NENA Next Generation 9-1-1 (NG9-1-1) Canadian Civic Location Data Exchange Format (CLDXF-CA) Standard

Abstract: The CLDXF-CA Standard defines the Canadian profile of the Internet Engineering Task Force (IETF) Presence Information Data Format – Location Object (PIDF-LO) to provide a format for exchanging Canadian civic location data.



NENA Next Generation 9-1-1 (NG9-1-1) Canadian Civic Location Data Exchange Format (CLDXF-CA) Standard

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EXECUTIVE OVERVIEW

This document defines a standard format for the exchange of civic location data in Next Generation 9-1-1 (NG9-1-1) systems deployed in Canada. Civic locations are specified using a combination of place names, thoroughfare address components, interior or exterior locations identified by name and other named location identifiers, which are created through civic addressing processes.

This document is one of a suite of NENA documents relating to the content, structure and use of location data. For example, the NG9-1-1 GIS Data Model [21] lists required and recommended GIS data layers for location databases supporting NG9-1-1. Any Canadian NG9-1-1 location system, by design, must be compatible with the CLDXF-CA exchange format.

In the context of NG9-1-1, primary location information is crucial since it is the means by which the NG9-1-1 Core Services (NGCS) routes calls to the proper or designated Public Safety Answer Point (PSAP), and how PSAPs determine where to send the response. In contrast to geodetic coordinates, which uniformly specify location using latitude, longitude, region of uncertainty and confidence factor (and in the near future, altitude or height measurements), civic location descriptions are inherently diverse. The goal however, is the same, which is to identify any given location clearly, consistently and precisely. Standardization is achieved by breaking civic location descriptions into their component parts.

This document defines and describes the elements forming a valid CLDXF-CA location data structure. Parties involved in, or associated with, Canadian emergency services should adopt this standard and related NENA standards to ensure the consistency and interoperability of their data in NG9-1-1 systems deployed in Canada, as well as ensuring interoperability with adjacent and foreign countries.

The specific goals of this document are:

1. To provide a normative and definitive set of civic location data elements for data exchange in support of emergency services (Section 2) in Canada,
2. To provide a hierarchical data structure that allows for describing unambiguously and uniquely a given civic location, and
3. To provide a normalized Canadian-specific implementation of the Presence Information Data Format [5] and Location Object [6][7] (both together forming the PIDF-LO), which is an international standard for location data exchange as defined by the Internet Engineering Task Force (IETF). This Canadian-specific implementation of the PIDF-LO is also referred to as the Canadian profile of the PIDF-LO.

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2. MUST NOT: This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.
3. SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
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These definitions are based on IETF RFC 2119 [3].

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Reason for Issue/Reissue

NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in the table below.

Document Number	Approval Date	Reason For Issue/Reissue
NENA-STA-029.1-2025	April 28, 2025	Initial Document

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1 INTRODUCTION

9-1-1 emergency service is inherently a location-based service that is, it requires the location of the caller to determine the nearest PSAP to route the call to, and the nearest emergency responders to be dispatched to the incident location. In NG9-1-1, the location itself is used and is carried with the emergency call. Since emergency calls can and will be transferred between jurisdictions, NG9-1-1 requires a common civic location format to be used uniformly across Canada. This is a departure from the legacy E9-1-1 ALI records and Master Street Address Guides (MSAGs) that were different between the Canadian E9-1-1 network providers.

This document defines that standard format for the exchange of civic location data in NG9-1-1 systems deployed in Canada. Civic locations are specified using a combination of place names, thoroughfare address components, interior or exterior locations identified by name and other named location identifiers. In contrast to geodetic coordinates, which uniformly specify location using latitude, longitude, region of uncertainty and confidence factor (and eventually, altitude or height measurements), civic location descriptions are inherently diverse. The goal, however, is the same, which is to identify any given location clearly, consistently and precisely. Standardization is achieved by breaking civic location descriptions into their component parts.

Civic addressing varies widely in Canada in both form and terminology used. This standard acknowledges that and was designed to support such variation, including civic addressing based on the Dominion Land Survey, which is common in the prairie provinces.

This document defines and describes the elements forming a valid CLDXF-CA location data structure. Canadian producers and consumers of emergency location data MUST adopt this standard and related NENA standards to ensure the consistency and interoperability of their data in NG9-1-1 systems deployed in Canada, as well as ensuring interoperability with adjacent and foreign countries.

One key challenge with civic locations used for emergency services is the risk of duplicate addressing, which can lead to mis-routed calls and delayed response to the emergency location. This standard acknowledges this concern and provides a hierarchical data structure and granular civic location attributes allowing addressing authorities to ensure civic locations are unambiguously and uniquely defined within provinces and territories.

CLDXF-CA is a data exchange container that is to be used between systems. How the location data is displayed to call takers is out of scope for this document. Similarly, the mechanism by which the CLDXF-CA container is conveyed between systems is specified by other standards and is therefore out of scope for this document.

CLDXF-CA supports location data that is made available for an initial emergency call and for crafted incident locations (for example, someone reporting an emergency at a different

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location). It does not support post-call location-related information such as responders' directions to the incident location; this is left to other standards to define.

To maximize interoperability, this standard leverages the international standard for location data developed by the Internet Engineering Task Force (IETF); the Presence Information Data Format – Location Object (PIDF-LO). The PIDF-LO standard uses the eXtensible Markup Language (XML) and has a standardized set of XML schemas that this document is also leveraging. Note that the PIDF-LO is extensible and in some cases, this document uses new elements that were added over time by other standards. All standardized location elements are registered in the Civic Address Types Registry [4] maintained by the Internet Assigned Number Authority (IANA). Non-standardized elements are not supported by this standard.

This standard also requires that civic locations be broken into their individual parts to facilitate quality control, parsing and comparison. For example, "North Main Street", which was commonly seen in E9-1-1 as a complete thoroughfare name, is no longer an acceptable format in NG9-1-1; each component "North", "Main", and "Street" must now be included as separate XML elements in a CLDXF-CA location.

Similarly, this standard allows for and promotes the use of natural spelling of civic locations. As such, address components that normally include accented characters, hyphens, apostrophes, and other recognized glyphs used in supported languages, should be included. Abbreviations, such as "Blvd" and "boul" are not supported, unless it is part of the official name as defined by the addressing authority, or otherwise stated in this document. Additionally, it is expected that casing as defined by languages' typography will be utilized. For example, "Boulevard" is expected to use title case in Canadian English whereby "boulevard" would be used in Canadian French. Additionally, systems compliant with this standard that produce or receive CLDXF-CA data are expected to preserve case. Element values are expected to be represented with mixed casing (i.e., a combination of uppercase and lowercase letters such as in "MacDonald", "LaCrosse", "O'Reilly", "deHavilland") as deemed correct by the authoritative source, with the exception of *Country* and *Administrative Level 1* elements which are represented by capital letters as per ISO-3166-1 [15][1] and ISO-3166-2 [16] respectively. These are other departures from the legacy practice of using only numbers and uppercase letters.

This data exchange format may change as new or modified data elements are identified. Vendors and governmental agencies are expected to make updates as required by revisions of this document.

[1] ISO 3166-1 is protected by ISO copyrights. The ISO states "ISO allows free-of-charge use of its country, currency and language codes from ISO 3166, ISO 4217 and ISO 639, respectively". See https://www.iso.org/iso-3166-country-codes.html

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In addition to specifying the civic location format, this document further provides details and specifications in creating the entire PIDF-LO that is, the PIDF part and the LO part. It further provides guidance as to the use and consumption of PIDF-LO domestically and from abroad (section 3).

This standard normatively supports both official languages of Canada, namely English and French. It further expects that Canadian English and Canadian French typography will be used in CLDXF-CA locations. For example, this document expects "neighbourhood", "centre", and "metre" rather than their U.S. English counterparts "neighborhood", "center", and "meter". This standard does not explicitly support other languages spoken in Canada, such as various Indigenous languages, although some characters may be supported by the UTF-8 encoding (the encoding standard used in this document). Should a need arise to normatively support other languages, a new version of this document would be required.

To protect privacy and confidentiality, example civic locations refer to public or well-known places, to the extent that such example fits the need. When the need requires a residential civic location to be used, these example residential civic locations have been anonymized by either replacing portions of the addresses by fake information or by using information that does not exist within the specified residential areas.

This standard does not assume, nor does it impose that location data stored in systems be modified to conform to this standard. However, any system or device that makes civic location data available for NG9-1-1, MUST prōvide it in the format specified in this document.

To assist implementers, informative XML examples of fully fleshed out CLDXF-CA locations are provided in Exhibit A.

A convenient quick reference guide on how *Administrative Level 1* through *Administrative Level 5* are populated for each province and territory is provided in Appendix A (informative).

2 Civic Location Data Elements

This section defines and describes each CLDXF-CA element. The CLDXF-CA data structure is defined in XML schemas [1] that, among other items, include an XML <sequence> of "Civic Address Type" and other XML elements. Business rules for each element are specified, which define when the element may or may not appear in a CLDXF-CA location data structure conforming to this document, what data type the element value is, and the maximum number of characters it can contain.

The default value for <minOccurs> and <maxOccurs> attributes for an XML <sequence> is "1", which means that if the attribute is not present, its default value is assumed. In the XML schemas, each Civic Address Type in the XML <sequence> is specified with a <minOccurs=0> attribute, which makes them all optional, and does not provide a

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<maxOccurs> attribute, which means that the default value of "1" is assumed. The default value of "1" for <maxOccurs> disallows any of them to be repeated, which means that each Civic Address Type can occur only once under one <civicAddress> complex element.

The business rules listed for each element specify additional requirements or conditions for when the element may appear in a CLDXF-CA location data structure. This document does not modify the PIDF-LO schemas, and all PIDF-LO data structures MUST conform to the XML schemas provided in the corresponding standards that created them.

At the XML schema level, all civic address element values in CLDXF-CA are limited to the "token" data type, which is defined as a string of characters that do not contain carriage returns, line feeds or tab characters, have no leading or trailing spaces and no internal sequences of two or more spaces.

An XML schema may further limit the value space of a standard XML data type and does so by defining its own data type locally. This is what the civic address XML schema has done for the *Country* element, for which a local data type labelled "iso3166a2" was defined, further limiting the base XML data type "token" to a string of two uppercase alphabetic characters. This additional restriction ensures that the format of the data in the *Country* element aligns with the ISO 3166-1 Alpha-2 Codes standard [15]. It should be noted however, that the XML processor in this case can only validate the format itself, not the value. For example, a value of 'XX' would pass XML validation while 'XX' is not a defined two-letter Country code in ISO 3166-1. This is where further refinements are required at the business layer to enforce, for example, specific domain of values or value spaces, without modifying the underlying XML schema, as was done for the *Country* element.

Within this document, three additional data types are defined to further limit element values. The specification of the data type in the element description constitutes an implicit business rule that the element MUST conform to. These data types are defined as follows:

1. **Printable** – The set of UTF-8 encoded characters that display glyphs when printed, plus the space character (U+0020). This explicitly supports accented characters and does not permit other non-printable characters (e.g., non-breaking space) or control characters (e.g., carriage return, line feed, and escape).
2. **Non-negative integer**: A whole number with a value of 0 or greater, composed of one or more of the numeric characters "0" through "9". Note that leading zeros are not maintained with this data type.
3. **Alphanumeric**: Uppercase letters "A" through "Z", lowercase letters "a" through "z", and numeric characters "0" through "9". Accented characters MUST NOT be used.

Additionally, the PIDF-LO XML schemas do not restrict nor specify the length a value can have in elements (with one exception for *Country* where the local data type does restrict the length to two characters as explained above). Considering that element values carried

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in a CLDXF-CA location are generally sourced from some form of storage such as a database and will generally be validated against GIS data at rest, this document specifies the maximum value length for each element so that source and receiving systems can be designed to accommodate the maximum expected size for each element.

It should be noted that, like other business rules, the data type and maximum value length constraints are applied at a different level than XML processing. Once embedded in its XML element, a value becomes what the XML schema requires, which in practice means that if an element data type is non-negative integer, the actual value will be an XML "token" resulting from the conversion of an integer, without a character length limitation (except for *Country*). All civic address element values in PIDF-LO are XML tokens.

This document specifies a format for exchanging civic location information between systems as such, it specifies data types for data in transit. Other data types may be used when the data is stored (i.e., at rest); however, any stored data that is promoted to a CLDXF-CA compliant PIDF-LO for exchange purposes MUST adhere to the format and data types specified in this document.

The elements are presented in five groups, each within its sub-section and prefaced by a brief explanatory note:

Section 2.1: Country, province/territory, and other place name elements
Section 2.2: Thoroughfare name elements
Section 2.3: Address number elements
Section 2.4: Named location elements
Section 2.5: Address descriptors

Each element description is organized as follows:

- **CLDXF-CA name** – The name of the CLDXF-CA element found in the element's section title. This name is used to either better express what the element contains or provide a natural language version of the XML element name. It is provided for convenience and has no technical impacts on the PIDF-LO.
- **PIDF-LO name** – A namespace-qualified XML element name. Prefixes defined below are used informatively to represent the namespaces in these instances.
- **Definition** – The definition or meaning of the element.
- **Definition source** – The source of the definition ("New" indicates that the definition is original and the source is this document).
- **Examples** – Illustrative examples of the element.
- **Data type** – Whether the element is of type printable, alphanumeric or integer.
- **Maximum value length** – The maximum number of characters the element can contain at rest.
- **Domain of values** – The range or set of values (if any) to which the element is

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restricted.

- **Business rules** – As explained above, all elements are optional in the XML schema definition. Business rules provide normative text that specifies any additional requirements or conditions for inclusion of the element beyond what is specified in the XML schema.
- **Notes** – Notes and comments giving additional explanation about the element and, when appropriate, providing additional requirements over and above business rules.

As a reading convention, CLDXF-CA element names are formatted in italic title case throughout this document (e.g., *Country, Administrative Level 1, Administrative Level 2, Additional Code*, etc.). PIDF-LO element names use upper or lower case according to their respective XML schema definition. When CLDXF-CA element name words are used in their generic sense, normal font and casing are used.

The following prefixes are defined for use in this document to represent the indicated namespaces. Note that actual PIDF-LO instances and other XML documents may declare whatever prefixes they wish in order to represent these namespaces.

- ca – urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr (RFC 5139 [7])
- cae – urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr:ext (RFC 6848 [11])
- cdx1 – urn:nena:xml:ns:pidf:nenaCivicAddr (NENA-STA-004.1 [13])
- cdx2 – urn:nena:xml:ns:pidf:nenaCivicAddr2 (NENA-STA-004.2 [14])

Throughout this document, the phrase "*Thoroughfare Name*" alone refers to the CLDXF-CA element. The phrase "complete thoroughfare name" indicates the full name of a thoroughfare as it would appear on a sign, map, or listing (that is, the several elements of the name concatenated together, usually with a space between each element). As an example, "North Main Street" would be a complete thoroughfare name, and "Main" would be the *Thoroughfare Name* element within that complete thoroughfare name.

Abbreviations MUST NOT be used unless expressly required in this document (e.g., the two-letter abbreviation for the country code), or when the abbreviation is part of an official name defined by the addressing authority.

There are circumstances where fractions can be used in civic location data elements. For example, an assigned address number may be "10 1/2". Fractions MUST be represented with their multi-character representation using the "/" between the numerator and the denominator (e.g., "4/5"), excluding superscripts and subscripts, and without spaces between characters (e.g., not "4 / 5"). Where it exists, the single-character glyph (e.g., "½") MUST NOT be used.

There is an implicit hierarchy in civic locations whereby addresses are represented from the larger relevant area to the smallest area that identifies the targeted location. That implicit hierarchy is reflected in the civic location data elements defined in this document. Below is

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an example visual representation of the civic address types defined in this document and how they may relate to each other in a hierarchical manner. It also provides a visual reference to standards that defined the various civic address types.

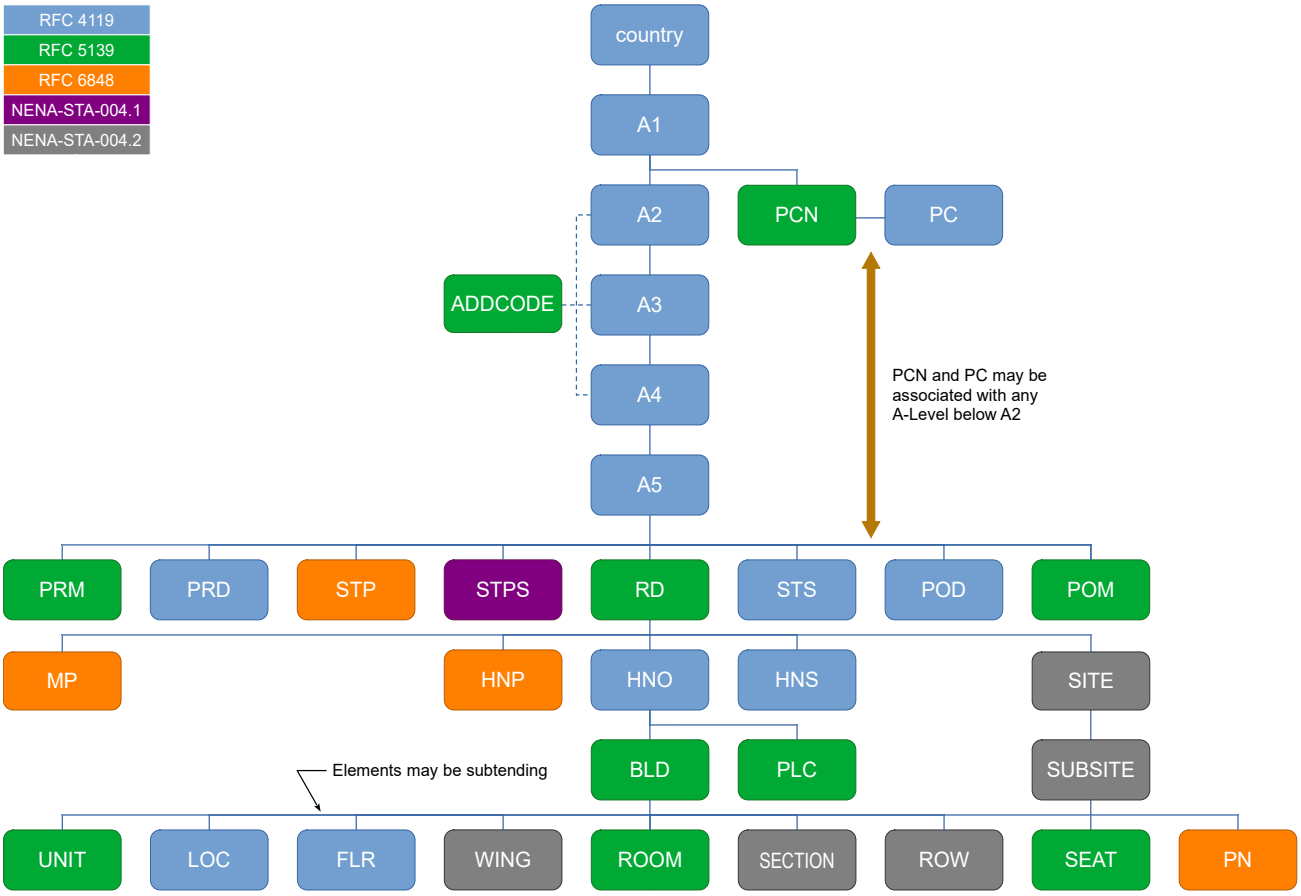


Figure 1 – Example Canadian Civic Location Hierarchical Representation

Note that the CLDXF-CA data structure is based on the geographical hierarchy of a location, which may not follow the authoritative administration of that location.

