Queensland Digital Road Network Standard

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Queensland Government

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3.01	13/02/2018	Minor amendments to reflect new department name.

Approval

Position	Name
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Table of contents

1 Scope and Introduction

1.1 Scope

The scope of this document is to provide an optimal method for the capture and maintenance of road network data and to provide broad parameters for the exchange of such data.

This DRN standard has been developed to specify only those items of linear data which comprise road networks. Non-linear and non-road entities (e.g. Points, Polygons, Grids, etc.) are not part of this standard.

In addition, data which can be derived from this 'core' DRN data or derived from overlays with other data is not included. For example, Administrative boundaries (e.g. Electoral) can be derived from overlays with other datasets and are therefore not included as an attribute on the DRN.

This standard does not define a data model because it is envisaged that suppliers/vendors of DRN data will develop their own data models which may be platform or software dependent.

QSIC shall coordinate any changes to this standard.

1.2 Introduction

This standard is designed to represent the 'core' set of requirements for the capture, management and representation of DRN data. The DRN data is considered to be the topological structure of the spatial road network information including sufficient attributes to meet the core set of requirements.

The standard is to apply to the Road Network defined in the Queensland Foundation Spatial Data Standard 2016 (to be approved by QSIC).

As such, this standard is designed to complement and continue work on other standards already developed by QSIC.

Note also that this standard incorporates the broad data modelling and conceptual feature components of the Geographic Data Files (GDF) Standard and AS4270, Spatial Data Transfer Standard (SDTS). As such, this DRN standard has been designed not to conflict with either GDF or SDTS.

2 Principles and Guidelines

In developing this standard, the following basic principles dictate the content of 'core' requirements and outline basic data structures and management concepts.

2.1 Principles

The basic principles for the development of the DRN standard are:

1. The DRN standard must be consistent with the current use of the existing digital road network data.
2. The DRN standard must be consistent with GIS and desktop mapping technology being used by a wide number of digital road network users.
3. The DRN standard should be based upon a common understanding of road information – e.g. the classification system should be based upon functional classes, i.e. to represent 'how the road is used'.

4. The DRN Standard must be consistent with other Queensland current and future policies, projects, etc. that relate to State Addressing, Road Network Administration, etc. (e.g. Queensland Location Management framework and Property Location Index).
5. The DRN Standard, where possible, must be consistent with National Road Network, Addressing, etc policies, projects, etc.
6. The SDRN must be able to provide support for existing Queensland Government business systems.

2.2 Essential components of DRN data structure

DRN data is structured in accordance with the definitions contained within *AS4270.1 - Logical Specifications for GIS Spatial Data Transfer Standard*. *AS4270.1* defines three classes of spatial objects:

Class 1 - geometry only;
Class 2 - geometry and topology; and
Class 3 - topology only.

The spatial objects preferred under the QSIC DRN standard are Class 2 – geometry and topology. As such, topology is inherent in this structure of the DRN using the following spatial objects:

a. 'Line Segment' - a direct line between two vertices.
b. 'Chain' – a directed non-branching sequence of non-intersecting Line Segments and/or arcs bounded by nodes, not necessarily distinct, at each end.
c. 'Node' – a zero-dimensional object that is a topological junction of two or more 'Line Segments' or 'Chains', or the end point of a 'Line Segment' or 'Chain'.

The spatial objects of 'Line Segment', 'Chain' and 'Node' will carry coordinate values of their end-points or vertices in the coordinate system (specified in section 7) and in the metadata statement pertaining to the data set.

The above is consistent with *ISO:14825 Intelligent transport systems – Geographic Data Files (GDF) – Overall data specification.*

2.3 DRN guidelines

The Digital Road Network data shall be structured in accordance with the following:

1. All roads will consist of 'Chains' and will carry names and consistent addressing ranges derived from those chains.
2. Where there is either a physical separation between two carriageways (i.e. divided freeway) or there is no inter-connectivity between the carriageways for a considerable distance, it shall be shown as two separate roads in the database.
3. The digitised direction of the road should preferably be in the same direction as the addressing of that road.
4. Road networks shall continue through, and connect with, roundabouts in order to provide all possible intersections.
5. The preferred minimum chain length in the DRN is 3 metres and chains shorter than this are strongly discouraged.
6. The DRN Standard is broadly based upon the concepts inherent with GDF and SDTS.
7. Additional DRN requirements will be accommodated in DRN modules designed for specific purposes – e.g. Emergency Services.

