

1 **MSDI Structures & Addresses Theme Plan**

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Executive Summary

The *Montana Spatial Data Infrastructure (MSDI) Structures & Addresses Theme Plan* is a component of MSL's *GIS Coordination Strategic Plan*, published in 2022. Goal 4 of the *GIS Coordination Strategic Plan* is focused on improving geospatial data value by maintaining and improving data quality of the MSDI. This theme plan describes the data quality measures used to assess MSDI datasets, the results of that assessment for the MSDI Structures & Addresses theme, and the goals and actions needed to improve the overall data quality of the structures and addresses data.

Over the next three to five years, the plan prioritizes four data-quality improvements: 1) ensure address points align with the associated structure and maintain the Placement attribute accordingly; 2) better synchronize address data between local and tribal providers, the statewide address database, and Next Generation 9-1-1 and elections systems; 3) increase the frequency and reliability of updates supplied by local and tribal providers so that the statewide database and key systems more closely reflect current local source data; and 4) improve accuracy of postal-community and ZIP Code attribution.

The plan recognizes that data quality determines whether the dataset is fit for critical operational uses. Currently, the data are being improved to meet the requirements of NG9-1-1 and elections. The improvements outlined in this plan are intended to expand reliability for other uses including broadband deployment, mail and package delivery, address validation, and other applications.

Theme Definition and Description

The Montana Structures & Addresses Framework is a statewide spatial database of structure and address points in the State of Montana. The goal of the Montana Structures & Addresses Framework is to have a routinely updated statewide database of addresses and selected theme-specific structure point data (e.g., schools, airports, fire stations, etc.). The Framework is designed to support a wide range of public and private sector uses including: 9-1-1 and emergency response, elections management, broadband internet access mapping, census programs, planning, natural resource studies, etc.

Many entities have roles in making this theme successful. MSL will continue to lead coordination, analysis, and automation support. The primary responsibility for many improvements remains with local and tribal address data providers.

Theme Testimonials

The Montana Secretary of State and Montana counties rely on the Montana State Library for accurate elections.

What is on your ballot is determined by where you live. Every voter must be assigned the correct ballot and that requirement depends entirely on accurate geography. When the Secretary of State's office set out to modernize Montana's election management system (ElectMT) with GIS technology, we did not have to build the underlying geospatial information from the ground up. The Montana State Library already maintained it in the form of data in the Montana Spatial Data Infrastructure (MSDI).

The State Library oversees the development and maintenance of two MSDI themes that are essential for accurate elections: Administrative Boundaries and Structures & Addresses. The Administrative Boundaries information is what is used to build elections and set up ballots. In Elections, the basic unit is a "precinct split" which is the smallest area in which the same combination of election districts is contested. Each precinct split represents a unique combination of the administrative boundaries within a county voting precinct. The ballot is configured based on those precinct splits and that determines which races and ballot issues need to appear on the ballot. Because the Administrative Boundary theme is accurate and authoritative the subsequent ballot is configured with only the correct contests. Voters receive a ballot that contains every contest they are entitled to vote on and none that they are not.

To determine which precinct split a voter is assigned to, the residential address of the voter is used. The MSDI Structures & Addresses theme information is used to geolocate the address of the voter and based on that location a precinct split is assigned to the voter. The Structures and Addresses theme is the same one used by and updated by counties for Next Generation 911 and broadband mapping. Reusing the authoritative source for voter's address location ensures that voter's residential addresses are correctly mapped, and voters are automatically assigned the correct precinct split.

Integration of the two MSDI themes with ElectMT results in a voter registration and election management system that is more accurate, more consistent across all 56 counties, and far less dependent on time-consuming manual map work that county election administrators once carried out alone.

Theme Plan (3-5 years)

Through the Data Quality Assessment Matrix (Appendix), Data Improvement Plan Table (Appendix), and with feedback from the MSDI Structures & Addresses Working Group, the following data improvement goals were identified. These objectives will be prioritized to be completed within the next three to five years. Progress on these items will be documented within the Data Improvement Plan and reported back through the Working Group.

Goals are listed in no order of priority:

1. Improve **spatial accuracy and precision** of address points.

- Outcome: all address points are located on the structure / within the building footprint (where a structure exists).
 - Action: move points to structures using imagery/building footprints and update the Placement attribute as needed.
 - Progress: as of July 2026, ~45,000 of ~671,000 (~7%) points still have a Placement value other than "Structure,".
2. Improve **consistency** of address point data between state address database and 9-1-1 and elections systems.
- Outcome: all counties have synchronized 9-1-1 and elections databases.
 - Action: continue coordinating with counties and the Secretary of State on TotalAddress updates.
 - Progress: As of July 2026, 9 of 56 counties have requested a comparison of their 9-1-1 and elections address points.
3. Improve **timeliness** of updates from local and tribal data providers to statewide database.
- Outcome: statewide database data are as current as data provider versions.
 - Action: MSL continues outreach and education to data providers, stressing the importance of regularly sharing data updates based on their specific maintenance cycles.
 - Progress: most providers currently share data only sporadically. The goal is to have all providers share data when addresses are created/updated.
4. Improve **integrity** of address data, including accurate postal community names and ZIP Codes.
- Outcome: all addresses carry correct postal community name and ZIP Code values per USPS/CASS verification.
 - Action: continue using National Address Database ZIP Code feedback, USPS ZIP Code lookup tools, and potentially CASS certification to validate.
 - Progress: April 2026 USPS NAD feedback shows 4,879 addresses (0.9%) with different ZIP Codes and 71,825 addresses (~11%) unmatched.

