Road Network File, Reference Guide, 2018

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Road Network File, Reference Guide, 2018

This reference guide is for users of the Road Network File. It provides an overview of the file, the general methodology used to create it and important technical information.

What's new?

- The 2018 Road Network File includes updates that are made on a continuous basis using various administrative sources and validated using provincial and municipal sources in partnership with Elections Canada.

1. About this guide

This reference guide is for users of the 2018 Road Network File. It provides an overview of the file, the general methodology used to create it and important technical information.

This reference guide does not provide details on specific software packages available for use with the 2018 Road Network File. Users should contact the appropriate software vendor for such information.

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2. Overview

The 2018 Road Network File depicts the digital road line coverage for Canada and contains information such as road arc unique identifier (UID), name, type, direction, address range, rank and class. It also includes the UID, name and type for each side of a road arc (where applicable) for the following geographic levels:

- province or territory;
- census subdivision.

The 2018 Road Network File is available as a national file.

How to cite this guide

Road Network File, Reference Guide, 2018. Statistics Canada Catalogue no. 92-500-G.

How to cite this product

Road Network File, 2018. Statistics Canada Catalogue no. 92-500-X.

3. About this product

Purpose of the product

The purpose of the 2018 Road Network File is to provide a framework for mapping and spatial analysis. It also supports Geographic Information System (GIS) applications used for land use and demographic studies, and for social, economic and market research.

The 2018 Road Network File is positionally consistent with the 2018 Census Subdivision Boundary File, which provide additional reference for mapping.

The 2018 Road Network File should be used in conjunction with the 2018 suite of geography products.

Definitions and concepts

Geographic terms and concepts are briefly defined in the *Dictionary, Census of Population, 2016* (https://www12.statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm).

Content

The 2018 Road Network File contains road arcs depicting the national road network and includes attribute information such as road arc unique identifier, name, type, direction, address range, rank and class. It also includes the unique identifier (UID), name and type for each side of a road arc (where applicable) for the following geographic levels:

- province or territory;
- census subdivision.

General methodology

The National Geographic Database (NGD) is a joint Statistics Canada–Elections Canada initiative to develop and maintain a national road network database that serves the needs of both organizations. The objective of the NGD is to continually improve the quality and currency of road network coverage using updates from provinces, territories and local sources. The source file used to create the Road Network File resides in Statistics Canada's Spatial Data Infrastructure and was derived directly from data stored on the NGD.

Creation of the 2018 Road Network File

The Road Network File was created from a source file consisting of all streets, highways and other road segments maintained in Statistics Canada's Spatial Data Infrastructure (SDI). A copy of the source file in its original format was created to facilitate geoprocessing (e.g., joins, modifications and verification operations). Additional attribute information (i.e., province or territory, census metropolitan area and census subdivision attributes) was then joined to the spatial component at the road segment level (see Table 4.1). The resulting file, containing both the spatial content and the attribute content, was verified against the source file maintained in the SDI.

The file was verified for spatial and attribute content, translated into French and English, and appropriately named according to the file naming convention. Final data processing consisted in converting the file using FME® (Safe Software) into the following file formats supported by Geographic Information System (GIS) software: ArcGIS® (.shp), and Geography Markup Language (.gml)

The ArcGIS®, and Geography Markup Language files are compressed into WinZip® files (file extension .zip) and made available for download from the Statistics Canada website.

Limitations

Statistics Canada maintains Road Network File information to support the census and other Statistics Canada activities. The relative position of road network features is important in maps created for reference purposes; therefore, relative positional accuracy takes precedence over absolute positional accuracy. The Road Network File does not contain street information required for route optimization. For example, data on one-way streets, dead ends and other street obstacles are not included in the Road Network File. Consequently, this file is not recommended for engineering applications, emergency dispatching services, surveying or legal applications.

The Road Network File contains road arcs with address ranges sourced from field observation or administrative data sources, with imputed address ranges, or without address ranges.

The limitations of the Road Network File should be recognized for uses other than the mapping, analysis and retrieval of Statistics Canada data.

The positional accuracy of the file does not support cadastral, surveying, digitizing or engineering applications.

