for the Island Areas. Once IARP applies the geographic updates from the GEO status file, it creates the Initial IA-CEF. POP and SEHSD will perform a SME review on the IA-CEF and DCMD will receive a review completion memo. The final IA-CEF will be delivered to CDL for each of the four Island Areas.

5.4.4 Create and Deliver Microdata Detail File (IA-MDF) for Island Areas [RPO 19-3.2.4]

A detailed view of the constituent activities that make up the “Create and Deliver Microdata Detail File (IA-MDF) for Island Areas” operational subactivity is given in Figure 65 below.

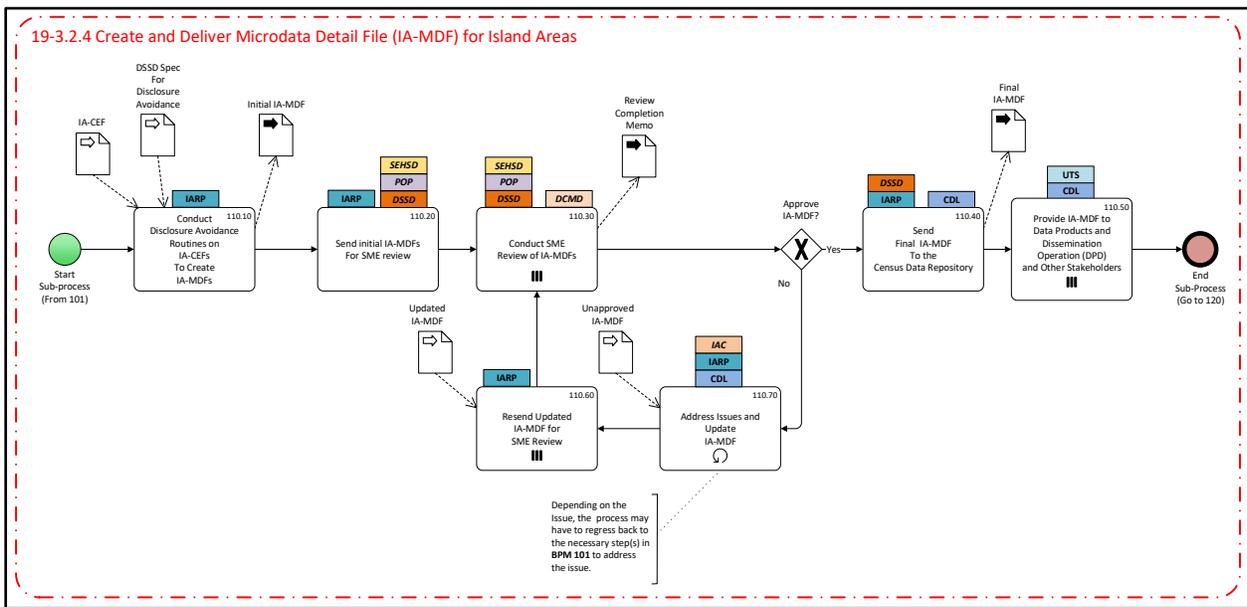


Figure 65: Create and Deliver Microdata Detail File (IA-MDF) for Island Areas

The creation and delivery of the Microdata Detail File (IA-MDF) is dependent on the following inputs:

- Final IA-CEF
- Applied Disclosure Avoidance Methodology
- Geographic Reference Files (GRF-N and GRF-C)

DSSD applies the disclosure avoidance methodology described in the IAC Disclosure Avoidance Specification to the final IA-CEF. The GRF files included as an input to the IA-MDF are used for tabulation purposes. Once the initial IA-MDF is produced, SMEs in POP, SEHSD and DSSD will receive and review the file. Once the data have been reviewed, DCMD will receive a review completion memo, and the final IA-MDF is delivered to CDL.

5.5 RPO Closeout [RPO 19-3.3]

As shown in Figure 56, the third activity in the RPO Post-Data Collection Phase is RPO Close-Out.

Figure 66 shows the BPM with detail for the RPO Closeout [RPO 19-3.3] activity area and its constituent activities.

