BOARD OF DIRECTORS OF THE GEORGIA EMERGENCY COMMUNICATIONS AUTHORITY

MONDAY, OCTOBER 18, 2021
2:00 PM TO 3:00 PM
CONFERENCE CALL

BOARD MEETING MINUTES

Board Members Present:	**Board Members Absent**:
Billy Hancock, *Chairperson*	Major Robert Balkcom
Alex Lee, *Vice Chairperson*	Ted Wynn
William Wright, *Secretary*	Peter Olson
Cheryl Greathouse	Michael Wall
Amy Oneacre	
Greg Whitaker	
Steve Nichols	
Steve Horton	
Billy Grogan	

The Georgia Emergency Communications Authority held a board meeting on October 18, 2021, as a conference call. A List of Attendees, an Agenda, and the Meeting Presentation are attached hereto and made official parts of these minutes as Attachments #1, #2 and #3. Billy Hancock called the meeting to order at 2:05 PM.

All board members are present except Ted Wynn and Peter Olson.

Chairperson Hancock welcomed everyone to the meeting and the conference call.

Roll Call

Executive Director's Update
Director Nix gave an announcement regarding Kevin Curtin's membership to the board. Curtain stepped down from his position at AT&T and has taken a job as Senior Vice President of Governmental Affairs of Georgia EMC. With this transition, he resigned to the board the week prior to this meeting. That vacancy leaves the board with a total of two vacancies now – one for the city administrator/city manager position and one for a telecommunication representative.

Board Presentations
No board presentations at this meeting.

Old Business
Chairperson Billy Hancock opened the floor for old business. There was no old business to discuss.

New Business
Chairperson Billy Hancock opened the floor for new business.

Georgia Geospatial Data Standards and Best Practices of NG911 Review
Executive Director Nix gave an update on the work conducted by the Geographic Information System (GIS) Standard Working Group. The main goal for 2021 was to seek and develop GIS standards and best practices for the state – which has not existed before – thus, it will assist in furthering GECA's efforts towards Next Generation 911. Nix thanked Natalie Lee and Susan Miller, from the State GIS Office, for their efforts in developing the standards. Their findings were finalized and sent to the board for comment and review. Through these comments, it was noted that the technical process behind the standard should be fine-tuned by looking at the GIS processes in Georgia and figuring out what would work for our state. Those technicalities have been addressed. Executive Director Nix turned the review over to Natalie Lee for further explanation.

Chairperson Billy Hancock opened the floor for approval of the GIS Standard. William Wright made a motion. Greg Whitaker made a motion to approve the standard. Billy Grogan seconded the motion. The Georgia Geospatial Data Standards and Best Practices of NG911 motion passed unanimously.

Data Mitigation Pilot Jurisdiction Review

Executive Director Nix discussed the Data Mitigation Pilot Jurisdiction Project. Nixed opened the floor for questions. There were no questions. Chairperson Billy Hancock opened the floor for approval of the Data Mitigation Pilot Jurisdiction Project. Greg Whitaker made a motion. Billy Groagn seconded the motion. The Data Mitigation Pilot Jurisdiction Review motion passed unanimously.

Modernizing 911 in Georgia (ARPA Application) Review
The state received an initial amount of $2 billion to be used for COVID-19 relief. Earlier this summer, the Governor's Office of Planning and Budget allowed state, local and non-profit/for-profit entities to apply for funding; specifically, for entities categorized by Negative Economic Impact, Broadband, and Water and Sewage Infrastructure. Executive Director Nix has been working with the Office of Planning and Budget (OPB) to develop an application document, specifically for NG911. GECA has developed three projects/goals for moving forward: NG911 technology implementation, GIS data mitigation and imagery, and cybersecurity assessments at local PSAPs. Director Nix has shared a budget and timeline for these projects to the board, as well as a detailed document that explains the technology implementation. Executive Director

Nix discussed both documents with the board in greater detail. ARPA funding applications are due by the end of October. Once the Review Committees evaluate the applications, they will be sent to the Governor's Office for final review and decision. The award announcement is anticipated to be in January 2022. Nix opened the floor for questions.

Chairperson Billy Hancock opened the floor for a motion to approve. Billy Grogan made a motion to approve. Greg Whitaker seconded the motion. The Modernizing 911 in Georgia (ARPA Application) motion passed unanimously.

Public Comment:
Chairperson Billy Hancock opened the floor for public comment. There were no public comments made.

Adjournment:
There being no further business to be brought before the Board, Michael Nix called for a motion to adjourn. Chairperson Billy Hancock made a motion to adjourn the meeting. William Wright seconded the motion. The meeting adjourned at 3:00 PM.

These minutes are hereby approved and adopted this 15th day of December 2021.

Billy Hancock Chairperson	William Wright Secretary

Official Attachments:

1. List of Attendees
2. Agenda
3. Meeting Presentation

BOARD OF DIRECTORS OF THE GEORGIA EMERGENCY COMMUNICATIONS AUTHORITY

THURSDAY, OCTOBER 18, 2021
2:00 PM TO 3:00 PM
CONFERENCE CALL

BOARD MEETING ATTENDEES

Board Members:
Billy Hancock, *Chairperson*
Alex Lee, *Vice Chairperson*
William Wright, *Secretary*
Cheryl Greathouse
Amy Oneacre
Greg Whitaker
Steve Nichols
Steve Horton
Billy Grogran

GECA Staff Members:
Michael Nix
Aleisha Rucker-Wright
Bess Larson
Skylar Whitaker
LaTonya Turner

9-1-1 Advisory Panel:
Tamika Kendrick, Emory Police Department
Daniel Dunlap, Augusta-Richmond County
Russ Palmer. Chatham County 911
Barry Woodward, City of Decatur 911
John Blalock, Floyd County 911

Others Attending:
Natalie Lee

BRIAN P. KEMP
GOVERNOR

MICHAEL NIX
EXECUTIVE DIRECTOR

Board of Directors of the Georgia Emergency Communications Authority

Monday, October 18, 2021
2:00-3:00 p.m.
Conference Call

Call Information:
gema.webex.com
Meeting Number (Access Code): 2437 048 4426
Meeting Password: GECA2021!
-or-
1-855-282-6330
Meeting Number (Access Code) 2437 048 4426

Meeting Agenda*

I. Call to Order/Opening Remarks—Chairperson Billy Hancock

II. Roll Call—Secretary William Wright

III. Executive Director's Update—none

IV. Board Presentations—none

V. Old Business—none

VI. New Business

A. Georgia Geospatial Data Standards and Best Practices of NG911 Review
B. Data Mitigation Pilot Jurisdiction Review
C. Modernizing 911 in Georgia (ARPA Application) Review

VII. Public Comment

VIII. Adjourn

*Meeting Agenda is subject to change

Georgia Geospatial Data Standards and Best Practices

for
Next Generation
9-1-1

2021 v.1

GIO
GEORGIA GEOSPATIAL INFORMATION OFFICE

1 Table of Contents

2 Document Versions

This section documents versions and their changes. The initial version of the document is numbered as version 1.0. Please note that there is a distinction between a version update and a minor revision. Version updates are made infrequently and affect the core content of the text: its concepts and structure. Minor revisions are changes that only update broken URL links, fix typos, and correct other scrivener errors and will be published with '.xxx' after the version (v).

Document Name	Document Change Publish Date	Edits made
Georgia Geospatial Data Standards and Best Practices for Next Generation 9-1-1, v1.0	(Planned) October 05, 2021	N/A – Initial document

3 Executive Summary

This document is designed as a chapter (or subset) of the Georgia Geospatial Data Standards and Best Practices Repository, an inventory of documents which describe standards that guide Georgians in the creation, maintenance, and sharing of geospatial framework datasets.[1] This chapter, the Georgia Geospatial Data Standards and Best Practices for Next Generation 9-1-1 (the Standard), is the guiding document for data that will sustain the impending Next Generation 9-1-1 (NG9-1-1) implementation; a massive overhaul of the system that routes and manages 9-1-1 calls and dispatch. It is the product of a partnership between the Georgia Emergency Communications Authority (GECA) and the Georgia Geospatial Information Office (GIO) who jointly assembled the Georgia NG9-1-1 Working Group; a group of local and State government subject matter experts and private sector professionals, from 9-1-1 data and Geographic Information System (GIS) backgrounds, who came together to strategize the operationalization of geospatial data to serve this new critical State need.

While this chapter of the Georgia Geospatial Data Standards and Best Practices Repository is tailored to the specific datasets needed by the State's 9-1-1 community, two of which are of great importance to all Georgia governments, those being 1) Site Structure Address Points, and 2) Road Centerlines. Therefore, the standards and best practices defined in this

[1] States that have robust geospatial data repositories typically organize their data into framework themes. "Framework" refers to structures which must be in place to support the vitality of the data at a state level. Framework datasets include Addresses, Road Centerlines, and Jurisdictional Boundaries as referred to in this document, but they also include many others such as Cadastre, Elevation, and Imagery. For more on Data Frameworks, see the Federal Geographic Data Committee's website on Geographic Information Framework Data Standard.

document for these two datasets should help guide anyone developing or maintaining address or road centerline data, regardless of its intended use.

While the document itself is technical and written for a data practitioner's use, the function of the Standard and its support are required at every level of government. This means, that to function as designed, this Standard must be referenced in programs, policy, and practice. This requires a base level of knowledge of the intent and scope of the Standard to deliver the data framework for the intended purposes. Standards are not simply meant to be shelved as a handbook for data providers, but the guiding and uniting document by which a data program can function from a granular, local scale to State and even federal application.

Indeed, the core of the Georgia Geospatial Data Standards and Best Practices for NG9-1-1 is the National Emergency Number Association (NENA) Standard for NG9-1-1 GIS Data Model, NENA-STA-006 [1], and the NENA Information Document for GIS Data Stewardship for Next Generation 9-1-1, NENA-INF-028 [2]: standards written to provide for interoperability, even internationally. NENA functions as the international industry standards producing body for 9-1-1 and has tailored the Federal Geographic Data Committee (FGDC) Standard for this specific use. Each state, then, is responsible for further tailoring the Standard to meet their unique needs. While it is true that these data will not be able to meet every business use case across Georgia, by definition, its precision and descriptive design will surely allow it to meet many other business needs like CENSUS, tax assessment, broadband, economic development, etc.

The data to be produced using this Standard must meet the requirements of NG9-1-1 Site Structure Address Points, Road Centerlines, Emergency Service Boundaries (Public Safety Answering Points (PSAP), Police, EMS, Fire), and Provisioning Boundaries. These data layers have critical roles to play in an NG9-1-1 system to: route calls geospatially to the correct PSAP, validate locations, and provide critical service information for the purposes of dispatching in an emergency. The critical nature of its use makes this Standard mandatory for NG9-1-1 purposes in the State of Georgia, meaning to the extent that data is created and applied for this purpose, it must conform to the mandatory aspects of its design. To support these efforts, the State GIO will acquire and maintain aerial imagery of the state, which all local, regional, and State governments may use as a basemap to assist in spatial data generation and maintenance.

It must also be noted that while there are mandatory requirements of the data, there are conditional, optional and strongly recommended items as well. As a community or data authority readies their data for this purpose, they are advised to become familiar with what aspects of the Standard apply, and what benefit optional aspects may offer them. This process of readiness may take considerable time and coordination, and the evolution of the data should be undertaken in phases as recommended in the best practices section.

Again, while the application of the Standard to data is technical, its benefit to the system, organization, and the State as a whole is far reaching. The Standard should be an operational aspect of the overall NG9-1-1 system, and referenced as such.

4 Introduction

The Georgia Geospatial Data Standards and Best Practices for Next Generation 9-1-1 is a living document written to govern the production, maintenance, and aggregation of the critical datasets necessary for the implementation and support of NG9-1-1 in Georgia. It was designed to describe, in detail, the required structure, population, and best practices for the maintenance of the following geospatial data layers: Site Structure Address Points; Road Centerlines; Emergency Service Boundaries (PSAP, Police, EMS, Fire), and Provisioning Boundaries (the 7 required, or, mandatory data layers as defined by the NENA Standard for NG9-1-1 GIS Data Model [1] for supporting NG9-1-1). While created to support 9-1-1 business processes, the standards and best practices within were designed to meet additional business needs at the local and State level, such as tax assessment, Department of Transportation's road collection and validation, local update of census addresses, forest district boundaries, broadband, and more. This document is the operational guideline and governing documentation to be used to create, validate, and unify these datasets across jurisdictional boundaries throughout the State of Georgia . Once aggregated, the data is available to the public for its use in business processes at the local, regional, state, and federal level, creating efficiencies and significant value for Georgians and the businesses that call Georgia home.

4.1 Purpose and Background

11 million of us in Georgia and an additional 8M international and domestic visitors rely on Georgia's 9-1-1 community to aide us at the very worst moments of our lives. We not only rely on these amazing civil servants and the systems that support them for our safety and the protection of our property, but we expect it to be perfect. None of us expect 9-1-1 personnel to lack critical resources or information they need to save lives – but unfortunately this is sometimes the case today. As the decades old 9-1-1 systems we have relied on in Georgia transition to NG9-1-1, the inconsistencies, lack of access to, and underfunded spatial (or map-based) data (e.g., statewide road centerlines or addresses) has been laid bare.

While an NG9-1-1 system itself justly boasts higher precision, interoperability (seamless support regardless of impact to individual PSAPs in a crisis), more situational awareness, and better response rates, it also relies on spatial data in a way that previous systems have not, putting Georgia in the position of needing to develop and standardize data for the first time for a life and death cause. Everyone, from 9-1-1 telecommunicators to the general public, is asking 9-1-1 to evolve and expecting it to do so quickly.

NG9-1-1 data must be seamless, valid, "live," and not just meet current 9-1-1 requirements, but exceed them. Developing and implementing this standard is a critical step in the process of becoming "NG9-1-1 ready." It will provide best practices for creating, maintaining, and aggregating site structure address points, road centerlines, emergency service boundaries, provisioning, and PSAP boundaries, while outlining the requirements for all layers in supporting NG9-1-1. In providing "standard" rules and recommendations for 9-1-1, this document will ensure that there is a singular measuring stick and unified goal for the production of each of these datasets produced in Georgia.

4.1.1 The Application of GIS Data in an NG9-1-1 System

To be clear, when a person in distress (a caller) dials 9-1-1, these data play a critical role in how calls are routed to the appropriate PSAP. They are also used to validate the physical location the call is coming from. To be specific, Emergency Services IP Networks (ESInets) are the ecosystems through which calls are routed and data is exchanged between callers and the PSAPs that answer them. They contain several functions or processes (described below) that use required spatial data that is maintained and managed in a central GIS repository. These data are seamless statewide, maintain their integrity, and are continuously updated.

In order to be successful, a paradigm shift regarding data accessibility must occur, as access to data will no longer be limited to just the PSAP who creates it. Instead, all PSAPs will have access to each other's data. Below are the specific processes, or core functions, inside an NG9-1-1 system that rely on the central GIS data repository that makes available all data stitched together statewide. In Georgia, this data repository is managed by the GIO, and the data it houses is available to all PSAPs for use at the local level.

4.1.1.1 ECRF

The Emergency Call Routing Function (ECRF) is a functional element, in the ESInet that performs a "point in polygon" query to identify which specific PSAP is responsible for the location the caller is calling from. It takes the civic address (e.g., 123 Main Street) sent via the service provider in a format called Presence Information Data Format Location Object (PIDF-LO) record (or, in the case of a mobile device, it uses the x/y location of the caller) and queries the road centerlines and address points to "geocode" or match to the data to get an x/y location (or in the case of a mobile device, it queries to get a dispatchable civic address). The x/y location is then used to query against the PSAP and service boundaries to identify the PSAP to route the call to and to identify the Police, Fire and EMS providers that service that civic address.

The ECRF then sends the call to the PSAP with the civic address and the information about the Emergency Service Providers that are responsible for responding to that address.

4.1.1.2 LVF

In a Location Validation Function (LVF), anytime a new subscriber (new customer or end point) is set up by a service provider (e.g., telephone, internet, VoIP), the address of that subscriber must be found in the GIS data to be "validated' or found to be correct (called 'validation'). This means that if a new office building is built, new addresses are defined, and the phones associated with that address are set up for service. In order for 9-1-1 services to be quickly routed to that address, it must be found within the GIS data used in the NG9-1-1 functional elements inside of the ESInet.

4.1.1.3 MDS

In an NG9-1-1 ecosystem, interoperability is key. A call must be able to be received from anywhere. The Mapping Data Service (MDS) provides the 9-1-1 telecommunicator with GIS data or alternatively, a map, for an out-of-area call.

4.1.1.4 GCS

Another process that relies on GIS data is a Geocode Service (GCS). The GCS allows a civic address in a PIDF-LO record to be matched against GIS data to get an x/y location, or reverse geocode to get a civic address when x/y are queried. This provides 9-1-1 telecommunicators with additional location information to share with first responders as situations evolve.

4.2 History

4.2.1 Previous Work

Very little has been done in Georgia to help guide GIS data development across the state, with the notable exception an effort made in 2000 by an all-volunteer group of GIS professionals from the public and private sector in the hopes of providing guidelines for data development across the state. This group, the Georgia Spatial Data Infrastructure/GIS Coordinating Committee, volunteered their time to help standardize and guide local government data production by developing the *Street Addressing Standards and Guidelines for The State of Georgia [3]*. Unfortunately, use of these guidelines was never widespread. The lack of adoption was due in part to the fact there wasn't an immediate, statewide need to use them, and no program in place to effectively coordinate and support their use.

Lack of a pervasively used standards to guide development of geospatial data across the State results in this — Georgia's 800+ governmental units (530+ cities, 159 counties, 12 regional governments, 100+ authorities and agencies) have been developing spatial data inconsistently for decades, which means their data cannot be easily or effectively shared across administrative boundaries. Standards ensure data is speaking the same language, enabling seamless communication, which, in the case of NG9-1-1, means ensuring a more effective way to save lives. The 800+ governmental entities are not to blame and should be commended for doing their best all these years, with no one steering the ship, and no one giving them resources to secure interoperability of their data with their neighbors.

Some local and State governments have managed to build interoperable and stable data with precious few resources. They have been thoughtful and strategic, using a variety of national standards and data models. Some local governments in Georgia use Esri's Local Government Data Model, and those who do have a leg-up on others as it provides a common structure for organizing data. Unfortunately, even those who have adopted a standard and/or data model are not using them the same way because they have never been required to share data with others. In other words, the standard is often altered to meet an individual jurisdictional need. When that data tries to communicate with the same data from another jurisdiction they will not be able to communicate; one will be speaking English, the other, Spanish.

Even more rare are governmental units who have the ability (expertise, software, hardware, security) to share data between city and county departments, let alone with neighboring counties or the state, in any consistent or real-time manner. Now we plan to ask them to all match up so that they can serve NG9-1-1. Without the guidance of the GIO, this task would be laborious at best, and waste taxpayer dollars at worst. To support the state's PSAPs and facilitate successful deployment of NG9-1-1, GIS data must be governed. Technologies and expertise must be used to reduce waste (time, cost, and human skill). The only way to succeed is to do this statewide, with a single entity orchestrating development and ensuring that we move in the proper direction: replacing hundreds of data siloes with an open, reliable, well supported, interconnected network of good data.

4.2.2 GIO and GECA

Funded by a grant from the United States Economic Development Administration, the Georgia Association of Regional Commissions, with support from the state's Department of Community Affairs (DCA), hired the state's first Geospatial Information Officer under a two-year contract. In 2017, the position became permanent thanks to the vision of DCA, and the Geospatial Information Office (Office) was established.

The creation of this Office marked a transition for Georgia, giving the states vast GIS community a champion to advocate on their behalf, and bring much needed organization to a relatively siloed community of data developers. The Office was created to empower all levels of government to higher effectiveness and efficiency through the coordination and use of geospatial data, standards, and technologies, enabling innovation and data-driven decision making. Its mission is to coordinate, promote, develop, and drive the use in analytics, of geospatial data for the State of Georgia , its agencies, authorities, regions, and local governments. Standards development is key to enabling the mission.

From the outset, the Office began to evaluate and plan for the creation of State datasets and programs that would provide value across State agencies. The Office began by developing a State Remote Sensing Program, which includes an Aerial Imagery Program and a Light Detection and Ranging (LiDAR) Program (LiDAR provides elevation data), the latter of which alone is anticipated to save the state's public and private sector over $8M/per year and support some of the state's top industries like construction and agriculture. It further collaborated with entities like: the Georgia Association of Regional Commissions, the Department of Natural Resources, the Georgia Emergency Management Agency, Georgia Department of Transportation, the Georgia Technology Authority, the Department of Community Affairs, and the Georgia branch of the United States Department of Agriculture; on award winning projects that helped these organizations use geospatial technologies to be more effective and efficient and to meet their mission as well as federal requirements.

In 2017, and to further iterate how critical standards are for success, the Georgia Geospatial Coordinating Committee's Data Framework and NG9-1-1 Working Groups recommended the development of standards and movement towards a revised, refreshed State clearinghouse of critical datasets. While desire was high at that time to produce standards to support this effort, there was little bandwidth within the all-volunteer group to undertake their development, and the GIO lacked staffing capacity as well.

In 2018, the Georgia Emergency Communications Authority (GECA) was established inside of the Georgia Emergency Management and Homeland Security Agency. One of their initial focuses was making progress on NG9-1-1 implementation.

In 2019, the Georgia Emergency Communications Authority (GECA), the Georgia Public Safety Training Center (GPSTC), and the Georgia Geospatial Information Office (GIO) received a federal grant awarded by the United States National Telecommunications and Information Administration (NTIA) and National Highway Traffic Safety Administration (NHTSA) to continue the process of migrating to NG9-1-1. This grant provided the means to accelerate efforts to move Georgia into NG9-1-1 readiness. As part of this project, the GIO acted as the coordinating arm for GIS activities and built the program for NG9-1-1 geospatial data. Paramount to creating a sustainable, statewide NG9-1-1 system is the creation and maintenance of standardized GIS data. The Georgia Geospatial Data Standards and Best Practices for NG9-1-1 document are created to unite all Georgians in the creation of this seamless data.

4.2.3 NG9-1-1 GIS Standards Working Group

In 2020, GECA and the GIO jointly established the State's NG9-1-1 GIS Working Group, a team of volunteers from GIS and 9-1-1 who came together to provide insight and recommendations to the GIO as they design Georgia's GIS Strategy for NG9-1-1. This Group recommended establishing a sub-working group to formulate the relevant standards, specific to Georgia. This Standards Working Group was born; a team of approximately 27 individuals from local, regional and state government, private sector, and 9-1-1. This team was led by Cheryl Benjamin, a national subject matter expert in NG9-1-1 GIS data standards, through the production of this Standard over the summer/fall of 2021.

We know from other states who are ahead of us on developing data for NG9-1-1, that the key to establishing useful and stable datasets is the widespread adoption of flexible, multi-use standards that govern them, resulting in data that is a boon to many business processes, not simply one (i.e., standards for creating address data will support NG9-1-1 as well as tax assessors, transportation planners, public works departments, etc.). This essential tenant of data governance is core to our state government's priority to maximize taxpayer value and leverage technology to best utilize limited State resources[2]. To that end, the Standards Working Group consisted of subject matter experts with various business needs, from in and outside the State, who will use these datasets (or will need them in the future). The participation of these members ensures that the data will be flexible; designed to serve many local, regional, state, and even federal needs. Under the direction of Cheryl Benjamin, they researched, discussed, voted on, and wrote the Georgia Geospatial Data Standards and Best Practices for NG9-1-1, in a manner that ensures it can be used to support other business needs such as the local update for census addresses (LUCA), tax assessment, Georgia DOT Roads Inventory, broadband, Department of Public Health, National Forest Service, Sexual Assault Kit Tracking system, and others.

Once created, a draft of the Standards document was made available for public review. After public comments were considered and, where appropriate, addressed in the document, a final draft was submitted to GECA and their Board of Directors for final review. As the statewide governing body for 9-1-1 in Georgia, the GECA Board of Directors officially adopted the Standards in the fall of 2021. This milestone marks a new era for GIS data development in Georgia. It begins by enabling the State's migration to NG9-1-1 and will continue into many more business needs into the future.

5 Change Management

The Georgia Geospatial Data Standards and Best Practices for Next Generation 9-1-1 is a living document. While its conception is recent, it will endure for the foreseeable future. This means it should be regarded as a stable, but not inflexible, document. As data, and the systems they support, evolve, so too will the standards that govern them.

First, there are three separate scenarios in which modification of this "Standard" as an operational set of documents would occur. As mentioned above in **Section 2 Document Versions**, there may be simple changes in hyperlinks or misspellings that require minor update and republication without version change.

Second, over time there may be a proposal and subsequent acceptance of additional domain values which would then require a modification to the template (Section 14.1), validation rules (Section 14.4), and domain repository (Section 14.3). For example, perhaps

[2] Georgia's State Initiatives and Priorities, 2021.

a new Street Name Post Type is accepted. The domain for the Street Name Post Type would be updated, the template updated, and the validation rules revised to allow for those values. This would not require an official revision to the Standard, as it does not affect the structure of the data model or the best practices.

Third and finally, there may be future modifications proposed and accepted that would modify the structure (fields and their population requirements) or the best practices. For example, there may be approval to mandate the inclusion of one or more fields that are currently marked as "Strongly Recommended" or "Optional" at some point in the future. If and when such a situation arises (i.e., a modification to add, remove, or change fields) that requires a modification to the Standard, the process will require the input of a panel of reviewers from the NG9-1-1 and GIS communities (the NG9-1-1 Working Group). This group will be called together by the GIO to meet, discuss, and propose modifications to the document as necessary. It will then vote on the change at hand, put it out for public comment for a minimum of 2 weeks, and then, if necessary, make additional revisions. Once approved within the NG9-1-1 Working Group, it will then be sent to the governing body (as of 2021, the GECA Board) for final approval. If not approved, the process will repeat. For more information on submitting comments or changes see **Section 14.3.1 Process for Submitting Updates to the Georgia Domains**.

6 Audience and Recommended Use

As mentioned above, the Georgia Geospatial Data Standards and Best Practices for NG9-1-1 are created to serve as both an operational document and a reference guide. This means it may be referenced by executive level stakeholders (those who are not practitioners of geospatial data) when building requirements for their supporting teams and contractors. Functionally, it provides the structure and specification as it will be used to govern how local data will be exchanged with the State level dataset. It is also a reference guide to assist practitioners in building and expanding their data where it does not exist. For those starting out, this is overwhelming. The process of creating these data will take time, and it may be helpful to start with workflows that guide the process by which data should be tackled.

6.1 How to Use the Standard

This document is structured into sections. The sections in the beginning provide the background, reference, and historical context for the document. The **Georgia Geospatial Data Standard and Guidelines** and **Best Practices for Building and Maintaining Geospatial Data** sections are the meat of the Standard, where the specific datasets are outlined, each field is described, and then recommendations or best practices for how data is built and maintained is provided. **Section 11 Workflows** is helpful for users who are beginning, or adjusting, their process for developing and maintaining data. Future Work outlines activities and changes that should be made in the near or long term. Finally, References and Appendices provide additional information and supportive documentation for these Standards and Best Practices.

It should be noted that both NG9-1-1 and Non-NG9-1-1 geospatial data practitioners alike will find this Standard useful to apply. Non-9-1-1 geospatial data practitioners should be aware of the use cases, but will find that the fields as defined will enable the data to be used for a multitude of cases.

For beginning readers, it may be useful to read through the document from start to finish. They may want to build their own template mapping document to evaluate how their data maps to the Standard, and then, if desired, migrate their data to the Georgia GIS Data Model template. Over time, users may find they spend the majority of their time referring to the sections that outline the schema for the data layers, the best practices information, and the workflows as a guide for establishing a more specific and granular workflow for the development of their data.

This data Standard is not meant to replace well-structured local data. Local data authorities may have their own unique data structures and field names for each of the datasets. Rather, this Standard provides the means by which all data can be compared across the State of Georgia and, for those without complete local data, a schema that can be adopted and put into immediate use beyond NG9-1-1.

7 Spatial Reference

Local GIS data may be created and maintained in any datum and coordinate system. For local data to be submitted to the Georgia GIO for aggregation into the State datasets, it must include metadata or other documentation that includes the datum and coordinate system of the submitted data.

All GIS data used in an NG9-1-1 system must be in the World Geodetic System of 1984 (WGS84) format to support interoperability between all systems and all sites across the US and beyond, as referenced in the NENA i3 Standard for Next Generation 9-1-1, NENA-STA-010 [4]. The datum and projection are of particular importance when reconciling datasets across the State in order to maintain integrity when performing analysis and reconciling data between boundaries.

The aggregated State datasets will be maintained in WGS84 since GIS data must be transformed into WGS84 prior to its use in NG9-1-1 systems. The Georgia GIO will reproject or transform local data not submitted in the WGS84 format. It is recommended that local GIS data be transformed into WGS84 prior to submission to the Georgia GIO. Since data transformation steps can introduce error, the transformation steps must be documented and consistently applied each time data is provided for NG9-1-1 use.

Geodetic parameters for WGS84 are specified by the European Petroleum Survey Group (EPSG) as follows:

- For 2-dimensional geometries, the geodetic parameters are required to follow EPSG::4326
- For 3-dimensional geometries, the geodetic parameters are required to follow EPSG::4979

8 Database Technical Components

8.1 Field Population Requirements

Not all GIS data layer fields require population for compliance with Georgia's Geospatial Data Standard. Population of a field is Mandatory, Conditional, Strongly Recommended, or Optional as described below. The Georgia GIO will automatically calculate and populate some fields[3]. Please refer to each layer's data structure summary table for more information.

8.1.1 Population Categories

Mandatory: The data field for every record ***must*** be populated with an attribute value to comply with the Standard. Failure to do so will affect the core functionality of the State's business processes.

Conditional: ***If*** an attribute value exists for a record, ***then*** it must be populated in the data field for that record to comply with the Standard. If no attribute value exists for a record, the data field should be a true NULL (e.g., <NULL>). Failure to populate a field, when appropriate, may affect the core functionality of the State's business processes.

Strongly Recommended:

The data field ***is not required*** to be populated with an attribute value. However, population of this field should be prioritized over other optional fields as this field has been identified as having value not only for the local jurisdiction, but for multiple organizations utilizing the data across the State. In some cases, population of this field may become mandatory in the future.

Optional: The data field ***is not required*** to be populated with an attribute value. These fields may be valuable at a local level, and can be populated at the discretion of the local authority.

8.1.2 Fully spelled out (No abbreviations)

The NENA Standard for NG9-1-1 GIS Data Model [1], requires field values to be fully spelled out to remove confusion and ambiguity. This is important when dealing with street names

[3] Calculation of fields en masse will be rolled out over the next couple of years and may not occur immediately.

where abbreviations could have multiple interpretations (e.g., "W Sawyer Tr" could be West Sawyer Trail, West Sawyer Trace, William Sawyer Trail, William Sawyer Trace, etc.).

Since many applications typically use abbreviations, particularly for map display purposes, an *Abbreviated Fully Concatenated Street Name* field has been added to the Road Centerlines and Site Structure Address Points layers in the Georgia Geospatial Data Standard.

The use of abbreviations in the NG9-1-1 GIS data should not be confused with what 9-1-1 telecommunicators see on their screens or what they need to type into their systems. That is handled by their software's data input interface. Consult with the NG9-1-1 Core Services Provider regarding the software translation capabilities of the data input interfaces used by the 9-1-1 telecommunicators.

8.1.3 Casing

This Standard requires that field values use title case format with the exception of Country and State, which must be in uppercase. Data in title case (e.g., Avenue of the Americas) is easily converted to uppercase, whereas converting from uppercase to title case can prove to be more difficult. Legacy street name fields should preserve the case of the existing data.

8.2 Field Types

For simplicity, this Standard identifies five field types (Text, Date, Short, Long, Float) that equate to the following NENA-defined field types:

P [Text] – Printable ASCII characters (decimal codes 32 to 126).

E [Text] – UTF-8 restricted to character sets designated by the 9-1-1 Authority, but not including pictographic characters. This allows for foreign names that require letters not in the ASCII character set (e.g., letters with tilde or grave accents).

U [Text] – A Uniform Resource Identifier (URI) as described in Appendix B, Terminology, and defined in RFC 3986 [5], and also conforming to any rules specific to the scheme (e.g., sip:, https:, etc.) of the chosen URI. Consult with the NG9-1-1 Core Services Provider for requirements.

D [Date] – Date and time. Information for a record represented as local time with offset from Coordinated Universal Time (UTC) as defined by the W3C "dateTime" datatype described in XML Schema Part 2: Datatypes Second Edition [6]. **Note:** Since many GIS applications cannot currently utilize this format, local data may store the date and time in the local database date/time format but time must include seconds and may be recorded to 0.1 seconds. Local data stored in a local database date/time format will be converted to the NENA-required format prior to use in NG9-1-1.

N [Short, Long] – Non-negative Integer, consisting of whole numbers only.

F [Float] – Floating (numbers that have a decimal place). There is no defined field length of a floating number; it is system dependent. These shall be double-precision fields.

8.3 Field Width

The maximum allowable field width, in number of characters.

8.4 Domains

A domain defines the set of all valid values that are allowed in a data field. Those fields with a domain shall only be populated with values from the identified domain. If a field does not have a domain defined, then any value that matches the field type and description may be populated in the data field. This Standard identifies a number of required domains, most maintained by the Georgia GIO and others limited to values identified in NENA registries. The full listing of domains is available in Appendix C, Domains, as a downloadable spreadsheet. Information on how to submit new values for consideration is documented in **Section 14.3.1 Process for Submitting Updates to the Georgia Domains**.

8.5 Unique Identifiers

Each record in a local GIS dataset must be assigned a unique identifier such that when consolidated into a nationwide or global GIS dataset, the identifier is not duplicated. Maintaining unique identifiers in a local GIS dataset also supports the reporting and resolution of errors through established quality control processes. Having consistency of the unique identifier between data submissions to the Georgia GIO greatly assists with identifying changes in the data since its last submission.

8.5.1 Local IDs

Locally assigned unique identifiers (a.k.a. Local ID) can be in any format needed for local use and typically consist of characters, numbers, or a combination of both. It can be an autogenerated unique identifier (e.g., database GUID or programmatically generated) or a manually generated unique identifier. Database GUID identifiers are frequently recommended as they can be used for multiple purposes.

A Local ID must be persistent, meaning that it does not change over time. There will be situations when a Local ID will need to change, such as when a new road is added and intersects with an existing road. The existing road must be split into two segments but only one segment can carry the original Local ID. The other segment must be assigned a new Local ID.

Note that an Esri OBJECTID is not a valid unique ID as it may change when data is exported.

8.5.2 NENA Globally Unique IDs (NGUID)

A unique identifier in the NG9-1-1 GIS data layers is known as a NENA Globally Unique Identifier (NGUID). The NGUID is created by combing a layer prefix (e.g., RCL, SSAP, PSAP, POLICE, FIRE, EMS, PB), a locally assigned unique identifier (Local ID), the ‘@’ symbol, and an

Agency Identifier (a registered domain name in the public Domain Name System as defined in Internet Engineering Task Force RFC 1034 [7]).

NGUID = Layer Prefix + Local ID + @ + Agency Identifier

The Agency Identifier is a Domain Name System (DNS) registered domain that uniquely identifies the agency (e.g., alpharettaga.us; barrowga.org). It is the Agency Identifier that makes the NGUID globally unique since a registered domain name can only belong to one agency.

8.6 Metadata

Metadata is information about the dataset that explains the who, what, where, when, why, and how. This information is important when sharing data with others so that the recipient clearly understands what the data contains and who to contact if there are additional questions. The Georgia GIO plans to develop a list of basic, critical metadata elements that will need to be included with submitted data. This information will be included in a future version of this document.

9 Georgia Geospatial Data Standard and Guidelines

9.1 Addressing

9.1.1 Site Structure Address Points

This layer is a **required** NG9-1-1 GIS data layer as defined in the NENA Standard for NG9-1-1 GIS Data Model [1]. All fields listed in the NENA Standard for this layer are included in the data structure described below. ***Blue italicized fields*** are additional fields added to meet the State of Georgia's needs. All fields listed in the data structure below must be included in the GIS data layer, even if data does not exist for a field, or a field is classified as Optional. The Georgia GIO will populate the fields where the descriptions are flagged with an asterisk (*).