Comparisons with other products or versions

Differences between the 2018 Road Network File and previous versions of the Road Network File include the following:

- The 2018 Road Network File contains additional roads, street names, address ranges and road classes.
- The 2018 Road Network File is compatible with the 2018 edition of the Census Subdivision Boundary File as well as the Interim List of Changes to Municipal Boundaries, Status and Names.
- The 2018 Road Network File does not necessarily follow the 2016 Census boundaries.

Use with other products

When considering whether to use the 2018 Road Network File, users should be aware of its compatibility or incompatibility with files available from other sources. Such files may not be consistent with Statistics Canada files.

Reference date

The geographic reference date is a date determined by Statistics Canada to finalize the geographic framework for which statistical data are collected, tabulated and reported. For the 2018 Road Network File, the geographic reference date is September 1, 2018.

4. Technical specifications

Record layout and data descriptions

The following table identifies and briefly describes selected attributes that make up the 2018 Road Network File.

Table 4.1
2018 Road network file record layout

Attribute name	Data type	Description
NGD_UID	Character (9)	Unique identifier of the arc
NAME	Character (50)	Street name associated with the arc
TYPE	Character (6)	Street type associated with the arc
DIR	Character (2)	Street direction associated with the arc
AFL_VAL	Character (9)	Civic address found on the left-hand side of the arc at the FROM node
ATL_VAL	Character (9)	Civic address found on the left-hand side of the arc at the TO node
AFR_VAL	Character (9)	Civic address found on the right-hand side of the arc at the FROM node
ATR_VAL	Character (9)	Civic address found on the right-hand side of the arc at the TO node
CSDUID_L	Character (7)	Uniquely identifies a census subdivision (composed of the 2-digit province or territory unique identifier followed by the 2-digit census division code and the 3-digit census subdivision code), left-hand side of arc
CSDNAME_L	Character (100)	Census subdivision name, left-hand side of arc
CSDTYPE_L	Character (3)	Census subdivisions are classified according to designations adopted by provincial/territorial or federal authorities, left-hand side of arc
CSDUID_R	Character (7)	Uniquely identifies a census subdivision (composed of the 2-digit province or territory unique identifier followed by the 2-digit census division code and the 3-digit census subdivision code), right-hand side of arc
CSDNAME_R	Character (100)	Census subdivision name, right-hand side of arc
CSDTYPE_R	Character (3)	Census subdivisions are classified according to designations adopted by provincial/territorial or federal authorities, right-hand side of arc
PRUID_L	Character (2)	Uniquely identifies a province or territory, left-hand side of arc
PRNAME_L	Character (100)	Province or territory name, left-hand side of arc
PRUID_R	Character (2)	Uniquely identifies a province or territory, right-hand side of arc
PRNAME_R	Character (100)	Province or territory name, right-hand side of arc
RANK	Character (4)	A 1-digit code that identifies the rank of road segments.
CLASS	Character (4)	Identifies the different types of street features.

Attribute domain values

Representation of unknown or no value

The null value is used to represent missing or non-existent values for a street's name, type, direction and address range.

The null value is also used for geographic area unique identifiers, names and types to indicate that a geographic area is outside Canada.

Street type

This value indicates the street type associated with the arc.

Table 4.2
Street Type

Type	Description
ABBEY	Abbey (E)
ACCESS	Access (E)
ACRES	Acres (E)
AIRE	Aire (E)
ALLEY	Alley (E)
ALLÉE	Allée (F)
AUT	Autoroute (F)
AV	Avenue (F)
AVE	Avenue (E)
BAY	Bay (E)
BEACH	Beach (E)
BEND	Bend (E)
BLOC	Bloc (F)
BLOCK	Block (E)
BLVD	Boulevard (E)
BOUL	Boulevard (F)
BOURG	Bourg (F)
BRGE	Barrage (F)
BROOK	Brook (E)
BYPASS	By-pass (E)
BYWAY	Byway (E)
C	Centre (F)
CAMPUS	Campus (E)
CAPE	Cape (E)
CAR	Carré (F)
CARREF	Carrefour (F)
CDS	Cul-de-sac (E)
CERCLE	Cercle (F)
CH	Chemin (F)
CHASE	Chase (E)
CIR	Circle (E)
CIRCT	Circuit (F)
CLOSE	Close (E)
COMMON	Common (E)
CONC	Concession (E)
CÔTE	Côte (F)
COUR	Cour (F)
COURS	Cours (F)
COVE	Cove (E)