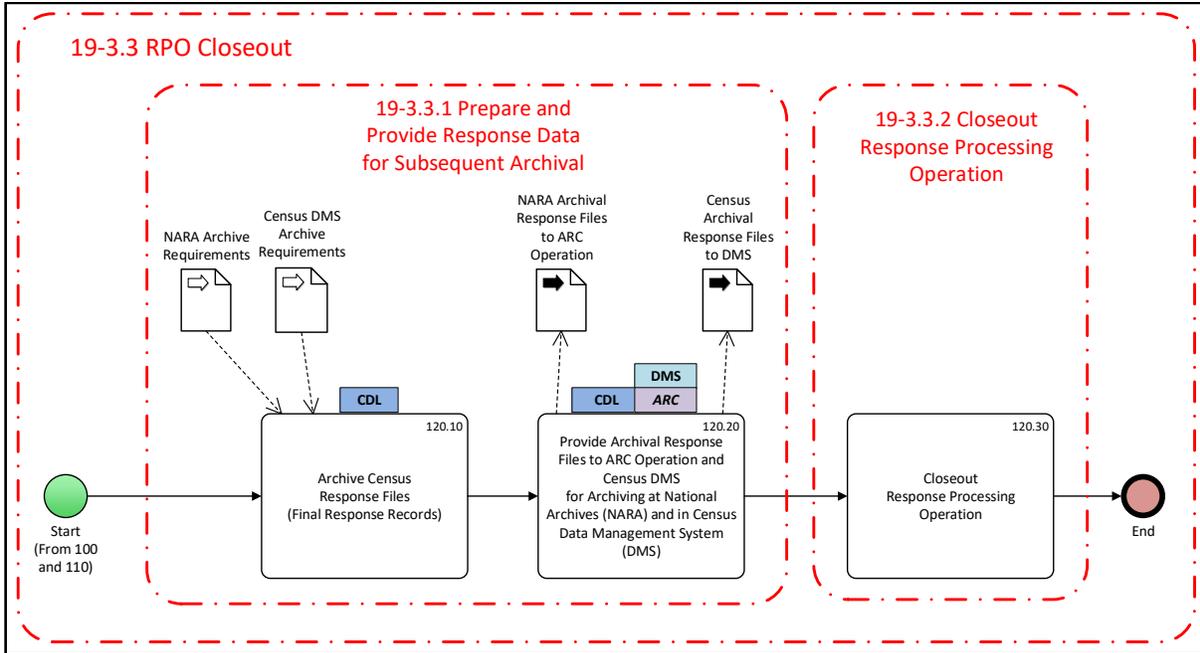


Figure 66: RPO Closeout

The RPO Closeout operational subactivity is subdivided into the following activity areas:

- RPO Closeout [RPO 19-3.3].
 - Prepare and Provide Response Data for Subsequent Archival [RPO 19-3.3.1].
 - Closeout Response Processing Operation [RPO 19-3.3.2].

Subsequent sections describe the “RPO Closeout” operational subactivities in detail.

5.5.1 Prepare and Provide Response Data for Subsequent Archival [RPO 19-3.3.1]

A detailed view of the activities that make up this subactivity is given in Figure 66 above.

This activity prepares and provides final response records for archiving at National Archiving (NARA) and Census Data Management system.

5.5.2 Closeout Response Processing Operation [RPO 19-3.3.2]

A detailed view of the activity that makes up this subactivity is given in Figure 66 above.

This activity closes out 2020 Census RPO by ensuring decennial headquarters staff have adequate information to assess post processing output files (i.e., CUF and CEF) and the 2020 Census Response Processing Operation.

6. Cost Factors

6.1 Background

The investment in RPO is projected to influence (reduce ↓ or increase ↑) the 2020 Census overall costs in the following ways:

- Real-time adjustment of the universe adjusted based on response status. (↓)
- Use of administrative records and third-party data (see NRFU). (↓)
- Flexible, rule-based decisions on the most cost-effective approach for collecting responses (expected to reduce in-field workloads). (↓)

6.2 Relevant IDEF0 Mechanisms

While the RPO operation 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 comprise part of the 2020 Census cost elements:

Staff

- HQ Staff
- NPC Staff

Sites

- HQ
- Data Hosting Sites
- NPC Site

Systems

- ECaSE
- CaRDS
- IPTS
- PEARSIS
- CAES
- SMarCS
- LiMA
- CDL
- DRPS
- IARP
- MAF/TIGER

- UTS

Other

- HQ Office IT Infrastructure
- Census Networks

7. Measures of Success

For the 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 Response Processing Operation (RPO) for details on the measures of success.

Appendix A – Acronyms and Terminology

Table 19 lists the acronyms and abbreviations used within this Detailed Operational Plan document.

