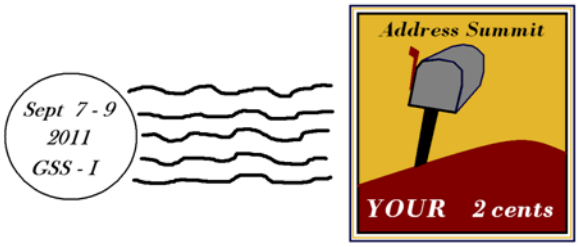

U.S. Census Bureau

Geography Division

Final Report

GSS-I Address Summit Pilot: Federal/State/Tribal/Local Address Management Coordination

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Version 1.0

Revision History

(Managed and Controlled Document)

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Approval Log

This Final Report has been reviewed and approved for use.

Date	Version	Name & Area Represented	Signature	Description of Major Changes
	1.0	Timothy F. Trainor Chief, Geography Division		
	1.0	Deirdre Dalpiaz Bishop Mentor, Geographic Operations Advisor		
	1.0	Michael Ratcliffe Mentor, Assistant Division Chief Geocartographic Products and Criteria		
3/22/13	1.0	Pilot Team- Crawford, Biggio, Joyce, Sadrak, Benjamin, Johnson, Sewash, Mitchell, Baldwin, Nez, Fashoway, Bello	/S/ignature	

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1. Overview

The Geographic Support System Initiative (GSS-I) is an integrated program of improved address coverage, continual spatial feature updates, and enhanced quality assessment and measurement. It will allow for a targeted, rather than full, address canvassing during 2019 in preparation for the 2020 Census. A pivotal piece of the GSS-I will be working with federal, state, local, and tribal governments, as well as other key stakeholders, to create an address list that is suitable for this purpose.

In preparation, the Census Bureau's Geography Division hosted a Census Address Summit in September 2011. Forty-four external experts in the fields of address list development, maintenance, and sharing attended the summit.

The goals of the Address Summit were as follows:

1. To educate Census Bureau partners about the GSS-I and the benefits of conducting a targeted address canvassing.

2. To gain a common understanding regarding the definition of an address.

3. To learn how Census Bureau partners are collecting, utilizing, and maintaining addresses.

    i. What industry standards are they following?
    ii. What are their best practices?
    iii. What are their major challenges?
    iv. What are their current practices for data sharing?

4. To brainstorm about potential pilot projects that will contribute to the improved quality of the Census Bureau's Master Address File (MAF).

During the Address Summit, attendees proposed six pilot projects. Geography Division determined that five pilots were feasible and began development in January 2012. One pilot was determined to be duplicative of other efforts occurring within the division and therefore, was not included. The goal of each pilot project follows:

- Address Authority Outreach and Support for Data Sharing Efforts Pilot

  To research and develop an approach for identifying and creating an inventory of address authorities which facilitates address data sharing activities and provides guidance on overcoming barriers (legal/policy) at the local level.

- Federal Geographic Data Committee (FGDC) Address Standards and Implementation Pilot

  To educate local authorities on the benefits, use, and implementation of the FGDC's United States Thoroughfare, Landmark, and Postal Address Data Standard (FGDC Address Standard).

- Federal/State/Tribal/Local Address Management Coordination Pilot

  To create a formalized model to allow for the development, maintenance, and bi-directional (state-local, state-federal, and tribal-federal) sharing of high quality multiple use address data.

- Data Sharing - Local, State, U.S. Postal Service (USPS), and Census Pilot

  To create an address data exchange model that will allow for address data sharing between local governments, state governments, the USPS, and the Census Bureau. It will provide a business process that increases the accuracy and coverage of local government address lists, while streamlining the process of sharing those externally.

- Hidden/Hard to Capture Addresses Pilot

  To determine how to capture hidden and hard to capture addresses in the Master Address File and make them useful for enumeration purposes.

This report focuses specifically on the Federal/State/Tribal/Local Address Management Coordination Pilot (hereafter referred to as 'the pilot').

2. Introduction

The goal of the pilot was to create a formalized model that allows for the development, maintenance, and bi-directional (state-local, state-federal, and tribal-federal) sharing of high quality multiple use address data.

As part of the 50 States Initiative (http://www.fgdc.gov/policyandplanning/50states/50states), a collaboration between the Federal Geographic Data Committee (FGDC) and the National States Geographic Information Council (NSGIC), many state governments are actively seeking to develop state-wide geospatial data sets, as well as processes designed to maintain the currency of the data at the state level. The "framework themes" identified by the 50 States Initiative, however, do not specifically mention address data (although cadastral data is included). During the process of developing strategic and business plans to meet the goals of the initiative, several states identified address data (beyond cadastral data) as a key component of their spatial data infrastructure.

In addition, multiple organizations, including NSGIC, the National Emergency Number Association (NENA), and the National Alliance for Public Safety GIS Foundation (NAPSG), are stressing the need for improved address data sharing to improve efficiency, reduce costs and duplication of effort, and to enhance public safety. (See http://www.nsgic.org/addresses-for-the-nation for an example.) These same organizations have expressed interest in compiling formalized models for address data sharing.

Different states are at various stages of development of statewide address data sets, and those who are at earlier stages stand to benefit from the experiences of those further along. Tribal governments also recognize the need for improving their address data and sharing it across

various levels of government in an effort to improve efficiency, reduce costs and enhance public safety. Like states, different tribal governments are at various stages of development in terms of achieving this goal, and they also can benefit from the experiences of other states and tribal governments, and existing research. All stakeholders, including the Census Bureau, will benefit from the creation of an address data-sharing model that can be adopted by any state or tribe.

The pilot team consisted of four Census Bureau employees from the Geography Division along with representation from Montana (MT), Navajo Nation (NN), New York (NY), and North Carolina (NC). The team worked from January 2012 through December 2012, developing a model that promotes bi-directional address data sharing and testing parts of the model. A key component of the model is a feedback loop, through which the Census Bureau will communicate to partners information about a partner-supplied address file, in particular how it may be used to improve the MAF and observations concerning the file's completeness and quality.

According to the model developed by the pilot team, the feedback provided by the Census Bureau would be shared between state and local partners, and between tribal and sub-tribal partners as necessary. The pilot team attempted to test as much of the model as possible. The testing completed as part of the pilot involved the following:

- Gather address data – Local to State/Tribal
- Gather address data – State/Tribal to Federal, and
- Census feedback to partners (data providers)

Sections 4 through 7 describe the components of the model tested by the pilot team. Included are recommendations, based on the experience of the pilot team, to inform the Geography Division's (hereafter referred to as "the GEO") partnering efforts going forward.

3. Objectives

The objectives of the pilot include:

1. Identifying best practices, processes, roles and responsibilities, and standards for address development, maintenance, and sharing
2. Developing, and testing to the extent possible, a model that will result in a bi-directional sharing of address data that meets the business needs of the Census Bureau and external stakeholders

4. Methodology

A. Developing the Model

The pilot team's initial meetings focused on information gathering. This information would feed into developing an address data-sharing model. All of the pilot team's initial external partners (the states of New York and North Carolina and the Navajo Nation) shared their experiences working with local governments to acquire address data. The pilot team members from the GEO (hereafter referred to as the "internal pilot team") shared information from their experience working with address data, spatial data and Census Bureau partnerships. Additionally, the

internal pilot team spoke to other addressing experts at the Census Bureau and reviewed the efforts of a number of organizations with addressing interests, including the FGDC, NSGIC, NENA, and other state agencies gathering this information.

The pilot team's research concluded that many state, tribal, and local governments used similar approaches in their endeavor to build address datasets. Based on the commonly applied approaches for building address datasets (including methods to identify address authorities and establish partnerships with those authorities), the internal pilot team drafted a model for bi-directional address data sharing and presented it to the external partners for their review and comment.

The pilot team recognized that much of the research and effort completed by sources outside of the pilot team (NSGIC, FGDC, NENA, other state governments not part of the pilot), produced artifacts that would be useful resources to state and tribal governments striving to build state or Native American reservation area-wide address data sets. The pilot team planned to include, as a supplement to the model, a resource library that documented and summarized the work of these other sources. The plan was for the library to be updated regularly so that at any point in time it would reflect the latest developments in address data maintenance and sharing.

As development of the model progressed, the plan was for the external team members to test, to the extent possible, elements of the model they were not already implementing. This plan was limited in that the pilot team developed the model based largely on the experiences of the external partners and they were already implementing many elements of the model. In an effort to make the testing more robust, the pilot team added two additional partners: the State of Montana and Guilford Metro 911 (North Carolina). Because the model covered both "local to state/tribe" data exchanges and "state/tribe to federal" data exchanges, the pilot team believed it was important to also include a local organization like Guilford Metro 911 to provide direct local input and feedback. Because Guilford Metro 911 is in North Carolina, and a representative from the Center for Geographic Information and Analysis (CGIA) in North Carolina was already on the pilot team representing the role of a "state," the pilot team benefitted from direct input from both sides of the state-local aspect of address data exchange.

To fulfill the pilot's objective to develop a model for bi-directional sharing, the team explored how the Census Bureau could provide information about address data to state, tribal, and local partners. The internal pilot team looked to the external partners to learn what types of information the Census Bureau could provide that would help them develop and improve their address data sets, strengthen their efforts to facilitate partnerships (at the local-to-state/tribal level), and build or reinforce their business cases. This effort evolved into a proposed set of census feedback products (see 4.D. *Census feedback to partners (data providers)*).

B. Gathering Address Data – Local-to-State/Tribe

Each of the four pilot partner areas had, in different ways, done work prior to the pilot project towards gathering address data from local partners. Below describes the experiences of the pilot partners in their data gathering efforts.

Montana

The Montana Address Database started in 2008 as an effort to create a statewide structure point database. Montana received funding to test a process for building structure points based on the existing statewide cadastral dataset. Using cadastral parcels and associated tables from the Montana Department of Revenue, centroids were generated for parcels that were believed to contain structures based on Department of Revenue (DOR) records. Student interns then adjusted the location of the centroids to align with what they could best determine to be the 'primary' structure (for example, the dwelling and not any outbuildings such as garages or sheds) based on the most current National Agricultural Imagery Program (NAIP) orthoimagery available. This effort continued into 2009 and resulted in a statewide structure point database. While in some cases the DOR records for a parcel contain the physical address, this is not the case for all parcels and even for those parcels that do contain addresses the data are not always correct. As a result, beginning in 2009 an effort was made to replace the cadastral-derived structure points with structure point address datasets from local governments, where available. Any address data local governments were willing to share was accepted, including non-structure point address data (for example, address points located at the entry point to a property). This work has continued and in 2011 Montana received funds through a Broadband grant to prioritize the address collection effort on the sixteen most rural and remote counties and the seven tribal reservations.

Navajo Nation

The Navajo Nation Addressing Authority (NNAA) is focused on establishing physical addresses for the Navajo Nation. Eastern Navajo Agency on New Mexico side are addressed by adjacent counties. The Navajo Nation is made up of 110 Navajo Chapters (equivalent to voting precincts or small counties) in Arizona, the southern edge of Utah, and northwestern New Mexico. The NNAA is in the process of implementing the Navajo Nation Enhanced 9-1-1 and Rural Addressing Initiative. The primary goal of the initiative is to link each telephone number to a permanent unique address for any property that currently has a telephone. Over 50% of the residents do not have landlines and those will also be included. The NNAA works with the Local Rural Addressing Committees (LRACs) in each Chapter. The LRACs map address points and roads, primarily by annotating paper maps provided by the NNAA. The NNAA takes the address data (point locations with attributes or addressable structures) collected by the LRACs, reviews it, and uses a web-based mapping tool (FDC Mapping Tool) to convert the data into shapefiles. LRACs are also responsible for assigning road names, based on standards established by the former E9-1-1 Task Force. The NNAA hosts training once a month for LRAC representatives to teach them how to record their addressable structures during the field data collection process. This training covers GIS, assigning addresses, naming and numbering roads,

calculating sign costs, public hearing/resolution process, and maintaining an address system.

New York

In December 2011, the New York State (NYS) Office of Cyber Security (OCS) embarked on a major project, the Street Address Mapping (SAM) Project, to create a statewide Address Point GIS database needed for Next-Generation 9-1-1 dispatch. The timing and the goals of the SAM project meshed well with the Census Pilot, especially since a major component of the SAM project has involved Local-to-State address data gathering. NYS OCS already has a statewide file now containing 4.2 million Address Points that they have shared quarterly with the Census Bureau since July 2010, but the majority of these points are parcel centroid based and were not in the FGDC or draft NENA Address Data standards. The Address Points file created as part of the SAM Project will have Address Points located on structures and, over time, subaddress detail (e.g., apartment, building, suite, floor, etc.) will also be mapped. Address attributes will reflect the current draft NENA Address Data Standard. This file will be publicly available, including its use in geocoding web services, as a GIS layer in web mapping services, and as a downloadable file from the NYS GIS Clearinghouse (http://gis.ny.gov).

In order to establish a long-term maintenance strategy for address points, OCS determined that it was critical to engage the 9-1-1 community. Over the past year, OCS has been working closely with the NYS 9-1-1 Coordinators and has developed a data sharing partnership model that will not only build the new structure-based Address Points data file but will result in a long-term data maintenance program. Before requesting any data, the first step in the project was to develop a close working relationship with the 9-1-1 community and their local governments. OCS met several times with the NYS 9-1-1 coordinators at their state spring and fall meetings.

North Carolina

Through a previous statewide effort in 2009, the Center for Geographic Information and Analysis solicited address data maintained by local governments on an "as is" basis regardless of content or format. Incoming data was evaluated, high-level quality control was performed, and data was loaded into a spatial database to facilitate output streams of spatial and non-spatial formats. CGIA in cooperation with NC Broadband is preparing to update the 2009 effort in Spring and Summer of 2013. While awareness of address assignment and maintenance has increased through this period, a business case or exchange standard for locally maintained address data is still over the horizon. Efforts such as the Census Bureau's GSS-I and Next Generation 9-1-1 (NG911) are two opportunities for providing momentum for progress in this area.

CGIA facilitated a delivery of existing address data from Guilford Metro 911 during the pilot. Since the 2013 North Carolina update workflow is on a parallel development track, the data received from Guilford Metro 911 was received and processed through a custom workflow to accommodate the timing of the pilot evaluation. The workflow under design for the 2013 update will focus on isolation of new and modified address records to improve efficiency and reduce the "per-cycle" cost of the state aggregation effort.