3 Spatial Accuracy

There is a need to improve and make consistent the level of spatial accuracy within major Queensland data sets - particularly where integration and analysis of data is required for a range of applications e.g. land administration, emergency services, town planning, etc.

The lack of spatial consistency between these major datasets has, in the past, highlighted an (apparent) lack of spatial accuracy of individual data sets.

3.1 DCDB and Road Network Spatial Relationship

Wherever possible, a high level of spatial consistency should be maintained between the road network and the DCDB. That is, unless field inspections or other definitive data sources show the positions of roads to the contrary, road networks should be maintained within the appropriate cadastral casement if possible.

Where such field inspections or other data sources show the positions of roads to be outside the appropriate cadastral casement, the road network should be maintained in the actual location so as to indicate the variance with the cadastral casement.

3.2 Spatial accuracy

Subject to the above (and the spatial accuracy levels inherent in the DCDB), the following spatial accuracies should be adopted for all data capture programs (with the exception of data captured for engineering and/or surveying purposes):

Table 1 – Spatial accuracies for data capture programs

Spatial Accuracy Identifier	Minimum Spatial Accuracy	Typical Category
2	± 2m	Urban
3	± 5m	Peri-Urban
4	± 25m	Rural
5	± 100m	Remote

These spatial accuracies are to be regarded as the minimum accuracy acceptable. It is expected that they will be exceeded during data capture with segments labelled accordingly (e.g. remote roads may be captured to ± 5 meters).

Therefore, the 'Positional Accuracy Reference Table' (appendix A, figure 3.2) provides for a spatial accuracy identifier to be used (e.g. 3 for ± 5m) as well as the category – which may be different (e.g. Remote roads).

These spatial accuracies conform to the requirements of ANZLIC and have been derived from previous work undertaken as follows:

Table 2 – Source details

Source	Source Date	Proposed Accuracy			
		Urban	Peri-Urban	Rural	Remote
DRN Market Scope Study - Report for CaLM - AUSDEC & DELTA Outlooks	Feb-95	Spatial accuracies not quoted			
ANZLIC National Road Centreline Database - Stage 1	Oct-95	20		50	200
ANZLIC National Road Centreline Database - Stage 2	Oct-95	5		20	100
Main Roads GPS/GIS Asset Standardisation - Corporate GIS Consultants	Jul-96	2	5	30	
Recommended Spatial Accuracy		2	5	25	100

While these spatial accuracies are to be used for the capture and recording of road networks, they should also be used for the capture of associated assets and roadside furniture.

4 Road Classifications

There is a need for an easy-to-use and consistent road classification system that meets the needs of all road users.

The following road classification system is based on functional classes – i.e. to represent 'how the road is used'.

Table 3 – Road classification system 1

Attribute	*Classification*
Roadtype	1. Freeways/Motorways
	2. Highways
	3. Secondary Roads
	4. Local Connector Roads
	5. Street/Local – only provides property access
	6. Notified Private or Restricted Roads
	7. Tracks
	8. Malls
	9. Construction Lines
	10 Unconstructed and/or Dedicated
	11. Ferry route
	12. Bikeway / Walkway
	13. Busway

Status	Proposed
	Restricted

OneWayInd	0. Bi-directional traffic flow
	1. Traffic flow in positive direction of the line only
	2. One way traffic in opposite direction
	3. No traffic flow in either direction

Arterial roads are classifications 1-4 of RoadType. Note that the classifications used above (e.g. Freeway) are those with which ordinary motorists would identify – i.e. a Freeway is self-explanatory and has certain expected characteristics such as access, speed, barriers etc. In cases where a road could have two classifications (e.g. Freeway as well as Highway), the highest classification (e.g. 1 – Freeway) should be used.

Vehicle Ferry connections which link one section of the road network with another have a unique classification. A ferry connection, apart from being named by common usage, will also have an alias name 'ferry connection'.

This classification system has been adopted as the DRN Standard. Should a user wish to use a different classification system, such a system can be created and linked to the PIDs for personal or internal use (for their organisation). The maintenance of this linked data is then the responsibility of the user.

5 Overview of DRN

The File and Table structures outlined below will form the 'core' requirements for spatial information to be attached to the basic spatial object of 'Chain' within the DRN.