Table 19: Acronyms and Abbreviations List

Acronym	Meaning
ACO	Area Census Office
ACS	American Community Survey
ADDCP	Associate Director for Decennial Census Programs
ADDUPs	Address Updates
ADO	Applications Development and Operations
AdRec	Administrative Records
ARC	Archiving operation
BCU	Basic Collection Unit
BPM	Business Process Model
BPMN	Business Process Modeling and Notation
CAES	Concurrent Analysis and Estimation System
CaRDS	Control and Response Data System
CDL	Census Data Lake
CEF	Census Edited File
CI	Coverage Improvement
CMDE	Coverage Measurement Design and Estimation operation
CMM	Coverage Measurement Matching operation
CQA	Census Questionnaire Assistance operation
CRO	Count Review Operation
CSR	Customer Service Representative
CUF	Census Unedited File
DC	District of Columbia
DCI	Data Capture and Integration

Acronym	Meaning
DCMD	Decennial Census Management Division
DLM	Decennial Logistics Management operation
DMS	Data Management System
DOP	Detailed Operational Plan
DPD	Data Products and Dissemination operation
DRF	Decennial Response File
DRIS	Decennial Response Integration System
DRPS	Decennial Response Processing System
DSC	Decennial Service Center operation
DSF	Delivery Sequence File
DSSD	Decennial Statistical Studies Division
EAE	Evaluations and Experiments operation
ECaSE	Enterprise Census and Survey Enabling
ECaSE ENUM	Enterprise Census and Survey Enabling Enumeration
E-Response	Electronic Data Submissions (for group quarters only)
ETL	Enumeration at Transitory Locations operation
FAQ	Frequently Asked Questions
FLDI	Field Infrastructure operation
FOCS	Field Operational Control System
FPD	Forms Printing and Distribution operation
FV	Field Verification
GDC	Geographic Data Capture
GDI	Geographic Data Integration
GDP	Geographic Data Processing
GEO	Geography Division
GEOP	Geographic Programs operation
GPS	Global Positioning System
GQ	Group Quarters operation

Acronym	Meaning
GQAC	Group Quarters Advance Contact
GQE	Group Quarters Enumeration
GRF	Geographic Reference File
HDF	Hundred Percent Detail File
HH	Household
HQ	Headquarters
HU	Housing Unit
IA	Island Areas
IAC	Island Areas Censuses
IA-CEF	Island Areas - Census Edited File
IA-CUF	Island Areas - Census Unedited File
IA-DRF	Island Areas - Decennial Response File
IA-MDF	Island Areas - Microdata Detail File
IA-PCUF	Island Areas - Preliminary Census Unedited File
IARP	Island Areas Response Processing
iCADE	integrated Computer Assisted Data Entry system
ICQ	Individual Census Questionnaires
ID	Identifier
IDEFO	Integrated Definition, Level 0
IE	Information Exchange
IMb®	Intelligent Mail barcode®
IOD	Integrated Operations Diagram
IPT	Integrated Project Team
IPTS	Intelligent Mail Barcode Postal Tracking System
ISR	Internet Self-Response operation
IT	Information Technology
ITIN	Information Technology Infrastructure operation
LiMA	Listing and Mapping Application

Acronym	Meaning
LQ	Living Quarters
LUCA	Local Update of Census Addresses operation
MAF	Master Address File
MAF/TIGER	Master Address File / Topologically Integrated Geographic Encoding and Referencing
MAFID	Master Address File Identifier
MAFX	Master Address File Extract
MCM	Mobile Case Management
MDF	Microdata Detail File
MDR	Metadata Repository
MVE	Maritime/Military Vessel Enumeration
NARA	National Archives and Records Administration
NID	Non-ID Processing operation
Non-ID	Non Identifier
NPC	National Processing Center
NRFU	Nonresponse Followup operation
OC	Operational Control
OCS	Operational Control System
PCUF	Preliminary Census Unedited File
PDC	Paper Data Capture
PEARSIS	Production Environment for Administrative Record Staging, Integration and Storage
PES	Post Enumeration Survey operations
PM	Program Management operation
PMGB	Portfolio Management Governing Board
POP	Population Division
PQ	Paper Questionnaire
PR	Puerto Rico
PSA	Primary Selection Algorithm