Table 4.2
Street Type

Type	Description
CRES	Crescent (E)
CREST	Crest (E)
CRNRS	Corners (E)
CROFT	Croft (E)
CROIS	Croissant (F)
CROSS	Crossing (E)
CRSSRD	Crossroads (E)
CRT	Court (E)
CTR	Centre (E)
DALE	Dale (E)
DELL	Dell (E)
DESSTE	Desserte (F)
DIVERS	Diversion (E)
DOWNS	Downs (E)
DR	Drive (E)
DRPASS	Droit de passage (F)
ÉCH	Échangeur (F)
END	End (E)
ESPL	Esplanade (E)
ESTATE	Estates (E)
EXPY	Expressway (E)
EXTEN	Extension (E)
FARM	Farm (E)
FIELD	Field (E)
FOREST	Forest (E)
FRONT	Front (E)
FSR	Forest service road (E)
FWY	Freeway (E)
GATE	Gate (E)
GDNS	Gardens (E)
GLADE	Glade (E)
GLEN	Glen (E)
GREEN	Green (E)
GRNDS	Grounds (E)
GROVE	Grove (E)
HARBR	Harbour (E)
HAVEN	Haven (E)
HEATH	Heath (E)
HGHLDS	Highlands (E)

Table 4.2
Street Type

Type	Description
HILL	Hill (E)
HOLLOW	Hollow (E)
HTS	Heights (E)
HWY	Highway (E)
ÎLE	Île (F)
IMP	Impasse (F)
INLET	Inlet (E)
ISLAND	Island (E)
KEY	Key (E)
KNOLL	Knoll (E)
LANDNG	Landing (E)
LANE	Lane (E)
LANEWY	Laneway (E)
LINE	Line (E)
LINK	Link (E)
LKOUT	Lookout (E)
LMTS	Limits (E)
LOOP	Loop (E)
MALL	Mall (E)
MANOR	Manor (E)
MAZE	Maze (E)
MEADOW	Meadow (E)
MEWS	Mews (E)
MONTÉE	Montée (F)
MOOR	Moor (E)
MOUNT	Mount (E)
MTN	Mountain (E)
ORCH	Orchard (E)
PARADE	Parade (E)
PARC	Parc (F)
PASS	Passage (E)
PATH	Path (E)
PEAK	Peak (E)
PINES	Pines (E)
PK	Park (E)
PKY	Parkway (E)
PL	Place (E)
PLACE	Place (F)
PLAT	Plateau (E)

Table 4.2
Street Type

Type	Description
PLAZA	Plaza (E)
POINTE	Pointe (E)
PORT	Port (E)
PROM	Promenade (F)
PT	Point (E)
PTWAY	Pathway (E)
PVT	Private (E)
QUAI	Quai (F)
QUAY	Quay (E)
RAMP	Ramp (E)
RANG	Rang (F)
RD	Road (E)
RDPT	Rond point (F)
REACH	Reach (E)
RG	Range (E)
RIDGE	Ridge (E)
RISE	Rise (E)
RLE	Ruelle (F)
ROUTE	Route (F)
ROW	Row (E)
RTE	Route (E)
RTOFWY	Right of way (E)
RUE	Rue (F)
RUIS	Ruisseau (F)
RUN	Run (E)
SECTN	Section (E)
SENT	Sentier (F)
SIDERD	Sideroad (E)
SQ	Square (E)
ST	Street (E)
STROLL	Stroll (E)
SUBDIV	Subdivision (E)
TERR	Terrace (E)
THICK	Thicket (E)
TLINE	Townline (E)
TOWERS	Towers (E)
TRACE	Trace (E)
TRAIL	Trail (E)
TRNABT	Turnabout (E)

Table 4.2
Street Type

Type	Description
TRUNK	Trunk (E)
TSSE	Terrasse (F)
VALE	Vale (E)
VIA	Via (E)
VIEW	View (E)
VILLAS	Villas (E)
VILLGE	Village (E)
VISTA	Vista (E)
VOIE	Voie (F)
WALK	Walk (E)
WAY	Way (E)
WHARF	Wharf (E)
WOOD	Wood (E)
WYND	Wynd (E)
N/A	not applicable
< Null >	no type

Street direction

Street direction can be used in conjunction with street name and type to identify common street elements (e.g., Elm ST S, versus Elm ST W or Elm ST). Street direction has no relation to the direction in which the road arc was digitized.

