

DRAWING LINES: VARIANCE IN MUNICIPAL BOUNDARY MAPS



2023

Local Government Commission
General Assembly of the Commonwealth of Pennsylvania
Harrisburg, Pennsylvania

Letter from the Chairman

Members of the General Assembly:

I am pleased to submit to you the following report on public maps depicting civil boundaries in the Commonwealth. As we will highlight, the transition to public digital maps using geospatial data, or information tied to specific geographic points, often reveals that various maps depicting boundaries between two communities, which should align precisely with one another, often contain discrepancies that are not easily corrected.

Repeatedly, challenges arise when entities use different databases to create their maps. While one agency may be statutorily required to use information from a certain source, another agency may elect to use another source out of convenience or accessibility. This dilemma is compounded by local governments that may, in turn, use other databases for their own needs. The result: maps that are not identical to each other when displayed over a recorded municipal boundary.

To better understand how this problem emerged, the Local Government Commission reviewed the history of boundary marking techniques and map making processes by various Commonwealth agencies. The Commission also analyzed publicly available geospatial datasets and discussed current practices with state and local practitioners.

In brief, our study resulted in four conclusions:

- Commonwealth agencies deliver services using different datasets, often containing conflicting municipal boundary information.
- Boundary information may be collected from outdated sources or based on missing records and may not reflect current legal municipal boundaries.
- Inaccurate maps may impact municipalities in a variety of ways and reduce public confidence in public resources.
- There is great potential for intergovernmental and interagency cooperation to increase efficiency in map-making processes and data sharing.

It is my hope that this report provides valuable information on the status of map making processes to help educate and assist Members of the General Assembly on matters involving local government.

Sincerely,



Senator Scott E. Hutchinson
Chairman

Acknowledgments

The Local Government Commission would like to acknowledge the contributions of all the following individuals and organizations without whom, this report would not be possible.

Office of Administration | Pennsylvania State Geospatial Coordinating Board

- Eric Jespersen, Executive Director
- Contributors to the Civic Boundary Working Group

Pennsylvania Department of State

- Michael Chmielewski, Director, Office of Legislative Affairs
- Kayla Gruber, Deputy Legislative Director

Pennsylvania Emergency Management Agency

- Jeffrey Boyle, Deputy Director for 911

Pennsylvania Department of Transportation

- Mark Leitzell, Manager, Cartographic Services, Bureau of Planning & Research
- Frank DeSendi, Manager, Geographic Information Division, Bureau of Planning & Research

Local Geohistory Project

- Mark Connelly, Programmer and Creator, Local Geohistory Project

Local Government Commission

The Local Government Commission is a bicameral, bipartisan legislative service agency of the Pennsylvania General Assembly. Created in 1935 by an Act of Assembly, it is one of the oldest agencies of its kind in the country. Five Senate Members and five House Members, appointed by the President Pro Tempore of the Senate and the Speaker of the House of Representatives, respectively, constitute the Commission. The ten Members, three from the majority party and two from the minority party in each chamber, collectively work by consensus for more effective and efficient local government.

The Commission serves as a specialized local government resource for Legislators, caucus staff, committee staff and constituents on inquiries, issues and legislation, providing objective expertise in many facets of local government. It takes on long-term complex projects, producing results that may be more difficult to achieve, or cannot be achieved, through caucus staff or advocacy groups alone. Commission Members, with the aid of staff, identify, draft and sponsor legislation to address local government issues, and review certain intergovernmental cooperation agreements as required by law.

The Commission provides a forum for statewide municipal associations, representing different types of municipalities and officials, to express their views directly before Legislators from both caucuses in the Senate and House. It works with these and other stakeholders in proposing legislation to advance more effective and efficient local government in Pennsylvania.

2021-2022 Commission¹

Senator Scott Hutchinson, Chair
Senator Judy Ward
Senator Cris Dush
Senator Judith L. Schwank
Senator Timothy P. Kearney

Representative R. Lee James, First-Vice Chair
Representative Dan Moul
Representative Jerry Knowles
Representative Robert Freeman
Representative Christina D. Sappey

¹ At this writing, the members of the 2021-2022 Commission continue to serve until the Local Government Commission reorganizes.

Table of Contents

Letter from the Chairman.....	i
Acknowledgments.....	ii
Local Government Commission	iii
Introduction.....	1
Background.....	3
Early Boundary-Marking Schemes in Pennsylvania	3
Geospatial Data and GIS	4
PennDOT, MUNBOUND, and the Municipal Liquid Fuels Program	6
United States Census Bureau and the Boundary and Annexation Survey	6
Other Public and Local Maps.....	8
Case Discussions.....	9
Case A. Small Borough with No Clear Cause of Disparity.....	10
Case B. Boundary Data Likely Missing Confident Points of Reference.....	11
Case C. Boundary Data Appears to Follow Unexpected Points of Reference	12
Case D. Challenges Created by Inadequate Reporting After Boundary Changes.....	13
Case E. Role of Courts in Boundary Ascertainment.....	15
Policy Area Considerations.....	17
Enhanced Emergency Dispatch with Next Generation 911	17
Federal Reporting and Test Fairness for Subsidies and Grants	18
Electoral Administration	18
Tax Fairness and Compliance.....	19
Land Use Rights	19
Future Outlook	21
Facilitate Dataset Sharing in PA.....	21
Improve Cooperation with the Census Bureau	21
Boundary Law Changes.....	23
Conclusion	25
Staff Information	27

Introduction

The Commonwealth of Pennsylvania, as we know it today, began to take shape through European settlement and William Penn’s charter establishing Penn’s Woods in 1682, founding Pennsylvania’s three original counties, Philadelphia, Bucks and Chester.² Over the next century, the contours of Pennsylvania’s geometry grew and changed amidst competing interests from Connecticut, New York and Virginia, and finally taking its current shape upon the completion of the purchase of the Erie Triangle in 1792.³ Within the Commonwealth’s boundaries, however, division into 67 counties and more than 2,500 municipal corporations would happen more gradually over the next two centuries – changing, merging, annexing and expanding innumerable times along the way. The civic boundaries that define where one community ends, and the next begins, have been mapped again and again by different agencies and entities for public purposes and private interests alike. Many of these efforts have resulted in maps that vary due to errors in transcription, conflicts between records, and legal disputes. At the same time, more public and private services rely on these maps, and in recent decades, transcription of these records onto digital platforms has become a necessary part of service delivery.

To increase efficiency in geospatial policy and technology, develop more uniform data standards, and promote better coordination among state agencies, the General Assembly passed Act 178 of 2014 to create the Pennsylvania State Geospatial Coordinating Board, otherwise known as the GeoBoard. The GeoBoard’s charge is, in part, to “provide advice and recommendations to the Governor and the citizens of this Commonwealth on geospatial issues.” To achieve this goal the GeoBoard has divided itself into numerous task forces authorized by statute to address a variety of issues related to geospatial policy. These include a Service Delivery Task Force, Governance Task Force, and Data Program Task Force. Within the Data Program Task Force lies the Civic Boundary Working Group, which actively deals with geospatial data as it relates to civic boundaries.⁴

The Civic Boundary Working Group is an *ad hoc* team comprising of members representing public and private stakeholders. As a component of the GeoBoard, this working group has sought to mitigate boundary disputes and “protect the legal record” by advocating for more streamlined data reporting measures.⁵ Members of the Civic Boundary Working Group include Keystone GIS (formerly PaMAGIC), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania Department of Community and Economic Development (DCED), County GIS Professionals, the Pennsylvania Society of Land Surveyors (PSLS), and PA One Call System.⁶

² Alderfer, Harold. PENNSYLVANIA LOCAL GOVERNMENT, 1681-1974. pg. 4. (1975).

³ Erie Triangle Historical Marker, Available at <https://explorepahistory.com/hmarker.php?markerId=1-A-294>. (Accessed February 9, 2023).

⁴ 2021 Annual Report, Pennsylvania State Geospatial Coordinating Board, Pennsylvania Office of Administration, 2021, pg. 4. Available at: <https://www.oa.pa.gov/Programs/Information%20Technology/Documents/geoboard-annual-report-2021.pdf>. (Accessed February 9, 2023).