Site Structure Address Points – Summary Table

Description	Field Name	Field Population	Field Type	Field Width	Domain
Data Management Elements					
Local Unique ID	*Local_ID*	***Mandatory***	*Text*	*140*	N/A
Site Structure Address Point NENA Globally Unique ID*	Site_NGUID	**Mandatory**	Text	254	N/A
Road Centerlines NENA Globally Unique ID (foreign key)	*RCL_NGUID*	*Optional*	*Text*	*254*	N/A
Parcel ID	*Parcel_ID*	*Strongly Recommended*	*Text*	*254*	N/A
Date Created	*DateCreate*	***Mandatory***	*Date*	N/A	N/A
Date Updated	DateUpdate	**Mandatory**	Date	N/A	N/A
Effective Date	Effective	Optional	Date	N/A	N/A
Expiration Date	Expire	Optional	Date	N/A	N/A

Description	Field Name	Field Population	Field Type	Field Width	Domain
Address Elements					
Address Number Prefix	AddNum_Pre	Conditional	Text	15	N/A
Address Number	Add_Number	Conditional	Long	6	Whole numbers from 0 to 999999
Address Number Suffix	AddNum_Suf	Conditional	Text	15	N/A
*Fully Concatenated Address Number**	*FullAddNum*	*Conditional*	*Text*	*38*	N/A
Milepost	Milepost	Conditional	Text	150	N/A
Complete Landmark Name	LandmkName	Conditional	Text	150	N/A
Building	Building	Optional	Text	75	N/A
Floor	Floor	Optional	Text	75	N/A
Unit	Unit	Optional	Text	75	N/A
Room	Room	Optional	Text	75	N/A
Seat	Seat	Optional	Text	75	N/A
Additional Location Information	Addtl_Loc	Optional	Text	75	N/A
Street Name Pre Modifier	St_PreMod	Conditional	Text	15	N/A
Street Name Pre Directional	St_PreDir	Conditional	Text	9	GA *PrePost Directional*
Street Name Pre Type	St_PreTyp	Conditional	Text	50	NENA *Street Name Pre Types and Street Name Post Types Registry*
Street Name Pre Type Separator	St_PreSep	Conditional	Text	20	NENA *Street Name Pre Type Separators Registry*
Street Name	St_Name	Conditional	Text	60	N/A
Street Name Post Type	St_PosTyp	Conditional	Text	50	NENA *Street Name Pre Types and Street Name Post Types Registry*
Street Name Post Directional	St_PosDir	Conditional	Text	9	GA *PrePost Directional*
Street Name Post Modifier	St_PosMod	Conditional	Text	25	N/A
*Fully Concatenated Street Name**	*FullStNm*	*Conditional*	*Text*	*245*	N/A
*Fully Concatenated Address**	*FullAddr*	*Conditional*	*Text*	*283*	N/A
*Abbreviated Fully Concatenated Street Name**	*AbFullStNm*	*Conditional*	*Text*	*155*	N/A
Legacy Street Name Pre Directional	LSt_PreDir	Conditional	Text	2	GA *Legacy PrePost Directional*
Legacy Street Name	LSt_Name	Conditional	Text	75	N/A
Legacy Street Name Type	LSt_Type	Conditional	Text	4	GA *Legacy PrePost Type*
Legacy Street Name Post Directional	LSt_PosDir	Conditional	Text	2	GA *Legacy PrePost Directional*
Postal Community Name	Post_Comm	Optional	Text	40	GA *Postal Community*
Postal Code	Post_Code	Optional	Text	7	GA *Postal Code*
ZIP Plus 4	Post_Code4	Optional	Text	4	GA *Postal Code*
Administrative Units					
Country*	Country	**Mandatory**	Text	2	GA *Country*
State	State	**Mandatory**	Text	2	GA *State*
County	County	**Mandatory**	Text	40	GA *County*
*FIPS Code**	*FIPS*	***Mandatory***	*Text*	*5*	GA FIPS

Description	Field Name	Field Population	Field Type	Field Width	Domain
Incorporated Municipality	Inc_Muni	**Mandatory**	Text	100	GA *Municipality*
Unincorporated Community	Uninc_Comm	Optional	Text	100	N/A
Neighborhood Community	Nbrhd_Comm	Optional	Text	100	N/A
Additional Code	AddCode	Conditional	Text	6	N/A
Location Elements					
Address Type	*Addr_Type*	*Optional*	*Text*	*5*	GA *Address Type*
Place Type	Place_Type	Optional	Text	50	GA *Place Type*
Placement Method	Placement	Optional	Text	25	NENA *Site/Structure Address Point Placement Method Registry*
Additional Data URI	AddDataURI	Conditional	Text	254	N/A
Latitude	Lat	Optional	Double	N/A	+90 degrees to -90 degrees
Longitude	Long	Optional	Double	N/A	-180 degrees to +180 degrees
Elevation	Elev	Optional	Long	6	Whole numbers from 0 to 999999
NG9-1-1 Elements					
Discrepancy Agency ID	DiscrpAgID	**Mandatory**	Text	75	N/A
ESN	ESN	Conditional	Text	5	Characters from 0 to 99999
MSAG Community Name	MSAGComm	Conditional	Text	30	N/A

Site Structure Address Points – Detailed Definitions

Site Structure Address Points – Data Management Elements

9.1.1.1 Local Unique ID

Field Name	Local_ID
Field Population	**Mandatory**
Field Type	Text
Field Width	140
Definition	A numeric and/or text locally assigned unique ID within the local dataset that may be an autogenerated ID or a manually generated ID. This local ID MUST be unique within the local dataset and should be persistent for as long as possible, so that it supports the reporting and resolution of errors from quality control processes.
Examples	SSAP47824393; 587392034; 90a942e1bc7f4g1h94c5acaadv24r89h; 076f8031-102f-4c08-8e9a-f9d888cf10c4
Domain	None

9.1.1.2 Site Structure Address Point NENA Globally Unique ID

Field Name	Site_NGUID
Field Population	**Mandatory**
Field Type	Text
Field Width	254
Definition	The NENA Globally Unique ID (NGUID) for a Site Structure Address Point such that when coalescing Site Structure Address Point data from other local 9-1-1 Authorities, this unique ID only occurs once. A Site Structure Address Point NGUID is created by concatenating a layer prefix (e.g., SSAP), the locally assigned unique ID (Local_ID), the "@" symbol, and the Agency Identifier (a registered domain name). The locally assigned unique ID (Local_ID) may be an autogenerated unique ID or a manually generated unique ID.
Examples	SSAP47824393@alpharettaga.us; 587392034@townscountyga.gov; 90a942e1bc7f4g1h94c5acaadv24r89h@barrowga.org
Domain	None

9.1.1.3 Road Centerlines NENA Globally Unique ID (foreign key)

Field Name	RCL_NGUID
Field Population	**Mandatory**
Field Type	Text
Field Width	254
Definition	The NENA Globally Unique ID (NGUID) for a Road Centerline segment such that when coalescing Road Centerline data from other local 9-1-1 Authorities, this unique ID only occurs once. A Road Centerline NGUID is created by concatenating a layer prefix (e.g., RCL), the locally assigned unique ID (Local_ID), the "@" symbol, and the Agency Identifier (a registered domain name). The locally assigned unique ID (Local_ID) may be an autogenerated unique ID or a manually generated unique ID. As a foreign key, the Road Centerline NGUID can be used to establish a link between the Site Structure Address Point and its associated record in the Road Centerlines layer. This relationship allows the Structure Address Point to access the Alias Street Name on the Road Centerline segment or the Street Name Alias Records in the Street Name Alias Table.
Examples	RCL47824393@alpharettaga.us; 587392034@townscountyga.gov; 90a942e1bc7f4g1h94c5acaadv24r89h@barrowga.org
Domain	None

9.1.1.4 Parcel ID

Field Name	Parcel_ID
Field Population	Strongly Recommended
Field Type	Text
Field Width	254
Definition	The unique identifier for the Parcel where the structure or property is located as officially recorded in the tax roll. This identifier is often represented as the combination "Map Book Page" + "Parcel Number" with the number of spaces between each part varying based on the number of characters of the preceding part. Maintenance of this field requires close coordination with the local tax assessment office so that parcel splits and merges are incorporated in a timely manner. This SHOULD NOT include the FIPS Code or Georgia Code, as those will be maintained separately (see FIPS Code).
Examples	A 01 030; B 01 56BA; B 01A 001; W 05B 010A; 0169 140; 0123D 007
Domain	None

9.1.1.5 Date Created

Field Name	DateCreate
Field Population	**Mandatory**
Field Type	Date
Field Width	N/A
Definition	The timestamp (date and time in DD/MM/YYY HH:MM:SS AM/PM) that the record was created.
Examples	6/23/2021 9:10:23 PM
Domain	None

9.1.1.6 Date Updated

Field Name	DateUpdate
Field Population	**Mandatory**
Field Type	Date
Field Width	N/A
Definition	The date and time that the record was created or last modified.
Examples	2021-01-12T17:31.28.7-05:00 (representing a record updated on January 12, 2021 at 5:31 and 28.7 seconds PM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2021-08-23T10:05:01.6-04:00 (representing a record updated on August 23, 2021 at 10:05 and 1.6 seconds AM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

9.1.1.7 Effective Date

Field Name	Effective
Field Population	Optional
Field Type	Date
Field Width	N/A
Definition	The date and time that the record is scheduled to take effect (e.g., the date and time an annexation takes effect and a copy of the Site Structure Address Points within the annexed area, that have had their Incorporated Municipality, ESN, and MSAG Community Name fields populated with the new values, are recognized for use in the NG9-1-1 system).
Examples	2021-12-15T01:30:00.5-05:00 (representing a record that will become active on December 15, 2021 at 1:30 and 0.5 seconds AM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2022-04-05T23:55:00.2-04:00 (representing a record that will become active on April 5, 2022 at 11:55 and 0.2 seconds PM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

9.1.1.8 Expiration Date

Field Name	Expire
Field Population	Optional
Field Type	Date
Field Width	N/A
Definition	The date and time when the information in the record is no longer considered valid (e.g., the date and time an annexation takes effect and the Site Structure Address Points within the annexed area, that have their Incorporated Municipality, ESN, and MSAG Community Name fields populated with the former values, are no longer recognized for use in the NG9-1-1 system).
Examples	2021-11-30T002:00:00.1-05:00 (representing a record that will expire and no longer be valid on November 30, 2021 at 2:00 and 0.1 seconds AM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2022-06-01T18:30:05.5-04:00 (representing a record that will expire and no longer be valid on June 1, 2022 at 6:30 and 5.5 seconds PM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

Site Structure Address Points – Address Elements

9.1.1.9 Address Number Prefix

Field Name	AddNum_Pre
Field Population	Conditional
Field Type	Text
Field Width	15
Definition	An extension of the Address Number consisting of the alphanumeric characters, punctuation, and spaces that precedes the Address Number and further identifies the location of a structure, site, or other addressed feature. These are not address ranges. Generally, not used in Georgia.
Examples	W180N; 194-0
Domain	None

9.1.1.10 Address Number

Field Name	Add_Number
Field Population	Conditional
Field Type	Long
Field Width	6
Definition	The numeric identifier for a structure, site, or other addressed feature along a thoroughfare or within a defined community.
Examples	1120; 32
Domain	Whole numbers from 0 to 999999

9.1.1.11 Address Number Suffix

Field Name	AddNum_Suf
Field Population	Conditional
Field Type	Text
Field Width	15
Definition	An extension of the Address Number consisting of the alphanumeric characters, punctuation, and spaces that follows the Address Number and further identifies the location of a structure, site, or other addressed feature. Not to be confused with Unit divisions within a building. Use should be minimized.
Examples	½; B
Domain	None

9.1.1.12 Fully Concatenated Address Number

Field Name	FullAddNum
Field Population	Conditional
Field Type	Text
Field Width	38
Definition	The complete address number with the Address Number Prefix, Address Number, and Address Number Suffix elements concatenated together: FullAddNum = AddNum_Pre + Add_Number + AddNum_Suf
Examples	**1120 ½** Oak Avenue; **32B** Franklin Circle
Domain	None

9.1.1.13 Milepost

Field Name	Milepost
Field Population	Conditional
Field Type	Text
Field Width	150
Definition	A measured distance travelled along a road, highway, trail, navigable waterway, or other unaddressed route, from a given point, that is typically posted with a milepost sign, a mile marker sign, or other marker. Milepost numbers may be used in place of, or in addition to, Address Numbers. Markers representing US National Grid coordinates should include the 3 character Grid Zone designation and the 2 character Square Identification since Georgia is located in four different grid zones.
Examples	**Mile Marker 73** Interstate 95; **ELM16SGC10446913** Allatoona Creek Trail; **Buoy R8** Doboy Sound
Domain	None

9.1.1.14 Complete Landmark Name

Field Name	LandmkName
Field Population	Conditional
Field Type	Text
Field Width	150
Definition	The name by which a prominent site or structure is publicly known and which may or may not be associated with a civic address. **Note:** This element may be impacted by a potential future change in NENA Standards. See **Section 12.1** for more information.
Examples	Centennial Olympic Park; Sanford Stadium; Fort Frederica National Monument, Martin Luther King, Jr. National Historical Park, Okefenokee National Wildlife Refuge
Domain	None

9.1.1.15 Building

Field Name	Building
Field Population	Optional
Field Type	Text
Field Width	75
Definition	The type (e.g., Building, Tower) and identifier (e.g., 2, B) for a building among a group of buildings that have the same Fully Concatenated Address. **Note:** This element may be impacted by a potential future change in NENA Standards. See **Section 12.1** for more information.
Examples	Building 1; Building 5A; Tower B; Tower D
Domain	None

9.1.1.16 Floor

Field Name	Floor
Field Population	Optional
Field Type	Text
Field Width	75
Definition	The floor, story, or level within a building. **Note:** This element may be impacted by a potential future change in NENA Standards. See **Section 12.1** for more information.
Examples	Floor 3; Fifth Floor; Mezzanine
Domain	None

9.1.1.17 Unit

Field Name	Unit
Field Population	Optional
Field Type	Text
Field Width	75
Definition	The type (e.g., Apartment, Unit) and identifier (e.g., 101, F) for a group or suite of rooms within a building that are under common ownership or tenancy, typically having a common primary entrance. **Note:** This element may be impacted by a potential future change in NENA Standards. See **Section 12.1** for more information.
Examples	Apartment 1408; Suite 12; Unit 7A
Domain	None

9.1.1.18 Room

Field Name	Room
Field Population	Optional
Field Type	Text
Field Width	75
Definition	The name or identifier of a single room within a building.
Examples	Room 102B; Dogwood Hall; Salon 2; Grand Ballroom; Rainwater Meeting Room
Domain	None

9.1.1.19 Seat

Field Name	Seat
Field Population	Optional
Field Type	Text
Field Width	75
Definition	An individual seat location where a person might sit.
Examples	Seat 6; 1; Desk A; E; Registration Desk; Cubicle F4
Domain	None

9.1.1.20 Additional Location Information

Field Name	Addtl_Loc
Field Population	Optional
Field Type	Text
Field Width	75
Definition	The type and identifier for a part of a subaddress that is not a Building, Floor, Unit, Room, or Seat.
Examples	Concourse C; Gate B20; Loading Dock 3A; Stairwell G
Domain	None

9.1.1.21 Street Name Pre Modifier

Field Name	St_PreMod
Field Population	Conditional
Field Type	Text
Field Width	15
Definition	A word or phrase that precedes all other Street Name elements and is separated from the Street Name element by a Street Name Pre Directional element and/or a Street Name Pre Type element.
Examples	**Old** County Road 7
Domain	None

9.1.1.22 Street Name Pre Directional

Field Name	St_PreDir
Field Population	Conditional
Field Type	Text
Field Width	9
Definition	A word preceding the Street Name element that indicates the direction taken by the road from an arbitrary starting point or line, or the sector where it is located.
Examples	**South** Pine Street; **Northwest** Main Street
Domain	GA *PrePost Directional*

9.1.1.23 Street Name Pre Type

Field Name	St_PreTyp
Field Population	Conditional
Field Type	Text
Field Width	50
Definition	A word or phrase that precedes the Street Name element and identifies the type of thoroughfare in the Fully Concatenated Street Name.
Examples	**Interstate** 95; **United States** 129 Highway; **Georgia State Route** 120; **Georgia Highway** 99; **State Route** 215; Old **County Road** 7; **Avenue** C
Domain	NENA *Street Name Pre Types and Street Name Post Types Registry*

9.1.1.24 Street Name Pre Type Separator

Field Name	St_PreSep
Field Population	Conditional
Field Type	Text
Field Width	20
Definition	A preposition or prepositional phrase between the Street Name Pre Type and the Street Name element.
Examples	Avenue **of the** States; Via **d'** Este
Domain	NENA *Street Name Pre Type Separators Registry*

9.1.1.25 Street Name

Field Name	St_Name
Field Population	Conditional
Field Type	Text
Field Width	60
Definition	The official name of the road as defined by the local Street Naming Authority for the given jurisdiction. The Street Name element does not include a street type, directional, or modifier unless assigned as such by the local Street Naming Authority.
Examples	**Oak** Avenue; **Peachtree** Road North; County Road **7**; Avenue of the **States**
Domain	None

9.1.1.26 Street Name Post Type

Field Name	St_PosTyp
Field Population	Conditional
Field Type	Text
Field Width	50
Definition	A word or phrase that follows the Street Name element and identifies the type of thoroughfare in the Fully Concatenated Street Name
Examples	Washington **Avenue**; Franklin **Circle**; Main **Street** Southwest
Domain	NENA *Street Name Pre Types and Street Name Post Types Registry*

9.1.1.27 Street Name Post Directional

Field Name	St_PosDir
Field Population	Conditional
Field Type	Text
Field Width	9
Definition	A word following the Street Name element that indicates the direction taken by the road from an arbitrary starting point or line, or the sector where it is located.
Examples	Peachtree Road **North;** Main Street **Southwest**
Domain	GA *PrePost Directional*

9.1.1.28 Street Name Post Modifier

Field Name	St_PosMod
Field Population	Conditional
Field Type	Text
Field Width	25
Definition	A word or phrase that follows all other Street Name elements and is separated from the Street Name element by a Street Name Post Type element and/or a Street Name Post Directional element.
Examples	Main Street East **Extension**; Washington Avenue **Frontage Road**; Interstate 95 **northbound**
Domain	None

9.1.1.29 Fully Concatenated Street Name

Field Name	FullStNm
Field Population	Conditional
Field Type	Text
Field Width	245
Definition	The Street Name element with all Pre/Post Modifiers, Pre/Post Directionals, Pre/Post Types, and Pre Type Separator elements concatenated together: FullStNm = St_PreMod + St_PreDir + St_PreTyp + St_PreSep + St_Name + St_PosTyp + St_PosDir + St_PosMod
Examples	Franklin Circle; Old County Road 7; Avenue of the States; Main Street Southwest
Domain	None

9.1.1.30 Fully Concatenated Address

Field Name	FullAddr
Field Population	Conditional
Field Type	Text
Field Width	283
Definition	The complete street address with the Fully Concatenated Address Number and the Fully Concatenated Street Name elements concatenated together: FullAddr = FullAddNum + FullStNm
Examples	32B Franklin Circle; 300 Old County Road 7; 320 Avenue of the States; 2851 Main Street Northwest
Domain	None

9.1.1.31 Abbreviated Fully Concatenated Street Name

Field Name	AbFullStNm
Field Population	Conditional
Field Type	Text
Field Width	155
Definition	The Fully Concatenated Street Name with abbreviations used for the Pre/Post Directionals and Pre/Post Types elements.
Examples	Franklin Cir; Old Co Rd 7; Ave of the States; Main St SW
Domain	None

9.1.1.32 Legacy Street Name Pre Directional

Field Name	LSt_PreDir
Field Population	Conditional
Field Type	Text
Field Width	2
Definition	The street direction prefix as it appears in the MSAG, as assigned by the local Street Naming Authority. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	**S** PINE ST; **NW** MAIN ST
Domain	GA *Legacy PrePost Directional*

9.1.1.33 Legacy Street Name

Field Name	LSt_Name
Field Population	Conditional
Field Type	Text
Field Width	75
Definition	The Street Name field as it appears in the MSAG, as assigned by the local Street Naming Authority. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	**OAK** AVE; **AVENUE OF THE STATES**; **PEACHTREE** RD N
Domain	None

9.1.1.34 Legacy Street Name Type

Field Name	LSt_Type
Field Population	Conditional
Field Type	Text
Field Width	4
Definition	The valid street type abbreviation as it appears in the MSAG, as assigned by the local Street Naming Authority. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	S PINE **ST**; OAK **AVE**; PEACHTREE **RD** N
Domain	GA *Legacy PrePost Type*

9.1.1.35 Legacy Street Name Post Directional

Field Name	LSt_PosDir
Field Population	Conditional
Field Type	Text
Field Width	2
Definition	The street direction suffix as it appears in the MSAG, as assigned by the local Street Naming Authority. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	PEACHTREE RD **N**; MAIN ST **SW**
Domain	GA *Legacy PrePost Directional*

9.1.1.36 Postal Community Name

Field Name	Post_Comm
Field Population	Optional
Field Type	Text
Field Width	40
Definition	The municipal name recognized by the USPS as valid for the ZIP Code of an address.
Examples	Greensboro; Macon
Domain	GA *Postal Community*

9.1.1.37 Postal Code

Field Name	Post_Code
Field Population	Optional
Field Type	Text
Field Width	7
Definition	The 5-digit code that identifies the individual US Post Office or metropolitan area delivery station associated with an address.
Examples	30642; 31201
Domain	GA *Postal Code*

9.1.1.38 ZIP Plus 4

Field Name	Post_Code4
Field Population	Optional
Field Type	Text
Field Width	4
Definition	A system of 4-digit codes that are used after the 5-digit Postal Code to specify a range of USPS delivery addresses.
Examples	2159; 6844
Domain	GA *Postal Code*

Site Structure Address Points – Administrative Units

9.1.1.39 Country

Field Name	Country
Field Population	**Mandatory**
Field Type	Text
Field Width	2
Definition	The two-letter abbreviation of the Country where the address is located. Must be in uppercase.
Examples	US
Domain	GA *Country*

9.1.1.40 State

Field Name	State
Field Population	**Mandatory**
Field Type	Text
Field Width	2
Definition	The two-letter abbreviation of the State where the address is located. Must be in uppercase.
Examples	GA; AL; FL; NC; SC; TN
Domain	GA *State*

9.1.1.41 County

Field Name	County
Field Population	**Mandatory**
Field Type	Text
Field Width	40
Definition	The name of the County where the address is located.
Examples	Cobb County; Chatham County
Domain	GA *County*

9.1.1.42 FIPS Code

Field Name	FIPS
Field Population	**Mandatory**
Field Type	Text
Field Width	5
Definition	Concatenation of the FIPS State code (13) and FIPS County code.
Examples	13051; 13141; 13259; 13307
Domain	GA *FIPS*

9.1.1.43 Incorporated Municipality

Field Name	Inc_Muni
Field Population	**Mandatory**
Field Type	Text
Field Width	100
Definition	The name of the Incorporated Municipality where the address is located. If the address is located in an unincorporated area of a county, populate the field with "Unincorporated."
Examples	City of Alpharetta; City of Atlanta; City of Junction City; City of McRae-Helena; City of Peachtree City; Town of Braselton; Athens-Clarke Unified Government; Unincorporated
Domain	GA *Municipality*

9.1.1.44 Unincorporated Community

Field Name	Uninc_Comm
Field Population	Optional
Field Type	Text
Field Width	100
Definition	The name of the Unincorporated Community where the address is located.
Examples	Evans; North Druid Hills; Vinings; Wilmington Island
Domain	None

9.1.1.45 Neighborhood Community

Field Name	Nbrhd_Comm
Field Population	Optional
Field Type	Text
Field Width	100
Definition	The name of an unincorporated neighborhood, subdivision, or area within an incorporated municipality where the address is located. Neighborhood communities are only used when they are known and have a clearly defined boundary.
Examples	Inman Park; Normaltown; Lake Forest; Woodfield Subdivision
Domain	None

9.1.1.46 Additional Code

Field Name	AddCode
Field Population	Conditional
Field Type	Text
Field Width	6
Definition	A Standard Geographical Classification code used in Canada that specifies a geographic area and is used to differentiate two municipalities with the same name in a province that does not have counties. **Note:** Since this field is not applicable in the US, it will not be populated in Georgia GIS data layers.
Examples	
Domain	None

Site Structure Address Points – Location Elements

9.1.1.47 Address Type

Field Name	Addr_Type
Field Population	Optional
Field Type	Text
Field Width	5
Definition	This code is pulled from the National Fire Incident Reporting System (NFIRS) which defines property use for locations. This list is being used for its granularity (e.g., **123:** Stadium, arena. Includes fixed seating in large areas, such as ballpark, football stadium, grandstand, and race track; **888:** Fire station) as well as its ability to be general (e.g., **1:** Assembly; **8:** Storage). It assists fire marshals with prioritizing inspections, helps to describe specific structures or locations for first responders, assists in the development of new building codes, and provides the means for analyzing programs or data targeted at specific property types.
Examples	9; 123; 888; UUU
Domain	GA *Address Type*

9.1.1.48 Place Type

Field Name	Place_Type
Field Population	Optional
Field Type	Text
Field Width	50
Definition	The type of feature identified by the address.
Examples	Airport; hospital; hotel; office; residence; school; stadium; store
Domain	GA *Place Type*

9.1.1.49 Placement Method

Field Name	Placement
Field Population	Optional
Field Type	Text
Field Width	25
Definition	The methodology used for placement of the address point.
Examples	Geocoding, Parcel, PropertyAccess, Site, Structure, Unknown
Domain	NENA *Site/Structure Address Point Placement Method Registry*

9.1.1.50 Additional Data URI

Field Name	AddDataURI
Field Population	Conditional
Field Type	Text
Field Width	254
Definition	A Uniform Resource Identifier (URI) that defines the Service URI for accessing additional data and information associated with the address location, including building information (e.g., blueprints, contact info, floor plans).
Examples	https://addtl12345.example.com
Domain	None

9.1.1.51 Latitude

Field Name	Lat
Field Population	Optional
Field Type	Double
Field Width	
Definition	The angular distance of the address point location north or south of the equator as defined by the coordinate system, expressed in decimal degrees.
Examples	33.748751
Domain	+90 degrees to -90 degrees

9.1.1.52 Longitude

Field Name	Long
Field Population	Optional
Field Type	Double
Field Width	
Definition	The angular distance of the address point location east or west of the prime meridian of the coordinate system, expressed in decimal degrees.
Examples	-84.388386
Domain	-180 degrees to +180 degrees

9.1.1.53 Elevation

Field Name	Elev
Field Population	Optional
Field Type	Long
Field Width	6
Definition	The WGS84 (GPS) elevation, given in meters above the ellipsoid, associated with the address.
Examples	48; 132
Domain	Whole numbers from 0 to 999999

Site Structure Address Points – NG9-1-1 Elements

9.1.1.54 Discrepancy Agency ID

Field Name	DiscrpAgID
Field Population	**Mandatory**
Field Type	Text
Field Width	75
Definition	The Agency Identifier (a registered domain name) for the agency that is responsible for receiving a Discrepancy Report and sufficiently resolving the discrepancy, should a discrepancy be discovered in the GIS data layer. This shall be the agency responsible for provisioning the GIS data layer to the Spatial Interface (SI) or to the SI Provider and may be the same agency as the locally appointed 9-1-1 Authority.
Examples	alpharettaga.us; townscountyga.gov; barrowga.org
Domain	None

9.1.1.55 ESN

Field Name	ESN
Field Population	Conditional
Field Type	Text
Field Width	5
Definition	A 3 to 5 character alphanumeric string that represents the Emergency Service Zone (ESZ) where the address is located. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	170; 245; 302; 525
Domain	Characters from 0 to 99999

9.1.1.56 MSAG Community Name

Field Name	MSAGComm
Field Population	Conditional
Field Type	Text
Field Width	30
Definition	The Community name where the address is located, as it appears in the MSAG. This may or may not be the same as the Postal Community Name used by the US Postal Service. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	EDISON COUNTY; MORGAN; LEARY CITY; BLAKELY RURAL
Domain	None

9.2 Transportation

9.2.1 Roads

This layer is a **required** NG9-1-1 GIS data layer as defined in the NENA Standard for NG9-1-1 GIS Data Model [1]. All fields listed in the NENA Standard for this layer are included in the data structure described below. ***Blue italicized fields*** are additional fields added to meet the State of Georgia's needs. All fields listed in the data structure below must be included in the GIS data layer, even if data does not exist for a field, or a field is classified as Optional. The Georgia GIO will populate the fields where the descriptions are flagged with an asterisk (*).

Road Centerlines – Summary Table

Description	Field Name	Field Population	Field Type	Field Width	Domain
Data Management Elements					
Local Unique ID	*Local_ID*	***Mandatory***	*Text*	*140*	N/A
Road Centerline NENA Globally Unique ID*	RCL_NGUID	**Mandatory**	Text	254	N/A
GDOT Route ID	*GDOT_ID*	*Strongly Recommended*	*Text*	*20*	N/A
Date Created	*DateCreate*	***Mandatory***	*Date*	N/A	N/A
Date Updated	DateUpdate	**Mandatory**	Date	N/A	N/A
Effective Date	Effective	Optional	Date	N/A	N/A
Expiration Date	Expire	Optional	Date	N/A	N/A
Address Elements					
Left Address Number Prefix	AdNumPre_L	Conditional	Text	15	N/A
Right Address Number Prefix	AdNumPre_R	Conditional	Text	15	N/A
Left FROM Address	FromAddr_L	**Mandatory**	Long	6	Whole numbers from 0 to 999999
Left TO Address	ToAddr_L	**Mandatory**	Long	6	Whole numbers from 0 to 999999
Right FROM Address	FromAddr_R	**Mandatory**	Long	6	Whole numbers from 0 to 999999
Right TO Address	ToAddr_R	**Mandatory**	Long	6	Whole numbers from 0 to 999999
Parity Left	Parity_L	**Mandatory**	Text	1	GA *Parity*
Parity Right	Parity_R	**Mandatory**	Text	1	GA *Parity*
Street Name Pre Modifier	St_PreMod	Conditional	Text	15	N/A
Street Name Pre Directional	St_PreDir	Conditional	Text	9	GA *PrePost Directional*
Street Name Pre Type	St_PreTyp	Conditional	Text	50	NENA *Street Name Pre Types and Street Name Post Types Registry*
Street Name Pre Type Separator	St_PreSep	Conditional	Text	20	NENA *Street Name Pre Type Separators Registry*
Street Name	St_Name	**Mandatory**	Text	60	
Street Name Post Type	St_PosTyp	Conditional	Text	50	NENA *Street Name Pre Types and Street Name Post Types Registry*
Street Name Post Directional	St_PosDir	Conditional	Text	9	GA *PrePost Directional*
Street Name Post Modifier	St_PosMod	Conditional	Text	25	N/A
*Fully Concatenated Street Name**	*FullStNm*	***Mandatory***	*Text*	*245*	N/A
*Abbreviated Fully Concatenated Street Name**	*AbFullStNm*	***Mandatory***	*Text*	*155*	N/A
Alias Street Name	*AliasStNm*	*Conditional*	*Text*	*245*	N/A
Legacy Street Name Pre Directional	LSt_PreDir	Conditional	Text	2	GA *Legacy PrePost Directional*
Legacy Street Name	LSt_Name	Conditional	Text	75	
Legacy Street Name Type	LSt_Type	Conditional	Text	4	GA *Legacy PrePost Type*

Description	Field Name	Field Population	Field Type	Field Width	Domain
Legacy Street Name Post Directional	LSt_PosDir	Conditional	Text	2	GA *Legacy PrePost Directional*
Postal Community Name Left	PostComm_L	Optional	Text	40	GA *Postal Community*
Postal Community Name Right	PostComm_R	Optional	Text	40	GA *Postal Community*
Postal Code Left	PostCode_L	Optional	Text	7	GA *Postal Code*
Postal Code Right	PostCode_R	Optional	Text	7	GA *Postal Code*
Administrative Units					
Country Left*	Country_L	**Mandatory**	Text	2	GA *Country*
Country Right*	Country_R	**Mandatory**	Text	2	GA *Country*
State Left	State_L	**Mandatory**	Text	2	GA *State*
State Right	State_R	**Mandatory**	Text	2	GA *State*
County Left	County_L	**Mandatory**	Text	40	GA *County*
County Right	County_R	**Mandatory**	Text	40	GA *County*
Incorporated Municipality Left	IncMuni_L	**Mandatory**	Text	100	GA *Municipality*
Incorporated Municipality Right	IncMuni_R	**Mandatory**	Text	100	GA *Municipality*
Unincorporated Community Left	UnincCom_L	Optional	Text	100	N/A
Unincorporated Community Right	UnincCom_R	Optional	Text	100	N/A
Neighborhood Community Left	NbrhdCom_L	Optional	Text	100	N/A
Neighborhood Community Right	NbrhdCom_R	Optional	Text	100	N/A
Additional Code Left	AddCode_L	Conditional	Text	6	N/A
Additional Code Right	AddCode_R	Conditional	Text	6	N/A
Routing Elements					
One-Way	OneWay	Strongly Recommend	Text	2	GA *OneWay*
Speed Limit	SpeedLimit	Strongly Recommend	Short	3	GA *Speed Limits*
Road Class	RoadClass	Strongly Recommend	Text	15	GA *Road Class*
NG9-1-1 Elements					
Discrepancy Agency ID	DiscrpAgID	**Mandatory**	Text	75	N/A
ESN Left	ESN_L	Conditional	Text	5	N/A
ESN Right	ESN_R	Conditional	Text	5	N/A
MSAG Community Name Left	MSAGComm_L	Conditional	Text	30	N/A
MSAG Community Name Right	MSAGComm_R	Conditional	Text	30	N/A
Validation Left	Valid_L	Optional	Text	1	GA *YN*
Validation Right	Valid_R	Optional	Text	1	GA *YN*

Road Centerlines – Detailed Definitions

Road Centerlines – Data Management Elements

9.2.1.1 Local Unique ID

Field Name	Local_ID
Field Population	**Mandatory**
Field Type	Text
Field Width	140
Definition	A numeric and/or text locally assigned unique ID within the local dataset that may be an autogenerated ID or a manually generated ID. This local ID MUST be unique within the local dataset and should be persistent for as long as possible, so that it supports the reporting and resolution of errors from quality control processes.
Examples	SSAP47824393; 587392034; 90a942e1bc7f4g1h94c5acaadv24r89h; 20e743d8-b9ce-42f8-8eca-50e06b6af571
Domain	None

9.2.1.2 Road Centerline NENA Globally Unique ID

Field Name	RCL_NGUID
Field Population	**Mandatory**
Field Type	Text
Field Width	254
Definition	The NENA Globally Unique ID (NGUID) for a Road Centerline segment such that when coalescing Road Centerline data from other local 9-1-1 Authorities, this unique ID only occurs once. A Road Centerline NGUID is created by concatenating a layer prefix (e.g., RCL), the locally assigned unique ID (Local_ID), the "@" symbol, and the Agency Identifier (a registered domain name). The locally assigned unique ID (Local_ID) may be an autogenerated unique ID or a manually generated unique ID. As a foreign key, the Road Centerline NGUID can be used to relate to alias street name records in the Street Name Alias Table or to establish a link between a Site Structure Address Point and its associated record in the Road Centerlines layer.
Examples	RCL47824393@alpharettaga.us; 587392034@townscountyga.gov; 90a942e1bc7f4g1h94c5acaadv24r89h@barrowga.org
Domain	None

9.2.1.3 GDOT Route ID

Field Name	GDOT_ID
Field Population	Strongly Recommended
Field Type	Text
Field Width	20
Definition	The Georgia Department of Transportation Route Identifier. This ID is used to associate a road with the route tracked by the DOT for maintenance and other purposes. It can be used to populate speed limits and road class. It is assigned when the local entity notifies GDOT via the Notification of Local Road Activity form. The ID is a concatenation of the single digit Function Type, the 3 character Census County Code, the single digit System Code, the 8 character Route Code, and the 3 character route designation of INC (increasing) or DEC (decreasing). To get ID information, or new IDs, please contact the Georgia Department of Transportation Office of Transportation Data for current process.
Examples	1191200034000INC
Domain	None

9.2.1.4 Date Created

Field Name	DateCreate
Field Population	**Mandatory**
Field Type	Date
Field Width	N/A
Definition	The timestamp (date and time in DD/MM/YYY HH:MM:SS AM/PM) that the record was created.
Examples	6/23/2021 9:10:23 PM
Domain	None

9.2.1.5 Date Updated

Field Name	DateUpdate
Field Population	**Mandatory**
Field Type	Date
Field Width	N/A
Definition	The date and time that the record was created or last modified.
Examples	2021-01-12T17:31.28.7-05:00 (representing a record updated on January 12, 2021 at 5:31 and 28.7 seconds PM US Eastern Standard Time, with a precision of .1 second in W3C “dateTime” datatype); 2021-08-23T10:05:01.6-04:00 (representing a record updated on August 23, 2021 at 10:05 and 1.6 seconds AM US Eastern Daylight Time, with a precision of .1 second in W3C “dateTime” datatype)
Domain	None

9.2.1.6 Effective Date

Field Name	Effective
Field Population	Optional
Field Type	Date
Field Width	N/A
Definition	The date and time that the record is scheduled to take effect (e.g., the date and time an annexation takes effect and a copy of the Road Centerlines within the annexed area, that have had their Incorporated Municipality, ESN, and MSAG Community Name fields populated with the new values, are recognized for use in the NG9-1-1 system).
Examples	2021-12-15T01:30:00.5-05:00 (representing a record that will become active on December 15, 2021 at 1:30 and 0.5 seconds AM US Eastern Standard Time, with a precision of .1 second in W3C “dateTime” datatype); 2022-04-05T23:55:00.2-04:00 (representing a record that will become active on April 5, 2022 at 11:55 and 0.2 seconds PM US Eastern Daylight Time, with a precision of .1 second in W3C “dateTime” datatype)
Domain	None

9.2.1.7 Expiration Date

Field Name	Expire
Field Population	Optional
Field Type	Date
Field Width	N/A
Definition	The date and time when the information in the record is no longer considered valid (e.g., the date and time an annexation takes effect and the Road Centerlines within the annexed area, that have their Incorporated Municipality, ESN, and MSAG Community Name fields populated with the former values, are no longer recognized for use in the NG9-1-1 system).
Examples	2021-11-30T002:00:00.1-05:00 (representing a record that will expire and no longer be valid on November 30, 2021 at 2:00 and 0.1 seconds AM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2022-06-01T18:30:05.5-04:00 (representing a record that will expire and no longer be valid on June 1, 2022 at 6:30 and 5.5 seconds PM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

Road Centerlines – Address Elements

9.2.1.8 Left Address Number Prefix

Field Name	AdNumPre_L
Field Population	Conditional
Field Type	Text
Field Width	15
Definition	An extension of the Left FROM Address or Left TO Address on the right side of the road segment, consisting of the alphanumeric characters, punctuation, and spaces that precedes the Address Number and further identifies the location of a structure, site, or other addressed feature. These are not address ranges. Generally, not used in Georgia.
Examples	W180N; 194-0
Domain	None

9.2.1.9 Right Address Number Prefix

Field Name	AdNumPre_R
Field Population	Conditional
Field Type	Text
Field Width	15
Definition	An extension of the Right FROM Address or Right TO Address on the right side of the road segment, consisting of the alphanumeric characters, punctuation, and spaces that precedes the Address Number and further identifies the location of a structure, site, or other addressed feature. These are not address ranges. Generally, not used in Georgia.
Examples	W180N; 194-0
Domain	None

9.2.1.10 Left FROM Address

Field Name	FromAddr_L
Field Population	**Mandatory**
Field Type	Long
Field Width	6
Definition	The beginning value of the address range on the left side of the road segment at the FROM node (begin point). This value can be higher than the Left TO Address.
Examples	100; 2342
Domain	Whole numbers from 0 to 999999

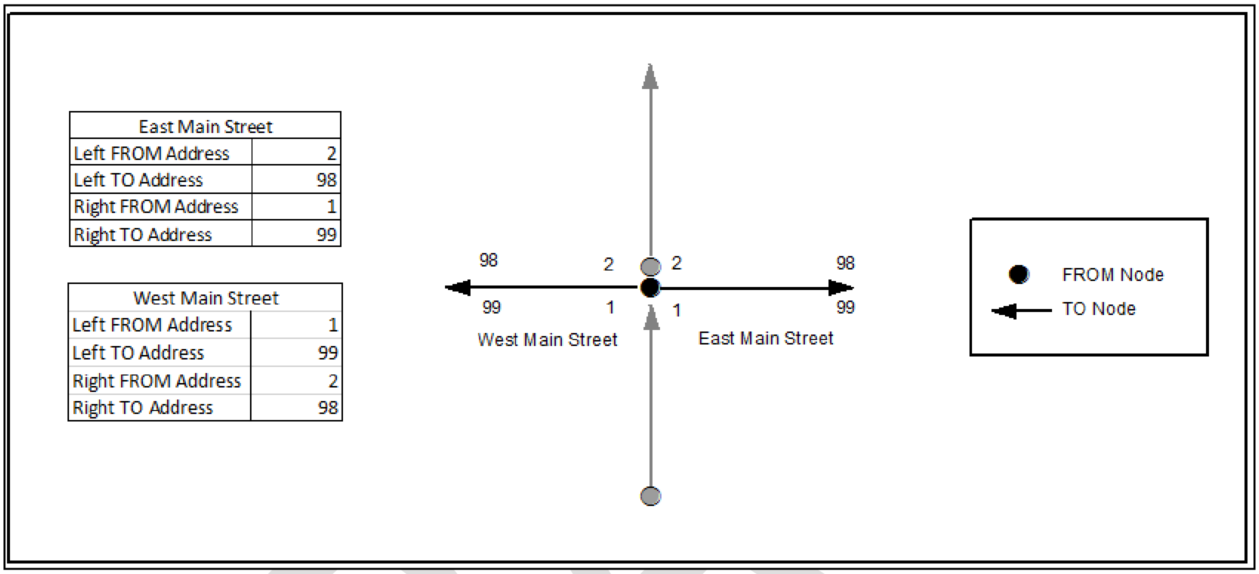

Figure 8-1 Example of Left FROM, Left TO, Right FROM, and Right TO Addresses

9.2.1.11 Left TO Address

Field Name	ToAddr_L
Field Population	**Mandatory**
Field Type	Long
Field Width	6
Definition	The ending value of the address range on the left side of the road segment at the TO node (endpoint). This value can be lower than the Left TO Address.
Examples	198; 2382
Domain	Whole numbers from 0 to 999999