C. Gathering Address Data – State/Tribal-to-Federal

Once the states/tribe had collected data from their local partners or through other means, the Census Bureau would need to acquire that data. Because of the small number of external partners on the pilot team, an automated, formal system for collecting the data was not necessary. The Census Bureau planned to accept data from the state and tribe level external partners at their convenience whether through email, an existing FTP site, or by internal pilot team members downloading data from a website provided by an external partner. Although not available for use during the pilot, the internal pilot team advised the external partners that as part of GSS-I the GEO is working on developing FTP sites and other means for collecting data on a larger scale and in a more consistent fashion.

D. Census Feedback to Partners (data providers)

The pilot team worked for several weeks, during the Spring of 2012, identifying the type of Census feedback that would be useful to the external partners. The team produced a document, *Federal/State/Tribal/Local Address Management Coordination Feedback Recommendations*, which primarily contained suggestions of what the external partners wanted to see, but also suggestions from the internal pilot team. Addresses in the MAF are restricted by Title 13, prohibited for unauthorized disclosure, which severely limits the ability of external partners to obtain and use address information from the MAF. In an effort to provide options that would not fall under such restrictions, the pilot team included in the feedback document proposed types of feedback that while derived from information in the MAF would pose no risk of disclosure and therefore fall outside of Title 13 constraints (see Attachment D).

Following a couple weeks of review and editing, the pilot team provided the feedback document to the GEO management for their review and comment. The review by the GEO management included a disposition about both the content of each type of feedback the pilot team proposed and whether it fell within/outside of Title 13 constraints. The version submitted to the GEO management for review and approval, proposed nine types of Census feedback.

Nine Proposed Types of Feedback

The internal pilot team met with subject matter staff in the GEO during development of the feedback recommendation. Through this consultation, the internal pilot team agreed the subject matter staff would flesh out much of the methodology for generating the proposed feedback during implementation, barring disapproval from the GEO management. Additionally, the internal pilot team agreed on two points while drafting the feedback recommendation:

- The methodology between the proposed types of feedback should be consistent where logical and feasible.
- The methodology should differ to the extent necessary for processing or that makes logical sense given the desired outcome.

During meetings with subject matter staff, particularly those staff members who would be fulfilling the recommendations if approved by the GEO management, the internal pilot team tried to ensure that the intent of each recommendation, as defined in the recommendation document, was clear. The internal pilot team also communicated specific time constraints for the feedback products. Together, the internal pilot team and additional subject matter staff in the GEO formulated a plan on how to go about fulfilling each of the nine proposed types of feedback. Described below, is the planned methodology for each type of proposed feedback.

General note for REC2, REC5, and REC6

The GEO shall aggregate the data at the following geographic levels:

- Reservation and Chapter (Navajo Nation),
- State and county (New York, North Carolina, and Montana)
- Census block (all partners).

REC1 – Polygons

The pilot team agreed that the GEO would independently review address point shapefiles from the pilot team's external partners for coverage purposes by comparing the partner files and publicly available imagery. The goal was to produce a shapefile containing 'areas of interest' (polygons) representing apparent discrepancies between the address points contained in the partner file and what was reflected in imagery.

REC2 – MAF Tallies

The pilot team agreed that the GEO would generate tallies from the Census Bureau's Master Address File (MAF) and break them into sub-categories identified by the external partners as potentially useful.

The following information describes key components of the methodology identified in preparation for fulfilling REC2.

Tallies from the MAF shall include the following subcategories:

- residential units
- non-residential units
- housing units
- group quarters
- primary addresses
- sub-addresses.

The GEO shall define a filter to identify those MAF units that are most likely valid at this point in time. The intent is to reflect a filter that would be similar to a 2020 Decennial Census filter if applied today.
The filter shall build on the universe of units in the MAF that were good for the 2010 Decennial Census.

The GEO shall use current census tabulation geography (2012) for aggregation.

The tallies shall be provided in comma delimited text files and as Excel files.

The process to generate these counts shall build from specifications for similar tallies previously generated for other projects.

REC3 - Business Case

This recommendation was designed to provide per address cost data for a couple of variables that could be combined with output from REC6 to produce metrics that indicate the value added (to both the Census Bureau and external partner) of using partner files to update the MAF. States/tribes/locals could use these metrics to help support their business case for maintaining current and accurate address data for their own purposes and/or to share with the Census Bureau. The intent was to provide metrics that were not restricted by Title 13.

Per address costs to be provided were the cost to the Census Bureau to correct or add an address during the Census process, and the value (in federal funding) to a state/tribe/local for an address adequately accounted for in the Census. The internal pilot team would fulfill this by conducting research to:

- Find existing Census publications that identify the cost of correcting or adding addresses through the Census process.
- Identify federal funding states/tribes and local entities receive as it relates to addresses adequately accounted for in the census.

The results from tallies defined in REC6 shall be used with this information, if possible, to generate specific metrics.

REC4 - Provide street features present in TIGER but not in partner files

This recommendation was retracted early on because the pilot team and the GEO management determined that features were out of scope for the pilot. Planned methodology for this type of feedback was never defined. However, the internal pilot team communicated the recommendation to the areas in the GEO currently working on Census feedback as it relates to features.

REC5 - MAF-Partner non-source specific discrepancy counts

The following information describes key components of the methodology identified in preparation for fulfilling REC5.

The GEO shall calculate tallies reflecting the difference from a comparison of counts between the partner file and the MAF. In cases where the difference is greater than zero (meaning the counts do not match between the two sources), the discrepancy count provided in the feedback product shall not indicate which source has more/less records.

The GEO shall provide tallies in comma delimited text files and as Excel files.

The method to generate these counts shall rely on existing processes currently in development as part of the GEO's overall plan for long-term partner file evaluation. As such, any constraints currently present within the existing process will apply to this project as well (this pertains to technical constraints in particular).

REC6 - MAF-Partner source specific discrepancy indicators

The following information describes key components of the methodology identified in preparation for fulfilling REC6.

The internal pilot team will calculate tallies reflecting the difference from a comparison of counts between the partner file and the MAF. In cases where the difference is greater than zero (meaning the counts do not match between the two sources), the discrepancy count provided in the feedback product shall indicate which source has more/less records.

In addition to a discrepancy count between the two files, additional tallies providing information about the comparison between the partner file and the MAF - such as the number of unmatched records in the partner file that appear eligible for updating the MAF - shall be provided. A complete list of the tallies to be calculated for REC6 follows:

6-1 Count of addresses in both partner file and MAF
6-2 Count of addresses only in partner file and eligible for MAF update
6-3 Count of addresses only in partner file and not eligible for MAF update
6-4 Count of addresses only in the MAF
6-5 Count of geocodeable addresses in partner file
6-6 Count of MAF addresses that become geocodeable because of information in partner file

The GEO shall provide tallies in comma delimited text files and as Excel files.

The method to generate these counts shall rely on existing processes currently in development as part of the GEO's overall plan for long-term partner file evaluation. As such, any constraints currently present within the existing process will apply to this project as well (this pertains to technical constraints in particular).

REC7 – Evaluation of partner file for a measure of overall quality and completeness

The following information describes key components of the methodology identified in preparation for fulfilling REC7.

7-1 Comparison between the partner file and the Census-defined Optimal and Minimum Address Guidelines

The Census Bureau has published draft "Address Data Submission Guidelines," for the 50 states, District of Columbia, and Puerto Rico which outline the address data elements and metadata that the Census Bureau uses to process partner provided address and structure datasets (http://www.census.gov/geo/www/gss/gdlns/addgdln.html). An address or structure dataset must meet the minimum guidelines before the GEO can accept and process the file. The GEO will develop an automated tool to conduct an automated comparison of the partner provided address and structure datasets with the address guidelines. The GEO may also interactively review the files as part of the comparison.

7-2 Tally of addresses that appear to be duplicated within the partner file

The tally of duplicate addresses shall use the existing method of address matching employed by the GEO for identifying duplicates. This method of address matching relies on the comparison of the following address components: House Number, Street Name, 5-digit ZIP Code, and Unit information. It does not factor in information about coordinate pairs or other geographic location points provided in a partner file.

The GEO shall provide the tally of duplicate addresses at the file level (State, Chapter, local).

REC8 – Consolidated information sheet of Census data publicly available

During the course of conversations amongst the pilot team on what kind of feedback products would be useful to the states, tribes and locals, it became apparent that some information the external partners were requesting was similar to information already publicly available. For example, some partners requested a count of housing units by Census block, which the Census Bureau released as part of the Public Law 94-171 Redistricting Data file. The internal pilot team agreed to research other publicly available datasets pertaining to addresses and housing unit counts and prepare a document describing them. The internal team would speak to the Geographic Products Branch within the GEO and other subject matter staff within the Census Bureau, and research the Census Bureau's website to prepare this document.

REC9 – Information on ZIP Codes

Evaluate ZIP Codes present in the partner file and identify potential corrections.

This recommendation could be fulfilled by either the Census Bureau or the USPS. If fulfilled by the Census Bureau, using information in the MAF, the results would be restricted by Title 13. Additionally, the USPS is the authority on ZIP Codes and is a participant in another pilot project. For these reasons, it seems appropriate to pursue working with the USPS to determine if this type of feedback can be provided to external partners.

5. Application/Results

A. Developing the model

The pilot team developed a model: *Comprehensive Address Stewardship Model: State or Tribal Level Steward, All Level Participants* and implemented as many components as was feasible in the pilot project. Implementation was based on the methodology described in Section 4.A *Developing the Model*. The pilot team developed the model using information gathered by the pilot team, Census subject matter experts, and outside research (see Attachment B). The model includes descriptions of key elements state, tribal and local governments should consider when building an address dataset, and assumes the state or tribal government ultimately will be the data stewards gathering data from the locals and other sources. It also illustrates situations where the federal participant (the Census Bureau) may need to work directly with the local government as part of an address data sharing partnership. The model illustrates the federal to state/tribal/local feedback loop, in which the Census Bureau shares address data and information about address data, as they can, with the states, tribes, and locals. The team also developed a secondary document titled *Assumptions and Explanations* that provides details about the items reflected in the model (see Attachment C).

State and tribal partners were asked to implement parts of the model they were not already using, as feasible, while collecting address data for the pilot. However, timing was an issue. The pilot kicked off in late January 2012, and from that point until April 2012, the pilot team developed the draft model. In order to meet pre-determined schedules, the model testing was to be completed by the end of September 2012. This gave the pilot team five months to implement and test the model, which was insufficient time for any one external partner to implement the *entire* model from start to finish. However, each external partner was able to test various elements of the model. In addition to the limited amount of time of the pilot project, the external partners to varying degrees, had datasets (in some cases long-standing) built prior to the pilot project – as described in Section 4.C *Gathering address data – State/Tribe-to-Federal*. This allowed the external partners to provide data to the Census Bureau, testing the Census feedback portion of the model, without testing the State/Tribal - to Local Data Gathering portion of the model.

The pilot team planned to build and include a resource library as part of the model. However, while implementing the pilot it became clear that the feedback component, particularly determining which feedback products were subject to Title 13 restrictions, took a disproportionate amount of time. Because of the time and resources involved in this review, the team decided that they could not complete the resource library in the timeframe allotted for the project. Consequently, the resource library was de-scoped from the pilot project and postponed until sufficient resources are identified to complete and maintain it.

B. Gathering Address Data – Local-to-State/Tribe

Section 4 describes the experiences of the external pilot partners in their data gathering efforts, much of which occurred prior to the pilot project. Below are additional details about how the pilot partners implemented their plans for partnering with local entities to gather address data.

Also included is information about how an objective of the pilot project, to test the address data sharing model, coincided (or not) with existing partnership efforts of the pilot external partners.

Montana

As stated in Section 4 above, Montana has been developing a statewide address database since 2009. The general approach has been to establish address data sharing agreements with the local governments, starting with those counties/cities with whom we had existing relationships. For the local governments the state did not have relationships with, the state researched who within the local government is responsible for addressing. Contact was first made via the phone and a visit to the local government often followed. This work has continued with varying degrees of effort based on available resources and funding, with mostly positive results. Currently, 42 out of 56 counties (75%) have contributed their address datasets. Additionally, two of the four tribes that maintain their own address data have signed agreements and shared their data. Only two counties that have been contacted have not agreed to share their address data.

The Navajo Nation

Throughout the course of the pilot, the Navajo Nation continued training and providing support to the LRACs as described in Section 4. LRACs provide the results of their fieldwork to the NNAA, who checks the work and confirms that suggested road names meet the standards established by the former E9-1-1 Task Force. Chapters must then approve any new road names by resolution after the public hearing process. During the course of the pilot, the NNAA had complete data for two chapters – To'Hajiilee and Ramah—they were able to share with the Census Bureau. Work is ongoing in a number of other Chapters.

New York

As stated in Section 4 above, before requesting any data, the first step in New York's project was to develop a close working relationship with the 9-1-1 community and their local governments. OCS met several times with the NYS 9-1-1 coordinators at their state and regional meetings, followed by onsite meetings or webinars with the individual counties. These county based meetings were held March through August, the same time as the Census Pilot discussions were ongoing. The meetings were used to bring together the county's address stakeholders to discuss the SAM Project and how it would benefit them. At these meetings, OCS learned what address-related data the county stakeholders could provide for the initial data build and OCS discussed the data usage agreement that the data providers would need to sign, acknowledging that the resultant Address Points file would be publicly available. Stakeholder concerns and the need for a long-term partnership for efficient and cost effective data maintenance were also discussed.

Following a county meeting, the data gathering stage began with OCS requesting copies of the address-related data identified during the county meeting to support the statewide address point build. Counties were also asked to complete and sign a Data Usage Agreement for each data set provided. OCS provided each county with an account to OCS' secure FTP web site, allowing for secure and efficient sharing of the county's data. Results have been positive with all but one county agreeing to provide address-related data for the build. To date, almost 85% of the counties have provided all or some of their address-related data to OCS and most have submitted their corresponding Data Usage Agreements (see Data Collection Status Map on the DOCUMENTS tab at http://www.dhses.ny.gov/ocs/streets).

North Carolina

As referenced in section 4, the timing of the GSS-I pilot and other state activities for soliciting data from local governments was not optimal for GSS-I pilot collection in terms of evaluating a production-ready workflow in North Carolina. Guilford Metro 911 posted data through an FTP exchange site for CGIA to acquire. This was sufficient for the needs of the pilot. As North Carolina develops a business case for regular updates for statewide aggregation of address data provided from local governments, some form of central exchange or transactional push of data from local-to-state will be appropriate to consider.

