

Geographical Information Systems (GIS) and Common Addressing FAQ [v5]

- This document was established to help GIS professionals and governing authorities understand how GIS and Common Civic Addressing will be utilized by NG9-1-1 in the future in Canada.
- The NG9-1-1 GIS Data Model version 2a was published in May 2023 with version 3 already in development. The Canadian Common Civic Addressing standard is in development and targeted to be made available by the end of 2023 or early 2024.
- The existing E9-1-1 call routing tools will NOT CHANGE until the new GIS and Common Civic Addressing standards are adopted and the new geospatial call routing mechanisms are defined and implemented (proposed National rollout in May 2027, which means the standards will be adopted and implemented prior to this start).
- ***NOTE: There is no dependency between the launch of NG9-1-1 services in Canada and the work required to prepare for the future geospatial call routing using the new GIS and Common Civic Addressing standards.***

WHAT

1. How Does GIS (Mapping) Information Relate to NG9-1-1?

Fundamentally, E9-1-1 and NG9-1-1 are both location-based services. The major difference is how and in what form location is used.

In E9-1-1, Public Safety relies solely on a table-based system populated with civic address ranges and related public safety data to correctly route emergency calls to the appropriate PSAP. This table-based system is sometimes called the Master Street Address Guide or MSAG. The MSAG can be provided as Geographic Information Systems (GIS) data, however **the power of GIS is not currently leveraged in E9-1-1 call routing**. The current lookup method is called selective routing.

In NG9-1-1, the location of the calling device is used to determine the closest and most appropriate Public Safety Answering Point (PSAP) to route the call to. NG9-1-1 enables routing of emergency calls using GIS data and geoprocessing.

Geo coordinates in the form of latitude and longitude (and eventually elevation) can be used to route calls with greater precision, and without the need to convert to a civic address. Geo-location will also be very important where a civic address does not exist or is too general, e.g. National Park front gate.

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The new location process will provide PSAPs with more timely and more accurate location information; however, callers to 9-1-1 will still be asked by the PSAP to validate the location of the emergency.

2. What is Changing in the Future NG9-1-1 Environment?

In addition to civic address call routing, NG9-1-1 will use live GIS information to route 9-1-1 calls based on device coordinates; **this is called geospatial call routing**. Two National Emergency Number Association (NENA) standards outline the GIS requirements in the NG9-1-1 environment; one for GIS data and the second for a common civic address format:

- [NENA-STA-006.2a-2022](#) – NENA Standard for NG9-1-1 GIS Data Model
- [NENA-STA-004.1.1-2014](#) - NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF) Standard

These standards originally established for the United States are currently being updated. They do provide a foundation for Canadian implementations, except for extensions to meet specific Canadian requirements such as postal codes vs zip codes, bilingual street names, etc.

To ensure applicability in Canada, Canadian GIS and addressing experts are driving the following NENA activities to evolve the standards through to Q1-2024:

- Canadian input to the current NG9-1-1 GIS Data Model (version 3)
- Canadian Civic Location Data Exchange Format (CLDXF-CA) Working Group (new standard)

NOTE: In the NENA Standard for NG9-1-1 GIS Data Model, several layers are identified as “Required”. These Required layers relate directly to NG9-1-1 location validation, geospatial call routing, or to the appropriate agency for dispatch, and public safety mapping applications.

The layers are:

- Road Centrelines
- Site/Structure Address Points
- Emergency Services Boundaries
 - *Confidential 9-1-1 specific layer i.e., Emergency Service Zone, and police, fire, and ambulance response areas*
- PSAP Boundaries
 - *Confidential 9-1-1 specific layer*
- Provisioning Boundaries

It is important to note that GIS data with civic addressing will form the basis for the future NG9-1-1 call routing and location display.

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3. Will I have to create a new GIS Dataset for NG9-1-1?

Depending on the format used for your current GIS dataset, you can likely expand it to fit NG9-1-1 requirements. You should not have to perform an overhaul or maintain two (2) GIS datasets unless your Computer Aided Dispatch (CAD) and other systems cannot adapt to the inclusion of latitude/longitude type of data.

A good place to start is by reviewing the NENA NG9-1-1 GIS Data Model standard version 2 (inclusive of Canadian considerations) against your existing dataset to determine missing information or gaps. Some adjustment will likely be necessary, the level of which will vary depending on your current dataset.

As directed in Telecom Decision CRTC 2020-150, Emergency Services IP Network (ESInet) providers must act as the top-level GIS data aggregator where no provincial aggregator has been designated.

To date, some provinces and territories have indicated they will appoint a GIS data aggregator. The designated aggregator (where it is not an ESInet Provider) will be responsible for providing the confidential 9-1-1 specific layers (as identified in #2 above) in a secure fashion to the ESInet provider, along with providing the non-9-1-1 specific layers required to properly support NG9-1-1.