Section 5.1 specifies the requirements of the spatial object.

Section 5.2 specifies the minimum requirements for the data structure.

Section 5.3 contains the detailed description of each of the attributes and outlines the rules pertaining to the attributes.

Section 5.4 describes specific requirements to ensure consistent representation of road connectivity.

Section 5.5 describes how change control should be managed.

5.1 Spatial object specifications

5.1.1 Essential physical characteristics

- The Spatial object (chain) will consist of a start node, end node and a chain of x,y coordinates.

5.1.2 Object Identifiers

- A unique Persistent Identifier (PID) will be attached to each Chain.
- Nodes will not have a PID.
- A PID will only be incremented by a change in the SDRN data file (explained in section 5.5).

5.1.3 Object Digitization

- Digitization of the spatial object should preferably be in the direction of the address range that corresponds to the segment.
- If no addresses are present than the Digitization of the spatial object is to be the same as those that make up the logical group of roads.
- If no addresses are present across the logical group of roads than all segments are to be digitised in the same direction.
- As addressing information becomes available the spatial objects of the logical group of roads are to be flipped to match the addressing.

5.1.4 Spatial Object Relationships

- Where a relationship between the DCDB and the road segment exists the road segment should be positioned within the road casement of the DCDB.
- Connectivity across the network is essential. An intersection is represented by a start node of one segment having the same coordinates as the end node of another segment. Where road segments overlap but there is no intersection then no pseudo-node shall exist.
- Where a road is separated by a 'traffic island' or barrier such as a dual carriage way than the road should be represented by two road segments. Each road segment should comply with the digitising rules above.
- The minimum length of a road segment should be 3 metres
- Where a road segment intersects with a locality or LGA boundary then the road segment should be cut at the boundary and a new segment commence.
- Pseudo-nodes are only to be used in the DRN in the case of chains crossing locality or LGA boundaries. A pseudo-node shall be placed where the centreline of the road intersects the locality or LGA boundary.

5.2 Data structure

STREET*	Character (55)
FROMLEFT	Integer
TOLEFT	Integer
FROMRIGHT	Integer
TORIGHT	Integer
ALIAS_NAME1*	Character (55)
ALIAS_NAME2	Character (55)
PID*	Integer
ROADTYPE*	Integer
DESCRIPTOR	Character (50)
STATUS	Character (20)
ONEWAYIND	Integer
TOLL	Integer
HNUM_STRUCT	Integer
QUAL_PNT*	Character (20)
ROAD_ID	Integer

STATE_RD_ID	Character (6)
STE_ROUTE_NUM	Character (10)
NAT_ROUTE_NUM	Character (10)
LOCALITY	Character (50)
LOCALITY_NUM	Integer
STE_LGA_NUM	Integer
ASGC_LGA_NUM	Integer
STATE	Character (3)

- The fields marked with an asterisk indicate those fields that are mandatory in any DRN data product. The SDRN data product will require all of the above fields to be included as a minimum.
- The primary addressing range should be derived from the PLI.
- Metadata is to be included with the capture, storage and each distribution of data as per the 'ANZLIC ISO Metadata Profile Version 1'. Quality data can be attached to individual chains. However, the quality pointers must be consistent with the information contained within the metadata statements.

5.3 Attribute data dictionary

5.3.1 Street

Description

The street name should only consist of information relevant to the street name.

Where possible, information relevant to the address or road type should be located in their associated fields.

A street name consists of two or more of the following:

A directional prefix, street name, road type and directional suffix. (street name and road type are mandatory).

Examples:

West Saint Johns Road

Saint Johns Road West

Saint Johns Road

Rules/Validation

- The Road Name components of Street shall accord with *AS/NZS 4819:2003 – Geographic information – Rural and urban addressing.*
- The road name should be in Proper Case.
- No punctuation-
  e.g. Apostrophes replaced with no space i.e.
  Saint John's Road becomes Saint Johns Road

- No Abbreviations – directional prefix, street name, road type and directional prefix spelt in full. In particular:
    - No abbreviations within the street name component of a street i.e.
      St Johns Road becomes Saint Johns Road
    - No abbreviations within the road type component of a street i.e.
      Saint Johns Rd becomes Saint Johns Road
    - No abbreviations within the directional suffix or directional prefix component of a street i.e.
      Saint Johns Road W becomes Saint Johns Road West
- Where Numbers make up the component of the street name they should be spelt in full.
  21st Avenue becomes Twenty First Avenue