9.2.1.12 Right FROM Address

Field Name	FromAddr_R
Field Population	**Mandatory**
Field Type	Long
Field Width	6
Definition	The beginning value of the address range on the right side of the road segment at the FROM node (begin point). This value can be higher than the Right TO Address.
Examples	3401; 122
Domain	Whole numbers from 0 to 999999

9.2.1.13 Right TO Address

Field Name	ToAddr_R
Field Population	**Mandatory**
Field Type	Long
Field Width	6
Definition	The ending value of the address range on the right side of the road segment at the TO node (endpoint). This value can be lower than the Right TO Address.
Examples	3499; 184
Domain	Whole numbers from 0 to 999999

9.2.1.14 Parity Left

Field Name	Parity_L
Field Population	**Mandatory**
Field Type	Text
Field Width	1
Definition	The even or odd property of the address number range on the left side of the road segment where: **O** (only Odd addresses in the address range) **E** (only Even addresses in the address range) **B** (Both Even and Odd addresses in the address range) **Z** (Address Range is 0-0)
Examples	O; E; B; Z
Domain	GA *Parity*

9.2.1.15 Parity Right

Field Name	Parity_R
Field Population	**Mandatory**
Field Type	Text
Field Width	1
Definition	The even or odd property of the address number range on the right side of the road segment where: **O** (only Odd addresses in the address range) **E** (only Even addresses in the address range) **B** (Both Even and Odd addresses in the address range) **Z** (Address Range is 0-0)
Examples	O; E; B; Z
Domain	GA *Parity*

9.2.1.16 Street Name Pre Modifier

Field Name	St_PreMod
Field Population	Conditional
Field Type	Text
Field Width	15
Definition	A word or phrase that precedes all other Street Name elements and is separated from the Street Name element by a Street Name Pre Directional element and/or a Street Name Pre Type element.
Examples	**Old** County Road 7
Domain	None

9.2.1.17 Street Name Pre Directional

Field Name	St_PreDir
Field Population	Conditional
Field Type	Text
Field Width	9
Definition	A word preceding the Street Name element that indicates the direction taken by the road from an arbitrary starting point or line, or the sector where it is located.
Examples	**South** Pine Street; **Northwest** Main Street
Domain	GA *PrePost Directional*

9.2.1.18 Street Name Pre Type

Field Name	St_PreTyp
Field Population	Conditional
Field Type	Text
Field Width	50
Definition	A word or phrase that precedes the Street Name element and identifies the type of thoroughfare in the Fully Concatenated Street Name.
Examples	**Interstate** 95; **United States** 129 Highway; **Georgia State Route** 120; **Georgia Highway** 99; **State Route** 215; Old **County Road** 7; **Avenue** C
Domain	NENA *Street Name Pre Types and Street Name Post Types Registry*

9.2.1.19 Street Name Pre Type Separator

Field Name	St_PreSep
Field Population	Conditional
Field Type	Text
Field Width	20
Definition	A preposition or prepositional phrase between the Street Name Pre Type and the Street Name element.
Examples	Avenue **of the** States, Via **d'** Este
Domain	NENA *Street Name Pre Type Separators Registry*

9.2.1.20 Street Name

Field Name	St_Name
Field Population	**Mandatory**
Field Type	Text
Field Width	60
Definition	The official name of the road as defined by the local Street Naming Authority for the given jurisdiction. The Street Name element does not include a street type, directional, or modifier unless assigned as such by the local Street Naming Authority.
Examples	**Oak** Avenue; **Peachtree** Road North; County Road **7**; Avenue of the **States**
Domain	None

9.2.1.21 Street Name Post Type

Field Name	St_PosTyp
Field Population	Conditional
Field Type	Text
Field Width	50
Definition	A word or phrase that follows the Street Name element and identifies the type of thoroughfare in the Fully Concatenated Street Name
Examples	Washington **Avenue**; Franklin **Circle**; Main **Street** Southwest
Domain	NENA *Street Name Pre Types and Street Name Post Types Registry*

9.2.1.22 Street Name Post Directional

Field Name	St_PosDir
Field Population	Conditional
Field Type	Text
Field Width	9
Definition	A word following the Street Name element that indicates the direction taken by the road from an arbitrary starting point or line, or the sector where it is located.
Examples	Peachtree Road **North;** Main Street **Southwest**
Domain	GA *PrePost Directional*

9.2.1.23 Street Name Post Modifier

Field Name	St_PosMod
Field Population	Conditional
Field Type	Text
Field Width	25
Definition	A word or phrase that follows all other Street Name elements and is separated from the Street Name element by a Street Name Post Type element and/or a Street Name Post Directional element.
Examples	Main Street East **Extension**; Washington Avenue **Frontage Road**; Interstate 95 **northbound**
Domain	None

9.2.1.24 Fully Concatenated Street Name

Field Name	FullStNm
Field Population	**Mandatory**
Field Type	Text
Field Width	245
Definition	The Street Name element with all Pre/Post Modifiers, Pre/Post Directionals, Pre/Post Types, and Pre Type Separator elements concatenated together: FullStNm = St_PreMod + St_PreDir + St_PreTyp + St_PreSep + St_Name + St_PosTyp + St_PosDir + St_PosMod
Examples	Franklin Circle; Old County Road 7; Avenue of the States; Main Street Southwest
Domain	None

9.2.1.25 Abbreviated Fully Concatenated Street Name

Field Name	AbFullStNm
Field Population	**Mandatory**
Field Type	Text
Field Width	155
Definition	The Fully Concatenated Street Name with abbreviations used for the Pre/Post Directionals and Pre/Post Types elements.
Examples	Franklin Cir; Old Co Rd 7; Ave of the States; Main St SW
Domain	None

9.2.1.26 Alias Street Name

Field Name	AliasStNm
Field Population	Conditional
Field Type	Text
Field Width	245
Definition	The primary alias or "also known as" street name associated with the road centerline. Often this is a numbered route or memorial street name.
Examples	United States Highway 23; Georgia State Route 120; Oconee Veterans Parkway; Deputy David Gilstrap Memorial Highway; Hog Mountain Road; Paul Broun Parkway
Domain	None

9.2.1.27 Legacy Street Name Pre Directional

Field Name	LSt_PreDir
Field Population	Conditional
Field Type	Text
Field Width	2
Definition	The street direction prefix as it appears in the MSAG, as assigned by the local Street Naming Authority. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	**S** PINE ST; **NW** MAIN ST
Domain	GA *Legacy PrePost Directional*

9.2.1.28 Legacy Street Name

Field Name	LSt_Name
Field Population	Conditional
Field Type	Text
Field Width	75
Definition	The Street Name field as it appears in the MSAG, as assigned by the local Street Naming Authority. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	**OAK** AVE; **AVENUE OF THE STATES**; **PEACHTREE** RD N
Domain	None

9.2.1.29 Legacy Street Name Type

Field Name	LSt_Type
Field Population	Conditional
Field Type	Text
Field Width	4
Definition	The valid street type abbreviation as it appears in the MSAG, as assigned by the local Street Naming Authority. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	S PINE **ST**; OAK **AVE**; PEACHTREE **RD** N
Domain	GA *Legacy PrePost Type*

9.2.1.30 Legacy Street Name Post Directional

Field Name	LSt_PosDir
Field Population	Conditional
Field Type	Text
Field Width	2
Definition	The street direction suffix as it appears in the MSAG, as assigned by the local Street Naming Authority. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	PEACHTREE RD **N;** MAIN ST **SW**
Domain	GA *Legacy PrePost Directional*

9.2.1.31 Postal Community Name Left

Field Name	PostComm_L
Field Population	Optional
Field Type	Text
Field Width	40
Definition	The municipal name recognized by the USPS as valid for the ZIP Code of an address.
Examples	Greensboro; Macon
Domain	GA *Postal Community*

9.2.1.32 Postal Community Name Right

Field Name	PostComm_R
Field Population	Optional
Field Type	Text
Field Width	40
Definition	The municipal name recognized by the USPS as valid for the ZIP Code of an address.
Examples	Greensboro; Macon
Domain	GA *Postal Community*

9.2.1.33 Postal Code Left

Field Name	PostCode_L
Field Population	Optional
Field Type	Text
Field Width	7
Definition	The 5-digit code that identifies the individual US Post Office or metropolitan area delivery station associated with an address.
Examples	30642; 31201
Domain	GA *Postal Code*

9.2.1.34 Postal Code Right

Field Name	PostCode_R
Field Population	Optional
Field Type	Text
Field Width	7
Definition	The 5-digit code that identifies the individual US Post Office or metropolitan area delivery station associated with an address.
Examples	30642; 31201
Domain	GA *Postal Code*

Road Centerlines – Administrative Units

9.2.1.35 Country Left

Field Name	Country_L
Field Population	**Mandatory**
Field Type	Text
Field Width	2
Definition	The two-letter abbreviation of the Country on the left side of the road segment where the address is located. Must be in uppercase.
Examples	US
Domain	GA *Country*

9.2.1.36 Country Right

Field Name	Country_R
Field Population	**Mandatory**
Field Type	Text
Field Width	2
Definition	The two-letter abbreviation of the Country on the right side of the road segment where the address is located. Must be in uppercase.
Examples	US
Domain	GA *Country*

9.2.1.37 State Left

Field Name	State_L
Field Population	**Mandatory**
Field Type	Text
Field Width	2
Definition	The two letter abbreviation of the State on the left side of the road segment where the address is located. Must be in uppercase.
Examples	GA; AL; FL; NC; SC; TN
Domain	GA *State*

9.2.1.38 State Right

Field Name	State_R
Field Population	**Mandatory**
Field Type	Text
Field Width	2
Definition	The two letter abbreviation of the State on the right side of the road segment where the address is located. Must be in uppercase.
Examples	GA; AL; FL; NC; SC; TN
Domain	GA *State*

9.2.1.39 County Left

Field Name	County_L
Field Population	**Mandatory**
Field Type	Text
Field Width	40
Definition	The name of the County on the left side of the road segment where the address is located.
Examples	Bibb County; Forsyth County
Domain	GA *County*

9.2.1.40 County Right

Field Name	County_R
Field Population	**Mandatory**
Field Type	Text
Field Width	40
Definition	The name of the County on the right side of the road segment where the address is located.
Examples	Barrow County; Richmond County
Domain	GA *County*

9.2.1.41 Incorporated Municipality Left

Field Name	IncMuni_L
Field Population	**Mandatory**
Field Type	Text
Field Width	100
Definition	The name of the Incorporated Municipality on the left side of the road segment where the address is located. If the address is located in an unincorporated area of a county, populate the field with "Unincorporated."
Examples	City of Alpharetta; City of Junction City; City of Peachtree City; Town of Braselton; Unincorporated
Domain	GA *Municipality*

9.2.1.42 Incorporated Municipality Right

Field Name	IncMuni_R
Field Population	**Mandatory**
Field Type	Text
Field Width	100
Definition	The name of the Incorporated Municipality on the right side of the road segment where the address is located. If the address is located in an unincorporated area of a county, populate the field with "Unincorporated."
Examples	City of Atlanta; City of McRae-Helena; Athens-Clarke Unified Government; Unincorporated
Domain	GA *Municipality*

9.2.1.43 Unincorporated Community Left

Field Name	UnincCom_L
Field Population	Optional
Field Type	Text
Field Width	100
Definition	The name of the Unincorporated Community on the left side of the road segment where the address is located.
Examples	Evans; Wilmington Island
Domain	None

9.2.1.44 Unincorporated Community Right

Field Name	UnincCom_R
Field Population	Optional
Field Type	Text
Field Width	100
Definition	The name of the Unincorporated Community on the right side of the road segment where the address is located.
Examples	North Druid Hills; Vinings
Domain	None

9.2.1.45 Neighborhood Community Left

Field Name	NbrhdCom_L
Field Population	Optional
Field Type	Text
Field Width	100
Definition	The name of an unincorporated neighborhood, subdivision, or area within an incorporated municipality on the left side of the road segment where the address is located. Neighborhood communities are only used when they are known and have a clearly defined boundary.
Examples	Inman Park; Woodfield Subdivision
Domain	None

9.2.1.46 Neighborhood Community Right

Field Name	NbrhdCom_R
Field Population	Optional
Field Type	Text
Field Width	100
Definition	The name of an unincorporated neighborhood, subdivision, or area within an incorporated municipality on the right side of the road segment where the address is located. Neighborhood communities are only used when they are known and have a clearly defined boundary.
Examples	Normaltown; Lake Forest
Domain	None

9.2.1.47 Additional Code Left

Field Name	AddCode_L
Field Population	Conditional
Field Type	Text
Field Width	6
Definition	A Standard Geographical Classification code used in Canada that specifies a geographic area and is used to differentiate two municipalities with the same name in a province that does not have counties. **Note:** Since this field is not applicable in the US, it will not be populated in Georgia GIS data layers.
Examples	N/A
Domain	None

9.2.1.48 Additional Code Right

Field Name	AddCode_R
Field Population	Conditional
Field Type	Text
Field Width	6
Definition	A Standard Geographical Classification code used in Canada that specifies a geographic area and is used to differentiate two municipalities with the same name in a province that does not have counties. **Note:** Since this field is not applicable in the US, it will not be populated in Georgia GIS data layers.
Examples	N/A
Domain	None

Road Centerlines – Routing Elements

9.2.1.49 One-Way

Field Name	OneWay
Field Population	Strongly Recommended
Field Type	Text
Field Width	2
Definition	The direction of traffic movement along a road in relation to the FROM node and TO node of the road segment where: B (Travel allowed in both directions) FT (One-way, travel from FROM node to TO node) TF (One-way, travel from TO node to FROM node)
Examples	B; FT; TF
Domain	GA *OneWay*

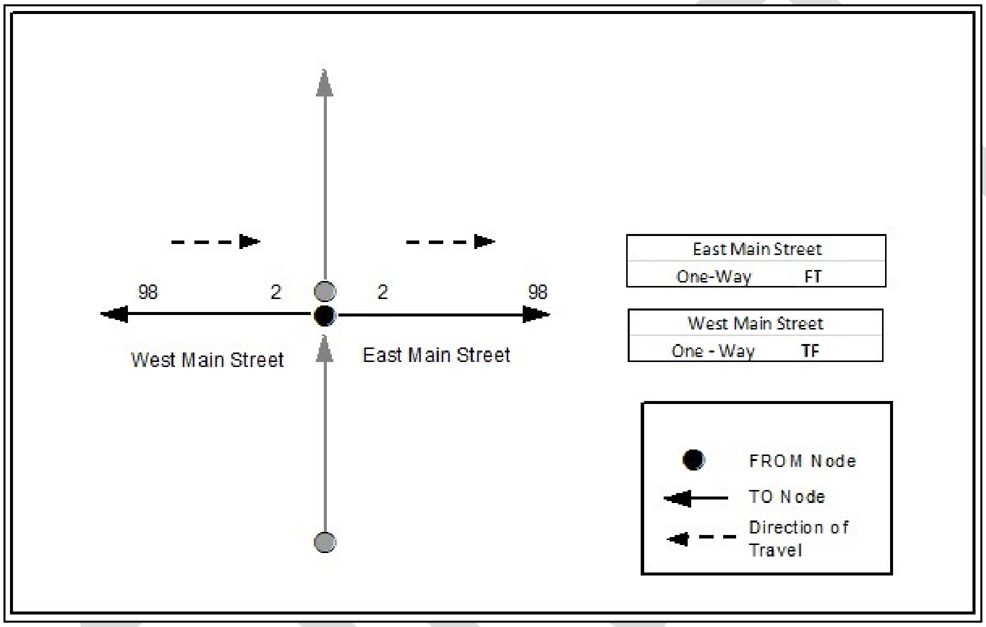

Figure 8-2 Example of One-Way attribution

9.2.1.50 Speed Limit

Field Name	SpeedLimit
Field Population	Strongly Recommended
Field Type	Short
Field Width	3
Definition	The posted speed limit of the road segment in MPH.
Examples	35; 55; 70
Domain	GA *Speed Limits*

9.2.1.51 Road Class

Field Name	RoadClass
Field Population	Strongly Recommended
Field Type	Text
Field Width	15
Definition	The general description of the type of road. These values are based on road classification definitions from the Census MAF/TIGER Feature Class Codes (MTFCC) at https://www.census.gov/library/reference/code-lists/mt-feature-class-codes.html. • *Primary* roads are limited-access highways that connect to other roads only at interchanges and not at at-grade intersections. This classification includes interstate highways and other highways with limited access, some of which are toll roads. • *Secondary* roads are main arteries that are not limited access, usually in the US Highway, State Highway, or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at grade intersections with many other roads and driveways. • *Local* roads are generally a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. This classification includes neighborhood, rural roads, city streets, and some unpaved roads. • *Ramp* is a road that allows controlled access from adjacent roads onto a limited access highway, often in the form of a cloverleaf interchange. • Service Drive is a road, usually paralleling a limited access highway, that provides access to structures and/or service facilities along the highway. These roads can be named and may intersect with other roads. • *Vehicular Trail* (4WD, snowmobile) is an unpaved dirt trail where a four-wheel drive vehicle, snowmobile, or similar vehicle is required. • *Walkway* (Pedestrian Trail, Boardwalk) is a path that is used for walking, being either too narrow for or legally restricted from vehicular traffic. • *Stairway* is a pedestrian passageway from one level to another by a series of steps. • *Alley* is a service road that does not generally have associated addressed structures and is usually unnamed. It is located at the rear of buildings and properties. • *Private* (service vehicles, logging, oil fields, ranches, etc.) is a road within private property that is privately maintained for service, extractive, or other purposes. These roads are often unnamed. • *Parking Lot* is the main travel route for vehicles through a paved parking area. • *Trail* (Ski, Bike, Walking/Hiking Trail) is generally a path used by human powered modes of transportation, being either too narrow for or legally restricted from vehicular traffic. • *Bridle Path* is a path that is used for horses, being either too narrow for or legally restricted from vehicular traffic. *Other* is any road or path type that does not fit into the above categories.
Examples	Primary; Secondary; Local; Ramp; Private; Trail
Domain	GA *Road Class*

Road Centerlines – NG9-1-1 Elements

9.2.1.52 Discrepancy Agency ID

Field Name	DiscrpAgID
Field Population	**Mandatory**
Field Type	Text
Field Width	75
Definition	The Agency Identifier (a registered domain name) for the agency that is responsible for receiving a Discrepancy Report and sufficiently resolving the discrepancy, should a discrepancy be discovered in the GIS data layer. This shall be the agency responsible for provisioning the GIS data layer to the Spatial Interface (SI) or to the SI Provider and may be the same agency as the locally appointed 9-1-1 Authority.
Examples	alpharettaga.us; townscountyga.gov; barrowga.org
Domain	None

9.2.1.53 ESN Left

Field Name	ESN_L
Field Population	Conditional
Field Type	Text
Field Width	5
Definition	A 3-5 character alphanumeric string that represents the Emergency Service Zone (ESZ) on the left side of the road segment. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	170; 245
Domain	Characters from 0 to 99999

9.2.1.54 ESN Right

Field Name	ESN_R
Field Population	Conditional
Field Type	Text
Field Width	5
Definition	A 3-5 character alphanumeric string that represents the Emergency Service Zone (ESZ) on the right side of the road segment. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	302; 525
Domain	Characters from 0 to 99999

9.2.1.55 MSAG Community Name Left

Field Name	MSAGComm_L
Field Population	Conditional
Field Type	Text
Field Width	30
Definition	The Community name on the left side of the road segment, as it appears in the MSAG. This may or may not be the same as the Postal Community Name used by the US Postal Service. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	EDISON COUNTY; MORGAN
Domain	None

9.2.1.56 MSAG Community Name Right

Field Name	MSAGComm_R
Field Population	Conditional
Field Type	Text
Field Width	30
Definition	The Community name on the right side of the road segment, as it appears in the MSAG. This may or may not be the same as the Postal Community Name used by the US Postal Service. **Note:** Used in Legacy Systems and is not used in a full NG9-1-1 implementation.
Examples	LEARY CITY; BLAKELY RURAL
Domain	None

9.2.1.57 Validation Left

Field Name	Valid_L
Field Population	Optional
Field Type	Text
Field Width	1
Definition	Indicates if the address range on the left side of the road segment should be used for civic location validation. A value of "Y" means the Road Centerlines layer can be used for address validation and therefore any Address Number within the address range on the left side of the road segment should be considered by the LVF to be valid. A value of "N" means the Road Centerlines layer should not be used for validation and an Address Number within the address range on the left side of the road segment should only be validated using the Site Structure Address Points layer. If no values are populated, a value of "Y" is assumed.
Examples	Y; N
Domain	GA *YN*

9.2.1.58 Validation Right

Field Name	Valid_R
Field Population	Optional
Field Type	Text
Field Width	1
Definition	Indicates if the address range on the right side of the road segment should be used for civic location validation. A value of "Y" means the Road Centerlines layer can be used for address validation and therefore any Address Number within the address range on the right side of the road segment should be considered by the LVF to be valid. A value of "N" means the Road Centerlines layer should not be used for validation and an Address Number within the address range on the right side of the road segment should only be validated using the Site Structure Address Points layer. If no values are populated, a value of "Y" is assumed.
Examples	Y; N
Domain	GA *YN*

9.3 Boundaries

9.3.1 Provisioning

The Provisioning Boundary layer is a **required** NG9-1-1 GIS data layer as defined in the NENA Standard for NG9-1-1 GIS Data Model [1]. All fields listed in the NENA Standard for this layer are included in the data structure described below. ***Blue italicized fields*** are additional fields added to meet the State of Georgia's needs. All fields listed in the data structure below must be included in the GIS data layer, even if data does not exist for a field, or a field is classified as Optional. The Georgia GIO will populate the fields where the descriptions are flagged with an asterisk (*).

This layer represents the coverage area for which GIS Data Providers are responsible for submitting data for NG9-1-1 use. This layer is used by GIS data aggregators or Spatial Interface Operators to ensure that submitted data includes coverage for the entire extent of the GIS Data Provider's provisioning boundary but does not extend beyond it. A Provisioning Boundary must align with the Provisioning Boundaries of all adjoining GIS Data Providers.

Provisioning – Summary Table

Description	Field Name	Field Population	Field Type	Field Width	Domain
Data Management Elements					
Local Unique ID	*Local_ID*	***Mandatory***	*Text*	*140*	N/A
Provisioning Boundary NENA Globally Unique ID*	PB_NGUID	**Mandatory**	Text	254	N/A
Date Created	*DateCreate*	***Mandatory***	*Date*	N/A	N/A
Date Updated	DateUpdate	**Mandatory**	Date	N/A	N/A
Effective Date	Effective	Optional	Date	N/A	N/A
Expiration Date	Expire	Optional	Date	N/A	N/A
NG9-1-1 Elements					
Discrepancy Agency ID	DiscrpAgID	**Mandatory**	Text	75	N/A

Provisioning – Detailed Definitions

Provisioning – Data Management Elements

9.3.1.1 Local Unique ID

Field Name	Local_ID
Field Population	**Mandatory**
Field Type	Text
Field Width	140
Definition	A numeric and/or text locally assigned unique ID within the local dataset that may be an autogenerated ID or a manually generated ID. This local ID MUST be unique within the local dataset and should be persistent for as long as possible, so that it supports the reporting and resolution of errors from quality control processes.
Examples	SSAP47824393; 587392034; 90a942e1bc7f4g1h94c5acaadv24r89h
Domain	None

9.3.1.2 Provisioning Boundary NENA Globally Unique ID

Field Name	PB_NGUID
Field Population	**Mandatory**
Field Type	Text
Field Width	254
Definition	The NENA Globally Unique ID (NGUID) for a Provisioning Boundary such that when coalescing Provisioning Boundary polygon data from other local 9-1-1 Authorities, this unique ID only occurs once. A Provisioning Boundary NGUID is created by concatenating a layer prefix (e.g., PB), the locally assigned unique ID (Local_ID), the "@" symbol, and the Agency Identifier (a registered domain name). The locally assigned unique ID (Local_ID) may be an autogenerated unique ID or a manually generated unique ID.
Examples	PB47824393@alpharettaga.us; 587392034@townscountyga.gov; 90a942e1bc7f4g1h94c5acaadv24r89h@barrowga.org
Domain	None

9.3.1.3 Date Created

Field Name	DateCreate
Field Population	**Mandatory**
Field Type	Date
Field Width	N/A
Definition	The timestamp (date and time in DD/MM/YYY HH:MM:SS AM/PM) that the record was created.
Examples	6/23/2021 9:10:23 PM
Domain	None

9.3.1.4 Date Updated

Field Name	DateUpdate
Field Population	**Mandatory**
Field Type	Date
Field Width	N/A
Definition	The date and time that the record was created or last modified.
Examples	2021-01-12T17:31.28.7-05:00 (representing a record updated on January 12, 2021 at 5:31 and 28.7 seconds PM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2021-08-23T10:05:01.6-04:00 (representing a record updated on August 23, 2021 at 10:05 and 1.6 seconds AM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

9.3.1.5 Effective Date

Field Name	Effective
Field Population	Optional
Field Type	Date
Field Width	N/A
Definition	The date and time that the record is scheduled to take effect (e.g., the date and time an annexation takes effect and the new Provisioning Boundary is recognized for use in the NG9-1-1 system).
Examples	2021-12-15T01:30:00.5-05:00 (representing a record that will become active on December 15, 2021 at 1:30 and 0.5 seconds AM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2022-04-05T23:55:00.2-04:00 (representing a record that will become active on April 5, 2022 at 11:55 and 0.2 seconds PM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

9.3.1.6 Expiration Date

Field Name	Expire
Field Population	Optional
Field Type	Date
Field Width	N/A
Definition	The date and time when the information in the record is no longer considered valid (e.g., the date and time an annexation takes effect and the former Provisioning Boundary is no longer recognized for use in the NG9-1-1 system).
Examples	2021-11-30T002:00:00.1-05:00 (representing a record that will expire and no longer be valid on November 30, 2021 at 2:00 and 0.1 seconds AM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2022-06-01T18:30:05.5-04:00 (representing a record that will expire and no longer be valid on June 1, 2022 at 6:30 and 5.5 seconds PM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

Provisioning – NG9-1-1 Elements

9.3.1.7 Discrepancy Agency ID

Field Name	DiscrpAgID
Field Population	**Mandatory**
Field Type	Text
Field Width	75
Definition	The Agency Identifier (a registered domain name) for the agency that is responsible for receiving a Discrepancy Report and sufficiently resolving the discrepancy, should a discrepancy be discovered in the GIS data layer. This shall be the agency responsible for provisioning the GIS data layer to the Spatial Interface (SI) or to the SI Provider and may be the same agency as the locally appointed 9-1-1 Authority.
Examples	alpharettaga.us; townscountyga.gov; barrowga.org
Domain	None

9.3.2 Service Boundaries

9.3.2.1 Emergency Service Boundaries

The PSAP, Fire, Police, and Emergency Medical Services layers are **required** NG9-1-1 GIS data layers as defined in the NENA Standard for NG9-1-1 GIS Data Model [1]. All fields listed in the NENA Standard for this layer are included in the data structure described below. ***Blue italicized fields*** are additional fields added to meet the State of Georgia's needs. All fields listed in the data structure below must be included in the GIS data layer, even if data does not exist for a field, or a field is classified as Optional. The Georgia GIO will populate the fields where the descriptions are flagged with an asterisk (*).

Other Emergency Service Boundaries such as Poison Control, Forest Service, Coast Guard, Animal Control, etc., may also be needed for NG9-1-1. The data structure for these Emergency Service Boundary layers is exactly the same as the PSAP, Police, Fire, and EMS layers and uses the same data structure described below. These layers are used in an NG9-1-1 implementation for the transfer of 9-1-1 calls to these agencies that are served by a call center, dispatch center, or other means.

9.3.2.1.1 Emergency Service Boundaries – Summary Table

Description	Field Name	Field Population	Field Type	Field Width	Domain
Data Management Elements					
Local Unique ID	Local_ID	**Mandatory**	Text	140	N/A
Emergency Service Boundary NENA Globally Unique ID*	ES_NGUID	**Mandatory**	Text	254	N/A
Date Created	DateCreate	***Mandatory***	Date	N/A	N/A
Date Updated	DateUpdate	**Mandatory**	Date	N/A	N/A
Effective Date	Effective	Optional	Date	N/A	N/A
Effective Date	Expire	Optional	Date	N/A	N/A
Administrative Units					
State	State	**Mandatory**	Text	2	GA *State*
Service Specific Elements					
Agency Identifier	Agency_ID	**Mandatory**	Text	100	N/A
Service URI	ServiceURI	**Mandatory**	Text	254	N/A
Service URN	ServiceURN	**Mandatory**	Text	50	NENA *urn:nena:service:responder*
Service Number	ServiceNum	Optional	Text	15	N/A
Agency vCard URI	AVcard_URI	**Mandatory**	Text	254	N/A
Display Name	DsplayName	**Mandatory**	Text	60	N/A
NG9-1-1 Elements					
Discrepancy Agency ID	DiscrpAgID	**Mandatory**	Text	75	N/A

Emergency Service Boundaries – Detailed Definitions

Emergency Service Boundaries – Data Management Elements

9.3.2.1.1.1 Local Unique ID

Field Name	Local_ID
Field Population	**Mandatory**
Field Type	Text
Field Width	140
Definition	A numeric and/or text locally assigned unique ID within the local dataset that may be an autogenerated ID or a manually generated ID. This local ID MUST be unique within the local dataset and should be persistent for as long as possible, so that it supports the reporting and resolution of errors from quality control processes.
Examples	SSAP47824393; 587392034; 90a942e1bc7f4g1h94c5acaadv24r89h
Domain	None

9.3.2.1.1.2 Emergency Service Boundary NENA Globally Unique ID

Field Name	ES_NGUID
Field Population	**Mandatory**
Field Type	Text
Field Width	254
Definition	The NENA Globally Unique ID (NGUID) for an Emergency Service Boundary (ESB) polygon such that when coalescing ESB polygon data from other local 9-1-1 Authorities, this unique ID only occurs once. An Emergency Service Boundary NGUID is created by concatenating a layer prefix (e.g., PSAP, POLICE, FIRE, EMS), the locally assigned unique ID (Local_ID), the "@" symbol, and the Agency Identifier (a registered domain name). The locally assigned unique ID (Local_ID) may be an autogenerated unique ID or a manually generated unique ID.
Examples	PSAP47824393@alpharettaga.us; 587392034@townscountyga.gov; 90a942e1bc7f4g1h94c5acaadv24r89h@barrowga.org
Domain	None

9.3.2.1.1.3 Date Created

Field Name	DateCreate
Field Population	**Mandatory**
Field Type	Date
Field Width	N/A
Definition	The timestamp (date and time in DD/MM/YYY HH:MM:SS AM/PM) that the record was created.
Examples	6/23/2021 9:10:23 PM
Domain	None

9.3.2.1.1.4 Date Updated

Field Name	DateUpdate
Field Population	**Mandatory**
Field Type	Date
Field Width	N/A
Definition	The date and time that the record was created or last modified.
Examples	2021-01-12T17:31.28.7-05:00 (representing a record updated on January 12, 2021 at 5:31 and 28.7 seconds PM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2021-08-23T10:05:01.6-04:00 (representing a record updated on August 23, 2021 at 10:05 and 1.6 seconds AM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

9.3.2.1.1.5 Effective Date

Field Name	Effective
Field Population	Optional
Field Type	Date
Field Width	N/A
Definition	The date and time that the record is scheduled to take effect (e.g., the date and time an annexation takes effect and the new PSAP Boundary is recognized for use in the NG9-1-1 system).
Examples	2021-12-15T01:30:00.5-05:00 (representing a record that will become active on December 15, 2021 at 1:30 and 0.5 seconds AM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2022-04-05T23:55:00.2-04:00 (representing a record that will become active on April 5, 2022 at 11:55 and 0.2 seconds PM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

9.3.2.1.1.6 Expiration Date

Field Name	Expire
Field Population	Optional
Field Type	Date
Field Width	N/A
Definition	The date and time when the information in the record is no longer considered valid (e.g., the date and time an annexation takes effect and the former PSAP Boundary is no longer recognized for use in the NG9-1-1 system).
Examples	2021-11-30T002:00:00.1-05:00 (representing a record that will expire and no longer be valid on November 30, 2021 at 2:00 and 0.1 seconds AM US Eastern Standard Time, with a precision of .1 second in W3C "dateTime" datatype); 2022-06-01T18:30:05.5-04:00 (representing a record that will expire and no longer be valid on June 1, 2022 at 6:30 and 5.5 seconds PM US Eastern Daylight Time, with a precision of .1 second in W3C "dateTime" datatype)
Domain	None

Emergency Service Boundaries – Administrative Units

9.3.2.1.1.7 State

Field Name	State
Field Population	**Mandatory**
Field Type	Text
Field Width	2
Definition	The two letter abbreviation of the State where the address is located. Must be in uppercase.
Examples	GA; AL; FL; NC; SC; TN
Domain	GA *State*

Emergency Service Boundaries – Service Specific Elements

9.3.2.1.1.8 Agency Identifier

Field Name	Agency_ID
Field Population	**Mandatory**
Field Type	Text
Field Width	100
Definition	A Domain Name System (DNS) registered domain name which is used to uniquely identify an agency. An agency is represented by a domain name as defined in Internet Engineering Task Force (IETF) RFC 1034. In order to correlate actions across a wide range of calls and incidents, each agency MUST use one domain name consistently. Any domain name in the public DNS is acceptable so long as each distinct agency uses a different domain name to ensure that each Agency Identifier is globally unique.
Examples	alpharettaga.us, townscountyga.gov, barrowga.org
Domain	None

9.3.2.1.1.9 Service URI

Field Name	ServiceURI
Field Population	**Mandatory**
Field Type	Text
Field Width	254
Definition	The Uniform Resource Identifier (URI) used for call routing that defines the URI of the specific service. The URI is usually a Session Initiation Protocol (SIP or SIPs) URI that defines the route to reach the service.
Examples	sips:sos@psap.columbus.oh.us
Domain	Must be a registered domain name

9.3.2.1.1.10 Service URN

Field Name	ServiceURN
Field Population	**Mandatory**
Field Type	Text
Field Width	50
Definition	The Uniform Resource Name (URN) used to select the service for which a route is desired. The ECRF is queried with a location and a service URN, and then returns the service URI.
Examples	urn:nena:service:sos.psap; urn:nena:service:responder.police; urn:nena:service:responder.fire; urn:nena:service:responder.ems
Domain	NENA *urn:nena:service:responder*

9.3.2.1.1.11 Service Number

Field Name	ServiceNum
Field Population	Optional
Field Type	Text
Field Width	15
Definition	The numbers that would be dialed on a 12 digit keypad to reach the emergency service appropriate for the location. This is not the same as an Emergency Service Number (ESN) in Legacy E9-1-1 systems. This field is used for all Emergency Service Boundaries including PSAP, Police, Fire, EMS, and others such as Poison Control. Within North America, the Service Number for most emergency services is 9-1-1, however, there may be Emergency Service Boundaries that have a different number that may be associated with them such as Poison Control.
Examples	911; 18002221222
Domain	A dialable number or dial string

9.3.2.1.1.12 Agency vCard URI

Field Name	AVcard_URI
Field Population	**Mandatory**
Field Type	Text
Field Width	254
Definition	A vCard (virtual card) is a file format standard for electronic business cards. The Agency vCard URI is the internet address of a JavaScript Object Notation (JSON) data structure that contains contact information (e.g., agency name, contact phone numbers) in the form of a jCard (RFC 7095). The vCard URI is used in the service boundary layers to provide contact information for each agency. The Service/Agency Locator (see NENA STA-010 [4]) provides these URIs for agencies listed within it.
Examples	https://vcard.psap.allegheny.pa.us; https://jcard.houstontx.gov/fire
Domain	None

9.3.2.1.1.13 Display Name

Field Name	DsplayName
Field Population	**Mandatory**
Field Type	Text
Field Width	60
Definition	A name or description of the entity offering emergency services within a PSAP or Emergency Service Boundary. This value must be suitable for display.
Examples	New York Police Department, Med Life Ambulance Services, Houston FD
Domain	None

9.3.2.1.1.14 Discrepancy Agency ID

Field Name	DiscrpAgID
Field Population	**Mandatory**
Field Type	Text
Field Width	75
Definition	The Agency Identifier (a registered domain name) for the agency that is responsible for receiving a Discrepancy Report and sufficiently resolving the discrepancy, should a discrepancy be discovered in the GIS data layer. This shall be the agency responsible for provisioning the GIS data layer to the Spatial Interface (SI) or to the SI Provider and may be the same agency as the locally appointed 9-1-1 Authority.
Examples	alpharettaga.us; townscountyga.gov; barrowga.org
Domain	None

9.3.2.1.2 PSAP

The PSAP Boundary layer is an Emergency Services Boundary that represents the geographic extent of each PSAP's primary call-taking responsibility for an emergency request. The PSAP Boundary layer may have one or many PSAP Boundaries contained in the layer. The data structure for the PSAP Boundary layer is defined in **Section 9.3.2.1.1 Emergency Service Boundaries – Summary Table**.

This layer is used by the Emergency Call Routing Function (ECRF) to perform a geographic query of the location of the emergency request (as a civic address, geographic coordinate, or geodetic shape) against the PSAP Boundary layer to determine the PSAP to which the emergency request is routed.

9.3.2.1.3 Fire

9.3.2.1.3.1 Fire – Primary Emergency Service

The Fire Boundary layer is an Emergency Services Boundary that represents the geographic extent for the primary responders for fire response services for an emergency request. The data structure for the Fire Boundary layer is defined in **Section 9.3.2.1.1 Emergency Service Boundaries – Summary Table**. An additional field (Fire Department Identification number) that must be included in the data structure for this layer is defined below.

This layer is used by the ECRF to perform a geographic query of the location of the emergency request (as a civic address, geographic coordinate, or geodetic shape) against the Fire Boundary layer to determine which fire agency is responsible for providing service to a location in the event a selective transfer is desired, or to direct an EIDO to an agency for dispatch, or to display the responsible agencies at the PSAP. In addition, the Fire Boundary layer is used by PSAPs to identify the appropriate fire responders to be dispatched.

Fire Department Identification number

Field Name	FDID
Field Population	Strongly Recommended
Field Type	Text
Field Width	5
Definition	A unique five-character identifier assigned by the State to identify a particular fire department within the State. This identifier may also identify the county, fire district, or other jurisdiction in which the fire department is located. Many States use the two left-most digits to identify the particular department within a jurisdiction. All five spaces in this field must be occupied by numerals or alphanumeric characters. If the FDID is less than five characters, use leading zeros.
Examples	05203, AR402, 48853, XX501, 1133
Domain	None

9.3.2.1.4 Police

9.3.2.1.4.1 Police – Primary Emergency Service

The Police Boundary layer is an Emergency Services Boundary that represents the geographic extent for the primary responders for police response services for an emergency request. The data structure for the Police Boundary layer is defined in **Section 9.3.2.1.1 Emergency Service Boundaries – Summary Table**.

This layer is used by the ECRF to perform a geographic query of the location of the emergency request (as a civic address, geographic coordinate, or geodetic shape) against the Police Boundary layer to determine which police agency is responsible for providing service to a location in the event a selective transfer is desired, or to direct an EIDO to an agency for dispatch, or to display the responsible agencies at the PSAP. In addition, the Police Boundary layer is used by PSAPs to identify the appropriate police responders to be dispatched.

9.3.2.1.5 Emergency Medical Services (EMS)

9.3.2.1.5.1 EMS – Primary Emergency Service

The EMS Boundary layer is an Emergency Services Boundary that represents the geographic extent for the primary responders for emergency medical services for an emergency request. The data structure for the EMS Boundary layer is defined in **Section 9.3.2.1.1 Emergency Service Boundaries – Summary Table**.