Further note that since the civic address XML schema defined by RFC 5139 [7] uses the XML <sequence> element, which forces the sub-elements to appear in the order they are declared, a compliant CLDXF-CA PIDF-LO will be partially reflective of the above geographical hierarchy.

To avoid duplicate civic locations, it is expected that the combination of the following CLDXF-CA elements is unique in all provinces and territories:

- *Country*
- Administrative levels as outlined below
- *Additional Code*

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- At least one of the following:
  - Thoroughfare name elements and address number elements
  - Thoroughfare name elements and *Distance Marker*
  - *Site*
  - *Structure*
  - *Location Marker*

2.1 Country, Province/Territory and Other Place Name Elements

Place names denote areas within which individual thoroughfare addresses and sites are found. Although place names may seem as simple as a "city+province/territory+postal code" combination, using place names sometimes creates confusion. Place names give the general location of a feature or event and are often needed to distinguish between otherwise identical combinations of complete thoroughfare name and address number in a given area.

Confusion may arise because, within Canada, there are multiple processes for creating place names. These include:

- The legislative process: Incorporated areas such as countries, provinces and territories, counties, incorporated municipalities, and some Indigenous communities are created by law. Since these places create taxing jurisdictions, they are well documented and precisely mapped. Every address in Canada lies within a province/territory, an incorporated municipality, or within the unincorporated portion of the province/territory.
- The local/unincorporated process: Unincorporated areas such as pre-amalgamation municipalities, neighbourhoods, and smaller community subdivisions can be quite extensive, and often contain duplicate complete thoroughfare names and address ranges. In these cases, place names, official or not, may be useful or even necessary in determining unambiguously where an address is located, or differentiating between similar addresses in the same general area. These place names include hamlets, neighbourhoods, subdivisions, shopping districts, crossroads, and other locales within large municipalities and unincorporated areas. These place names come into existence through informal usage and recognition. The places have no precise definition in Canada's place name geography; they have no general powers of government, and they are not controlled or registered by any authority. Their definition and boundary are often imprecise. Nevertheless, unofficial place names can be useful and even necessary in locating an address and should be included whenever they might be helpful in getting first responders to the right place faster.
- The postal process: This process is under the auspice of Canada Post, which has the ability to assign mailing place names, assign their corresponding postal codes, and to

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allocate delivery points among them. Mailing place names are captured in the *Postal Community Name* element and the postal code in the *Postal Code* element.

In this standard, place names (other than postal place names and country, which have their own specific elements) are captured in the *Administrative Level 1* through *Administrative Level 5* elements. There are variations in how place names are defined between provinces and territories in Canada. These variations prevent a uniform mapping of incorporated and unincorporated areas to the place name elements *Administrative Level 1* through *Administrative Level 5*. In other words, a province may have official place names in *Administrative Level 1*, *Administrative Level 2*, and A*dministrative Level 3*, while another province or territory might have them in *Administrative Level 1* and *Administrative Level 3* only. This document acknowledges and codifies that fact by specifying the mapping for each province and territory.

There is a distinction between place names and sites. A place name (i.e., the *Country*, *Postal Community Name* and *Administrative Level 1* through *Administrative Level 5* elements) is typically a designated geographic location intended for multiple uses or multiple occupants, whereby a site (i.e., the *Site* and *SubSite* elements) typically has a single owner/occupant and frequently has a single use purpose.

A convenient quick reference guide on how *Administrative Level 1* through *Administrative Level 5* are populated for each province and territory is provided in Appendix A (informative).

2.1.1 *Country*

namespace:PIDF-LO name: ca:country

Definition: The name of a country represented by its two-letter ISO 3166-1 [15] country alpha-2 code value in uppercase letters.

Definition source: Adapted from NENA-STA-004.2 [14]

Examples: CA, US, FR

Data type: Printable

Maximum value length: 2

Domain of values: Restricted to ISO 3166-1 [15] country Alpha-2 code values.

Business rules: Mandatory element. Every Canadian civic location MUST include a *Country* element.

Notes:

1. Although the scope of CLDXF-CA is restricted to Canadian addresses, the *Country* element must be included to facilitate reconciliation with address standards of other nations, and to accommodate call transfers from and to other countries.

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2. There are several standards for country names. The IETF PIDF-LO specifies the uses of the two-letter abbreviations (i.e., Alpha-2 codes) defined in ISO 3166-1 [15][2] as the standard for representing country names.

2.1.2 *Administrative Level 1*

namespace:PIDF-LO name: ca:A1

Definition: The name of a province or territory represented by the two-letter uppercase abbreviation given in ISO 3166-2 [16]. A province/territory is the primary sub-national division of Canada.

Definition source: Adapted from IETF RFC 5139 [7] Section 3.4

Examples: BC, PE, AB, NB, NT

Data type: Printable

Maximum value length: 2

Domain of values: Restricted to the Canadian two-letter province/territory abbreviations given in ISO 3166-2 [16].

Business rules: Mandatory element. Every Canadian civic location MUST include the province/territory code.

Notes: None

2.1.3 *Administrative Level 2*

namespace:PIDF-LO name: ca:A2

Definition: *Administrative Level 2*, where it exists, is the primary subdivision of a Canadian province or territory.

Definition source: Adapted from IETF RFC 4119 [6]

Examples:

- Capitale-Nationale, an Administrative Region in the Province of Quebec
- Central Kootenay, a Regional District in British Columbia
- York, a County in New Brunswick
- Region of Peel, a Regional Municipality in Ontario (Upper Tier)
- Queens, a County in Nova Scotia

[2] ISO 3166-1 is protected by ISO copyrights. The ISO states "ISO allows free-of-charge use of its country, currency and language codes from ISO 3166, ISO 4217 and ISO 639, respectively". See https://www.iso.org/iso-3166-country-codes.html

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Data type: Printable

Maximum value length: 100

Domain of values: There is no single controlling registry or authority of these names. A domain may be established by regional or provincial/territorial authorities that covers its area of jurisdiction.

Business rules: Where this level of subdivision exists and the address is contained within that subdivision, the *Administrative Level 2* value MUST be provided. Where *Administrative Level 2* does not exist, an *Administrative Level 3* value MUST be provided.

Notes:

1. *Administrative Level 2* indicates location, not jurisdiction. This administrative level may include federal, provincial, territorial, Indigenous, and other lands within which this administrative level government has powers, including powers to name roads and assign address numbers, which may be limited or superseded by other government bodies. Indicating who has what jurisdiction at a given address is well beyond the scope or intent of this standard.
2. Dependent on the province or territory, it may be, but not limited to, a county, a regional municipality, an administrative region or a regional district.
3. *Administrative Level 2* coverage varies among provinces and territories between full, partial, and none.
4. This table defines the primary divisions for *Administrative Level 2* in each province/territory.

Province/Territory	***Administrative Level 2***
Alberta	Rural Municipalities or Urban Service Area; where Rural Municipalities or Urban Service Area exist, MUST be present. Otherwise, MUST NOT be present (i.e., absent or blank).
British Columbia	Regional Districts plus Regional Municipalities and unincorporated regions; MUST be provided.
Manitoba	No *Administrative Level 2*; MUST NOT be present (i.e., absent or blank).
New Brunswick	Counties; MUST be provided.

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Province/Territory	*Administrative Level 2*
Newfoundland and Labrador	Provincial Electoral Districts; MUST be provided.
Northwest Territories	Administrative regions; MUST be provided.
Nova Scotia	Counties; MUST be provided.
Nunavut	Administrative regions; MUST be provided.
Ontario	Upper Tier Municipalities (i.e., Regional Municipalities, Counties, United Counties), Single Tier Municipalities (e.g., City of Toronto), Indigenous communities, Unincorporated areas (e.g., Districts); MUST be provided.
Prince Edward Island	Counties; MUST be provided.
Québec	Régions administratives; MUST be provided.
Saskatchewan	No *Administrative Level 2*; MUST NOT be present (i.e., absent or blank).
Yukon	No *Administrative Level 2*; MUST NOT be present (i.e., absent or blank).

Table 1 – Administrative Level 2

2.1.4 *Administrative Level 3*

namespace:PIDF-LO name: ca:A3

Definition: *Administrative Level 3*, where it exists, is the primary or secondary division of a province or territory.

Definition source: Adapted from IETF RFC 4119 [6]

Examples:

- Calgary, a municipality in Alberta
- Richmond, a municipality in British Columbia
- Laval, a city in the Province of Quebec
- Ross River, an unincorporated community in Yukon

Data type: Printable

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Maximum value length: 254

Domain of values: There is no single controlling registry or authority of these names. A domain may be established by regional or provincial/territorial authorities that covers its area of jurisdiction.

Business rules: Where this level of subdivision exists and the address is contained within that subdivision, the *Administrative Level 3* value MUST be provided. Where *Administrative Level 3* does not exist, an *Administrative Level 2* value MUST be provided.

Notes:

1. *Administrative Level 3* values are known by a variety of terms: municipality, city, regional municipality, town, village, township, municipal district, community, county, ville, and parish, among others. Local government types and terminologies vary substantially between provinces/territories, but the distinctions are not particularly significant in constructing civic locations.
2. Addresses in unincorporated portions have no municipal place name by definition, however a non-municipal place name MUST be provided in this element if *Administrative Level 2* is absent or blank.
3. Boundaries associated with *Administrative Level 3* often differ from postal delivery areas. Therefore, the *Administrative Level 3* name may differ from the *Postal Community Name* for historical or practical reasons.
4. Many governments are known by a popular/common name and a legal name (e.g., Montréal vs. Ville de Montréal). It is up to the local authority to determine which name will be used. So long as it is consistent with what the underlying GIS data uses and what is communicated to LIS operators, usage of one or the other is acceptable.
5. Local authorities may wish to compile a list of locally-recognized unincorporated communities for their convenience. Whether to do so, and if so what names to include, is an implementation matter to be decided locally.
6. This table defines the divisions for *Administrative Level 3* in each province/territory. In addition, Indigenous communities may be defined as *Administrative Level 3*.

Province/Territory	***Administrative Level 3***
Alberta	Incorporated municipalities and unincorporated areas or communities; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
British Columbia	Incorporated municipalities and unincorporated areas or communities; MUST be provided.

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Province/Territory	*Administrative Level 3*
Manitoba	Incorporated municipalities and unincorporated areas or communities; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
New Brunswick	Incorporated municipalities and unincorporated areas or communities; MUST be provided.
Newfoundland and Labrador	Incorporated municipalities, unincorporated areas and Local Service Districts; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Northwest Territories	Incorporated municipalities and unincorporated areas or communities; MUST be provided.
Nova Scotia	Incorporated municipalities; MUST be provided.
Nunavut	Incorporated municipalities and unincorporated areas or communities; MUST be provided.
Ontario	Lower Tier municipalities; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Prince Edward Island	Incorporated municipalities and Fire Districts; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Québec	Municipalités locales et territoires non-organisés; MUST be provided.
Saskatchewan	Incorporated areas; MUST be provided.
Yukon	Incorporated municipalities and unincorporated areas or communities; MUST be provided.

Table 2 – Administrative Level 3

2.1.5 *Administrative Level 4*

namespace:PIDF-LO name: ca:A4

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Definition: *Administrative Level 4*, where it exists, is the subdivision of the most granular, preceding administrative level.

Definition source: Adapted from IETF RFC 4119 [6]

Examples:

- Ralston, a hamlet in Alberta
- Brudenell, prior to the amalgamation, a former municipality in Prince Edward Island
- Sydney, prior to the amalgamation, a former municipality in Nova Scotia
- Melrose, a community in Newfoundland and Labrador, now part of the municipality of Trinity Bay North
- North York, prior to the Toronto amalgamation, a former municipality in Ontario
- Pittsburgh, prior to the Kingston amalgamation, a former township in Ontario
- Charlesbourg, a borough of Quebec City in the Province of Quebec
- Glendale, a community in Nova Scotia

Data type: Printable

Maximum value length: 100

Domain of values: There is no single controlling registry or authority of these names. A domain may be established by regional or provincial/territorial authorities that cover its area of jurisdiction.

Business rules: Where this level of subdivision exists and the address is contained within that subdivision, the *Administrative Level 4* value MUST be provided.

Notes:

1. This table defines the divisions for *Administrative Level 4* in each of the province/territory.

Province/Territory	***Administrative Level 4***
Alberta	Hamlets/rural subdivisions; if they exist, MUST be provided. Otherwise MUST NOT be present (i.e., absent or blank).
British Columbia	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Manitoba	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.

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Province/Territory	*Administrative Level 4*
New Brunswick	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Newfoundland and Labrador	Communities; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Northwest Territories	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Nova Scotia	Communities; MUST be provided.
Nunavut	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Ontario	Former municipalities (i.e., pre-amalgamation); if the former municipality name is required to avoid duplicate addresses, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Prince Edward Island	Civic Address Communities; MUST be provided.
Québec	Arrondissements; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Saskatchewan	Unincorporated areas[3]. If they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Yukon	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.

Table 3 – Administrative Level 4

[3] In Saskatchewan, all unincorporated areas are administered by an incorporated entity such as a rural municipality or the Northern Saskatchewan Administrative District, which means that the unincorporated areas are contained in *Administrative Level 3*.

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2.1.6 *Additional Code*

namespace:PIDF-LO name: ca:ADDCODE

Definition: A case-sensitive alphanumeric code of up to six characters used to disambiguate addresses when the combination of *Administrative Level 2*, *Administrative Level 3*, *Administrative Level 4* (if used), and *Thoroughfare Name* may not be unique within a province or territory. The inclusion of *Additional Code* ensures that otherwise duplicate addresses become unique.

Definition source: Adapted from IETF RFC 4776 [9]

Examples:

- 3h12jk
- 100232
- AREQUF
- 49080 (existing *Additional Code* for the Paroisse Notre-Dame-du-Bon-Conseil, région administrative Centre-du-Québec)
- 49075 (existing *Additional Code* for the Village Notre-Dame-du-Bon-Conseil, région administrative Centre-du-Québec)

Data type: Alphanumeric

Maximum value length: 6

Domain of values: There is no single controlling registry or authority of these codes. A domain may be established by local, regional or provincial/territorial authorities that covers its area of jurisdiction.

Business rules: Mandatory element; this element MUST be provided and MUST uniquely identify a geographic area defined in *Administrative Level 2* or *Administrative Level 3* or *Administrative Level 4*. An *Additional Code* value MUST be unique within a province or territory so that the combination of *Administrative Level 1* and *Additional Code* is globally unique.

Notes:

1. An *Additional Code* value MUST be associated with one and only one of *Administrative Level 2*, *Administrative Level 3,* or *Administrative Level 4*. In other words, if an *Additional Code* value is associated with an *Administrative Level 4* area, all locations within that *Administrative Level 4* area MUST use the same *Additional Code* value. *Additional Code* is not restricted to a single administrative level across a province or territory.
2. *Additional Code* MUST be associated with *Administrative Level 4* when *Administrative Level 4* is the lowest administrative level that ensures the uniqueness of an address, when either *Administrative Level 2* or *Administrative Level 3* data is present, or both.

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This is the case in some large municipalities that were amalgamated such as Toronto, ON and Montréal, QC.

3. Should *Administrative Level 4* exist, but is not required to ensure the uniqueness of an address when either *Administrative Level 2* data, or *Administrative Level 3* data, or both are present, *Additional Code* MUST be associated with *Administrative Level 2* or *Administrative Level 3*.
4. When *Additional Code* is not associated with *Administrative Level 4*, if *Administrative Level 2* is present but *Administrative Level 3* is not, *Additional Code* is associated with *Administrative Level 2*. If *Administrative Level 3* is present and *Administrative Level 2* is not, *Additional Code* is associated with *Administrative Level 3*. If both *Administrative Level 2* and *Administrative Level 3* are present, *Additional Code* is associated with *Administrative Level 3*.
5. An *Additional Code* MUST NOT be blank, MUST NOT contain spaces, and MUST be up to six characters in length, so long as it meets the uniqueness requirements.
6. The addressing authority, or some other entity to which this role has been delegated, is responsible for creating and maintaining the *Additional Code* values for its jurisdiction. Addressing Authorities must make reasonable effort to ensure uniqueness of *Additional Code* values within a province or territory.
7. NG9-1-1 GIS Data aggregators should have data validation checks to ensure uniqueness of *Additional Code* values within a province or territory is achieved.
8. Codes already in existence MAY be used if they satisfy the uniqueness, data type, and length requirements defined in this document.
9. For jurisdictions that do not have existing codes, they may create them by utilizing a randomization tool using alphanumeric character encoding to derive six-character alphanumeric codes. A length of six characters is RECOMMENDED for randomly generated codes.
10. *Additional Code* values are case-sensitive.

2.1.7 *Administrative Level 5*

namespace:PIDF-LO name: ca:A5

Definition: *Administrative Level 5*, where it exists, is the subdivision of *Administrative Level 4*.

Definition source: Adapted from IETF RFC 4119 [6]

Examples:

- Spring Park, a neighbourhood in Prince Edward Island
- Sutton, a suburban community in Ontario

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Data type: Printable

Maximum value length: 100

Domain of values: There is no single controlling registry or authority of these names. A domain may be established by regional or provincial/territorial authorities that cover its area of jurisdiction.

Business rules: Where this level of subdivision exists and the address is contained within that subdivision, the *Administrative Level 5* value MUST be provided.

Notes:

1. This table defines divisions for *Administrative Level 5* in each of the province/territory.

Province/Territory	***Administrative Level 5***
Alberta	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
British Columbia	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Manitoba	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
New Brunswick	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Newfoundland and Labrador	Neighbourhoods; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Northwest Territories	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Nova Scotia	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.

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Province/Territory	*Administrative Level 5*
Nunavut	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Ontario	Suburban neighbourhoods, communities, former villages; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Prince Edward Island	Neighbourhoods; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Québec	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.
Saskatchewan	Neighbourhoods or subdivisions; if they exist, MUST be provided. Otherwise, MUST NOT be present (i.e., absent or blank).
Yukon	None at the present time. SHOULD NOT be present (i.e., absent or blank) until such time data exist to support its inclusion.