C. Gathering Address Data – State/Tribal-to-Federal

The Census Bureau acquired data from the Navajo Nation via email. The state of New York provided their data via an FTP site, and the Census Bureau downloaded datasets from the North Carolina and Montana websites. Because of the small number of external partners submitting data through the pilot, it was possible to use a variety of methods, and still effectively track and store the data within the GEO. Guilford Metro 911 provided data via the state of North Carolina, in order for the pilot team to test the local-to-state and subsequent state-to-federal portion of the model. These methods were effective, with the exception of minor problems linking to the metadata on one of the external partner's website.

Although reflected in the model, the federal-to-local portion of the Census feedback loop was not tested as part of the pilot project.

D. Census Feedback to Partners (data providers)

Implementing Title 13 Procedures for Data Sharing, with External Partners

Prior to the review of the feedback recommendation document, the GEO management (having sought out and received guidance from the Data Stewardship Executive Policy committee, or DSEP), advised the internal pilot team of the DSEP committee's decision to grant permission to share the Title 13 data with the external partners for the purposes of this project by employing the same procedures used for the 2010 LUCA program. This meant that the GEO and internal

pilot team had to put together, in a very short time frame, several sets of documentation for each external partner, including the following:

- An overview of all documents
- A Confidentiality Agreement
- A Confidentiality and Security Guidelines document
- A letter to the respective Highest Elected Official (HEO) explaining the pilot project and their designation of the liaison
- A letter to all external partners explaining paperwork
- A Pilot Designation form for the HEOs
- A Return or Destruction of Title 13 materials form
- A Self-Assessment Checklist for The Confidentiality and Security document

Several of the Title 13 documents required signatures of officials (including the external partners, their designated data reviewers, and the HEO within each partner state and tribe). This is similar to the 2010 LUCA program and since the pilots were operating under those auspices, similar paperwork and procedures were required for the pilot.

The Census Bureau sent the forms via FedEx. The appropriate officials signed and returned the forms to the Census Bureau. The Census Bureau had to receive the forms prior to delivering any Title 13 protected feedback products. In some cases, the external partners were required to have this documentation fully reviewed by their legal teams or additional upper management officials. The process took significant time, both for the internal pilot team and the external partners.

Possibly the most notable stumbling block for the pilot team related to the Title 13 paperwork, was the requirement that the HEO from each partner state and tribe review and sign a designation form. For one partner this required step was never completed, due not to a lack of effort of the pilot team, but more likely to competing priorities within the offices of officials at this level. For similar endeavors in the future, a more efficient process should be identified, possibly one that does not require the signature of the HEO.

Vetting and Approval of Feedback Recommendation Document

The internal pilot team submitted the feedback recommendation document to the GEO management mid-June 2012. The plan, outlined as understood by the internal pilot team, was for the GEO management to review the recommendation document and provide the final approval/disproval of both the content described with each type of feedback and questions related to what data would fall outside of Title 13 constraints. It was during the review by the GEO management that the internal pilot team learned the recommendations might need to go to the Policy Coordination Office and the Disclosure Review Board (DRB) within the Census Bureau.

Several steps followed the initial review of the recommendation document by the GEO management. The internal pilot team met to go through their comments and questions. The internal pilot team then revised the document to reflect the input from the GEO management and resubmitted the second draft for review. Included in the second draft, at the request of the GEO

management, was information about the 2010 Local Update of Census Addresses program (LUCA). The GEO management also asked the team, based on the precedents set during 2010 LUCA, to answer (from the internal pilot team's perspective) two questions:

- What types of feedback are likely to fall within Title 13 constraints?
- Which recommendations should receive a weigh-in from the DRB?

During the GEO management's review of the second draft, they met with the internal pilot team to discuss each type of proposed feedback in light of the Title 13 considerations. The group determined that the DRB should weigh in on each recommendation, the proposed recommendation document. In addition, the types of feedback concerning data aggregation at various geographic levels should be updated to reflect census block as the lowest level for aggregation rather than county as was originally proposed. (Note-County was the original choice as an effort by the pilot team to avoid disclosure risks and associated Title 13 constraints. GEO management, however, believed it in the best interest of the project to present to the DRB census block as the proposed level of data aggregation. The goal was to get guidance about what could be released at the census block level, without posing a disclosure risk, and then apply that guidance to geographic levels higher than census block. Said differently, if the DRB saw no disclosure risk at the block level then implied is the clearance for higher-level geographies, specifically census tract and county.)

The next phase was to update the document for review by the DRB. In preparation for the DRB meeting, the internal pilot team revised the document reflecting changes from the meeting with the GEO management and editorial updates. The goal was to make the wording in the feedback recommendation document clear and concise, including only the information required for consideration by the DRB.

Given the nature of the feedback recommendation, particularly how it differs from items typically presented to the DRB, a pre-meeting was set-up with the Chair of the DRB where the recommendation was discussed and the DRB Chair agreed it should be considered by the full board.

The following week a pilot mentor and one member of the internal pilot team met with the DRB, along with a member from the Policy Coordination Office, to discuss the feedback recommendation. The DRB and Policy Coordination Office representatives expressed concern with sharing tallies outside of Title 13 constraints that reflect a comparison between an external address file and the MAF, particularly at low geographic levels such as census block. Therefore, recommendations for tallies involving a comparison between a partner file and the MAF were treated as Title 13 protected for the pilot project. Additionally, the GEO provided tallies only from the MAF (not involving a comparison to external address data) outside of Title 13 constraints only at the county level or higher. Made clear during this process is the need going forward, for additional review and consideration within the Census Bureau for what data products (i.e. tallies) present a true disclosure risk and should continue to be treated as Title 13 protected.

Somewhat transparent to the external partners were the iterations of the feedback document developed as part of the internal Census Bureau review and consideration for Title 13

constraints. The content of the recommendations remained consistent throughout the internal iterations, but information requested by GEO management as necessary to consider the Title 13 constraints, was added to the internal iterations to aid in the review. The external partners received the draft feedback recommendation document first submitted to GEO management in mid-June 2012 and then a revised version in August 2012, after the questions about Title 13 had been answered. Overall, there were many versions throughout the life cycle of the document. Neither internal pilot team members nor the external partners anticipated the feedback recommendation document development process to run the course of the summer. The need for the internal pilot team to commit such a large amount of time (originally unanticipated), left no time to work on other parts of the pilot project.

Fulfillment of Feedback Recommendations

The GEO fleshed out methodology for each type of proposed feedback during implementation. Additional information about the methodology used to generate Census feedback, particularly the details not explicitly identified during the planning phase but worked out during implementation, is included below.

REC1 – Polygons

This recommendation was designed to provide the external partners with an analysis of address coverage for specific regions within their state or, in the case of the Navajo Nation, their chapters. The GEO completed the analysis manually by comparing the partner provided address datasets with publicly available imagery. It was not feasible within the pilot project to focus on areas with relatively small discrepancy counts. Therefore, in many cases the analysis focused on areas that included discrepancies of ten or more structures.

The GEO identified the areas of discrepancy (aka Areas of Interest/AOI) through a manual analysis using tools available in ArcGIS, and represented them as polygons in the ESRI shapefile format.

There were challenges involved in providing a consistent product to all external partners for this recommendation. The partner-provided files represented different areas ranging from densely to sparsely populated regions of the country, resulting in significant differences in the size of their address datasets. These datasets covered an array of urban and rural areas for all external partners. In addition, the coverage between datasets varied. For example, the GEO identified 64 AOI polygons for Montana, which covered a variety of areas across the state and included a sample of their roughly 600,000 addresses. Navajo Nation provided a subset of their total address dataset – reflecting two chapters within the Navajo Nation – potentially affecting the small number of AOI polygons identified for Navajo Nation. On the other hand, New York and North Carolina provided several million addresses each in their respective address datasets, resulting in the GEO identifying many more AOI polygons for each of those partners.

The GEO should further evaluate this type of feedback prior to implementation for generating feedback products in the future. The method applied needs to balance multiple interests including:

- Identification of the best methodology for identifying the Areas of Interest and ability to implement that methodology on a large scale.
- Ability to measure the accuracy of the results in an automated fashion that lends itself to large-scale production.

REC2 – MAF Tallies

The GEO defined a filter to identify the MAF universe. In addition, the GEO defined rules for identifying the number of principle and sub-addresses within a geographic area.

The filter attempted to identify those MAF units that were good for the 2010 Census, are valid non-residential units, or reflect residential units added since the 2010 Census and appear valid.

In tallying the primary and sub-addresses, the GEO applied the following logic:

- Primary Address: A unique instance of House Number and Street Name and 5-digit ZIP Code
- Sub-Address: A non-unique instance of House Number and Street Name and 5-digit ZIP Code (should have unit information to differentiate each address)

There is more than one method for identifying a primary and sub-address. Other options can be considered for similar efforts in the future. They include:

- Consider non-unique instances of Basic Street Address (BSA).
- Consider non-unique instances of BSA in conjunction with key words used as unit identifiers (i.e. those with 'LOT' can be excluded since they likely reflect a mobile home or other single-family type dwelling).
- Consider unique instances of coordinate pairs (aka map spots, MAF structure points, points, etc.).
- Rely on metadata/flags indicating primary versus sub-address categorization.

REC3 - Business Case

Based on the meeting with the DRB and post meeting internal discussion, it was determined that the approach for this recommendation needed to be reconsidered. Using tallies produced under Title 13 (i.e. REC6) to aid in producing metrics to fulfill this recommendation would mean that the metrics would then be Title 13. It was proposed that the dollar figures as originally outlined be provided, but not include any tally/summary data. This would allow REC3 to be non-title 13 and remain consistent with the original intent of this recommendation. The partners could then use the dollar figures to create their own metrics. Title 13 constraints would still apply however, if the external partners use tallies protected by Title 13 to generate metrics.

During implementation the internal pilot team discovered there was little existing information on the per address dollar figures the team defined in the recommendation. However, related to the cost of correcting or adding addresses through the Census process, a per address statistic was identified that could be used as a starting point for calculating metrics as part of developing a business case. This address statistic provided was the estimated cost to update a case (address)

during the 2009 Address Canvassing operation. Other general use information that could be used to build a business case was also provided in the Census feedback for REC3.

Information about the amount of funding state and local governments receive, related to an address adequately accounted for in the census, was unavailable.

REC5 - MAF-Partner non-source specific discrepancy counts

The GEO aggregated these tallies by using geocodes (census blocks) assigned to the address records in each of the partner files. The GEO assigned geocodes based on the coordinate pairs provided in the partner files.

The process used to identify these geocodes is referred to as the matching and geocoding process for the GSS-I (GSSMG) and the goal is to refine it and apply it for long-term use in processing partner provided address files.

Currently in development, the GSSMG set of processes uses 2010 census geography. Therefore, the GEO aggregated the results for REC5 by 2010 census geography.

In order to provide the most accurate reflection possible, the GEO used the MAF universe defined for REC2 (MAF Tallies) to calculate the REC5 tallies. Since the GEO used the geocodes assigned to address records in the partner files to calculate these tallies, and because those geocodes are based on 2010 census geography, the GEO also aggregated the REC5 tallies by 2010 census geography. Although the REC2 tallies were aggregated using current (2012) geography, the GEO ignored the suffixes in the current geography during aggregation, to allow for greater consistency with the 2010 census geography.

There are some limitations with this method, primarily in instances where a 2010 census block has been reshaped (boundary correction) which causes a MAF unit to fall in a current census block that is different from the 2010 census block to which is was previously associated. For additional information, see *2010 versus Current Census Geography* in Attachment A: Terminology and Acronyms.

For similar feedback products generated in the future it is advisable to use consistent census geography and avoid such limitations. The drawback here, however mild, is that a comparison with data aggregated by 2010 census geography becomes less meaningful.

REC6 - MAF-Partner source specific discrepancy indicators

The GEO aggregated these tallies by using geocodes (census blocks) assigned to the address records in each of the partner files. The GEO assigned the geocodes based on the coordinate pairs provided in the partner files. The tallies were generated by matching the incoming partner addresses to the Census MAF.

REC6, like REC5, also used the GSSMG. Therefore, the GEO aggregated the results for REC6 by 2010 census geography.

6-1 Count of addresses in both partner file and MAF
6-2 Count of addresses only in partner file and eligible for MAF update
6-3 Count of addresses only in partner file and not eligible for MAF update
6-4 Count of addresses only in the MAF
6-5 Count of geocodeable addresses in partner file

Tally 6-6, Count of MAF addresses that become geocodeable because of information in partner file, relied on geocodes present in the partner file, assigned through the GSSMG process. Without assurance that all records within a partner file would have an assigned geocode, the GEO applied this tally to file level only.

REC7 – Evaluation of partner file for a measure of overall quality and completeness
This product was not included at the request of external Census partners, but by the internal pilot team members because it is information used as part of the partner provided address file evaluation process currently in development in the GEO under the GSS-I. For this reason, the GEO provided this feedback at the file level only.

The "Address Data Submission Guidelines" are still in draft and their refinement ongoing. They will evolve as the GEO continues developing improved methods for managing addresses.

The availability of metadata impacts all processing of local files, including the comparison of a local file with the address guidelines.

In some cases, even in the absence of metadata, field names within an address file are fairly intuitive and the GEO is able to decipher what data elements reflect the information instrumental to evaluating a local file. That information includes the primary address components of House Number, Street Name, Unit information, and 5-digit ZIP Code. It also includes information about what the address represents – referred to by the guidelines as Address Use and Address Type indicators.

In other cases however, those distinctions are not as clear. Without explicit metadata from the partner/data provider, the accuracy of the GEO's evaluation process is limited by many assumptions that the GEO must make when trying to decipher the information contained in a file. The GEO made every effort to acquire metadata or a data dictionary if the partner did not initially include it with their dataset, and was successful in acquiring the metadata or data dictionary in all cases but one. The GEO engaged in ongoing communication with partners to ensure that the GEO was accurately interpreting their data.

Metadata Comparison in 7-1

There was not sufficient time to automate this process, particularly given the small number of files processed as part of the pilot. Therefore, the GEO completed a manual comparison between the partner files, any associated metadata, and the census address guidelines.

A manual comparison will not be feasible on a large scale and in a batch-processing environment.