This layer is used by the ECRF to perform a geographic query of the location of the emergency request (as a civic address, geographic coordinate, or geodetic shape) against the EMS Boundary layer to determine which emergency medical services agency is responsible for providing service to a location in the event a selective transfer is desired, or to direct an EIDO to an agency for dispatch, or to display the responsible agencies at the PSAP. In addition, the EMS Boundary layer is used by PSAPs to identify the appropriate emergency medical services responders to be dispatched.

10 Best Practices for Building and Maintaining Geospatial Data

10.1 General Considerations

The required data layers for NG9-1-1 have many uses beyond location validation and call routing. In particular, the Road Centerlines and the Site Structure Address Points layers are used throughout all levels of government to support and provide numerous public services. This section identifies several general concepts to consider when building data for multiple business needs.

10.1.1 Data Development and Maintenance Plan

A good local data development and maintenance plan should be created at the earliest stages to ensure the best use of available resources and address data. Not all attribute fields are required for the ECRF and LVF to function. Having a strategy to populate the Strongly Recommended and Optional fields in the Road Centerlines layer and the Site Structure Address Points layer over time will help keep costs in check while making the best use of available resources. The data maintenance plan should include feedback loops with clear assignments identifying who, at the local level, is responsible for making updates to the data, who resolves errors found in the data, and who validates the updates and corrections. All involved must clearly understand their role in data maintenance and commit to meeting the stringent timelines for error correction. Additional considerations when developing a maintenance plan are discussed in **Section 11 Workflows**.

10.1.2 Use of Orthoimagery versus GPS Data Collection Devices

Current, high-resolution orthoimagery can provide a cost-effective way to create spatially accurate site structure address points, add new road centerlines, or spatially improve the location of existing address points and road centerlines. Road centerline compilation and address point placement that is done in the office is much more efficient than sending staff into the field with GPS units to collect geospatial coordinates for addressed locations and road alignments that clearly exist in the orthoimagery. Consider limiting GPS use to collect locations for:

- Subaddresses
- Sites, structures, and new roads not yet present in existing imagery
- Sites, structures, and road centerlines that are not clearly discernible in the existing imagery

In all situations, the spatial accuracy of the data is only as good as the least accurate data source or data collection device that was used to create it or spatially improve it.

10.1.3 Military Sites

In most cases, military installations are limited in their ability to share their geospatial data to civilians since it is considered Controlled Unclassified Information (CUI). The Department of Defense (DoD) can share geospatial data with their civilian counterparts as long as it is negotiated in a Memorandum of Agreement (MOA) to document proper data usage and security controls during the life of the Agreement.

The military is working to develop standardized NG9-1-1 geospatial data across all the Services. The NG9-1-1 data layers will include the following: Road Centerlines, Site Structure Address Points, PSAP Boundaries, Emergency Service Boundaries (Police, Fire, and EMS), and Provisioning Boundaries. Questions about the status of DoD NG9-1-1 data development amongst the Services as well as information about MOAs should be directed to the Georgia GIO who will reach out to the military on behalf the stakeholders. Local contact can be made with the applicable military installation Emergency Dispatch Center to negotiate data sharing for mutual aid support or NG9-1-1 system operation.

Military data is built to the Spatial Data Standard for Facilities, Infrastructure, and Environment - Vector (SDSFIE-V) [8], which is managed by the Defense Installation Spatial Data Information Program (DISDI) [9]. The military Site Structure Address Points layer is a combination of buildings, structures, recreation areas, etc. which are not all referenced by a building number or a feature name to maintain CUI controls.

10.1.4 Considerations for Road Centerlines

10.1.4.1 Accuracy of Boundary Data (for alignment and segmentation at boundaries)

Boundary data and its spatial relationship with road centerlines data is critical for NG9-1-1 purposes. Overlapping boundaries create issues when segmenting road centerlines or aligning road centerlines with State, county, PSAP, or other Emergency Service Boundaries. Before aligning or segmenting road centerlines with any boundary, it is important to confirm that the correct boundary is being used and that there are no unintentional spatial gaps or overlaps in the boundaries. This is discussed in more detail in **Section 10.2.3.1 Segmentation and Alignment at Boundaries**.

10.1.4.2 Geocoding offsets

In the absence of a Site Structure Address Points layer, the location of a 9-1-1 caller's civic address is derived from the interpolation of that address against the address ranges in the Road Centerlines layer. The geocoded location is offset slightly from the right or left side of the segment with the intent for it to fall within the appropriate PSAP and Emergency Service Boundaries. However, sometimes these boundaries and the road centerlines have an angular or other odd alignment to each other that results in the geocoded location being placed into the incorrect PSAP, Police, Fire, and/or EMS polygon. It is important to understand the geocoding offset distance used in the LVF, ECRF, CAD, and other systems and its potential impact on geocoded locations in such areas. Modification of road centerline geometry or the address ranges may be necessary to mitigate geocoded locations falling into an incorrect polygon.

10.1.4.3 Limitations and Requirements of CAD Software

A Road Centerlines layer built for NG9-1-1 purposes is typically used in CAD systems for consistency of data shared between the systems. Understanding the limitations and requirements of the CAD software is necessary when developing the Road Centerlines layer. Each CAD software package has its own unique requirements for road centerlines data. In some cases, CAD software may require 0-0 ranges in unaddressed areas, while others may not. Some CAD software may also allow for, or even require, Z (height) values which will affect how road centerlines are split at overpasses and underpasses. Additional attribution for CAD routing purposes may require population of the Strongly Recommended One-Way and Speed Limit attributes.

Currently, not all CAD software packages can natively ingest GIS data in the NENA Standard for NG9-1-1 GIS Data Model [1] format, upon which this Georgia Geospatial Data Standards and Best Practices for Next Generation 9-1-1 document is based. CAD software may require the use of abbreviations or different parsing of the street names and addresses. Since this document cannot take into account all of the CAD software packages, it is important to always refer to your particular CAD software requirements when developing and updating the Road Centerlines layer.

10.1.5 Considerations for Site Structure Address Points

Entities developing Site Structure Address Points need to carefully consider the level of positional accuracy desired and the resources available, not just for the initial data development but long-term data maintenance. In general, address point placement methodologies that result in more spatially accurate points require more resources to create and maintain them. Some items to consider when developing such a plan are described below.

10.1.5.1 Placement Method (e.g., Structure, Site, PropertyAccess, Parcel, Geocoding)

Some address point placement methodologies require minimal resources while others are very resource intensive. Consider starting with a less spatially accurate placement method and over time, gradually improve the spatially accuracy of the address points, as time and resources allow. For example, use available parcel data to generate site structure address points from parcel centroids, populating Placement Method as “Parcel.” Then as time and resources permit, use high-resolution orthoimagery to move the address points onto the sites and structures, changing Placement Method to “Site” or “Structure” as appropriate. This allows for quick creation of a Site Structure Address Points layer that can almost immediately be used in 9-1-1 and other applications.

Similarly, if using orthoimagery to place site structure address points but field research is required for an address that cannot be clearly discerned on the imagery, create a temporary address point using the parcel centroid location if the parcel upon which it is located is known, populating Placement Method as “Parcel.” Alternatively, create an address point at the driveway entrance to the addressed property if the driveway is visible in the orthoimagery, populating Placement Method as “PropertyAccess”. Population of the Placement Method attribute is strongly recommended in these situations to provide data users with information on the site structure address point’s positional accuracy.

10.1.5.2 Amount of Subaddress Detail Needed

Costs increase directly with the amount of subaddress detail that is collected for an addressed location. When determining the amount of subaddress detail needed, consider how 9-1-1 applications will use the data and how precise the site structure address point location needs to be. At a minimum, enough subaddress detail should be provided to route 9-1-1 calls to the appropriate PSAP and get first responders to the correct location.

Consider beginning with a low level of subaddress information and increase in granularity as time and resources permit. For example, collect Building, and potentially Unit, subaddress information that will at least get responders to a specific building. Additional subaddress detail may be needed where a large site or building is split by a PSAP or an Emergency Service Boundary and subaddresses at that location are served by a different PSAP or responding agencies.

10.1.5.3 Limitations of CAD Software

It is important to understand the limitations and requirements of the CAD software when developing the Site Structure Address Points layer. Currently, not all CAD software packages can natively ingest GIS data in the NENA Standard for NG9-1-1 GIS Data Model [1] format, upon which this Georgia Geospatial Data Standards and Best Practices for Next Generation 9-1-1 document is based. Each CAD software package has its own unique requirements for address points data and may require the use of abbreviations or different parsing of the street names and addresses. Some optional fields may not be recognized and therefore population of those fields may need to be postponed or a separate set of NG9-1-1 address fields may need to be carried in the data for NG9-1-1 purposes.

Consider the CAD software’s ability to use stacked points, use subaddress data in a related table structure, or even recognize subaddresses as unique addresses and not as duplicate addresses. Also consider if the CAD software can differentiate between the Placement Method values or if it requires a specific Placement Method (e.g., PropertyAccess versus Structure). For example, a structure located far from the road it is addressed off of may benefit from having two address points: an address point at the driveway entrance with Placement Method populated as “PropertyAccess” and an address point on the structure with Placement Method populated as “Structure”. If the CAD software cannot differentiate between the points, it may be necessary to only show one point. Since this document cannot take into account all of the CAD software packages, it is important to always refer to your particular CAD software requirements when developing and updating the Site Structure Address Points layer.

10.1.6 Considerations for PSAP, Emergency Service, and Provisioning Boundaries

Entities developing PSAP, Emergency Service, and Provisioning Boundary data layers need to understand that these layers are not always identical to the legal county, city, or other administrative boundaries within Georgia. Agreements may exist between PSAPs that define their areas of responsibility, particularly in areas where the boundary differs from the administrative boundaries. Though such formal agreements are not required, it is critical that neighboring GIS Data Providers work together to define their areas of responsibility and that any differences between the administrative boundaries and their areas of responsibility are properly reflected in the data layers.

10.1.6.1 Accuracy of the PSAP and Emergency Service Boundaries

There should be no unintentional gaps or overlaps within the PSAP Boundary layer or the Emergency Service Boundary layers. Gaps in PSAP boundaries prevent the ECRF from identifying which PSAP to route a call should a civic or geodetic location fall within that gap, resulting in a default route to a pre-identified PSAP. In addition, if a civic or geodetic location fell within an area where PSAP Boundaries overlapped, the ECRF would not be able to identify which of those PSAPs to route the call. Similarly, gaps and overlaps within an Emergency Service Boundary would prevent the ECRF from determining the correct Emergency Service Providers for service at that location.

Boundaries with unintentional gaps and overlaps also create issues when segmenting data. For example, Road Centerlines segmented at these boundaries would result in attribution conflicts for the segment in the overlapping area or lack of attribution in the gap area, including the address, place names, and 9-1-1 attribution elements. **Section 10.2.3.1 Segmentation and Alignment at Boundaries**, provides more detail about the impacts of improper road centerline segmentation at boundaries.

Neighboring GIS Data Providers must agree on the location of the boundary nodes in their PSAP Boundary layer and each Emergency Service Boundary layer, not only within the State of Georgia , but with their neighboring states. As stated previously, these locations, also known as “snap-to-points,” do not need to represent formal or legal boundaries, but instead, simply represent their agreed upon location for data maintenance purposes. Creation of a statewide Snap-to-Points data layer has been identified as an item requiring future development work as documented in **Section 12.2 Planned Georgia Geospatial Data Standards Development Related to NG9-1-1**.

GIS Data Providers within Georgia, and with neighboring states, must work together to resolve any discrepancies in these layers such that there are no unintentional gaps or overlaps.

10.1.6.2 Boundary Alignment for Efficiency of Call Routing and Response

When neighboring GIS Data Providers evaluate the location of their shared PSAP and Emergency Service Boundaries, consideration should be given to boundary realignment in areas where more efficient call routing or assignment of the primary responding units would result.

10.1.6.3 Boundary Coverage in Open Water

PSAP and Emergency Service Boundary coverage should extend into open water areas to clearly define which entity will receive emergency 9-1-1 calls and which response agencies would respond to a call from the water. For calls coming from offshore waters that may need to be transferred to another agency such as the US Coast Guard, an Emergency Service Boundary for that organization must be available to facilitate the transfer of such calls.

10.1.6.4 Accuracy of the Provisioning Boundary

There should be no unintentional gaps or overlaps within the Provisioning Boundary layer. Overlapping boundaries would result in multiple GIS Data Providers being able to submit GIS data for the same area which could result in duplicate GIS features (e.g., Road Centerlines, Site Structure Address Points) in the overlapping area. GIS Data Providers must work together to resolve these discrepancies such that their Provisioning Boundary covers the entire extent of their geographic area of responsibility but does not extend beyond their coverage area into a neighboring jurisdiction's geographic area of responsibility.

10.1.6.5 Boundary Realignment for New or Modified Road Centerlines and Site Structure Address Points

Upon changes to the geometry of road centerlines or site structure address points, or the addition of new features, the associated PSAP and Emergency Service Boundaries may require realignment to maintain the intended call routing and identification of responder agencies. It may also require realignment of the Provisioning Boundary to properly identify the entities that will be responsible for provisioning those features.

10.2 Road Centerlines Recommendations and Best Practices

10.2.1 General Best Practices

The validation checks described in **Section 14.4 Appendix D: Quality Control NG9-1-1 Validations**, identify the essential geometry and attribute quality control checks that the state's validation tools perform in their inspection of the Road Centerlines layer. These checks are used to identify data integrity issues and ensure consistent, valid data throughout the dataset. Ensuring that the data meets the requirements of these Road Centerline validation checks will avoid unnecessary rework and ensure that the data meets the required specifications for the NG9-1-1 Location Validation Function and Emergency Call Routing Function.

Quality control is a continuous process. Each time data is submitted to the Georgia GIO for aggregation into the statewide Road Centerlines layer, these validation checks will be run. Results will be returned to the GIS Data Provider for resolution of errors flagged as non-conforming. Initially, all local data will be aggregated into the statewide dataset, however, at some point in the future, mandatory features that are non-conforming will not be incorporated into the statewide dataset.

10.2.2 Geometry

10.2.2.1 Divided Roads

Road centerlines represent the center of a road. Limited-access roads, also referred to as divided roads, typically have some form of physical barrier (e.g., concrete wall, metal barrier, grassy median, elevated curbs, a ditch) separating the opposing traffic flow. These should be digitized with two centerlines, each representing a different direction of travel. This is especially important if the data is used for vehicular routing of emergency responders or for routing of other vehicles.

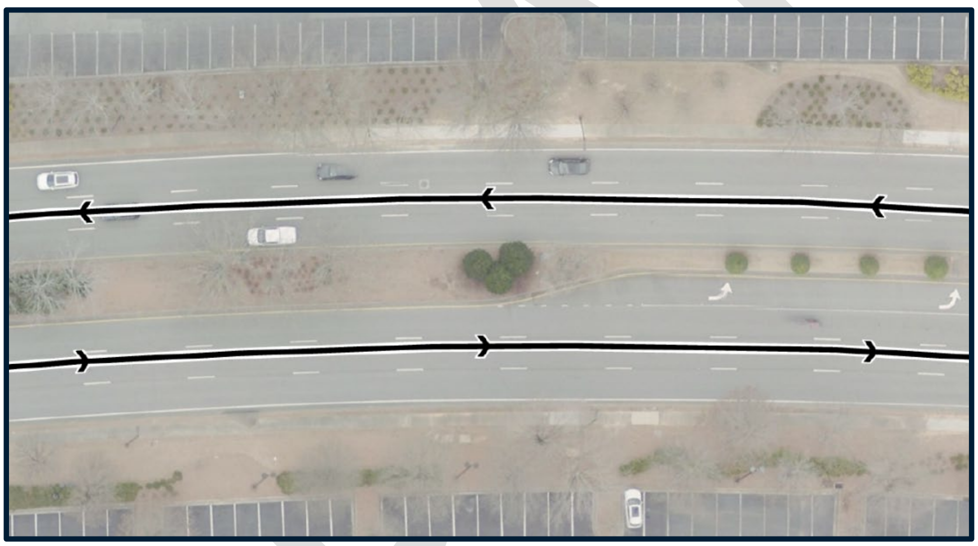

Figure 10-1 Limited-access road with a physical barrier, represented with two centerlines

A single centerline is used to represent the road when there is only yellow painted striping or a flush median separating the opposing traffic flow lanes that can be easily driven over without damaging a vehicle.

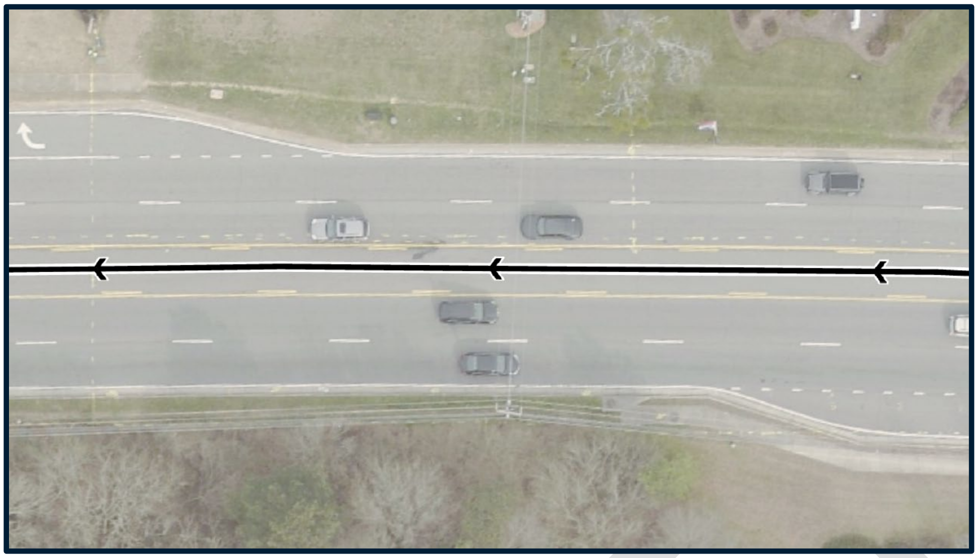

Figure 10-2 Road with painted striping in a center turn lane, represented with one centerline

10.2.2.2 Turn Lanes

Turn lanes are only represented with their own road centerline when clearly separated from the main road alignment by a physical barrier or channelization island such as the triangular islands often used for right turn lanes.

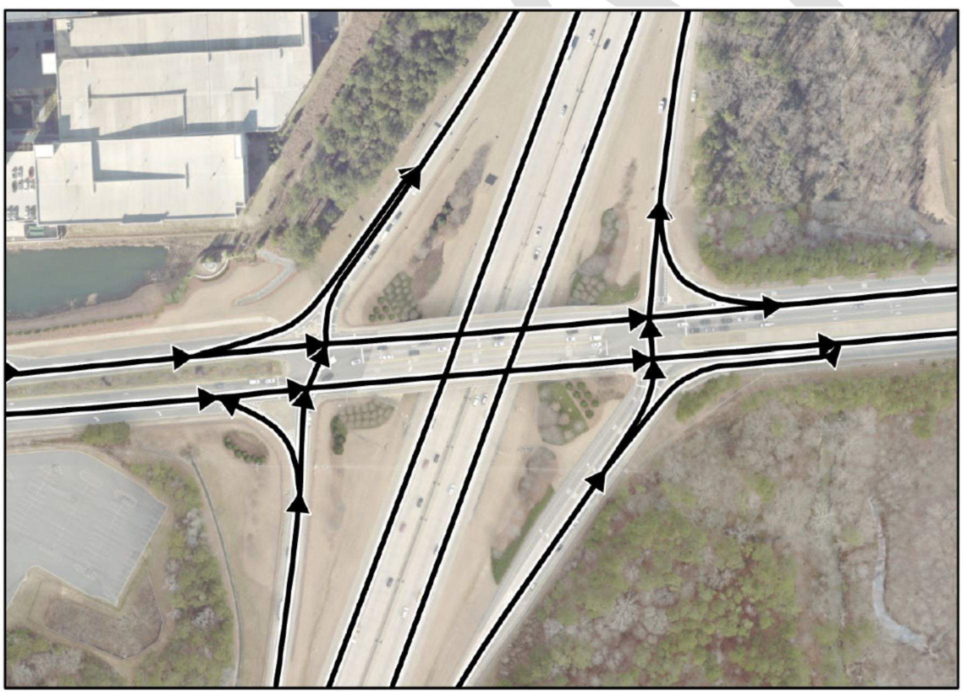

Figure 10-3 Turn lanes with channelization islands

10.2.2.3 Diverging Diamond Interchanges

A diverging diamond interchange is a complicated intersection that moves traffic to the opposite side of the road to facilitate left-hand turns onto highway ramps and improve traffic flow. Diverging diamond interchanges use traffic barriers between opposing traffic lanes for safety purposes. Attribute population of diverging diamond road centerlines is no different than any other road. The Right/Left attributes must reflect the values related to the addressed properties on their respective side of the road centerlines.

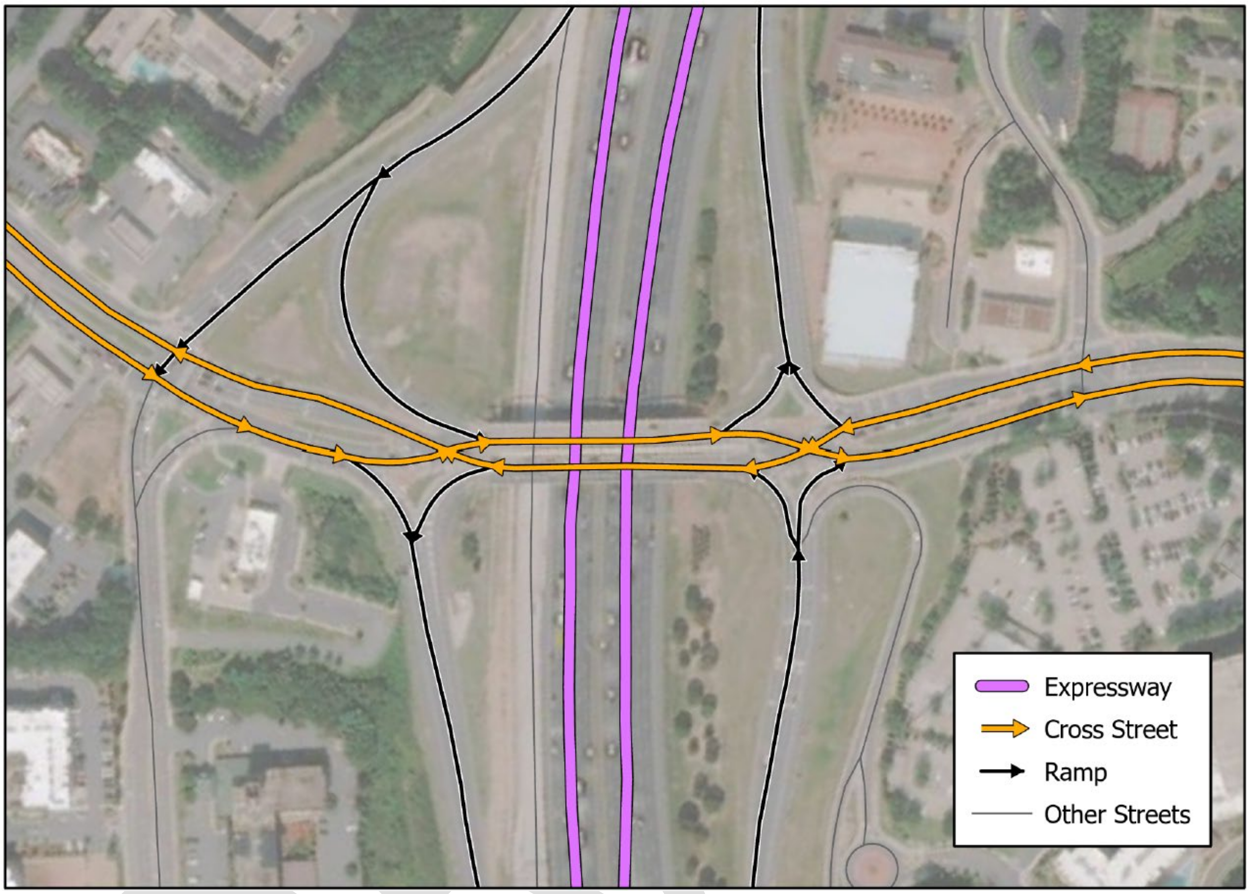

Figure 10-4 Diverging diamond interchange

10.2.2.4 Cul-de-sacs

It is recommended that cul-de-sacs be digitized with a single, straight line segment, even if a physical island exists in the cul-de-sac. The road centerline should extend straight through the cul-de-sac, ending on the pavement. This avoids double counting the mileage around the cul-de-sac if the Road Centerlines layer is used to count mileage for the GDOT highway inventory.

Figure 10-5 Cul-de-sac represented without a physical island

If representing a cul-de-sac with the physical island, there must be more than one segment representing the circle around the cul-de-sac, otherwise the state's validation tools will flag the single segment as an error. Usually, two or three segments are used to represent the cul-de-sac circle.

Figure 10-6 Cul-de-sac represented with a physical island

10.2.2.5 True Curves

True curves that are mathematically derived (i.e., not represented by a series of connected vertices) must not be used as they can cause issues with data transformation. Before submission to the Georgia GIO for aggregation into the statewide Road Centerlines layer, data containing true curves must be converted into segments with vertices. This can be done by using the Densify tool in ArcPro or ArcMap (see https://pro.arcgis.com/en/pro-app/latest/tool-reference/editing/densify.htm) or by exporting the layer to a shapefile.

Tech tip: Find true curves by using the *Non-Linear Segment* default check in the ArcMap data reviewer extension (see https://desktop.arcgis.com/en/arcmap/latest/extensions/data-reviewer/checks-in-data-reviewer.htm).

10.2.2.6 Road Centerline Digitizing Direction

Road centerlines should be digitized in the direction of increasing addressing, when possible, with the lower address numbers in the Right/Left FROM Address field and the higher address numbers in the Right/Left TO Address field. Highways and other unaddressed limited-access roads should be digitized in the direction of increasing mile marker numbering or the direction of travel. Whichever method is chosen, it is important to be consistent throughout the jurisdiction.

Addressed roads with parity issues and unaddressed local or private roads should be digitized in the same direction as other nearby road centerlines.

10.2.3 Road Centerline Segmentation

Segmentation of road centerline is very important when developing and maintaining the Road Centerlines layer. Unquestionably, road centerlines must be segmented wherever an attribute value changes. Road centerline segments must be snapped to their adjoining segments to avoid unintended geometry overlaps or spatial gaps between them.

Roads should always be segmented at:

- Road intersections
- Intersection with NG9-1-1 required boundary layers: PSAP, Police, Fire, EMS, Provisioning
- Changes in boundary attributes: State, County, Incorporated Municipality, ESN, MSAG Community
- Changes in other optional boundary attributes (but ONLY if these optional fields are populated in the Road Centerlines layer): Unincorporated Community, Neighborhood Community, Postal Community
- Changes in the Street Name or Alias Street Name

- Change in other optional attribute values (but ONLY if these optional fields are populated in the Road Centerlines layer): One-Way, Speed Limit, Road Class

Road intersections at overpasses and underpasses are only segmented if they carry elevation data that can be used to determine if the intersection is at-grade or is an overpass/underpass. Consultation with the Core Services Provider and understanding the requirements of the local CAD software is necessary to determine when an overpass/underpass intersection should be segmented.

Roads that intersect with the NG9-1-1 required boundary layers are segmented at the boundary and their address ranges adjusted so that an address geocoded to the road centerlines will fall into the correct PSAP, Police, Fire, and EMS polygons to ensure proper call routing for a civic location and location validation of a civic address.

In most cases, roads should not be segmented at driveways, unnamed roads, or parking lots. There are some situations where segmenting a road centerline at these intersections may be beneficial for routing first responders, particularly in rural areas where there are not many addressed properties or where an addressed structure may not be visible from the road or is located a long distance from the road. Segmenting a road centerline at these intersections allows the address ranges to be refined and provide more accurate geocoding results.

Road centerlines typically have many uses beyond call routing and location validation (e.g., CAD, transportation applications, etc.). These uses may have additional requirements for road segmentation and carrying additional attributes in the Road Centerlines layer to support these uses. Understanding the requirements of the local CAD software and these other uses is necessary to determine when additional segmentation may be needed.

10.2.3.1 Segmentation and Alignment at Boundaries

Road centerlines must be properly aligned at boundaries to provide accurate locations for the NG9-1-1 Location Validation Function, Emergency Call Routing Function, and other applications that rely upon geocoded locations derived from the road centerline address ranges. This is especially important when aggregating local data into the statewide Road Centerlines layer so that there are no unintentional spatial gaps or overlaps in the data.

Road Centerlines must be aligned and snapped to boundaries between different jurisdictions and emergency service providers so that geocoded locations fall within the correct jurisdiction, PSAP, Police, Fire, and EMS polygons. For example, a road centerline ending at a PSAP Boundary must snap to the exact same point on the PSAP Boundary as the endpoint of the adjoining road centerline in the adjacent PSAP.

If a Road Centerline is contiguous with a boundary (e.g., County Line Road), it must be aligned with the corresponding boundary, node for node. This is especially critical for

Emergency Call Routing where the slightest deviation may result in a geocoded location being placed into the wrong PSAP Boundary polygon and then the call being routed to the incorrect PSAP.

GIS Data Providers must agree on the location of the boundary nodes and the points where road centerlines are snapped to on the boundaries within the State of Georgia and between the neighboring states. These locations do not need to represent formal or legal boundaries, but instead, simply represent their agreed upon location for data maintenance purposes. Creation of a statewide Snap-to-Points data layer has been identified as an item requiring future development work as documented in **Section 12.2 Planned Georgia Geospatial Data Standards Development Related to NG9-1-1**.

10.2.3.2 Segmentation and Attribution Based on Jurisdiction of Addressed Properties

Road centerline attributes are populated based on the jurisdiction in which the addressed property is located, not where the roadbed is physically located. On occasion, jurisdictional boundaries may parallel and fall along one side of a road centerline rather than being coincident with the road centerline. The State, County, Incorporated Municipality, ESN, MSAG Community, Postal Community, and other place name fields must reflect the addressed properties on their respective side of the road centerline, and not that of the roadbed. If addressed properties on one side of a road segment are in different jurisdictions within the same block, then the road centerline must be segmented between the addresses properties that are in different jurisdictions.

For example, in Figure 10-7 below, the properties addressed from 1121 to 1185 that are on the north and west side of Conway Road are within the city of Decatur while Conway Road and the addressed properties on the rest of Conway Road are located in the unincorporated community of Belvedere Park in DeKalb County. Even though Conway Road is entirely located within Belvedere Park, Conway Road must be segmented between addresses 1185 and 1191. The Incorporated Municipality field is populated with "Decatur" for addresses 1121-1185 and "Unincorporated" for the rest of Conway Road.

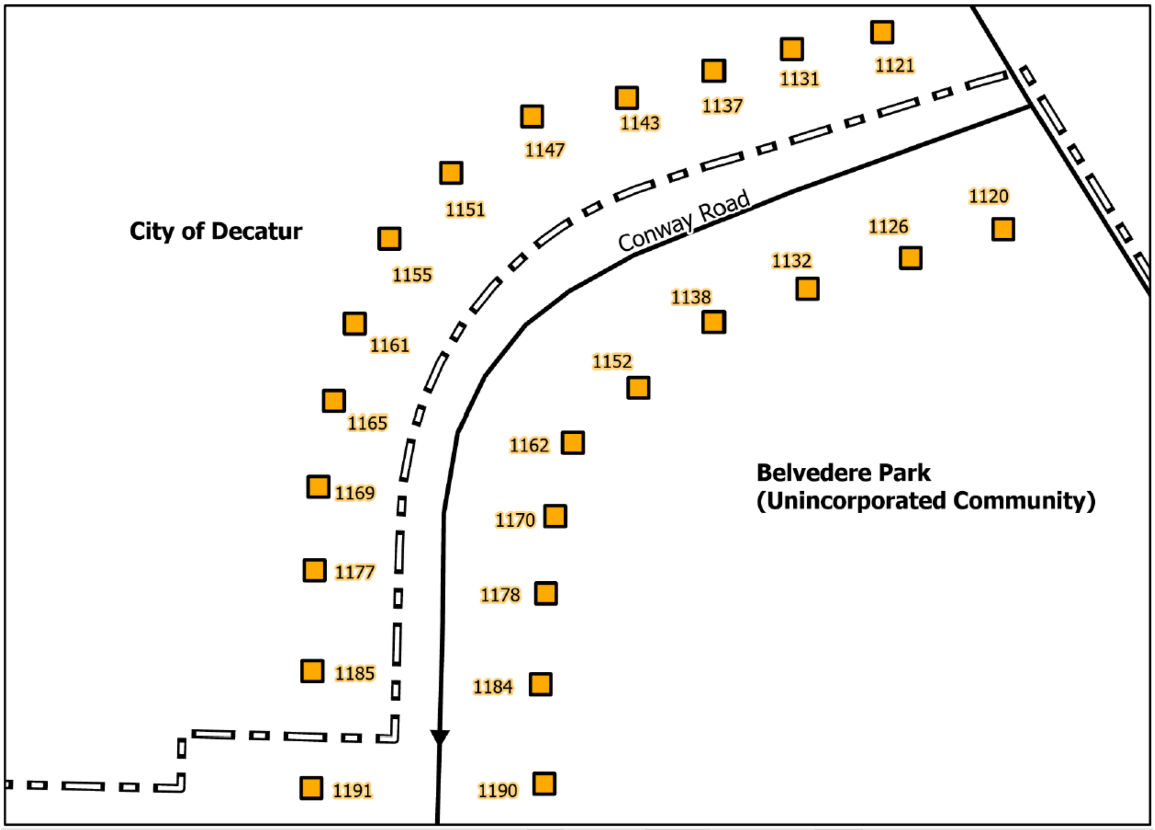

Figure 10-7 Segmentation based on jurisdiction of addressed properties

Segmentation of some road centerlines may be greatly impacted by the annexation of non-contiguous addressed properties. Each time the jurisdiction of an addressed property changes, the road centerline would need to be segmented, creating numerous short segments on the same block. Such an example is show in Figure 10-8 below, where McKinnon Drive is segmented at each jurisdictional change, creating 8 segments on the same block. Segmentation to this degree usually is not necessary if address points exist for all addressed properties on the road and a composite locator is used for geocoding. Composite locators use multiple locators and can be set up to geocode first against the Site Structure Address Points layer and then geocode against the address ranges in the Road Centerlines layer. Understanding which layers the geocoding locators use for address matching in the ECRF, LVF, CAD, and other applications that use the Road Centerlines will determine to what degree a road centerline with addressed properties in different jurisdictions should be segmented.

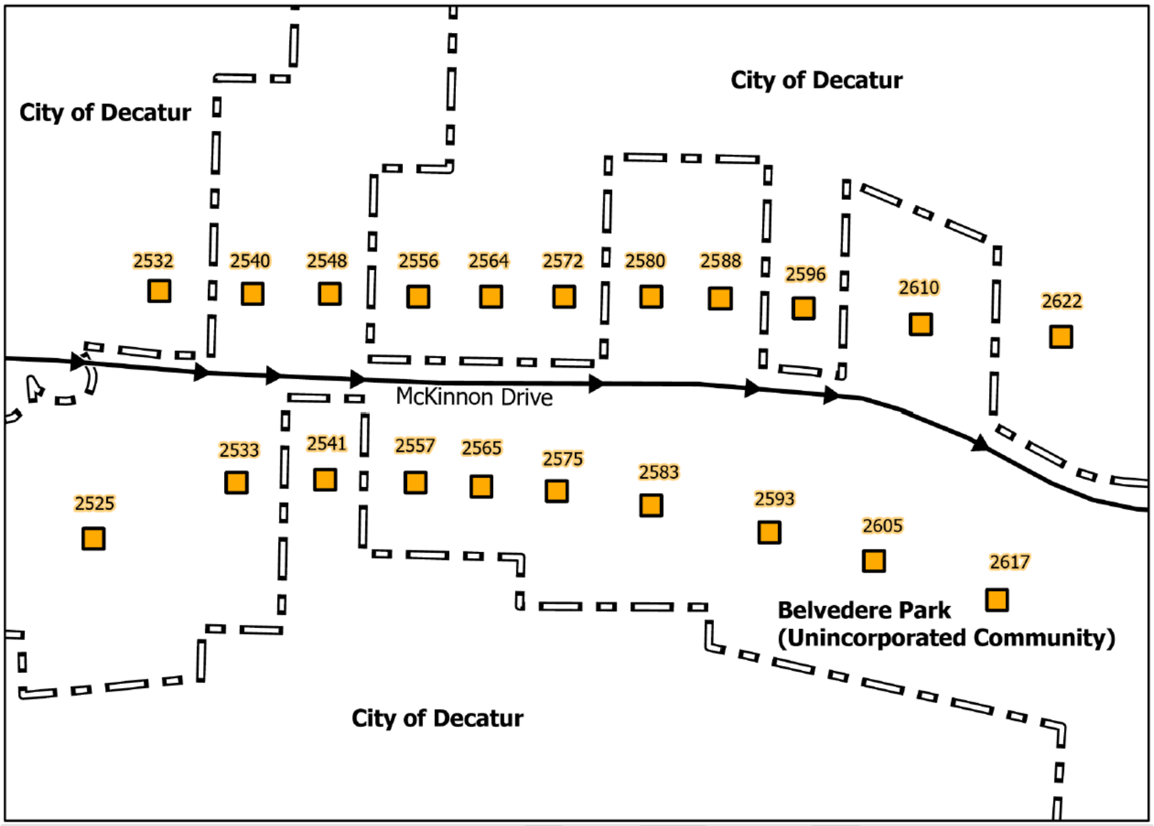

Figure 10-8 Segmentation based on numerous jurisdiction changes on the same block

10.2.4 Address Ranges

Address ranges on adjacent road centerlines that have the same street name and are within the same jurisdiction must not have unintentional gaps and overlaps. An intentional gap in an address range might exist at a jurisdictional boundary, where the street name continues across the boundary but the address numbers were purposely increased by a thousand numbers or more when crossing the boundary, so it was clear which jurisdiction an addressed property was located in. All unintentional address range gaps and overlaps must be resolved by the GIS Data Provider. This is especially critical at PSAP boundaries where gaps and overlaps must be jointly resolved by the GIS Data Providers so that the address ranges on the road centerlines within their PSAP polygons properly reflect the addresses each PSAP is responsible for.

There is no NENA requirement for address ranges to be populated as actual address ranges or as potential address ranges. There are pros and cons with each method, but for the reasons described below, potential address ranges are recommended. Understanding the requirements of local CAD software and other local GIS data needs may impact which address range type to use. In some cases, carrying both address range types on the Road Centerlines layer may be necessary to meet local needs.

10.2.4.1 Potential (Theoretical) Address Ranges

Potential address ranges (also known as theoretical ranges) are based on addresses being assigned a standardized measured distance (e.g., every 52.8 feet, 5.28 feet, 50 feet) from the starting point of a road, and incrementally increasing the address number by 1 on each side of the road.

Typically, there are no address range gaps at intersections. This makes it less labor intensive to maintain the address ranges, particularly in rapidly developing areas where new address numbers are constantly being assigned. If a Site Structure Address Points layer exists, having potential address ranges allows a composite locator to first search for a civic address in the Site Structure Address Points layer and if it is not found there, to search the Road Centerlines layer and interpolate the location from the address ranges.