IMPORTANT NOTE: All ownership of data remains with the Authoritative Source¹.

4. What if we do not have a GIS or the required data?

If 9-1-1 service is available in your area, contact your 9-1-1 Service Provider to find out how they locate and route 9-1-1 calls today. Your municipality, region, province/territory may already have a GIS dataset that supports a level of NG9-1-1 requirements. You can also contact your local road maintenance authority.

5. What, if any, funding is available to address the cost of meeting the new NG9-1-1 standards?

Funding is a local, regional, or provincial/territorial responsibility. Some jurisdictions have established funding mechanisms that can be accessed by the local 9-1-1 authorities for GIS and Addressing requirements. There is no mandate for funding for this initiative at a federal level.

¹ For this document, 'Authoritative Source' means the original source of Civic Addressing and GIS (mapping) data provided specifically for Public Safety use and future 9-1-1 call routing by the local jurisdiction responsible for assigning addresses with geospatial coordinates (where applicable).

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6. What is the timeline for NG9-1-1 Readiness?

Due to the force majeure situation posed by the COVID-19 pandemic, the Commission, via a letter dated 8 April 2020, suspended all outstanding NG911 deadlines established in the NG911 framework and indicated that it would initiate a proceeding to establish new deadlines for all outstanding obligations.

On 14 June 2021 the CRTC issued [Telecom Decision CRTC 2021-199](#) with new deadlines, stating that certain components of the NG9-1-1 Core Services (NGCS) are to be phased in starting 1 March 2022. However, the NGCS relying on the new NG9-1-1 GIS Data Model and Common Civic Addressing format are NOT required at that time; instead, they are targeted to be rolled out from 2025-2027 with the future implementation of geospatial call routing (*per the [ESCO0743 re NG9-1-1 GIS Readiness Progression Timeline](#)*). The goal is to set and approve the updated NG9-1-1 GIS Data Model and Common Addressing standard for Canada early in 2024.

In January 2021, the Emergency Service Working Group (ESWG) established [ESTF0095 - Change from ESRD to Geodetic Location Call Routing](#), which is task designed to determine the requirements and logistics around the move from the current routing method for wireless 9-1-1 calls to geospatial call routing for both wired and wireless calls.

As with implementation timelines for NG9-1-1 voice and texting, GIS and Common Address Standards timelines will be set through the CRTC. Projected timelines are 2025-2027 to coincide with the implementation of future geospatial call routing once approved by the CRTC.

7. What will happen if I cannot meet the new standard?

If you cannot adjust your GIS dataset to meet NG9-1-1 requirements in time for the transition, you may have to rely on contracting a third-party to compile and/or maintain the GIS data layers needed for NG9-1-1. Once the standards are ready in 2023 or 2024, a decision should be made whether to handle this locally or with the help of a contracted third-party resource.

8. What about using open-source or publicly available GIS data for NG9-1-1 purposes?

It is possible to use open-source or any other publicly available GIS data for layers that are not confidential or 9-1-1 specific. 9-1-1 specific GIS Layers must be created and managed locally by the 9-1-1 Governing Authority and must be submitted to the NG9-1-1 GIS aggregator and NG9-1-1 network providers in a secure manner as specified in NG9-1-1 industry standards and best practices.

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This is a key consideration as 9-1-1 layers (*detailed in the question 2 answer*) contain routing information for your jurisdiction that, if compromised, could lead to potential security threats, including impacting the routing of 9-1-1 calls in your jurisdiction.

9. What is an Aggregator and why do we need one for NG9-1-1?

An aggregator collects and validates information for 9-1-1, ensuring the data meets public safety GIS data standards and best practices for content and management. The ESWG is proposing a single aggregator for each province to assemble and validate information for NG9-1-1 due to the critical nature of 9-1-1 call routing.

Some provinces have already designated an aggregator, and for those that do not, the NG9-1-1 network provider will be the top-level aggregator (per [Telecom Decision CRTC 2020-150](#)).

It should be noted that GIS data must be provided to the NG9-1-1 network provider serving your jurisdiction as this data is required for call routing in the NG9-1-1 Core Network.

WHY

10. Why do I need to review my GIS data model?

NG9-1-1 service relies on telecommunications device location data to route 9-1-1 calls to the appropriate PSAP. Unless someone provides accurate and authoritative GIS data, your PSAP(s) may be unable to effectively support NG9-1-1 service requirements and public expectations.

WHEN

11. When will the final version of the NENA GIS standard that addresses Canadian requirements be ready, should we wait until then?

There will never be a “final” version. The NENA GIS standard is a living document and is expected to evolve over time much like the NENA i3 standard, upon which NG9-1-1 is designed.