5.3.2 FromLeft

Description

The first street number of a land parcel adjacent to the road segment that constitutes the left side of the spatial object

Rules/Validation

- First street number, left side, along direction of road
- Street Number contains only integer values
- Street Number does not contain a range of values
- Street Number value is not represented on more than one segment where those segments make up the logical group of roads
  i.e. No overlapping of address values

5.3.3 ToLeft

Description

The last street number of a land parcel adjacent to the road segment that constitutes the left side of the spatial object

Rules/Validation

- The Last street number, left side, along direction of road
- Street Number contains only integer values
- Street Number does not contain a range of values
- Street Number value is not represented on more than one segment where those segments make up the logical group of roads
  i.e. No overlapping of address values

5.3.4 FromRight

Description

The first street number of a land parcel adjacent to the road segment that constitutes the right side of the spatial object

Rules/Validation

- First street number, right side, along direction of road
- Street Number contains only integer values
- Street Number does not contain a range of values
- Street Number value is not represented on more than one segment where those segments make up the logical group of roads
  i.e. No overlapping of address values

5.3.5 ToRight

Description

The last street number of a land parcel adjacent to the road segment that constitutes the right side of the spatial object

Rules/Validation

- The Last street number, right side, along direction of road
- Street Number contains only integer values
- Street Number does not contain a range of values
- Street Number value is not represented on more than one segment where those segments make up the logical group of roads
  i.e. No overlapping of address values

5.3.6 Alias_Name1

Description

The Alias_Name1 should only consist of information relevant to the street name. Where possible, information relevant to the address or road type should be located in their associated fields.

A valid Alias Name may occur where a section of highway also carries a local road name.

An alias name consists of two or more of the following:

A directional prefix, street name, road type and directional suffix. (street name and road type are mandatory).

Examples:

West Saint Johns Road

Saint Johns Road West

Saint Johns Road

Rules/Validation

- The Road Name components of Alias_Name1 shall accord with *AS/NZ 4819:2003 – Geographic information – Rural and urban addressing*.
- The road name should be in Proper Case.
- No punctuation - e.g. Apostrophes replaced with no space i.e.

  Saint John's Road becomes Saint Johns Road
- No Abbreviations – directional prefix, street name, road type and directional prefix spelt in full. In particular:
  - No abbreviations within the street name component of a street i.e.
    St Johns Road becomes Saint Johns Road
  - No abbreviations within the road type component of a street i.e.
    Saint Johns Rd becomes Saint Johns Road
  - No abbreviations within the directional suffix or directional prefix component of a street i.e.
    Saint Johns Road W becomes Saint Johns Road West
- Where Numbers make up the component of the street name they should be spelt in full.
  21st Avenue becomes Twenty First Avenue

  Note: vehicle carrying ferry connections will also have an alias of Ferry Connection.

5.3.7 Alias_Name2

Description

The Alias_Name2 should only consist of information relevant to the street name. Where possible, information relevant to the address or road type should be located in their associated fields.

An alias name consists of two or more of the following:

A directional prefix, street name, road type and directional suffix. (street name and road type are mandatory).

Examples:

West Saint Johns Road

Saint Johns Road West

Saint Johns Road

Rules/Validation

- The Road Name components Alias_Name2 of shall accord with *AS/NZ 4819:2003 – Geographic information – Rural and urban addressing*.
- The road name should be in Proper Case.

- No punctuation - e.g. Apostrophes replaced with no space i.e.

  Saint John's Road becomes Saint Johns Road

- No Abbreviations – directional prefix, street name, road type and directional prefix spelt in full. In particular:
  - No abbreviations within the street name component of a street i.e.
    St Johns Road becomes Saint Johns Road
  - No abbreviations within the road type component of a street i.e.
    Saint Johns Rd becomes Saint Johns Road
  - No abbreviations within the directional suffix or directional prefix component of a street i.e.
    Saint Johns Road W becomes Saint Johns Road West
- Where Numbers make up the component of the street name they should be spelt in full.
  21st Avenue becomes Twenty First Avenue

  Exit numbers for freeways / motorways should be included in this field if relevant.

  e.g. EXIT 132 Northbound

5.3.8 PID

Description

PERSISTANT IDENTIFIER;

Used to identify an object in both the supplier and client databases.