Table 4.3
Street Direction

Street Direction	Street description
E	East / Est
N	North / Nord
NE	North East / Nord-est
NO	Nord-ouest
NW	North West
O	Ouest
S	South / Sud
SE	South East / Sud-est
SO	Sud-ouest
SW	South West
W	West
< Null >	no type

CSDTYPE_L and CSDTYPE_R

Census subdivisions are classified according to designations adopted by provincial, territorial or federal authorities. The geographic reference date associated with the assignment of CSDTYPE_L and CSDTYPE_R is September 1, 2018.

Table 4.4
Census subdivision types

CSDTYPE	CSD description
C	City / Cité
CÉ	Cité
CC	Chartered community
CG	Community government
CM	County (municipality)
CN	Crown colony / Colonie de la couronne
COM	Community
CT	Canton (municipalité de)
CU	Cantons unis (municipalité de)
CV	City / Ville
CY	City
DM	District municipality
FD	Fire District
HAM	Hamlet
ID	Improvement district
IGD	Indian government district
IM	Island municipality
IRI	Indian reserve / Réserve indienne
LGD	Local government district
LOT	Township and royalty
M	Municipality / Municipalité
MD	Municipal district
MÉ	Municipalité
MRM	Regional Municipality / Municipalité régionale
MU	Municipality
NH	Northern hamlet
NL	Nisga'a land
NO	Unorganized / Non organisé
NV	Northern village
P	Parish / Paroisse (municipalité de)
PE	Paroisse (municipalité de)
RCR	Rural community / Communauté rurale
RDA	Regional district electoral area
RG	Region

Table 4.4
Census subdivision types

CSDTYPE	CSD description
RGM	Regional municipality
RM	Rural municipality
RMU	Resort Municipality
RV	Resort village
S-É	Indian settlement / Établissement indien
SA	Special area
SC	Subdivision of county municipality / Subdivision municipalité de comté
SÉ	Settlement / Établissement
SET	Settlement
SG	Self-government / Autonomie gouvernementale
SM	Specialized municipality
SNO	Subdivision of unorganized / Subdivision non organisée
SV	Summer village
T	Town
TC	Terres réservées aux Cris
TI	Terre inuite
TK	Terres réservées aux Naskapis
TL	Teslin land
TP	Township
TV	Town / Ville
V	Ville
VC	Village cri
VK	Village naskapi
VL	Village
VN	Village nordique

PRUID_L and PRUID_R

These values uniquely identify a province or territory. The geographic reference date associated with the assignment of PRUID_L and PRUID_R is September 1, 2018. Please see the Province or territory (https://www12. statcan.gc.ca/census-recensement/2016/ref/dict/geo038-eng.cfm) definition from the *Dictionary, Census of Population, 2016* for more information.

Note: <Null>, not applicable (outside of Canada)

RANK

Rank is a value assigned to a road arc to facilitate the selection of streets.

Table 4.5
Rank

Street rank code	Street rank description
1	Trans-Canada Highway
2	National Highway System (not rank 1)
3	Major Highway (not rank 1 or 2)
4	Secondary Highway, Major Street (not rank 1, 2, or 3)
5	All other streets (not rank 1, 2, 3, or 4)

CLASS

The street class code identifies the different types of street features within the 2018 Road Network File.

Table 4.6
Street class code

Street class code	Street class description
10	Highway
11	Expressway
12	Primary highway
13	Secondary highway
20	Road
21	Arterial
22	Collector
23	Local
24	Alley/Lane/Utility
25	Connector/Ramp
26	Reserve/Trail
27	Rapid transit
28	Planned
29	Strata
80	Bridge/Tunnel
90, 95	Unknown

Software formats

The 2018 Road Network File is available for download from the Statistics Canada website in the following formats:

- ArcGIS®
  File extension: .shp
- Geography Markup Language (GML) 3.1.1
  File extension: .gml

This reference guide does not provide details on specific software packages available for use with the 2018 Road Network File. Users should contact the appropriate software vendor for such information.