The existing version of the NG9-1-1 GIS Data Model and Common Canadian Addressing standard (established for the United States) are stable, providing a sound foundation for Canadian implementations, except for a few extensions to meet specific Canadian requirements such as postal codes vs zip codes, bilingual street names, etc. These features already exist in the Canadian 9-1-1 model and will continue in NG9-1-1.

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12. When will we see the new NG9-1-1 Service Agreement that defines the new GIS Standards and Exchange formats?

This agreement has already been circulated including high level information about GIS requirements.

A future updated agreement schedule will be issued when detailed requirements are available (expected in 2025).

WHERE

13. Where can I find more information to better inform myself and 9-1-1 Governing Authorities regarding why we need to make these changes?

There are numerous sources for NG9-1-1 and GIS information including:

- CRTC decisions and timelines
 - ESWG TIF 92 standards documents are posted on the Bell 9-1-1 FLEX portal and provide additional details
 - GIS NENA Standards
 - Become involved with working groups - ESWG Task 92 Group is specifically working on GIS and Addressing Standards for Canada,
 - ESRI Canada website, blog and educational resources
 - 9-1-1 Service Provider bulletins
 - NG9-1-1 subject matter experts, vendors, and consultants
 - Applicable local, regional, provincial, and national GIS associations, etc.
- (See applicable links and additional resources listed at the end of this FAQ.)*

WHO

14. Do I still supply other GIS Data to my PSAP that is not being specifically requested by my ESI-net Provider?

PSAPs have multiple additional layers associated to GIS and common addressing for their specific needs, which will continue to be used along with the new NG9-1-1 GIS and common addressing information. Continue supplying relevant data to your PSAP. This information is useful to 9-1-1 Call takers for locating callers and with determining the most appropriate emergency response.

15. Who will be our Provincial Aggregator?

As directed in [Telecom Decision CRTC 2020-150](#), NG9-1-1 network providers must act as the top-level data aggregator where there is no provincial aggregator. To date, some provinces and territories have indicated they will appoint a GIS data aggregator.

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The designated aggregator (where it is not Bell, TELUS, or SaskTel) will be responsible for providing the confidential 9-1-1 specific layers in a secure fashion to the NG9-1-1 network provider, in addition to non-9-1-1 layers properly support NG9-1-1. All ownership of data remains with the authoritative source.

16. We currently provide GIS data to an external agency who is responsible for submission to our 9-1-1 Service Provider. Does this change with NG9-1-1; will we be required to provide this data directly to the ESInet Provider?

For NG9-1-1, if the external agency has an agreement with the ESInet Provider, then the introduction of NG9-1-1 service would not impact how you provide the data to your 9-1-1 service provider. As long as those agreements are in place, data can be provided via a third party or directly. However, you are still ultimately responsible to provide the data, regardless of the process.

17. Will the Provincial Aggregator provide the data directly to our PSAP and First Responders? If so, are they charging us for this service?

In order to ensure the most effective and efficient use of GIS and common addressing for geospatial call routing and response, it is essential that all ESInet Providers and PSAPs (including First Responders) use the same base GIS data as defined by ESWG.

The base GIS data set, the sharing process, and possible costs (if any) are still being determined as part of the ongoing ESWG work. Additional details related to Aggregators will be announced once they are finalized and approved.

18. Will the aggregator be allowed to change my data?

The aggregator will validate your data, and if discrepancies are identified it will be returned to you for verification and updating. The aggregator should not change data without your approval. The ultimate responsibility for the accuracy, completeness and currency of the GIS data used by NG9-1-1 is the **local authoritative source**, working directly with the designated aggregator and/or ESInet Provider.

In most cases, the local authoritative source is a local, regional, or provincial government. This will formally be addressed as part of the pending NG9-1-1 service agreement with your respective NG9-1-1 network provider (*e.g., in relation to the quality assurance / quality improvement process*).

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19. Is the aggregator going to be able to use the data for non-9-1-1 purposes and are the downstream users (PSAP, responders and CAD vendors) going to be able to use the data for non-9-1-1 purposes?

Currently, two different scenarios are possible for GIS data aggregators for NG9-1-1. The first is a designated Provincial aggregator, responsible to coalesce 9-1-1 and non 9-1-1 specific GIS data from authoritative sources within the province. Absent of a designated Provincial GIS data aggregator, the ESInet Provider will be the default GIS data aggregator for the purpose of NG9-1-1.

In this role, the NG9-1-1 network provider will coalesce 9-1-1 and non 9-1-1 specific GIS data directly from the authoritative sources. Depending on the terms of the agreement between authoritative sources and the GIS data aggregator (at the Provincial or NG9-1-1 network provider level), the aggregator may maintain, use or otherwise distribute non 9-1-1 specific GIS data for different purposes.