Table 4 – Administrative Level 5

2.1.8 *Postal Community Name*

namespace:PIDF-LO name: ca:PCN

Definition: A mailing place name associated with the postal code of an address.

Definition source: Adapted from IETF 4776 [9]

Examples: Vancouver, Edmonton, Iqaluit, Winnipeg, St. John's

Data type: Printable

Maximum value length: 40

Domain of values: As defined by Canada Post

Business rules: A *Postal Community Name* value MAY be provided if one exists for the specified civic address.

Notes:

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1. A *Postal Community Name* value is the name of the post office from which mail is delivered to an address, or another place name for a postal code that is recognized by Canada Post.
2. Canada Post associates a mailing place name to each postal code, and also lists additional place names that are acceptable for postal delivery.
3. Canada Post does not offer an easily accessible resource for a specific domain of value of postal community names however, several of its products (for a fee) include postal community names (called "Municipality Name") acceptable for postal delivery, which can be used to validate a given postal community name. Alternatively, the free "Find a Postal Code" web application can be used.
4. Canada Post supports some alternate names and abbreviations for postal delivery. Only official postal community names are expected to be used[4]. The use of alternate names and abbreviations is discouraged[5].

2.1.9 *Postal Code*

CLDXF-CA name: *Postal Code*

namespace:PIDF-LO name: ca:PC

Definition: A seven-character uniformly structured alphanumeric code in the form "ANA NAN" where "A" is an alphabetic character and "N" is a numeric character. The two segments, separated by a space, make up a *Postal Code* value.

Definition source: Adapted from Canada Post Addressing Guidelines [8]

Examples: Y1A 1V8, X1A 3T2, X0C 0G0, J0M 1C0

Data type: Printable

Maximum value length: 7

Domain of values: As defined by Canada Post.

Business rules: A *Postal Code* value MAY be provided if one is associated with the specified civic address.

Notes: None

[4] A future version of this document will make it mandatory to use the official postal community name when a value is provided. See section 6.4.

[5] A future version of this document will prohibit the use of alternate names and abbreviations postal community name when a value is provided. See section 6.4.

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2.2 Thoroughfare Name Elements

This document uses the term "thoroughfare" for CLDXF-CA element names defined in this section so that names align with their respective definitions. These element names may be referred to elements or database fields using the term "street" in other NENA documents (e.g., "*Thoroughfare Name*" versus "Street Name", "*Thoroughfare Name Pre Type*" versus "Street Name Pre Type", etc.).

This CLDXF-CA standard requires that complete thoroughfare names be parsed into their component's most simple elements. This section of CLDXF-CA defines and describes the eight simple elements needed for parsing any complete thoroughfare name in Canada. Each word or phrase of a complete thoroughfare name fits into one of the elements.

This approach greatly simplifies data validation and organization, and the use of consistent, common elements fosters address data exchange between PSAPs and other entities. Parsing is essential for complete thoroughfare name data maintenance and quality control, and for defining and applying local thoroughfare naming rules consistently.

Each of the eight element descriptions includes a definition, examples, and notes with more detailed explanations. The eight elements are:

- *Thoroughfare Name Pre Modifier* (e.g., "Alternate" in Alternate Route 8)
- *Thoroughfare Name Pre Directional* (e.g., "North" in North Fairfax Drive)
- *Thoroughfare Name Pre Type* (e.g., "Avenue" in Avenue A; "chemin" in chemin du parc)
- *Thoroughfare Name Pre Type Separator* (e.g., "of the" in Avenue of the Americas)
- *Thoroughfare Name* (e.g., "Fairfax" in North Fairfax Avenue)
- *Thoroughfare Name Post Type* (e.g., "Avenue" in North Fairfax Avenue)
- *Thoroughfare Name Post Directional* (e.g., "East" in Seventh Street East)
- *Thoroughfare Name Post Modifier* (e.g., "Extended" in East End Avenue Extended)

Every complete thoroughfare name has a *Thoroughfare Name* element. All other elements are optional. No complete thoroughfare name is likely to include all eight elements.

Most complete thoroughfare names are simple and straightforward to parse; they include a *Thoroughfare Name* and the vast majority include a type word and perhaps a directional word before or after. However, a few complete thoroughfare names are more complex or ambiguous, and no set parsing rules can parse all complete thoroughfare names unambiguously. Directional words and thoroughfare name pre and post types are frequently used as or in the *Thoroughfare Name* element ("South Park Street", "chemin de la Rive Sud"). Some complete thoroughfare names are inherently ambiguous (e.g., "The Boulevard") or unusually complex ("East Kent Avenue North", "Old Trunk Tree Road", "Middle River Branch Road"). Deciding which words and phrases of the complete

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thoroughfare name go in which data elements may require human judgment and local knowledge.

The larger set of thoroughfare name elements supports a systematic, logically consistent method for parsing complete thoroughfare names. Parsing helps to isolate and correct errors within complete thoroughfare names. Local thoroughfare naming authorities (usually not the PSAPs) can create local lists of values for each element to trap errors and standardize values on entry. This in turn prevents duplication of names, assignment errors, misspellings, case differences, syntax differences, and other variations that hinder maintenance of an authoritative thoroughfare name list. This in turn benefits all of the parties that create, validate, organize, and exchange address data. However, as noted above, a few complete thoroughfare names are more complex or ambiguous, and local knowledge and human judgment may be required. Local authorities will have the final say on how the rules and definitions provided in this document will be implemented.

The goals of parsing include:

1) Enhancing data quality and validation for local address authorities (usually not PSAPs) and helping to ensure consistent application of thoroughfare naming rules over time;
2) Giving PSAPs (and other downstream users such as first responders) cleaner data from the local addressing authorities;
3) Providing data aggregators such as regional or provincial/territorial governments, and NG9-1-1 network providers with a single set of elements for use in combining data from multiple sources; and
4) Simplifying NG9-1-1 data exchange through the use of common elements that are consistently defined and used.

Creators of CLDXF-CA locations, such as LIS operators and device manufacturers supplying location, and addressing authorities are expected to follow these principles. If parsing is not properly and consistently done, more errors will be expected in the validation process with the Location Validation Function (LVF).

2.2.1 *Thoroughfare Name Pre Modifier*

namespace:PIDF-LO name: ca:PRM

Definition: A word or phrase that precedes and modifies the *Thoroughfare Name* element but is separated from it by a *Thoroughfare Name Pre Type* or a *Thoroughfare Name Pre Directional*, or both.

Definition source: NENA-STA-004.2 [14]

Examples:

- "Old" in "Old North First Street" ("Old" is a *Thoroughfare Name Pre Modifier* because

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the *Thoroughfare Name Pre Directional* "North" separates "Old" from the *Thoroughfare Name* "First", and the *Thoroughfare Name Post Type* "Street")
- "Alternate" in "Alternate Route 8" (because "Route" separates "Alternate" from the *Thoroughfare Name* element)
- "Southwest" in "Southwest North Globe Avenue" (because only the last directional word is placed in the *Thoroughfare Name Pre Directional*)

Data type: Printable

Maximum value length: 25

Domain of values: None

Business rules: A *Thoroughfare Name* MUST be present if a *Thoroughfare Name Pre Modifier* is included.

Notes:

1. A *Thoroughfare Name Pre Modifier* precedes and modifies a *Thoroughfare Name* element but is separated from the *Thoroughfare Name* element by a *Thoroughfare Name Pre Type* or a *Thoroughfare Name Pre Directional* or both. Any word or phrase of a complete thoroughfare name that precedes the *Thoroughfare Name Pre Directional* (or that precedes the *Thoroughfare Name Pre Type* if the complete thoroughfare name has no *Thoroughfare Name Pre Directional*) comprises the *Thoroughfare Name Pre Modifier*.

2. Occasionally, two directional words occur together in or before a *Thoroughfare Name*. Only one of the words can be a *Thoroughfare Name Pre Directional*. The other might either be parsed as a *Thoroughfare Name Pre Modifier*, or else placed in the *Thoroughfare Name* element. In some cases, two parsing methods are possible, and local knowledge may be required to know which is correct. Some examples illustrate these points:

   1) Northwest East River Avenue
   2) East North Parkway
   3) Northwest East Avenue A
   4) North South Road Southwest

   In parsing a complete thoroughfare name, the first task is to determine what goes in the *Thoroughfare Name* element. Other decisions follow from that one. If more than one parsing is possible, confer with the local thoroughfare naming authority for authoritative information. If that is not possible, sometimes the most likely parsing can be inferred by noting how directional words are used in other thoroughfare names within the same addressing system.

   Example 1: For "Northwest East River Avenue", the *Thoroughfare Name* could be "River". In that case the complete name would be parsed as follows:

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- Northwest = *Thoroughfare Name Pre Modifier*
- East = *Thoroughfare Name Pre Directional*
- River = *Thoroughfare Name*
- Avenue = *Thoroughfare Name Post Type*

Plausible alternate scenario: The Avenue is in the northwest quadrant of the city, and it runs on both sides of a river. "Northwest East River Avenue" runs on one side of the river, and "Northwest West River Avenue" runs on the other side of the river.

However, the thoroughfare naming authority might also give "East River" as the *Thoroughfare Name* then the complete name would be parsed as follows:

- Northwest = *Thoroughfare Name Pre Directional*
- East River = *Thoroughfare Name*
- Avenue = *Thoroughfare Name Post Type*

Plausible alternate scenario: The Avenue is in the northwest quadrant of the city. It runs along the East River, and is named for it.

Example 2: For "East North Parkway", the *Thoroughfare Name* most likely would be "North". In that case the complete name would be parsed as follows:

- East = *Thoroughfare Name Pre Directional*
- North = *Thoroughfare Name*
- Parkway = *Thoroughfare Name Post Type*

It is uncommon but possible that the *Thoroughfare Name* may be "Parkway". In that case the complete name would be parsed as follows:

- East = *Thoroughfare Name Pre Directional*
- North = *Thoroughfare Name Pre Type*
- Parkway = *Thoroughfare Name*

Example 3: For "Northwest East Avenue A", only one parsing is possible because the directional words are separated from the *Thoroughfare Name* by a *Thoroughfare Name Pre Type*:

- Northwest = *Thoroughfare Name Pre Modifier*
- East = *Thoroughfare Name Pre Directional*
- Avenue = *Thoroughfare Name Pre Type*
- A = *Thoroughfare Name*

Example 4: In some cases, a *Thoroughfare Name* can be comprised of two directional words. For example, "North South Road Southwest" is parsed as follows:

- North South = *Thoroughfare Name*
- Road = *Thoroughfare Name Post Type*
- Southwest = *Thoroughfare Name Post Directional*

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2.2.2 *Thoroughfare Name Pre Directional*

namespace:PIDF-LO name: ca:PRD

Definition: A word preceding the *Thoroughfare Name* element that indicates the direction taken by the thoroughfare[6] from an arbitrary starting point or line, or the sector (e.g., quadrant, octant) where it is located.

Definition source: Adapted from NENA-STA-004.1 [13]

Examples:

- "North" in "North Fairfax Drive"
- "South" in "South Main Street"
- "North" in "Southwest North Globe Avenue" (because only the last directional word is placed in the *Thoroughfare Name Pre Directional*)

Data type: Printable

Maximum value length: 10

Domain of values:

- English: North, Northeast, Northwest, South, Southeast, Southwest, East, West
- Français: nord, nord-est, nord-ouest, sud, sud-est, sud-ouest, est, ouest

Business rules: A *Thoroughfare Name* MUST be present if a *Thoroughfare Name Pre Directional* is included.

Notes:

1. The use of *Thoroughfare Name Pre Directional* is uncommon in French-language complete thoroughfare names.
2. Occasionally, two directional words occur together in or before a *Thoroughfare Name*. See Note 2 under *Thoroughfare Name Pre Modifier* for more details.

2.2.3 *Thoroughfare Name Pre Type*

namespace:PIDF-LO name: cae:STP

Definition: A word or phrase that precedes the *Thoroughfare Name* element and identifies a type of thoroughfare[7] in a complete thoroughfare name.

Definition source: NENA-STA-004.1 [13]

Examples:

[6] See the definition of thoroughfare in section 7

[7] See the definition of thoroughfare in section 7

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- "Avenue" in "Avenue A"
- "Calle" in "Calle 1"
- "Highway" in "Highway of Heroes"
- "chemin" in "chemin Tanguay"

Data type: Printable

Maximum value length: 50

Domain of values: Restricted to values found in the NENA Street Name Pre Types and Street Name Post Types Registry [20].

Business rules: A *Thoroughfare Name* MUST be present if a *Thoroughfare Name Pre Type* is included.

Notes:

1. A complete thoroughfare name usually includes either a *Thoroughfare Name Pre Type* or a *Thoroughfare Name Post Type*. Occasionally, complete thoroughfare names have neither attribute (e.g., "Broadway"), or both attributes (e.g., "Avenue C Loop"). Both may also be used in jurisdictions that require dual-language representation of thoroughfare types (e.g., "rue Goodine Street"), which is common practice in the province of New Brunswick. In this example, "rue Goodine Street" is parsed as follows:

   rue = *Thoroughfare Name Pre Type*
   Goodine = *Thoroughfare Name*
   Street = *Thoroughfare Name Post Type*

2. *Thoroughfare Name Pre Type* values MUST be spelled out in full for data exchange. No abbreviations are recognized within this standard.
3. In English-language complete thoroughfare names, pre-types are less common than post-types. Pre-types are more common in Spanish-, Italian- and French-language complete thoroughfare names.
4. In French-language pre-types, it is common practice to use all lowercase characters.
5. For numbered (or, occasionally, lettered) jurisdictional routes, the *Thoroughfare Name Pre Type* includes the type word as well as the jurisdiction name, if given, and the administrative type of road. The following examples show the parsing of jurisdictional route names:
   - Highway 20: *Thoroughfare Name Pre Type* = Highway; *Thoroughfare Name* = 20
   - Rural Road 67: *Thoroughfare Name Pre Type* = Rural Road; *Thoroughfare Name* = 67
   - autoroute 40: *Thoroughfare Name Pre Type* = autoroute; *Thoroughfare Name* =

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- Township Road 250: *Thoroughfare Name Pre Type* = Township Road; *Thoroughfare Name* = 250
- Range Road 265: *Thoroughfare Name Pre Type* = Range Road; *Thoroughfare Name* = 265

6. NENA maintains a registry of known thoroughfare name types (pre, post, or both) in the "Street Name Pre Types and Street Name Post Types" registry [20]. Anyone finding additional *Thoroughfare Name Pre Type* values may propose them for inclusion in the registry. This is done by using the on-line form at https://www.nena.org/page/NRS_SubmitNewValue, selecting "CLDXF-StreetNamePreTypesAndStreetNamePostTypes" in the "Registry or Sub-Registry Name" drop-down list, filling in the proposed new entry along with an example (required) and any useful comment (optional). Should there be an existing value in the registry with a different casing style, the submission should be to add an alternative casing value to the existing entry (e.g., "Boulevard" exists and "boulevard" is requested to be added – in this case, "boulevard" would be an alternative casing value to the existing entry "Boulevard"). This is achieved by completing the "AlternativeCasing" box in the submission form. Note that only the first letter casing is accepted.

   New submissions MUST NOT include region-specific variations on generic thoroughfare name types. Any value that includes a locality name will be represented in the registry by the generic form of the *Thoroughfare Name Pre Type* without the locality name. Thus, for the *Thoroughfare Name Pre Type* value of "Ontario Route" only the word "Route" needs to be validated in the registry. Nothing precludes one to include the locality in the element; it is just not part of the registered values.

   The parsing of complete thoroughfare names is at local discretion; however, a proposed new thoroughfare type should fit within the definition of a "thoroughfare type". If it does not then it should be placed in a different element, unless there is a justifiable reason to parse it as a thoroughfare type.

   Note that it is not required in CLDXF-CA to always have a *Thoroughfare Name Pre Type* or a *Thoroughfare Name Post Type*, and it may be preferable to incorporate some components of the complete thoroughfare name into the base *Thoroughfare Name* element (or, less frequently, the *Thoroughfare Name Pre Modifier* or *Thoroughfare Name Post Modifier* elements) rather than parsing them as thoroughfare type words.

7. Where a province or territory name is used in a *Thoroughfare Name Pre Type* as shown in note 6 above, it MUST be written out in full rather than abbreviated (i.e., "Ontario" rather than "ON").

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8. Occasionally two or more type words occur together before the *Thoroughfare Name* element (e.g., Bypass Highway 20). All of the words are placed in the *Thoroughfare Name Pre Type*, unless the local addressing authority has included any of them in the *Thoroughfare Name* element. If the two type words are not part of the *Thoroughfare Name* element and are not separated from each other by a directional word or other words, they are all placed in the *Thoroughfare Name Pre Type* element. Where a *Thoroughfare Name Pre Type* is comprised of two or more thoroughfare types, that unique combination needs to be included as a registry item even if all words are already in the registry.

2.2.4 *Thoroughfare Name Pre Type Separator*

namespace:PIDF-LO name: cdx1:STPS

Definition: A preposition or prepositional phrase between the *Thoroughfare Name Pre Type* and the *Thoroughfare Name*.

Definition source: NENA-STA-004.1 [13]

Examples:

- "at" in "Avenue at Port Imperial"
- "de las" in "Alameda de las Pulgas"
- "des" in "rue des Étoiles"
- "in the" in "Circle in the Woods"

Data type: Printable

Maximum value length: 20

Domain of values: Restricted to values found in the "NENA Registry of Street Name Pre Type Separators" [18].

Business rules: A *Thoroughfare Name* and a *Thoroughfare Name Pre Type* MUST be present if a *Thoroughfare Name Pre Type Separator* is included.

Notes:

1. *Thoroughfare Name Pre Type Separator* values are less common in English-language thoroughfare names, but they are common in Spanish-, Italian- and French-language names.
2. NENA maintains a Street Name Pre Type Separators registry. Anyone who finds additional *Thoroughfare Name Pre Type Separator* values in Canadian thoroughfare names may propose them for inclusion in the registry. This is done by using the on-line form at https://www.nena.org/page/NRS_SubmitNewValue, selecting "CLDXF-StreetNamePreTypeSeparators" in the "Registry or Sub-Registry Name" drop-down list, and give the suggested new value with an example of its usage.

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2.2.5 *Thoroughfare Name*

namespace:PIDF-LO name: ca:RD

Definition: The element of the complete thoroughfare name that identifies the particular thoroughfare[8] (as opposed to any thoroughfare types, directionals, and modifiers).