Used as a unique key.

Rules/Validation

- The PID is unique.
- The PID is assigned at the creation of the object.
- The PID should be permanent and persist as the same value for the life of the object.
- The PID is retired and not reallocated on the deletion of the object.
- The PID is retired when the road segment is no longer in the dataset or after a comprehensive update is performed and is no longer logically related to the before object.

The rules for creating and retiring PIDs are those formulated by the Intergovernmental Commission for Surveying and Mapping's (ICSM) Harmonized Data Manual – Incremental Update Guidelines. Typically, a PID will only be retired through changes that are unavoidable. For example, when a linear feature is split into two features or when two features are merged. The PID will be maintained when the spatial representation of the feature changes but logically the feature is the same.

5.3.9 Road type

Description
A classification that describes the usage of an object within the SDRN.

Rules/Validation

1 Freeway/Motorway
2 Highway
3 Secondary Road
4 Local Connector Road
5 Street / Local Road
6 Private – non-public road
7 Track
8 Mall
9 Construction line
10 Unconstructed
11 Ferry route
12 Bikeway / Walkway
13 Busway

5.3.10 Descriptor

Description
A descriptive sub class of the road type.

Rules/Validation
Allowable values;

ROUNDABOUT	VEHICULAR FERRY
ON RAMP	PASSENGER FERRY
OFF RAMP	4WD
BRIDGE	FIRE TRAIL
TUNNEL	WALKING TRACK
WALKWAY	HORSE TRAIL
BIKEWAY	LEVEL CROSSING

A descriptor may have unique constraints to a road type.

ROADTYPE 7	4wd, Walking Track, Horse Trail, Fire Trail
ROADTYPE 12	Walkway, Bikeway (Where a segment has dual purpose within its unique constraint i.e. could be used as a walkway or bikeway then the description is blank). Road type 12 can only have ‘Walkway’, ‘Bikeway’ or BLANK.
ROADTYPE 11	Vehicular Ferry, Passenger Ferry (Where a segment has dual purpose within its unique constraint then the descriptor is blank)

Where a segment has the potential to have two descriptors and is outside of any unique constraint rules than the descriptor with the highest importance should be chosen. Importance is from (HIGH) 'Roundabout' to 'Level Crossing' (LOW).

5.3.11 Status

Description

The status field indicates a level of access

Rules/Validation

- Proposed
- Restricted

5.3.12 OneWayInd

Description

The *ONEWAYIND* field contains codes representing traffic direction in relation to the direction (digitizing) of the line segment.

Rules/Validation

- **0** – Road has Bi-directional Flow
- **1** – One Way i.e. in line with the direction of the line (see spatial object)
- **2** – One Way Traffic in opposite direction of the line (see spatial object)
- **3** – No traffic flow in either direction

5.3.13 Hnum_struct

Description

Depicts type of house numbering. The Street Addressing (SA) Table (appendix A, figure 2.4) describes the categorisation of the street addressing systems in common use in Queensland.

Rules/Validation

- **0** – Not Defined
- **1** – No House Numbering
- **2** - Urban Regular (odd and even on both sides of road)
- **3** – Urban Regular (odd numbers on opposite sides of even numbers)
- **4** – Urban Irregular
- **5** – Rural standard
- **6** – Rural (40 m Frontage)
- **7** – Rural (18m Frontage**)**
- **8** - Rural (based on a lot system)

5.3.14 Qual_pnt

Description
Quality Indicator

Rules/Validation

Based off the road centreline the QUAL_PNT is used to keep a record lineage for each segment.

The contents of the quality pointer field are specified in the Quality Pointer Table (appendix A, figure 2.3).

This table describes the quality pointer as categorised by the Quality Pointer Reference Tables (appendix A, figures 3.1-3.4).

Figure 3, appendix A, shows the Quality Pointer Reference Tables of:

- Lineage (appendix A, figure 3.1)
  This table defines the Lineage component (Fields 1 and 2) of the quality pointer.
- Positional Accuracy (appendix A, figure 3.2)
  This table defines the Positional Accuracy component (Fields 3 and 4) of the quality pointer.
- Attribute Accuracy (appendix A, figure 3.3)
  This table defines the Attribute Accuracy component (Fields 5 and 6) of the quality pointer.
- Logical Consistency (appendix A, figure 3.4)
  This table defines the Logical Consistency component (Fields 7 and 8-15) of the quality pointer.