Address Component Comparison in 7-1

Requirements to automate this comparison were drafted and a subsequent application programmed. This required a unique 'crosswalk' for each file, where layouts varied, which is not feasible on a large scale and in a batch-processing environment.

This comparison is feasible however, if based on the standard GSSMG processing layout – a layout in which all incoming files will be transformed for production processing.

Tally of duplicate addresses in 7-2

During evaluation of the partner files there were instances where the apparent presence of building information may have impacted the identification of duplicate addresses. For example, one of the files received contained building information in an unexpected field. Without a data dictionary to define the data in each field GEO had to interpret the data.

As noted above, without clear metadata, the GEO must decipher what address components exist in a file and how those components are formatted. If the GEO does not correctly identify and/or decipher the presence of building information within a local file, addresses may be erroneously categorized as duplicates.

A comparison with the address guidelines will be a valuable tool for partner file evaluation. This information, in addition to a coverage analysis (comparing coverage between a partner file and the MAF) will help the GEO determine if and how to use a partner file for updating the MAF.

REC8 – Consolidated information sheet of Census data publicly available

The internal pilot team gathered information from the GEO's Geographic Products Branch, utilizing a document that branch had prepared listing available geographic products. The internal pilot team also conducted independent research on the American FactFinder website to see what other datasets (American Community Survey, 2010 Decennial, etc.) had address or housing unit related data.

Four main products were identified that the internal pilot team thought may be useful to external partners, including the 2010 Census Redistricting Data (Public Law 94-171) Summary Files and maps, the TIGER/Line Shapefiles, and the American Community Survey (ACS) data. While these datasets and products are advertised by the Census Bureau elsewhere, this document pointed out *specifically* the housing and address data available within those products and the levels of geography at which the relevant data are available. For example, ACS 1-year and 3-year estimates have housing unit counts and housing characteristics available at the county level and the ACS 5-year estimates have the same data available but at the census tract, census tribal tract, and tribal subdivision level. Likewise, the TIGER/Line shapefiles are widely touted and

advertised, and indeed many of the external partners were aware of them, but they were not all aware of address range and feature information included with them.

REC9 – Information on ZIP Codes

The GEO management and internal pilot team discussed this recommendation and determined it was more appropriate for it to be researched by the *Data Sharing – Local, State, USPS, and Census* pilot team, given that the USPS is the originator of ZIP Codes and a partner on that pilot team.

The USPS agreed to first test the idea of providing feedback on ZIP Codes using data from an external partner on the *Data Sharing – Local, State, USPS, and Census* pilot team, with the possibility of including in that test, data from external partners on the *Federal/State/Tribal/Local Address Management Coordination* pilot team. After working through the process with one of their own partners, the *Data Sharing – Local, State, USPS, and Census* pilot team concluded they would only be able to fulfill the recommendation within their own pilot. Therefore, the recommendation would not be fulfilled for any external partners on the *Federal/State/Tribal/Local Address Management Coordination* pilot team.

The pilot team discussed the option for external partners to explore, on their own, the USPS County Project, which uses the same processes the USPS would have used to fulfill this recommendation as part of the pilot projects.

Internal Census Process to get feedback to partners

Several branches in the GEO were involved with the process of creating the feedback materials. There were several steps in this process:

- Initial meetings to come up with a process and flow
- Discussion about format/design of feedback products
- Development of password letters, which the GEO provided to the partners to unlock encrypted files
- Data encryption of Title 13 feedback products
- Creation of CDs/DVDs for Title 13 products and some non-Title 13 products
- Email delivery notices for Title 13/non-Title 13 products being delivered by FedEx/UPS
- Email distribution of some non-Title 13 products

6. Discussion and Findings

A. Developing the Model

The model was used by the external partners, but as discussed in Section 5.A, time constraints did not allow any one partner to test all elements from start to finish during the course of the pilot project. Implementing the model from start to finish in a real-world scenario would take months, if not years, which is well beyond the time frame of this pilot. Because the model was designed based on the combined experiences of the external partners, many of them had tested

and proved in portions of the approach for themselves before the pilot team developed the comprehensive model. The pilot teams believes it is safe to say all elements of the model have been implemented, by at least one of the external partners, at some point (inside or outside of the pilot) and were determined to be effective.

The team had one member representing a local partner (Guilford Metro 911) and was able to test the aggregation of local address data through a state level partner (CGIA, North Carolina). In a similar fashion, the GEO provided feedback to the local partner through the state level partner. The model includes alternate data-sharing paths including one reflecting the address data sharing/feedback loop directly between the Census Bureau and a local partner. The pilot team assumes that sharing Census feedback with a local would work in much the same way as sharing feedback with the state or tribe worked, but that was not tested in this pilot project.

As mentioned in Section 5.A, the pilot team had to forego development of the resource library given competing demands on the pilot team's time for working through issues related to Census feedback content and Title 13 constraints. However, several team members feel such a library should be pursued in the future. Should the GEO agree to pursue this, the pilot team recommends first researching to ensure that some other individual or organization has not already developed such a document or library. In addition, the pilot team recommends the GEO ensure adequate resources are available to maintain such a library over time should they decide to pursue the effort.

B. Gathering Address Data – Local-to-State/Tribe

The perspectives described below are from the external partners regarding the viability of participating in an address data sharing relationship and feedback loop that involves both local entities and the Census Bureau. Important to note are the challenges involved in this type of partnering effort as identified by the external partners.

Montana

> *Montana's effort to aggregate address data from local governments into a single statewide database predates this Census pilot project and will likely continue, given available funding and resources, regardless of the outcome of this pilot project. Therefore, Montana believes this is a viable option that could have positive results for all parties.* ***The key challenges that come to mind are the suitability of the address data gathered by Montana from local governments (which is largely for Next Generation 9-1-1- (NG911/E-911 needs) and how the feedback loop can be accomplished in a sustainable and efficient way for all parties involved****.*

The Navajo Nation

> *The NNAA will continue to support LRACs through training and collect data that results from their field work. It is hard to imagine how the Census Bureau could work directly with the Chapters without including the NNAA because of NNAA's*

strong role in supporting the LRACs as they collect, create and convert the address data into a digital format. This method of the tribe (NNAA) aggregating data from the Chapter level seem like a viable option that will provide the best results for all involved. ***Challenges to this approach include having sufficient resources within NNAA to engage long-term with the Census Bureau. An efficient means for data and feedback sharing will have to be developed.***

New York

The key challenge in OCS' SAM Project was obtaining the trust of the 9-1-1 community and showing that OCS could provide something of value back to them. *For the counties that do not currently have structure-based address point data, their immediate benefit will be access to OCS' new data. For counties who already have structure-based address point data, the benefit to them is that the new data will be in the draft NENA Address Data standard, the format that will be required for NG9-1-1. The new data will also include subaddresses and validly addressed vacant parcels, again, all at no cost to the counties. Additional benefits OCS is providing include:*

- *OCS involvement with NENA GIS data standards development*
- *Monthly webinars with the 9-1-1 coordinators to review and discuss current NENA GIS data standards*
- *Investigation into a data maintenance platform for long term address point maintenance that OCS would like to procure and provide to the counties at no cost, and*
- *Future facilitation of discussions between county offices and their local governments regarding address point data maintenance responsibilities, with the goal of building an effective and efficient communication workflow for sharing address information within their county*

Obtaining data from the counties has not been without its challenges. In some cases, it took OCS several months of persistent phone calls to schedule an on-site meeting or conference call with a county. In other cases, it was locating an advocate in the county to champion the project or just getting agencies within a county to talk to one another. *The value of the county-based onsite meetings and conference calls is clearly shown by the high participation rate OCS experienced in the data gathering stage. Although time consuming and more costly than relying on just phone calls and email, in person communication shows the State's commitment to the project and has helped to foster trust and build a relationship between the State and each county. Continued updates about the project at the 9-1-1 Coordinator's meeting, through the monthly webinars, on the State's SAM Project website, and through standard email correspondence has also helped to strengthen the partnership.*

In a situation where the State is absolutely unable to obtain data from a local partner, the Census Bureau should attempt to gather data directly from the local government to incorporate into the MAF. The Census Bureau should then apply

the other piloted methods of sharing address information with the State, such as Recommendation 1, providing polygons to the State where the State data is missing addresses that now exist in the MAF.

North Carolina

North Carolina is developing a series of projects under the umbrella of Address NC to facilitate the partnership between local governments and stakeholders that can benefit from an aggregated statewide address database. Address NC will facilitate the development and sharing of best practices with local governments to encourage the development and maintenance of high quality, locally maintained address data. Address NC will also seek to align business and technical requirements from the stakeholders to maximize the utility and reuse of the aggregated statewide resource.

The key challenges will be in developing the business models and metrics to verify the efficiencies of the aggregate system. *The demonstrated advances within North Carolina local governments since the 2009 statewide aggregation exercise are representative of the acknowledgement of agencies working together in the context of local government efficiencies. State agencies and stakeholders that can benefit from the aggregated statewide address database need to be led through this process as part of Address NC to simultaneously document requirements, establish efficiency metrics, and engage local governments in legitimate "win-win" scenarios.*

CGIA will also continue to reach out to Census and other partners to offer the Address NC framework as a primary point of engagement for the most up-to-date source for address framework data in North Carolina. This engagement will be important in supporting the technical requirements, business justification, and programmatic support to ensure Address NC provides relevant addressing data to federal stakeholders.

C. Gathering Address Data – State/Tribe-to-Federal

The Census Bureau believes that bi-directional sharing of address data may be more manageable and the process more efficient when the Census Bureau works through state and tribal level partners as part of a federal-state/tribal-local partnership, as opposed to working directly with local address data stewards bypassing the state/tribal level partner.

Working with and through state or tribal level partners to obtain address data and provide Census feedback, would reduce the number of address datasets that would need to be collected, standardized, processed, maintained, and tracked by the Census Bureau. State datasets, for example, would in many cases be standardized statewide and hopefully incorporate much of the information identified in the Census Bureau's address guidelines. The Census Bureau could then allocate resources to designing and maintaining a system intended to accommodate the fifty or so various formats in which address data would come in from the states as opposed to spending the

resources to develop a more complex system that could handle thousands of variations in local datasets. This concern however, is further mitigated by recent efforts to standardize addresses, most notably through the Federal Geographic Data Committee's *United States Thoroughfare, Landmark, and Postal Address Data Standard,* which some state and local address data stewards have adopted or are planning to adopt at some point. When a Census partner provides an address dataset that is in the FGDC standard (or variation of it), it can reduce the resources required at the Census Bureau to process the file.

However, in some cases, states or tribes may not have access to local address data due to internal politics, resource limitations, technical constraints, communication challenges or other reasons. The reasons may prevent some states or tribes from maintaining a current, statewide or reservation-wide, address dataset. In those situations, the Census Bureau should consider working directly with the local level address data stewards. Timeliness might also be an issue. In some cases, the Census Bureau might be able to acquire data directly from a local partner and process it faster than if the data first goes through a state level partner.

For the Census Bureau's tribal partners, the situations will vary. For smaller tribal areas it may be more effective for the Census Bureau to obtain, in collaboration with the tribe(s), addresses for the tribal area(s) by working directly with a local level partner (i.e. county, town, etc.) or state level partner with which the tribe(s) have existing address data sharing partnerships. Conversely, for larger tribal areas, including the Navajo Nation, it may be best for the Census Bureau to develop address data sharing partnerships directly with the tribe.

For address data bi-directional sharing and partnering, the pilot team proposes some general recommendations that may not be applicable in every circumstance. The Census Bureau, in conjunction with Census partners, will need to identify, area by area, the best approach for everyone involved.

Cited below are some specific notations from the pilot's external partners regarding the role of the state as the liaison between the Census Bureau and local partners:

> *Serving as the liaison between the Census Bureau and local governments is a viable option for address data sharing. The key challenge is that all parties see a benefit to this method. For example, using this method will the number of partners and/or the number occasions a partner contacts a local government regarding address data (i.e., requesting the data or with questions/issues about the data) be reduced? Will this method help foster relationships between local governments and the state, resulting in increased address data sharing? Will this method make it more efficient to Census to maintain an updated MAF?*
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> ---
>
> *The State-to-Federal partnership is an important piece for completing the Address framework. The concept will not work unless each level of the partnership (local, state, and federal) can demonstrate an equitable success factor that motivates and justifies continued partnership. Challenges to this approach would be policies and perspectives that ignore the necessity of direct and indirect benefits. Participants at each level need to understand and*

acknowledge that each partner's success is a necessity in achieving the success of all; focusing inwardly at the expense of other partners will diminish the returns of all.

The establishment of local buy-in (and state-level buy-in for that matter) is a function of demonstrated return of value. This can take the form of improved information from the pilot recommendations. This can take the form of improved workflows to integrate data updates that are compatible with local government address assignment and maintenance practices. This can take the form of improved ingest workflows and information validation exchanges from both state and federal participants directed to local governments.

D. Census Feedback to Partners (data providers)

External Partner Perspective on Census Feedback

The external partners found some of the feedback products useful, making the effort to participate in the pilot worthwhile. Going forward, the external partners are willing to engage in a long-term partnership with the Census Bureau if they receive similar feedback products with suggested improvements. (See sections below on individual types of feedback.)

General Note: One partner did not receive feedback products protected by Title 13 due to delays in the Title 13 paperwork processing. The information included under each recommendation above reflects the consolidated view of the partners who received the respective type of feedback and provided input on their use of the feedback. Recommendations related to the limitations of Title 13 during the pilot are described Section 6.E.

REC1 – Polygons

The external partners indicated the polygon feedback was among the most useful to them, but the GEO could improve it to increase its usefulness even further. They would like to receive this type of information from the Census Bureau going forward.

Partners made the following suggestions to improve its utility:

- Clarify methodology and possibly improve it, particularly for areas with many multi-story buildings.
- Provide additional information about each polygon (i.e. were all structures considered or only certain types?)
- Identify the minimum number of structures that had to be missing in order for the GEO to delineate a polygon. If the number of the missing structures is included in the feedback, specify if that number is an actual or estimated count, and if possible, how many are sub-addresses.
- Provide clearer documentation on imagery sources used in the analysis, and use imagery that is available to the partners.
- Include a definition of terms with the written analysis.
- Provide the count of missing structures by census block.

REC2 – MAF Tallies

Data Dictionary – Metadata

Some partners found the data dictionary provided to be sufficient while others felt it lacked clarity and details about how the GEO derived the tallies and what is reflected in each subcategory.