Definition source: NENA-STA-004.1 [13]

Examples:

- "Hastings" in "East Hastings Street"
- "Lionel-Groulx" in "avenue Lionel-Groulx"

Data type: Printable

Maximum value length: 254

Domain of values: None

Business rules: At least one of the following MUST be present:

- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*
- A *Site* whose identifier is unique within the given set of place names
- A *Structure* whose identifier is unique within the given set of place names
- A *Location Marker* whose identifier is unique within the given set of place names

Notes:

1. The *Thoroughfare Name* should be the official name of a thoroughfare as assigned by a local governing authority or, in the absence of a local governing body (e.g., a private road), a name that is commonly used and recognized.
2. Thoroughfare names are usually given to roadways carrying vehicular traffic, but they may also be given to other thoroughfares or access ways along which address numbers may be assigned or distance markers placed such as: Walkways, boardwalks, trails, waterways, rail lines, etc.
3. Either an *Address Number* or a *Distance Marker* (or both) should be provided with a *Thoroughfare Name*, unless none have been assigned along a road. Examples:
    - 12005 Range Road 88
    - Km 12, Range Road 88 (where *Distance Marker* = Km 12, *Thoroughfare Name Pre Type* = Range Road and *Thoroughfare Name* = 88)
    - Km 12, 12005 Range Road 88 (meaning: Address number 12005 is found at

[8] See the definition of thoroughfare in section 7

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distance marker 12 on Range Road 88)

4. Inconsistent *Thoroughfare Name* spellings are common, especially as to:
   - Internal capitalization: McIntyre, Mcintyre
   - Spaces: McIntyre, Mc Intyre
   - Spelling: MacIntyre, McIntyre
   - Apostrophes: Smiths Lane, Smith's Lane
   - Hyphens: rue Saint Jacques, rue Saint-Jacques
   - Numbered thoroughfares: Third Street, 3rd Street, 3 Street

   Inconsistent spellings of the same thoroughfare name must be resolved by referring to official records of the thoroughfare naming authority, or written records of guidance from the thoroughfare naming authority.

2.2.6 *Thoroughfare Name Post Type*

namespace:PIDF-LO name: ca:STS

Definition: A word or phrase that follows the *Thoroughfare Name* element and identifies a type of thoroughfare[9] in a complete thoroughfare name.

Definition source: NENA-STA-004.1 [13]

Examples:

- "Avenue" in "Victoria Avenue"
- "Street" in "Brunswick Street"
- "avenue" in "8ième avenue"

Data type: Printable

Maximum value length: 50

Domain of values: Restricted to values found in the NENA Street Name Pre Types and Street Name Post Types Registry [20].

Business rules: A *Thoroughfare Name* MUST be present if a *Thoroughfare Name Post Type* is included.

Notes:

1. A complete thoroughfare name usually includes either a *Thoroughfare Name Pre Type* or a *Thoroughfare Name Post Type*. Occasionally, complete thoroughfare names have neither attribute (e.g., "Broadway"), or both attributes (e.g., "rue Goodine Street"), which is common practice in the province of New Brunswick. In this example, "rue Goodine Street" is parsed as follows:

[9] See the definition of thoroughfare in section 7

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rue = *Thoroughfare Name Pre Type*
Goodine = *Thoroughfare Name*
Street = *Thoroughfare Name Post Type*

2. *Thoroughfare Name Post Type* values MUST be spelled out in full for data exchange. No abbreviations are recognized within this standard.
3. *Thoroughfare Name Post Type* words are often used as or in the *Thoroughfare Name* element (e.g. "Park Lane Circle"). Whether a *Thoroughfare Name Post Type* value is better placed in the *Thoroughfare Name Post Type* or the *Thoroughfare Name* element cannot always be discerned from the complete thoroughfare name itself. Sometimes the proper parsing has to be checked with the thoroughfare naming authority, or inferred from the context of the complete thoroughfare name.
4. Occasionally, two or more type words occur together after the *Thoroughfare Name* element (e.g., "Tenth Street Bypass"). All of the words are placed in the *Thoroughfare Name Post Type*, unless the local address authority has included any of them in the *Thoroughfare Name* element. If the type words are not part of the *Thoroughfare Name* element and are not separated from each other by a directional word or other words, they are all placed in the *Thoroughfare Name Post Type* element. Where a *Thoroughfare Name Post Type* is comprised of two or more thoroughfare types, that unique combination needs to be included as a registry item even if all words are already in the registry.
5. NENA maintains a registry of known thoroughfare name types (pre, post, or both) in the "Street Name Pre Types and Street Name Post Types" registry [20]. Anyone finding additional *Thoroughfare Name Post Type* values may propose them for inclusion in the registry. See Note 2 under *Thoroughfare Name Pre Type* for more details.

2.2.7 *Thoroughfare Name Post Directional*

namespace:PIDF-LO name: ca:POD

Definition: A word following the *Thoroughfare Name* element that indicates the direction taken by the thoroughfare[10] from an arbitrary starting point or line, or the sector where it is located.

Definition source: NENA-STA-004.1 [13]

Examples:

- "East" in "Seventh Street East"
- "Northeast" in "Ingraham Street Northeast"

[10] See the definition of thoroughfare in section 7

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- "Southwest" in "Boulevard South Southwest"
- "sud" in "boulevard Métropolitain sud"

Data type: Printable

Maximum value length: 10

Domain of values:

- English: North, Northeast, Northwest, South, Southeast, Southwest, East, West
- Français: nord, nord-est, nord-ouest, sud, sud-est, sud-ouest, est, ouest

Business rules: A *Thoroughfare Name* MUST be present if a *Thoroughfare Name Post Directional* is included.

Notes:

1. A complete thoroughfare name may include a *Thoroughfare Name Pre Directional*, a *Thoroughfare Name Post Directional*, neither element, or both elements.
2. Full spelling (e.g., North, Northeast, sud, sud-est) for data exchange is REQUIRED to avoid ambiguity.
3. Directional words are often used as or in the *Thoroughfare Name* element (e.g., "Avenue North"). Whether a directional word value is to be placed in the *Thoroughfare Name Post Directional* or the *Thoroughfare Name* element cannot always be discerned from the complete thoroughfare name itself. Sometimes the proper parsing has to be checked with the thoroughfare naming authority, or inferred from the context of the complete thoroughfare name.
4. Occasionally, two directional words occur together in or after *Thoroughfare Name*. Only one of the words can be a *Thoroughfare Name Post Directional*. The other might be parsed as either a *Thoroughfare Name Post Modifier*, or otherwise placed in the *Thoroughfare Name* element. In some cases, more than one parsing is possible, and local knowledge is required to know which one is correct. Three examples illustrate these points:

   1) Boulevard South Southwest
   2) Pharr Court South Northwest
   3) North South Road Southwest

   In parsing a thoroughfare name, the first task is to determine the *Thoroughfare Name* element. Other decisions follow from that one. If more than one parsing is possible, confer with the local thoroughfare naming authority for authoritative information. If that is not possible, sometimes the most likely parsing can be inferred by noting how directional words are used in other thoroughfare names within the same addressing system.

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Example 1: For "Boulevard South Southwest", the *Thoroughfare Name* most likely would be "South". In that case, the complete thoroughfare name would be parsed as follows:

Boulevard = *Thoroughfare Name Pre Type*
South = *Thoroughfare Name* (directional word used as a thoroughfare name)
Southwest = *Thoroughfare Name Post Directional*

It is uncommon, but possible, that the *Thoroughfare Name* be "Boulevard". In that case, the complete thoroughfare name would be parsed as follows:

Boulevard = *Thoroughfare Name*
South = *Thoroughfare Name Post Directional*
Southwest = *Thoroughfare Name Post Modifier*

Example 2: For "Pharr Court South Northeast", only one parsing is possible, because the directional words are separated from the *Thoroughfare Name* by a *Thoroughfare Name Post Type*:

Pharr = *Thoroughfare Name*
Court = *Thoroughfare Name Post Type*
South = *Thoroughfare Name Post Directional*
Northeast = *Thoroughfare Name Post Modifier*

Example 3: In this case, the *Thoroughfare Name* is comprised of two directional words. Here, "North South Road Southwest" is parsed as follows:

North South = *Thoroughfare Name*
Road = *Thoroughfare Name Post Type*
Southwest = *Thoroughfare Name Post Directional*

2.2.8 *Thoroughfare Name Post Modifier*

namespace:PIDF-LO name: ca:POM

Definition: A word or phrase that follows and modifies the *Thoroughfare Name* element but is separated from it by a *Thoroughfare Name Post Type* or a *Thoroughfare Name Post Directional*, or both.

Definition source: NENA-STA-004.2 [14]

Examples:

- "Extended" in "East End Avenue Extended". Here, "Extended" is a *Thoroughfare Name Post Modifier* because the *Thoroughfare Name Post Type* "Avenue" separates "Extended" from the *Thoroughfare Name* "East End". In this case, "East End" has been designated as the *Thoroughfare Name* by the local naming authority; "East" is not a *Thoroughfare Name Pre Directional*.

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- "Extension" in "Forest Hills Parkway North Extension". Here, "North" separates "Extension" from the *Thoroughfare Name Post Type*.
- "Northwest" in "Pharr Court South Northwest". Here, only the first directional word is placed in the *Thoroughfare Name Post Directional*.
- "Central" in "Bay Road Central".
- "Number 2" in "Banner Fork Road Number 2". Here, "Road" separates "Number 2" from the *Thoroughfare Name*.

Data type: Printable

Maximum value length: 25

Domain of values: None

Business rules: A *Thoroughfare Name* MUST be present if a *Thoroughfare Name Post Modifier* is included.

Notes:

1. Occasionally, two directional words occur together in or after *Thoroughfare Name*. Only one of the words can be a *Thoroughfare Name Post Directional*. The other might be parsed as either a *Thoroughfare Name Post Modifier*, or otherwise placed in the *Thoroughfare Name* element. In some cases, more than one parsing is possible, and local knowledge is required to know which one is correct. Three examples illustrate these points:

   1) Boulevard South Southwest
   2) Pharr Court South Northwest
   3) North South Road Southwest

   In parsing a thoroughfare name, the first task is to determine the *Thoroughfare Name* element. Other decisions follow from that one. If more than one parsing is possible, confer with the local thoroughfare naming authority for authoritative information. If that is not possible, sometimes the most likely parsing can be inferred by noting how directional words are used in other thoroughfare names within the same addressing system.

   Example 1: For "Boulevard South Southwest", the *Thoroughfare Name* most likely would be "South". In that case, the complete thoroughfare name would be parsed as follows:

   Boulevard = *Thoroughfare Name Pre Type*
   South = *Thoroughfare Name* (directional word used as a thoroughfare name)
   Southwest = *Thoroughfare Name Post Directional*

   It is uncommon but possible that the *Thoroughfare Name* may be "Boulevard". In that case, the complete thoroughfare name would be parsed as follows:

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Boulevard = *Thoroughfare Name*
South = *Thoroughfare Name Post Directional*
Southwest = *Thoroughfare Name Post Modifier*

Example 2: For "Pharr Court South Northeast", only one parsing is possible, because the directional words are separated from the *Thoroughfare Name* by a *Thoroughfare Name Post Type*:

Pharr = *Thoroughfare Name*
Court = *Thoroughfare Name Post Type*
South = *Thoroughfare Name Post Directional*
Northeast = *Thoroughfare Name Post Modifier*

Example 3: In this case, the *Thoroughfare Name* is comprised of two directional words. Here, "North South Road Southwest" is parsed as follows:

North South = *Thoroughfare Name*
Road = *Thoroughfare Name Post Type*
Southwest = *Thoroughfare Name Post Directional*

2.3 Address Number Elements

Address numbers usually indicate, by sequence and parity, where along a thoroughfare the numbered feature is located. In CLDXF-CA, address numbers are broken into three component elements: *Address Number Prefix*, *Address Number*, and *Address Number Suffix*. A fourth element, *Distance Marker*, may be given in lieu of, or in addition to, the address number.

The *Address Number* element is defined as a non-negative integer to support quality control checks on data at rest such as address sorting, parity definition, and in/out of address range tests. An *Address Number* is required before an *Address Number Prefix*, or an *Address Number Suffix* can be given.

Some jurisdictions include address numbers with alphanumeric extensions (e.g., "123 A"; "123-A", "123 1/2"). The extensions ("A", "-A", "1/2") are *Address Number Suffix* values. The *Address Number Suffix* can include a hyphen and any supported special characters, if present.

In a few parts of Canada, alphanumeric extensions precede the *Address Number* (e.g., "10-" in 10-1408). In such cases, the letters, numbers, and hyphens preceding the *Address Number* integer all comprise an *Address Number Prefix*. (See the *Address Number Prefix* description and notes for details of the particular numbering systems that use prefixes).

Distance Marker numbers are most useful for specifying locations along national, provincial/territorial highways, recreational trails, and other routes where addressed features are not found, as well as along sparsely populated stretches of regional,

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provincial, territorial, federal, and other routes where distance marker signs are posted. *Distance Marker* numbers may be given in lieu of, or in addition to, address numbers (if address numbers have been assigned along the route). The *Distance Marker* element includes both the word and the numeric value (e.g., "Km 43"; "Distance Marker 231.5").

2.3.1 *Address Number Prefix*

namespace:PIDF-LO name: cae:HNP

Definition: An extension of the *Address Number* that precedes it and further identifies a location along a thoroughfare[11], or within a defined area.

Definition source: NENA-STA-004.1 [13]

Examples:

- "A" in "A19 Route 117"
- "0" in "0123 Sunset Boulevard"
- "10-" in "10-1408 Township Road 320"

Data type: Printable

Maximum value length: 15

Domain of values: None

Business rules: An *Address Number* MUST be present if an *Address Number Prefix* is included.

Notes:

1. The *Address Number Prefix* contains alphanumeric characters that precede an address number, plus any punctuation and spaces (except leading, trailing, and consecutive spaces, which are stripped by the XML processor), if any.
2. In some jurisdictions, a leading zero is used in an address number. Where there are leading zeros, they are included in the *Address Number Prefix* and not in the *Address Number*.
3. Most address numbers do not include a prefix. When found, the prefix MUST be separated from the address number so that the address number can be maintained as an integer for sorting and quality control checks.

2.3.2 *Address Number*

namespace:PIDF-LO name: ca:HNO

[11] See the definition of thoroughfare in section 7

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Definition: The integer identifier of a location along a thoroughfare[12] or within a defined area.

Definition source: NENA-STA-004.2 [14]

Examples:

- "19" in "A19 Route 117"
- "123" in "0123 Sunset Boulevard"
- "1408" in "10-1408 Township Road 320"

Data type: Non-negative integer

Maximum value length: 6

Domain of values: None

Business rules: A *Thoroughfare Name* MUST be present if an *Address Number* is included.

Notes:

1. The *Address Number* is defined as an integer to support address sorting, parity definition, and in/out of address range tests.
2. If an address includes a *Thoroughfare Name*, it must also include an *Address Number* or a *Distance Marker*, unless no address-numbers or distance markers have been assigned along that thoroughfare.
3. Some address numbers may be preceded, or followed by letters, fractions, hyphens, decimals, and other non-integer content. Those non-integer characters MUST be placed in the *Address Number Prefix* if they appear before the address number, or in the *Address Number Suffix* if they follow the address number. For example, the address number for "21 87690B Township Road 722" would be parsed as follows:

   "21" = *Address Number Prefix*
   "87690" = *Address Number*
   "B" = *Address Number Suffix*

4. Occasionally zero is issued as a valid address number (e.g., 0 rue du Trésor). Zero should not be used to indicate there is no address number except when there is no integer portion of the complete thoroughfare number (e.g., 1/2 Fifth Avenue). In this case, "0" MUST be entered for the *Address Number* (e.g., "0 1/2 Fifth Avenue").

2.3.3 *Address Number Suffix*

[12] See the definition of thoroughfare in section 7

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namespace:PIDF-LO name: ca:HNS

Definition: An extension of the *Address Number* that follows it and further identifies a location along a thoroughfare[13] or within a defined area.

Definition source: NENA-STA-004.1 [13]

Examples:

- "1/2" in "119 1/2 Elm Street" (note the leading space separator is not included in the suffix)
- "A" in "123 A Main Street" (note the leading space separator is not included in the suffix)
- "A" in "123A Main Street"
- "-A" in "123-A Main Street"
- "1/2" in "194-03 1/2 50th Avenue" (note the leading space separator is not included in the suffix)

Data type: Printable

Maximum value length: 15

Domain of values: None

Business rules: An *Address Number* MUST be present if an *Address Number Suffix* is included.

Notes:

1. Most address numbers do not include a suffix. When found, the suffix MUST be separated from the address number so that the address number can be maintained as an integer for sorting and quality control checks.
2. The *Address Number Suffix* contains alphanumeric characters that follow an address number, plus any punctuation and spaces (except leading, trailing, and consecutive spaces, which are stripped by the XML processor), if any.
3. Decimals MUST NOT be used in the *Address Number Suffix* element. Instead, fractions MUST be used as their multi-character representation using the "/" between the numerator and the denominator (e.g., "4/5"), excluding superscripts and subscripts, and without spaces between characters (e.g., not "4 / 5"). Where it exists, the single-character glyph (e.g., "½") MUST NOT be used.

2.3.4 *Distance Marker*

namespace:PIDF-LO name: cae:MP

[13] See the definition of thoroughfare in section 7

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Definition: A physical marker labelled with the distance travelled along a route such as a trail, a waterway, a road or a highway.

Definition source: Adapted from NENA-STA-004.2 [14]

Examples:

- "Milepost 1303" in "Milepost 1303, Alaska Highway"
- "Distance Marker 12" in "Distance Marker 12, 12005 County Road 88"
- "DM134" in "DM134, Highway 105 East, Millville"

Data type: Printable

Maximum value length: 150

Domain of values: None

Business rules: A *Thoroughfare Name* MUST be present if a *Distance Marker* is included.

Notes:

1. Given that Canada has formally adopted the metric system, the *Distance Marker* number is usually referring to a distance in kilometres or metres.
2. Nautical markers whose primary function is to indicate distance along a waterway MUST be included in *Distance Marker*.
3. In circumstances where a distance marker is represented with a fraction, the decimal representation of the fraction MUST be used (e.g., "Km 112.5" or "Km 112,5"). Fraction representations MUST NOT be used (e.g., not "Km 112 1/2" nor "Km 112 ½").
4. An address may include a *Distance Marker* with or without an *Address Number*. If they are given together, it means that the address number occurs at the distance marker. Examples:
    - *Distance Marker* without *Address Number*: "Km 12, County Road 88";
    - *Distance Marker* with *Address Number*: "Km 12, 12005 County Road 88", which means that address number 12005 is found at distance marker Km 12 on County Road 88.

2.4 Named Location Elements

This section defines and explains the use of named location elements in CLDXF-CA. These elements do specify a location but not with a thoroughfare address, but rather by identifying features such as sites and buildings as well as locations within buildings such as units or rooms by name. The individual components of a complete location description that reference named features, other than places and thoroughfares (covered in sections 2.1 and 2.2), are placed into the appropriate CLDXF-CA elements based on the definitions provided here. The named location elements can be used to complement the thoroughfare

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address elements; either or both may be used as long as a valid identifier for a physical structure or site is provided. There is no limitation on how features are named; functional or descriptive phrases, proper names, or alphanumeric identifiers can all be used. For example, "Building 1," "Ashcroft Library," and "Cafeteria" are all valid structure names.