Fields 16-20 of the quality pointer may contain a code representing the source of the data (optional).

Information coded in the Quality Pointer attribute is also contained in the Metadata 'Data Quality' statement attached to the file and is categorised as Lineage, Positional Accuracy and Attribute Accuracy.

A summary of this Quality Pointer attribute should therefore agree with the Metadata Data Quality statements and be a summary of such metadata statements.

The source of the data referenced in the Quality Pointer Reference Table will be identified in the metadata (e.g. MR captured PID numbers xxxxxxxxx to yyyyyyyyy).

The Quality Pointer Table is structured to accommodate the requirements of:

- *AS4270.1 - Logical Specifications for GIS Spatial Data Transfer Standard;*
- *AS/NZS ISO 19115:2005 – Geographic Information – Metadata*

5.3.15 Road_id

Description
Group Identifier

Rules/Validation
A unique identifier for each series of continuous road segments with a single road name. This value is to be maintained between releases.

5.3.16 State_rd_id

Description
Unique Identifier for Main Roads Controlled roads

Rules/Validation
An identifier used by the Department of Transport and Main Roads for uniquely identifying the roads that fall within its jurisdiction

5.3.17 Ste_route_num

Description
Route numbers used to identify state routes

Rules/Validation
State routes are determined by consultation between LGAs and State Government.

5.3.18 Nat_route_num

Description
Route numbers used to identify National routes

Rules/Validation
National routes are determined by consultation between State and Federal Governments.

5.3.19 Locality

Description
Suburb

Rules/Validation
Locality represents the name of the locality or suburb that contains the road segment. The locality naming conventions should align with DNRM DCDB locality

The location of the locality boundaries will be consistent with those defined in the most recent release of the DCDB.

5.3.20 Locality_num

Description
Integer representing a Suburb

Rules/Validation
Derived from the DNRM DCDB this number represents the locality number that contains the road segment.

The location of the locality boundaries will be consistent with those defined in the most recent release of the DCDB.

5.3.21 Ste_lga_num

Description
Integer Representing a Local Government Authority – Queensland Standard.

This file correlates the LG number (e.g. 30) with its actual name (e.g. Gold Coast).

Rules/Validation
Represents the QLD State Government code used to uniquely identify Queensland Local Government Authorities.

Current LGA numbers are in the range 1-73 inclusive.

5.3.22 Asgc_lga_num

Description
Integer Representing a Local Government Authority – National Standard

Rules/Validation
Australia Standard Geographical - The codes used shall be those specified in the Australian Standard Geographical Classification (ASGC) 1216.0.

Classification code used to uniquely identify Local Government Authorities that contain road segments.

5.3.23 State

Description
Value representing the State

Rules/Validation

QLD	QUEENSLAND
NSW	NEW SOUTH WALES
SA	SOUTH AUSTRALIA
NT	NORTHERN TERRITORY

5.4 Special Connectivity Requirements

5.4.1 Roundabouts

The road segments that make up a roundabout are

- roads entering or leaving a roundabout,
- roads representing the actual roundabout (named roundabout)
- roads (roadtype 9) representing the spoke of the roundabout.

A road entering or leaving a roundabout must have a corresponding spoke, with the same road name that starts or ends at the centre of the roundabout.

The direction of the road segments that make up the actual roundabout should be in the direction of traffic flow and conform to one way rules (oneway_id).

The direction of the spokes should correspond with the road segments entering or leaving the roundabout and should not be trafficable.

5.5 Change Control Requirements

All changes must be managed through a spatial object life-cycle from generation through to retirement. This should be controlled through the PID and through the 'Change Control File Structure' (appendix A, figure 1.1).

The SDRN data will be updated via a 'Change Control File' – the primary focus of which will be to track changes applicable to DRN re-issue. Where a new chain is generated, the Retirement date field in the Change Control File will be blank. Correspondingly, where a chain is retired, the Retirement date field in the Change Control File will be populated.

This file correlates the change type number (e.g. 2) with the reason for change (e.g. Feature Split) as outlined in the Change Control Type table (appendix A, figure 2.2).