Acronym	Meaning
QA	Quality Assurance
QC	Quality Control
QCM	Quality Control Management
QOO	Quality Outbound Operation
RA	Remote Alaska
RDI	Response Data Integration
RI	Reinterview
RPO	Response Processing Operation
RPS	Response Processing System
SAS	Statistical Analysis System (COTS Product)
SBE	Service-Based Enumeration
SDF	Sample Delivery File
SEHSD	Social, Economic, and Housing Statistics Division
SEI	Systems Engineering and Integration operation
SMaRCS	Sampling, Matching, Review, and Coding System
SME	Subject Matter Expert
SOCS	Survey Operational Control System
SPC	Security, Privacy, Confidentiality operation
SR	Self-Response
SRV	Self-Reported Vacant
TEA	Type of Enumeration Area
TIGER	Topologically Integrated Geographic Encoding and Referencing system
TL	Transitory Location
TLAC	Transitory Location Advance Contact
UC	Universe Creation
UCM	Universe Control and Management
UE	Update Enumerate operation
UL	Update Leave operation

Acronym	Meaning
UM	Universe Management
UPO	Universe Control and Management (UCM) Production Operation
US	United States
USPS	United States Postal Service
UTS	Unified Tracking System

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 (2018), "[2020 Census Operational Plan](#)," Version 4.0, December 31, 2018.

U.S. Census Bureau (2018), "Preparing for the 2020 Census Operational Assessment Study Plan," Draft, May 10, 2018.

Walker, S., Winder, S., Jackson, G., and Heimel, S. (April 2012), "2010 Census Nonresponse Followup (NRFU) Operations Assessment Report," U.S. Census Bureau. Washington, DC.

Appendix C – Activity Tree for Response Processing Operation (RPO)

This appendix presents the Activity Tree for the RPO. 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 “19,” the first activity would be numbered 19-1. 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 19-1.1 the second subactivity as 19-1.2. The second activity would be numbered 19-2, and so on.

Response Processing Operation Activity Tree

➤ 19-1 RPO Pre-Data Collection Phase

- 19-1.1 Initial Enumeration Universe Creation and Management
 - 19-1.1.1 Decennial Universe Inputs
 - 19-1.1.1.1 Create Decennial Requirements for Enumeration Universe
 - 19-1.1.1.2 Receive Universe Input Data
 - 19-1.1.2 Decennial Enumeration Universe Creation and Delivery
 - 19-1.1.2.1 Create Initial Enumeration Universe
 - 19-1.1.2.2 Provide Initial Enumeration Universe to RPO Universe Management (UM)
 - 19-1.1.3 Pre-Data Collection Housing Unit Self-Response (HUSR) Paper Mailing Support

➤ 19-2 RPO Data Collection Phase

- 19-2.1 Initial Enumeration Universe/Workload Generation
 - 19-2.1.1 Generate Initial Enumeration Universe Case List for HU Self-Response Operations
 - 19-2.1.2 Generate Initial UL Universe/Workload for UL Operational Control (OC)
 - 19-2.1.3 Generate Initial UE Universe/Workload for UE Operational Control (OC)
 - 19-2.1.4 Generate Initial GQ Universe/Workload for GQ Advance Contact Operational Control (OC)
 - 19-2.1.5 Generate Initial ETL Universe/Workload for ETL Advance Contact Operational Control (OC)
- 19-2.2 RPO Mode Management
 - 19-2.2.1 Support Housing Unit Self-Response (HUSR) Data Collection and Nonresponse Followup (NRFU)
 - 19-2.2.1.1 Distribute HU SR Universe Case List Information
 - 19-2.2.1.2 Receive HU Self-Response Status and Response Data
 - 19-2.2.1.3 Manage HU Self-Response and NRFU Response Results