Features referenced by named location elements may or may not be well known or individually mapped in a GIS. Location records may provide details that can be used to precisely locate a caller.

The named location elements along with somewhat simplified definitions are listed below:

Site:	An identified area of land, which may or may not have structures on it.
SubSite:	A named sub-area of a site, such as a parking lot.
Structure:	Any kind of "vertical" feature such as a building, cell tower, tank, etc.
Wing:	A designated part of a structure that comprises a significant portion of the structure's floor area.
Floor:	A defined vertical level within a structure.
Unit:	Most commonly, a collection of rooms with distinct function or occupancy.
Room:	A single enclosed space within a structure.
Section:	An identified, unenclosed area within a structure.
Row:	A linear collection of seats, workstations, equipment, or storage.
Seat:	A single seat, workstation, or other "point" location within a structure.
Location Marker:	A uniquely identified infrastructure component such as a call box.

The elements from *Site* through *Room* (except *Floor*, see note below) in the listing above form a hierarchy from largest to smallest, where features higher in the hierarchy contain and aggregate features below. Note that for *Wing, Unit* and *Room* elements, a physical structure must be identified either by thoroughfare address or by name. In the most common case, named location elements are used to identify units within a structure that is identified by thoroughfare address. Also note that not every level of the hierarchy needs to be present in a location. For example, there might be data for individual rooms in a named classroom building, without a wing or a unit being specified.

The *Section*, *Row*, and *Seat* elements are used to identify unenclosed areas or more precise locations such as individual workstations within a structure, wing, unit, or room. For example, the *Section, Row,* and *Seat* elements may exactly specify a location within a named structure like a football stadium without reference to wing, unit, or room.

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The *Floor* element is not in the hierarchy of larger to smaller "horizontal" elements; however, it is often critical in a response context.

The primary challenge in using these elements is classifying the components of the complete location description. Careful reading of the definitions and reference to the examples are recommended. This set of elements is intended to be comprehensive, such that a description of any named location can be unambiguously expressed using the CLDXF-CA standard. Examples are provided for concert and sports venues, campus buildings, airports, shopping malls, hospitals, and other cases that may be problematic. For those cases where the appropriate classification of a location description component cannot be determined, the *Additional Location Information* element can be used.

Abbreviations MUST NOT be used to shorten a name but MUST be used when the official name assigned by the naming authority contains an abbreviation (e.g., "QEII Health Sciences Centre").

2.4.1 *Site*

namespace:PIDF-LO name: cdx2:SITE

Definition: The name of an exterior area which is publicly known and unique within a given place. A site may contain one or more structures and/or sub-sites.

Definition source: NENA-STA-004.2 [14]

Examples:

- Parliament Hill
- Toronto Pearson International Airport
- Prince Edward Island National Park

Data type: Printable

Maximum value length: 254

Domain of values: None

Business rules: At least one of the following MUST be present:

- A *Site* whose identifier is unique within the given set of place names
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*
- A *Structure* whose identifier is unique within the given set of place names
- A *Location Marker* whose identifier is unique within the given set of place names

Otherwise, any *Site* identifier MAY be provided.

Notes:

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1. A site is often an area where there are numerous buildings such as a school campus, an industrial complex, a mall, or a residential development. However, *Site* may also refer to an area such as a historical or cultural site, a campground, a park, or a farm where there are few or no structures.
2. A site typically has a single owner, use or occupancy, as distinguished from the smallest kind of place, typically found in the *Administrative Level 5* element, such as a neighbourhood, which is intended for multiple uses or multiple occupants.
3. Any exterior infrastructure at ground level such as tennis courts or parking lots would be classified as a *Site* or a *SubSite*. Any built feature with a vertical dimension is a *Structure*, including not only buildings but also underground parking garages, tanks, cell towers, sub-stations, and other similar infrastructure.
4. Areas which are distinctly identified and geographically separate are treated as different sites, even if they are associated with a single entity, such as the downtown and the main campus of a university. However, a single site may be composed of several non-contiguous areas in close proximity, such as a park, campus, or similar feature divided by a roadway.
5. Many named sites represent areas with multiple buildings, which are collectively or individually assigned one or more thoroughfare addresses. Sites and buildings can be associated with a thoroughfare address simply by including the corresponding address number (or a distance marker) and thoroughfare name elements in the civic location. Here is an example:

   Site (SITE) = Saint Mary's University
   Structure (BLD) = Burke Building
   Address Number (HNO) = 5932
   Thoroughfare Name (RD) = Inglis
   Thoroughfare Name Post Type (STS) = Street

2.4.2 *SubSite*

namespace:PIDF-LO name: cdx2:SUBSITE

Definition: The name of a sub-area within a larger area specified either by a site name, a thoroughfare address, or both.

Definition source: NENA-STA-004.2 [14]

Examples:

- "les plaines d'Abraham" in "Le parc des Champs-de-Bataille, les plaines d'Abraham"
- "Sandy Pond Day Use Area" in "Terra Nova National Park, Sandy Pond Day Use Area"
- "Parking Lot" in "Parking Lot, Stanley Park, 735 Stanley Park Drive, Vancouver"
- "Unit B12" in "123 Main Street West, Unit B12" (Sunnyvale mobile home park)

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- "99" in "600 Causeway Road, Seaforth, 99" (a year-round fishing shed)
- "Tennis Courts" in "Rideau Hall Grounds, Tennis Courts"

Data type: Printable

Maximum value length: 254

Domain of values: None

Business rules: One of the following elements or combination of elements, which identifies a physical site MUST be present if a *SubSite* is included:

- A *Site*
- A *Thoroughfare Name* and *Address Number*
- A *Thoroughfare Name* and *Distance Marker*

Notes:

1. Site names often identify extensive areas, which may contain smaller named areas. The *SubSite* element is used to identify such locations. There may be multiple civic locations referencing different sub-sites within the same site or at the same thoroughfare address.

   Site (SITE) = QEII Health Sciences Centre[14]
   SubSite (SUBSITE) = Halifax Infirmary Site
   Site (SITE) = QEII Health Sciences Centre
   SubSite (SUBSITE) = Victoria General Site

2. Exterior features such as lots in a mobile home park or slips at a marina are not contained within structures and do not meet the CLDXF-CA definition of *Unit* (see section 2.4.6). Their complete identifiers MUST be stored in the *SubSite* element instead. Although units in a mobile home park are normally used as a reference to the mobile home itself, the type word "unit" actually refers to the lot or space that the mobile home is occupying.

3. There may be some confusion as to whether a built feature such as a parking lot or a plaza is a *SubSite* or a *Structure*. As mentioned in note 3 under *Site* above, a *SubSite* is an exterior area at ground level, as opposed to a *Structure,* which is built above or below ground.

4. For a given *Site* and *SubSite*, there may be different structures. Examples:

   Site (SITE) = QEII Health Sciences Centre
   SubSite (SUBSITE) = Victoria General Site
   Structure (BLD) = Dickson Building

[14] Note that "QEII" is an abbreviation that is part of the official name

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Site (SITE) = QEII Health Sciences Centre
SubSite (SUBSITE) = Victoria General Site
Structure (BLD) = Centennial Building

When it is necessary to specify several "levels" of detail for a non-structure location within a site area then all levels must be included in the *SubSite* element. These components of the *SubSite* element should be concatenated and ordered to reflect their geographic hierarchy from largest to smallest. Examples:

Site (SITE) = Wentworth Marina
SubSite (SUBSITE) = Dock C Slip 40A
Site (SITE) = University of Toronto St. George Campus
SubSite (SUBSITE) = Back Campus Tennis Courts

2.4.3 *Structure*

A common requirement in representing civic locations is to provide a distinct identifier for each structure that share a thoroughfare address. A similar need exists when structures on a campus, a housing complex, or similar sites are primarily known by name, whether or not a thoroughfare address has been assigned. The following sections cover both situations.

The *Structure* element stores the names or other identifiers for all structures with a vertical dimension as discussed in Note 3 under *Site*. This includes both conventional buildings that have walls, doors, and a roof, and other kinds of structures such as cell towers, transformer stations, fuel tanks, and so on.

Structures may be identified by proper or generic names, ("Massey Hall", "Cafeteria") or by alphanumeric IDs ("Building A26"). All these will be referred to as structure names or structure identifiers in the discussion below.

The official structure identifier should be used in CLDXF-CA locations. If there are several distinct identifiers associated with a given structure, the one selected will be most useful if it matches what is displayed on the structure exterior or signage, and is familiar to members of the community.

namespace:PIDF-LO name: ca:BLD

Definition: A built feature with a vertical dimension, including both conventional buildings with walls, doors and a roof, and other kinds of infrastructure such as cell towers, transformer stations, fuel tanks, etc.

Definition source: Adapted from NENA-STA-004.2 [14]

Examples:

- "Tower Building" in "2000 Wellington Street, Tower Building"
- "Parkade P1" in "Calgary International Airport, Parkade P1"
- "Core Sciences Building" in "45 Arctic Avenue, Memorial University of Newfoundland,

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Core Sciences Building"
- "Leslie L. Dan Pharmacy Building" in "Leslie L. Dan Pharmacy Building, University of Toronto – St. George Campus"
- Confederation Bridge

Data type: Printable

Maximum value length: 75

Domain of values: None

Business rules: At least one of the following MUST be present:

- A *Structure* whose identifier is unique within the given set of place names
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*
- A *Site* whose identifier is unique within the given set of place names
- A *Location Marker* whose identifier is unique within the given set of place names

Otherwise, any *Structure* identifier MAY be provided.

Notes:

1. Building names typically include either the generic type word "Building" or a specific type word such as "Terminal" or "Library" and these should be included where they form part of the name. Clearly descriptive type words are especially important in identifying non-building structures such as cell towers or fuel tanks. For example, if one amongst a group of fuel tanks at a tank farm is labelled "Number 5" in the source data, "Fuel Tank Number 5" would be a preferred identifier in the CLDXF-CA location.
2. A structure identifier in combination with a site name or with a thoroughfare address (or both) may be used to identify a structure within a given place. A structure identifier must be unique within a named site, or within a group of buildings identified by thoroughfare address, in order to define the location unambiguously.

   Here is an example of a civic location that includes a named structure and a thoroughfare address:

   Thoroughfare Name (RD) = Front
   Thoroughfare Name Post Type (STS) = Street
   Thoroughfare Name Post Directional (POD) = West
   Address Number (HNO) = 55
   Structure (BLD) = Union Station

   Here is an example of a named structure on a named site:

   Site (SITE) = Carleton University
   Structure (BLD) = Alumni Hall

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Here is an example of a named structure with both a named site and a thoroughfare address:

Thoroughfare Name (RD) = Wellington
Thoroughfare Name Post Type (STS) = Street
Address Number (HNO) = 3938
Site (SITE) = Parliament Hill
Structure (BLD) = West Block

3. In some cases, the description of a location may contain a structure identifier only. Such structures will usually have visible signage and/or their identifiers will be publicly known. For such locations, the structure identifier must be unique within the most granular place name specified. Here are two examples:

Structure (BLD) = Ambassador Bridge
Structure (BLD) = Pont de Québec

There is no fixed relationship between the *Structure* element and the thoroughfare address elements; more than one thoroughfare address may be assigned to a single structure, or the same thoroughfare address may be assigned to several structures. Here is an example structure, the Eric Spicer Municipal Building, which has more than one thoroughfare address:

Thoroughfare Name (RD) = Mount-Hope
Thoroughfare Name Post Type (STS) = Avenue
Address Number (HNO) = 21
Structure (BLD) = Eric Spicer Municipal Building
Thoroughfare Name (RD) = Acadia
Thoroughfare Name Post Type (STS) = Street
Address Number (HNO) = 33
Structure (BLD) = Eric Spicer Municipal Building

Here is an example of a single civic location with multiple structures on the campus of the University of Prince Edward Island:

Thoroughfare Name (RD) = University
Thoroughfare Name Post Type (STS) = Avenue
Address Number (HNO) = 550
Site (SITE) = University of Prince Edward Island
Structure (BLD) = Atlantic Veterinary College
Thoroughfare Name (RD) = University
Thoroughfare Name Post Type (STS) = Avenue
Address Number (HNO) = 550
Site (SITE) = University of Prince Edward Island
Structure (BLD) = Robertson Library

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4. Structure identifiers should be relatively permanent. If a business or other organization name is used, which may change, there must be a mechanism in place to update these locations.
5. Physically contiguous spaces, such as attached townhouse-style residential units that have separate exterior access, should be treated as separate structures rather than wings or units if most or all of the following conditions are met:

   a) The spaces contain unrelated entities
   b) Management, utilities, and ownership are distinct
   c) There is no access between the spaces
   d) There is no identifier for the whole footprint
   e) Separate thoroughfare numbers have been assigned

   Sometimes separate buildings in a campus setting (e.g., a large hospital or educational institution) are joined and the type-word "Building" or equivalent is retained to identify that portion of the larger footprint. These should be classified as structures to avoid confusion, even if they do not meet the criteria listed above.

2.4.4 *Wing*

namespace:PIDF-LO name: cdx2:WING

Definition: A designated part of a structure that spans one or many floors, typically including more than one unit or room and representing a significant portion of the structure floor area.

Definition source: Adapted from NENA-STA-004.2 [14]

Examples:

- "East Wing" in "Guelph General Hospital, East Wing"
- "Concourse B" in "Vancouver International Airport, Main Terminal, Concourse B"
- "Zone Publique – Niveau des Départs" in "Aéroport International Montréal-Trudeau, Zone Publique – Niveau des Départs"

Data type: Printable

Maximum value length: 75

Domain of values: None

Business rules: At least one of the following MUST be present to identify a physical structure if a *Wing* is included:

- A *Structure*
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*

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Notes:

1. A wing may be identified with the type word "Wing", but other type words describing similar physical configurations may be used such as "Zone" or "Quadrant". A wing may also be identified by distinct occupancy or function using type words such as "Centre" or "Concourse" in an airport terminal. When present, the type word should be included in the *Wing* element, especially if there is a possible ambiguity with other wings using different type words in the same structure (e.g., Wing 1 and Zone 1).
2. Fully spelled-out type words (e.g., Wing, Zone, Quadrant, aile, bloc, etc.) MUST always be included with the identifier.
3. In cases where the identifier is not a number, the identifier word, like for the type word, MUST be fully spelled-out (e.g., "East Wing", "aile chirurgicale", etc.).

2.4.5 *Floor*

namespace:PIDF-LO name: ca:FLR

Definition: The standardized identifier for a storey or level within a structure, wing, or unit.

Definition Source: NENA-STA-004.2 [14]

Examples:

- "Floor 4" in "65 rue Brunswick Street, 4th Floor" (see note 2)
- "Upper Mezzanine" in "244 Victoria Street, Upper Mezzanine"

Data Type: Printable

Maximum value length: 75

Domain of values: None

Business rules: At least one of the following MUST be present to identify a physical structure if *Floor* is included:

- A *Structure* identifier
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*

Notes:

1. Fully spelled-out type words (e.g., Floor, Basement, Mezzanine, rez-de-chaussée, Balcony, étage, rez-de-jardin, etc.) MUST always be included with the identifier.
2. Floors are often identified using the type word "Floor" in combination with numeric values, which may be expressed as ordinal words, ordinal numbers, numbers or number words. For example, "Second Floor," "Floor 2," or "2nd Floor" could all be used to refer to the second floor. All these different number forms MUST be

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represented as a plain integer in the *Floor* element, thus "Second," "2nd," and "Two" will all be represented by the number "2" in the *Floor* element, along with the type word (e.g., "Floor 2", "étage 4").

3. In circumstances where a floor is represented with a fraction (e.g., floor 1 has an entry at the ground level on one side of a building and an entry on the parking lot on the other side of the building, the latter being identified as "Floor 1 1/2"), such fraction MUST be represented with its multi-character representation using the "/" between the numerator and the denominator (e.g., "4/5"), excluding superscripts and subscripts, and without spaces between characters (e.g., not "4 / 5"). Where it exists, the single-character glyph (e.g., "½") MUST NOT be used.
4. In cases where the identifier is not a number, the identifier word, like the type word, MUST be fully spelled-out (e.g., "Upper Balcony", "Orchestra Circle", etc.).

2.4.6 *Unit*

namespace:PIDF-LO name: ca:UNIT

Definition: A group of rooms or a suite, within a structure, under common ownership or tenancy, typically having a common primary entrance.

Definition source: Adapted from IETF RFC 4776 [9]

Examples:

- "Apartment 12" in "123 Main Street, Apartment 12"
- "Suite 1338" in "8882 170 Street Northwest, Suite 1338"
- "unité B" in "456 rue principale, unité B"

Data type: Printable

Maximum value length: 75

Domain of values: None

Business rules: At least one of the following MUST be present to identify a physical structure if a *Unit* is included:

- A *Structure* identifier
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*

Notes:

1. A unit is typically a group of rooms or a suite, within a structure, under common ownership or tenancy and does not have a separately assigned thoroughfare address. The most common kinds of unit are residential apartments or condominiums, or spaces occupied by a single business within a larger commercial building. A unit can also be a collection of rooms comprising a department or functional area within a

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single enterprise. A unit is usually on a single floor but can sometimes span multiple floors.

2. Distinct occupancy, control or use is the key characteristic of a unit. For example, a single-room studio apartment in a residential apartment building, or a storage unit in a self-storage facility would be classified as units because they are distinctly occupied and controlled even though they are single rooms. This also applies to stores in a mall, or side-by-side residential units in a "rowhouse" or "townhouse" configuration. However, if separate thoroughfare numbers instead of unit identifiers are assigned to side-by-side businesses or residential units then they MUST be treated as separate structures rather than units.
3. Physical configuration is also important. If a space is physically configured as a collection of rooms (a room cannot have rooms within it – see note 5 under *Room*), which also individually need to be identified then the space MUST be classified as a unit even if it is not labelled as such. The *Unit* element MUST be populated if there is a unit being identified in the location.
4. Fully spelled-out type words (e.g., Apartment, Suite, Unit, unité, etc.) MUST always be included with the identifier.
5. The type word may precede or follow the identifier (e.g., "Suite 3103" vs. "Presidential Suite"). Either order is acceptable and local usage should be followed. In some cases, no type word is used (e.g., "Penthouse", "appentis").
6. Sometimes, in situations where formal unit identifiers have not been assigned, a positional word such as "Left", "Upper" or "Rear" is used to identify a unit. Such informal identifiers MUST be included in the *Unit* element. However, if positional words are used to identify a separate structure on a lot then they MUST be placed into the *Structure* element.
7. Exterior features such as lots in a mobile home park or slips at a marina are not contained within structures and do not meet the CLDXF-CA definition of a unit. Their complete identifiers MUST be stored in the *SubSite* element instead.
8. Where known, the *Floor* element MUST be populated, even if the *Unit* element includes the floor value. For example, "Unit 3101" might indicate that the unit is on the 31st floor, but that cannot be presumed. Giving the *Floor* value explicitly helps locating the unit. Similarly, if the unit identifier consists of a floor name such as in "Basement", or a floor name followed by a type word such as in "Basement Apartment", or by a combination of floor name and informal identifier such as in "Basement Rear", the entire unit identifier go into the *Unit* element.
9. Different sources may use various formats for unit values that identify the same unit. CLDXF-CA does not dictate how to express unit values; such decisions are in the purview of property managers working with local 9-1-1 and addressing authorities.