⁵ *Modernizing Civic Boundary Data Management in Pennsylvania*, Civic Boundary Working Group, Pennsylvania State Geospatial Coordinating Board, December 3, 2020.

⁶ 2021 Annual Report, pg. 9.

Members of the Civic Boundary Working Group met with staff of the Local Government Commission to discuss the compilation of a report on boundary case studies as part of its goal to address boundary disputes. The goal of this report is to:

- Define the issues surrounding multiple map representations that purport to depict the same boundary;
- Review a selection of current processes used to capture this data; and
- Identify potential policy implications that may arise from this issue.

This report does not presume to question the legality of municipal and civic boundaries as they are – rather, we aim to illustrate how different agencies and stakeholders represent geospatial data and promote further discussion.

Background

In the first section of this report, we will review some of the earliest examples of boundary marking techniques, provide an introduction to geospatial data and geospatial information systems, and also review some of the map-making processes utilized by state and Federal agencies. It is important to first build an understanding of how maps are made today before we can begin a comparative analysis and superimpose these separate boundary maps.

Early Boundary-Marking Schemes in Pennsylvania

Historically, the mapping out of boundaries relied heavily on geographic features to demarcate a local government's territorial limits. As Pennsylvania developed westward, large counties were split up to account for the growth in population. For example, the incorporation of Lancaster County and the boundary which separated it from Chester and Philadelphia. Prior to 1729, the area now known as Lancaster was originally part of Chester County.⁷ Then, on May 29th of that year, it was formally divided and declared:⁸

[...] That all and singular the lands within the province of Pennsylvania lying to the northward of Octoraro Creek and to the westward of a line of marked trees running from the north branch of the said Octoraro Creek northeasterly to the river Schuylkill, be erected into a county, and the same is hereby erected into a county, named and from hence forth to be called Lancaster County [...].

Here, the original act incorporating Lancaster County defines the boundary between Chester and Lancaster as Octoraro Creek, as well as a line of trees further north. This boundary is still reflected today and can be viewed on any publicly available map. Historic boundary records pose at least two challenges: how boundary records are reflected in physical markings, and how those records were legally preserved for future reference. Some, like the example above, are contained in special acts of the General Assembly incorporating the municipality; others may be included in records of the respective county Court of Quarter Sessions or even on the county's road docket. These records may be comprehensive documents of incorporation including boundary information or be as simple as basic docket entries where no detailed records are known to exist.⁹

As for marking boundaries, many municipalities were historically separated primarily by these natural features. Some, like the Octoraro Creek, are reasonably durable, while others, like a line of trees, may be hard to identify after the life cycle of the trees. As boundaries became more refined, and with the absence of prominent geographic markers such as streams or rivers, surveyors used boundary stones

⁷ Bureau of Municipal Affairs, *Incorporation Dates for Pennsylvania Municipalities: Lancaster County*, Department of Internal Affairs, 1965, <http://www.phmc.state.pa.us/bah/dam/rg/di/IncorporationDatesForMunicipalities/pdfs/lancaster.pdf?catid=36>. (Accessed on February 9, 2023).

⁸ Act of May 10, 1729 (4 Sm.L.131, Ch. 306).

⁹ *Finding A Pennsylvania Municipality's Official Incorporation Documents*. Archives Advice No. 13, Pennsylvania State Archives. Available at https://www.phmc.pa.gov/Archives/Records-Management/Documents/13_Municipal%20Incorporation%20Dates.pdf. (Accessed on February 14, 2023).

or known property lines to declare a boundary. In fact, some boundaries have been surveyed and updated with boundary markings over time.¹⁰

Boundary stones, or other permanent monuments, enabled map makers to account for precise changes in a boundary, and provided more permanent references for elected officials to determine where one municipality may end, and another begins. It is true that property lines may shift, and tree lines may be cut down, but deliberate stone monuments cement a boundary's location. While the Mason-Dixon Line between Pennsylvania and Maryland may provide some of the most well-known examples, there are numerous stones intersecting the sixty-seven counties. The earliest stone markers in Pennsylvania were erected in 1682 to outline the twelve-mile circle of the Pennsylvania-Delaware border. These stones were then replaced and updated in 1892 following a retracement survey.¹¹ As an example, a monument like this was erected between Lehigh and Schuylkill to note their shared boundary in the middle of a state game land.¹²



These monuments still provide the legal basis for boundaries marking today, and their preservation is of great importance to many stakeholders – from municipalities and counties to state agencies and the General Assembly. Numerous private companies even advertise survey services to restore or replace monuments with iron rods, pipes, nails, or concrete pillars.¹³ And, with advancements in technology, they are being more easily recorded and catalogued in electronic databases.

Geospatial Data and GIS

To better understand how boundary disputes occur, it is important to understand GIS, otherwise known as geographic information systems. Geospatial data has been described as “information that describes objects, events or other features with an association on or near the surface of the Earth.”¹⁴ This data is often a synthesis between location, temporal, and attribute information. As the name

¹⁰ Bureau of Land Management, *A History of the Rectangular Survey System*, United States Department of the Interior, 1983, pg. 1893, <https://www.blm.gov/sites/blm.gov/files/histrect.pdf>. (The Federal government appropriated large sums for land surveyors to “correct” previously established boundaries and replacing old markers with newer, easily readable monuments in the early 20th Century).

¹¹ *Delaware-Pennsylvania Border Marker*, National Park Service, October 8, 2021. Available at <https://www.nps.gov/places/delaware-pennsylvania-border-marker.htm>. (Accessed on February 9, 2023).

¹² *Schuylkill-Lehigh County Boundary Marker*, Waymarking, June 10, 2009. Available at: https://www.waymarking.com/waymarks/wm6JNA_Schuylkill_Lehigh_County_Boundary_Marker_Gamelands_217_PA. (Accessed on February 9, 2023).

¹³ *Boundary Surveys in Somerset and Johnstown, PA*, Cortes Associates, n.d. Available at <https://www.cortesurveying.com/boundary-survey>. (Accessed on February 9, 2023).

¹⁴ *What is Geospatial Data?*, IBM, 2020. Available at: <https://www.ibm.com/topics/geospatial-data>. (Accessed on February 9, 2023).

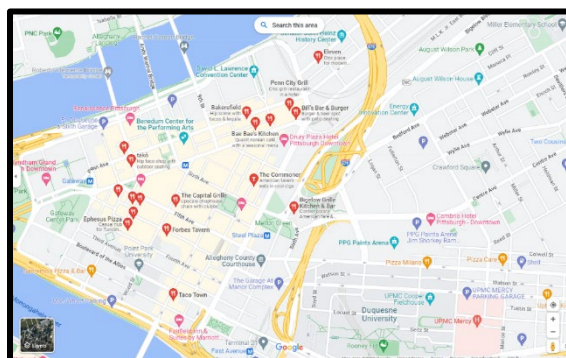
suggests, location and temporal information deal with the geographic location of a point, as well as its place in time (a singular event, like a lightning strike; or a permanent event, such as the placing of a stone marker). Attribute information relates to the characteristics of the data point.¹⁵

Cataloging boundary markers as individual data points can be useful, but it neglects the wider picture that many stakeholders need to carry out their work. What use would a spreadsheet of data points be to a state agency responsible for emergency management coordination if that agency is unable to determine how far points are from one another? How would that agency be able to find the best route to Point B from Point A if the data they've compiled does not highlight roads, rivers, or bridges?

To address this concern, practitioners elevate geospatial data to the next level and utilize GIS. By layering geospatial data points over geographic or political maps, and cross-referencing them with traditional business data, they can create what is known as a Geospatial Information System, or GIS.¹⁶

While such a system may seem highly advanced and futuristic, it is commonly used in a variety of functions that many people take advantage of in their daily lives. Say you would like to explore what local restaurants are in your area. You may go onto a popular browser and look for “restaurants near me” and find the following map.¹⁷

A map like this uses GIS. It is a series of overlays pulling information on restaurants in proximity to your location – and so much more. The map also includes and demarcates a variety of points: from public spaces to hospitals, locations of interests and education systems. Additionally, it includes geospatial information like zoning, roads, and bridges.