Therefore, the GEO needs to include additional information in the data dictionary to help make the tallies understandable and possibly more useable for a broad range of external partners.

Tallies

In general, this information was noted as more useful to some partners than others.

Overall, the tallies appear to be marginally useful to the external partners. Generally, breakouts by classification (housing unit (HU), group quarter (GQ), non-residential units (NON-RES)) were relatively more useful than breakouts by primary vs. sub-addresses.

In some instances, partners indicated that, while interesting, this does not appear to be data they would use to directly improve their address datasets. However, one partner noted that the data from these tallies could be used to justify state and local address collection and maintenance programs at the state and local levels and may be useful in building a business case for state level address dataset.

The partners who found this information most useful provided the following suggestions to improve its utility:

- Aggregate at levels lower than county that do not fall under Title 13 constraints, such as Town, City, and Village. Doing so is critical to encouraging local government participation and endorsement of address collection, maintenance and sharing.
- Include additional information about sub-addresses for non-residential structures in particular.

REC3 - Business Case

In general, the Census feedback for REC3 appeared to be more useful to some partners than others. For those that found the feedback useful they provided the following notations:

- The cost and statistical information about the Address Canvassing production and QC activities was not previously known. The links within the report to the *2010 Census Address Canvassing Operational Assessment* document and the *Federal Aid to States for Fiscal Year 2010* documents were very helpful and informative.
- The actual cost per case/address for Address Canvassing production and QC activities will be extremely useful as one partner builds their structure-based address point file and has to justify the costs for hiring a contractor to assist them with the work.
- The feedback for REC3 (as well as for REC5 and REC6) provides a key source of metric-based justification that supports the business case not only for participation in the GSS-I

by local and state partners, but for other business processes that rely on high quality address data.

- Using this type of information to demonstrate increased address dataset accuracy on an annual basis over time provides significant value and justification for ongoing engagement for local and state partners.
- North Carolina state team members are evaluating the utility of these proposed GSS-I information sources as a comparison to population projections generated within the state, building permits and other data sources to establish federally apportioned funds "at risk". The information provided in recommendations 3, 5, and 6 as it pertains specifically to business case documentation and development is sought for three primary goals:
  - Provide source information that documents the improved quality of the MAF as a reflection of local and state participation in the GSS-I.
  - This information will provide a transitive benefit for local and state partners that can be tracked through time:
    - improved data quality in the MAF through engagement of local and state resources will lead to more efficient and accurate Census counts;
    - improved Census counts will provide increased value to federal funding that is based on apportionment figures; and
    - documented improvement of data quality over time and apportionment shares will demonstrate there are significant benefits and return on investment directly tied to address maintenance activities.
  - These metrics and information related to improved addressing provided by Census to state and local partners can be used in the business justification for business processes at the state and local level such as NG911, voter registration, streamlined sales tax initiatives and others.

Suggestions for future modifications to the recommendation as currently written:

- In the future, similar feedback is desired, particularly if new and improved cost and statistical information (see Section 7 for specific recommendations) related to Census use of address data from the GSS-I partnership program is tabulated.
- As partners create their own individual business cases, and to the extent that they do not contain Title 13 protected information and can be shared outside of their organization, include them as a Resource Library item.
- As part of the ongoing feedback loop, solicit information from partners about how they are using the feedback to build their respective business cases, particularly how they are applying the information available in the *2010 Census Address Canvassing Operational Assessment* (source of REC3 feedback provided in pilot). Make this information available to all Census partners to encourage consistency in the application of the metrics.
- Review the *2010 Census Address Canvassing Operational Assessment* document for additional information that can supplement the current REC3 feedback and support partners in their effort to develop business cases.
- Supplement the current REC3 feedback with a table of the total annual payments, broken down by States and other entities, as reported in the *Federal Aid to States for Fiscal Year 2010* document.

REC5 - MAF-Partner non-source specific discrepancy counts

Data Dictionary – Metadata

Some partners found the data dictionary provided to be sufficient while others felt it lacked clarity, particularly regarding the definition of an 'Address Record.'

Therefore, the GEO needs to provide a clearer explanation of this phrase, along with 'MAF Unit' and the distinction between the two, to help make the tallies understandable and possibly more useable for a broad range of external partners.

Tallies

In general the tallies were noted by the partners as interesting, but their utility limited because the information does not indicate where the discrepancy exists (MAF or partner file). However, one partner noted that assuming the GEO incorporates the state and local files into the MAF these data could, over time, provide some information on improved data quality in the MAF due to state and local participation in the GSS.

The partners who found this information most useful provided the following suggestions to improve its utility:

- As with the tallies in REC2, aggregate at levels lower than county that do not fall under Title 13 constraints, such as Town, City, and Village. Doing so is critical to encouraging local government participation and endorsement of address collection, maintenance and sharing.

REC6 - MAF-Partner source specific discrepancy indicators

Data Dictionary – Metadata

Some partners found the data dictionary provided to be sufficient while others felt it lacked clarity, particularly regarding the following:

- Definition of 'partner entity' and 'partner-provided MSP'
- Additional clarification on the definition for the term 'address' and whether it refers to all classifications (HU, GQ, NON-RES)
- Clarification on eligibility requirements for using a partner provided address to update the MAF

Therefore, the GEO needs to provide a more detailed explanation of these concepts to help make the tallies understandable and possibly more useable for a broad range of external partners.

Tallies

6-1: Count of addresses in both partner file and MAF

The partners noted an interest in seeing the change in these tallies over time, particularly when the results of REC1 are supplied to local address data partners and used by them in targeting

areas with a lack of coverage. The tally could be used to measure whether efforts to improve the address datasets by local, state, or tribal address data stewards and also the Census Bureau, are effective and result in datasets that are more aligned between all three partner levels.

6-2: Count of addresses only in partner file and eligible for MAF update
The partners indicated that while they found it interesting to learn how the MAF will be impacted by the data sharing effort, the information does not contribute to their work and is not useful for their data maintenance activities.

6-3: Count of addresses only in partner file and not eligible for MAF update
Similar to 6-1 and 6-2, the partners indicated that this information is interesting, particularly if gathered and analyzed over time to determine the progression of the address datasets maintained by the locals, states, tribes, and the Census Bureau.

6-4: Count of addresses only in the MAF
Partners indicated this information might be of more use for the Census Bureau's internal processing. There is not an immediate need for this information by the state, tribal, or local partners.

6-5: Count of geocodeable addresses in partner file
Partners indicated this tally was confusing and therefore they are unsure of what use it could be to them. Of particular confusion was the concept that records in a partner provided address file may geocode to a place outside the partner entity. More explanation is required, about how the GEO derives geocodes and why it is possible to obtain a geocode outside the boundary of the entity who submitted the file.

6-6: Count of MAF addresses that become geocodeable because of information in partner file
Similar to 6-2, the partners indicated it is interesting to see how the partnership improves the MAF, but it is not necessary for their own purposes.

The partners who found the REC6 tallies most useful provided the following suggestions to improve its utility:

- As with the tallies in REC2 and REC5, aggregate at levels lower than county that do not fall under Title 13 constraints, such as Town, City, and Village. Doing so is critical to encouraging local government participation and endorsement of address collection, maintenance and sharing.
- Use in conjunction with the data available from REC3 to show a dollar value in improving address data over time, and provide justification for continued engagement between the GEO and state and local partners.

REC7 – Evaluation of partner file for a measure of overall quality and completeness

Comparison with Census Address Guidelines
This information appeared useful to the partners, particularly related to the breakout between city style and non-city style addresses. Partners provided the following suggestions to make this information most useful:

- Aggregate the information at lower levels of geography (i.e. census block, town, etc.) rather than providing at the file level. This could help make it useful to local partners as well.
- Provide the unique identifiers for the records that did not meet the Census Address Guidelines so the partners can review the addresses individually.

To be most useful and accurate, partners should provide metadata about their files, or at least a data dictionary that describes the address-related attributes used in the partner file. After an initial review of the data, the GEO should follow up with the partner to discuss and clarify any questions about the partner's data. The GEO should try to avoid making assumptions about a partner's dataset unless absolutely necessary.

Tally of Duplicate Addresses

Partners indicated that more of an explanation is needed to explain exactly how the GEO identifies duplicates, in order to make this information useable.

Additional information should include details about how the GEO handles sets of duplicates – or a 'survivor' is chosen – so it is clear what the number of duplicates represents.

REC8 – Consolidated information sheet of Census data publicly available

Overall, the external partners found this type of feedback useful, although some commented they would need more time to see how useful it would be in improving their address data. The information sheet informed them of data products they were not aware of. In particular, external partners cited the data released with the TIGER/Line shapefiles, including the relationship files, and any files with address ranges, alternate street names and ZIP Codes as most useful. The external partners recognized the address range-feature name relationship file as one that would be useful to someone just starting to build an address database, or as a source against which they might compare their address data. One partner suggested the data would be even more useful to them if the GEO provided the data as a geodatabase with the relationships already built for them.

One external partner suggested that the GEO offer webinars on how to navigate the Census Bureau's website for this information. For example, the link to the TIGER/Line shapefiles provided in the document took the user to the main TIGER/Line page by design so that users could access links to both the data and the documentation and see that multiple years' worth of TIGER/Line data are available. The partner, however, would have preferred one link directly to the 2012 data and another to the documentation. They also commented that the technical documentation was general and the metadata with the files was more detailed and useful to them. Since it would be impossible to provide links to the exact parts of the website to meet the preferences of each user of this document, the pilot team recommends:

- Providing links to the main Census Bureau web pages, and
- Providing training on how users can navigate from the main web pages to areas of the Census Bureau website that meet their respective needs

Unlike most of the other feedback products, this type of feedback is completely independent of the address data external partners may share with the Census Bureau. Thus, the Census Bureau would only need to update this document when new or updated datasets become available.

REC9 – Information on ZIP Codes

At least half of the external partners would still like to see this recommendation considered for the future. They believe that ZIP Code information would be very useful, depending on the specific elements that would be included and the format. (Some partners did note, however, that not all local files contain ZIP Codes.) Efforts to have this type of feedback tested by the *Data Sharing – Local, State, USPS, and Census* pilot, using data provided from an external partner on this team, were not realized. However, the concept was tested as part of that pilot using data from one of their external partners, and their final report will hopefully provide information about the feasibility of the USPS providing this type of feedback in the future.

Other Potential Feedback Products

Several partners mentioned they would like to have an actual list of addresses from the Census Bureau's MAF to compare to their own address lists. Ideally, partners would like to use this information to update their own lists, but the pilot team recognized this is not possible under the current interpretation of Title 13 and did not pursue this type of feedback as part of this pilot.

Census Perspective

Working with external partners in a way that allows for meaningful communication and on-going data exchange of address data requires considerable time of both the Census representatives and the external partners.

If an ongoing feedback loop can be established however, the information shared through such a partnership will be critical in ensuring the best evaluation by GEO of incoming partner files. It will also help ensure that the best possible feedback products are available for partners, perpetuating a meaningful feedback loop that benefits all parties.

If, between the Census Bureau and external partners, a method for meaningful ongoing communication can be established, that allows for sufficient communication and that does not overburden any one party requiring more time than is available, such partnerships will be extremely valuable to the Census Bureau's efforts to maintain a high quality MAF over the next decade.

REC1 – Polygons

Generating this type of feedback proved to be interactive in nature and quite labor intensive. Ultimately, the Census Bureau would have to automate this process for it to be viable in the future.

A consideration for generating this type of feedback in the future is the inclusion of the map spots, maintained by the GEO, to provide a more precise comparison and discrepancy count

based on Census Bureau data. It also makes the process easier to implement. The drawback however, is that it introduces the element of Title 13. Determining if and how the GEO could use map spots to help generate this type of feedback, in a way that is not restricted by Title 13, may be worth pursuing.

REC2 – MAF Tallies

Generating the MAF tallies was an automated process defined as part of the pilot project. It is similar to projects the GEO has completed in the past and will likely undertake in the future.

Defining requirements for the categorizations of primary and sub-addresses was not straight forward, and additional consideration is advisable prior to providing tallies in the future using these breakouts.

That said, the effort required in the GEO to generate this type of feedback would lessen over time as the process is refined and fewer changes are required to the existing automated process.

It is reasonable for the GEO to consider offering similar feedback in the future.

REC3 - Business Case

While the intent of the recommendation was to provide a dollar figure, at the address level, that identified the cost to the Census Bureau to add, change or otherwise modify an existing address to make it 'useable' in the census, a dollar figure more narrow in scope was provided as feedback. A number with the broad scope originally hoped for was unavailable; however, the internal pilot team did locate cost figures from the 2009 Address Canvassing operation and provided those to the external partners. In addition, information from the *Federal Aid to States for Fiscal Year 2010* report was also included in the REC3 feedback.

Using the 2009 Address Canvassing cost figures to help measure improvements to the MAF over time (i.e. a partner file contributed x number of new and valid addresses to the MAF saving the Census Bureau x dollars) is a starting point for the Census Bureau. The same measure of improvement could be included by an external partner as part of developing a business case for a statewide address dataset.

The internal pilot team recognizes that to be most useful in measuring improvements to the MAF overtime however, a more comprehensive dollar figure should be identified. The comprehensive dollar figure should include, not just the cost of Address Canvassing but also the cost of other field operations such as the Nonresponse Follow-up Operation (NRFU), ancillary costs that may not be directly associated to a particular field operation but involve resources of Census personnel to manage the MAF throughout the Census process, and the impact of inflation.

The intent of the recommendation was also to include a dollar figure, at the address level, that identified the value to a state for every valid address the Census Bureau included in the census for that respective state. This number was also unavailable to the internal pilot team. The internal pilot team recommends that external partners collaborate with state, tribal and local level

partners to help identify measures that could help define this type of measure. One such measure may be the cost to state, tribal and local entities to participate in the Census Bureau's Local Update of Census Addresses (LUCA) program. Would an ongoing address data and feedback sharing partnership with the Census Bureau mitigate the need for partners to allocate resources necessary to participate in the LUCA program? If so, what cost savings does that offer a partner?

REC5 - MAF-Partner non-source specific discrepancy counts and REC6 - MAF-Partner source specific discrepancy indicators

The effort to generate feedback for both REC5 and REC6 was a semi-automated process. As such, it needs further development to be feasible on a large scale in a batch-oriented environment.