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However, the elimination of unnecessary punctuation and spaces will tend to reduce the number of exact-string-match discrepancies, which have to be dealt with. For example, different sources might enter "1-A" or "1A" or "1 A" to refer to the same unit. If all parties use the most compact form of the unit identifier, in this case "1A" with no space or punctuation, this best practice would avoid discrepancies. Of course, punctuation must not be eliminated where it would introduce ambiguity. For example, "101 Main Street, Building 1, Unit 1-21" has to be distinguished between "101 Main Street, Building 12, Unit 12-1". So, in this case the '-' cannot be eliminated.

10. In circumstances where a unit is represented with a fraction (e.g., "unit 1 1/2"), such fraction MUST be represented with its multi-character representation using the "/" between the numerator and the denominator (e.g., "4/5"), excluding superscripts and subscripts, and without spaces between characters (e.g., not "4 / 5"). Where it exists, the single-character glyph (e.g., "½") MUST NOT be used.

2.4.7 *Room*

namespace:PIDF-LO name: ca:ROOM

Definition: A single, distinctly identified, enclosed space within a structure.

Definition source: NENA-STA-004.2 [14]

Examples:

- "Room M120" in "Toronto Sick Kids Hospital, Room M120"
- "hall d'entrée" in "123 rue Principale, hall d'entrée"

Data type: Printable

Maximum value length: 75

Domain of values: None

Business rules: At least one of the following MUST be present to identify a physical structure if *Room* is included:

- A *Structure* identifier
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*

Notes:

1. Fully spelled-out type words (e.g., Room, chambre, salle, etc.) MUST always be included with the identifier.
2. In cases where the identifier is not a number, the identifier word, like the type word, MUST be fully spelled-out (e.g., "Executive Room", "salle de conférence Montcalm", etc.).

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3. Sometimes both a sequential or alphanumeric identifiers and a descriptive word or phrase may be associated with a given room, for example "Room 201, Science Lab". In such case, choose only one component as the primary identifier for CLDXF-CA. Considerations in making such a choice include:

   a) Give preference to the authoritative name assigned by property manager/occupant.
   b) Be consistent with signage at the entrance of the space or pointing to it.
   c) Choose persistent and unique identifiers.
   d) Consider how the space is known to the community.

   One important point relating to (c) is that using functional or descriptive identifiers that might change as opposed to those that are more permanent alphanumeric or sequential requires a commitment to maintaining them. For example, a generic space that is identified as a conference room might become an office, or an office labelled with a person's name might get a new occupant. On the other hand, a cafeteria with built-in kitchen equipment and food display cases is likely to remain a cafeteria.

   It may be necessary to consider several of the criteria listed above in deciding which identifier to use. For example, a room might be known as "Room 201" in a facility management system (authoritative identification), but also have built in lab benches, a big sign on the door saying only "Science Lab", and be known as such within the community. In these cases where there are inconsistencies, it may be helpful to work with facility managers and building owners to make the best decision.

4. Complete identifiers for locations in complex settings may encode multiple named location elements. For example, a hospital room might be identified as "A-E307" where "A" is a building tower, "E" refers to the east wing of that tower and "A-E307" is the room number posted on the door. The components of the identifier go into the matching elements in a way that matches signage and how these features are known to hospital staff, as in the following example:

   Site (SITE) = Bard Medical Centre
   Structure (BLD) = Tower A
   Wing (WING) = East Wing
   Floor (FLOOR) = Floor 3
   Room (ROOM) = Room A-E307

5. A space labelled as a "Room" is presumptively classified as such. However, the physical configuration may be at odds with the label, for example when a space identified as a "Room" provides access to and contains smaller enclosed spaces within it, which are also identified as rooms. This creates a conflict, since there can be only one *Room* element in a given location.

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If, in such cases, there are sub-spaces whose size and function qualify them as "rooms" and which need to be included in a location, then the larger space can be classified as a *Unit* with the type word "Room", and the sub-spaces can be classified as *Room* values. Example:

Building (BLD) = Bombur Office Building
Unit (UNIT) = Room 219
Room (ROOM) = The Shire Conference Room

6. In circumstances where a room is represented with a fraction (e.g., "Room 112 1/2"), such fraction MUST be represented with its multi-character representation using the "/" between the numerator and the denominator (e.g., "4/5"), excluding superscripts and subscripts, and without spaces between characters (e.g., not "4 / 5"). Where it exists, the single-character glyph (e.g., "½") MUST NOT be used.

2.4.8 *Section*

namespace:PIDF-LO name: cdx2:SECTION

Definition: An identified, unenclosed area within a structure, wing, unit, or room.

Definition source: NENA-STA-004.2 [14]

Examples:

- "Section 241" in "BC Place, Section 241"
- "Customer Seating" in "Eaton Centre, Food Court, Customer Seating"
- "Waiting Area" in "Toronto Pearson International Airport, Terminal 1, Gate D45, Waiting Area"

Data type: Printable

Maximum value length: 75

Domain of values: None

Business rules: At least one of the following MUST be present to identify a physical structure if *Section* is included:

- A *Structure* identifier
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*

Notes:

1. Fully spelled-out type words (e.g., Section, Zone, secteur, etc.) MUST always be included with the identifier.
2. In cases where the identifier is not a number, the identifier word, like for the type word, MUST be fully spelled-out (e.g., "Loading dock", "pont supérieur", etc.).

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3. Sections may be identified using the type word "Section" in combination with numeric values, which may be expressed as ordinal words, ordinal numbers, numbers, or number words. For example, "Second Section", "Section two" or "2nd Section", could all be used to refer to the second section. All these different numbered forms MUST be represented as a plain integer in the *Section* element, thus "Second", "two" and "2nd" will all be represented by "2" in the *Section* element, along with the type word as stated in note 1 (e.g. "Section 2").
4. Often in event venues, temporary partitions are used to split a large room into sub-spaces. If locations are needed for these, *Section* SHOULD be used. Example:

   Structure (BLD): Four Seasons Hotel
   Room (ROOM): Grand Ballroom
   Section (SECTION): West Section

5. Sections will often be used to identify a sub-area that contains a collection of seats or cubicles (which would go in *Seat*) within a larger space. Sections containing seats or cubicles may be internally organized into rows as well. Note that a section need not be part of a room or unit, but it MUST be within a structure identified either by a value in the *Structure* element or a thoroughfare address.

   Example 1:

   Site (SITE) = University of Minas Tirith
   Structure (BLD) = Númenor Memorial Stadium
   Floor (FLOOR) = Upper Deck
   Section (SECTION) = Section 129
   Row (ROW) = Row B
   Seat (SEAT) = Seat 3

   Example 2:

   Structure (BLD) = Warehouse 3
   Section (SECTION) = Paper Products Section
   Row (ROW) = Aisle 4

6. The *Section* element can be used to identify an unenclosed area within a large open interior space, such as a functional area on a factory floor, or an identified subdivision of a large warehouse. Example:

   Site (SITE) = ACME Plant
   Structure (BLD) = Main Assembly Building
   Section (SECTION) = Powder Coat Section

2.4.9 *Row*

namespace:PIDF-LO name: cdx2:ROW

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Definition: An identified linear feature, such as a linear arrangement of seats, workstations, equipment, or storage, within a structure, wing, unit, room, or section.

Definition source: NENA-STA-004.2 [14]

Examples:

- "Aisle 4" in "Warehouse 3, Aisle 4"
- "Row AA" in "Theatre 4, Row AA, Seat 5"
- "B-Line Assembly" in "ACME Plant, Main Assembly Building, B-Line Assembly"

Data type: Printable

Maximum value length: 75

Domain of values: None

Business rules: At least one of the following MUST be present to identify a physical structure if *Row* is included:

- A *Structure* identifier
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*

Notes:

1. Fully spelled-out type words (e.g., Row, Line, rangée, ligne, etc.) MUST always be included with the identifier.
2. In cases where the identifier is not a number, the identifier word, like for the type word, MUST be fully spelled-out (e.g., "Upper Balcony", "Orchestra Circle", etc.).
3. Rows may be identified using the type word "Row" in combination with numeric values, which may be expressed as ordinal words, ordinal numbers, numbers, or number words. For example, "Second Row", "Row two" or "2nd Row", could all be used to refer to the second row. All these different numbered forms MUST be represented as a plain integer in the *Row* element thus, "Second", "two" and "2nd" will all be represented by the number "2" in the *Row* element, along with the type word (e.g., "Row 2").
4. Rows will often be used to identify a linear grouping of seats or cubicles (which would go in *Seat*) within a larger space. Note that a row need not be part of a room or unit, but it MUST be within a physical structure identified either by a value in the *Structure* element or by thoroughfare address. Example:

   Site (SITE) = University of Minas Tirith
   Structure (BLD) = Númenor Memorial Stadium
   Floor (FLOOR) = Upper Deck
   Section (SECTION) = Section 129

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Row (ROW) = Row B
Seat (SEAT) = Seat 3

5. In other situations, rows may not contain subdivisions such as seats or cubicles. In such cases, *Seat* is omitted. Example:

   Structure (BLD) = Atlantic Superstore
   Row (ROW) = Aisle 12

2.4.10 *Seat*

namespace:PIDF-LO name: ca:SEAT

Definition: An identified seat, desk, workstation, cubicle, or similar precise location within a structure, wing, unit, room, section, or row.

Definition source: NENA-STA-004.2 [14]

Examples:

- "Cubicle A-7" in "1 Canada Place, Room 819, Cubicle A-7"
- "Registration Desk" in "Grand Hotel, 1101 Laurier Street, Registration Desk"
- "Seat 5" in "Theatre 4, Row AA, Seat 5"

Data type: Printable

Maximum value length: 75

Domain of values: None

Business rules: At least one of the following MUST be present to identify a physical structure if *Seat* is included:

- A *Structure* identifier
- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*

Notes:

1. Fully spelled-out type words (e.g., Seat, siège, etc.) MUST always be included with the identifier.

2.4.11 *Location Marker*

namespace:PIDF-LO name: cae:PN

Definition: A uniquely identified and indivisible infrastructure component, smaller than a structure, which exists either within a structure or exterior to any structure, such as an alarm box, a utility pole, a callbox, or other similar feature.

Definition source: NENA-STA-004.2 [14]

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Examples:

- Callbox MB-80-21
- Standpipe
- Pole 12
- Low Water Crossing #21

Data type: Printable

Maximum value length: 100

Domain of values: None

Business rules: *Location Marker* MUST be unique within the given place name if a *Thoroughfare Name*, *Structure*, or *Site* is not present.

Notes:

1. Some infrastructure features with a small footprint are not appropriately classified as structures. These locations could be relevant for emergency response and their identifiers can be placed in the *Location Marker* element.
2. *Location Marker* may identify interior or exterior features.
3. *Location Marker* is distinct from *Distance Marker* in that *Location Marker* identifies a physical feature rather than a distance along a thoroughfare.
4. Since *Location Marker* can identify many different kinds of features, both type and value words MUST be included in the element e.g., "Call box MB-80-21".
5. Nautical markers whose function is to indicate distance along a waterway MUST be included in *Distance Marker* rather than in *Location Marker*.
6. Some infrastructure features such as utility poles may not be located along a known thoroughfare or within a known site. However, if they are uniquely identified within a given place then their identifiers can be placed in the *Location Marker* element.
7. Signposts or poles may carry signage that identifies other kinds of features, such as sub-areas in a parking lot. These identifiers SHOULD be placed in the appropriate *Site*, *Structure*, *SubSite*, or other corresponding elements rather than into the *Location Marker* element. However, some poles with signage, for example at a jurisdiction boundary, can be considered useful location markers and MAY be placed into the *Location Marker* element.

2.4.12 *Additional Location Information*

namespace:PIDF-LO name: ca:LOC

Definition: Information that relates to location but does not meet the definition of any of the other named location elements.

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Definition source: Adapted from NENA-STA-004.2 [14]

Examples:

- Main Loading Dock
- Stairwell C
- Elevator Bank 14-21

Data type: Printable

Maximum value length: 254

Domain of values: None

Business rules: One of the following MUST be present if *Additional Location Information* is included:

- A *Thoroughfare Name* and an *Address Number*
- A *Thoroughfare Name* and a *Distance Marker*
- A *Site* whose identifier is unique within the given set of place names
- A *Structure* whose identifier is unique within the given set of place names

Notes:

1. Fully-spelled out words MUST be used.
2. Only information that is pertinent to emergency calling should be included in this element.

2.5 Address Descriptors

This section defines elements that are used to refine the description of an address. Address descriptors do not contain data that is part of an address. Rather, they contain attributes for feature(s) at the given location. In this version, only one address descriptor is defined: *Place Type*.

2.5.1 *Place Type*

The *Place Type* element can be used to indicate the type of feature found at an address. Identifying the type of feature present at a particular address is often valuable to emergency responders and therefore *Place Type* is included in CLDXF-CA as an optional element.

namespace:PIDF-LO name: ca:PLC

Definition: The type of feature found at the address.

Definition source: Adapted from NENA-STA-004.2 [14]

Examples: Airport, arena, bank, hospital, hotel, government, industrial, library, office, parking, warehouse, aéroport, banque, hôtel, usine, stationnement, cinéma, etc.

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Data type: Printable

Maximum value length: 50

Domain of values: None

Business rules: A descriptive place type MAY be provided if one exists and is relevant to public safety.

Notes:

1. *Place Type* is a free-form text element. Values are however expected to be associated with address-based features (see examples above). Use of values not directly associated with address-based features such as "airplane," "bicycle," "automobile," "truck," "bus," "watercraft", and "underway" (a vehicle in motion) SHOULD NOT be used as they would only introduce confusion.
2. Often, one address contains multiple place types (e.g., "restaurant" and "bar"), or is used to identify several types of features (e.g., parcel, building, building entrance, utility meter, utility pole, etc.) that occur at the same location. A PIDF-LO location MUST contain only one *Place Type* value. If multiple values apply, consider the purpose for which the location was created, and pick the one value that best indicates the type of feature for that purpose.

2.6 Unused Civic Location Data Elements

This standard uses a number of civic location data elements. Any civic location data element not specified in this document MUST NOT be used in a CLDXF-CA compliant PIDF-LO since there is no defined usage for these elements and that the inclusion of some of these may introduce confusion.

3 Creating a Canadian Civic Location Exchange Data Structure

This document normatively defines the structure of a Canadian civic location when it is exchanged between systems. It does not specify how a location is originally created or stored internally in any system.

The exchange mechanism specified herein relies on the IETF PIDF-LO standards, which are the standardized vehicle for exchanging Canadian civic locations.

While the data structure of a Canadian civic location itself is defined in section 2, a PIDF-LO construct that needs to be exchanged MUST comply with RFC 3863 [5] for the PIDF part and with RFC 4119 [6] updated by RFC 5139 [7] for the LO part. More specifically, the LO part is nested under the PIDF part.

This document defines normatively the data structure of a Canadian civic location, which is to be embedded in the <civicAddress> element of PIDF-LO.

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Note that the actual "on the wire" conveyance mechanisms of PIDF-LO are defined by other IETF RFCs and are out of scope for this document.

The following subsections further define the requirements for constructing the PIDF part and the LO part to conform to this document. Any system that creates a PIDF-LO document carrying a Canadian civic location MUST adhere to these requirements.

The generic LO part of the PIDF-LO supports location information in civic and/or geodetic formats. For example, the primary location information may be in civic format, accompanied by its corresponding geodetic format. In a different embodiment, the primary location information may be in geodetic format supplemented by a civic component (e.g., latitude and longitude plus *Floor* for height). Yet in another embodiment, the primary location information may be accompanied by other secondary location information (e.g., primary = home, secondary 1 = cottage, secondary 2 = office). All of these variations are allowed by RFC 4119 [6], RFC 5139 [7] and RFC 5491 [12] and available to entities creating PIDF-LO documents. That said, these variations are out of scope for this document and only a PIDF-LO containing a single location information in civic format is defined herein.

For convenience, here is a list of salient XML schemas available at their permanent, stable locations. Note that this list is not exhaustive and other XML schemas may need to be imported to an XML processor to validate fully a CLDXF-CA PIDF-LO.

Name	URL
pidf	No permanent location available at this time. Implementers have to create a local schema file from the schema definition found in RFC 3863 [5].
pidf:common-schema	https://www.iana.org/assignments/xml-registry/schema/pidf/common-schema.xsd
pidf:data-model	https://www.iana.org/assignments/xml-registry/schema/pidf/data-model.xsd
pidf:geopriv10	https://www.iana.org/assignments/xml-registry/schema/pidf/geopriv10.xsd
pidf:geopriv10:basicPolicy	https://www.iana.org/assignments/xml-registry/schema/pidf/geopriv10/basicPolicy.xsd
pidf:geopriv10:civicAddr	https://www.iana.org/assignments/xml-registry/schema/pidf/geopriv10/civicAddr.xsd
pidf:geopriv10:civicAddr:ext	https://www.iana.org/assignments/xml-registry/schema/pidf/geopriv10/civicAddr/ext.xsd
EmergencyCallData:ProviderInfo	https://www.iana.org/assignments/xml-registry/schema/EmergencyCallData/ProviderInfo.xsd
vcard-4.0	https://www.iana.org/assignments/xml-registry/schema/vcard-4.0.xsd
nenaCivicAddr	https://github.com/NENA911/NENA-Civic-Address-Extensions-1/blob/main/nenaCivicAddr.xsd
nenaCivicAddr2	https://github.com/NENA911/NENA-Civic-Address-Extensions-2/blob/main/nenaCivicAddr2.xsd

Table 5 – List of Salient XML Schemas for CLDXF-CA

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Note that the pidf:geopriv10:civicLoc XML schema MUST NOT be used as it was replaced by the pidf:geopriv10:civicAddr schema in RFC 5139 [7].

Additionally, NENA-STA-010 [23] specifies that the EmergencyCallData:ProviderInfo schema be used in the <provided-by> element of the PIDF-LO. The pidf:geopriv10:dataProvider schema MUST NOT be used in CLDXF-CA.