GIS has enabled organizations to highlight information across maps and illustrate the relationships between interacting variables. When multiple points of geospatial data are registered, they tag and anchor a precise location in space and time.¹⁸ Web browser companies are not the only ones who use these types of systems. Today, a variety of state and Federal agencies use GIS data to create their own maps for their internal uses and provide government services.

¹⁵ *Id.*

¹⁶ *What is Geospatial Data?*, IBM, 2020. Available at <https://www.ibm.com/topics/geospatial-data>. (Accessed on February 9, 2023).

¹⁷ *Restaurants in Pittsburgh*, Google, 2022. Available at: <https://www.google.com/maps/search/Restaurants/@40.4419613,-79.9989463,16z/data=!3m1!4b1>. (Accessed on November 3, 2022).

¹⁸ *What is Geospatial Data?*, IBM, 2020. Available at <https://www.ibm.com/topics/geospatial-data>. (Accessed on February 9, 2023).

PennDOT, MUNBOUND, and the Municipal Liquid Fuels Program

PennDOT is one of the premier state agencies to have developed its own internal GIS map. PennDOT utilizes a municipal boundaries design file known as MUNBOUND to record geospatial data as it relates to local boundaries. Originally created from maps at a scale of 1”= 2000’, it is a design file originally created by PennDOT’s Cartographic Information Division¹⁹ and includes information on cities, townships, boroughs, counties, PennDOT Engineering Districts, House of Representative Districts, Senatorial Districts, and Congressional Districts. It also includes information on roads (both state and municipal), highways, and bridges.²⁰

But MUNBOUND does more for PennDOT than just record this type of data. It serves as the foundation for PennDOT’s entire map-making process. The Geographic Information Division uses this file to produce maps that are available to the public and available for purchase from PennDOT.²¹ Yet while MUNBOUND helps develop the maps to be used by citizens and agency personnel alike, it also serves as the point-of-reference for all of PennDOT’s geography-based programs.

Among many of the programs and services provided by PennDOT, one of the most important for county and municipal governments is the Municipal Liquid Fuels Program. This program is managed by the department and is authorized by the act of June 1, 1955 (P.L. 1944 No. 655), otherwise known as the Liquid Fuels Tax Municipal Allocation Law. The goal of Act 655 is to provide funding for the maintenance and repair of public roads, and allocations from the Motor License Fund authorized by this act enable a variety of projects that may otherwise go unfunded.

The MUNBOUND system has provided PennDOT with the opportunity to develop its own internal GIS map-based program.²² And while there are procedures to verify information, the overall reliance on this system underscores the need to ensure that boundaries are as accurate as possible. When the alignment of a boundary is called into question, PennDOT reviews the sources of data and conducts research to identify alternative data sources to support or refute the boundary alignment. If the review indicates that a boundary is not in alignment, PennDOT then adjusts their maps to represent the more accurate data. That cannot be done, however, in a vacuum. Other organizations, too, such as the United States Census Bureau utilize their own maps when making agency-wide decisions. In similar fashion to PennDOT with MUNBOUND, the United States Census Bureau relies on a program to verify geospatial data: The Boundary and Annexation Survey.

United States Census Bureau and the Boundary and Annexation Survey

More commonly known as BAS, the Boundary and Annexation Survey provides local governments across the country with an opportunity to review and verify information collected by the Census Bureau. More than 40,000 local governments can ensure the authenticity of the Bureau’s legal

¹⁹ Currently the Geographic Information Division.

²⁰ *PennDOT’s Geographic Information System*, Pennsylvania Department of Transportation, 2001, pg. 51.

²¹ See e.g. *Partnering with Pennsylvania Local Governments*. Pennsylvania Department of Transportation, 2022, pg. 5-8. Available at <https://www.dot.state.pa.us/public/pubsforms/Publications/PUB%20772.pdf>. (Accessed on February 14, 2023).

²² PennDOT OneMap. Available at <https://gis.penndot.gov/onemap/>. (Accessed February 14, 2023).

boundary data, which includes information on tribal, local, and state boundaries, as well as counties, minor civil divisions, consolidated cities, and other census designated places. Respondents to the survey can review information the Census Bureau has collected on their own local government and provide feedback and corrections.²³

The BAS is authorized by Federal law, 13 U.S.C. §6, and fulfills the Census Bureau's responsibility to manage and maintain a national database about legal government boundaries. It also helps the Bureau, as the lead Federal agency in this field, compile information on statistical and administrative boundaries.²⁴

The Census Bureau provides local governments with the annual survey through email and written notice at the start of the year. Participants can provide map updates to the Census Bureau by adding an ArcGIS extension known as the BAS Partnership Toolbox, downloading a software known as the Geographic Update Partnership Software, or annotating a paper map and mailing the finalized document to the Census Bureau.²⁵ Boundary updates returned by March 1 are reflected in the American Community Survey (ACS) and Population Estimates Program (PEP) data, as well as the subsequent year's BAS materials. The final deadline to report updates is May 31, however any information provided after March 1 is excluded from ACS and PEP and only reflected in subsequent BAS material.²⁶

The advent of BAS has afforded local governments a laudable opportunity to provide much needed feedback. But one stark critique of the survey is that it is optional. Although the Census Bureau incentivizes participation by including early responses in the ACS and PEP as discussed above, a municipality can respond late, or not at all, without direct consequence.

As it is not mandatory, there are potential pitfalls within BAS. An unresponsive municipality or county can cause recent lawful boundary changes to be unreported to the Census Bureau. Even if once-contested disputes between municipalities become resolved due to a court ruling, changes may not be reported to the Census Bureau by a newly elected local official unfamiliar with the Survey.

As a later section of this report will explore in greater detail, these challenges are only compounded when faced with another reality: not all Commonwealth agencies rely on the same map sources.²⁷ Like PennDOT's maps, the Census Bureau's maps are used by other state agencies and organizations as well. What must be considered, though, is that while BAS may at times fail to be updated on the most

²³ *About*, United States Census Bureau, 2022, <https://www.census.gov/programs-surveys/bas/about.html>. (Accessed on February 9, 2023).

²⁴ *FAQs*, United States Census Bureau, 2022, <https://www.census.gov/programs-surveys/bas/about/faq.html>. (Accessed on February 9, 2023).

²⁵ *Response Methods*, United States Census Bureau, 2023, <https://www.census.gov/programs-surveys/bas/information/response-methods.html>. (Accessed on February 9, 2023).

²⁶ *FAQs*, United States Census Bureau, 2022, <https://www.census.gov/programs-surveys/bas/about/faq.html>. (Accessed on February 9, 2023).

²⁷ In addition to the practices summarized here, other state agencies not a subject of the research presented may use either or both of these map sources, or even another resource such as Google Maps.

recent acquisitions or boundary changes, that does not mean those changes are not reflected in local and legal records.

Other Public and Local Maps

In addition to the statewide map sources, municipalities and counties may also maintain their own GIS maps for the purposes of providing for planning, administration of property assessment, and even to provide public information about local resources, services and features. The Pennsylvania Municipalities Code, in authorizing municipalities to adopt “official maps,” presupposes the municipal boundaries, but does not necessarily provide legal weight as to the accuracy of those boundaries in comparison to other map sources.²⁸ Rather, they are often interactive tools for community members to use in order to receive or locate services. The challenges highlighted in the statewide maps can add further confusion when compared to these local sources, which may also imperfectly reflect legal boundaries.

²⁸ The act of July 31, 1968 (P.L. 805, No. 247), known as the “Pennsylvania Municipalities Planning Code” authorizes municipalities to adopt official maps and showcase how a municipality looks at a point in time and highlight its potential growth.

Case Discussions

In the next section of this report, we will examine several example cases using maps of Commonwealth municipalities demonstrating conflicts between various sources of GIS data used by different public agencies. Importantly, the purpose of the case discussion in this section of the report is to demonstrate by example the kinds of challenges that exist throughout the Commonwealth, not to independently assess the veracity of boundaries for any municipality. That assessment would require community by community examinations of records reflecting boundaries at incorporation as compared to subsequent changes due to legal annexations, mergers, consolidations, court orders or other forms of boundary change performed by subject area professionals.