If additional time is allocated to fully automate the generation of tallies similar to those in REC5 and REC6, it is reasonable for the GEO to consider offering similar feedback in the future.

REC7 – Evaluation of partner file for a measure of overall quality and completeness

Comparison with Census Address Guidelines

Completing the comparison of metadata components was a manual process. It is not clear how the GEO would fully automate this given the variance in how metadata are provided (as a word document, in XML as part of a shapefile or geodatabase, PDF separate from the address files/etc.). That said, regardless of whether a certain amount of manual effort is required to review the metadata associated with a partner file, it will be part of the pre-processing and evaluation the GEO conducts in processing partner provided address files. It may be feasible for the GEO to make available to interested partners, general information about how the presence and/or lack of metadata impacted the evaluation of the file.

Completing the comparison of address components was an automated process defined as part of the pilot project. It will likely need ongoing revisions as the Census Address Guidelines may evolve over time. Provided the automated processing is based on a standard layout, currently the GSSMG layout (see Section 5 for additional details), this seems a reasonable type of feedback for the GEO to offer in the future.

An option for making this type of feedback more feasible for the GEO (particularly the metadata comparison) is to specify that a partner provided address file and associated metadata be in a standard format (such as FGDC).

Tally of Duplicate Addresses

The GEO automated this process, relying on the GEO's existing method for identifying like addresses. The GEO will do this as part of the standard file evaluation process to help determine how to use a partner file in updating the MAF. This is a reasonable type of feedback for the GEO to offer in the future.

REC8 – Consolidated information sheet of Census data publicly available

This product was a relatively simple endeavor for the Census Bureau, particularly given that it combined information already generated. The GEO deliberately made dataset descriptions and links for accessing the data generic, so the GEO would only need to update the document when the contents of the datasets (not the data themselves) change. For example, the GEO would not have to update the document every time there is a new release of ACS data, only if the data released as part of the one-, three- or five- year releases changes. An exception is the "TIGER/Line Shapefile Availability" table currently included in the document, which specifies 2012 TIGER/Line files. A simple change, however, could make that general for all TIGER/Line releases.

Partner recommendations that the Census Bureau conduct webinars to help users navigate the Census website better would require additional resources. However, this seems like a tool that would prove useful to all users of the Census Bureau's geographic data. The GEO could also record and post webinars to make them available at any time to a wider audience. The GEO's Geographic Products Branch should consider this.

REC9 – Information on ZIP Codes

While this recommendation was not fulfilled by Census, the GEO staff still believe this type of feedback work would be best suited for the USPS since it is similar in nature to work they are currently performing under the County Project. Depending on the results of the *Data Sharing – Local, State, USPS, and Census* pilot the GEO should consider pursuing this recommendation outside the pilot via other teams in the GEO focusing on working relations with the USPS.

E. Challenges brought by Title 13 constraints and their application to the MAF and products derived from information in the MAF

Title 13 served as a major hurdle and at times a real roadblock for sharing valuable information between the pilot team participants.

This sentiment was captured repeatedly in feedback from the external partners, and is shared by the internal pilot team. Specifically, the external partners expressed frustration with the inability for them to use results provided under REC6, among others. This sense of frustration, both in terms of required paperwork and overall Title 13 restrictions, is described below by one of the external partners:

> *"The decision by Census that the Highest Elected Official needs to sign the paperwork for us to see Census address data is problematic. It is our view that Census is overly conservative in the interpretation of Title 13 data with respect to the nature of the work we have been testing in the Pilot project."*

Obtaining the necessary signed documents, given the tight schedule for the pilot project, burdened the external state partners with the challenge of having to try to acquire prompt attention from the governor of each state. The governors that did sign the paperwork did so

within the range of one week to one-month of receiving the paperwork. The GEO was unable to deliver some Title 13 protected feedback products to one partner, because they never received the liaison designation form from the Governor's office. One partner suggested that the Census Bureau reconsider the requirement that the HEO must sign a document designating a liaison. If the Census Bureau continues to require this, the partner suggested that the GEO provide the document directly to the partners, rather than the HEO, so partners can process the document for signature using their existing official channels. This allows partners to follow their usual protocol and track the documents internally.

Hurricane Sandy hit New York hard during the latter stages of the pilot project. Given that all available state resources needed to be shifted toward emergency management and recovery efforts, the Title 13 paperwork for this project was likely and understandably made a low priority. These challenges illustrate but a few of the many issues that accompany sharing data protected by Title 13. The pilot team does not recommend that the GEO offer data protected under Title 13 as Census feedback for the following reasons:

- Distribution and maintenance of paperwork and administrative responsibilities is over burdensome.
- Information cannot be shared/distributed beyond the individuals who have agreed to the confidentiality constraints, impacting not only state and tribal participation, but local and sub-tribal government participation.

In summary, the pilot team notes the following about the impacts of Title 13 on the project:

- Determining what should be covered under Title 13 took a significantly higher level of effort, time, and resources than what was expected.
- The pilot team and the GEO management made assumptions about what should have and should not have been covered by Title 13, and erred on the side of caution in the absence of explicit guidance from the Policy Coordination Office and the DRB. It is possible some of the things the pilot team determined to be as covered under Title 13 may actually fall outside of those constraints, but care was taken to take no chances. If the GEO considers similar feedback products for the future, a more clear and thorough examination of what presents a disclosure risk and should therefore be covered under Title 13 is necessary.
- Further clarification from the DRB and the Policy Coordination Office, about their position on this issue and the specific questions presented to them as part of this pilot, is imperative.

F. If the GEO pursues similar data sharing efforts on a larger scale in the future, additional effort is needed for:

- Designing automated approaches that allow the Census Bureau to provide feedback products
- Designing methods for collecting and/or aggregating state/tribe/local data
- Establishing methods for a comprehensive feedback loop – an iterative process involving ongoing communication between the Census Bureau and partners about feedback, general data quality along with specific issues, and the needs on both sides in continuing to improve the address data for all parties

7. Conclusions

A. Address Data Sharing Model/ Resource Library

The pilot team recommends the following:

- The model should continue being shared and made available publicly for utilization by state, tribal and local governments. It should be a topic at conferences and meetings involving federal, state, tribal and local address data stewards, such as the annual NSGIC and NENA conferences. Discussing the model in these forums will provide a good opportunity for users and potential users to provide input.

- The GEO should establish a mechanism for receiving, from those utilizing the model, feedback about its feasibility and ways it can be improved. The GEO should then revise the model periodically to reflect such feedback. A forum for vetting changes and allowing input from users should also be considered.

- The pilot team recommends the resource library be pursued, first by dedicating resources to a) ensure a similar resource does not already exist, and if not, b) develop the library and maintain it. The library would be a resource to state, tribal and local governments trying to build their own address datasets. Consideration should also be given to the resources necessary for maintaining the resource library over time. If the GEO cannot provide the resources to maintain the library, then it would not be as useful to potential users.

  Given the recommendations to make the model available to potential users and to facilitate getting feedback to GEO from those using the model, the development of the resource library could be part of that system. So, integrating the development of the resource library should be considered in light of how the GEO decides to maintain and improve the model.

- The model establishes the state or tribe as the aggregator of address data, serving as a liaison in many ways, between the Census Bureau and local partners. The Census Bureau has, however, established partnerships with many local entities that currently benefit both the Census Bureau and the local partners. States and tribal governments, too, have established valuable partnerships with their local and sub-tribal governments. In order for GEO to successfully use this model going forward, consideration must be given to handling communication amongst all stakeholders in a way that does not compromise these existing relationships.

  For example, during the implementation of the pilot, there were local entities (in a state that was a partner on the pilot team) contacted about address data sharing activities (specifically one of the other GSS-I address pilots). This caused confusion because the state level partner on the pilot team was contacted by the local entities involved and asked by those entities about the communication they had received from the Census Bureau. The state level partner was unaware the local entities had been (or were going to be) contacted by another of the GSS-I pilots and was therefore caught off guard by the

questions of the local entities. The experience gave the impression the Census Bureau is operating in a fractional manner without sufficient communication between all stakeholders.

The pilot team therefore recommends that GEO consider making available to external partners, a comprehensive list of all the partners with which GEO currently works to foster address data sharing and maintenance and the programs in which each is involved. If security or other restrictions prohibit the release of such a list, the pilot team recommends the GEO develop a mechanism to ensure that all address sharing and maintenance related activities are communicated to each of the Census Bureau's external partners and stakeholders. Possibilities include a dynamic and interactive online blog, forum, blackboard, or other technology that allows easily accessible, near real-time, web-based communication by any number of users.

B. Address Data Sharing Feedback Loop

The Census Bureau should continue working with state, tribal, and local level address data stewards to implement an address data sharing feedback loop, on a larger scale than was used in the pilot, considering the following recommendations:

- Include a greater number of state, tribal and local partners whose entities nest within each other. Include additional tribal areas, particularly small tribes that can provide insight about how best to partner with the Census Bureau to share address data.
- Determine if the types of feedback recommended for use in the future (see individual recommendations below) can be improved particularly concerning the content, format, and processing. Refine the types of feedback that are truly feasible on a large scale and that are useful to external partners and worth the effort on everyone's part to generate.
- Identify more fully how to achieve buy-in from local level partners, in a partnership framework that supports the state/tribal level partner taking on the role of aggregating and submitting the data to the Census Bureau. Identify the needs of local level partners that can be met through an address data sharing partnership involving both the state/tribe and the Census Bureau.
- Identify the environment (set of circumstances) for which a state or tribe centered address data sharing partnership may not work, and identify how address data sharing partnerships involving the Census Bureau can or should be approached in such environments.
- Determine the frequency needed for each type of recommended feedback (e.g. monthly, quarterly, annually, etc.).

<u>REC1 – Polygons</u>

The pilot team recommends for future address sharing partnerships, that the GEO offer this type of feedback to census partners. However, the GEO should consider issues described in Section 6, particularly:

- Providing additional details about each AOI
- Automating the process for it to be feasible on a large scale

- Refining methodology and weighing the pros and cons of several options, particularly those that promise to make the information more useful to partners but risk making the feedback subject to Title 13 restrictions

REC2 – MAF Tallies

The pilot team recommends that the GEO offer this type of feedback to census partners for future address sharing partnerships. However, the GEO should consider issues described in Section 6, particularly:

- The need to more clearly define primary vs. sub-address and identify the best methodology for identifying each, and
- The question of whether it is possible to provide tallies aggregated at geography levels lower than county, specifically town, city, and village, outside of Title 13 constraints. If the MAF tallies cannot be aggregated at geographic levels lower than county, outside of Title 13 constraints, it is questionable - based on the results of this pilot - whether offering this type of feedback is worthwhile.

REC3 - Business Case

The pilot team recommends that GEO build on the information available from the 2009 Addressing Canvassing operation and identify a comprehensive method of measuring the savings to the Census Bureau in using partner files to help maintain the MAF. Measures identified for this purpose should be evaluated for their ability to allow comparisons over time.

The pilot team recommends that GEO offer this type of feedback to census partners for future address sharing partnerships. Consideration should be given to issues described in Section 6, particularly:

- The need for comprehensive dollar figures that reflect savings to the Census Bureau and value added to a partner, for engaging in an address data sharing partnership
- The value in having a 'formula', or well defined methodology, used by the Census partners in generating metrics for building a business case. Making available a common methodology for generating metrics that can be used in developing a business case will help ensure that partner-generated metrics are consistent.
- The limitations with using Census feedback defined in REC5 and REC6 because it is currently considered Title 13. The inability of partners to use such feedback and share it beyond what is allowed under Title 13 constraints essentially renders the feedback defined by REC5 and REC6 unusable for most purposes as they relate to developing business cases.

REC5 - MAF-Partner non-source specific discrepancy counts

The pilot team recommends that the GEO not allocate resources to generating this type of feedback for future address sharing partnerships. The pilot team does recommend however, that the GEO reconsider this type of feedback if through subsequent partnership activities it becomes apparent this type of feedback is more worthwhile than was discovered through this pilot.

The GEO treated this type of feedback as Title 13 information for the pilot, which presented many limitations for a partners' use of the feedback and should be part of any future consideration to allocate resources towards providing this type feedback.

REC6 - MAF-Partner source specific discrepancy indicators

The pilot team recommends that the GEO not allocate resources to generating this type of feedback for future address sharing partnerships. The pilot team does recommend however, that the GEO reconsider this type of feedback if through subsequent partnership activities it becomes apparent this type of feedback is more worthwhile than was discovered through this pilot.

The GEO treated this type of feedback as Title 13 information for the pilot, which presented many limitations for a partners' use of the feedback and should be part of any future consideration to allocate resources towards providing this type feedback. If in the future the Census Bureau decides this type of feedback does not need to be protected under Title 13, the usefulness of these data, particularly in combination with the information available as part of REC3, would significantly increase. External partners could use this information to create a business justification for continuing to allocate resources to address maintenance and sharing activities, by showing how improved data quality in the MAF leads to more accurate Census counts. Improved counts could benefit local and state governments in terms of funding opportunities.

REC7 – Evaluation of partner file for a measure of overall quality and completeness

Comparison with Census Address Guidelines

The pilot team recommends for future address sharing partnerships, that the GEO offer this type of feedback to census partners. However, the GEO should consider issues described in Section 6, particularly:

- Aggregating tallies at lower geographic levels (rather than file level only)
- Providing unique identifiers so specific records not meeting the guidelines can be reviewed by the partner

For the pilot, this type of feedback also included a summary from the comparison of metadata present in a partner file to the metadata described in the Census Address Guidelines. Given the limitations with producing this information outlined in Section 6 and the limited utility this information provided the pilot partners, the pilot team recommends that resources not be allocated to generating feedback on the comparison of metadata, and limit it to the comparison of address components only. However, because the evaluation of a partner provided address file will inherently include a review of any metadata provided with the file, information (albeit it in a different format than was tested in the pilot) about how the presence and/or lack of metadata impacted the file evaluation could be made available to partners interested in such feedback.

Tally of Duplicate Addresses

The pilot team recommends that the GEO offer this type of feedback to census partners for future address sharing partnerships. However, the GEO should consider issues described in Section 6, particularly:

- The need for clearer explanation of how duplicates are identified and handled
- The need to determine utility of this information to census partners once additional explanation is provided

REC8 – Consolidated information sheet of Census data publicly available

The pilot team recommends keeping and continuing to maintain a document describing and listing publicly available products that include address and housing unit information. The existing document would require only occasional and minimal updating, requiring few resources. Partners indicated it was useful to them. The team also recommends the Geographic Products Branch in the GEO considering conducting webinars to assist data users in navigating the website and geographic datasets available there.