5.5.1 Change Control File Structure

Figure 1.1, appendix A, shows the file structure for controlling change to the DRN data - The Control File. The 'Change Control File' (appendix A, figure 1.1) is mandatory when there are changes to the DRN data.

All changes are controlled through the use of PIDs. Note that only changes during the nominated update period are carried – all previous changes must be consecutively applied to a dataset. If a change is not applied in sequence, the PID being changed may not exist and an error should therefore be reported by the application loading the data. The change control file will list all changes since the last reissue.

A requirement on the owner or custodian of the DRN will be to maintain the history of all changes.

Refer to the Change Control Type (Change_Type) Table (appendix A, figure 2.2). This table describes reasons for a change in a PID.

6 Data Exchange

This DRN specification requires that data be transferred in industry standard interchange formats.

The smallest unit of data supply is the locality.

7 Coordinate Systems

The DRN will be supplied relative to the Geocentric Datum of Australia 1994 (GDA94) as defined by the Commonwealth of Australia Gazette GN35, dated 6-09-1995

(ref. htttp://www.icsm.gov.au/icsm/gda/gazette.htm.).

Transformation of coordinates between GDA94 and the previous Australian Geodetic Datum (AGD84 and AGD66) shall be undertaken using the high accuracy Distortion Grid Transformations as described in Chapter 7, GDA94 Technical Manual

(ref. http://www.icsm.gov.au/icsm/gda/gdav2.2.pdf).

All coordinate system information will be defined in the metadata under the section headed 'Reference System'. The section 'Additional Metadata' must also contain the location of the network with regard to the physical representation of the network (e.g. centre of carriageway or centre of outside lane).

8 Conclusion

This Standard will form the basis for the storage, update, management and distribution of Digital Road Network data within Queensland. The Standard will be modified as the needs of users change and technology presents new opportunities.

9 Appendix A

9.1 Figures and Tables

Change Control File Structure

Figure 1.1 – Change Control File Structure

Attribute	*Format*	*Example*
PID	*Char (12)*	*001203542*
Creation Date	*Date*	*20061231*
Retirement Date	*Date*	

Attribute Tables

Figure 2.1 – Persistent Identifier (PID) (Change_Type)

*Field**	*Description*	*Example*
1-9	*Numeric - 0 to 999,999,999*	*0003542*

Figure 2.2 – Change Control Type

Attribute	*Description*
1	*Spatial Correction*
2	*Feature Split*
3	*Name alteration*
4	*Address Range alteration*
5	*etc.*

Figure 2.3 – Quality Pointer (Qlty_Pnt)

*Field**	*Description*	*Example*
1-2	*Lineage*	*GC*
3-4	*Positional Accuracy*	*R3*
5-6	*Attribute Accuracy*	*F1*
7-15	*Logical Consistency*	*220030227*
16-20	*Data acquisition organisation*	*Q0086*

Figure 2.4 – Street Addressing (SA)

Attribute	*Description*
1	*No Street Addressing*
2	*Urban Regular (odd/even on both sides)*
3	*Urban Regular (odd/even on opposite sides)*
4	*Urban Irregular*
5	*Rural according to standard*
6	*Rural (>40m frontage)*
7	*Rural (18-40m frontage)*
8	*Rural (based on Lot system)*

Notes:
* – 'Field' in this table denotes Character position

Quality Pointer Reference Tables

Figure 3.1 – Lineage Table

Field 1*	*GPS, Surveyed, Digitised, Cadastre derived (i.e. DCDB), Other*		
Field 2	*If GPS*	*Single, Differential, Single + Correction Signal*	
	If Surveyed	*Engineering, Cadastral, Topographic, Other*	
	If Cadastre	*DCDB derived, Other*	
	If Digitised	*0*	*Digitised from 1:100,000 Topo maps*
		1	*Digitised from 1:50,000 Topographic maps*
		2	*Digitised from 1:25,000 Topo/Ortho maps*
		3	*Digitised from 1:10,000 Topo/Ortho maps*
		4	*Digitised from 1:5,000 Topo/Ortho maps*
		5	*Digitised from 1:2,500 Topo/Ortho maps*
		6	*Digitised from Cadastral sheets*
		7	*Compiled from other map sources*
		8	
		9	*Other*