However, potential address range values can sometimes cause inaccurate geocoding results, particularly in cities with hundred-block addressing or on dead end roads. In these cases, actual address ranges may provide more accurate geocoded locations.

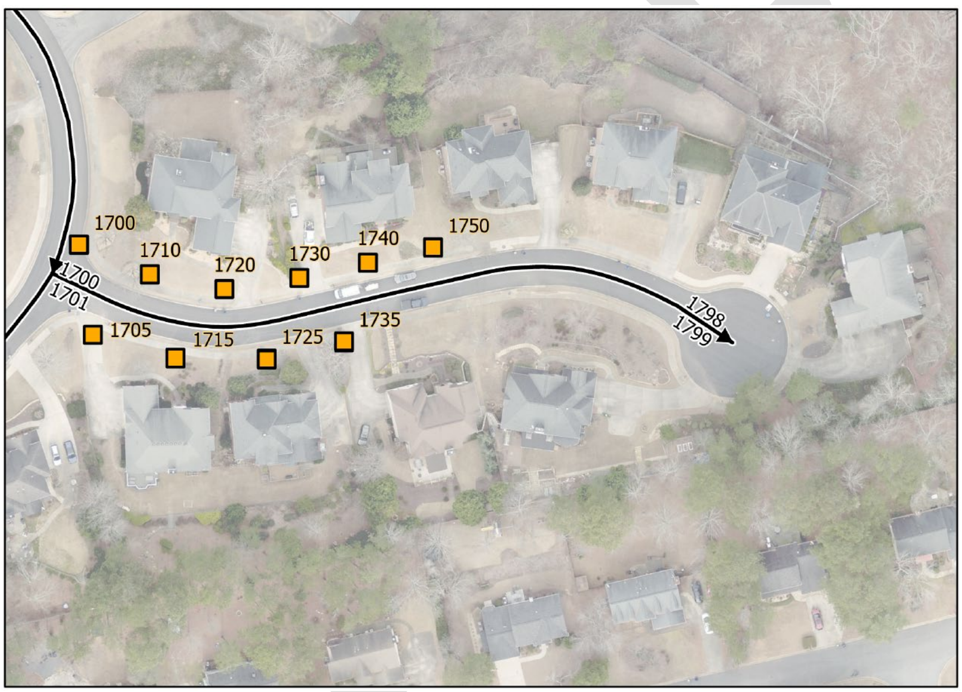

Figure 10-9 Geocoding impacts using potential address ranges or hundred-block ranges

10.2.4.2 Actual Address Ranges

Actual address ranges are similar to MSAG ranges in that the address ranges are based on the highest and lowest assigned address on the road centerline segment. This can result in geocoded locations occurring closer to their actual location, unless the first and last assigned addresses are for structures that are physically located far from the endpoints, particularly in rural areas.

Gaps in the address ranges usually exist at intersections. Actual address ranges are more labor intensive to maintain as every new address assigned in a gap area requires modification of the address range. Strong and well documented editing routines are required.

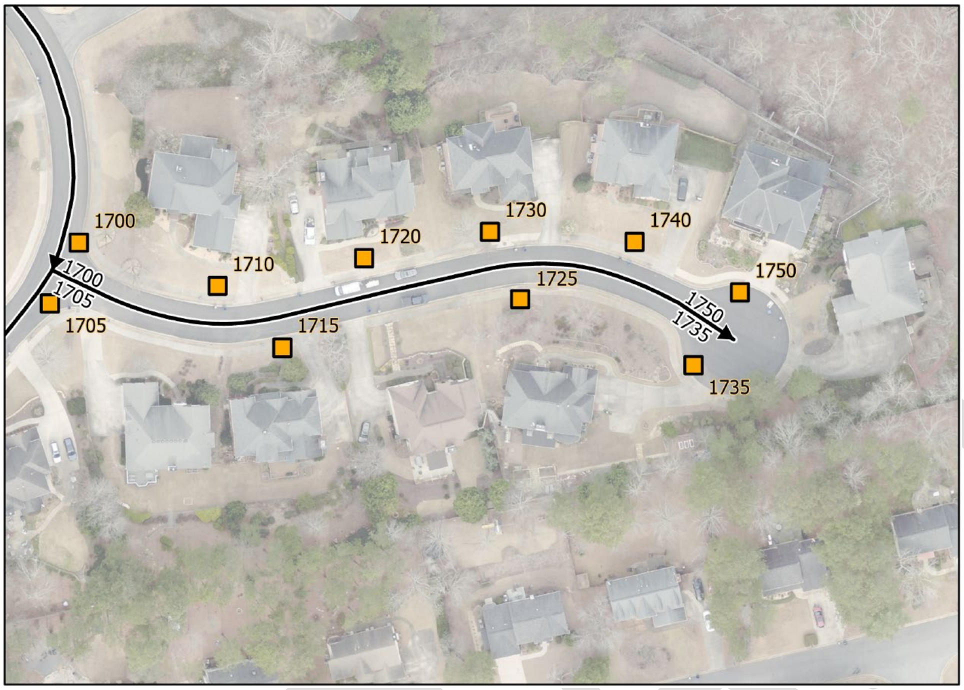

Figure 10-10 Geocoding impacts using actual address ranges

10.2.4.3 0 – 0 Address Ranges

Some jurisdictions utilize 0–0 address ranges to accommodate local CAD software requirements such as the non-addressed side of a median for limited-access roads or within a large intersection of a divided road where there is no gap in the assigned addresses on each side of the intersection. Using 0–0 address ranges may conflict with some quality control processes (e.g., duplicate 0–0 address ranges with the same Street Name) but should not impact the functionality of the ECRF or LVF.

On rare occasion, an address range may need to start with 0 if the first assigned address has a value less than one (e.g., ½, ⅓).

10.2.5 Street Names

Street names are populated with the 9-1-1 street name that was assigned by the local Addressing Authority.

10.2.5.1 Different Street Name on Each Side of a Road Centerline

While uncommon, some roads that follow jurisdictional boundaries have been assigned a different street name on each side of the road. Not only can this be confusing to responders, it requires the GIS data to be falsely portrayed in order to include both street names for proper ECRF and LVF functionality. Rather than trying to make the GIS data fit the situation, the Street Naming Authorities should work together to come to agreement on a single street name that can be used for both sides of the road. If a common resolution is unable to be obtained, then it is recommended that two road centerlines be created and placed slightly offset (parallel) to each other, representing their direction of travel, and be brought back together at a single point at intersections. Each road centerline should be populated with the Street Name as assigned by its local Street Naming Authority and addressed only on the side of the road with that Street Name. Stacked road centerlines are not recommended as they may cause issues with topology checks and local CAD systems.

Figure 10-11 Different street name assigned on each side of the road

10.2.5.2 Interstates and Limited-Access Highways

Interstates and other limited-access highways are often named with their jurisdiction and route number (e.g., Interstate 75, State Route 400). The travel direction (e.g., northbound, southbound, eastbound, westbound) on a limited access highway is often not part of the official street name but it is very important for responders and other service providers who need to know which side of the highway a location is associated with, particularly if they need to enter the highway using an entrance ramp. For interstates and other limited-access highways, it is recommended that the travel direction be included in the Street Name Post Modifier field in lowercase as “northbound”, “southbound”, “eastbound”, or “westbound”.

Example: Interstate 75 NB

Street Name Pre Type:	Interstate
Street Name:	75
Street Name Post Modifier:	northbound

Example: State Route 400 SB

Street Name Pre Type:	State Route
Street Name:	400
Street Name Post Modifier:	southbound

10.2.5.3 Interstate and Limited-Access Highway Crossover Roads

Interstates and limited-access highways frequently include connector roads intended for use by emergency vehicles and maintenance vehicles to quickly get to the other side of the road without having to drive to the next exit or interchange. For the purposes of consistency across Georgia, these connector roads should be named "Emergency Services Only Crossover".

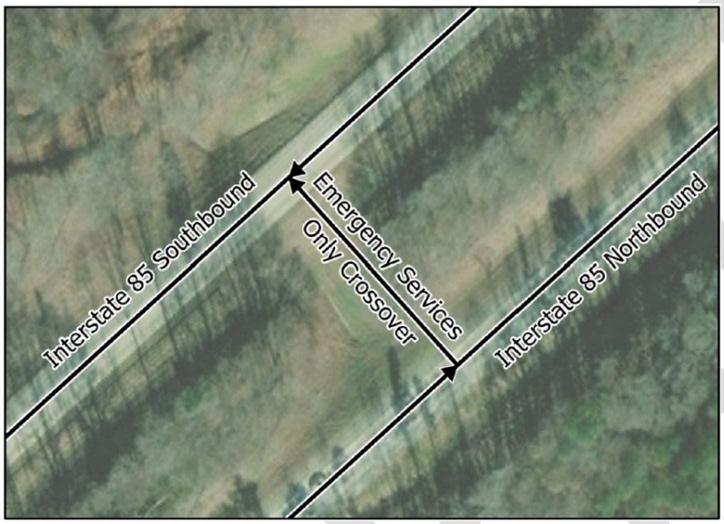

Figure 10-12 Emergency Services Only Crossover

Some connector roads are intended for public use as a legal U-turn. For the purposes of consistency, these connector roads should be named "Public Crossover".

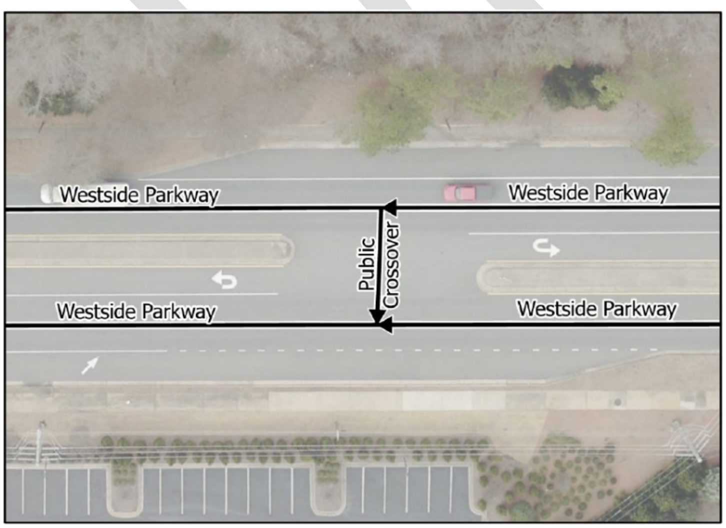

Figure 10-13 Public Crossover

10.2.5.4 Ramps and Interchanges

Naming ramps at interchanges is inconsistently done across the State of Georgia . It is strongly recommended that as much information as possible be put into the Street Name field for ramps, including the FROM road, TO road, travel direction, and exit number, as appropriate. Ramps should be single segments unless a physical barrier exists that splits the ramp for separate travel directions.

The following ramp naming convention is recommended, with everything placed in the Street Name field:

<Exit #> <FROM Street> <travel direction> to <TO Street> <travel direction>

Where:

Exit #:	"Exit <#>"
FROM Street:	Route/Street Name that the ramp is exiting from
TO Street:	Route/Street Name that the ramp is going to
travel direction:	NB, SB, EB, WB

Due to the current 60 character field width limitation of the Street Name field, some abbreviations are necessary for the ramp names. For consistency, abbreviations are allowed ONLY for the travel direction (i.e., NB, SB, EB, WB) and the road jurisdiction for numbered routes in a ramp name. Everything else must be fully spelled out. The allowable abbreviations for the road jurisdiction in a ramp name are:

I – Interstate
US – United States Highway, United States Route
GA – Georgia State Route, Georgia Highway, State Route, State Highway
CO – County Highway, County Route, County Road

Example ramp names using the recommended ramp naming convention:

- **Street Name:** Exit 259A I75 NB to I285 EB
- **Street Name:** Exit 154 I20 EB to US278
- **Street Name:** GA10 EB to East Ponce De Leon Avenue
- **Street Name:** Pleasant Hill Road SB to Ronald Reagan Parkway EB

10.2.6 Overlapping Routes and Multiple Street Names

Street names are critical to NG9-1-1 call routing. Of concern is that a road can be known by several different street names. Local jurisdictions may assign a local street name for a road, while the Georgia DOT may assign a state route number to that same road. To further complicate matters, the road may also carry a US route number, a second state route number, a county road number, and/or a memorial or honorarium name for that same road.

While these multiple street names are all important, the official 9-1-1 name assigned by the local Street Naming Authority is the street name that must be populated in the Road Centerlines layer for NG9-1-1 LVF and ECRF purposes. A future version of this Georgia Geospatial Data Standards and Best Practices for Next Generation 9-1-1 document is expected to contain an Alias Street Name Table. The table will be a related table that will allow an unlimited number of alias street names to be cross-referenced to individual segments in the Road Centerlines layer. The Alias Street Name Table will parse the alias street names into the same street name fields as used in the Road Centerlines layer. In the interim, an optional Alias Street Name field is included in the Road Centerlines layer. Guidelines on populating this field when there are multiple alias street names for the same road are provided below in **Section 10.2.6.1 Street Naming Hierarchy**.

Entities with local CAD systems that can currently use related tables should consider developing an Alias Street Name Table now in a format that can be used by their CAD system, if time and resources permit. Note that more advanced CAD systems may allow alias street names to be parsed into the street name fields while others may initially only be able to handle a simple concatenated full street name. Any work done now would be an important first step for development of the future Alias Street Name Table.

10.2.6.1 Street Naming Hierarchy

As required for NG9-1-1 and as previously stated, the official 9-1-1 street name assigned by the local Street Naming Authority is the street name that must be populated in the Road Centerlines layer. All other names are considered alias street names. Since an Alias Street Name Table does not currently exist and there is only one optional Alias Street Name field, guidelines are provided on which street name to populate in the Alias Street Name field when there are multiple street names for the same road.

Where a street name and numbered route overlaps, it is usually clear which is the official 9-1-1 street name to populate in Road Centerlines layer. However, when there are multiple overlapping street names and numbered routes or where the overlapping street names occur in a small, limited area (e.g., traffic circles, roundabouts, exit ramps that lead to multiple roads), determining which official 9-1-1 street name to populate in the Road Centerlines layer may not be straightforward. For these situations, use this hierarchy (based on jurisdiction) for populating the street name fields in the Road Centerlines layer:

- Interstate Name (highest priority)
- Interstate Business Route name
- US Route name
- US Business, Alternate, or Truck Route name
- State Highway name
- State Business, Alternate, or Truck Route name
- County Route Name
- Other local or memorial street name (lowest priority)

Using this hierarchy, the official 9-1-1 street name is placed into the street name fields and the highest jurisdiction route name is placed into the Alias Street Name field. For example, US Route 23 and State Route 42 both overlap Macon Street in the City of McDonough. Macon Street is placed into the street name fields and United States Route 23 is placed into the Alias Street Name field since the US Route is a higher jurisdiction than the State Route.

When multiple routes with the same jurisdiction overlap and neither are the official 9-1-1 street name, the lowest route number is placed into the Alias Street Name field. For example, State Route 9 and State Route 120 both overlap a section of South Main Street in the City of Alpharetta. South Main Street is placed into the street name fields and State Route 9 is placed into the Alias Street Name field since 9 is lower than 120.

10.2.7 Roundabouts and Traffic Circles

Naming of roundabouts and traffic circles can be challenging, particularly when routes overlap the official 9-1-1 street name or when street names end or change at the circle. The concepts discussed above in **Section 10.2.6.1 Street Naming Hierarchy** can be applied to roundabouts and traffic circles as described in the following sections.

10.2.7.1 Two local roads that only have a local street name intersect at a roundabout or traffic circle

Populate the street name fields with the official 9-1-1 street name on those segments in the circle that one would traverse to continue through to the opposite side of the circle. If a segment in the circle is traversed by two intersecting roads that only have a local street name, populate the street name fields with the name of the road that typically has a higher traffic flow. The other overlapping street name is placed in the Alias Street Name field.

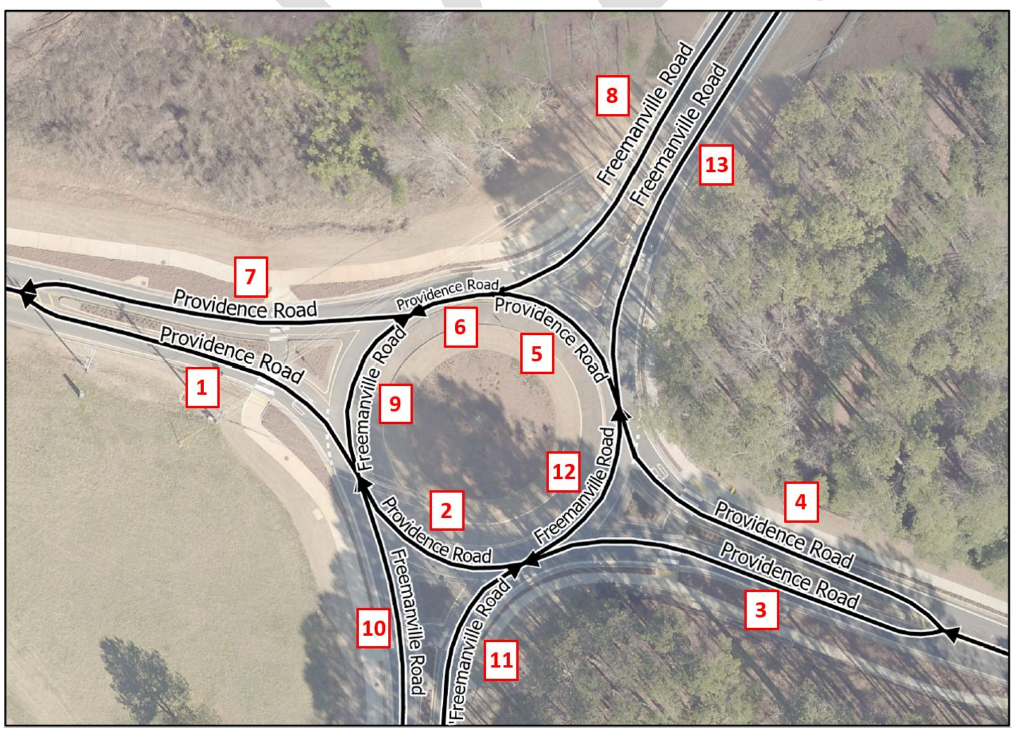

Figure 10-14 Roundabout with two intersecting local roads that only have a local street name

For example, in Figure 10-14, Providence Road runs east-west through the roundabout circle on segments 2, 5, and 6 and Freemanville Road runs north-south through the roundabout circle on segments 6, 9 and 12. Both are the official 9-1-1 name as assigned by the local Street Naming Authority and both are local roads at the same hierarchy. Since Providence Road has a higher traffic flow than Freemanville Road, the street name fields for segment 6 in the circle is populated with Providence Road and the Alias Street Name field is populated with Freemanville Road. Table 10-1 below provides the recommended population of the street name fields and the Alias Street Name field for all segments in Figure 10-14.

Segment #	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier	Alias Street Name
1					Providence	Road			
2					Providence	Road			
3					Providence	Road			
4					Providence	Road			
5					Providence	Road			
6					Providence	Road			Freemanville Road
7					Providence	Road			
8					Freemanville	Road			
9					Freemanville	Road			
10					Freemanville	Road			
11					Freemanville	Road			
12					Freemanville	Road			
13					Freemanville	Road			

Table 10-1 Population of Street Names in Figure 10-14

10.2.7.2 Street name ends at a roundabout or traffic circle

Populate the street name fields with the official 9-1-1 street name of the through road that continues through the circle on those segments in the circle that one would traverse to get to the opposite side of the circle. For routing purposes to move from the ending road to the through road, continue the ending street name into the circle, populating the street name fields with the ending street name on those segments in the circle that one would traverse to get to the through road on the opposite side of the circle and placing the street name of the through road into the Alias Street Name field.

For routing purposes to move from the through road to the ending road, populate the street name fields with the street name of the through road on those segments in the circle one would traverse to get from the through road to the ending road.

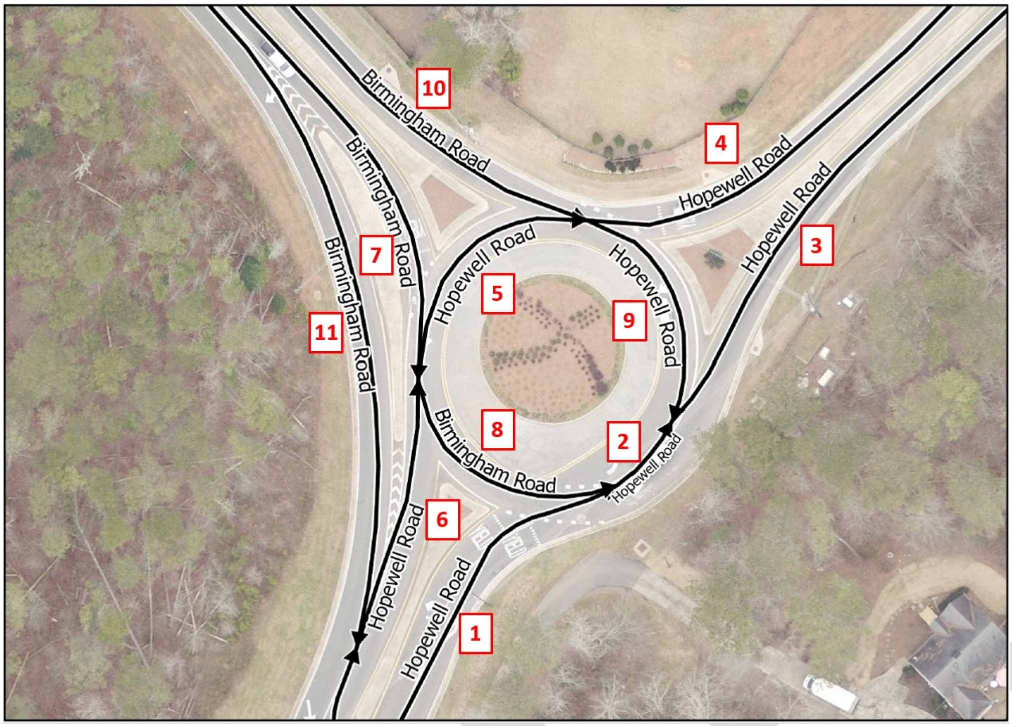

Figure 10-15 Roundabout with a road ending at the roundabout

For example, in Figure 10-15, Birmingham Road ends at the roundabout where it intersects Hopewell Road. The street name fields for segments 2 and 5 in the circle are populated with Hopewell Road since it runs through the circle and these are the primary segments one would traverse through the circle. The street name fields for segment 8 in the circle are populated with Birmingham Road in order to travel from Birmingham Road to northbound Hopewell Road, and since the entire roundabout is part of Hopewell Road, the Alias Street Name field is populated with Hopewell Road. The street name fields for segment 9 in the circle are populated with Hopewell Road in order to travel from northbound Hopewell Road to Birmingham Road. Table 10-2 below provides the recommended population of the street name fields and the Alias Street Name field for all segments in Figure 10-15.

Segment #	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier	Alias Street Name
1					Hopewell	Road			
2					Hopewell	Road			
3					Hopewell	Road			
4					Hopewell	Road			
5					Hopewell	Road			
6					Hopewell	Road			
7					Birmingham	Road			
8					Birmingham	Road			Hopewell Road
9					Hopewell	Road			
10					Birmingham	Road			
11					Birmingham	Road			

Table 10-2 Population of Street Names in Figure 10-15

10.2.7.3 Multiple street names ending at a roundabout or traffic circle

Populate the street name fields with the official 9-1-1 street name of the through road that continues through the circle on those segments in the circle that one would traverse to get to the opposite side of the circle. For routing purposes to move from an ending road to the through road and the other ending road on the opposite side of the circle, continue the ending street name into the circle, populating the street name fields with the ending street name on those segments in the circle that one would traverse to get to the through road and the other ending road on the opposite side of the circle and placing the street name of the through road into the Alias Street Name field.

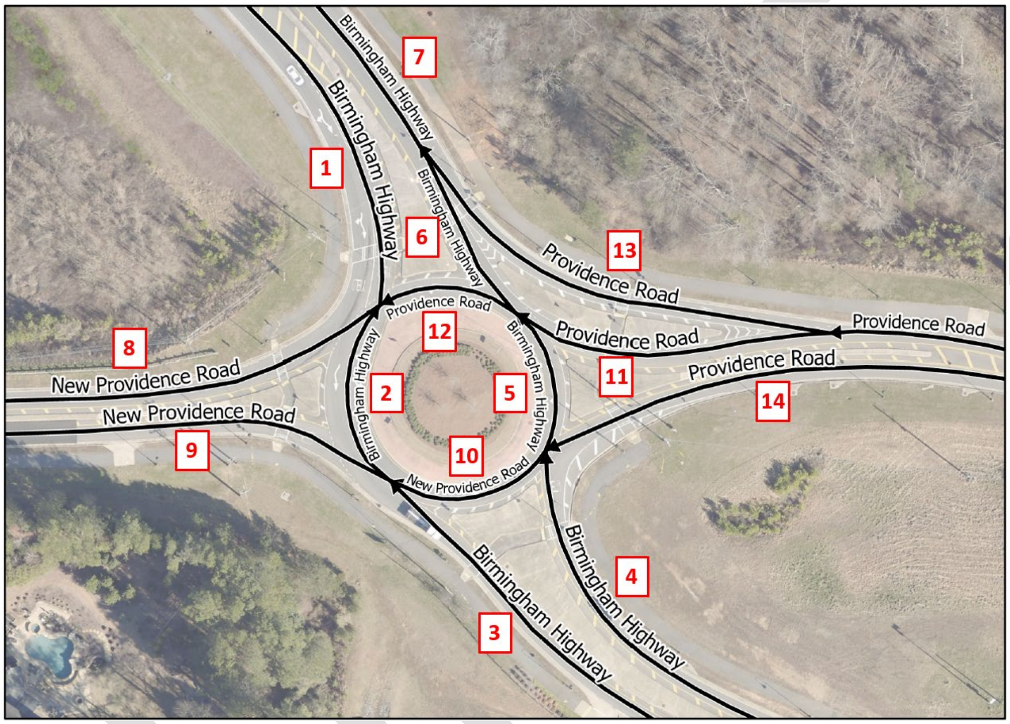

Figure 10-16 Roundabout with multiple roads ending at the roundabout

For example, in Figure 10-16, Birmingham Highway runs north-south through the roundabout circle on segments 2 and 5. Birmingham Highway is also known as State Route 372. New Providence Road ends at the west side of the roundabout circle and Providence Road ends at the east side of the roundabout circle. The street name fields for segment 10 in the circle are populated with New Providence Road in order to travel from eastbound New Providence Road to eastbound Providence Road and northbound Birmingham Highway. For routing purposes, to move from southbound Birmingham Highway to eastbound Providence Road, the Alias Street Name field for segment 10 is populated with Birmingham Highway.

The street name fields for segment 12 in the circle are populated with Providence Road in order to travel from westbound Providence Road to westbound New Providence Road and southbound Birmingham Highway. For routing purposes, to move from northbound

Birmingham Highway to westbound New Providence Road, the Alias Street Name field for segment 12 is populated with Birmingham Highway.

Table 10-3 below provides the recommended population of the street name fields and the Alias Street Name field for all segments in Figure 10-16.

Segment #	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier	Alias Street Name
1					Birmingham	Highway			State Route 372
2					Birmingham	Highway			State Route 372
3					Birmingham	Highway			State Route 372
4					Birmingham	Highway			State Route 372
5					Birmingham	Highway			State Route 372
6					Birmingham	Highway			State Route 372
7					Birmingham	Highway			State Route 372
8					New Providence	Road			
9					New Providence	Road			
10					New Providence	Road			Birmingham Highway
11					Providence	Road			
12					Providence	Road			Birmingham Highway
13					Providence	Road			
14					Providence	Road			

Table 10-3 Population of Street Names in Figure 10-16

10.2.8 Trails

Many communities in Georgia have built extensive pedestrian and bike trail systems. Including information about these trails in the Road Centerlines layer can provide valuable information for locating a caller that may dial 9-1-1 from a pedestrian or bike path trail.

Named trails with numbered markers can be represented in the Road Centerlines just as if they are a named road. If the reference system is based on US National Grid coordinates, the marker should instead be represented with Site Structure Address Points as described in **Section 10.3.5 Mileposts and Location Markers**.

It is strongly recommended that the optional Road Class field be populated with the appropriate value for all trails and bike paths represented in the Road Centerlines layer.

10.3 Site Structure Address Point Recommendations and Best Practices

10.3.1 General Best Practices

The validation checks described in **Section 14.4 Appendix D: Quality Control NG9-1-1 Validations**, identify the essential geometry, attribute, and cross-feature quality control checks that the state's validation tools perform in their inspection of the Site Structure Address Points layer for nonconformance. These checks are used to identify data integrity issues and ensure consistent, valid data throughout the dataset. Ensuring that the data meets the requirements of the Site Structure Address Points validation checks will avoid unnecessary rework and ensure that the data meets the required specifications for the NG9-1-1 Location Validation Function and Emergency Call Routing Function.

Quality control is a continuous process. Each time data is submitted to the Georgia GIO for aggregation into the state's Site Structure Address Points layer, the validation checks will be run. Results will be returned to the GIS Data Provider for resolution of errors flagged as non-conforming. Initially, all local data will be aggregated into the statewide dataset, however, at some point in the future, mandatory features that are non-conforming will not be incorporated into the statewide dataset.

Although creating a library of address assignment best practices has been identified as an item requiring future development work in **Section 12.2 Planned Georgia Geospatial Data Standards Development Related to NG9-1-1**, one best practice Addressing Authorities in Georgia are strongly recommended to adopt is to assign an address based on the named road used to access the structure. Given today's use of navigation technologies by emergency responders, delivery service providers, and numerous government and commercial routing applications, this is especially important when there is no direct access from the road that the front entrance to the addressed structure faces. In particular, emergency responders may waste valuable time backtracking to an address if the assigned address does not provide the most direct route to the structure.

10.3.2 Address Point Placement

The NENA Information Document for Development of Site/Structure Address Point Data for 9-1-1, NENA-INF-014 [10] provides detailed guidelines on address point placement and subaddress data development. Review of the document is strongly recommended as it provides an in-depth discussion of five address point placement methodologies that meet NG9-1-1 Location Validation and Emergency Call Routing requirements. These include:

- **Geocoding:** Placement of an Address Point based on geocoding to Road Centerlines
- **Parcel:** Placement of an Address Point based on a parcel
- **Site:** Placement of an Address Point based on a site
- **Structure:** Placement of an Address Point based on a structure(s)
- **PropertyAccess:** Placement of an Address Point based on property access

In addition, the document includes a section on address point placement for subaddresses (i.e., specific locations within structures, sites, or within a group of structures and/or sites). With the volume of information and numerous graphics provided in the NENA Information Document for Development of Site/Structure Address Point Data for 9-1-1 [10], it should be consulted when more detailed information on address point placement is desired and be considered a companion document to this Georgia Geospatial Data Standards and Best Practices for Next Generation 9-1-1 document.

Address point placement is especially critical for NG9-1-1 Emergency Call Routing and dispatching responders. During NG9-1-1 Emergency Call Routing, a civic location is geocoded first to the Site Structure Address Points layer. The location of an identified address point is then spatially compared to the PSAP Boundary layer to determine which PSAP to send the call. The location of that same identified address point is also spatially compared to the Emergency Services Boundaries to provide the telecommunicator with the recommended Police, Fire and EMS providers that should respond to the call. The address point must fall within the correct PSAP Boundary or valuable time will be lost during call transfer to the correct PSAP.

10.3.2.1 Address Point versus Access Point

Address points are typically placed on the addressed feature (e.g., a structure or a site). However, there are some situations where an access point may be preferred or can prove useful as supplemental information for vehicle routing purposes. An access point is the point of access to the addressed feature and may represent a driveway, gate, an entrance to a building containing multiple addresses, or other building entrance.

An access point can be useful for directing emergency responders to a structure that may be located far from the road it is addressed off of or may share a long driveway with other addressed structures as shown below in Figure 10-17. In these situations, it may be useful to include both an address point on the structure and an access point at the end of the driveway near the road centerline. The address points on the structures should have Placement Method populated as "Structure." Access points should be placed offset from the road centerline and in alignment with the direction of the increasing address ranges. Attributes on the access point should be populated with the same values as on the Structure address point it represents, with only the Placement Method attribute being populated differently, as "PropertyAccess." This same population of fields is regardless to whether the access point is physically located in a different jurisdiction or responder area since its location only represents from where off of a named road one would turn to access the addressed structure.

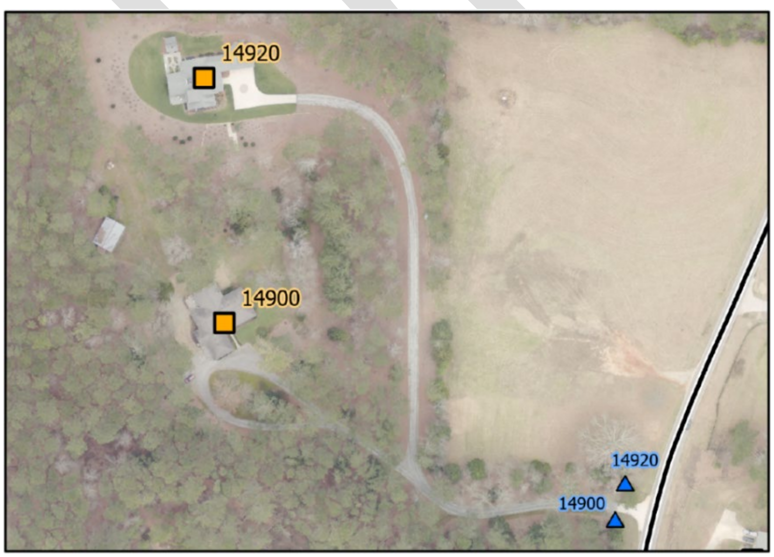

Figure 10-17 Address points on structures with access points at the shared driveway

An access point can also be useful for directing emergency responders to the correct structure in a more expeditious manner when an addressed location has multiple entrances into the property as shown below in Figure 10-18.

Figure 10-18 Access point indicating the entrance to use for the addressed structure

In this example, the entire property has one address: 2200 Encore Parkway. There is one addressed structure and several parking lots that can be represented as subaddresses. An address point has been placed on the structure. The main entrance that leads to the addressed structure has an access point populated with the main address and the Placement Method attribute is populated as “PropertyAccess.” The other entrances into the property also have access points populated with the main address but the Unit field includes the lot or gate designation to differentiate them from the main address. Rather than placing the address points in the middle of the parking lots, they have been placed at the access to the parking lots to quickly direct responders to their location.

Commercial and government buildings often have different entrances for freight service and other delivery trucks. In these situations, it may be helpful to include access points to direct delivery service providers to the freight entrance, particularly if there are several possible entrances. For example, in Figure 10-19 below, address points are placed at the primary structure entrance and subaddress points are placed at the loading dock. An access point associated with each address is placed at the appropriate entrance to the property. This can be helpful information to responders that may need to respond to an accident on the loading dock, directing them to the correct entrance and then to the correct building, which may not have its address posted at the rear of the building.

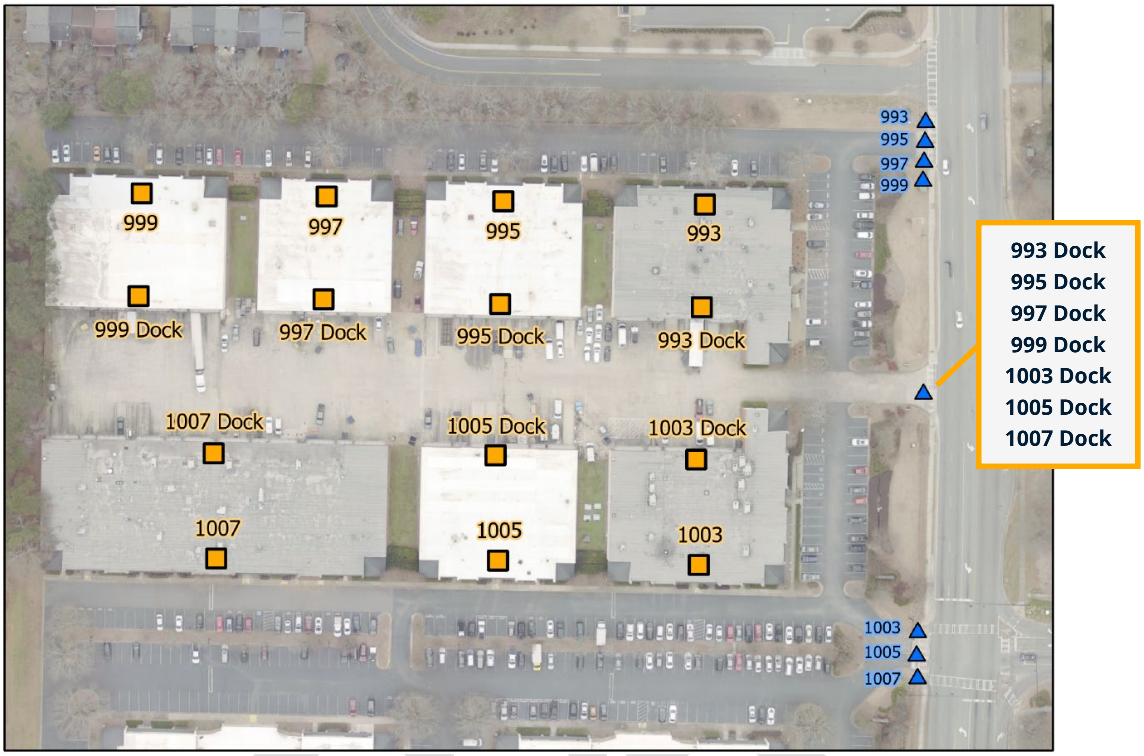

Figure 10-19 Access points indicating different entrances to the addressed structures versus the loading docks

Another point of confusion where access points can prove to be useful is when a structure is accessed from a totally different named road than the road from which it is addressed. An example of this is shown below in Figure 10-20, where the only way to get to 5850 Windward Parkway is to drive onto Edison Drive. If a property is unable to be readdressed to its access road (which is strongly recommended), then including both an address point on the structure and an access point at the intersection of the road that the structure is addressed off of and the access road, may benefit emergency responders by directing them to the location where to turn off of the main road to reach the structure.