REC9 – Information on ZIP Codes

This pilot team recommends, barring the outcome and recommendations of the *Data Sharing – Local, State, USPS, and Census* pilot, the GEO continue to look at ways information related to ZIP Codes can be made available to state, tribal and local address data stewards and other Census partners.

C. Title 13 Constraints and Address Data Sharing

One of the key takeaways from this pilot project is that Title 13 policies severely limited the benefit to external partners of participating in an address data sharing partnership with the Census Bureau. Both the cost, in time to complete and manage the required paperwork, as well as the diminished/limited utility of the Census Feedback products covered under Title 13 were substantial drawbacks to the external partners. Based on extensive conversations between the internal pilot team and external partners throughout the course of the project, there is nearly universal agreement that the overall partnership was adversely impacted by Title 13 restrictions. It is fair to say that the participants in this pilot project would certainly like to see Title 13 restrictions lifted.

In addition to continuing efforts of address data sharing, the pilot team recommends the GEO management prepare a report for higher level Census management that includes the following:

- The issues/questions the internal pilot team brought to the GEO management, the DSEP group, the Policy Coordination Office and the DRB regarding Title 13 application and scope related to generating and providing feedback
- The responses each group provided to this team and the GEO management
- Summary of Title 13 related decisions made for the pilots, and why
- List of outstanding questions related to Title 13 and address data sharing

The goal of such a report is to obtain clear direction about what does and does not fall under the existing Title 13 constraints for address data sharing.

8. Acknowledgements

Members of the pilot team as well as others involved with the pilot are listed below. The internal pilot team would like to thank our partners for their time, effort, and involvement with the pilot. The pilot would not have been a successful endeavor without their valuable input.

Individual	Organization
Heidi Crawford	Team Lead, Tribal/Local Geographic Partnerships Branch, US Census Bureau
Dan Biggio	Team Member, Linear Features Branch, US Census Bureau
Colleen Joyce	Team Member, Geographic Areas Branch, US Census Bureau
Tanya Sadrak	Team Member, Address Programs Management Branch, US Census Bureau
Cheryl Benjamin	Partner, Office of Cyber Security, NYS Division of Homeland Security & Emergency Services (DHSES)
William Johnson	Partner, Deputy Director, Office of Cyber Security, NYS Division of Homeland Security & Emergency Services (DHSES)
Joe Sewash	Partner, North Carolina Center for Geographic Information and Analysis, Office of the State Chief Information Officer
Arbin Mitchell	Partner, Chief of Staff, Navajo Nation
M.C. Baldwin	Partner, GIS/Rural Addressing Coordinator, Division of Community Development, Navajo Nation
Norbert Nez	Partner, Computer Operations Manager, Division of Community Development, Navajo Nation
Michael Fashoway	Partner, Structures Framework and Address Data Coordinator, Montana State Library
Rachel Bello	Partner, Network Administrator, Guilford Metro 911

Attachment A: Terminology and Acronyms

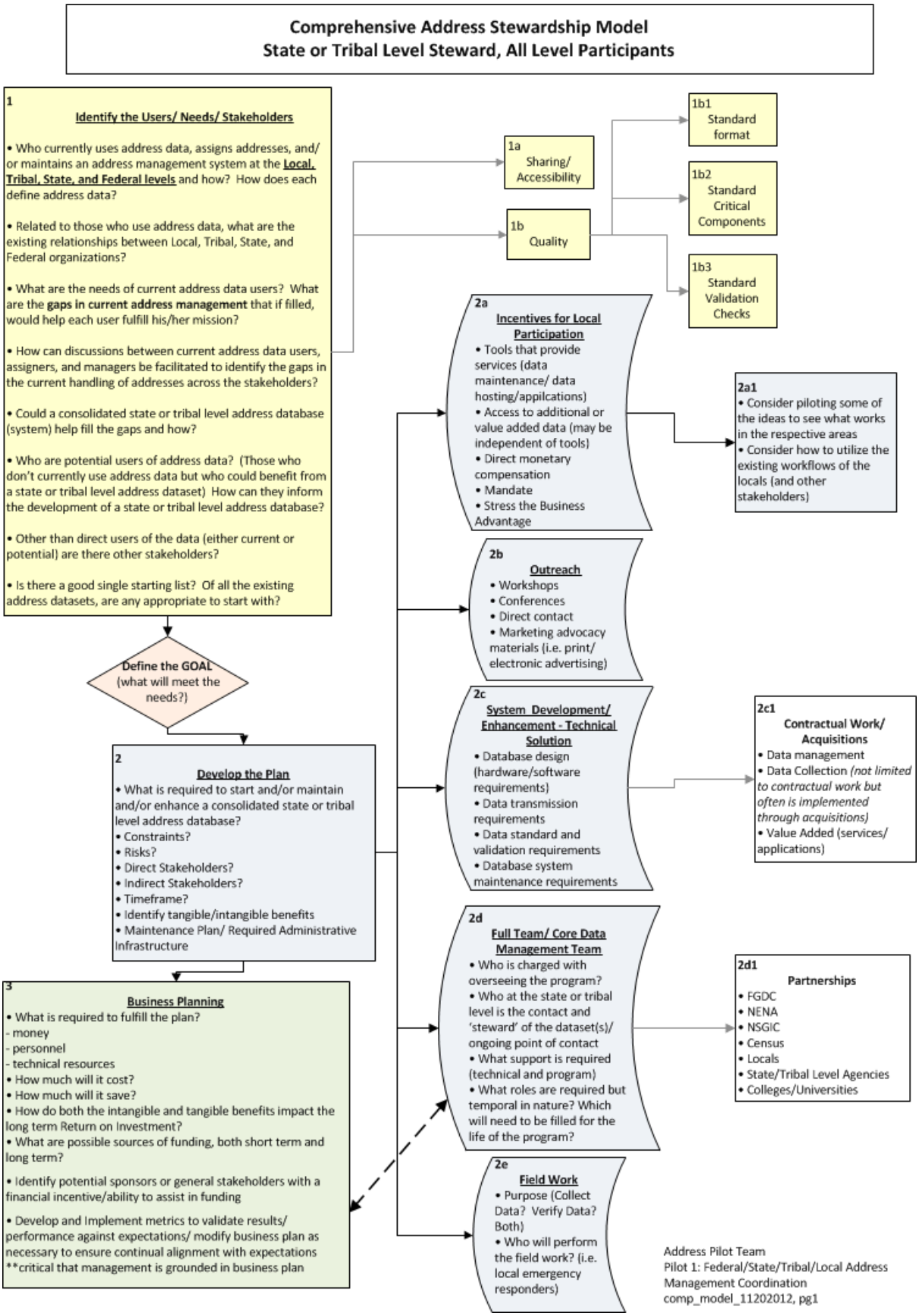
Term/Phrase	Definition/ Explanation
2010 versus Current Census Geography	Current tabulation (tab) blocks are based on the 2010 tab blocks and reflect changes to the tab geography since. Changes to the tab geography include: • In some cases, 2010 tab blocks may have been 'reshaped' if they followed a feature for example, that has been spatially enhanced and reshaped since 2010. These blocks are referred to as the 'current' tab blocks. In some cases, this may have resulted in MAF units moving to a new 'current' tab block that is different from the 2010 tab block with which they were previously associated. • 2010 tab blocks may have been split by a boundary since being published in 2010 and are now reflected with a suffix. The suffixed blocks are also referred to as the 'current' blocks.
Basic Street Address (BSA)	Consists of a House Number, Street Name, and 5-digit ZIP Code. Does not consider other address elements such as building/unit information and coordinate pairs.
External Pilot Team	Pilot team members from state/tribal/local
Internal Pilot Team	Pilot team members from the U.S. Census Bureau
Principle Address in the MAF	An address reflecting a structure. A principle Address may or may not represent a multi-unit.
Sub-Address in the MAF	An address reflecting a unit or living quarter that is part of a multi-unit (many units within the same structure).

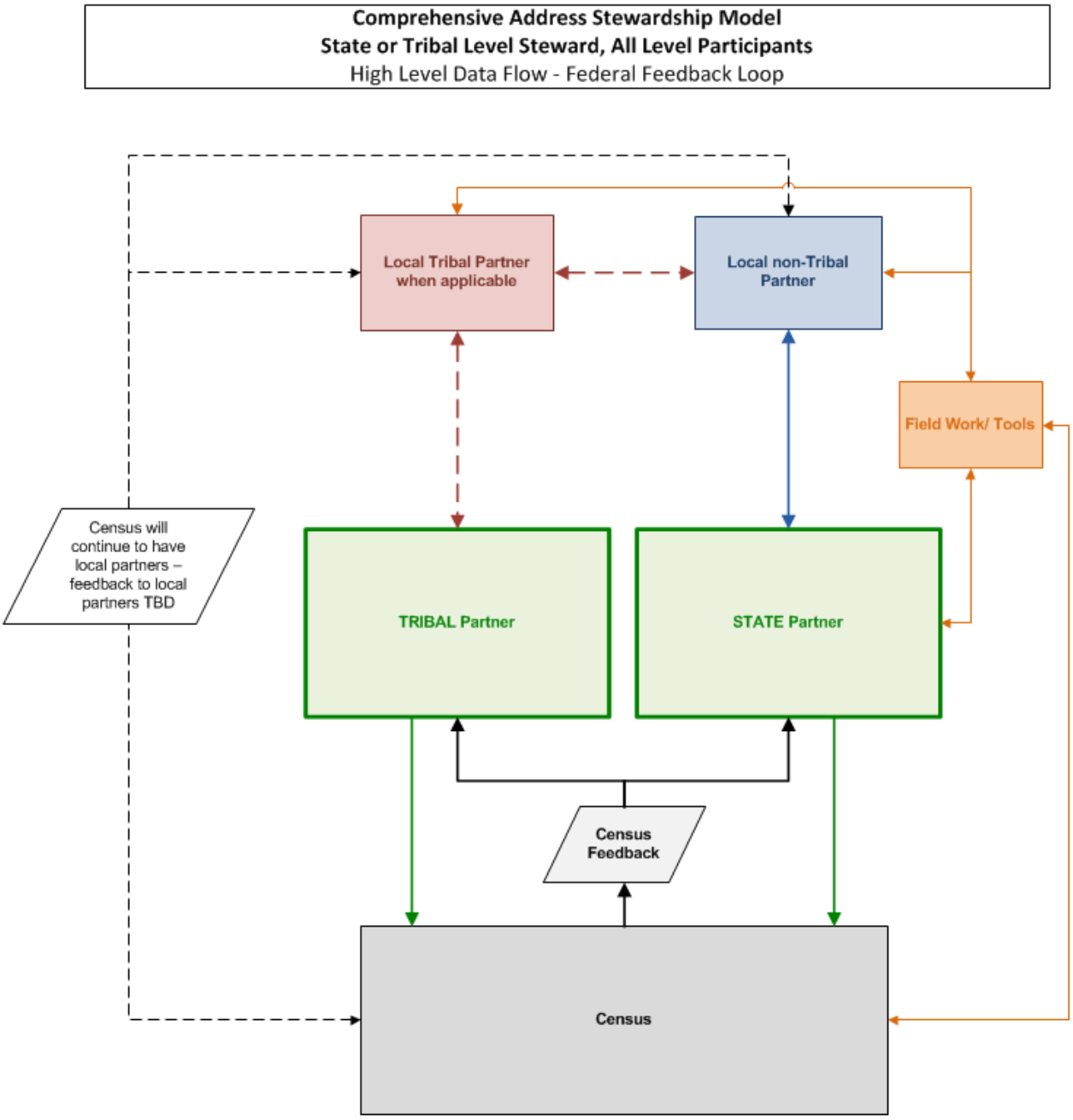
Acronym	Meaning
ACS	American Community Survey
CGIA	Center for Geographic Information and Analysis
DRB	Disclosure Review Board
DSEP	Data Stewardship Executive Policy Committee
FGDC	Federal Geographic Data Committee
GEO	Geography Division, U.S. Census Bureau
GQ	Group Quarters
GSS-I	Geographic Support System Initiative
GSSMG	Matching and geocoding process for the partner file evaluation in GEO
HEO	Highest Elected Official
HU	Housing Unit
LRAC	Local Rural Addressing Committee
MAF	Master Address File
NAPSG	National Alliance for Public Safety GIS Foundation
NENA	National Emergency Number Association
NG911	Next Generation 911
NNAA	Navajo Nation Addressing Authority
Non-Res	Non-Residential
NSGIC	National States Geographic Information Council
OCS	Office of Cyber Security
SAM	Street Addressing Mapping
TIGER	Topologically Integrated Geographic Encoding and Referencing
USPS	United States Postal Service

Attachment B: Models

1) Comprehensive Address Stewardship Model: State or Tribal Level Steward, All Level Participants on page 48
The model includes detailed descriptions of all the elements state, tribal and local governments should consider when building an address dataset, and assumes the state or tribal government ultimately will be the data stewards gathering data from the locals and other sources.

2) Comprehensive Address Stewardship Model: State or Tribal Level Steward, All Level Participants > High Level Data Flow - Federal Feedback Loop on page 49
The model includes the federal to state/tribal/local feedback element, in which the Census Bureau shares address data and information about address data, as they can, with the states, tribes, and locals. The model also accounts for situations where the federal participant (the Census Bureau) may have to work directly with the local government.