File extension and accented character information

The ArcGIS®, and Geography Markup Language files are compressed into WinZip® files (file extension .zip).

Metadata files are now available for spatial data products.

The 2018 Road Network File contains attributes with accented characters. They were successfully tested on the desktop versions of ArcGIS® 10.5.1 and FME Data Inspector 2015.1®.

Geographic representation

The 2018 Road Network File is available on the Statistics Canada website in the following geographic representation:

- Projection: Lambert conformal conic
- False easting: 6200000.000000
- False northing: 3000000.000000
- Central meridian: -91.866667
- Standard parallel 1: 49.000000
- Standard parallel 2: 77.000000
- Latitude of origin: 63.390675
- Linear unit: metre (1.000000)
- Datum: North American 1983 (NAD83)
- Prime meridian: Greenwich
- Angular unit: degree
- Spheroid: GRS 1980.

The North American Datum of 1983 (NAD83) is an adjustment of the 1927 datum that reflects the higher accuracy of geodetic surveying.

Users of the 2018 Road Network File can transform the file into the representation that best satisfies their needs, knowing the effects of these representations on angles, areas, distances and direction. Users can choose the best projection considering the map's objectives.

File naming convention

Spatial product file names follow a file naming convention. The file projection, geographic level, geographic coverage, file type, geographic reference date, file format and language are embedded within the file name. Standardizing the names of the files facilitates the storage of compressed files, all of which have the extension .zip.

Each file name has 13 characters. All letters are in lower case to maintain consistency.

First character: Projection of file

- l: projection of file is Lambert conformal conic

Next three characters: Primary geographic level of file or type of file

- rnf: Road Network File

Next three numbers: Geographic code of coverage

- 000: Canada

Next character: File type

- r: Road Network File

Next two numbers: Geographic reference date

The geographic reference date is the date Statistics Canada identified for finalizing the geographic framework under which statistical data are collected, tabulated and reported. The reference date for the 2018 Road Network File is September 1, 2018.

- 18: geographic reference date is 2018

Next character: File format

- a: ArcGIS® (.shp)
- g: Geography Markup Language (.gml)

Final two characters: Language

- _e: English
- _f: French

5. Data quality

Spatial data quality elements provide information on the fitness for use of a spatial database by describing why, when and how the data were created, and how accurate the data are. The quality elements include an overview of lineage, positional accuracy, attribute accuracy, logical consistency and completeness. This information is provided to users for all spatial data products disseminated.

Lineage

Lineage describes the history of the spatial data, including descriptions of the source material from which the data were derived, and the methods of derivation. It also contains the dates of the source material, and all transformations involved in producing the final digital files.

The National Geographic Database (NGD) is a joint Statistics Canada–Elections Canada initiative to develop and maintain a spatial database that serves the needs of both organizations. The objective of the NGD is to continually improve the quality and currency of spatial coverage using updates from provinces, territories and local sources. The source files used to create the Road Network File reside in Statistics Canada's Spatial Data Infrastructure (SDI) and were derived directly from data stored on the NGD.

The data in the 2018 Road Network File were derived from the SDI environment based on a copy of the NGD that contains the road network in Canada, as well as street attributes (name, type, direction, address range, rank and class).

The files were verified for their spatial and attribute content, translated into French and English, and appropriately named according to the file naming convention. The geographic area unique identifier, name and type, and the relationships between the various geographic levels, are found in the SDI.

Final data processing consisted in converting the file using FME® (Safe Software) into the following GIS file formats: ArcGIS® (.shp), and Geography Markup Language (.gml).

Road information was incorporated from a variety of sources, including provincially sourced data, municipal maps and field observation. The timeliness of the NGD varies from region to region depending on the source data.

Positional accuracy

Positional accuracy refers to the absolute and relative accuracy of the positions of geographic features. Absolute accuracy is the closeness of the coordinate values in a dataset to values that are true or accepted as true. Relative accuracy is the closeness of the relative positions of features to their true relative positions or to their relative positions accepted as true. Descriptions of positional accuracy include the quality of the final file or product after all transformations.