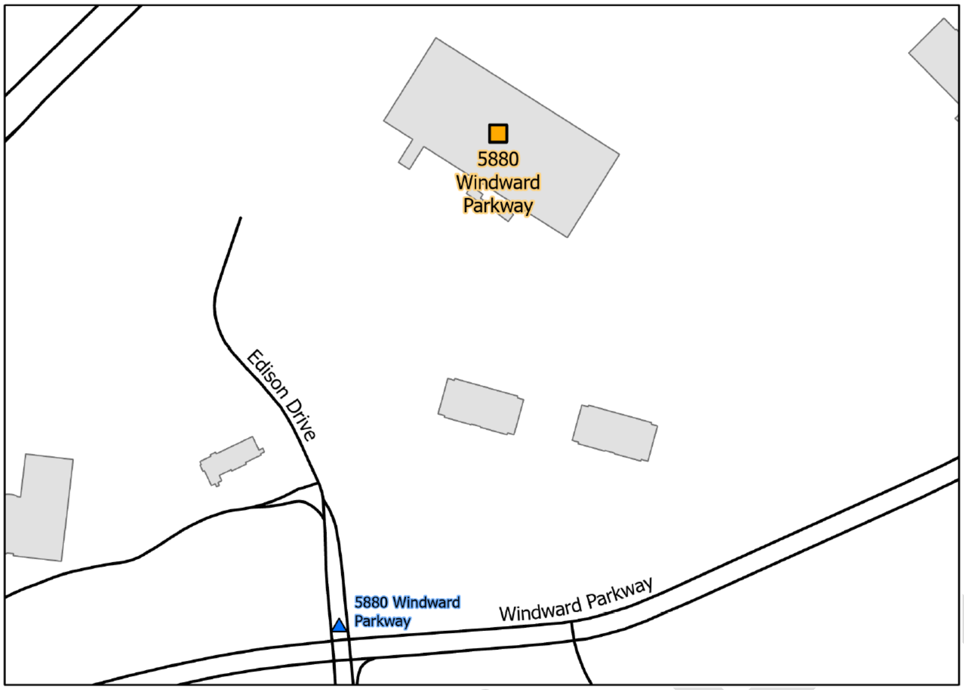

Figure 10-20 Access point indicating the entrance to use for the addressed structure

If both an access point and address point are shown, population of the Placement Method attribute is strongly recommended to clearly differentiate the two points. It also provides a means to easily remove one or the other if a 9-1-1 or other application is unable to differentiate between them. Currently, the NENA Standard for NG9-1-1 GIS Data Model [1] only defines one Placement Method, "PropertyAccess", that specifically represents an access point "based on the location of the primary access to a given property". See NENA Information Document for Development of Site/Structure Address Point Data for 9-1-1 [10], Section 3.4.5, Placement of an Address Point Based on Property Access, for more information.

10.3.3 Address Point Placement for Special Cases

In most cases, address point placement is straightforward with points placed on the center of a structure or site. Large structures or sites, particularly those with multiple entry points, may benefit by having the address point placed at the primary entrance to the structure or site. However, there are some situations that may require a little more research or even field visits to determine the correct address point placement location.

10.3.3.1 Multiple Addresses or Units within a Single Structure

Shopping centers, commercial buildings, condominiums, and duplexes contain multiple businesses or residences that are located within the same structure. In some cases, the individual units have been addressed with their own individual address number but in many situations, they share the same address number and are only differentiated by subaddress information (e.g., apartment, unit, suite, etc.). In both situations, address point placement is usually based on whether the units share an entrance to the building or have their own separate entrance.

Generally, address points should be placed at or near each addressed unit's building entrance, positioned just within the building footprint and near the building base. This will keep the address points very close to their true location, even if future imagery shifts slightly, and will help avoid the urge to move the address points each time new imagery is acquired. This point placement method is shown in Figure 10-21 below, where each unit in a shopping center has its own separate entrance.

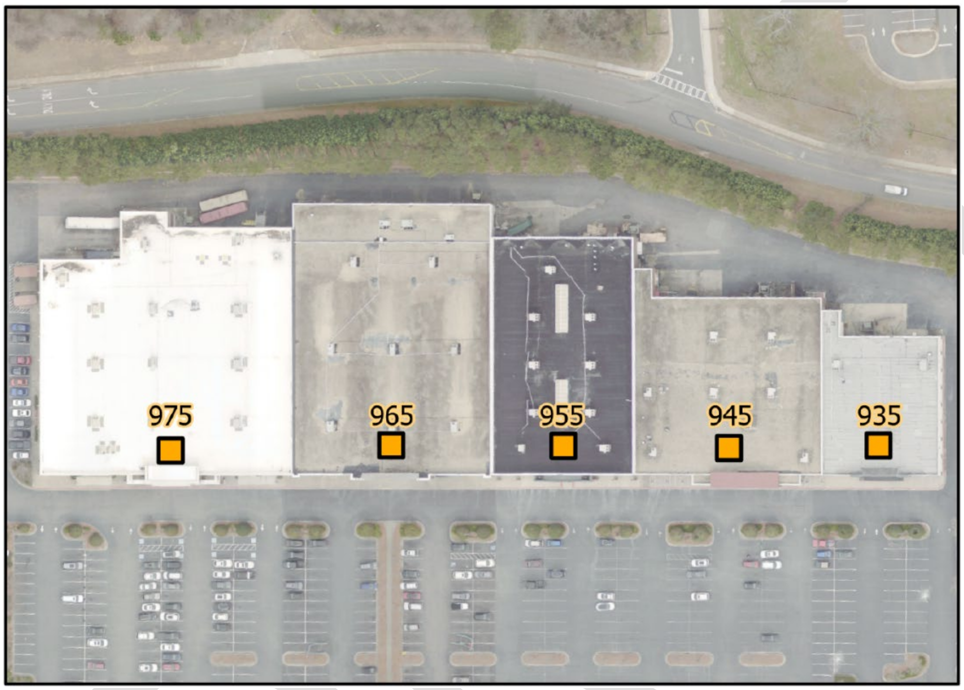

Figure 10-21 Multiple addresses within a single structure, each with a separate entrance

When addressed units share a common entrance such as in an apartment or office building, typical practice is to stack the address points at the shared building entrance since it is usually unknown exactly where within the structure an individual unit is located. Address points for each unit should be placed just within the building footprint, near the shared entrance for the addressed units. Understanding the requirements of the local CAD software is necessary to determine whether stacked points can be used.

In Figure 10-22 below, all of the addressed units in the structure share the same address and are differentiated only by their unit number. There are five main entrances with each entrance providing access to multiple units. Depending on the entrance, two or four address points are stacked at each building entrance, representing the units that can be accessed through that entrance. Providing this level of detail for complicated addressing situations will help direct responders to the correct entrance, saving valuable time during an emergency.

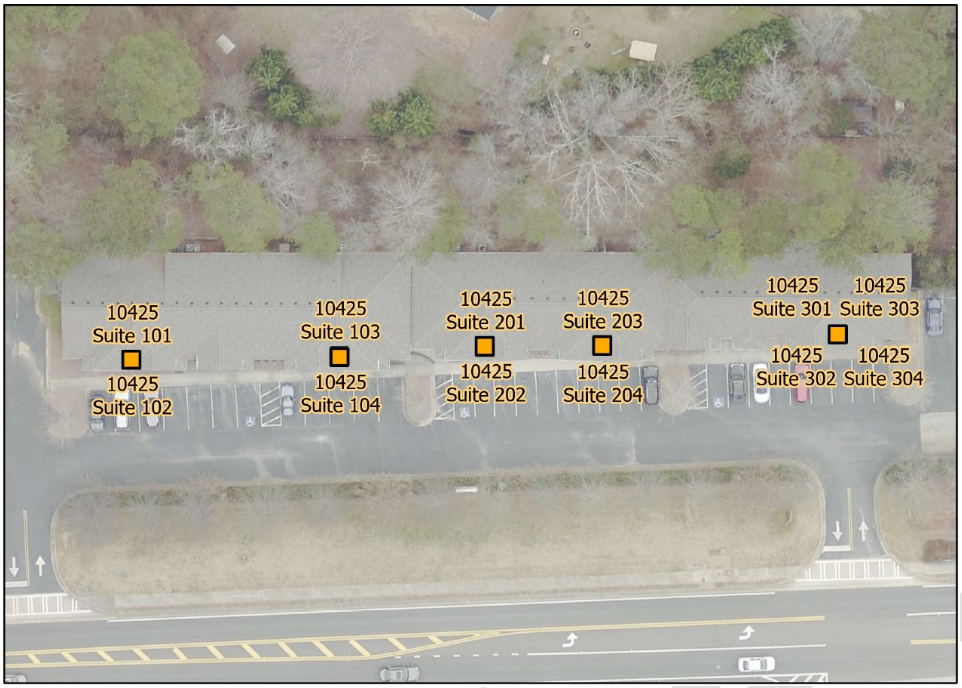

Figure 10-22 Multiple addresses within a single structure, sharing a common entrance

If the location of units within a structure are known, address points can be placed in the general location of each unit. However, trying to place address points exactly where individual units are located can be resource intensive to research, create, and maintain. Placement at this level of detail should be reserved for locations when knowing that level of detail will be valuable to the responders.

Large buildings, such as a school or large box store, may have multiple entrances. In these situations, place an address point with the primary address at the main entrance of the building, where someone would generally meet the responders. The other entrances should be treated as subaddresses, populating the subaddress fields with information related to the entrance name or what it serves (e.g., Auditorium, Gym, A Wing, Automotive).

High rise buildings with multiple entrances may sometimes have multiple entrances with elevators located nearby that only serve specific floors. In these situations, it is important to make sure that address points are stacked at the building entrance associated with the elevator that serves their floor so that responders are directed to the correct entrance.

Some 9-1-1 applications and CAD software have difficulty with subaddresses. To alleviate this issue, an address point that has only the structure address and no subaddress information can be created and placed at the structure's primary entrance. The address points with subaddress information can then be stacked on it. If subaddresses are not usable in an application, address points with populated subaddress fields can then be easily extracted from the file while still allowing other applications full use of the address points with subaddress information.

In rare situations, a structure may be split by a PSAP Boundary or an Emergency Service Boundary. In these situations, it is critical that the address points are placed within the corresponding PSAP and Emergency Services Boundaries that services the address. This may not be at the structure entrance.

10.3.3.2 Multiple Structures and/or Sites that Share the Same Address

Some properties contain multiple structures and/or sites that all share the same address and are only differentiated by a number, name, or other unique identifier (e.g., medical campus, mobile home park, campground), as in the complex shown in Figure 10-23 below.

At a minimum, each structure and/or site should have its own address point with the subaddress fields populated so that responders are sent to the correct location in an expeditious and efficient manner. This is especially critical when the addressed property is spilt by a PSAP Boundary or an Emergency Service Boundary. Address points must be placed so that calls will be routed to the correct PSAP and the appropriate emergency service providers can be identified.

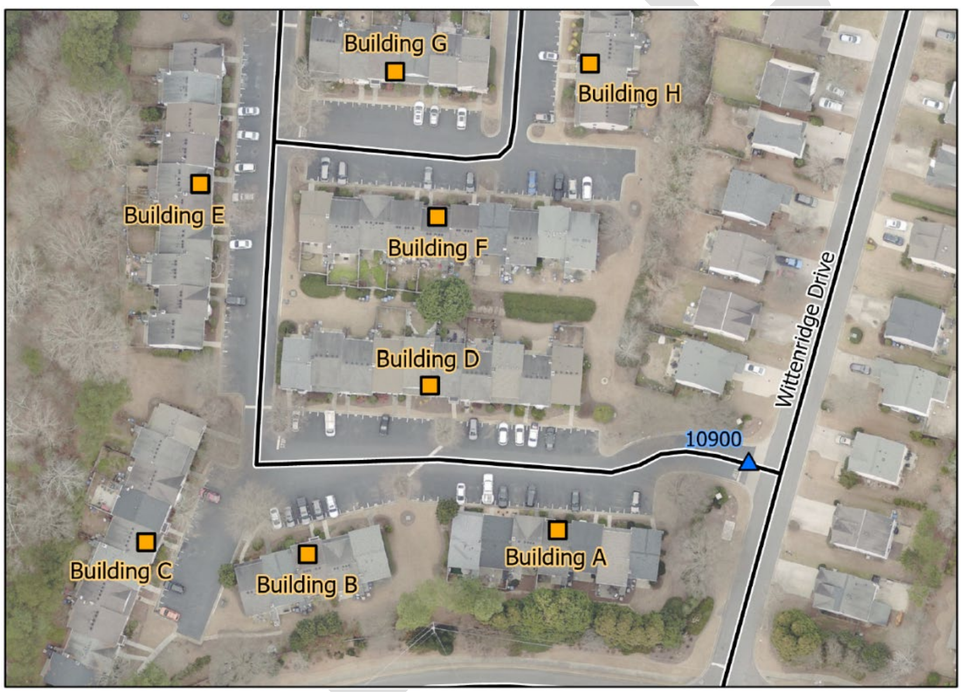

Figure 10-23 Multiple structures differentiated only by their building and unit numbers

To further assist responders, it is often helpful to create an access point that contains only the property address (no subaddress information) and place it at the primary access to the property, particularly if the property is expansive or the CAD software does not recognize subaddresses as unique addresses. If subaddress information is known but not the specific structure and/or site it is associated with, additional access points populated with the subaddress information can be stacked on the access point.

10.3.3.3 Multiple Properties Sharing One Address

Large properties assigned a single address may consist of multiple parcels and even span across a road, such as an agricultural or livestock farm. An address point should be placed on the primary addressed structure, regardless if the address conflicts with the odd/even parity of the address range on that side of the road. In such a case, the validation checks run on data submitted to the Georgia GIO for aggregation into the state's Site Structure Address Points layer, will flag this address point as non-conforming. If no structure exists on the addressed property, an address point should be placed on the side of the road that does not conflict with the address range odd/even parity, with Placement Method populated as "Parcel". If there is a driveway or other main access to the property that goes to a specific feature on the property such as a swimming hole or fishing pond, an access point could be placed at that entrance, with Placement Method populated as "PropertyAccess."

10.3.4 Transient Structures

Mobile home parks, seasonal RV or hunting camps, and other addressed locations often have temporary structures that can be moved to a different location on the addressed property or be removed entirely from the property. For large properties where the temporary structure is moved frequently to different locations around the property, an address point with Placement Method populated as "PropertyAccess" should be placed at the access to the property as that is where responders would typically arrive to be met by someone who requested the emergency service. If there is no primary access to the property, an address point with Placement Method populated as "Parcel" should be used.

For small properties or areas where the temporary structure is usually located when it is on the property (e.g., mobile home park, campsite), the address point can be placed where the transient structure would normally be located. To minimize maintenance of the Placement Method attribute for such situations, populate Placement Method as "Site" if the address contains subaddress information (e.g., lot #, unit #, campground #) and "Parcel" if there is only one address for the entire property. This avoids having to constantly update the record when the temporary structure is removed from the property.

10.3.5 Mileposts and Location Markers

Mileposts, trail markers, and other location markers that typically represent a measured distance along a trail, bike path, navigable waterway, or other unaddressed route, provide a valuable reference for 9-1-1 callers when a civic address location is unavailable. If these locations will used for call routing purposes, they should be represented as an address point in the Site Structure Address Points layer. Populate the Milepost field with the marker type and value and populate the trail or waterway name in the street name fields.

Alternatively, mileposts can be placed in a Mile Marker layer that can be referenced by the 9-1-1 telecommunicator. This is a recommended layer in the NENA Standard for NG9-1-1

GIS Data Model [1], but it is not used for the Emergency Call Routing Function or Location Validation Function. Development and maintenance of these features and their associated layers is an important consideration when deciding how to represent them in NG9-1-1 geospatial data.

Emergency Location Markers (ELM) are increasingly being posted on many trails in Georgia. These markers represent a US National Grid coordinate that includes a 3 character Grid Zone designation, a 2 character Square Identification, and the local grid coordinate. They can be represented with an address point, populating the marker type and value in the Milepost field (e.g., ELM16SGC10446913) and the trail name in the street name fields.

10.4 Parsing Addresses into the Georgia Geospatial Data Standards

10.4.1 Parsing Address Numbers

Parsing addresses into their appropriate address fields is not complicated. The Address Number is the integer portion with anything preceding the integer being placed in the Address Number Prefix field and anything following the integer being placed in the Address Number Suffix field.

Zero should not be used to indicate that an address number does not exist for a location. In rare situations, a zero address may have been validly assigned or it may be inferred if the assigned address number is a fraction (e.g., ½ Main Street). In these situations, 0 may be placed in the Address Number field.

The Address Number Prefix field should not be used to represent a range of addresses within a structure or on a parcel. Each address within a structure or on a parcel must be represented with a separate address point.

Most confusion with address numbers arises regarding whether the suffix represents a unit. Apartments and business suites are units within a building and are considered subaddresses. These are parsed into the Unit field as are mobile home park lot numbers. It is recommended to not assign new address numbers that require usage of the Address Number Suffix field.

In Georgia, the Address Number Prefix field generally is not used. However, entities using the FGDC Standard may currently be using it for Milepost or Mile Marker addresses. In such situations, they may be placing “Milepost” and “Mile Marker” type words into the Address Number Prefix field and the Milepost/Mile Marker number into the Address Number field. However, the NENA Standard for NG9-1-1 GIS Data Model [1] uses a separate, single Milepost field for these addresses where the type designator and the number are concatenated together and placed in the Milepost field. The NENA Milepost field is used to align with the PIDF-LO Milepost element. Since the Georgia Standard aligns with the NENA Standard for NG9-1-1 GIS Data Model [1], any Milepost or Mile Marker values stored locally in the Address Number Prefix, Address Number, and Address Number

Suffix fields will need to be pulled out, concatenated, and put into the Milepost field prior to use in an NG9-1-1 system.

Table 10-4 below provides examples of how to parse address numbers into their appropriate fields.

Table 10-4 Example Parsing of Address Numbers

Milepost	Address Number Prefix	Address Number	Address Number Suffix	Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier
		152						Alans	Way		
		30						Solomon	Avenue		
		24	1/2		West			Main	Street		
		4660	B		North			Peachtree	Road		
Mile Marker 73						Interstate		95			
ELM16SGC10446913								Allatoona Creek	Trail		
Buoy R8								Doboy	Sound		

10.4.2 Parsing Street Names

Parsing street names into their appropriate street name fields usually is straightforward and replicates how the street name is parsed in legacy 9-1-1 databases (that were based on the USPS Publication 28 postal addressing standard). The biggest change, and when most confusion arises, is when populating the Street Name Pre Modifier, Street Name Pre Type, Street Name Pre Type Separator, and Street Name Post Modifier fields as these are new fields not found in legacy 9-1-1 databases. Of these four new fields, the Street Name Pre Type field will be the one most used, typically for numbered routes and lettered avenues. The other three fields are not commonly used but must be populated if the address parsing rules apply. It is recommended that, when possible, to not assign new street names that require usage of the Street Name Pre Modifier or Street Name Post Modifier fields.

Further explanation for each street name field is provided in its Detailed Definitions in this document. The NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF) Standard,NENA-STA-004 [11] defines the detailed civic location data elements needed for address data exchange. Review of the CLDXF document is strongly recommended as it provides an in-depth discussion of address parsing for NG9-1-1 purposes.

The table below provides examples of how to parse street names into their appropriate fields. Footnotes immediately follow the table to explain the parsing of street names that have special considerations.

Table 10-5 Example Parsing of Street Names

Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier
				Broadway			
				Captains	View		
	North			Peachtree	Road		
	East			Oglethorpe	Highway		
	South			Pointing	Road		
				Saint Mary[1]	Drive		
				AMB[2]	Drive	Northwest	
				Diamond S Arena[2]			
	East			2nd[3]	Avenue	Southwest	
				Hayes / Wilbanks[4]	Road		
				O'Brian's[4]	Path		
				K & K[4]	Drive		
				Old Monroe - Madison[4]	Highway		
				1 Corinthians 13:1[4]	Lane		
				The Retreat		North	
The				Retreat[5]		North	
		Avenue		C			
		Interstate		95			
		United States		129	Highway		
		Georgia State Route		120			
		Georgia Highway		99			
		State Route		215			
		Connector		206		Northwest	
		County Road		7			
Old		Highway		17		Northeast	
		Avenue	of the	States			
		Via[6]	d'	Este			
		Avenida[6]	del	Sol	Drive		
				Cottage in the Woods[7]	Lane		
	South			Main	Street Extension[8]		
				Franklin Street	Extension[8]	Southeast	
				Old Alabama Road	Connector[8]		
				Circle	Road		
				Charlie Smith Senior	Highway		
				Martin Luther King Junior	Drive		

Street Name Pre Modifier	Street Name Pre Directional	Street Name Pre Type	Street Name Pre Type Separator	Street Name	Street Name Post Type	Street Name Post Directional	Street Name Post Modifier
				Cow Island[9]			
				Cherry Hill[9]	Crossing		
				Isles of Wight[9]	Road		
				Lake Forest South[9]	Drive		
				North Point[9]	Parkway		
				West Forty[9]	Drive		
				School Circle[9]	Road		
West	South[10]			5th	Avenue		
				Park	Avenue	West[10]	Northwest
				East West	Connector	Southeast	
				North	Avenue	Northwest	
				Washington	Avenue		Frontage Road
	West			Lake	Road		Fire Road 12
				Main	Street		Extended[11]
		Interstate		75			Southbound[12]

NOTES:

[1] All street name field values must be fully spelled out to remove confusion and ambiguity. This is important as abbreviations could have multiple interpretations. For example, “ST” could be Saint, Street, or Sandra Theresa (someone’s initials).

[2] On rare occasions, a street name may be a valid acronym or abbreviation, but only if it was assigned as such by the local Addressing Authority. Street signs often use acronyms or abbreviations due to space limitations. Always consult with the local Addressing Authority regarding the official 9-1-1 assigned street name.

[3] How numbered streets are represented is based on local street naming conventions. The street name can be represented as a number, as shown here, or be fully spelled out (e.g., 2nd or Second).

[4] Special characters are allowed in NG9-1-1 street name fields which have a text field type of Printable ASCII characters (decimal codes 32 to 126) or UTF-8 character sets. Consult with your Core Service Provider regarding their recommendation for 9-1-1 and CAD system current requirements.

[5] A Pre Modifier must be separated from the Street Name by either a Street Name Pre Directional or a Street Name Pre Type unless the local Street Naming Authority has established a local practice where words such as “The” or “Old” that precede a Street Name are placed in the Street Name Pre Modifier field so the Street Name can be placed properly in an alphabetized list.

[6] Foreign language equivalents (e.g., French, Spanish, Italian) of Street Name Pre Types and Street Name Pre Type Separators are parsed into these fields and not into the Street Name field.

[7] Since “Cottage” is not a valid Street Name Pre Type and is not in the NENA *Street Name Pre Types and Street Name Post Types Registry* or USPS Publication 28, Appendix C1 [12], it is included in the Street Name.

[8] When two Street Name Post Types occur after the Street Name, both are placed in the Street Name Post Type. However, if local addressing rules consider the first occurrence part of the Street Name, the first occurrence is included in the Street Name field and the second is parsed as a Street Name Post Type.

[9] When the Street Name is the name of a place, geographic feature, landmark, or other similar feature, the directional is included in the Street Name field and is not parsed as a Street Name Pre Directional (requires local knowledge as to whether the directional is part of the name of the place, geographic feature, landmark, or other similar feature).

[10] When two directional words occur together before the Street Name and the second directional is not the name of a place, geographic feature, landmark, or other similar feature, the first occurrence is placed in the Street Name Pre Modifier and the second is placed in the Street Name Pre Directional. Similarly, when two directional words occur together after the Street Name, the first occurrence is placed in the Street Name Post Directional and the second is placed in the Street Name Post Modifier.

[11] Since "Extended" is not in the NENA *Street Name Pre Types and Street Name Post Types Registry* or USPS Publication 28, Appendix C1 [12], it is parsed as a Street Name Post Modifier and not a Street Name Post Type.

[12] The traveling direction on divided roads only can be included but it is parsed as a Street Name Post Modifier (in lowercase).

10.4.3 Parsing Subaddresses

A subaddress specifies a location within a site or building that has the same numbered thoroughfare address as all other locations within the site or building, and is differentiated from the other locations by its subaddress. Parsing subaddresses into the six subaddress fields (i.e., Building, Floor, Unit, Room, Seat, Additional Location Information) is not difficult as the Type designator usually helps to guide the parsing.

Further explanation for each subaddress field is provided in its Detailed Definitions in this document. The NENA NG9-1-1 United States CLDXF Standard [11] provides further guidance for parsing of the subaddress.

The table below provides examples of how to parse subaddresses into their appropriate fields. Footnotes immediately follow the table to explain the parsing of subaddresses that have special considerations.

Table 10-6 Example Parsing of Subaddresses

Building	Floor	Unit	Room	Seat	Additional Location Information	Address with Subaddress
Building B		Suite 1220				1365 Clifton Road Northeast, Building B, Suite 1200
Tower B	3rd Floor		Room 312			5221 Reynolds Road, Tower B, 3rd Floor, Room 312
Concourse D					Gate D21	Atlanta International Airport, Concourse D, Gate D21
	Eighth Floor		Peachtree Ballroom			210 Peachtree Street Northwest, Eighth Floor, Peachtree Ballroom
		Apartment 3D				122 South Main Street, Apartment 3D
		Penthouse 2				659 Peachtree Street Northeast, Penthouse 2
	Mezzanine		Green Room			422 Broadway, Mezzanine, Green Room
		Unit 56				459 Mall Boulevard, #56
		Upper				30 Solomon Avenue, Upper
		Lower				30 Solomon Avenue, Lower
		Basement				18 Oak Avenue, Basement
	Floor 2			Cubicle 48	Wing C	1245 Washington Avenue, Wing C, Floor 2, Cubicle 48

11 Workflows

Generally speaking, there are many ways to accomplish this work. Below are general guidelines for creating solid datasets and specific tasks necessary for NG9-1-1 Readiness.

11.1 General Guidelines

Build a Team

Engagement and utilization are critical to success. Build a team of users (both technical and non-technical) and producers of data, both to define the current state (how does this data evolve today?) and end state (how SHOULD this data evolve in the future?). Without engagement of the participants throughout the lifecycle of a dataset, failure of the workflow or inability to fulfill the requirements will most likely occur. Plan to continue to meet, and build a community that works together across departments and administrative boundaries.

Document Current and End State, Metadata

A solid, stable dataset requires documentation and metadata. Without proper documentation and metadata, you cannot be sure that the data is being used or interpreted appropriately. Documentation should include a data flow diagram and a plan (how will the work be done? What is the “end state”? Who should be involved in the review?

How should the data be quality controlled? How shall the data be quality assured?). Once created, it should be reviewed and processes revisited regularly to be sure the processes and procedures are still working, and nothing is missed.

Testing and Feedback Loops

Paramount to data quality and assurance are clear responsibilities and validation of data. To be sure the data is appropriately meeting the requirements of the business process(es) it was designed for, it should be tested. Testing should be done locally and often. While the State will support this effort with its validation and aggregation tools (https://ng911-hub.gio.georgia.gov/pages/georgias-validation-and-aggregation-portal), it is good practice to have local processes that check data, whether as simple as searching for blank values, or as robust as buying a tool that has scripted rules. It may be helpful to use checks similar to the state's validation checks described in **Section 14.4 Appendix D: Quality Control NG9-1-1 Validations**.

Every data flow should have feedback loops, and clear identification of who holds the responsibility to make changes to the data. Plan for mistakes that need resolution and make it easy and clear how those processes will work. This is especially important in an NG9-1-1 workflow where discrepancies in the data must be edited and resolved within 3 days, as described in NENA Next Generation 9-1-1 Data Management Requirements, NENA-REQ-002 [13].

Differentiate between Data Editing Authority and Data Access

The standardization of data makes access to neighboring jurisdictions data more efficient to manage for use in local systems. In many cases, data needed for local business processes spans the authority of multiple entities. For example, a business use of road centerlines may require data from a neighboring jurisdiction to be included as part of the overall road centerline dataset for a given county, but the responsibility for provisioning data is limited to the jurisdiction who maintains authority over it. The data Standard provides a structure to query by authority. This means that while a dataset contains records from both jurisdictions, when provisioning, these records can be pulled out. Users should consult the Georgia Aggregation and Validation Portal (https://ng911-hub.gio.georgia.gov/pages/georgias-validation-and-aggregation-portal) for more practical steps on extracting their data for load into the system.

Try to Eliminate User Error

Seek opportunities to limit the potential for mistakes, whether through auto population tools to prevent users from needing to type data that is already present in the system, or consolidating workflows to eliminate unnecessary editing and more quickly move through different departments and hands before it is published.

11.2 NG9-1-1 Phased Approach

Users may find the NENA Information Document for GIS Data Stewardship for Next Generation 9-1-1 [2] helpful in guiding their progress in creating, augmenting, and maintaining this data. Specifically in Georgia, we advise users that are beginning their process to use the following steps:

11.2.1 Phase 1

Phase 1 focuses on gathering information, boundaries, and basic data checks.

Steps:

- Gather data, coordinate with the 9-1-1 Director.
    - It is particularly important to gather multiple sources of data. For example, you may have voter registration lists, trash collection routes, and customer databases from which to pull addressing information. You will undoubtedly find cases where the same address or road is referenced in multiple ways. There is one official name (the 9-1-1 authoritative name) for a given road or address, while the street signs or other posted addresses may conflict. These conflicting sources will cause issues in a 9-1-1 call when unreconciled to one another. Knowing where the discrepancies exist, even if mitigation is not possible, is an important step of the process.
- For all data that currently exists, migrate and map data to the Georgia Geospatial Data Standard.
- Submit data to the GIO's Data Validation and Aggregation Portal [14]. Review results.
- Review your community's Service Delivery Strategy Document. Determine if they match the data/understanding of jurisdiction you hold internally to your community. Make edits to both as necessary, ensuring compliance with rules laid out by the state's Department of Community Affairs {x}.
- Coordinate regionally with neighboring jurisdictions to determine appropriate jurisdiction for PSAPs, paying special attention to addresses and road centerline agreement and areas where a boundary splits a street. Determine where there are overlaps or gaps and resolve them together.
- Coordinate regionally with neighboring jurisdictions to determine appropriate service boundaries (EMS, police, fire). Be sure that representatives from all services are engaged.
- Create feedback loops and processes to keep boundaries stable and in agreement whenever there is a change (e.g., annexations)

11.2.2 Phase 2

Phase 2 focuses on road centerlines.

Steps:

- Ensure that all road centerlines have mandatory fields correctly populated.
- Resolve errors found in the road centerline basic geometry checks (checking for duplication, hanging segments etc.).
- Review Parity Left and Parity Right
- Improve the alignment of centerlines using current imagery.
- Ensure that road centerlines do not extend beyond the Provisioning Boundary layer.
- Coordinate regionally with neighboring jurisdictions to review overlapping or gaps in road ranges.
- Perform MSAG synchronization. Do the street names and communities match? Do the road centerlines cover all records found in the MSAG? Does the MSAG include all addressed streets found in the road centerlines? Do the community names match? Edit as needed (both files).

11.2.3 Phase 3

Phase 3 focuses on site structure address points.

- Ensure that all site structure address points have mandatory fields correctly populated.
- Resolve errors found in the site structure address points basic geometry checks.
- Improve the location of address points, moving geocoded or parcel-based address points onto existing structures using current imagery.
- Ensure that address points do not exist beyond the Provisioning Boundary layer.
- Create address points for each structure in areas where multiple structures share the same address, populating the Building, Unit, or Additional Location Information fields to ensure each address point has a unique address.
- Coordinate regionally with neighboring jurisdictions to review duplicate address points.
- Cross check addresses to road centerlines. Ensure they are in agreement.
- Perform ALI synchronization. Do the street names and communities match? Do the road centerlines cover all records found in the ALI? Do the address points cover all ALI records? Edit as needed.

11.2.4 Phase 4:

Phase 4 focuses on additional address points, Strongly Recommended, and Optional fields.

- Create addresses for additional locations, landmarks, and entry points to aid in response.
- Begin populating the Strongly Recommended attribute fields.
- Begin populating the Optional attribute fields, taking into consideration that some of these fields are marked as potentially changing in a future update of the Georgia Standard.

12 Future Work

12.1 Future changes in NENA Standards

The NENA NG9-1-1 GIS Standards undergo continuous review and update, not just to incorporate technology changes, but the implementation of the NENA Standards often identifies areas in the Standards needing improvement, clarification, or reconsideration. It is important for the State of Georgia to monitor the evolution of NENA NG9-1-1 GIS Standards and how fields in this Standard may be impacted by potential future changes in the NENA Standards. The NENA NG9-1-1 United States Civic Location Data Exchange Format (NG9-1-1 CLDXF) Standard [11] and the NENA Standard for NG9-1-1 GIS Data Model (NG9-1-1 GIS Data Model) [1] are both undergoing an update as of the release of version 1 of this Standards document. Noted below are planned changes in these documents that may impact the Georgia Geospatial Data Standard.

The following elements are being added in version 2 of the NENA NG9-1-1 CLDXF Standard, which will eventually result in equivalent additions to the Site Structure Address Points layer in the NENA NG9-1-1 GIS Data Model Standard:

- Site
- Subsite
- Structure
- Unit PreType
- Unit Value
- Wing
- Section
- Row

Existing elements planned for removal and/or replacement with new element(s) in version 2 of the NENA NG9-1-1 CLDXF Standard, which will eventually result in equivalent changes to the Site Structure Address Points layer in the NENA NG9-1-1 GIS Data Model Standard:

- **Complete Landmark Name** and **Landmark Name Part:** to be replaced by new Site, Subsite, and Structure elements
- **Building:** to be replaced by new Structure element
- **Unit:** to be replaced with new Unit PreType and Unit Value elements

Planned changes to allowable content in version 2 of the NENA NG9-1-1 CLDXF Standard:

- **Incorporated Municipality:** Will no longer be populated as “Unincorporated” if in an unincorporated part of a county
- **Unincorporated Community, Neighborhood Community:** Population will be required if in an incorporated municipality or an unincorporated area of a county

where an address cannot be distinguished from another address without an additional place name.

Planned changes to field structure or allowable content in version 2 of the NENA NG9-1-1 GIS Data Model Standard:

- **P and E Field Types:** Combined and redefined as field type P
- **NENA Globally Unique ID:** Field name (when used as a primary key) and how it is constructed is changing, including requirement of a suggestive layer prefix
- **Allowable layer prefix values (impacts NGUID construction):** Established for standardization and to align with NENA i3 GIS Layers Registry
- **Discrepancy Agency ID:** Field width increasing to 100 in all layers
- **County:** Field width increasing to 100 in all layers
- **Legacy Street Name Type:** Field name changing to LSt_Typ in Site Structure Address Points and Road Centerlines layers
- **Road Class:** "Walkway" domain value changing to "Walkway/Pedestrian" and "Trail" domain value changing to "Bike Path or Trail."
- **ZIP Plus 4:** Field description changing to Postal Code Extension and field name changing to PostCodeEx in the Site Structure Address Points layer

Other longer term potential changes:

- **Elevation:** the NENA 3D GIS Requirements Working Group is evaluating potential changes needed to meet future FCC Z coordinate requirements
- **Place Type:** Domain may be extended in a future version of the NENA NG9-1-1 GIS Data Model Standard

12.2 Planned Georgia Geospatial Data Standards Development Related to NG9-1-1

- **Discuss NGUID and Local ID requirements with Core Services Provider**
  Core Service Providers may have recommendations as to the Agency Identifier that should be used when constructing a NENA Globally Unique Identifier (NGUID). Until a Core Service Provider is in place, organizations can use their organization's registered domain name for the Agency Identifier within their NGUIDs.
- **Create a domain for ESN**
  The Domain is characters from 0 to 99999; however, there are many questionable values in the local data. Need to get the allowable ESN values from ATT, GECA, and/or MCP.
- **Establish a Domain Review Board**
  A small group of technical professionals representing Georgia's GIS data maintenance practitioners should be established to review and evaluate submissions of new domain values on a scheduled basis.

- **Consider abbreviating some values in the Pre/Post Modifiers for the Abbreviated Fully Concatenated Street Name**
  Potential values to abbreviate would be for where there are two consecutive directionals, where one is placed in the Modifier field and the other is placed in the Directional field, or where the Post Modifier includes Type words like "Road" (in Fire Road 12).
- **Reevaluate field width for Abbreviated Fully Concatenated Street Name**
  Current field width is 155. This uses smaller widths only for the Pre/Post Directionals (2) and Pre/Post Types (21/10). Does not take into account potential use of abbreviations in the Pre/Post Modifier fields. If abbreviations for directionals and types are used in the Pre/Post Modifier fields, field width could possibly be reduced.
- **Consider creating a library of address assignment best practices**
  Compile a library of existing guidance documents. Include the need to consider the effects changing an address would have on residents (e.g., utility bills, mortgages and deeds, government IDs) and businesses (e.g., letterhead, signage, websites).
- **Expand the quality controls to include Georgia-specific fields**
  Construct queries to expose the non-conformance of data for Georgia-specific Mandatory and Strongly Recommended fields where they do not currently exist.
- **Develop a list of required metadata elements for data submissions**
  Identify basic, critical metadata elements that will need to be included with data submitted for statewide aggregation. Develop quality controls for inclusion and completeness of metadata.
- **Develop best practices for the required NG9-1-1 Boundary layers**
  Convene a small group of Georgia GIS data maintenance practitioners in adjacent counties to pilot the resolution of alignment issues related to PSAP Boundaries, Emergency Service Boundaries, and Provisioning Boundaries. Develop best practices and recommendations based on the challenges faced and the results of the pilot.
- **Consider creating a statewide Snap-to-Points data layer**
  Develop and use snap-to-points as part of the NG9-1-1 Boundary alignment pilot. Consider testing and establishing a uniform precision for each of the data layers to avoid data translation issues. Evaluate their usefulness as a statewide data layer based on the results of the pilot.

13 References

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[10] National Emergency Number Association. *NENA Information Document for Development of Site/Structure Address Point GIS Data for 9-1-1.* NENA-INF-014.1-2015. Arlington, VA: NENA, approved September 18, 2015.

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[12] United States Postal Service (USPS). *Publication 28-Postal Addressing Standards*. https://pe.usps.com/cpim/ftp/pubs/Pub28/pub28.pdf, July 2020.

[13] National Emergency Number Association. *NENA Next Generation 9-1-1 Data Management Requirements.* NENA-REQ-002.1-2016. Arlington, VA: NENA, approved March 10, 2016.

[14] Georgia GIO. "Georgia's Validation and Aggregation Portal," updated October 2021, https://ng911-hub.gio.georgia.gov/pages/georgias-validation-and-aggregation-portal.

14 Appendices

14.1 Appendix A: Templates

Template file geodatabase can be found here.

Template field mapping sheet can be found here.

14.2 Appendix B: Terminology

The following are commonly used terms when discussing GIS for Next Generation 9-1-1 and legacy 9-1-1. Additional terms and more detailed definitions can be found on the GIO Hub at https://ng911-hub.gio.georgia.gov/pages/nextgenterms.

Term or Abbreviation	Definition / Description
Addressing Authority	The local, military, or county entity responsible for issuing addresses and reconciling address discrepancies for locations within its jurisdiction.
ALI (Automatic Location Identification)	(Legacy 9-1-1 term) Database of telephone numbers and the physical location/civic address associated with each number.
ANI (Automatic Number Identification)	(Legacy 9-1-1 term) Telephone number associated with the line that called 9-1-1.
APCO (Association of Public Safety Communications Officials)	A professional organization of public safety communications professionals dedicated to the enhancement of public safety communications.
BCF (Border Control Function)	Like a firewall that provides a secure entry into the ESInet for emergency calls presented to the network.
CLDXF (Civic Location Data Exchange Format)	A United States emergency services profile of PIDF-LO that defines a set of civic location data elements needed for the exchange of civic location records.
E9-1-1 (Enhanced 9-1-1)	A telephone system based on network switching to deliver emergency calls to the appropriate PSAP and automatically provide the caller's location and telephone number to the PSAP.
ECRF (Emergency Call Routing Function)	An NG9-1-1 functional element that takes a location, compares it to the GIS data, and determines which PSAP should receive the call.
ESInet (Emergency Services IP Network)	A managed IP network shared by all public safety agencies used for emergency services communications.
ESN (Emergency Service Number)	(Legacy 9-1-1 term) A 3-5 digit number that represents an Emergency Service Zone (ESZ), which is the unique combination of police, fire and EMS responders for a given location.
ESRP (Emergency Services Routing Proxy)	An NG9-1-1 functional element on the edge of the ESInet that looks for emergency calls and ushers the call through the ESInet (i.e., selects the next hop routing) based on the caller's location and routing policy.
FGDC (Federal Geographic Data Committee)	A United States governmental coordinating body responsible for providing advisory direction and facilitating cooperation among federal agencies for the development, use, and sharing of geospatial data.
GCS (Geocode Service)	An NG9-1-1 service that provides geocoding (address matching) and reverse geocoding services.