*NOTE: Confidential 9-1-1 specific layers received by the aggregator **WILL NOT be allowed to be used** or distributed for non 9-1-1 specific purposes. This will be reflected in the updates in the applicable future NG9-1-1 Service Agreement (per the GIS and addressing schedule).*

HOW

20. How Do I Get Started?

Starting today, familiarize yourself with the requirements being adapted for Canada based on the [NENA Standard for NG9-1-1 GIS Data Model](#). In addition, you can test your current data using the [GIS Validator Tool](#) and undertake a [GIS Readiness Assessment](#), both are highly recommended and should provide:

- **what** is your current state and identification of the gaps that exist
- **who** to engage to meet standards
- **how** to prepare for location-based call routing in an NG9-1-1 environment

Governing authorities must be educated and prepared to provide funding and resources to meet NG9-1-1 requirements for service delivery to coincide with the implementation of geospatial routing of 9-1-1 calls.

Talk to your 9-1-1 service provider and vendor(s) to understand how to prepare and get involved with the National group working on this effort ([ESWG Task 92](#)). Additionally, talk to other public safety agencies and colleagues across the country to coordinate preparations and implementations.

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21. Are tools/apps available to assist with conversion of existing data models into a format/structure required by provincial aggregators?

Some standards and tools already exist. Speak to your GIS vendor and the 9-1-1 Service Provider for your area.

22. How often do we have to provide updated data to the designated aggregator?

The [NENA Data Management standard](#) advocates a 72-hour update cycle for data issues identified in discrepancy reports, but this is not a requirement for day 1 transition (e.g., 2025-2027). Rather, 72 hours is the gold standard target for future service delivery of GIS and addressing data. Updates should be provided as frequently as possible since they are essential for the timely emergency services responses.

NOTE: The vital addressing and GIS data for emergency response is required at the point when calls for help come from these locations e.g., construction site, road work, etc.

23. How will the Provincial Aggregator notify me if my data does not meet the new NG9-1-1 standards?

This process will be defined in the new NG9-1-1 Service Agreement that every 9-1-1 Governing Authority will be required to sign on behalf of their primary and secondary PSAPs. NG9-1-1 Service Agreements have been presented to 9-1-1 governing authorities by the applicable ESInet Provider.

24. How will quality assurance and quality improvement be in place to enable emergency GIS and addressing data to stay current or be updated/changed when needed?

The QA/QC (Quality Assurance / Quality Control) processes will be developed and recommended by ESWG for standardization by each ESInet network provider. Once determined, these requirements will be updated in the applicable NG9-1-1 Service Agreement Schedule (e.g., 2025 and beyond).

At this time, it is fair to say that QA/QC will be required at the different levels of data integration and coalescing; at the authoritative source, at the provincial aggregation level (if applicable), and at the NG9-1-1 network provider level.

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Important Additional Information

- NENA Standard for NG9-1-1 GIS Data Model:
<https://www.nena.org/page/ng911gisdatamodel>
- Telecom Decision 2020-150 <https://crtc.gc.ca/eng/archive/2020/2020-150.pdf>
respecting CISC Emergency Services Working Group – Consensus report ESRE0089
<https://crtc.gc.ca/public/cisc/es/ESRE0089b.pdf> regarding next-generation 9-1-1 GIS
(mapping) and common addressing considerations -
- CRTC NG9-1-1 website: <https://crtc.gc.ca/eng/phone/911/gen.htm>
- CRTC Telecom Regulatory Policy 2017-182
<https://crtc.gc.ca/eng/archive/2017/2017-182.htm> and 2017-182-1:
<https://crtc.gc.ca/eng/archive/2017/2017-182-1.htm>
- CRTC ESWG Website: <https://crtc.gc.ca/cisc/eng/cisf3e4.htm>
- Esri Canada: https://www.esri.ca/en-ca/solutions/industries/public-safety/segments/next-generation-9-1-1?rmedium=www_esri_ca&rsource=/en/industries/next-generation-9-1-1
- Bell 9-1-1 Flex Portal (requires login credentials): <https://911flex.bell.ca/Login.html>
- NENA Website: <https://www.nena.org/>
- NENA Knowledge Base Glossary: <https://www.nena.org/page/glossary>
- NENA Standards Index: <https://www.nena.org/page/standards>
- NENA Detailed Functional and Interface Standards for the NENA i3 Solution:
https://www.nena.org/page/i3_Stage3
- 911 Gov Strategy plan: See Appendix 2 and Appendix 3 in:
https://www.911.gov/assets/911_Data_Information_Sharing_Strategic_Plan_Final.pdf
 - *NOTE: although most of these references are US based, the standards have been endorsed by the CRTC for NG9-1-1 design and deployment in Canada. Additionally, many of the 911 Gov development working groups include Canadian participants.*