By contrast, our efforts that follow seek to highlight that significant conflicts exist in the sources of data relied upon by different public and private entities providing services to residents throughout the Commonwealth. These maps are imperfect²⁹ and periodically revised by GIS professionals that serve in a custodial role over each dataset. Accordingly, readers will note that we have redacted the names of municipalities and counties that would ordinarily appear on the following maps.

The following diagrams were constructed by utilizing the One Map³⁰ tool used by PennDOT which contains the MUNBOUND data set and allows users to superimpose polygon files from other GIS datasets as layers which can be viewed over a variety of base map³¹ files. We were able to access a variety

²⁹ Candidly, many GIS custodians specifically caution that GIS data is provided to the public without warranty as to accuracy. For example, the Dauphin County general public license for use of its GIS data is excerpted below:

7. Disclaimer of Warranties:

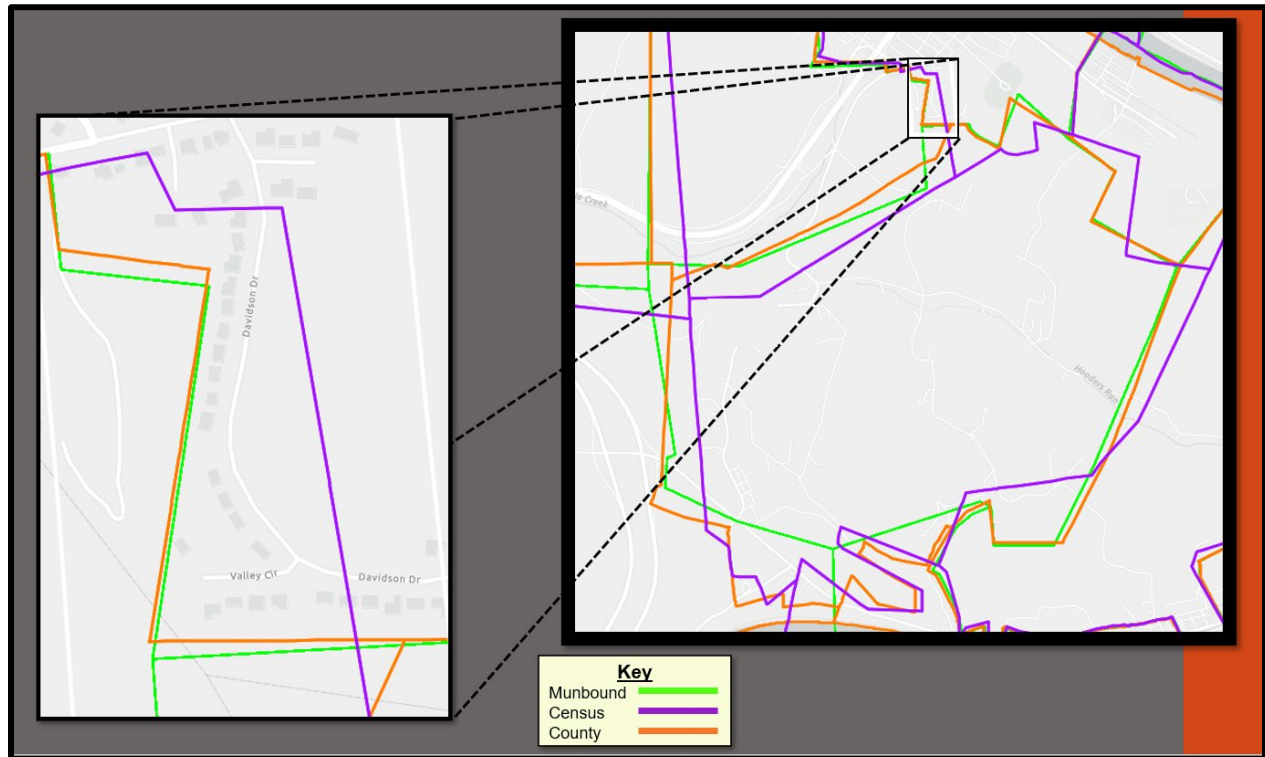
YOU EXPRESSLY ACKNOWLEDGE AND AGREE THAT USE OF THE GIS DATA IS AT YOUR SOLE RISK AND THAT THE ENTIRE RISK AS TO SATISFACTORY QUALITY, PERFORMANCE, ACCURACY AND EFFORT IS WITH YOU. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THIS GIS DATA IS PROVIDED "AS IS", WITH ALL FAULTS AND WITHOUT WARRANTY OF ANY KIND, AND DAUPHIN COUNTY HEREBY DISCLAIMS ALL WARRANTIES AND CONDITIONS WITH RESPECT TO THE GIS DATA, EITHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES AND/OR CONDITIONS OF MERCHANTABILITY, OF SATISFACTORY QUALITY, OF FITNESS FOR A PARTICULAR PURPOSE, OF ACCURACY, AND NON-INFRINGEMENT OF THIRD PARTY RIGHTS. DAUPHIN COUNTY DOES NOT WARRANT AGAINST INTERFERENCE WITH YOUR ENJOYMENT OF THE GIS DATA, THAT THE FUNCTIONS CONTAINED IN THE GIS DATA WILL MEET YOUR REQUIREMENTS, THAT THE OPERATION OF THE GIS DATA WILL BE UNINTERRUPTED OR ERROR-FREE, OR THAT DEFECTS IN THE GIS DATA WILL BE CORRECTED. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY DAUPHIN COUNTY SHALL CREATE A WARRANTY. SHOULD THE GIS DATA PROVE DEFECTIVE, YOU ASSUME THE ENTIRE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

³⁰ PennDOT One Map, <https://gis.penndot.gov/onemap/>. (Accessed on February 9, 2023).

³¹ With the exception of Example B, the following diagrams utilize the “Light Grey Canvas” base on the One Map platform.

of publicly available GIS datasets through the Pennsylvania Spatial Data Access³² clearinghouse, the US Census Bureau,³³ and numerous county GIS offices to produce the following visualizations.

Case A. Small Borough with No Clear Cause of Disparity.



The diagram in Case A. depicts a small borough and surrounding areas where there is a high degree of disparity between various data sources on public facing GIS resources. In the region where this borough is located, surrounding municipal geometries demonstrate similar levels of irregularity, and we have found no immediately evident underlying cause for the disparity between the sources of information. On a day-to-day basis, the residents of the community likely rely on boundaries that are similar to the Census Bureau boundaries, because in this particular case, the Census Bureau boundaries are most consistent with commercial mapping applications like Google Maps. However, the inconsistent data may have an impact if the borough is maintaining sections of road in the southern portion of the borough that the county and Census Bureau include, that fall outside of the boundaries determined by the PennDOT system.³⁴ Another potential impact is highlighted in the excerpted box highlighted above. The boundaries of the adjacent borough to the north show a conflict between the