Term or Abbreviation	Definition / Description
GIS (Geographic Information System)	A framework or system for gathering, managing, and analyzing geospatial data.
GIS Data Provider	The entity that creates and maintains geospatial data based upon established rules and policies. The GIS Data Provider is responsible for providing the data to other organizations, including submission to the Georgia GIO for aggregation into the State datasets. The GIS Data Provider is responsible for resolving errors found during quality control checks on their data and ensuring that it conforms to, or can be transformed to, the Georgia Geospatial Data Standards.
LIS (Location Information Server)	An NG9-1-1 functional element that provides the locations for a Service Provider's subscribers.
LoST (Location-to-Service Translation) Protocol	In NG9-1-1, a protocol that takes the location information (civic or geodetic) in a PIDF-LO record, compares it to GIS data, and identifies the appropriate PSAP to route the call to.
LVF (Location Validation Function)	An NG9-1-1 functional element that validates a new subscriber's civic address against the GIS data before a 9-1-1 call is ever made.
MCS (MSAG Conversion Service)	An NG9-1-1 web service that converts between and the MSAG and PIDF-LO.
MDS (Mapping Data Service)	An NG9-1-1 service that provides an out-of-area map from features in a GIS database.
MSAG (Master Street Address Guide)	(Legacy 9-1-1 term) Database of street names and their associated address ranges within a given community.
NENA (National Emergency Number Association)	The technical standards setting organization for 9-1-1, focused on continued improvement and modernization of the 9-1-1 emergency communication system.
NGCS (Next Generation 9-1-1 (NG9-1-1) Core Services)	The base set of NG9-1-1 services needed to process a 9-1-1 call on an ESInet.
PIDF-LO (Presence Information Data Format – Location Object)	Format for sending location information in an XML schema through the NextGen9-1-1 call routing process.
PRF (Policy-based Routing Function)	An NG9-1-1 functional element that determines the next hop in NG9-1-1 system for a call, based on policy routing rules established by the PSAP.
PSAP (Public Safety Answering Point)	A call center or entity responsible for receiving and processing 9-1-1 calls.
PSTN (Public Switched Telephone Network)	The current circuit-switched communication system for routing E9-1-1 calls.
SI (Spatial Interface)	The interface between the GIS data and the NG9-1-1 functional elements that consume the GIS data.

Term or Abbreviation	Definition / Description
Street Naming Authority	The local, military, or county entity responsible for approving or issuing street names and reconciling street name discrepancies, for public streets and private driveways, if applicable, within its jurisdiction.
VOIP (Voice over Internet Protocol)	Technology that allows delivery of voice calls over IP networks.

14.3 Appendix C: Domains

Download the NG9-1-1 Geospatial Data Standards Domain list here.

14.3.1 Process for Submitting Updates to the Georgia Domains

Because the Georgia Standard is a living document, there is the ability to adjust domains as circumstances arise that require the inclusion of new values. In many cases, an update to the domain is unnecessary, as the Standard is flexible enough to allow existing fields to be used. For example, the absence of a Street Name Post Type can be handled by placing the street name and post type inside of the Street Name field. In other cases, however, the frequency of the use of a given value warrants its addition. For example, "Channel" was recently added to the domain as it was deemed valuable by many entities for adding Buoy markers in a channel. When a value has a repeatable use case, users should nominate these values using the following survey: https://arcg.is/1T0TmT1.

14.4 Appendix D: Quality Control NG9-1-1 Validations

The following sets of validations are designed to reinforce the Georgia Geospatial Data Standards by informing, at the local and State level, where there are nonconformances. Additional helpful validations are to be built out over time and will be provided via the Georgia NG9-1-1 Validation and Aggregation Portal Page (https://ng911-hub.gio.georgia.gov/pages/georgias-validation-and-aggregation-portal). The validations included as part of the Standard are mandatory for data to support an NG9-1-1 ESInet[4]. Validations are organized as follows:

- Essential Geometry Checks – These validations ensure that basic geometric rules are not violated. The presence of non-conformance in these areas indicate "dirty data" which can make spatial queries inconstant or impossible. They also cover network topology in the case of road centerlines which ensures that the directionality and connectivity are sound.

[4] In some cases, nonconformance can be mitigated with additional data (for example, Site Structure Address points where there is conflict in a Road Centerline). The impact of nonconformance on the Next Generation 9-1-1 ESInet can be understood by studying its use in the core functions it supports. Visit the NG9-1-1 Hub for additional thresholds and guidance.

- Feature Checks – For each layer, validations are critical to ensure that all features are a seamless topologically sound coverage and can be cleanly queried spatially.
- Cross-Feature Checks – These are validations that ensure agreement between related features.
- Attribute Validations – these are validations that appropriate values (domain values where appropriate) are populated where the field is mandatory or strongly recommended. Note that in some cases attributes are required if needed or Conditional, so validations are not built for those fields.

14.4.1 Essential Geometric and Network Checks

Check	Description
Duplicate Features	Two features with the exact same geometry
Duplicate Vertices	Two consecutive vertices with the same x,y values at the precision of the dataset
Check for Self-Intersecting lines/polygon boundaries	Feature does not intersect itself
Kickbacks	A line segment that changes 180 forming a Z shape
Check for Spikes	Three consecutive vertices (ABC) in which: • Distance between AB is less than BC • Sine of the angle ABC is less than sine of 1 degree (configurable) • AB is under a maximum tolerance (optional, configurable)
Features are valid (OGC specification)	Lines must have at least 2 points and a length greater than 0
Check for Overlaps	Polygons and lines must not overlap each other within a single layer.
Check for Multipart features	All features must be simple geometry, and not multipart.
Check for Linear EndPoint Connectivity	If a linear feature has a spatial intersection with another linear feature, then it is at those linear end point(s)
Check for Short Lines	Validates that no linear features are shorter than 12 standard units (i.e., 12ft)
Check for Floating Lines	Validates that all line features are connected (none floating)
Check for Overshoots/Undershoots	Linear features do not contain any overshoots or undershoots.

14.4.2 Boundary Features (e.g., PSAP, EMS, ESZ, Fire, County, etc.)

Check	Description
Attribute Checks	See Georgia NG9-1-1 Attribute Validations
Essential Geometric and Network Checks	
Check for Gaps/Coverage	Boundary linework edge matching between boundary types. This is mostly done via gap/coverage.
State specific business rules	Examples include: County/City must be inside a single PSAP, PSAP must me inside a single County.

14.4.3 Point Features (e.g., Address Points, Site Structure Points)

Check	Description
Attribute Checks	See Georgia Attribute Validations
Essential Geometric and Network Checks	
Check that there are no Point Features with the same Address attributes within the Zip Code.	A scalar comparison (not dependent on direction)

14.4.4 Road Features (Road Centerlines)

Check	Description
Attribute Checks	See Georgia NG9-1-1 Attribute Validations
Essential Geometric and Network Checks	
Check Road is broken at intersections	Road touches other Roads at end, Road does not cross another Road).
Check that Left/Right Address Range is valid	Left/Right side is either both zeros or both not zeros
Check Parity	Left/Right Parity values matches Left/Right Address Range Numbers
Check for overlapping ranges	a scalar comparison, a Road Feature's Address Ranges should not overlap another Road Feature's Address Range
Check that Address Range values increase in same direction on both sides	One side of a road centerline should not increase while the other side decreases. Note: Some anomalies might exist.

14.4.5 Boundary Features vs Road Features

Check	Description
Road Features are broken at Boundary Features	Physically, road centerlines must be segmented at the intersection with NG9-1-1 required boundary layers: PSAP, Police, Fire, EMS, Provisioning Note: Additionally, changes in boundary attributes should indicate a boundary change, such as State, County, Incorporated Municipality, ESN, MSAG Community
Road Feature boundary attributes match that of containing Boundary Feature.	Road centerlines' attributes must agree with the attributes of the boundaries that contain them: PSAP, Police, Fire, EMS, Provisioning

14.4.6 Boundary Features vs Point Features

Check	Description
Check that Point Feature is inside one Boundary Feature.	Points cannot reside directly on a vertex separating two polygons.
Check that the Point Feature attributes match that of containing Boundary Feature.	SSAP's attributes must agree with the attributes of the boundaries that contain them: PSAP, Police, Fire, EMS, Provisioning
Check that there are no Point Features with the same Address attributes within the Boundary Feature. Used for the ESN or PSAP.	Check that there are no Point Features with the same Address attributes within the Zip Code, PSAP, or ESN.

14.4.7 Point Features vs MSAG & ALI

Check	Description
ALI Synchronization	Every point must have a matching record the ALI tables.
MSAG Synchronization	Every point must have a matching record the MSAG tables.

14.4.8 Road Features at Intersection Points

Check	Description
Checks Roads with the same name that touch at an intersection.	The attributes for a side of a Road are compared to the attributes of a side of the other touching Road. The sides of the roads compared depend on whether the Road geometries start or end at the intersection. • Parity attributes match across intersection.

Check	Description
	• Address Range Numbers increase or decrease consistently across intersection. • Address Range Numbers do not overlap across intersection. Note: Optional, as there is another more inclusive check for overlapping address ranges. However, this might be useful as more specific/superseding error report. • Bifurcation: No more than 2 roads with the same name intersect at a point.

14.4.9 Point Features vs Road Features

Check	Description
Points Features are associated to nearby Road Features and classified as left or right of Road Feature	• All Address Attributes (e.g., StreetName, StreetPreDir, Zip Code) of a Point Feature match the Address Attributes of nearby Road. Note: If the Point Feature's address attributes don't match a nearby road, no association to a road is considered, the Point feature is reported and the following rules are not run on the Point. • Point Feature Address Number Parity matches Road Feature for Parity for given side. • Point Feature Address Number is within Road Feature Address Range for given side. • Point Feature Address Numbers are ordered along Road. (A.K.A. Fishbone. A Fishbone analysis is the process of drawing a line from the point to its corresponding position (relative to the address range) of its closest road which has the same name. In doing so, the line (or, fishbone) should not cross the fishbone of another address point, which would indicate that the address is out of order. Please note that in some cases where the address point is placed on the structure and the driveway is a long meandering road, the system may interpret the address as not conforming. Refer to the best practices section for guidance.

14.4.10 Georgia NG9-1-1 Attribute Validations

14.4.10.1 Required Layers

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Emergency_Medical_Services	Avcard_URI	Mandatory
Emergency_Medical_Services	Agency_ID	Mandatory
Emergency_Medical_Services	DateUpdate	Mandatory
Emergency_Medical_Services	DiscripAgID	Mandatory
Emergency_Medical_Services	DsplayName	Mandatory
Emergency_Medical_Services	Global ID	Mandatory
Emergency_Medical_Services	ServiceURI	Mandatory
Emergency_Medical_Services	ServiceURN	Mandatory
Emergency_Medical_Services	State	Mandatory
Emergency_Medical_Services	Effective	Optional
Emergency_Medical_Services	Expire	Optional
Emergency_Medical_Services	ServiceNum	Optional
Fire	Avcard_URI	Mandatory
Fire	Agency_ID	Mandatory
Fire	DateUpdate	Mandatory
Fire	DiscripAgID	Mandatory
Fire	DsplayName	Mandatory
Fire	Global ID	Mandatory
Fire	ServiceURI	Mandatory
Fire	ServiceURN	Mandatory
Fire	State	Mandatory
Fire	Effective	Optional
Fire	Expire	Optional
Police	Avcard_URI	Mandatory
Police	Agency_ID	Mandatory
Police	DateUpdate	Mandatory
Police	DiscripAgID	Mandatory
Police	DsplayName	Mandatory
Police	Global ID	Mandatory
Police	ServiceURI	Mandatory
Police	ServiceURN	Mandatory
Police	State	Mandatory
Police	Effective	Optional

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Police	Expire	Optional
Police	ServiceNum	Optional
PSAP_Boundary	Avcard_URI	Mandatory
PSAP_Boundary	Agency_ID	Mandatory
PSAP_Boundary	DateUpdate	Mandatory
PSAP_Boundary	DiscripAgID	Mandatory
PSAP_Boundary	DsplayName	Mandatory
PSAP_Boundary	Global ID	Mandatory
PSAP_Boundary	ServiceURI	Mandatory
PSAP_Boundary	ServiceURN	Mandatory
PSAP_Boundary	State	Mandatory
PSAP_Boundary	Effective	Optional
PSAP_Boundary	Expire	Optional
PSAP_Boundary	ServiceNum	Optional
Provisioning_Boundary	DateUpdate	Mandatory
Provisioning_Boundary	DiscripAgID	Mandatory
Provisioning_Boundary	Global ID	Mandatory
Provisioning_Boundary	Effective	Optional
Provisioning_Boundary	Expire	Optional
Road_Centerlines	AdNumPre_L	Conditional
Road_Centerlines	AdNumPre_R	Conditional
Road_Centerlines	AddCode_L	Conditional
Road_Centerlines	AddCode_R	Conditional
Road_Centerlines	ESN_L	Conditional
Road_Centerlines	ESN_R	Conditional
Road_Centerlines	LSt_Name	Conditional
Road_Centerlines	LSt_PosDir	Conditional
Road_Centerlines	Lst_PreDir	Conditional
Road_Centerlines	LSt_Type	Conditional
Road_Centerlines	MSAGComm_L	Conditional
Road_Centerlines	MSAGComm_R	Conditional
Road_Centerlines	St_PosDir	Conditional
Road_Centerlines	St_PosMod	Conditional
Road_Centerlines	St_PosTyp	Conditional
Road_Centerlines	St_PreDir	Conditional

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Road_Centerlines	St_PreMod	Conditional
Road_Centerlines	St_PreSep	Conditional
Road_Centerlines	St_PreTyp	Conditional
Road_Centerlines	Country_L	Mandatory
Road_Centerlines	Country_R	Mandatory
Road_Centerlines	County_L	Mandatory
Road_Centerlines	County_R	Mandatory
Road_Centerlines	DateUpdate	Mandatory
Road_Centerlines	DiscrpAgID	Mandatory
Road_Centerlines	FromAddr_L	Mandatory
Road_Centerlines	FromAddr_R	Mandatory
Road_Centerlines	Global ID	Mandatory
Road_Centerlines	IncMuni_L	Mandatory
Road_Centerlines	IncMuni_R	Mandatory
Road_Centerlines	Parity_L	Mandatory
Road_Centerlines	Parity_R	Mandatory
Road_Centerlines	St_Name	Mandatory
Road_Centerlines	State_L	Mandatory
Road_Centerlines	State_R	Mandatory
Road_Centerlines	ToAddr_L	Mandatory
Road_Centerlines	ToAddr_R	Mandatory
Road_Centerlines	Effective	Optional
Road_Centerlines	Expire	Optional
Road_Centerlines	NbrhdCom_L	Optional
Road_Centerlines	NbrhdCom_R	Optional
Road_Centerlines	OneWay	Optional
Road_Centerlines	PostCode_L	Optional
Road_Centerlines	PostCode_R	Optional
Road_Centerlines	PostComm_L	Optional
Road_Centerlines	PostComm_R	Optional
Road_Centerlines	RoadClass	Optional
Road_Centerlines	SpeedLimit	Optional
Road_Centerlines	UnincCom_L	Optional
Road_Centerlines	UnincCom_R	Optional
Road_Centerlines	Valid_L	Optional

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Road_Centerlines	Valid_R	Optional
Site_Structure_Address_Points	St_Name	Conditional
Site_Structure_Address_Points	AddCode	Conditional
Site_Structure_Address_Points	AddDataURI	Conditional
Site_Structure_Address_Points	AddNum_Pre	Conditional
Site_Structure_Address_Points	AddNum_Suf	Conditional
Site_Structure_Address_Points	Add_Number	Conditional
Site_Structure_Address_Points	ESN	Conditional
Site_Structure_Address_Points	LSt_Name	Conditional
Site_Structure_Address_Points	LSt_PosDir	Conditional
Site_Structure_Address_Points	Lst_PreDir	Conditional
Site_Structure_Address_Points	LSt_Type	Conditional
Site_Structure_Address_Points	LandmkName	Conditional
Site_Structure_Address_Points	MSAGComm	Conditional
Site_Structure_Address_Points	Mile_Post	Conditional
Site_Structure_Address_Points	St_Name	Conditional
Site_Structure_Address_Points	St_PosDir	Conditional
Site_Structure_Address_Points	St_PosMod	Conditional
Site_Structure_Address_Points	St_PosTyp	Conditional
Site_Structure_Address_Points	St_PreDir	Conditional
Site_Structure_Address_Points	St_PreMod	Conditional
Site_Structure_Address_Points	St_PreSep	Conditional
Site_Structure_Address_Points	St_PreTyp	Conditional
Site_Structure_Address_Points	Country	Mandatory
Site_Structure_Address_Points	County	Mandatory
Site_Structure_Address_Points	DateUpdate	Mandatory
Site_Structure_Address_Points	DiscrpAgID	Mandatory
Site_Structure_Address_Points	Inc_Muni	Mandatory
Site_Structure_Address_Points	Site_NGUID	Mandatory
Site_Structure_Address_Points	State	Mandatory
Site_Structure_Address_Points	Addtl_Loc	Optional
Site_Structure_Address_Points	Building	Optional
Site_Structure_Address_Points	Effective	Optional
Site_Structure_Address_Points	Elevation	Optional
Site_Structure_Address_Points	Expire	Optional

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Site_Structure_Address_Points	Floor	Optional
Site_Structure_Address_Points	Lat	Optional
Site_Structure_Address_Points	Long	Optional
Site_Structure_Address_Points	Nbrhd_Comm	Optional
Site_Structure_Address_Points	Place_Type	Optional
Site_Structure_Address_Points	Placement	Optional
Site_Structure_Address_Points	Post_Code	Optional
Site_Structure_Address_Points	Post_Code4	Optional
Site_Structure_Address_Points	Post_Comm	Optional
Site_Structure_Address_Points	Room	Optional
Site_Structure_Address_Points	Seat	Optional
Site_Structure_Address_Points	Uninc_Comm	Optional
Site_Structure_Address_Points	Unit	Optional

14.4.10.2 Strongly Recommended Layers

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Complete_Landmark_Name_Alias_Table	ACLandmark	Conditional
Complete_Landmark_Name_Alias_Table	ACLMNNGUID	Mandatory
Complete_Landmark_Name_Alias_Table	DateUpdate	Mandatory
Complete_Landmark_Name_Alias_Table	DiscrpAgID	Mandatory
Complete_Landmark_Name_Alias_Table	Site_NGUID	Mandatory
Complete_Landmark_Name_Alias_Table	Effective	Optional
Complete_Landmark_Name_Alias_Table	Expire	Optional
Counties	CntyNGUID	Mandatory
Counties	Country	Mandatory
Counties	County	Mandatory
Counties	DateUpdate	Mandatory
Counties	DiscrpAgID	Mandatory
Counties	State	Mandatory
Counties	Effective	Optional
Counties	Expire	Optional
Incorporated_Muni_Boundary	AddCode	Conditional
Incorporated_Muni_Boundary	DateUpdate	Mandatory
Incorporated_Muni_Boundary	Country	Mandatory
Incorporated_Muni_Boundary	County	Mandatory

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Incorporated_Muni_Boundary	DiscrpAgID	Mandatory
Incorporated_Muni_Boundary	IncM_NGUID	Mandatory
Incorporated_Muni_Boundary	Inc_Muni	Mandatory
Incorporated_Muni_Boundary	State	Mandatory
Incorporated_Muni_Boundary	Effective	Optional
Incorporated_Muni_Boundary	Expire	Optional
Landmark_Name_Part_Table	ACLMNNGUID	Conditional
Landmark_Name_Part_Table	LMNP_NGUID	Conditional
Landmark_Name_Part_Table	Site_NGUID	Conditional
Landmark_Name_Part_Table	DateUpdate	Mandatory
Landmark_Name_Part_Table	DiscrpAgID	Mandatory
Landmark_Name_Part_Table	LMNP_Order	Mandatory
Landmark_Name_Part_Table	LMNamePart	Mandatory
Landmark_Name_Part_Table	Effective	Optional
Landmark_Name_Part_Table	Expire	Optional
Neighborhood_Comm_Boundary	AddCode	Conditional
Neighborhood_Comm_Boundary	UnincCommB	Conditional
Neighborhood_Comm_Boundary	DateUpdate	Mandatory
Neighborhood_Comm_Boundary	DiscrpAgID	Mandatory
Neighborhood_Comm_Boundary	Country	Mandatory
Neighborhood_Comm_Boundary	County	Mandatory
Neighborhood_Comm_Boundary	Global ID	Mandatory
Neighborhood_Comm_Boundary	Inc_Muni	Mandatory
Neighborhood_Comm_Boundary	Nbrhd_Comm	Mandatory
Neighborhood_Comm_Boundary	State	Mandatory
Neighborhood_Comm_Boundary	Effective	Optional
Neighborhood_Comm_Boundary	Expire	Optional
States	DateUpdate	Mandatory
States	DiscrpAgID	Mandatory
States	Country	Mandatory
States	Global ID	Mandatory
States	State	Mandatory
States	Effective	Optional
States	Expire	Optional
Street_Name_Alias_Table	ALStName	Conditional

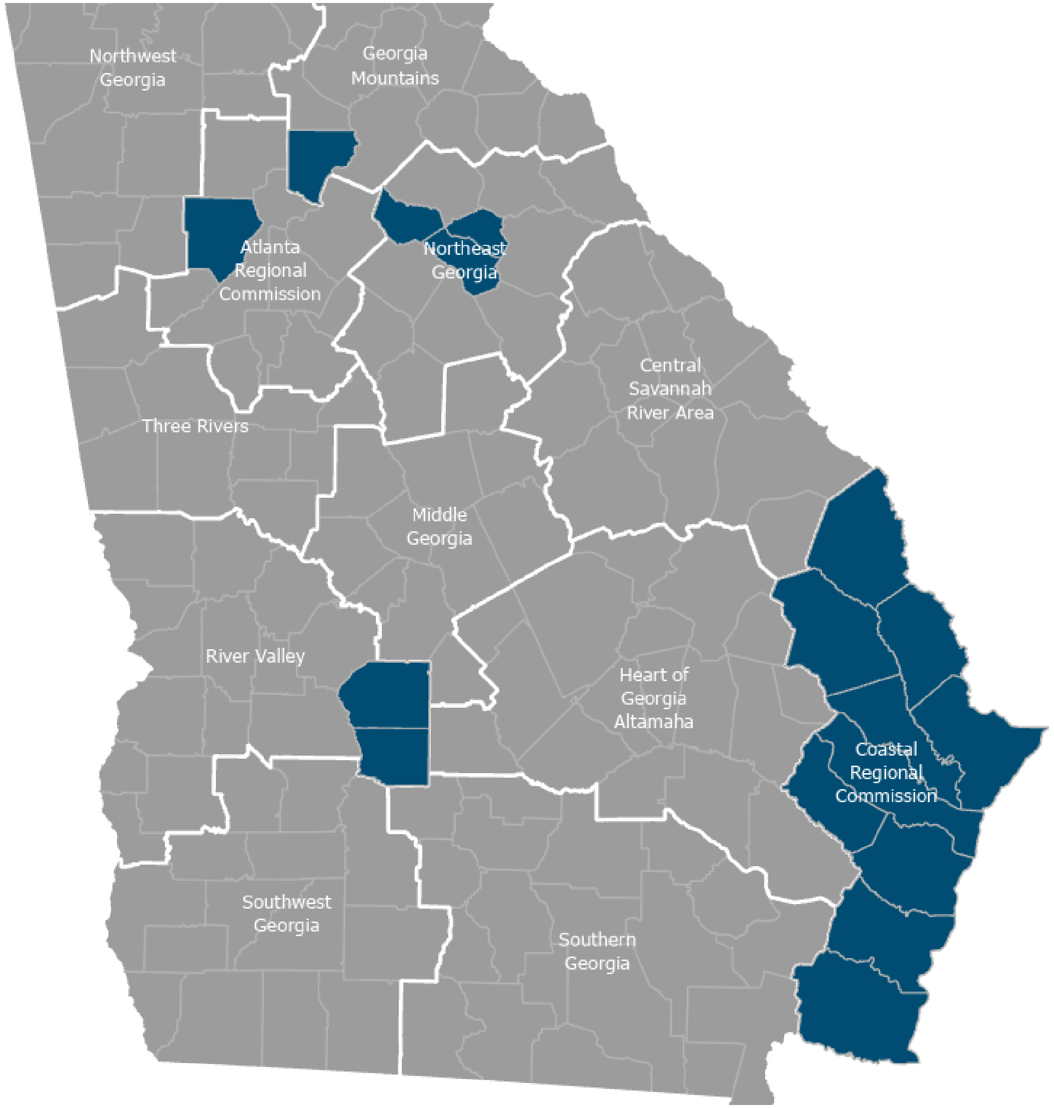
Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Street_Name_Alias_Table	ALStPosDir	Conditional
Street_Name_Alias_Table	ALStPreDir	Conditional
Street_Name_Alias_Table	ALStTyp	Conditional
Street_Name_Alias_Table	Ast_PosDir	Conditional
Street_Name_Alias_Table	Ast_PosMod	Conditional
Street_Name_Alias_Table	Ast_PosTyp	Conditional
Street_Name_Alias_Table	Ast_PreDir	Conditional
Street_Name_Alias_Table	Ast_PreMod	Conditional
Street_Name_Alias_Table	Ast_PreSep	Conditional
Street_Name_Alias_Table	Ast_PreTyp	Conditional
Street_Name_Alias_Table	DateUpdate	Mandatory
Street_Name_Alias_Table	DiscrpAgID	Mandatory
Street_Name_Alias_Table	Ast_NGUID	Mandatory
Street_Name_Alias_Table	Ast_Name	Mandatory
Street_Name_Alias_Table	RCL_NGUID	Mandatory
Street_Name_Alias_Table	Effective	Optional
Street_Name_Alias_Table	Expire	Optional
Unincorporated_Comm_Boundary	AddCode	Conditional
Unincorporated_Comm_Boundary	DateUpdate	Mandatory
Unincorporated_Comm_Boundary	DiscrpAgID	Mandatory
Unincorporated_Comm_Boundary	Country	Mandatory
Unincorporated_Comm_Boundary	County	Mandatory
Unincorporated_Comm_Boundary	Global ID	Mandatory
Unincorporated_Comm_Boundary	State	Mandatory
Unincorporated_Comm_Boundary	Uninc_Comm	Mandatory
Unincorporated_Comm_Boundary	Effective	Optional
Unincorporated_Comm_Boundary	Expire	Optional

14.4.10.3 Recommended Layers

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Cell_Site_Location	Cmarket_ID	Conditional
Cell_Site_Location	Csite_Name	Conditional
Cell_Site_Location	ESRD_ESRK	Conditional
Cell_Site_Location	ESRK_Last	Conditional
Cell_Site_Location	Lat	Conditional

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Cell_Site_Location	Long	Conditional
Cell_Site_Location	Site_ID	Conditional
Cell_Site_Location	Switch_ID	Conditional
Cell_Site_Location	CSctr_Ornt	Mandatory
Cell_Site_Location	Cell_NGUID	Mandatory
Cell_Site_Location	Country	Mandatory
Cell_Site_Location	County	Mandatory
Cell_Site_Location	DateUpdate	Mandatory
Cell_Site_Location	DiscripAgID	Mandatory
Cell_Site_Location	Sector_ID	Mandatory
Cell_Site_Location	State	Mandatory
Cell_Site_Location	Technology	Mandatory
Cell_Site_Location	Site_NGUID	Optional
Hydrology_Line	DateUpdate	Mandatory
Hydrology_Line	DiscripAgID	Mandatory
Hydrology_Line	Global ID	Mandatory
Hydrology_Line	HS_Name	Optional
Hydrology_Line	HS_Type	Optional
Hydrology_Polygon	DateUpdate	Mandatory
Hydrology_Polygon	DiscripAgID	Mandatory
Hydrology_Polygon	Global ID	Mandatory
Hydrology_Polygon	HP_Name	Optional
Hydrology_Polygon	HP_Type	Optional
Mile_Marker_Location	MileM_Type	Conditional
Mile_Marker_Location	MileM_Unit	Conditional
Mile_Marker_Location	DateUpdate	Mandatory
Mile_Marker_Location	DiscripAgID	Mandatory
Mile_Marker_Location	Global ID	Mandatory
Mile_Marker_Location	MileMValue	Mandatory
Mile_Marker_Location	MileM_Ind	Mandatory
Mile_Marker_Location	MileM_Rte	Mandatory
Railroad_Centerlines	RLOP	Conditional
Railroad_Centerlines	RLOWN	Conditional
Railroad_Centerlines	DateUpdate	Mandatory
Railroad_Centerlines	DiscripAgID	Mandatory

Layer Name	Attribute Name	Attribute Type (Mandatory, Conditional, Optional)
Railroad_Centerlines	Global ID	Mandatory
Railroad_Centerlines	RLNAME	Optional
Railroad_Centerlines	RMPH	Optional
Railroad_Centerlines	RMPL	Optional



Data Mitigation Pilot

<u>Goal:</u> Practice the Phased Approach as identified in the Geospatial Data Standards and Best Practices document by employing recommended steps to bring data up to speed.

<u>Recommended focus areas (in blue):</u> **<u>(Would like GECA Board to Approve):</u>**

- Barrow/Athens/Oconee
- Crisp Dooley
- Coastal Regional Commission
- Cobb and Forsyth (perhaps expand to include coordination with Roswell, Fulton, Alpharetta)

<u>Timeline and Resources</u>: beginning Fall 2021 extending to March 2022, using Federal Grant Funds.

<u>Scope</u>:

- Collect, validate, map existing data
- Perform Boundary Workshops to build/shore up the jurisdictional boundaries between communities and their neighbors
- Guide Communities in developing a data flow and feedback loop for data (How do we do things now? How might we do things better?)
- Perform data mitigation to improve the quality of road centerlines, site structure address points utilizing the Georgia Geospatial Data Standards and Best Practices for NG9-1-1.

Modernizing 911 in Georgia

October 31, 2021

State Fiscal Recovery Fund

Economic Impact Committee

Contents

Proposal Summary

Today, there are striking technological and operational disparities between Georgia 150+ 911 centers that COVID-19 has only exacerbated. There are 911 centers in the state that struggle with basic functionality while others are on the cutting edge of technology. This large disparity between 911 centers makes it difficult to ensure that a consistent, quality 911 service is delivered consistently to every caller across the state.

Our project focuses on implementing a statewide Internet-protocol (IP)-based network known as Next Generation 911 (NG911) and the necessary support to ensure the system works effectively and efficiently. We are requesting $56,512,944.00 to be used over a three-year period to cover the implementation of this new technology, data support, and cybersecurity assessments. The impact of this technology upgrade will be felt statewide and has the potential to affect every citizen and visitor in Georgia.

NG911 is important in Georgia because it will:

- Help 911 centers more accurately locate a caller
- Ensure calls are routed to the correct 911 centers
- Enable data sharing across jurisdictional boundaries
- Allow texts, pictures, and videos to flow from callers to emergency responders
- Increase 911 accessibility to communities with communications disabilities

Our primary goal through this project is to ensure that any person calling 911 in the state of Georgia will have the same opportunity for a quality level of service, regardless of location, and to update 911 technology to the place where the public already thinks it is.

Modernizing 911 in Georgia consists of three (3) projects:

- NG911 Technology Implementation and Project Management: $46,505,515.00 and $354,496.00
    - The Georgia Emergency Communications Authority will manage a contract with an emergency communications vendor to implement an Emergency Services IP-network (ESInet) and the Next Generation Core Services (NGCS) that will connect to each 911 center in the state.
- Geographic Information System (GIS) Data Development and Maintenance: $7,172,933.00
    - The Department of Community Affairs, through the Georgia Geospatial Information Office (GIO), will create and manage, for the first time, statewide geospatial data that will empower the NG911 system
- Cybersecurity Assessments: $2,480,000
    - GECA will contract with a third-party provider to conduct cybersecurity and physical security assessments at each of the primary 911 centers. The assessments will provide the 911 centers with an understanding of their baseline status and increased awareness of vulnerabilities.

Description of the Issue

COVID-19 Impacts in the 911 Center

COVID-19 has impacted the operations of every 911 center regarding personnel, operations, and/or technology. Based on a recent survey to 911 Directors, nearly 10% of the state's 911 personnel have tested positive from COVID-19. This is due, at least in part, to the layout of most 911 centers which do not allow for social distancing and the 8, 10, and 12 hour shifts that 911 personnel work in proximity of each other. Additionally, Georgia has lost at least fourteen (14) 911 personnel due to COVID-19 or complications arising from COVID-19. On the operational component of 911, over 76% of centers have seen an increased call volume since the start of the COVID-19 pandemic in March 2020. Over half of our 911 centers have had to delay hardware, software, or other technology updates/upgrades due to COVID-19 because of delays in getting the necessary parts and centers having to close their doors to visitors because of COVID-19 protocols. There was a staffing shortage in 911 across the state prior to the pandemic and it has only exacerbated the problem. Currently, there are 911 centers in the state that are having to transfer calls to other 911 centers because they do not have the staffing in place for certain shifts. This inevitably leads to a delay in dispatching first responders and in the world of public safety and 911, seconds save lives.

911 centers in Georgia were not able to take advantage of the many benefits of NG911 during COVID-19. Virtually every 911 center in the state is working on outdated technology that has not kept up with the times. The telephony technology in most of our 911 centers is from the 1990s, at best. In 2021, where Uber and Lyft can find you down to your curbside location, 911 centers struggle daily finding wireless 911 callers and with 85% of all 911 calls coming from a cell phone, this can have major, life or death consequences. This legacy technology that is present in 911 centers today cannot natively accept enhanced caller location information that could be delivered from the cell phone or the cell phone carrier to the 911 center. Today, wireless calls are routed to 911 centers via triangulation of cell phone towers. This way of determining location is outdated and inaccurate and leads to misroutes of hundreds of emergency calls to the wrong jurisdiction daily. Part of this problem is that the telephony technology present today in 911 centers is, in large part, still copper line based. Many of these lines have been in the ground for decades and have been spliced together causing delays in call connection times to 911 centers and degraded voice clarity once the call gets to the 911 center. Additionally, copper line-based technology was only built for voice traffic in a time when cell phones did not exist. Right now, you can text and send pictures and videos to someone across the globe, but you cannot do the same with 911.

911 centers are funded by a 911 fee that is levied on phone bills monthly. On average, only 55% of a center's budget is covered by 911 fees. The remaining dollars come from local general fund appropriation and larger projects such as technology and center upgrades are covered by capital improvement plans and SPLOST. Very few centers will ever be able to upgrade their technologies to NG911 on their own.

Leveraging economics of scale and increased purchasing power, GECA would be able to procure a statewide solution with these State Fiscal Recovery Fund dollars.

No statewide GIS management processes currently

To take full advantage of the improved capabilities that NG911 provides 911 centers, the State of Georgia must have accurate and complete GIS or mapping data. These data are the threads that tie the network together. Specifically, the NG911 system requires several map-based datasets. These geospatial datasets are simply a digitized representation of the "real world" that enable modeling inside the network. The mandatory geospatial datasets required, as defined by the National Emergency Number Association and Georgia Geospatial Data Standards and Best Practices for NG9-1-1 are:

1. Site/Structure Address Points
2. Routable Road Centerlines
3. 911 Center Jurisdictional Boundaries
4. Law Enforcement Boundaries
5. Fire Boundaries
6. EMS Boundaries
7. Aerial Imagery

These seven datasets do not current exist at a state scale and must exist if Georgia is going to fully leverage the life-saving tools available in an NG911 environment. It is necessary to make these one-time investments to build these datasets seamlessly and at a state-scale. These datasets will be developed in partnership with 911 centers; city, county, and regional GIS departments; and other state and local partners.

In addition to the lack of statewide datasets, the lack of state-level coordination and the access to accurate address data prevented the best situational awareness possible for first responders. For over a year, GECA shared anonymized address data from the Georgia Department of Public Health (DPH) with 911 centers with the intent of making first responders aware if they were responding to an address with any COVID-19 positive residents. Unfortunately, because GECA, DPH, or local 911 centers did not have access to a system that contained validated addresses, the data being shared often contained errors and, in some cases, resulted in addresses not being able to be verified or mapped. This project will enable the state to build this data and data maintenance processes once and use it in many ways.

Cybersecurity concerns in an IP-connected environment

Most 911 centers rely on their county or city-managed IT departments for cybersecurity protections. In many cases, the 911 center is treated the same as any other department without additional server, network, or other considerations made. There have been cases across the state and country of malware and ransomware attacks that have taken down 911 centers for considerable amounts of time because of the typical cookie cutter approach to cybersecurity in 911. As we transition to an IP-connected 911 system, it's imperative that 911 centers have as many tools as possible to protect themselves, inside and out. Additionally, the vast majority of 911 centers do not have funding available to perform cybersecurity assessments and/or implement any recommendations made during an assessment.

Project Design and Implementation

Project #1: NG911 Technology Implementation and Project Management

The Georgia Emergency Communications Authority will work with a project management consultant that will assist in the development of a Request for Proposal (RFP) document for a statewide NG911 system consisting of the IP transport network, the Emergency Services IP-network (ESInet), and the services needed to process 911 requests within the NG911 environment, the Next Generation Core Services (NGCS). RFP development and contract negotiation is expected to take 10 months to 1 year.

Once a NG911 vendor is selected, in Year 2, GECA will work with our 911 centers and the vendor to develop a technology implementation timeline for each center. The vendor would be responsible for network connectivity, utilizing new or existing circuits, at each center as well as the NGCS setup. Once the centers have connectivity and core services set up, the vendor would begin testing and training on the new network with call cutovers to the new system once testing and training has occurred. Due to the number of 911 centers in Georgia, it will take up to two years for full implementation.

To ensure the NG911 vendor is following the requirements laid out in the RFP, GECA will continue to work with the project management consultant. The consultant will develop various matrices to ensure the vendor is delivering on all requirements. Additionally, there will be validation work done to ensure that the NG911 system is performing as expected.

This improved technology would allow 911 centers to take advantage of remote call taking and dispatching. As highlighted in an *Urgent Communications* article from May 2020, "with the remote option, telecommunicators can remain productive, even if they are in a situation where policy calls for them to be quarantined" and "[t]his reduction in sick leave also means telecommunicators are not being forced to extend their shifts beyond the scheduled time as often." This remote option also extends beyond COVID-19 and would provide greater flexibility during an event or disaster that would prevent 911 personnel from getting to the 911 center.

Moving to the standards-based, IP-enabled system will allow our 911 centers to receive more accurate caller location information and allow the centers to be able to receive texts, pictures, and videos from Georgia citizens and visitors. This critical information could then be shared with first responders to improve their response efforts.

Project #2: Geographic Information System (GIS) Data Development and Maintenance

Geospatial data plays an integral role in how governments make decisions and conduct work all around the world, every day. If Georgia wants to be competitive, it must modernize the way it manages these valuable geospatial assets. A recent survey of 911 centers and GIS data creators illustrates this need, when it found that nearly 70% of the State currently lacks the data and processes needed to support a migration to NG911. This ARPA Project (Project) will close that significant gap and ensure the required data can be ready to support State and local governments through the migration and beyond.