Comprehensive Address Stewardship Model
State or Tribal Level Steward, All Level Participants
1
Identify the Users/ Needs/ Stakeholders
• Who currently uses address data, assigns addresses, and/ or maintains an address management system at the Local, Tribal, State, and Federal levels and how? How does each define address data?
• Related to those who use address data, what are the existing relationships between Local, Tribal, State, and Federal organizations?
• What are the needs of current address data users? What are the gaps in current address management that if filled, would help each user fulfill his/her mission?
• How can discussions between current address data users, assigners, and managers be facilitated to identify the gaps in the current handling of addresses across the stakeholders?
• Could a consolidated state or tribal level address database (system) help fill the gaps and how?
• Who are potential users of address data? (Those who don't currently use address data but who could benefit from a state or tribal level address dataset) How can they inform the development of a state or tribal level address database?
• Other than direct users of the data (either current or potential) are there other stakeholders?
• Is there a good single starting list? Of all the existing address datasets, are any appropriate to start with?
Define the GOAL (what will meet the needs?)
2
Develop the Plan
• What is required to start and/or maintain and/or enhance a consolidated state or tribal level address database?
• Constraints?
• Risks?
• Direct Stakeholders?
• Indirect Stakeholders?
• Timeframe?
• Identify tangible/intangible benefits
• Maintenance Plan/ Required Administrative Infrastructure
3
Business Planning
• What is required to fulfill the plan?
- money
- personnel
- technical resources
• How much will it cost?
• How much will it save?
• How do both the intangible and tangible benefits impact the long term Return on Investment?
• What are possible sources of funding, both short term and long term?
• Identify potential sponsors or general stakeholders with a financial incentive/ability to assist in funding
• Develop and Implement metrics to validate results/ performance against expectations/ modify business plan as necessary to ensure continual alignment with expectations
**critical that management is grounded in business plan
1a Sharing/ Accessibility
1b Quality
1b1 Standard format
1b2 Standard Critical Components
1b3 Standard Validation Checks
2a
Incentives for Local Participation
• Tools that provide services (data maintenance/ data hosting/appilcations)
• Access to additional or value added data (may be independent of tools)
• Direct monetary compensation
• Mandate
• Stress the Business Advantage
2a1
• Consider piloting some of the ideas to see what works in the respective areas
• Consider how to utilize the existing workflows of the locals (and other stakeholders)
2b
Outreach
• Workshops
• Conferences
• Direct contact
• Marketing advocacy materials (i.e. print/ electronic advertising)
2c
System Development/ Enhancement - Technical Solution
• Database design (hardware/software requirements)
• Data transmission requirements
• Data standard and validation requirements
• Database system maintenance requirements
2c1
Contractual Work/ Acquisitions
• Data management
• Data Collection (not limited to contractual work but often is implemented through acquisitions)
• Value Added (services/ applications)
2d
Full Team/ Core Data Management Team
• Who is charged with overseeing the program?
• Who at the state or tribal level is the contact and 'steward' of the dataset(s)/ ongoing point of contact
• What support is required (technical and program)
• What roles are required but temporal in nature? Which will need to be filled for the life of the program?
2d1
Partnerships
• FGDC
• NENA
• NSGIC
• Census
• Locals
• State/Tribal Level Agencies
• Colleges/Universities
2e
Field Work
• Purpose (Collect Data? Verify Data? Both)
• Who will perform the field work? (i.e. local emergency responders)
Address Pilot Team
Pilot 1: Federal/State/Tribal/Local Address Management Coordination
comp_model_11202012, pg1


Comprehensive Address Stewardship Model
State or Tribal Level Steward, All Level Participants
High Level Data Flow - Federal Feedback Loop
Local Tribal Partner when applicable
Local non-Tribal Partner
Field Work/ Tools
Census will continue to have local partners – feedback to local partners TBD
TRIBAL Partner
STATE Partner
Census Feedback
Census
Address Pilot Team
Pilot 1: Federal/State/Tribal/Local Address Management Coordination
comp_model_11202012, pg2

Attachment C: Model - Assumptions and Explanations

Assumptions and Explanations
A Reference Tool for the Comprehensive Address Stewardship Model

Assumptions

1) There already exists for a particular state/tribe an advocate of some kind for a state or reservation-level address dataset (i.e. someone in the state or tribe wants to see this happen and is willing to work towards it).

2) Local partners within a state or reservation have some existing data/are the authoritative source and originator of the addresses for their respective jurisdiction.

3) This model will be further adapted to guide federal/tribal address data sharing partnerships.

1. Identify the Users/Needs/ Stakeholders

Identifying up front what the current users of address data feel is lacking in their current address management systems, will aid the cost/benefit analysis that is also part of the stewardship model. Identifying what the benefits (both tangible and intangible) are to developing a high quality state- or reservation-level address dataset may be critical to 'selling' the idea and getting it off the ground.

1a. When considering the data sharing and accessibility needs of the current (and potential) address data users, consider the following:

1. Are there unique needs for where the data is physically stored?

2. Are there issues concerning limited access and use restrictions for the data?

3. Should there be consideration for crowd sourcing? To what extent is the general public a stakeholder?

1b. When considering quality as part of identifying users, stakeholders and their respective needs, consider the following:

1. What is the preferred standard (i.e. FGDC, NENA, other)? How should this be balanced with efforts to place as little a burden as possible on data sharing partners? How are local datasets built and maintained?

2. What data components are critical? Which are nice to have? Which stakeholders get to weigh in on that determination? Are the considerations of all stakeholders treated equal?

3. Quality must be defined by the users and stakeholders. Validation checks must be designed to meet the measures of quality defined by them.

2. Develop the Plan

There will be many things to consider when developing the plan. What is needed to get the program off the ground and then what will be needed to maintain the program? How long will you need to develop the plan and then conduct it? Consider constraints, risks, and success criteria.

2a. While developing the plan it is important to consider what incentives may entice a local to participate in the program. Participation might be mandated, but there might be other reasons that a local would participate. Some of these reasons might include compensation, or access to data that has had value added. Additional incentives may include data hosting and access to easy-to-use applications for data maintenance.

2b. As part of the plan it will be necessary to consider the participants and what type of outreach would be most effective. Would written materials such as postcards or letters be effective? Are there resources for workshops or personal visits? Conferences/workshops organized by other groups might offer an opportunity to reach out to participants.

2c. If there is not a system to support the receipt of data, consideration may be needed for the development of such a system. Alternatively, if there is a system in place then adjustments may be needed. Requirements such as hardware/software design, data transmission, and how to validate the data will need to be determined.

> 1. When designing the technical solution, it can be beneficial (if not necessary) to consider contracting out the (in part or its entirety) development and/or support of the technical solution. It may be worth investigating whether vendors offer for acquisition, a particular service that is required (i.e. geocoding or standardizing per FGDC standards).

2d. Determine who is in charge of overseeing the project and what staffing might be needed to support them. What would be the roles/responsibilities of the team? Will some roles be temporary and others needed for the entire program? Also, who is the data steward of the state/tribal level data?

> 1. As the Full and Core teams are developed, there will be data custodians and spokespersons for the project that will be responsible for maintaining existing, and building new, partnerships. It is critical to understand the existing partnerships (needs on both sides) and consider all types of partnerships that may benefit the effort.

2e. In determining who might perform the necessary field work consider options such as partnerships with colleges and universities that may have a program which allows students, in a related field of study, to conduct field work in exchange for college credit.

Additionally and along the same lines, many post K-12 learning institutions have long-standing internship programs that could provide people to complete necessary field work as well.

Consider secondary learning institutions (typically 7^{th} through 12^{th} grade), for opportunities that may allow students to conduct field work as part of their curriculum studies.

These considerations may also lead to a strong partnership with unobvious organizations, such as the State Department of Education and local school districts.

Another source for field data collection may be emergency responders. If provided resources (i.e. tablets, GPS devices, validation tools/applications), these folks may be able to provide on-going accurate/current data. Additionally, they may be able to verify existing data.

3. Business Planning

It will be necessary to identify upfront what resources there are to work with, not just from a monetary perspective, but as well as personnel and technical resources such as systems. If the program is not mandated and funding is not provided then assess what it may cost up front and for the long term. Also, consider the overall return on investment of the project. Are there sponsors that may have funding or would it be necessary to apply for grants for funding? Given the resources needed to conduct the project what are the short-term and long-term benefits?

Attachment D: Feedback Recommendations

Federal/ State/ Tribal/ Local Address Management Coordination Pilot
Feedback Recommendations

Background

One of the components of the pilot was for the GEO to receive data from the external pilot partners and provide them with feedback on their data. This document contains the recommendations for the types of feedback the GEO provided or hoped to provide to them. The recommendations were suggested by the external partners, internal pilot team, and subject matter experts.

Table 1 – Recommendation List Format

Column Name	Column Description
Recommendation #	A number/letter that uniquely identifies each recommendation
Title 13	Recommendation considered within Title 13 – Yes/No
Notes	Includes any pertinent notes about the recommendation

Table 1 – Recommendation List

#	Recommendation Description	Title 13 Constraints Apply?	Notes
REC1	**Polygons** Provide a GIS file that includes coordinates defining a polygon for an area-of-interest (AOI) where there is a discrepancy in number of structures between a partner file and files that contain publicly available imagery. (Note: The AOI is expected to range from street level covering a couple of blocks to an area that consists of numerous blocks or tract(s), this area may not fit into a specific piece of census geography.) Provide this information at the state/tribal level for the four state/tribal partners. In addition to outlining the area where there is a discrepancy *(a discrepancy is defined as structures apparent in the imagery and not reflected by points in the partner file),* that is greater than the defined threshold *(TBD by subject matter during implementation)* the GIS file should include; 1) Approximate count of the discrepant structures in AOI 2) Spatial extent of AOI 3) List of blocks the AOI falls within 4) Information about the vintage of the imagery used in analysis	No	
REC2	**MAF-Tallies** Provide state/county/block level tallies generated from the	No- if aggregated at the county/tribal-chapter level	Tallies were provided at the state/county (chapter)/block

#	Recommendation Description	Title 13 Constraints Apply?	Notes
	MAF. For each state/county/block a count of the following shall be tallied; **1) Total number of units** 1a) Total number of residential units 1a1) Total number of housing units 1a2) Total number of group quarters 1b) Total number of non-residential units **2) Total number of Basic Street Addresses (principal addresses)** 2a) Total number of Basic Street Addresses that occur more than once (indicate a multi-unit) 2b) Total number of Basic Street Addresses that occur only once (indicate a single family structure) **3) Total number of MAF units that appear to be part of a multi-unit structure (sub-addresses)**	or higher Yes – if aggregated at a geographic level lower than county	level
REC3	**Business Case** Provide the dollar amount ($) per address for 1) and 2) below. Tally/summary data provided through other recommendations. A census partner can use the tally data and the per address figure to calculate metrics to illustrate an ROI. The intent is to provide a state/tribe/local with the tools to create their own metrics that they can use to support their business case for maintaining a current and accurate address dataset that is needed for their own purposes or can be shared with others like the Census Bureau. 1) The approximate cost ($) to the Census Bureau for an address that has to be corrected or added during the Census process, calculate the value to the Census Bureau in receiving the partner file (making the case that getting high quality address data from partners will save the Federal Gov't money) 2) The approximate value ($) of funding provided to a state or county or tribe for an address adequately accounted for in the Census, calculate the value to the partner in providing their file to the Census Bureau to help maintain the MTDB (equitable distribution of Federal funds)	No- if summary metrics are calculated from non-Title 13 constrained counts Yes – if summary metrics are calculated from Title 13 constrained counts Example1- Tallies defined in REC5 and REC6 are currently covered by Title 13 at all geographic levels. Therefore, any ROI metrics calculated using these tallies are subject to Title 13 constraints.	Upon implementation of this recommendation, it was discovered that the exact dollar figures did not exist. Other figures and supporting information were provided that could potentially be used as tools to aggregate ROI.
REC4	Provide street features present in TIGER, but not in partner file. Include address ranges associated to each feature. **Note:** Features were out of scope for the pilot. The recommendation to provide feedback on features is included here to document the request of this type of feedback by the pilot team's external partners.	No	
REC5	**MAF - Partner File comparison** Comparing the partner file to the MAF, determine ***a non-source specific discrepancy rate*** between the two sources. Provide a discrepancy rate (+/-) for each state/county/block. The rate will reflect the extent to which the two sources (partner file and MAF) are inconsistent but will not indicate	Yes- at all geographic levels	Tallies were provided at the state/county (chapter)/block level Originally thought to be non-Title 13, during implementation discovered it potentially was and

#	Recommendation Description	Title 13 Constraints Apply?	Notes
	the details of the discrepancy within each source. Only those addresses that geocode to a block will be included in the rate.		therefore considered it Title 13.
REC6	**MAF - Partner File Comparison** Comparing the partner file to the MAF, determine ***a source*** *specific discrepancy rate* between the two sources. Counts of the following to be provided at the state/county/block level; **'Count of addresses in both partner file and MAF'** 1) # of addresses in the partner file that were found in the MAF. **'Count of addresses only in partner file and eligible for MAF update'** 2) # of addresses in partner file that were not found in the MAF and are eligible to be added to the MAF. **'Count of addresses only in partner file and not eligible for MAF update'** 3) # of addresses in partner file that were not found in the MAF and are not eligible to be added to the MAF. This tally shall include additional information explaining why addresses will not be eligible to be added to the MAF. **'Count of addresses only in MAF'** 4) # of addresses in the MAF not found in partner file. **'Count of geocodeable addresses in partner file'** 5) # of addresses in partner file that were geocodeable, meaning a census block was identified. **'Count of MAF addresses that become geocodeable because of information in partner file'** 6) # of addresses in MAF that become geocodeable because of value added from partner file. (MAF units in this category will be a subset of those in Tally 1 above.)	Yes – at all geographic levels	Tallies were provided at the state/county (chapter)/block level
REC7	**Partner File Review** Evaluate the partner file to measure quality and completeness (as defined by Census Address Guidelines). 1) Information about the consistency between partner file and Census defined *Optimal Address Guidelines* and *Minimum Address Guidelines*. This will involve a comparison between the metadata and address components outlined in the minimum and optimal address guidelines and those present in the partner file. The output will be a summary report of how the partner file aligns with the guidelines. 2) # of addresses that appear to be duplicated within the partner file	No	

#	Recommendation Description	Title 13 Constraints Apply?	Notes
REC8	**Public Data** Information document on what public data is currently available including; Download of shapefiles with 2010 Census population and housing counts *http://www.census.gov/geo/www/tiger/tgrshp2010/tgrshp2010.html*	No	
REC9	**Information on ZIP Codes** Evaluate ZIP Codes present in partner file and identify potential corrections. Possible implementation methodologies Include: 1) For each address in the partner file attempt to identify a ZIP Code from a matching address in the MAF and provide that information back to the partner. OR 2) At the county level attempt to identify valid ZIP Codes associated with that county based on matching addresses in the MAF and provide that information back to the partner.	Yes- if option 1 is implemented No- if option 2 is implemented No- if USPS fulfills	We pursued having the USPS fulfill this recommendation, but they were not able to fulfill it for this Pilot. They were doing some of the work as part of the Data Sharing – Local, State, USPS, and Census Pilot.