3.1 A Note on the Presence Data Model

RFC 4479 [26] defines a data model for the Presence Information Data Format (PIDF). According to RFC 4479, PIDF originally defined in RFC 3863 [5], lacked guidance on what exactly a "tuple" is in real-world communications systems as well as missing important concepts such as "service", "device", and "person".

While RFC 4479 clarified these aspects, the industry has not implemented RFC 4479 for civic location PIDF-LOs and the vast majority of implementations follow RFC 3863 in constructing the PIDF part of a PIDF-LO that is, they systematically use <tuple> and <status> to host the <geopriv> element, the LO part.

In light of the above, this document assumes RFC 3863 as the baseline for implementing civic location PIDF-LOs in Canada, and the rules defined herein are derived from that RFC. However, this document supports possible implementations that would adhere to the recommendations of RFC 4479 and use <device> or <person> to host the LO part rather than <tuple>.

For completeness, the stable locations for the PIDF model XML schemas have been provided. However, this document does not prescribe support for RFC 4479.

3.2 PIDF Part

RFC 3863 [5] defines the Presence Information Data Format (PIDF), which is a profile of the Common Profile for Presence (CPP) defined in RFC 3859 [10]. It is the host for the Location Object (LO) defined in RFC 4119 [6] and updated by RFC 5139 [7]. As the PIDF part is integral to a PIDF-LO, it is important that a common set of rules be applied to ensure interoperability and standards compliance.

The PIDF part of a PIDF-LO compliant with this document MUST comply with RFC 3863 [5], with the following clarifications:

1. It MUST include one and only one <presence> element.
2. It MUST include one topmost <tuple> element under <presence> with an "id" attribute value satisfying the unicity requirement of RFC 3863 [5], which contains one civic location.
3. It MAY include a second <tuple> element should there be a geodetic representation of the civic location.

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3.1. The "id" attribute value MUST be different than the one in the first <tuple> element.

3.2. The <tuple> element containing the civic location MUST come first.

3.3. The inclusion of the second <tuple> element is out of scope for this document.

4. The <device> and <person> elements MAY be used but have no defined usage in this document. However, should these elements be used to convey a complete or partial civic location, the <civicAddress> structure of the LO part MUST comply with the format specified in this document.
5. It MUST include the <status> element under <tuple>.
6. It MUST include the <timestamp> element, which MUST represent the time at which the PIDF-LO was created.
7. The elements <basic>, <contact> and <note> MAY be used but have no defined usage in this document.
8. Any other elements imported from other namespaces MAY be present but have no defined usage in this document.

3.3 LO Part

As noted above, the Location Object (LO) is defined as an extension to PIDF (RFC 3863 [5]) by RFC 4119 [6], updated by RFC 5139 [7]. In addition to the requirements of these RFCs, the LO part MUST follow RFC 5491 [12], with the following clarifications:

1. Rule #1 MUST be applied.
2. Rule #2 MUST be applied with the following clarifications:

   2.1. Only one civic location MUST be present in one PIDF-LO document.

   2.2. The <geopriv> element MUST reside under the <status> element of the <tuple> element.

   2.3. The <device> and <person> elements MAY be used but have no defined usage in this document. However, should these elements be used to convey a complete or partial civic location, the <civicAddress> structure of the LO part MUST comply with the format specified in this document.

   2.4. Should there be a geodetic representation of the same exact civic location, it MUST reside in another <tuple> element. See bullet 3 of the PIDF Part. The inclusion of the second <tuple> element is out of scope for this document.

3. Rule #3, 4, 5, 6, 7, 8 and 9 of RFC 5491 [12] are obsoleted by the rules under #2 above.
4. The <location-info> element containing the single civic location MUST reside under the <geopriv> element.

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5. The <geopriv> element MUST include one and only one <provided-by> element containing a <ProviderInfo> data block as defined in RFC 7852 [17], which identifies the service provider proffering the location.
6. The <geopriv> element MUST include one and only one <usage-rule> element with at least one of the sub-elements defined in RFC 4119 [6].
7. The <geopriv> element MAY include a <method> element populated with an appropriate method-token defined in the Method Tokens IANA Registry [22].

3.4 Use of the XML Language Attribute in CLDXF-CA Data Structures

The PIDF-LO XML schemas support the use of the language attribute "xml:lang" defined in World Wide Web Consortium (W3C) XML Recommendation 1.0 [24], which may be utilized to specify the natural language used in the content of an XML element. The content of the language attribute is a language tag with a syntax defined by RFC 5646 [25], which uses one or more subtags. The syntax is rather complex but one commonly used format includes the primary language subtag and the region subtag. For example, "en-CA" is the common expression of the language tag for Canadian English. When sub-elements exist under an element that has a language attribute, sub-elements inherit that language unless another language attribute is specified on the sub-element, overriding the one for the top element. When the language attribute is absent, the natural language of the content is not specified or the content is considered non-linguistic. Note that it is not an error to have a language tag associated with non-linguistic content; it is just irrelevant.

Canada has two official languages recognized by the federal government, and other languages are officially recognized by provinces and territories. This document's version expressly supports the two official languages of Canada namely, Canadian French and Canadian English. Nevertheless, there are cases where official names use a different natural language. Those cases are theoretically supported by this standard's version through the use of the UTF-8 encoding. It may be beneficial in these cases to use language tags.

Language tags are typically used by applications rendering information on user interfaces, including but not limited to translation services. They do not affect the content itself, nor do they affect location validation.

In 9-1-1 systems, it is not common practice to translate and store information provided or associated with 9-1-1 calls; however, there is nothing that would prevent a recipient of a CLDXF-CA location to do so. That said, there may be some benefits in providing the natural language used in some content to a call taker. For example, the *Additional Location Information* element may contain free-form text in a certain language. However, other elements would not benefit from a language tag such as the *Additional Code* element, which is an alphanumeric string.

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Due considerations must be taken when adding language tags to elements:

- Is the content linguistic in nature?
- Are all the sub-elements under a top element having content in the same language?
- Is the content translatable? For example, "rue Crescent" in Montréal should never be translated to "rue Croissant". Similarly, "Rideau Avenue" in Toronto should never be translated to "Curtain Avenue".
- In the above examples, should the *Thoroughfare Name* element content "Crescent" have the xml:lang attribute set to "en-CA" and "Rideau" set to "fr-CA" or simply left unspecified?
- When a language attribute is specified in a top element and some sub-elements' content are non-linguistic, should a language tag set to "und" (undefined) of blank (xml:lang="") be added to such elements?
- Is there an overarching need to provide language tags in the proffered CLDXF-CA location?
- Would adding language tags add confusion rather than aid call takers?

This is no single answer to those questions and only the context of each CLDXF-CA location can lead to the proper answer for that location.

That said, the following generic guidance should be used by location providers:

- Use language tags only when necessary.
- When used, target elements that are always linguistic in nature.
- Be mindful of the impacts on sub-elements. If in doubt, refrain from using language tags.
- Should there be a mix of linguistic and non-linguistic sub-elements (e.g., tokens, integers, alphanumeric strings, number strings, etc.), consider using language tags on linguistic sub-elements only and leave the others unspecified.
- Using "xml:lang="und"" or "xml:lang=""" should be limited to situations where a non-linguistic value could be misinterpreted without an explicit designation.
- Official names clearly associated with a natural language may have language tags.
- Official names using other natural languages than Canadian English and Canadian French should use language tags if it would benefit the 9-1-1 call taker to know the natural language used.
- Free-form text content should have a language tag.

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3.5 Compliant Canadian PIDF-LO Construct

Based on the above, a compliant Canadian civic location to be exchanged in a PIDF-LO document would be constructed as follows (illustrative only – a real XML structure would have additional information such as namespace definitions, optional attributes, etc.):

```
<presence> entity= {presentity URI}
   <tuple id={some string}>
      <status>
         <geopriv>
            <location-info>
               <civicAddress>
                 {list of civic address elements defined in this
                  document, representing one discrete location}
               </civicAddress>
            </location-info>
            <usage-rules>
               <retransmission-allowed>
                  {true/false}
               </retransmission-allowed>
               <retention-expires>
                  {dateTimeStamp}
               </retention-expires>
            </usage-rules>
            <method>{method-token}</method>
            <provided-by>
               {EmergencyCallData:ProviderInfo data block}
            </provided-by>
         </geopriv>
      </status>
      <timestamp>{dateTimeStamp}</timestamp>
   </tuple>
</presence>
```

3.6 Recipients of PIDF-LO

PIDF-LO is an international standard from which many countries derive their specific profiles, as this document does for Canada. Given the possibility that Canadian systems could receive civic location-based PIDF-LO documents from foreign countries, those systems MUST be capable of properly handling and processing PIDF-LO documents that do not adhere to the construction rules defined above, as well as the civic location format defined in this document. So long as those foreign PIDF-LO documents comply with the core international standards defined by RFC 3863 [5], RFC 4119 [6], RFC 5139 [7], and

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RFC 5491 [12], Canadian systems MUST be capable of properly handling and processing them.

Conversely, any system in a foreign country SHOULD be capable of properly handling and processing a PIDF-LO carrying a Canadian civic location data structure as defined in this document.

4 NENA REGISTRY SYSTEM (NRS) CONSIDERATIONS

This document does not propose NRS actions.

5 IANA ACTIONS

This document proposes one IANA action.

5.1 PIDF-LO Civic Address Considerations Registration for Canada

As per RFC 5774 [23], IANA is requested to add the following registration for Canada:

```
<record>
   <country>CA</country>
   <serial> <!-- assigned by IANA --> </serial>

   <!-- reference to document -->
   <xref type="uri" data="https://www.nena.org/ng911cldxfca_v1"/>

   <!-- record requesters -->
   <xref type="person" data="Guy_Caron"/>
   <xref type="person" data="Brandon_Abley"/>

   <status> <!-- assigned by IANA --> </status>
</record>

<people>
   <person id="Guy_Caron">
      <name>Guy Caron</name>
      <org>unaffiliated</org>
      <uri>mailto:guycaron911@gmail.com</uri>
      <updated>2025-04-28</updated>
   </person>
   <person id="Brandon_Abley">
      <name>Brandon Abley</name>
      <org>National Emergency Number Association</org>
      <uri>mailto:babley@nena.org</uri>
      <updated>2025-04-28</updated>
   </person>
```


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```
</people>
```

6 IMPACTS AND CONSIDERATIONS

6.1 Operations Impacts Summary

This standard describes a format to be used within NG9-1-1 systems in Canada when exchanging location data. As such, this standard will have a profound impact on the operation of NG9-1-1 systems that require or use location data. Additionally, since this standard defines and describes a set of standard data elements for civic locations used within NG9-1-1 systems, all NENA standards dealing with the creation, maintenance, or use of NG9-1-1 GIS data will need to be compatible with the required format.

In addition, Originating Networks and devices providing civic location with emergency calls will be impacted by the introduction of this standard.

6.2 Technical Impacts Summary

CLDXF-CA is a profile of the IETF PIDF-LO and uses the IETF PIDF-LO XML schemas, extended to include North American-specific elements. Due to extensions made in this, previous, and future versions of this document, current NG9-1-1 systems, especially implementations of NGCS Functional Elements, such as the ECRF and the LVF, will need to adapt to the business rules defined in this standard, and to the addition of new elements, or removal of other elements, in order to support uniformity in performance and overall consistency. Additionally, PSAP Functional Elements receiving CLDXF-CA locations will need to adapt to the changes outlined in this version to remain compliant. Originating Networks and devices providing civic location with emergency calls in Canada will also be required to adopt this new exchange format.

6.3 Security Impacts Summary

While this document is only concerned with the form of the data and its container, readers should consider how privacy of location will be implemented in systems that reference this document.

Guidelines as outlined in NENA-STA-040.2-2024 – *Security for Next Generation 9-1-1 (NG-SEC)* [19] shall be adhered to where applicable.

6.4 Recommendation for Additional Development Work

A future version of this document will change note 4 of section 2.1.8 to read:

> *Canada Post supports some alternate names and abbreviations for postal delivery. Only official postal community names MUST be used. Alternate names and abbreviations MUST NOT be used.*

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6.5 Anticipated Timeline

Canada has set an implementation timeline for NG9-1-1. The introduction of CLDXF-CA is integral to this timeline, which is defined by the Canadian Radio-television and Telecommunications Commission (CRTC).

6.6 Cost Factors

The introduction of a new and common civic location format in Canada will require changes across the 9-1-1 ecosystem where civic location data are created and consumed. These changes will require investments commensurate to the level of complexity it drives on impacted systems.

If an organization such as a 9-1-1 Authority or a service provider chooses not to change its local data formats, investments will still be needed to develop software capable of converting the local format to the standard data exchange format.

6.7 Cost Recovery Considerations

Normal practices are assumed for cost recovery considerations.

6.8 Additional Impacts (non-cost related)

Based on the analysis of the authoring group, the information or requirements contained in this NENA document are known to have 9-1-1 technical impacts. The primary impact is that implementation of the standard will require the modification or creation of processes or workflows to export address data to the CLDXF-CA format, or to import address data from the CLDXF-CA format. Since this is an address data exchange standard, it does not impose any restrictions on how address data is handled internally within any agency, an Originating Network, a device or other entities creating, exchanging or managing location information.

7 Abbreviations, Terms, and Definitions

See the NENA Knowledge Base (NENAkb) [2] for a complete listing Glossary of terms and abbreviations used in NENA documents. Abbreviations and terms used in this document are listed below with their definitions.

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Term or Abbreviation (Expansion)	Definition / Description
9-1-1 Authority	A State, Provincial, Territorial, County, Regional, or other governmental entity responsible for 9-1-1 service operations. For example, this could be a county/parish, Indigenous or other local government, a special 9-1-1 or Emergency Communications District, a Council of Governments, or other similar body.
9-1-1 SSP (9-1-1 System Service Provider)	An entity that provides systems and support necessary to enable 9-1-1 calling for one or more Public Safety Answering Points (PSAPs) in a specific geographic area. A 9-1-1 SSP may provide the systems and support for either E9-1-1 or NG9-1-1. In the context of E9-1-1, it is typically, but not always, an Incumbent Local Exchange Carrier (ILEC). This includes: A method of interconnection for all telecommunications providers including but not limited to the wireline, wireless, and VoIP carriers A method and mechanism for routing a 9-1-1 call to the Public Safety Answering Point (PSAP) with no degradation in service regardless of the technology used to originate the call A method to provide accurate location information for an emergency caller to a PSAP and if required, to other emergency response agencies Installation of PSAP call handling equipment and training of PSAP personnel when contracted to do so Coordinating with PSAP authorities and other telecommunications entities for troubleshooting and on issues involving contingency planning, disaster mitigation and recovery
ALI (Automatic Location Identification)	The automatic display at the PSAP of the caller's telephone number, the address/location of the telephone and supplementary emergency services information of the location from which a call

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Term or Abbreviation (Expansion)	Definition / Description
	originates.
API (Application Programming Interface)	A set of routines, protocols, and tools for building software applications. The API specifies how software components should interact and APIs may be used when programming GUI (Graphical User Interface) components.
CLDXF-CA (Civic Location Data Exchange Format-Canada)	A Canadian profile of PIDF-LO that defines a set of standard data elements describing detailed thoroughfare address information. Note that "CA" is not an abbreviation but the two-letter code assigned to Canada in the ISO-3166-1 Standard. In the spelled out version of CLDXF-CA herein, the code has been replaced by the country name to assist those readers not familiar with the ISO standard.
CRTC (Canadian Radio-television and Telecommunications Commission)	Supervises and regulates broadcasting and telecommunications systems in Canada.
ECRF (Emergency Call Routing Function)	A functional element in NGCS (Next Generation Core Services) which is a LoST (Location-to-Service Translation) protocol server where location information (either civic address or geo-coordinates) and a Service URN serve as input to a mapping function that returns a URI used to route an emergency call toward the appropriate PSAP for the caller's location or towards a responder agency.
FE (Functional Element)	An abstract building block that consists of a set of interfaces and operations on those interfaces to accomplish a task. Mapping between functional elements and physical implementations may be one-to-one, one-to-many, or many-to-one.
GIS (Geographic Information System)	A system for capturing, storing, displaying, analyzing, and managing data and associated attributes which are spatially referenced.
IANA (Internet Assigned	The departmental entity within ICANN (Internet

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Term or Abbreviation (Expansion)	Definition / Description
Numbers Authority)	Corporation for Assigned Names and Numbers) that oversees coordination of global IP address allocation, DNS root zone management, protocol name and number registries, and other Internet protocol assignments. Some NENA documents may use IANA Protocol Registries following the processes described in RFC 8126.
ICANN (Internet Corporation for Assigned Names and Numbers)	The organization serving as the steward and operator of the IANA functions that maintains public domain addresses and URLs, including related policies and databases.
IETF (Internet Engineering Task Force)	Lead standard-setting authority for Internet protocols.
IP (Internet Protocol)	The method by which data is sent from one computer to another on the Internet or other networks.
IPR (Intellectual Property Rights)	A category of legal rights that includes patents, published and unpublished patent applications, copyrights, trademarks, and trade secret rights, as well as any intellectual property right resembling a member of the foregoing list as such right may exist in a particular jurisdiction.
LIS (Location Information Server)	A Functional Element that provides locations of endpoints. A LIS can provide Location-by-Reference, or Location-by-Value, and, if the latter, in geodetic or civic forms. A LIS can be queried by an endpoint for its own location, or by another entity for the location of an endpoint. In either case, the LIS receives a unique identifier that represents the endpoint, for example an IP address, circuit-ID, or Media Access Control (MAC) address, and returns the location (value or reference) associated with that identifier. The LIS is also the entity that provides the dereferencing service, exchanging a location reference for a location value.
LVF (Location Validation	A Functional Element in an NGCS (Next Generation 9-

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Term or Abbreviation (Expansion)	Definition / Description
Function)	1-1 Core Services) that is a LoST protocol server where civic location information is validated against the authoritative GIS database information. A civic address is considered valid if it can be located within the database uniquely, is suitable to provide an accurate route for an emergency call, and adequate and specific enough to direct responders to the right location.
NENA (National Emergency Number Association)	The 9-1-1 Association, which is fully dedicated to the continued improvement and modernization of the 9-1-1 emergency communication system. NENA's approach includes research, standards development, training, education, certification, outreach, and advocacy through communication with stakeholders. As an ANSI-accredited Standards Developer, NENA works with 9-1-1 professionals, public policy leaders, emergency services and telecommunications industry partners, like-minded public safety associations, and more. Current NENA activities center on awareness, documentation, and implementation for Next Generation 9-1-1 (NG9-1-1) and international three-digit emergency communication systems. NENA's worldwide members join with the emergency response community in striving to protect human life, preserve property, and maintain the security of all communities.
NG9-1-1 (Next Generation 9-1-1)	An IP-based system comprised of hardware, software, data, and operational policies and procedures that: (A) provides standardized interfaces from emergency call and message services to support emergency communications; (B) processes all types of emergency calls, including voice, data, and multimedia information; (C) acquires and integrates additional emergency call

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Term or Abbreviation (Expansion)	Definition / Description
	data useful to call routing and handling; (D) delivers the emergency calls, messages, and data to the appropriate public safety answering point and other appropriate emergency entities; (E) supports data or video communications needs for coordinated incident response and management.
NGCS (Next Generation 9-1-1 Core Services)	Set of services needed to process a 9-1-1 call on an ESInet. It includes, but is not limited to, the ESRP, ECRF, LVF, BCF, Bridge, Policy Store, Logging Services, and typical IP services such as DNS and DHCP. The term NG9-1-1 Core Services includes the services and not the network on which they operate.
NRS (NENA Registry System)	The entity provided by NENA to manage registries. NENA Registry System website
PIDF (Presence Information Data Format)	The PIDF (Presence Information Data Format) is specified in IETF RFC 3863. It provides a common presence data format for Presence protocols, and also defines a new media type. A presence protocol is a protocol for providing a presence service over the Internet or any IP network.
PIDF-LO (Presence Information Data Format – Location Object)	The PIDF-LO (Presence Information Data Format – Location Object) is an extension to PIDF that contains location information.
PSAP (Public Safety Answering Point)	A physical or virtual entity where 9-1-1 calls are delivered by the 9-1-1 Service Provider. Related Terms: Primary PSAP: A PSAP to which 9-1-1 calls are routed directly from the 9-1-1 Control Office. Secondary PSAP: A PSAP to which 9-1-1 calls are transferred from a Primary PSAP. Alternate PSAP: A PSAP designated to receive calls when the primary PSAP is unable to do so.

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Term or Abbreviation (Expansion)	Definition / Description
	Consolidated PSAP: A facility where multiple Public Safety Agencies choose to operate as a single 9-1-1 entity. Legacy PSAP: A PSAP that cannot process calls received via i3-defined call interfaces (IP-based calls) and still requires the use of CAMA or ISDN trunk technology for delivery of 9-1-1 emergency calls. Serving PSAP: The PSAP to which a call would normally be routed. NG9-1-1 PSAP: This term is used to denote a PSAP capable of processing calls and accessing data services as defined in NENA's i3 specification, NENA-STA-010, and referred to therein as an "i3 PSAP." Virtual PSAP: An operational model directly enabled through NG9-1-1 features and/or network hosted PSAP equipment in which telecommunicators are geographically dispersed, rather than working from the same physical location. Remote access to the PSAP applications by the dispersed telecommunicators requires the appropriate network connections, security, and work station equipment at the remote location. The virtual work place may be a logical combination of physical PSAPs, or an alternate work environment such as a satellite facility, or any combination of the above. Workers are connected and interoperate via IP connectivity.
Thoroughfare	A route, a part thereof, or other access way along which a location can be reached. A thoroughfare is typically a road, but may be a walkway, boardwalk, trail, waterway, rail line, etc.
XML (eXtensible Markup Language)	An internet specification for web documents that enables tags to be used that provide functionality beyond that in Hyper Text Markup Language (HTML). In contrast to HTML, XML has the ability to allow information of indeterminate length to be transmitted

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Term or Abbreviation (Expansion)	Definition / Description
	to a PSAP call taker or dispatcher versus the current restriction that requires information to fit the parameters of pre-defined fields.
XSD (XML Schema Definition)	The formal document definition (structure, content type and constraints) describing a class of XML data. There are various XML schema languages, but in NENA documents, all schemas are assumed to be defined using the W3C XML Schema definition language.

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Exhibit A EXAMPLE CLDXF-CA CONSTRUCTS (INFORMATIVE)

This informative Exhibit provides a few examples of complete PIDF-LO constructs abiding to the CLDXF-CA standard defined in this document. Should there be discrepancies between this Exhibit and the text in the body of this standard, the latter prevails.

The example constructs use common XML best practices including namespace definition. Where a particular element has no value, the XML tags have been omitted.

Example 1 – Large Event Space

This example depicts a location within a large events venue, with a precision to the seat level. It utilizes the named location XML elements BLD, FLR, SECTION, ROW and SEAT.