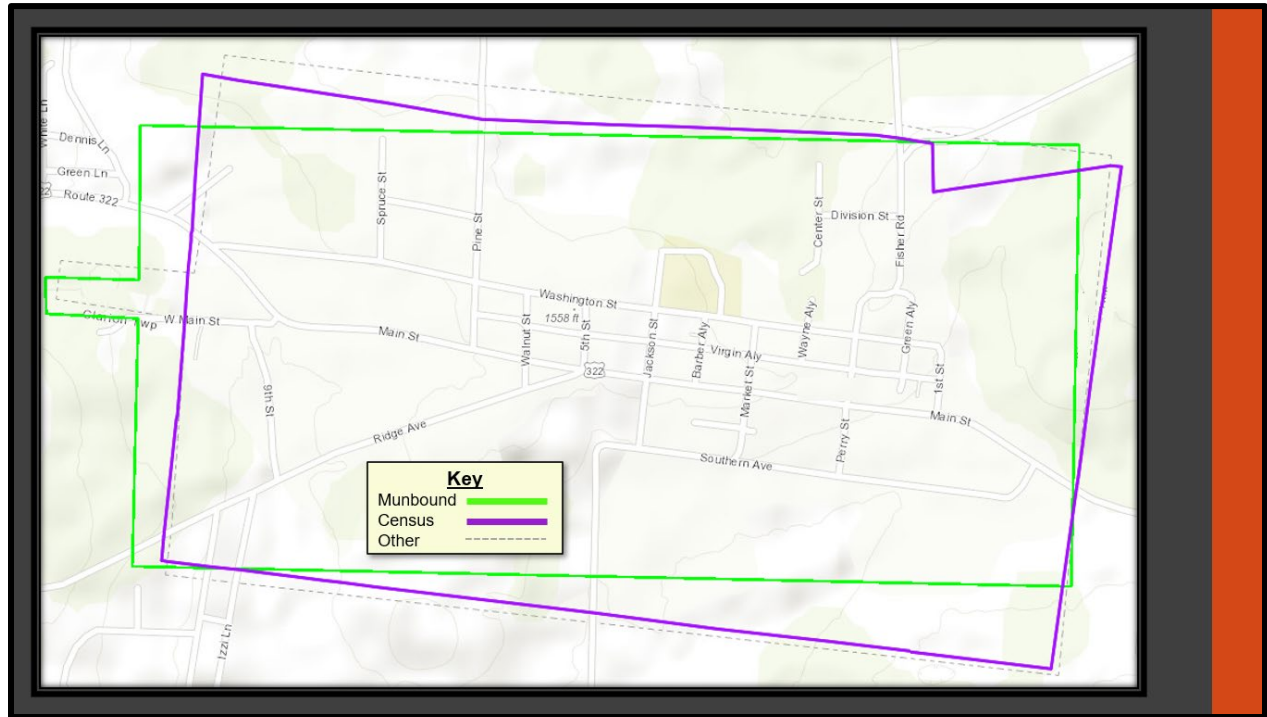
³² Pennsylvania Spatial Data Access, <https://www.pasda.psu.edu/>. (Accessed on February 9, 2023). *See infra* Future Outlook, Pennsylvania Spatial Data Access (PASDA).

³³ United States Census Bureau Mapping Files, <https://www.census.gov/geographies/mapping-files.html>. (Accessed on February 9, 2023).

³⁴ The impact here is lessened by the fact that most of the roads that appear in the space between boundaries in this example are state routes maintained by the Commonwealth.

Census Bureau boundaries and closely aligned PennDOT and county records. According to the data in the base map,³⁵ in this area we count 24 residential buildings which appear to be placed by census data in a different municipality than county or PennDOT data.

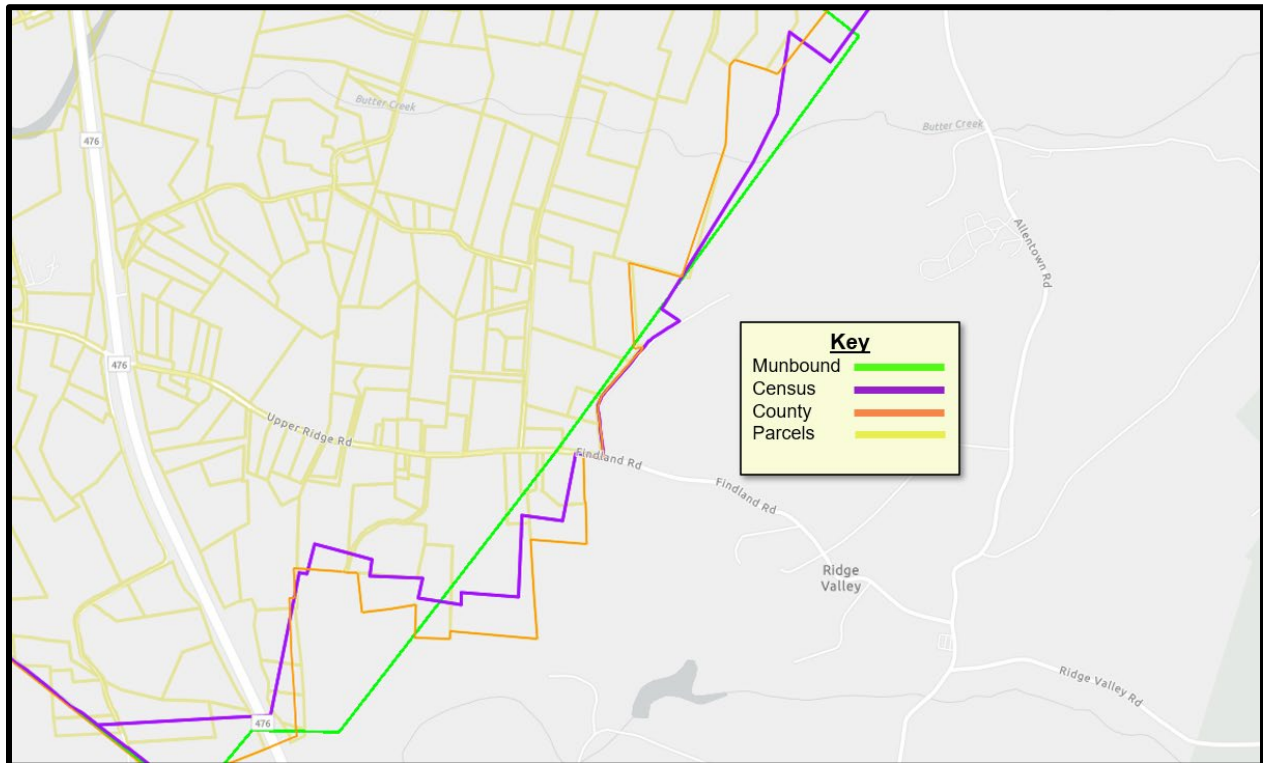
Case B. Boundary Data Likely Missing Confident Points of Reference.



In this case, we can again observe various map layers without clear alignment defining the municipal boundaries of this small borough. This case, however, appears somewhat different than Case A. because the overall shapes of the layers are mostly similar, but the major difference appears to be the orientation of the map on the base map. Although we do not know the underlying reason for this for certain, the data displayed is consistent with a scenario where mapping data has attempted to reflect a known set of metes and bounds (with the possible exception of the small outcrop on the left-hand portion of the diagram) but placed differently on the underlying base map. This may be due to missing information about known physical reference points along the municipal boundary necessary to orient the map accurately. A legal description of the municipal boundary should include references to physical reference points, such as stone monuments or naturally occurring geographic features. However, if historic reference points cannot now be located and aligned accurately by geographic coordinates, it is difficult to accurately align mapping data. Frequently, original boundary descriptions contain references to individual trees, stones or monuments which are no longer known due to loss or degradation in the passage of time.

³⁵ The base map depicts a series of structures that appear to be consistent with single family homes and other residential structures on other maps that include aerial photography.

Case C. Boundary Data Appears to Follow Unexpected Points of Reference



Case C appears to model a different set of boundary quality questions in the jagged lined area above. In this case, we have added in the county parcel data for the township in the upper portion of the diagram because the jagged nature of the county records modeling the municipal boundary line closely align with the outer parcel boundary for many of the parcels in this portion of the township. This phenomenon, if it accurately models the legal boundary of the township, would stand out as an uncommon municipal boundary in the Commonwealth. For one, municipal boundaries do not usually rely upon or follow parcel boundaries because parcels frequently change through conveyance, subdivision, agreement, prescription and court order. No basis of law exists that would transform the municipal boundary by operation of law because of changes in these parcel boundaries. Thus, is it very unlikely that a boundary previously established according to the parcel lines would continue to do so today. Rather, the county records appear more consistent with a historic record keeping error conflating the parcel boundaries with the municipal boundaries that has not been corrected to date.

However, it is also clear that the boundary confusion does not end with the question of the county records. The Census Bureau boundary appears to be based on a similar shape as the county boundary, although its orientation and exact shape conflicts with the county data. By contrast the PennDOT line appears to be either a line of best fit between areas where more clear boundary data is available, or an approximation of a municipal line that appears in a USGS survey not depicted in the diagram presented here. Record keeping, transcription and information sharing concerns are significant contributing factors to the challenges in modelling clear, consistent municipal boundaries.