The State Geospatial Information Office (GIO) will lead all activities listed below, on behalf of GECA, and in partnership with local and State data creators as well as several private sector experts who specialize in geospatial and data science. This Project will protect and expand the significant investment already made towards Georgia's migration to a modern Next Generation 911 system. In funding this ARPA Project, the State will capitalize, and expand, on work already accomplished through funding from a Federal NG911 Grant and matched by State funds from GECA. Without ARPA, or a similar funding plan, the State risks losing the momentum already achieved, putting Georgia further behind the rest of the nation.

At the end of this three-year Project, the GIO's NG911 Data Program (Program) will have developed all the components necessary to support the short and long-term goals of Georgia's migration, at both the local and state scale. A collection of tasks, outlined below, will be performed, some finite, others ongoing, but all with the singular mission of getting Georgia's geospatial data NG911 ready.

The mandatory data a fully-fledged NG911 system demands includes at a minimum: Site/Structure Address points, Road Centerlines, Emergency Service Boundaries (Fire, EMS, Police), Public Safety Answering Point Boundaries, and Provisioning Boundaries. It also demands those data to be seamless, adhere to the Georgia Geospatial Data Standard, current, interoperable, and be continuously, securely, and consistently validated. In short, these new demands placed on data are significant and require substantial coordination and partnership with local and State governments; enabled through common platforms, tools, education, and additional supportive data.

As a first step to meet these new demands, the GIO has developed the NG911 Data Program and a supporting Strategic Plan, focused entirely on building and maintaining the data and processes needed by the State's 911 community. The Program is governed by the strategy, which sets its direction and establishes priorities. The strategy defines success, outlines the steps to achieve it, and prioritizes the activities to get there.

Educational & Technical Support

Georgia Local Authorities are our very best and most precious resource. Local, institutional knowledge cannot be replaced by contractors. An investment in training and building up our local government data authorities will be a benefit to the constituents who are served by them, and last well into the future. A robust general education campaign, and an in-depth technical support program must be established to help ensure a smooth transition to NG911. The building blocks of all NG911 data come from local governments. They are after all, creating and managing the addresses, roads, and the service delivery strategies this Project aims to operationalize for 911 through mapping technologies. Local data authorities, who manage digital representations of roads and addresses in a computer, have never been asked to curate data that will be used to help save lives. Nor do they currently curate their data in a manner that meets NG911 demands.

Data Collection, Cross Jurisdictional Reconciliation, and Data Quality Assurance and Aggregation

One of the core tasks of this Project is the massive undertaking to baseline all required data across the State, which includes: 1) gathering all existing address and road centerline data 'as-is' (meaning the data will have gaps, overlaps, and missing elements required by NG911) from each of Georgia's nearly 700 local governments; 2) work with those who do not have the data already to create it; 3) translate all of that data into the Georgia GIS Data Standard, and finally; 4) analyzing the entire data collection for errors along administrative borders (which will result in significate disconnects as data management has never been coordinated in Georgia across city and county lines). Modern GIS tools will be used to automate these activities, and all local governments will have access to a common toolbelt to facilitate their work, saving them significant time and money, and making data management feasible. In the beginning, this task will require significant investment to even get to a strong starting point, however, once that baselining exercise is complete, tools and processes will be put in place to automate most of the work, and the Program will enter maintenance mode where work will be less intense.

Infrastructure & Application Development/Maintenance

Another core component of this Project is the development of shared resources the entire State can use to support migration. The GIO will provide shared enterprise infrastructure, tools, and applications to facilitate their work (as opposed to doing the work in silos, potentially 700 different ways). This extremely cost-effective approach is fully supported by other US states, further down the road on NG911 migration.

To that end, the GIO is investing in flexible, configurable tools, platforms, and processes, which are designed to save time, money, and be used multiple ways. For example, over the past 3 years, the GIO partnered with GECA, Georgia Technology Authority leadership, and national subject matter experts to scope, design, and build a cloud-based Enterprise Spatial Data Infrastructure (SDI). This robust, secure ecosystem will not only meet the immediate demands of NG911 for the State and all local governments but is ready to scale to any level to meet all future demands.

Engage Stakeholders (public/private outside 911)

Critical to success are the use and dependencies made on data developed for this Project. State and public partnerships designed around these data ensure it can be used many ways, realizing significant economies of scale. Therefore, within this portion of the Project the GIO will engage a wide array of stakeholders from both the public and private sector to ensure all data is leveraged to its fullest capacity, such as: ensure all State agencies utilize the master address dataset to support their relevant business functions; enable statewide geocoding services to all State agencies; partner with navigation giants like Google, Apple, TomTom and HERE to automatically ensure all new roads and addresses appear on these vendors tools as soon as they are known to the statewide datasets and; eliminate existing duplicative, siloed data development &/or purchasing across State agencies.

Service Delivery Boundary Reconciliation

In Georgia, cities and counties utilize a process called Service Delivery Strategies (SDS) to define which government services (water, sewer, fire, police, etc…) citizens will receive from either the city or the county, depending on geographic location, and how such services will be funded. SDS's are intended to minimize inefficiencies resulting from gaps or duplicative service delivery, and competition between local governments for resources. They also provide a mechanism to resolve disputes over local government service delivery, funding equity, and land use.

Unfortunately, conflicts do occur, due in large part to the lack of clearly defined boundaries of service delivery areas, which historically have never existed in a digital format, nor been consistently delineated in strategy documentation (e.g. vaguely described in words only, or with a printed map on which a highlighter is used to hand draw boundaries where the width of the pen itself spans a two block width on the map, making it impossible to know if the city or the county is responsible for those hundreds of homes and businesses beneath the wide marker line).

Through this ARPA Project, the GIO, guided by many stakeholders such as DCA, GMA, and ACCG will fix this problem and develop the tools and processes to dramatically streamline the delineation of SDS boundaries now and into the future. This ARPA Project will specifically allow for: 1) the creation of draft base maps for Fire, EMS, Police, and PSAP boundaries, based on existing SDS documents dating back to approximately 2000; 2) a series of workshops statewide with relevant stakeholders (Fire, Police, EMS leadership) to validate &/or reconcile the newly created SDS boundary base maps; and 3) the development of tools and business-logic based processes to facilitate all future SDS boundary changes. While many of the tasks will be technical, this portion of the Project will rely largely on strong communication and interpersonal skills. A multitude of subtasks will take place, from collecting data where it exists, creating it where it is missing, facilitating meetings when boundaries are disputed and gaining resolution, and refining an efficient means for keeping boundaries in sync with the legal documentation that defines them into the future.

Cybersecurity

The GIO has been and will continue throughout this Project to work together with the Georgia Technology Authority to maintain security and integrity of the data collected and ultimately served to the ESInet. While the GIO has built its infrastructure with cybersecurity as the guiding principle, as Georgia's migration to NG911 evolves, security demands will increase, especially as more partners are engaged.

Manage statewide Orthoimagery Program

Orthoimagery is a critical component of Georgia's NG911 data strategy, as it is the common base map on which all data will be built and maintained. Beyond this critical need, there are countless other use cases for the imagery throughout local and State government, such as facilitating revenue generation for tax assessors, responding to emergencies and natural disasters, doing change detection on the States forestry assets, or supporting precision agriculture. Running a statewide imagery program saves local and agencies from acquiring this necessary resource on their own, ensuring access to higher quality, consistent, and more current base maps for all. Imagery Programs are a key component of any well-appointed state Geospatial Information Office, as it must be in Georgia.

Systems/Data Integration Testing & Systems/Data Integration Refinement

Related to infrastructure and application development activities is support of the coming ESInet. GECA, the GIO, and ultimately the contractors responsible for the ESInet must coordinate seamlessly with each other, throughout design and implementation phases of ESInet deployment. At the core of this collaboration for the GIO will be data integration testing and process refinement to ensure all systems are designed to work seamlessly together.

Strategy/Automation Process Refinement

Once an ESInet is implemented, there will be adjustments required to GIO tools and processes. Though all strategies, tools, and processes have anticipated the exact needs of the ESInet, once it is fully implemented, automated processes will require minor adjustments. A standard agile process of designing, building, testing, and deploying will be in place to facilitate refinements and if necessary, build new data flows, processes, and feedback loops.

At the end of the three-year Project:

At the end, all geospatial-related aspects of the migration to NG911 will be in place to enable location-based call routing. Every local data authority will have the ability to validate their data for acceptance into the State repository, daily. Once provisioned for the ESInet, there will be a clean, intuitive process by which data issues are communicated back to locals when necessary, and data is shared for all to use (supporting 911 and thousands of other government functions).

Project #3: Cybersecurity Assessments

To better protect our 911 centers and NG911 network, GECA will contract with a cybersecurity consultant to perform a cybersecurity assessment for each of Georgia's primary 911 centers. These evaluations will, in part, consist of performing an assessment of the call processing and computer aided dispatch networks as well as an assessment of the physical security of the 911 center. Other cybersecurity evaluations will include reviews of firewall security, remote access capabilities, intrusion detection, network penetration tests, and phishing exercises. Once each assessment is completed, the consultant will provide a report with vulnerabilities and recommendations for 911 centers to remedy the items identified during the assessment. It is expected to take approximately 18 months to perform a cybersecurity assessment at each of the 911 centers.

These assessments and reports will provide the 911 centers with an understanding of their baseline status and increased awareness of vulnerabilities. This project will generate greater visibility into the state's 911 infrastructure, which will be growing in complexity and sophistication as the state transitions to NG911.

Capabilities and Competencies

Project #1: NG911 Technology Implementation and Project Management

Vendor Management Consultant

GECA will utilize State Fiscal Recovery Fund dollars to contract with a third-party consultant that specializes in and has provided vendor management support to other states in their NG911 implementation to ensure that any timelines/milestones/deliverables are met before any funds are expended. The consultant would also assist in negotiations with vendors to ensure the best product at the best rate is selected. There will be a project manager assigned to serve as the single point of contact for the implementation validation. The project manager will collect and submit data to fulfill any reporting requirements.

GECA Staff

Internal to GECA, there are two administrative staff members, a Program Manager and a Special Projects and Operations Coordinator, that will assist the GECA Executive Director, Deputy Executive Director, and Financial Administrator in administering the grant and ensure project and fiscal accountability. GECA also has emergency communications field coordinators who are the day-to-day contact with the 911 centers and will continue to make sure information flows to and from the 911 centers. Both administrative staff members currently assist in the management of a training grant program and the program manager has previously assisted with data collection on other grants. GEMA/HS, the agency GECA is operationally attached to has a Federal Grants Administrator that currently provides data collection and submission support for GECA and will continue to do so for any future grant awards to GECA.

GECA Board of Directors

GECA is governed by a 15-member Board of Directors that will approve any contracts selecting a NG911 system and cybersecurity assessment provider(s). The Board will also be provided at least quarterly updates on the implementation timeline as well as the GIS Data Development and Maintenance and Cybersecurity Assessments.

Project #2: GIS Data Development and Maintenance

GIO Staff

A permanent, ongoing technical team will develop the statewide NG911 geospatial data including the initial build and ongoing maintenance. This new team will complement the existing Geospatial Information Officer and Geospatial Data Programs Manager. The Geospatial Data Programs Manager will be responsible for collecting and submitting any data to fulfill any reporting requirements.

- GIO Data Scientist
    - Govern the health and quality of all spatial data; oversee the collection storage, and interpretation of these data; and evaluate data for completeness and readiness for use statewide
- GIO Solutions Engineer
    - Manage enterprise data frameworks for all NG911 data; manage cloud, ESRI, third party, and stakeholder ecosystem; and provide oversight of IT hardware and software resources
- GIO Data Analyst
    - Support enterprise data frameworks for all NG911 data and provide technical support to local government staff
- GIO Data Project Manager & Outreach Coordinator
    - Engage and maintain relationships and communications with 911 and GIS communities by developing and maintaining communications, web pages, outreach webinars, training, and presentations to educate, training, and guide the GIS and 911 community
- Customer Success Manager
    - Ensure all GIO tools and processes are focused on ensuring GECA and 911 centers can more efficiently and effectively meet their goals; manager support tickets and escalation with vendors and local governments

Project #3: Cybersecurity Assessments

The contracted cybersecurity consultant will utilize their cybersecurity professionals to perform these assessments. A dedicated project manager will be assigned to GECA and will be the single point of contact to ensure the assessments are being performed as contracted. The project manager will collect and submit data to fulfill any reporting requirements. The updates to GECA staff will allow GECA staff to monitor progress of the project.

Plan for Collecting the Data Required

All project activities would qualify as Negative Economic Impact and more specifically Aid to Other Impacted Industries. The implementation of this project would create technological equity among all part of the state and provide vulnerable and negative economically affected populations the same type of connectivity to 911 regardless of location in the state. GECA, the Project Management Consultant, NG911 Vendor, GIO, and the Cybersecurity Assessment Provider will report any information that is required of Negative Economic Impact projects found in the Compliance and Reporting Guidance.

Project #1: NG911 Technology Implementation and Project Management

Project Management Consultant will assist GECA staff in measuring project performance and collect any data on milestones/deliverables from the RFP being met via matrices derived from the winning proposal. The NG911 network will be tested for connectivity, reliability, redundancy, and interoperability. Additionally, the NG911 Vendor will install NG911 circuits and equipment at the 911 center, set up Next Generation Core Services, perform testing and training, and finally "cutover" according to a pre-established timeline.

The Project Management Consultant will ensure the project is proceeding as planned by developing or performing the following:

- Traceability matrix for all requirements vendor committed to deliver
- Validation and gap analysis of vendor provided implementation plan
- Validation of vendor provided acceptance test plan
- Validation of vendor provided cutover plan
- Change management document
- Punchlist of outstanding action items
- Review and comment on vendor provided minutes from status meetings

Project #2: GIS Data Development and Maintenance

Critical to success and engagement of the entire team of stakeholders and partners is transparency and reporting of status and milestones, not only to the entire team but to Georgia citizens as well who will be thrilled to know the State is modernizing its 911 systems. Integrated into all GIO technical solutions and communications plan throughout this Project will be map-based status reports and dashboard visualizations showing progress over time. This will be combined with a well-maintained public website providing access to strategic plans, process documentation, and data itself --- celebrating success.

Project #3: Cybersecurity Assessments

GECA staff will monitor the cybersecurity assessment project and its vendor to ensure that the established assessment timelines are being met and work is being done accordingly. Staff will monitor status of each 911 center in required weekly updates from the cybersecurity assessment vendor to GECA.

The Cybersecurity Assessments will consist of:

- Project kickoff teleconference with each 911 center
- Technical teleconference with each 911 center to review technology and IP addresses to be monitored
- Onsite kickoff and installation of monitoring devices on each 911 center network
- Onsite physical security assessment of the 911 center
- 5-7 days of remote monitoring of each 911 center network
- Final report prepared and review in detail with each 911 center
- At least quarterly GECA Board meeting updates on overall progress of the project.

Budget

See Budget Narrative for full explanation.

Match Funds

While there are no match funds available right now, there is the potential to utilize additional 911 fees made available to GECA pending legislation passing during the 2022 Session of the Georgia General Assembly.

Supporting Documentation

The following items will be submitted as Supporting Documentation

Budget and Timeline Summary

Budget Narrative

NG911 Technology Implementation Budget

GIO Staff and Budget Documentation

Letters of Support from the following Associations:

- Georgia 911 Directors' Association
- Georgia Chapter of the Association of Public-Safety Communications Officials (GA-APCO)
- Georgia Chapter of the National Emergency Number Association (GA-NENA)
- Emergency Managers Association of Georgia (EMAG)
- Georgia Sheriffs' Association (GSA)
- Georgia Association of Chiefs of Police (GACP)
- Georgia Association of Fire Chiefs (GAFC)
- Georgia Emergency Medical Services Association (GEMSA)

- Association of County Commissioners of Georgia (ACCG)
- Georgia Municipal Association (GMA)

		Year 1	Year 2	Year 3	
Project #1	**NG911 Technology Implementation**		$ 23,345,310.00	$ 23,160,205.00	**$ 46,505,515.00**
	NG911 Project Management	$ 68,672.00	$ 155,904.00	$ 129,920.00	**$ 354,496.00**
Project #2	**GIS Data Development and Maintenance**	$ 3,157,003.00	$ 2,126,365.00	$ 1,889,565.00	**$ 7,172,933.00**
Project #3	**Cybersecurity Assessments**	$ 1,856,000.00	$ 624,000.00		**$ 2,480,000.00**
					$ 56,512,944.00

Project #1				
NG911 Technology Implementation* (Contracts)				
**Costs include Non-recurring + Monthly recurring costs*				
NG911 Circuits/Trunks		$ 4,264,762.50	$ 5,547,412.50	$ 9,812,175.00
NG911 Aggregation		$ 6,828,750.00	$ 6,731,250.00	$ 13,560,000.00
Next Generation Core Services		$ 11,130,360.00	$ 9,848,480.00	$ 20,978,840.00
Text Delivery		$ 1,121,437.50	$ 1,033,062.50	$ 2,154,500.00
		$ 23,345,310.00	**$ 23,160,205.00**	**$ 46,505,515.00**
NG911 Project Management (Consultant)				
Contract Negotiation	$ 42,688.00			
Implementation Support	$ 25,984.00	$ 155,904.00	$ 129,920.00	
	$ 68,672.00	**$ 155,904.00**	**$ 129,920.00**	**$ 354,496.00**
Project #2				
GIO Staff Cost (Personnel)	**$ 683,755.00**	**$ 671,855.00**	**$ 671,855.00**	**$ 2,027,465.00**
Salary	*$ 388,000.00*	*$ 388,000.00*	*$ 388,000.00*	*$ 1,164,000.00*
Fringe	*$ 191,955.00*	*$ 191,955.00*	*$ 191,955.00*	*$ 575,865.00*
Travel	*$ 80,000.00*	*$ 80,000.00*	*$ 80,000.00*	*$ 240,000.00*
Technology	*$ 23,800.00*	*$ 11,900.00*	*$ 11,900.00*	*$ 47,600.00*
Consultant Support Cost (Consultant)	**$ 1,390,748.00**	**$ 372,010.00**	**$ 142,710.00**	**$ 1,905,468.00**
Materials, Expenses, Software (Supplies)	**$ 707,500.00**	**$ 707,500.00**	**$ 700,000.00**	**$ 2,115,000.00**
ESRI Enterprise License Agreement	*$ 250,000.00*	*$ 250,000.00*	*$ 250,000.00*	*$ 750,000.00*
1Spatial	*$ 100,000.00*	*$ 100,000.00*	*$ 100,000.00*	*$ 300,000.00*
GISinc	*$ 50,000.00*	*$ 50,000.00*	*$ 50,000.00*	*$ 150,000.00*
Airnet	*$ 50,000.00*	*$ 50,000.00*	*$ 50,000.00*	*$ 150,000.00*
Azure Cloud	*$ 50,000.00*	*$ 50,000.00*	*$ 50,000.00*	*$ 150,000.00*

Boundary Reconciliation Software	*$ 200,000.00*	*$ 200,000.00*	*$ 200,000.00*	*$ 600,000.00*
Printed Boundary Maps	*$ 7,500.00*	*$ 7,500.00*		*$ 15,000.00*
Imagery (Supplies)	**$ 375,000.00**	**$ 375,000.00**	**$ 375,000.00**	**$ 1,125,000.00**
Imagery Provider	*$ 300,000.00*	*$ 300,000.00*	*$ 300,000.00*	*$ 900,000.00*
Imagery Hosting/Service Provider	*$ 75,000.00*	*$ 75,000.00*	*$ 75,000.00*	*$ 225,000.00*
	$ 3,157,003.00	**$ 2,126,365.00**	**$ 1,889,565.00**	**$ 7,172,933.00**
Project #3				
Cyber Assessment @ $16,000 x 155 911 Centers 116 centers in Year 1, 39 centers in Year 2 (Consultant)	**$ 1,856,000.00**	**$ 624,000.00**		**$ 2,480,000.00**
			Total Proj. Cost	$ 56,512,944.00

Project #	Year	Subcategory	Deliverable	Responsible Party
Project #1	Year 1	RFP	NG911 RFP Process	GECA/Project Management Vendor
Project #1	Year 1	RFP	NG911 RFP Negotiations	GECA/Project Management Vendor
Project #1	Year 1	RFP	Scoring tool and methodology	Project Management Vendor
Project #1	Year 1	RFP	SME support for response to vendor questions during procurement	Project Management Vendor
Project #1	Year 1	RFP	Support with contract negotiations	Project Management Vendor
Project #1	Year 2/3	Implementation	ESInet Connectivity	NG911 Vendor
Project #1	Year 2/3	Implementation	PSAP Equipment Installs	NG911 Vendor
Project #1	Year 2/3	Implementation	PSAP Call Handling Equipment Installs	Local 911 center
Project #1	Year 2/3	Implementation	Next Generation Core Services Setup	NG911 Vendor
Project #1	Year 2/3	Implementation	Testing	NG911 Vendor
Project #1	Year 2/3	Implementation	Training	NG911 Vendor
Project #1	Year 2/3	Implementation	Cutovers	NG911 Vendor
Project #1	Year 2/3	Vendor Management	Traceability matrix for all requirements vendor commited to deliver	Project Management Vendor
Project #1	Year 2/3	Vendor Management	Validation and gap analysis of vendor provided implementation plan	Project Management Vendor
Project #1	Year 2/3	Vendor Management	Validation of vendor provided acceptance test plan	Project Management Vendor
Project #1	Year 2/3	Vendor Management	Validation of vendor provided cutover plan	Project Management Vendor
Project #1	Year 2/3	Vendor Management	Change management document	Project Management Vendor
Project #1	Year 2/3	Vendor Management	Punchlist of outstanding action items	Project Management Vendor
Project #1	Year 2/3	Vendor Management	Review and comments on vendor provided minutes from status meetings	Project Management Vendor
Project #2	Year 1	Boundary Work	Build feedback loop strategy for boundaries	GIO and Contractor
Project #2	Year 1	Boundary Work	Build Feedback loop toolset for boundaries	GIO and Contractor
Project #2	Year 1	Boundary Work	Build out State level boundary datasets	GIO and Contractor
Project #2	Year 1	Boundary Work	Further develop rules for Boundary updates process	GIO and Contractor
Project #2	Year 1	Boundary Work	Perform 50% of the boundary workshops	GIO and Contractor
Project #2	Year 1	Boundary Work	Perform research on Service Delivery Strategies	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Build CAD translators	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Build out interface for connectivity with SI provider	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Build out Metadata requirements	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Collect Data from jurisdictions that have not already submitted data	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Coordinate feedback loop for cross jurisdiction data agreement (monitor)	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Cyber Audits and Monitoring	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Define roll out process for publishing data	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Faciliate Validation of all core datasets by Locals using tools	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Further customize tools and scripts to aid stakeholders with data mitigation and movement	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Further Refine validation and aggregation process for cross jurisdiction communication	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Monitor Progress on Data Mitigation	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Perform Quality Check on County, City, PSAP, Police, Fire, EMS data as a baseline (for those that have not yet submitted data)	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Perform regular testing and monitoring of environments and ecosystem	GIO and Contractor
Project #2	Year 1	Core Data Validation and Aggregation	Perform Statistical Analysis to monitor the healthy of all state datasets	GIO and Contractor
Project #2	Year 1	Outreach	Build out Educational and Guidance Documentation, websites	GIO and Contractor
Project #2	Year 1	Outreach	Connect data framworks by analyzing relationships and overlap	GIO and Contractor
Project #2	Year 1	Outreach	Coordinate with potential stakeholders via GIAC	GIO and Contractor
Project #2	Year 1	Outreach	Develop Data Mitigation plans for locals to follow	GIO and Contractor
Project #2	Year 1	Outreach	Manage access and provide technical assistance to 1Spatial users	GIO and Contractor
Project #2	Year 1	Outreach	Manage State Imagery Program	GIO and Contractor
Project #2	Year 1	Outreach	Monitor evolving NG911 requirements	GIO and Contractor
Project #2	Year 1	Outreach	Perform Partner Training and Outreach	GIO and Contractor
Project #2	Year 1	Outreach	Public data framworks statistics for Partners	GIO and Contractor
Project #2	Year 2	Boundary Work	Build out State level boundary datasets	GIO and Contractor
Project #2	Year 2	Boundary Work	Perform 50% of the boundary workshops	GIO and Contractor
Project #2	Year 2	Boundary Work	Suggest feedback loop strategy for boundaries	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Assist locals with ETL schemas (build additional scripts)	GIO and Contractor

Project #2	Year 2	Core Data Validation and Aggregation	Build out interface for connectivity with SI provider (cont)	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Build out Metadata tools	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Collect Data from jurisdictions that have not already submitted data	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Cyber Audits and Monitoring	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Faciliate Validation of all core datasets by Locals using tools	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Further expansion of backend space (increase cloud footprint as we accummulate more data)	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Monitor Progress on Data Mitigation	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Perform cross jurisdiction validation	GIO and Contractor
Project #2	Year 2	Core Data Validation and Aggregation	Perform Quality Check on County, City, PSAP, Police, Fire, EMS data as a baseline (for those that have not yet submitted data)	GIO and Contractor
Project #2	Year 2	Outreach	Build out Educational and Guidance Documentation	GIO and Contractor
Project #2	Year 2	Outreach	Dashboard/Reporting updates	GIO and Contractor
Project #2	Year 2	Outreach	Perform Partner Training and Outreach	GIO and Contractor
Project #2	Year 2	Outreach	Revisit Standards for updates based on ESInet provider	GIO and Contractor
Project #2	Year 2	Outreach	Website Updates	GIO and Contractor
Project #2	Year 3	Core Data Validation and Aggregation	Build out Metadata validations	GIO and Contractor
Project #2	Year 3	Core Data Validation and Aggregation	Cyber Audits and Monitoring	GIO and Contractor
Project #2	Year 3	Core Data Validation and Aggregation	ECRF pilot to test GIS in call routing	GIO and Contractor
Project #2	Year 3	Core Data Validation and Aggregation	Faciliate Validation of all core datasets by Locals using tools	GIO and Contractor
Project #2	Year 3	Core Data Validation and Aggregation	Monitor Progress on Data Mitigation	GIO and Contractor
Project #2	Year 3	Core Data Validation and Aggregation	Perform cross jurisdiction validation	GIO and Contractor
Project #2	Year 3	Core Data Validation and Aggregation	Perform Quality Check on County, City, PSAP, Police, Fire, EMS data as a baseline (for those that have not yet submitted data)	GIO and Contractor
Project #2	Year 3	Outreach	Dashboard/Reporting updates	GIO and Contractor
Project #2	Year 3	Outreach	Perform Partner Training and Outreach	GIO and Contractor
Project #2	Year 3	Outreach	Website Updates	GIO and Contractor
Project #3	Year 1/2	Cybersecurity Assessments	Project Kickoff Teleconference with each 911 Center	Cybersecurity Assessment Provider
Project #3	Year 1/2	Cybersecurity Assessments	Technical Teleconference with each 911 Center to review technology and IP addresses to be monitored	Cybersecurity Assessment Provider
Project #3	Year 1/2	Cybersecurity Assessments	Onsite Kickoff and installation of monitoring devices on each 911 center network	Cybersecurity Assessment Provider
Project #3	Year 1/2	Cybersecurity Assessments	Onsite physical security assessment of the 911 center	Cybersecurity Assessment Provider
Project #3	Year 1/2	Cybersecurity Assessments	5-7 days of remote monitoring of each 911 center network	Cybersecurity Assessment Provider
Project #3	Year 1/2	Cybersecurity Assessments	Final report prepared and reviewed in detail with each 911 center	Cybersecurity Assessment Provider
Project #3	Year 1/2	Cybersecurity Assessments	Quarterly (or as needed) GECA Board meeting updates on overall progress of the project.	Cybersecurity Assessment Provider

Georgia NG911 - Cost Summary

Number of PSAPs	**155**
Number of Diverse IP Connections to each PSAP	**2**
Annual Call volume	**19,000,000**
Number of Carriers	**130**
Number of POI's (1 per carrier)	**130**

Length of Contract in Years: 7

GA NG 911 Cost Summary Table	Total NRC Costs	Total NRC Year 2 (3/4 of 911 centers)	Total NRC Year 3 (1/4 of 911 centers)	Total MRC 7 yr Extended Costs	Total MRC Extended Costs Year 2	Total MRC Year 3 Extended Costs
Total Evaluated Non-Recurring Costs (NRC) - NG9-1-1 Trunks	**$ 185,250.00**	$ 138,937.50	$ 46,312.50			
Total Evaluated Cost (120 month of MRC) - NG9-1-1Trunks				**$ 38,507,700.00**	$ 4,125,825.00	$ 5,501,100.00
Total Evaluated Non-Recurring Costs (NRC) - Aggregation	**$ 3,165,000.00**	$ 2,373,750.00	$ 791,250.00			$ -
Total Evaluated Cost (120 month of MRC) - Aggregation				**$ 41,580,000.00**	$ 4,455,000.00	$ 5,940,000.00
Total Evaluated Non-Recurring Costs (NRC) - NGCS Specific	**$ 6,656,000.00**	$ 4,992,000.00	$ 1,664,000.00			$ -
Total Evaluated Cost (120 month of MRC) - NGCS Specific				**$ 57,291,360.00**	$ 6,138,360.00	$ 8,184,480.00
Total Evaluated Non-Recurring Costs (NRC) - Text	**$ 616,250.00**	$ 462,187.50	$ 154,062.50			$ -
Total Evaluated Cost (120 month of MRC) - Text				**$ 6,153,000.00**	$ 659,250.00	$ 879,000.00
Total Evaluated 1st year Labor Rate	**$ -**					
NRC Total	**$ 10,622,500.00**	$ 7,966,875.00	$ 2,655,625.00		$ 15,378,435.00	$ 20,504,580.00
120 month MRC Total				**$ 143,532,060.00**		$ 20,504,580.00
GRAND TOTAL (NRC + 120 months MRC) USED FOR EVALUATION				**$ 154,154,560.00**		

	Estimated Annual Cost	Estimated Monthly Cost
Estimated Annual Cost of NG9-1-1 Contract	$ 20,504,580.00	$ 1,708,715.00

	Year 2 (E+H)	Year 3 (F+I)	Total
NG911 Trunks	$ 4,264,762.50	$ 5,547,412.50	$ 9,812,175.00
NG911 Aggregation	$ 6,828,750.00	$ 6,731,250.00	$ 13,560,000.00
Next Generation Core Services	$ 11,130,360.00	$ 9,848,480.00	$ 20,978,840.00
Text Message Delivery	$ 1,121,437.50	$ 1,033,062.50	$ 2,154,500.00
	$ 23,345,310.00	**$ 23,160,205.00**	**$ 46,505,515.00**

GA NG 9-1-1 Circuit/Trunk Costs - All implementation/on going maintenance is all inclusive of costs

Assumes minimum of 2 IP connections and 1 LTE connection per PSAP

Number of PSAPs	155
Number of Diverse IP Connections to each PSAP	2
Annual Call volume	19,000,000

A	B	C	D	E	F	G	H	I
Line Item #	Feature Name	Feature Description	Quantity	Unit of Measure	Monthly Recurring Charge	Non-Recurring (One Time Charge)	Total Extended Annual Cost (D*Fx12mo)	Total Extended NRC Costs (D*G)
1.1.1	NG 9-1-1 One-time Circuit Install & Test	Service testing	465	Per Connection	-	150.0000	-	$ 69,750.00
1.1.2	NG 9-1-1 Alternate Technology to Support Diverse Path	NG 9-1-1 Diverse Path	0	Per Connection	100.0000			
1.1.3	NG 9-1-1 Monthly Circuit Cost (1 Mbps)	NG 9-1-1 Trunk - 1 Mbps	0	Per Connection	500.0000	-	$ -	-
1.1.4	NG 9-1-1 Monthly Circuit Cost (10 Mbps)	NG 9-1-1 Trunk - 10 Mbps	403	Per Connection	800.0000	-	$ 3,868,800.00	-
1.1.5	NG 9-1-1 Monthly Circuit Cost (100 Mbps)	NG 9-1-1 Trunk - 100 Mbps	31	Per Connection	2,400.0000	-	$ 892,800.00	-
1.1.6	NG 9-1-1 Monthly Circuit Cost (1000 Mbps)	NG 9-1-1 Trunk - 1000 Mbps	10	Per Connection	4,500.0000	-	$ 540,000.00	-
1.1.7	NG 9-1-1 Trunk SD WAN service	SD WAN Service	1	Statewide	5,000.0000	100,000.0000	$ 60,000.00	$ 100,000.00
1.1.8	NG 9-1-1 Trunk Data Center Cross Connects	Non-Bidder owned Data Center cross connections	77.5	Per Connection	150.0000	200.0000	$ 139,500.00	$ 15,500.00
	MRC Annual 12 month Total						$ 5,501,100.00	
	NRC Total							$ 185,250.00

GA NG 911 Aggregation Costs - All implementation/on going maintenance is all inclusive of costs

Number of PSAPs	155
Number of Diverse IP Connections to each PSAP	2
Annual Call volume	19,000,000
Number of Carriers	130
Number of POI's (1 per carrier)	130

A	B	C	D	E	F	G	H	I
Line Item #	Feature Name	Feature Description	Quantity	Unit of Measure	Monthly Recurring Charge	Non-Recurring (One Time Charge)	Total Extended Annual Cost (D*Fx12mo)	Total Extended NRC Costs (D*G)
1.2.1	NRC Project Initiation and Design	Aggregation Service Initialization	1	Statewide	-	500,000.0000	-	$ 500,000.00
1.2.2	OSP Integration MRC and NRC	Upon successful OSP integration into Aggregation	130	Per OSP	1,500.0000	20,000.0000	$ 2,340,000.00	$ 2,600,000.00
1.2.3	Prime Aggregation	Recurring cost for Statewide Aggregation Service for NGCS	1	Statewide	40,000.0000	-	$ 480,000.00	-
1.2.4	Point of Interconnection	Interconnection between disparate technologies such as originating carrier network and NG9-1-1 network	130	Per OSP	2,000.0000	500.0000	$ 3,120,000.00	$ 65,000.00
	MRC Annual 12 month Total						$ 5,940,000.00	
	NRC Total							$ 3,165,000.00

GA NG 911 Specific Costs - All implementation/on going maintenance is all inclusive of costs

Number of PSAPs	155	Number of ESInet Connections	2
Number of Diverse IP Connections to each PSA	2	Number of LDB Records	4,000,000
Annual Call volume	19,000,000		
Number of Carriers	130		
Number of POI's (1 per carrier)	130		

A	B	C	D	E	F	G	H	I
Line Item #	Feature Name	Feature Description	Quantity	Unit of Measure	Monthly Recurring Charge	Non-Recurring (One Time Charge)	Total Extended Annual Cost (D*Fx12mo)	Total Extended NRC Costs (D*G)
1.3.1	NGCS per NENA i3 requirements and standards - NRC is Non-Tarriff item	NGCS to include all functional elements	1	Statewide	600,000.0000	500,000.0000	$ 7,200,000.00	$ 500,000.00
1.3.2	LPG - Legacy PSAP Gateway	Interface service to the PSAP	155	Per PSAP	150.0000	-	$ 279,000.00	-
1.3.3	Regional Interoperability Connection and Integration (ESInet to ESInet) - Number of neighboring ESInets	ESInet to ESInet connection	4	Per ESInet	1,000.0000	100,000.0000	$ 48,000.00	$ 400,000.00
1.3.4	PSAP Integration Deployment	Implementation Services at each PSAP	155	Per PSAP		12,000.0000	$ -	$ 1,860,000.00
1.3.5	NG Service PSAP Integration	Managed Service at PSAP for Multiple ESInets	155	Per PSAP	100.0000	6,000.0000	$ 186,000.00	$ 930,000.00
1.3.6	System Monitoring and Dashboard Interface	Statewide System monitoring	1	Statewide	10,000.0000	-	$ 120,000.00	
1.3.7	Outage Reporting	Automated system for outage reporting	1	Statewide	5,000.0000	-	$ 60,000.00	
1.3.8	NRC Project Initiation and Design - Non-Tarriff item	Project Initialization for NGCS	1	Statewide		250,000.0000	$ -	$ 250,000.00
1.3.9	NRC New Technology Statewide Integration	Technologies beyond standard updates	1	Statewide		100,000.0000	$ -	$ 100,000.00
1.3.10	NRC New Technology PSAP Integration	Integration service at PSAP	155	Per PSAP		6,000.0000	$ -	$ 930,000.00
1.3.11	Statewide 911 GIS	Manage GIS Updates	155	Per PSAP	75.0000	1,000.0000	$ 139,500.00	$ 155,000.00
1.3.12	Call Data Record Management System / 9-1-1 Traffic Logging	Meta data and i3 logging	155	Per PSAP	75.0000	200.0000	$ 139,500.00	$ 31,000.00
1.3.13	GIS DB Editing Support	Complex editing service	200	Per Record Correction	1.1000	1,000,000.00	$ 2,640.00	1,000,000.00
1.3.14	GIS update process	Automated editing service	12,000	Per valid record	0.0250	-	$ 3,600.00	
1.3.15	LDB Editing Support	Complex editing service	200	Per Record Correction	1.1000	500,000.00	$ 2,640.00	500,000.00
1.3.16	LDB update process	Automated editing service	12,000	Per valid record	0.0250	-	$ 3,600.00	
	MRC Annual 12 month Total						$ 8,184,480.00	
	NRC Total							$ 6,656,000.00

GA NG 911 Text Costs - All implementation/on going maintenance is all inclusive of costs

Number of PSAPs	155
Number of Diverse IP Connections to each PSAP	2
Annual Call volume	19,000,000
Number of Carriers	130
Number of POI's (1 per carrier)	130

A	B	C	D	E	F	G	H	I
Line Item #	Feature Name	Feature Description	Quantity	Unit of Measure	Monthly Recurring Charge	Non-Recurring (One Time Charge)	Total Extended Annual Cost (D*Fx12mo)	Total Extended NRC Costs (D*G)
1.4.1	Statewide Text Aggregator -	Serve as the terminating Text Control Center for GA	1	Statewide	40,000.0000	500,000.0000	$ 480,000.00	$ 500,000.00
1.4.2	NG Text to 9-1-1 – Web Based OTT	Web solution at each PSAP	77.5	Per PSAP	100.0000	500.0000	$ 93,000.00	$ 38,750.00
1.4.3	NG Text to 9-1-1 – Integrated	Integrated solution at each PSAP	78	Per PSAP	200.0000	1,000.0000	$ 186,000.00	$ 77,500.00
1.4.4	RTT service -	Statewide RTT solution	1	Statewide	10,000.0000		$ 120,000.00	$ -
	MRC Annual 12 month Total						$ 879,000.00	
	NRC Total							$ 616,250.00

GA NG 911 Specific Costs - All implementation/on going maintenance is all inclusive of costs

A	B	C	D	E	F	G	H	I
Line Item #	Feature Name	Feature Description	Quantity	Unit of Measure	Monthly Recurring Charge	Non-Recurring (One Time Charge)	Total Extended Annual Cost (D*Fx12mo)	Total Extended NRC Costs (D*G)
22.6.1	NRC New Technology PSAP Integration (est. 50hrs per each 155 PSAPs)		0	Per Hour	-	150.0000	$ -	$ -
22.6.2	NG9-1-1 Training	Per SOW Requirements	0	Per Hour		150.0000		$ -
	MRC Annual 12 month Total						$ -	
	NRC Total							$ -

The labor rates are not included in the cost estimate as all costs are part of the contract. This is included for unanticipated costs only.