19. Response Processing Operation (RPO)

- 19-2.2.1.4 Provide HU Self-Response Data Collection Paper Mailing Support
- 19-2.2.1.5 Provide Nonresponse Followup (NRFU) Support
 - 19-2.2.1.5.1 Create Initial NRFU Universes and Apply AdRec Modeling Results
 - 19-2.2.1.5.1.1 Create Early NRFU Universe
 - 19-2.2.1.5.1.2 Create Initial Production NRFU Universe (incl. FV Workload)
 - 19-2.2.1.5.2 Provide NRFU Data Collection Support
 - 19-2.2.1.5.2.1 Receive NRFU Response and Status Data
 - 19-2.2.1.5.2.2 Manage NRFU Response Results
 - 19-2.2.1.5.2.2.1 Process NRFU Response Results
 - 19-2.2.1.5.2.2.2 Perform Reinterview Quality Control Support for NRFU
 - 19-2.2.1.5.3 Manage Daily NRFU Universe/Workload Updates
 - 19-2.2.1.5.3.1 Manage Daily NRFU Case Updates
 - 19-2.2.1.5.3.2 Apply Additional AdRec Modeling Results to Production NRFU Universe
- 19-2.2.2 Support Update Leave (UL) Data Collection
 - 19-2.2.2.1 Distribute UL Universe/Workload Information
 - 19-2.2.2.2 Receive UL Listing and UL Case Status Data
 - 19-2.2.2.3 Manage UL Listing and Case Status Results
 - 19-2.2.2.3.1 Perform UL Listing QC Support
 - Select Listing QC Sample for UL Field Work
 - Create Listing QC Workload for UL Operation
 - Receive Listing QC Results from Field
 - 19-2.2.2.3.2 Process UL Case Status Results
 - 19-2.2.2.3.3 Process UL Listing Results
- 19-2.2.3 Support Update Enumerate (UE) Data Collection
 - 19-2.2.3.1 Distribute UE Universe/Workload Information
 - 19-2.2.3.2 Receive UE Response and Status Data
 - 19-2.2.3.3 Process UE Response/Status Results
 - 19-2.2.3.4 Process UE Listing Results
- 19-2.2.4 Support Group Quarters (GQ) Data Collection
 - 19-2.2.4.1 Provide GQ Advance Contact Data Support
 - 19-2.2.4.2 Distribute GQ Enumeration Universe/Workload Information
 - 19-2.2.4.3 Receive GQ Enumeration Response and Status Data
 - 19-2.2.4.4 Manage GQ Enumeration Response Results
 - 19-2.2.4.5 Provide Maritime/Military Vessel Enumeration (MVE) Support

19. Response Processing Operation (RPO)

- 19-2.2.5 Support Enumeration at Transitory Locations (ETL) Data Collection
 - 19-2.2.5.1 Provide ETL Advance Contact Data Support
 - 19-2.2.5.2 Distribute ETL Enumeration Universe/Workload Information
 - 19-2.2.5.3 Receive ETL Response and Status Data
 - 19-2.2.5.4 Manage ETL Response Results
 - 19-2.3 RPO Enumeration Universe Management and Data Collection Phase Processing
 - 19-2.3.1 Manage Daily RPO Enumeration Universe/Workload Updates
 - 19-2.3.1.1 Manage Enumeration Universe Updates
 - 19-2.3.1.2 Manage GQ Universe/Workload Updates
 - 19-2.3.1.3 Manage ETL Universe/Workload Updates
 - 19-2.3.1.4 Perform Supplemental Universe Update
 - 19-2.3.2 Provide Data to HQ Ops
 - 19-2.3.3 Perform Data Collection Phase Processing Work
 - 19-2.3.3.1 Perform Data Collection Phase Response Data Processing
 - 19-2.3.3.1.1 Perform Coverage Improvement (CI) Related Support Activities
 - 19-2.3.3.1.1.1 Apply CI Selection Rules and Create CI Workload
 - 19-2.3.3.1.1.2 Update Response Data Based on CI Results
 - 19-2.3.3.1.2 Perform Coding Related Support Activities
 - 19-2.3.3.2 Perform RPO Self-Response Quality Assurance Activities
- **19-3 RPO Post-Data Collection Phase**
 - 19-3.1 Stateside/PR Response Processing
 - 19-3.1.1 Process 2020 Census Responses for Stateside/PR
 - 19-3.1.1.1 Supplement Enumeration with AdRec Data
 - 19-3.1.1.2 Determine Final Enumeration Universe
 - 19-3.1.1.3 Update and Finalize Decennial Response File (DRF)
 - 19-3.1.2 Create and Deliver Census Unedited File (CUF) for Stateside/PR
 - 19-3.1.3 Create and Deliver Census Edited File (CEF) for Stateside/PR
 - 19-3.2 Island Areas Response Processing (IARP)
 - 19-3.2.1 Process 2020 Census Responses for Island Areas
 - 19-3.2.2 Create and Deliver Census Unedited File (IA-CUF) for Island Areas
 - 19-3.2.3 Create and Deliver Census Edited File (IA-CEF) for Island Areas
 - 19-3.2.4 Create and Deliver Microdata Detail File (IA-MDF) for Island Areas
 - 19-3.3 RPO Closeout
 - 19-3.3.1 Prepare and Provide Response Data for Subsequent Archival
 - 19-3.3.2 Closeout Response Processing Operation