Case D. Challenges Created by Inadequate Reporting After Boundary Changes



Case D provides a model to demonstrate the issues that can be created by inadequately shared information between governmental entities. Both panels above depict different municipalities where boundaries changed due to territory being added to one municipality and taken from an adjacent municipality through lawful annexation, which has been authorized by a variety of statutory provisions over the Commonwealth’s history and intended to serve different purposes. Municipal officials have often been confused about their recordkeeping and information sharing responsibilities especially after the enactment of the 1968 Pennsylvania Constitution.³⁶ The areas in green that jut away from the

³⁶ See Pa. Const. Art. IX, § 8 (below). By operation of section 8, the General Assembly was given the charge to enact legislation providing a process for boundary change procedures. When no such enactment occurred providing for annexation by the early 1970s, Pennsylvania appellate courts struck down the pre-1968 annexation acts, leaving only a Constitutional mechanism for local ballot measures for annexation, without clear procedural requirements, until the General Assembly’s enactment of Act 41 of 2022.

§ 8. Consolidation, merger or boundary change.

Uniform Legislation.—The General Assembly shall, within two years following the adoption of this article, enact uniform legislation establishing the procedure for consolidation, merger or change of the boundaries of municipalities.

Initiative.—The electors of any municipality shall have the right, by initiative and referendum, to consolidate, merge and change boundaries by a majority vote of those voting thereon in each municipality, without the approval of any governing body.

other boundaries in both municipalities above depict annexations that occurred decades ago, that were recorded in county records in each respective county, but were not sufficiently made available to other governmental agencies. PennDOT's records now capture the annexations after PennDOT was more recently made aware of the relevant legal records, however in both cases, these changes have not yet been adopted by the Census Bureau.³⁷ In the case of the municipality on the right, even though the annexation appears in county records, that county does not reflect the annexation in its own GIS records.

These examples also highlight the value produced by volunteer efforts to curate historical records across the Commonwealth. The records depicting these annexations, and countless others, are easily accessible online only because of the Local Geohistory Project which has analyzed historical records and databased geographic changes in governmental entities across the Commonwealth.³⁸

Study.—The General Assembly shall designate an agency of the Commonwealth to study consolidation, merger and boundary changes, advise municipalities on all problems which might be connected therewith, and initiate local referendum.

Legislative Power.—Nothing herein shall prohibit or prevent the General Assembly from providing additional methods for consolidation, merger or change of boundaries.

³⁷ We are also not aware of any effort to update the Census Bureau's records in either case by the municipality through the BAS.

³⁸ Connelly, Mark A, *Local Geohistory Project*, 2009-2022. Available at: <https://www.localgeohistory.pro/en/>. (Accessed on February 9, 2023).

Case E. Role of Courts in Boundary Ascertainment



The final case, presented here in Case E depicts a scenario where inconsistencies between municipal lines lead to legal conflict between communities. These municipalities, disclosed here by name due to the final adjudication of the dispute, Woodward and Dunnstable Townships located in Clinton County, provide a recent and instructive view into how these may be resolved by the courts when reviewing records fail to bring clarity.

Here, in 2017, Woodward Township filed a petition in the Court of Common Pleas of Clinton County for the appointment of a board of boundary commissioners to conduct a hearing and view and ultimately conclude where the boundary between the townships lies.³⁹ Historical records showed that the line dividing the Township was first created in 1841 when Dunnstable Township was divided, creating Woodward Township, and then adjusted in 1844 when a portion of the border between townships was shifted by court order to enlarge Woodward Township.⁴⁰ Accordingly, surveyors representing both townships presented proposed boundary lines each asserting that they had accurately identified the line adopted by the court in 1844:

Neither surveyor could find the southernmost point of the 1841 boundary line between the two townships. The two surveyors proposed boundary lines which started from a common point on an island in the Susquehanna River, proceeding north to a stone monument which marked the former site of a maple tree (denoted in the 1844

³⁹ Woodward Township v. Dunnstable Township, 255 A.3d 651 (Pa. Cmwlth. 2021).

⁴⁰ *Id* at 654.

court of quarter sessions' order as a "sugar," which both surveyors said meant a maple), and then diverged. From the site of the maple tree, [Woodward Township Surveyor's] proposed boundary line went due north, then turned due west, then turned due north again.

[Dunnstable Township Surveyor] proceeded from the assumption that the 1843/1844 surveyor would have left monuments to mark the division line. [He] searched for such monuments, which he believed that he found, and used those to reconstruct a boundary line that tacked slightly westward from due north with two turns, before turning 90 degrees, slightly to the south of due west, [resulting in a] proposed boundary line generally matched [to] the Clinton County GIS line.⁴¹

According to the procedures of the Second Class Township Code,⁴² the appointed commissioners ultimately were tasked with assessing the weight and credibility of the evidence and conclusions presented and adopted the line proposed by Woodward Township. Dunnstable Township contested the findings on appeal, asserting that the commissioners ignored evidence presented by its surveyor and arguing that Woodward had ultimately sought a considerable annexation of its territory in contradiction to a long acquiescence between the townships that lead to a long belief that the line was closer to where the Dunnstable surveyor had proposed.

In its decision rejecting Dunnstable Township's appeal, the Commonwealth Court's opinion provides instructive insight into how boundary disputes are resolved by operation of law:

1. The primary decision-making role is fulfilled by the findings of fact determined by the appointed boundary commissioners who may ultimately have no choice but assess weight and credibility of incomplete evidence.⁴³
2. Where insufficient evidence of boundary markers exists, commissioners may have to rely upon recorded courses and distances as a more reliable basis for the establishment of a boundary line.⁴⁴

Evidence that the parties have acquiesced to a particular understanding about the division between municipalities may only be relevant when all other evidence has been considered, not as an equitable substitute for that evidence.⁴⁵

⁴¹ *Id* at 654-55.

⁴² Subsequently, Act 41 of 2022 has standardized and transferred boundary dispute procedures to 53 Pa.C.S. Ch. 7.

⁴³ *See id* at 656-57.

⁴⁴ *Id* at 656-57 (*quoting* Will v. Piper, 134 A.2d 41 (Pa. Super. 1957)).

⁴⁵ *Id* at 659 (*citing* Adams Township v. Richland Township, 154 A.3d 250 (Pa. 2017)).

Policy Area Considerations

The previous sections touched upon various policy areas that are potentially affected by, or rely upon, municipal boundary mapping. Policy makers at every level can only utilize the information that is available to them. The more accurate the data, the easier an official can make an informed policy decision. In the following section, we will explain the impact of municipal mapping as it relates to emergency services, grant and subsidy tests, electoral administration, tax fairness, and land use issues.

Enhanced Emergency Dispatch with Next Generation 911

The Commonwealth is in the process of updating its current 911 emergency dispatch system to the Next Generation 911 (NG911) system, as required by Act 12.⁴⁶ The biggest change in this new system is the use of GIS data for determining caller location and routing calls to the appropriate Public Safety Answering Points (PSAP). Historically, 911 operations worked by using the address associated with each landline telephone account to determine which PSAP would answer the emergency call. From there, the PSAP would collect relevant information from the caller, and then dispatch the appropriate emergency services to the incident. As technology progressed, more emergency calls were being made through wireless phones, which relied on global positioning systems (GPS) or cell tower triangulation to help route the calls to the proper PSAPs.

NG911 will employ...GIS databases [which] will not only maintain municipal delineations such as addresses and county lines; they will also include the jurisdictional borders between PSAPs. Further, GIS can use address information as well as latitude and longitude to identify caller location (known as Location Validation Function) and route calls more accurately to the appropriate PSAP. This technology can even show telecommunicators event histories for the location, as well as events that have occurred in similar areas.⁴⁷

Because NG911 is primarily relying on GIS data, discrepancies between municipal mapping systems may not have a significant impact on the function of the system, as municipal boundaries are less important than the more precise GIS location point.⁴⁸ However, counties and PSAPs do need to develop and improve their current GIS data layers to meet the NG911 accuracy standards.⁴⁹ Municipal boundaries are not a required data element to support NG911 call delivery and have no impact on the function of the NG911 system. However, clear municipal boundaries may assist counties with determining the optimal PSAP to which a 911 call is delivered, and which emergency services (Fire, Police, EMS) serve or are dispatched to a municipality.⁵⁰

⁴⁶ Act of June 29, 2015 (P.L. 36, No. 12). (*See* 35 Pa.C.S. §§ 5301 et seq.).