Data Quality Measures

The data quality of MSDI Structures and Addresses was assessed based on the measures below. Data quality is a component of the value of data. Because data quality directly affects usefulness, improving the quality improves the value of the data.

Update Frequency

Update Frequency, an aspect of Timeliness, is defined by how often the data is updated.

Findings: the assessment did not identify any priority work for Update Frequency.

134 Archive Frequency

135 Archive Frequency is defined as how often the data are archived or how often a snapshot of
136 the data is taken. Archive Frequency is another aspect of Timeliness.

137 Findings: the assessment did not identify any priority work for Archive Frequency.

138 Spatial Accuracy & Precision

139 Precision refers to how data values are stored and expressed. Spatial Accuracy describes if
140 data values correctly represent the observed phenomenon which is subject to usage needs
141 and measurement technologies.

142 Findings: Since the beginning of the geo-enabled elections project in 2022, considerable
143 effort has been made by data providers to align addresses with the appropriate structure.
144 However, several data providers have yet to begin this work or are still in the process of
145 doing so.

146
147 Goal 1 in the Theme Plan focuses on improving alignment of address points with the
148 structure.

149 Consistency

150 Consistency highlights the similarities and differences between data that are stored in
151 multiple datasets or databases.

152 Findings: Currently, differences between local and tribal data provider's address databases
153 and the statewide address database exist. Additionally, there are differences between the
154 above databases and elections address databases.

155
156 Goal 2 in the Theme Plan focuses on improving the consistency of address data between 9-
157 1-1 and elections databases.

158 Completeness

159 Completeness is a measurement of whether the data are comprehensive and represent
160 the required observations.

161 Findings: the assessment did not identify any priority work for Completeness.

162 Timeliness

163 Timeliness is an assessment of the data's update cycles and temporality to internal and
164 external deadlines and reporting needs.

165 Findings: Currently, the timeliness, or frequency of updates from data providers, varies
166 greatly. Some data providers submit updates on a regular basis (e.g., monthly), while
167 others only infrequently or not at all. This also affects the consistency of data (see
168 Consistency, above).

Goal 3 in the Theme Plan focuses on getting more timely updates from local and tribal address data providers.

Integrity

Integrity is an assessment of the data's structure, schema, and maintenance workflows for accuracy, precision, consistency, completeness to meet a user's needs and interoperability.

Findings: Currently, the data are being improved to meet the requirements of two of the most critical uses: 9-1-1 and elections. These improvements will also result in the data better meeting the needs of additional use cases. For example, ensuring all addresses are located on the structure will benefit both elections, 9-1-1, and other use cases such as broadband mapping. Likewise, ensuring addresses have the correct postal community names and ZIP Codes (which are not strictly required for NG9-1-1) benefit elections, broadband mapping, postal and package delivery, and more.

Goals 1 and 4 in the Theme Plan focus on improving the data to meet identified user needs, including accurate postal community names and ZIP Codes.

Relevance

Relevance refers to whether data are available, accessible, and meet the requirements for a given business use based on completeness, consistency, precision, accuracy, integrity, and timeliness.

Findings: the assessment did not identify any priority work for Relevance

Parking Lot

Attribute precision, specifically the "place type" attributes, were identified as an area of improvement but were not prioritized in this plan. Some data providers maintain place or structure type classification attributes. For those data providers that do not maintain place type(s), MSL populates the attributes based on Department of Revenue (DOR) property and structure type data. However, the DOR types are not necessarily a one-for-one match to the Framework types, so discrepancies exist. These may be prioritized in a future plan.

Schedule

Objectives and Tasks	Timeline in Years				
Year	1	2	3	4	5
1. Move remaining address points to structure location, update Placement attribute	X	X			
2. Synchronize data provider, state, and business application (e.g., 9-1-1, elections) databases	X	X	X	X	X

3. Improve data update frequency based on data provider maintenance cycles	X	X	X		
4. Improve workflows, schema, and attribution to provide for additional use cases	X	X	X	X	X

X = Working on task

Theme Challenges

For all four prioritized goals above (Precision/Accuracy, Consistency, Integrity, Timeliness), the actions to improve the data primarily rest on the data providers. The Montana State Library (MSL) can support these goals through offering analysis, comparison, or automation support.

All four goals will require additional staff time to accomplish. Precision/Accuracy is the most resource-intensive item, estimated at ~375 hours of external support to move points at a rate of 2 per minute. Integrity work would ideally be supported via a subscription to a United States Postal Services (USPS) Coding Accuracy Support System (CASS) service (e.g., Melissa Data¹, Smarty²). Other state agencies make use of CASS services, so resource sharing or partnerships should be explored.

Conclusion

In 2022, MSL published the GIS Coordination Strategic Plan. Goal 4 of the strategic plan is focused on continuing to improve the collection, maintenance, and dissemination of authoritative land information. This theme plan summarizes the assessment of the MSDI Structures and Addresses Framework based on the measures of geospatial data value described in Goal 4 of the strategic plan. Additionally, this plan generalizes the near- and long-term goals into a program of data quality improvement. This plan also defines specific and measurable actions that, if successful, will result in improved data quality, increased data value, and an MSDI Structures and Addresses Framework that meets the needs of a larger range of users and use cases.

Appendix

[MSDI Structures & Addresses Data Theme Quality Assessment Matrix](#)

[MSDI Structures & Addresses Data Improvement Plan Table](#)

¹ <https://www.melissa.com/>

² <https://www.smarty.com/>