



## Geo-Enabled Elections Best Practices

For all the rewards from making the transition, implementing GIS into elections management requires a sound plan, effort, and resolve. Technically, realizing the inherent visualization and analytical advantages of GIS involves replacing non-spatial 'address file' systems with election precinct and voter location data in a GIS format. In practice, this will require some additional investment and technology. It will require a lasting commitment from election leaders and staff training. And, it may require collaboration across agencies, changes to policy, and possibly supporting statutory changes.

Below is a set of best practices to guide a GIS transformation, drawn from the insights, experiences, and counsel from ten states that participated in NSGIC's Geo-Enabled Elections project 2017-2019.

### Convene a team of specialists

Geo-enabling elections requires collaboration at a high level between leaders in elections, information technology and database administration, and geospatial information technology. Working together under the leadership of an engaged project champion, officials and key staff should address critical elements of geo-enabling the elections process: project goals, requirements, timelines, budget, and governance. Including the GIS coordinator or coordination office responsible for coordinating GIS resources and implementation from the outset is highly recommended.

### Collect & sustain a statewide voting unit GIS layer

To geo-enable elections, a GIS layer depicting voting unit boundaries is needed, and this must include both precinct tabulation areas, as well as the minor ballot area boundary divisions (also known as 'splits' and 'subs'). A sustainable approach for updating this data, congruent with all elections-related deadlines and events, is essential.

A simple data content specifications document should be developed and adopted in coordination with election offices, including spatial data validation rules and processes to ensure data integrity.

It is recommended that development of an application programming interface (API) should be considered for both single and bulk point-in-polygon GIS query capabilities. This will enable automated determination and validation of voter assignments to voting units.

Finally, for transparency, an interactive web map should be created for stakeholder and public viewing of the most current voting unit data.



## Implement a statewide geocoding strategy

An overall geocoding strategy is needed to specify a consistent, cost-effective method for assigning geographic coordinates to each residential address using state, local, and/or commercial GIS reference data.

Whether using public sector or commercial geocoding datasets, or a combination thereof, the approach to geocoding can be coordinated with other state-level entities to maximize the chance of potential partnerships that can greatly reduce costs and improve data quality.

The elections-specific portion of the geocoding strategy should also include a method for manually placing or assigning geographic coordinates for geocoding correction or omission.

Where possible, automated processes for geocoding should be put in place using multiple geospatial data sources (e.g., street-range GIS data, address point GIS data, public and commercial geocoding APIs, etc.) to ensure the best possible validation of an address.

A complete lineage, or, at a minimum, basic record-level metadata should be kept for address locations, describing how, when, and by whom geographic coordinates for each voter residence have been updated.

## Assemble best available contextual GIS layers

In order to geo-enable elections, relevant, accurate, verified, and accessible data are needed. While precincts, districts, and voter address points are required to ensure proper precincting and districting of voters, the importance of contextual GIS layers is also paramount.

The recommended contextual GIS layers that should be accessible within a geo-enabled elections system include boundaries for cities, towns, school districts, and service districts, but also reference materials such as aerial photography, base maps, zip codes, and even tax parcels. Identifying the data content expectations and an expected refresh schedule for each of the needed contextual layers is important.



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### Define & implement data validation processes

An analysis of the information provided in interviews of state elections directors highlights the need for additional work to create spatial auditing processes for precinct assignments. This will continue to be a need in a geo-enabled elections system and the spatial audit focus should include the voting unit GIS data, geocoding resources, and results.

Validating the elections data using geanalytics (e.g. does the candidate or voter fall within the correct district) and cross-checking geocoding results against multiple sources, will provide greater confidence in the elections system to administrators and the public. Validation processes should include: operational data quality controls; periodic full review and reporting; change logging; metadata documentation; and periodic archiving.

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