⁴⁷ Legislative Budget and Finance Committee, *A Study Pursuant to Senate Resolution 96: 911 Communication Services*, September 2022, pg. 20.

⁴⁸ Notes from discussion with Pennsylvania Emergency Management Agency (PEMA), September 13, 2022.

⁴⁹ PEMA, Pennsylvania NG9-1-1 Project Overview, January 2021, pg. 12.

⁵⁰ Notes from discussion with PEMA, January 12, 2023.

Federal Reporting and Test Fairness for Subsidies and Grants

As discussed previously, PennDOT uses their own mapping system in administering their Municipal Liquid Fuels Program. The accuracy of the data available to PennDOT is, naturally, directly correlated to the accuracy of the fund distributions. When a change to municipal boundaries goes unreported, future liquid fuels funding could be disproportionately allocated to the affected municipalities. However, these potential inaccuracies would only affect funding insofar as the change or correction relates to roads; if the boundary change, or discrepancy between maps, only deals with land (*see*, for instance, Case D above) then liquid fuels funding would likely be unaffected.

Similarly, at the Federal level, increased municipal participation with the BAS improves the accuracy of the information that the Census Bureau shares with several Federal agencies and programs. As mentioned earlier in this report, participation in the annual program is voluntary, which can lead to the Census Bureau using incomplete or inaccurate information in developing their mapping systems. Changes in municipal boundaries that aren't reflected in the BAS may then also complicate subsidy and grant eligibility determinations.

The Department of Housing and Urban Development uses BAS boundaries to determine jurisdictional eligibility for various grant programs, such as the Community Development Block Grant program. The Department of Agriculture uses BAS boundaries to determine eligibility for various rural housing and economic development programs.⁵¹

Electoral Administration

Municipal boundaries also affect electoral administration – voters need to be confident that they are in fact voting within the correct district when choosing who will represent them. Per the Pennsylvania Election Code, every township, borough, or ward within a city, borough, or township constitutes an election district.⁵² The Election Code also provides mechanisms for the creation of new election districts through division, redivision, or consolidation of existing districts. These new district boundaries are required to conform with United States Census block lines.⁵³ Where disparities exist between mapping systems, it can be unclear where the boundaries of the election districts should lie. However, according to the Pennsylvania Department of State (DOS), election districts tend to be affected more by changes from the Census Bureau than by municipal boundary map uncertainty.⁵⁴ This again points back to the shortcomings of the Census Bureau's BAS system being voluntary and therefore potentially producing less than accurate maps. As an illustration, Case A in the Case Discussions section shows an area containing 24 households which the Census Bureau believes to be in one municipality, but the county and PennDOT maps show in a neighboring municipality.

⁵¹ *BAS Methodology*, United States Census Bureau. Available at: <https://www.census.gov/programs-surveys/bas/technical-documentation/methodology.html>. (Accessed February 9, 2023).

⁵² Act of June 3, 1937 (P.L. 1333, No. 320), known as the "Pennsylvania Election Code," § 501.

⁵³ *Id* at §§ 502-504.

⁵⁴ Notes from discussion with DOS, August 25, 2022.

Tax Fairness and Compliance

One of the foundations of municipal fiscal policy is ensuring tax fairness and equity, working from the assumption that taxpayers are indeed paying taxes to the appropriate taxing authorities. It would seem, then, that a potential problem could arise when a taxpayer lives or owns property that abuts or overlaps boundary lines which may be incorrect – they then may be paying taxes to the wrong taxing authority. However, municipal boundary lines do not always line up with parcel lines – in fact, they often don't. Therefore, there already exists statutory mechanisms for handling taxes where a parcel overlaps a boundary line. In particular, the Consolidated County Assessment Law⁵⁵ provides for the allocation of property taxes in light of boundaries crossing parcel lines. Generally, the taxes are paid to the taxing authority in which the “mansion house”⁵⁶ is located. If municipal boundaries pass through the mansion house itself, then the owner is typically able to choose the taxing authority to be liable to, or the taxes are paid to the municipality which contains the majority of the mansion house.⁵⁷ Given these parameters, it is much less likely that a potential taxing issue would arise in which a disputed boundary line either: (1) moved to cross through a mansion house that was previously located entirely in one municipality, (2) continued to pass through a mansion house in which the owner hadn't already chosen a taxing authority, or (3) changed the municipality in which the majority of the house was located. That is not to say that this situation would be impossible. However, if such a situation would occur, once the boundary line was determined, Section 8818 of the Consolidated County Assessment Law would provide for the correction of any property taxes paid moving forward.

Land Use Rights

When development issues emerge near municipal boundaries, questions often arise about the applicability of one or more community's land use regulations, including zoning and subdivision regulations. Even when all information is available and clear in the absence of municipal boundary issues, it can still be difficult to design projects in a manner consistent with community expectations. This challenge only grows when data discrepancies lead to conflicting decisions between jurisdictions and can lead to wasted time and resources when development applications have been tailored to comply with the requirements of one jurisdiction only to discover that they must be rewritten for another municipality, or worse yet, discover that the proposed use is no longer viable at the location proposed.

Along with development issues, underground utility mapping presents another potential land use area where discrepancies could arise. The Pennsylvania One Call System maintains mapping information provided to them by utility companies, which contains the municipalities that each company services.⁵⁸ This additional mapping system may or may not always align with municipal, PennDOT, and/or Census Bureau maps.

⁵⁵ 53 Pa.C.S. §§ 8801 et seq.

⁵⁶ *Id.* at § 8818.

⁵⁷ *Id.*

⁵⁸ *About*, Pennsylvania One Call System, Inc. Available at: <https://www.pa1call.org/pocs/0c5177e9-d1e5-4c73-951c-2fa0eee77c90/About>. (Accessed on February 9, 2023).

Future Outlook

There are several new and continuing efforts and tools, as well as changes in statutory law, which may allow Federal agencies, the Commonwealth and Pennsylvania local government officials to move towards a set of cohesive, better verified boundaries.

Facilitate Dataset Sharing in PA

BaseMap 2030

PA BaseMap 2030 is an effort being advanced by the Pennsylvania Geospatial Coordinating Board (GeoBoard) to improve workflows related to mapping and data shared among governmental entities. Its ultimate goal, among other things, is to “[p]rovide open, standards-driven, authoritative data that is free to access and easy to find and use” and “[d]eliver a common map that can be used by all levels of government for decision making.” Current efforts are focused on working through individual GeoBoard working groups to define needs and processes to pursue these goals.⁵⁹

Pennsylvania Spatial Data Access (PASDA)⁶⁰

In contrast to the future-focused efforts of the BaseMap 2030 initiative, Pennsylvania Spatial Data Access (PASDA) is an online data clearinghouse established in 1995 and which is now a cooperative project of the Governor’s Office of Administration, Office for Information Technology and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University. PASDA allows any state agency, local government, non-governmental agency or academic institution to share its geospatial data through PASDA with a goal of facilitating data access. PASDA does not resolve conflicts between data sets or correct errors – the data sets are offered to the public as they are received. However, by making various sources available through PASDA, it is possible to compare and contrast them, and identify potential data discrepancies.⁶¹

Improve Cooperation with the Census Bureau

Implementation of BAS Agreement

As referenced earlier in this report, the United States Census Bureau utilizes the Boundary and Annexation Survey, or BAS, to verify its own boundary data by providing local governments an opportunity to confirm reported information regarding their own boundaries. While BAS does effectively capture a wide range of discrepancies that may otherwise go unreported, there is the potential for certain drawbacks since BAS participation is optional, as previously discussed. However, those concerns may be abated with the active intergovernmental involvement of states.

⁵⁹ *PA BaseMap 2030*. Pennsylvania Office of Administration. Available at: <https://www.oa.pa.gov/Programs/Information%20Technology/Pages/BaseMap-2030.aspx>. (Accessed on February 2, 2023).

⁶⁰ *About*, Pa Spatial Data Access, <https://www.pasda.psu.edu/about.asp> (Accessed on February 2, 2023).