```
<?xml version="1.0" encoding="UTF-8"?>
<presence xmlns="urn:ietf:params:xml:ns:pidf"
 xmlns:gp="urn:ietf:params:xml:ns:pidf:geopriv10"
 xmlns:gbp="urn:ietf:params:xml:ns:pidf:geopriv10:basicPolicy"
 xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
 xmlns:cae="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr:ext"
 xmlns:cdx1="urn:nena:xml:ns:pidf:nenaCivicAddr"
 xmlns:cdx2="urn:nena:xml:ns:pidf:nenaCivicAddr2"
 xmlns:pi="urn:ietf:params:xml:ns:EmergencyCallData:ProviderInfo"
 xmlns:xc="urn:ietf:params:xml:ns:vcard-4.0"
 entity="pres:5551230987@fst1.ca">
   <tuple id="35495jrefdsc">
      <status>
         <gp:geopriv>
            <gp:location-info>
              <ca:civicAddress xml:lang="fr-CA">
                <ca:country>CA</ca:country>
                <ca:A1>QC</ca:A1>
                <ca:A2>Montréal</ca:A2>
                <ca:A3>Montréal</ca:A3>
                <ca:A4>Ville-Marie</ca:A4>
                <ca:RD>Canadiens-de-Montréal</ca:RD>
                <ca:HNO>1909</ca:HNO>
                <ca:FLR>Rouge A</ca:FLR>
                <ca:PC>H3B 5E8</ca:PC>
                <ca:BLD>Centre Bell</ca:BLD>
                <ca:SEAT>1</ca:SEAT>
                <ca:PCN>Montréal</ca:PCN>
                <ca:ADDCODE>66023</ca:ADDCODE>
                <cae:STP>avenue</cae:STP>
                <cdx1:STPS>des</cdx1:STPS>
                <cdx2:SECTION>101</cdx2:SECTION>
                <cdx2:ROW>AA</cdx2:ROW>
```


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```
            </ca:civicAddress>
         </gp:location-info>
         <gp:usage-rules>
            <gdp:retransmission-allowed>true
            </gdp:retransmission-allowed>
            <gdp:retention-expiry>2022-10-12T13:20:00-05:00
            </gdp:retention-expiry>
         </gp:usage-rules>
         <gp:method>Manual</gp:method>
         <gp:provided-by>
            <pi:EmergencyCallData.ProviderInfo>
               <pi:DataProviderReference>4ndhfsas$G7@tsp1.ca
               </pi:DataProviderReference>
               <pi:DataProviderString>FST1</pi:DataProviderString>
               <pi:ProviderID>www.fst1.ca</pi:ProviderID>
               <pi:ProviderIDSeries>domain</pi:ProviderIDSeries>
               <pi:TypeOfProvider>Telecom Provider
               </pi:TypeOfProvider>
               <pi:ContactURI>tel:+1-555-555-1118</pi:ContactURI>
               <pi:Language>fr-ca</pi:Language>
               <pi:Language>en-ca</pi:Language>
               <pi:DataProviderContact>
                  <xc:vcard>
                     <xc:categories>Gestion des adresses client
                     </xc:categories>
                     <xc:email>
                        <xc:text>sac.addr.client@fst1.com</xc:text>
                     </xc:email>
                     <xc:fn>
                        <xc:text>Jean Tremblay</xc:text>
                     </xc:fn>
                     <xc:org>
                        <xc:text>Service à la clientèle</xc:text>
                     </xc:org>
                  </xc:vcard>
               </pi:DataProviderContact>
            </pi:EmergencyCallData.ProviderInfo>
         </gp:provided-by>
      </gp:geopriv>
   </status>
   <timestamp>2022-10-11T13:20:00-05:00</timestamp>
</tuple>
</presence>
```


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Example 2 – Campus Style Public Site

This example depicts a location within a well-known public building, with a precision to the seat level. It utilizes the named location XML elements SITE, BLD, WING, FLR, ROOM, SECTION, ROW and SEAT.

```
<?xml version="1.0" encoding="UTF-8"?>
<presence xmlns="urn:ietf:params:xml:ns:pidf"
 xmlns:gp="urn:ietf:params:xml:ns:pidf:geopriv10"
 xmlns:gdp="urn:ietf:params:xml:ns:pidf:geopriv10:basicPolicy"
 xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
 xmlns:cae="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr:ext"
 xmlns:cdx1="urn:nena:xml:ns:pidf:nenaCivicAddr"
 xmlns:cdx2="urn:nena:xml:ns:pidf:nenaCivicAddr2"
 xmlns:pi="urn:ietf:params:xml:ns:EmergencyCallData:ProviderInfo"
 xmlns:xc="urn:ietf:params:xml:ns:vcard-4.0"
 entity="pres:5551230987@tsp1.ca">
   <tuple id="a35495jrefdsc">
      <status>
         <gp:geopriv>
            <gp:location-info>
              <ca:civicAddress xml:lang="en-CA">
                <ca:country>CA</ca:country>
                <ca:A1>ON</ca:A1>
                <ca:A2>Ottawa</ca:A2>
                <ca:RD>Wellington</ca:RD>
                <ca:STS>Street</ca:STS>
                <ca:HNO>111</ca:HNO>
                <ca:FLR>Lower</ca:FLR>
                <ca:PC>K1A 0A6</ca:PC>
                <ca:BLD>Centre Block</ca:BLD>
                <ca:ROOM>House of Commons</ca:ROOM>
                <ca:SEAT>Eleventh</ca:SEAT>
                <ca:PCN>Ottawa</ca:PCN>
                <ca:ADDCODE>w3f6i6</ca:ADDCODE>
                <cdx2:SITE>Parliament Hill</cdx2:SITE>
                <cdx2:WING>West Wing</cdx2:WING>
                <cdx2:SECTION>Right</cdx2:SECTION>
                <cdx2:ROW>First</cdx2:ROW>
              </ca:civicAddress>
            </gp:location-info>
            <gp:usage-rules>
               <gdp:retransmission-allowed>true
               </gdp:retransmission-allowed>
               <gdp:retention-expiry>2022-10-12T13:20:00-05:00
               </gdp:retention-expiry>
```


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```
            </gp:usage-rules>
            <gp:method>Manual</gp:method>
            <gp:provided-by>
               <pi:EmergencyCallData.ProviderInfo>
                  <pi:DataProviderReference>4ndhfsas$G7@tsp1.ca
                  </pi:DataProviderReference>
                  <pi:DataProviderString>TSP1</pi:DataProviderString>
                  <pi:ProviderID>www.tsp1.ca</pi:ProviderID>
                  <pi:ProviderIDSeries>domain</pi:ProviderIDSeries>
                  <pi:TypeOfProvider>Telecom Provider
                  </pi:TypeOfProvider>
                  <pi:ContactURI>tel:+1-555-555-1119</pi:ContactURI>
                  <pi:Language>en-ca</pi:Language>
                  <pi:Language>fr-ca</pi:Language>
                  <pi:DataProviderContact>
                     <xc:vcard>
                        <xc:categories>Customer Address Management
                        </xc:categories>
                        <xc:email>
                           <xc:text>csd.cust.addr@tsp1.com</xc:text>
                        </xc:email>
                        <xc:fn>
                           <xc:text>Jane Doe</xc:text>
                        </xc:fn>
                        <xc:org>
                           <xc:text>Customer Service Desk</xc:text>
                        </xc:org>
                     </xc:vcard>
                  </pi:DataProviderContact>
               </pi:EmergencyCallData.ProviderInfo>
            </gp:provided-by>
         </gp:geopriv>
      </status>
      <timestamp>2022-10-11T13:20:00-05:00</timestamp>
   </tuple>
</presence>
```

Example 3 – Traditional Dwelling with Unit

This example depicts a civic location of a common house address with apartments along a road with complex name parsing. This type of example is expected to represent the bulk of the locations. It utilizes the named location XML element UNIT.

```
<?xml version="1.0" encoding="UTF-8"?>
<presence xmlns="urn:ietf:params:xml:ns:pidf"
 xmlns:gp="urn:ietf:params:xml:ns:pidf:geopriv10"
 xmlns:gdp="urn:ietf:params:xml:ns:pidf:geopriv10:basicPolicy"
```


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```
xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
xmlns:cae="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr:ext"
xmlns:cdx1="urn:nena:xml:ns:pidf:nenaCivicAddr"
xmlns:cdx2="urn:nena:xml:ns:pidf:nenaCivicAddr2"
xmlns:pi="urn:ietf:params:xml:ns:EmergencyCallData:ProviderInfo"
xmlns:xc="urn:ietf:params:xml:ns:vcard-4.0"
entity="pres:5556780987@tsp5.ca">
  <tuple id="a35405jrefdsc">
     <status>
        <gp:geopriv>
           <gp:location-info>
             <ca:civicAddress xml:lang="en-CA">
               <ca:country>CA</ca:country>
               <ca:A1>BC</ca:A1>
               <ca:A2>Metro Vancouver</ca:A2>
               <ca:A3>Vancouver</ca:A3>
               <ca:RD>Main</ca:RD>
               <ca:STS>Street</ca:STS>
               <ca:POD>West</ca:POD>
               <ca:POM>Extension</ca:POM>
               <ca:HNO>123</ca:HNO>
               <ca:HNS>B</ca:HNS>
               <ca:UNIT>Apartment 1102</ca:UNIT>
             </ca:civicAddress>
           </gp:location-info>
           <gp:usage-rules>
              <gdp:retransmission-allowed>true
              </gdp:retransmission-allowed>
              <gdp:retention-expiry>2022-10-12T13:20:00-05:00
              </gdp:retention-expiry>
           </gp:usage-rules>
           <gp:method>Manual</gp:method>
           <gp:provided-by>
              <pi:EmergencyCallData.ProviderInfo>
                 <pi:DataProviderReference>4ndhfbob$G7@tsp5.ca
                 </pi:DataProviderReference>
                 <pi:DataProviderString>TSP5</pi:DataProviderString>
                 <pi:ProviderID>www.tsp5.ca</pi:ProviderID>
                 <pi:ProviderIDSeries>domain</pi:ProviderIDSeries>
                 <pi:TypeOfProvider>Telecom Provider
                 </pi:TypeOfProvider>
                 <pi:ContactURI>tel:+1-555-555-1120</pi:ContactURI>
                 <pi:Language>en-ca</pi:Language>
                 <pi:Language>fr-ca</pi:Language>
                 <pi:DataProviderContact>
                    <xc:vcard>
```


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```
                        <xc:categories>Customer Address Management
                        </xc:categories>
                        <xc:email>
                           <xc:text>csd.cust.addr@tsp5.ca</xc:text>
                        </xc:email>
                        <xc:fn>
                           <xc:text>Jane Doe</xc:text>
                        </xc:fn>
                        <xc:org>
                           <xc:text>Customer Service Desk</xc:text>
                        </xc:org>
                     </xc:vcard>
                  </pi:DataProviderContact>
               </pi:EmergencyCallData.ProviderInfo>
            </gp:provided-by>
         </gp:geopriv>
      </status>
      <timestamp>2022-10-11T13:20:00-05:00</timestamp>
   </tuple>
</presence>
```


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Appendix A ADMINISTRATIVE LEVELS QUICK REFERENCE (INFORMATIVE)

This informative Appendix provides a convenient quick reference guide to how *Administrative Level 1* through *Administrative Level 5* are populated for each province and territory.

Should there be discrepancies between this Appendix and the text found in the body of this standard, the latter prevails.

	Administrative Level 1	*Administrative Level 2*	*Administrative Level 3*	*Administrative Level 4*	*Administrative Level 5*
Abbreviated Definition	The name of a province or territory represented by the two-letter uppercase abbreviation given in ISO 3166-2	Where it exists, is the primary subdivision of a Canadian province or territory	Where it exists, is the primary or secondary division of a province or territory	Where it exists, is the subdivision of the most granular, preceding administrative level	Where it exists, is the subdivision of *Administrative Level 4*
Examples	BC, PE, AB, NB, NT	Central Kootenay, a Regional District in British Columbia; York, a County in New Brunswick	Calgary, a municipality in Alberta; Laval, a city in the Province of Quebec	Ralston, a hamlet in Alberta; Charlesbourg, a borough of Quebec City in the Province of Quebec	Spring Park, a neighbourhood in Prince Edward Island; Sutton, a suburban community in Ontario
Alberta	AB	Rural Municipalities or Urban Service Areas	Incorporated municipalities and unincorporated areas or communities	Hamlets/rural subdivisions	None until such time data exists to support its inclusion
British Columbia	BC	Regional Districts plus Regional Municipalities and unincorporated regions	Incorporated municipalities and unincorporated areas or communities	None until such time data exists to support its inclusion	None until such time data exists to support its inclusion
Manitoba	MB	No *Administrative Level 2*	Incorporated municipalities and unincorporated areas or communities	None until such time data exists to support its inclusion	None until such time data exists to support its inclusion
New Brunswick	NB	Counties	Incorporated municipalities and unincorporated areas or communities	None until such time data exists to support its inclusion	None until such time data exists to support its inclusion
Newfoundland and Labrador	NL	Provincial Electoral Districts	Incorporated municipalities, and unincorporated areas and Local Service Districts	Communities	Neighbourhoods
Northwest Territories	NT	Administrative regions	Incorporated municipalities and unincorporated areas or communities	None until such time data exists to support its inclusion	None until such time data exists to support its inclusion

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	Administrative Level 1	*Administrative Level 2*	*Administrative Level 3*	*Administrative Level 4*	*Administrative Level 5*
Nova Scotia	NS	Counties	Incorporated municipalities	Communities	None until such time data exists to support its inclusion
Nunavut	NU	Administrative Regions	Incorporated municipalities and unincorporated areas or communities	None until such time data exists to support its inclusion	None until such time data exists to support its inclusion
Ontario	ON	Upper Tier Municipalities (i.e., Regional Municipalities, Counties, United Counties), Single Tier Municipalities (e.g., City of Toronto), Indigenous communities, Unincorporated areas (e.g., Districts)	Lower Tier municipalities	Former municipalities (i.e., pre-amalgamation)	Suburban neighbourhoods, communities, former villages
Prince Edward Island	PE	Counties	Incorporated municipalities and Fire Districts	Civic Address Communities	Neighbourhoods
Québec	QC	Régions administratives (administrative regions)	Municipalités locales et territoires non-organisés (local municipalities and non-organized territories)	Arrondissements (boroughs)	None until such time data exists to support its inclusion
Saskatchewan	SK	No *Administrative Level 2*	Incorporated areas	Unincorporated areas	Neighbourhoods or subdivisions
Yukon	YU	No *Administrative Level 2*	Incorporated municipalities and unincorporated areas or communities	None until such time data exists to support its inclusion	None until such time data exists to support its inclusion

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