The Spatial Data Infrastructure (SDI) does not fully comply with the global positioning system (GPS). However, every possible attempt is made to ensure that the standard geographic area boundaries maintained in the SDI respect the limits of the administrative entities they represent (e.g., provinces, territories and census subdivisions) or on which they are based (e.g., census metropolitan areas and census agglomerations). The positional accuracy of these limits depends on source materials used by Statistics Canada to identify the location of limits. In addition, because of the importance of relative positional accuracy, the positional accuracy of other geographic data (e.g., road network data and hydrographic data) that are stored within the SDI is considered when positioning the limits of the standard geographic areas.

Absolute positional accuracy

Absolute positional accuracy describes the degree to which the position of features in a geographic database reflects their true position on the ground (i.e., the closeness of reported coordinate values to values accepted as true).

The information present in the Spatial Data Infrastructure (SDI) road layer was developed for the purposes of statistical analysis and census operations. The absolute position of roads in the SDI varies with the source files and documents used to build and maintain the database. Therefore, the road layer is not suitable for highprecision measurement applications such as engineering or property transfers, nor for other uses that might require highly accurate measurements of the earth's surface.

Absolute positional accuracy is not a requirement for census processes.

Relative positional accuracy

Relative positional accuracy describes the degree to which the position of features in a geographic database reflects their true ground relationships.

For the National Geographic Database, relative positional accuracy is important. A road must appear in its proper position relative to other roads and physical features.

Attribute accuracy

Attribute accuracy refers to the accuracy of quantitative attributes and the correctness of non-quantitative attributes. No explicit testing for attribute accuracy is done; however, results from internal operations suggest a high degree of accuracy.

Data entry during maintenance operations includes a data control process to ensure that attributes are properly associated to a specific geometric feature. This includes the association, as well as its accuracy.

As noted under the "Lineage" section, the attributes (names, types and unique identifiers) of all standard geographic areas are sourced from Statistics Canada's Spatial Data Infrastructure. The names and types of administrative standard geographic areas are updated using source materials from provincial, territorial and municipal authorities.

The class attribute is not updated on a regular basis; as such, quality checks are not performed to verify its accuracy.

Logical consistency

Logical consistency describes the fidelity of relationships encoded in the structure of the digital spatial data. For example, a road arc that does not have a street name should not have a street type.

The 2018 Road Network File was verified against data in the Spatial Data Infrastructure and found to be logically consistent.

Consistency with other products

The position of the arcs in the 2018 Road Network File are not necessarily consistent with previous editions of boundary files or road network files as a result of updates made using provincially and territorially sourced data.

Topology checks were performed with the 2018 Road Network File and the 2018 Census Subdivision Boundary File to measure the degree of integration in these products. The results indicated that the degree of integration was within the default tolerance parameters, as defined below:

- Tolerance: 0.001 metres
- Resolution: 0.0001 metres.

Completeness

Completeness refers to the degree to which geographic features, their attributes and their relationships are included or omitted in a dataset. It also includes information on selection criteria, definitions used and other relevant mapping rules.

New road features have been added to the National Geographic Database to create a more complete road layer and are present in the 2018 Road Network File.

Table 5.1
Number of road features in the 2018 Road network file

National level	Number of arcs	Arc length (kilometres)
With street name	1,917,818	823,022
Without street name	311,049	341,593
Named street with full address range on at least one side	1,351,106	53,333
Canada	2,228,867	1,164,615

Note: arc length was calculated in Lambert conformal conic projection.

Appendices

See definitions of the geography universe from the *Dictionary, Census of Population, 2016* (https://www12.statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm).

See Figure 1.1 Hierarchy of standard geographic areas for dissemination, 2016 Census (https://www12.statcan.gc.ca/census-recensement/2016/ref/dict/figures/f1_1-eng.cfm) in the *Dictionary, Census of Population, 2016*.

See Table 1.1 Geographic areas by province and territory, 2016 Census (https://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t1_1-eng.cfm) in the *Dictionary, Census of Population, 2016*.

See Table 1.5 Census subdivision types by province and territory, 2016 Census (https://www12.statcan.gc.ca/census-recensement/2016/ref/dict/tab/t1_5-eng.cfm) in the *Dictionary, Census of Population, 2016*.