⁶¹ *See also*, PA Open Data Portal, the Commonwealth’s own data clearinghouse containing data from more than 30 Commonwealth Agencies. Available at <http://data.pa.gov>. (Accessed on February 2, 2023).

Tennessee is one state that actively coordinates with the Census Bureau to share and verify boundary data through their Office of Local Government. The Tennessee Office of Local Government (OLG) is located within the state’s Comptroller of the Treasury office and assists the Census Bureau with collecting completed BAS materials. Because both organizations “[have] a mission critical need to gather and maintain geographic data, [...] each party can benefit from the knowledge, expertise, and resources of the other party in a cooperative manner.” The Tennessee OLG and the Census Bureau signed a cooperative agreement in 2016. From the Memorandum of Understanding, the two organizations recognized the need to “define a cooperative program for the sharing of information and resources, particularly as it relates to geographic governmental unit boundaries.”⁶²

Per the agreement, the Census Bureau provides OLG with feedback on the review of datasets and updates BAS boundaries to correspond with information OLG has on file, among other things. The OLG, in return, assists the Census Bureau with promoting local government participation in BAS, report boundary changes on behalf of local governments, and provides the Census Bureau with a list of entities that have no recorded boundary changes.⁶³

Although Pennsylvania does not have an office of local government quite like Tennessee, that has not prevented the Commonwealth from working towards collection of BAS materials through agency coordination by the Department of Community and Economic Development (DCED). As of February 4, 2023, a Memorandum of Understanding, similar to the agreement between Tennessee’s OLG and the Census Bureau, has been executed out of the “mutual interest and benefit to [DCED and Census] as it furthers each one’s goal of accurately carrying out their responsibilities for maintaining and disseminating accurate boundary data.” Beginning in 2024, the Census Bureau will notify DCED annually when BAS materials are available, while DCED will report boundary changes annually on behalf of local governments.⁶⁴

Census Bureau Boundary Quality Project

Additionally, there is another program operated by the Census Bureau known as the Boundary Quality Project. This program “is designed to assess, analyze, and improve the spatial quality of legal, statistical, and administrative boundaries within the Census Bureau’s MAF/TIGER System.”⁶⁵ Currently, twenty-seven states participate in the project – Pennsylvania does not. States that participate have access to completed boundary information on legal geographies related to counties, incorporated places, parishes, and subdivisions. As defined by the United States Census Bureau:

Ensuring quality boundaries is a critical component of the geographic preparations for each decennial census and the Census Bureau’s ongoing geographic programs. In addition, the improvement of boundary quality is an essential element of the Census

⁶²Memorandum of Understanding Between the U.S. Census Bureau and the Tennessee Comptroller of the Treasury Office of Local Government, Tennessee Office of Local Government, 2016.

⁶³ *Id.*

⁶⁴ Memorandum of Understanding Between the U.S. Census Bureau and the Pennsylvania Department of Community and Economic Development, 2023.

⁶⁵ Agency Information Collection Activities; Submission to the Office of Management and Budget (OMB) for Review and Approval; Comment Request; Boundary and Annexation Survey, 86 Fed. Reg. 26896 (May 18, 2021).

Bureau's commitment as the responsible agency for legal boundaries under OMB Circular A-16.

The Boundary Quality project represents an effort to systematically target and assess boundary quality within the Census Bureau's MAF/TIGER System. Historically, it has relied exclusively on geographic programs such as BAS and the Participant Statistical Areas Program (PSAP) to obtain updates to tribal, state, local government, and [Census Designated Place] boundaries. While programs like BAS play an essential role in improving boundary quality, the goal of boundary quality activities is to establish a new more accurate baseline for legal boundaries and [Census Designated Places] within an entire state or county. BAS would build on this baseline by collecting individual legal boundary changes and optionally associated addresses, and [Census Designated Place] updates on a transaction basis as they occur over the years.⁶⁶

Boundary Law Changes

Act 41 of 2022 amended Title 53 of the Consolidated Statutes to create a new subchapter providing for Municipal Boundary Change (Municipal Boundary Change Act or MBCA). Among other things, the MBCA consolidated existing law surrounding judicial boundary ascertainment and enacted statutory procedures for the annexation by referendum process in Article IX, Section 8 of the Pennsylvania Constitution. Perhaps more importantly, it also created a new process to allow municipalities to propose a boundary change or settle a boundary dispute by agreement.

Changing boundaries and settling disputes by agreement has the potential to lower some of the costs to municipalities surrounding boundary change. Disputes like the one in Woodward Township and Dunnstable Township happen periodically across the Commonwealth, and previously existing statutory law did not recognize a right to establish a boundary line that neighboring communities found convenient, or even one that could satisfy the need to resolve an unclear boundary. Where a boundary is known to be unclear (and potentially resolved differently by different sources of data), neighboring municipalities had to decide to either provide for a change by referendum, or subject the ambiguity to resolution judicially, which could result in an inconvenient boundary, or one that conflicted with the functional acquiescence between the neighboring municipalities. The MBCA will allow the neighboring municipalities to skip that process and establish boundaries by written agreement so long as impacted residents do not insist on subjecting the agreement to a referendum of the voters.

⁶⁶ *Id.*

Lastly, the MBCA presents standardized and clear responsibilities⁶⁷ to notify county officials and state agencies of the outcome of any form of boundary change, or any boundary established by judicial decree in a manner that is similar to the reporting requirements that apply to mergers or consolidations. Under-reporting these changes historically constitutes a source for many known conflicts between boundary data sets. To the extent these new reporting requirements are adhered to, improved outcomes should follow.

⁶⁷ § 719. Notification of boundary change.

(a) General rule.--Within 15 days after a change in boundaries has taken effect, the governing body of a municipality shall file a final report of the boundary change containing the following information with the County Board of Elections, the Department of Community and Economic Development, the Department of Transportation, the Governor's Office of Policy Development or its successor, the Department of Education and the State Tax Equalization Board:

- (1) The name of the impacted municipalities.
- (2) A land survey showing the courses and distances of the boundary in the impacted territory.
- (3) The location of the monuments along the new boundary line.
- (4) The total assessed valuation of the impacted territory.
- (5) The approximate population of the impacted territory.
- (6) The designation, as provided for in section 715(e)(1) (relating to boundary change agreement by abutting municipalities), by which the impacted territory is to be known.
- (7) In the case of a boundary change by judicial ascertainment, the decree shall be attached to the report.

(b) Combined notifications authorized.--All municipalities impacted by a boundary change may jointly provide for a combined final report under subsection (a).

Conclusion

Ideally, policymakers, private industry and the members of the public at large would benefit from one uniform boundary defining the contours of all communities in the Commonwealth. Relying on such an authoritative data set would improve service delivery, reduce errors and increase public confidence. The challenges posed by unclear and conflicting records, in many ways, represent the growing pains of a rapidly digitizing society. New opportunities exist and will continue to emerge to deliver public and private services more efficiently and accurately by using technologies like digital mapping. Along the way, however, challenges will continue to be posed by lost or unclear records and errors in transcription. Interagency and intergovernmental cooperation provide an opportunity to improve these challenges. Tools like the BAS agreement may facilitate greater coordination with Federal officials, while statutory changes and data clearinghouses in the Commonwealth may encourage greater cooperation between the Commonwealth and its political subdivisions. In every case, however, improvement will take time and rely on the commitment of policy makers and public servants to utilize the tools available.

Staff Information

Name/Title	Post-Secondary Education	
David A. Greene, Esq. Executive Director	B.A. J.D.	The Pennsylvania State University Widener University School of Law
Kristopher J. Gazsi, Esq. Assistant Director/Legal Counsel	B.A. J.D.	Lebanon Valley College The Pennsylvania State University— The Dickinson School of Law
Martin A. Toth, Esq. Associate Legal Counsel	B.A. J.D.	University of Scranton Dickinson School of Law
Julia E. Frey Research Analyst	B.A. M.P.A.	Shippensburg University Shippensburg University
Jaren Bittinger Research Analyst	B.A. M.P.A.	Shippensburg University Shippensburg University
Karen S. Bear, CPS Executive Assistant	A.S.B.	South Hills School of Business & Technology
Sonya I. Ebersole Fiscal Administrator	A.S.A.	Harrisburg Area Community College