Figure 3.2 – Positional Accuracy

Field 3* *Urban, Peri-Urban, Rural, REmote*

Field 4 *Spatial Accuracy Identifier:-*

Identifier	*Minimum Spatial Accuracy*	*Typical Category*
2	*± 2m*	*Urban*
3	*± 5m*	*Peri-Urban*
4	*± 25m*	*Rural*
5	*± 100m*	*Remote*

Figure 3.3 - Attribute Accuracy

Field 5*	*Field checked, Map derived, Other*		
Field 6	*Date Identifier*	*0*	*Current to within a year of DRN file date*
		1	*within 1-5 years of DRN file date*
		2	*within 5-10 years of DRN file date*
		3	*within 10-20 years of DRN file date*
		4	*within >20 years of DRN file date*

Figure 3.4 - Logical Consistency

Field 7* *Class 1, Class 2, Other*

Field 8-15 Date

10 Appendix B

10.1 List of references

ANZLIC ISO Metadata Profile, Version #1: Core Metadata Elements, ANZLIC, February 2001)

ANZLIC AS/NZS 4270.1 GIS SDTS Specifications, January 1995

Australian Standard Geographical Classification, Australian Bureau of Statistics, July 2002

Geocentric Datum of Australia Technical Manual version 2.2, Intergovernmental Committee on Surveying and Mapping, (ref. http://www.icsm.gov.au/icsm/gda/gdav2.2.pdf)

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QSIC Standard #1 Foundation Spatial Data, Revised October 2012

QSIC Standard #2 Parcel Identification, Reviewed October 2012

Harmonized Data Model – Incremental Update Guidelines, Inter-governmental Committee for Surveying and Mapping, June 2002

ISO 14825:2004(E) Intelligent transport systems – Geographic Data Files (GDF) – Overall data specification

AN/NZS ISO 19115:2005 Geographic information – Metadata

AN/NZS 4819:2003 Geographic information – Rural and urban addressing

10.2 Abbreviations

AGD	Australian Geodetic Datum
AMG	Australian Map Grid
ANZLIC	Australia New Zealand Land Information Council
AS/NZS	Standards Australia/Standards New Zealand
DBMS	Database Management System
DCDB	Digital Cadastral Data Base
DNRM	Department of Natural Resources and Mines
DRN	Digital Road Network
ISO	International Organization for Standardization
GDA	Geocentric Datum of Australia
GDF	Geographic Data File
GIS	Geographic information system
GPS	Global Positioning System
ICSM	Intergovernmental Committee on Surveying and Mapping
LG	Local Government
DTMR	Department of Transport and Main Roads
QSIC	Queensland Spatial Information Council
QSIO	Queensland Spatial Information Office
RDBMS	Relational Database Management System
SA	Street Address
SDRN	State Digital Road Network (structured data product)
SDTS	Spatial Data Transfer Standard (AS/NZS 4270)
SI	Short Integer (Ranging from 0 to $\pm$ 32767)

10.3 Definitions

Alias Name	The secondary name used for a generic section of the transportation network
Attribute Accuracy	Test of accuracy of attributes
Change_Type	A descriptor given to the reason for a change of a PID (e.g. Feature Split)
Completeness	Information about selection criteria, definitions used and other relevant mapping rules
Digital Road Network	This is a digital representation of the road network. The network includes but is not limited to gazetted and non-gazetted trafficable roads
Ferry Connection	A vehicle transport facility between two fixed locations on the road network which uses a prescribed mode of transport
FromLeft	The 'From' street address on the Left side of the road (Chain) direction
FromRight	The 'From' street address on the Right side of the road (Chain) direction
LG_Number	The number given to each LG in Queensland – e.g. Gold Coast is LG 30
Lineage	Description of the source material, date, transformations used, etc
Locality	See Suburb
Logical Consistency	Report on the fidelity of relationships encoded in the data structure of the digital spatial data
Non-trafficable	An attribute of a vehicle track indicating that it would be not usable by a conventional 2-wheel drive vehicle
OneWayInd	The Classification of the traffic direction – 'Bi-directional', etc. – (refer Chapter 4)
Ortho	*abbrev*. 'Orthophotography' – aerial photography that has been mathematically rectified.
PID	Persistent Identifier
Peri-Urban	Surrounds urban areas, particularly those likely to be impacted by population growth and development pressures, areas of high environmental management significance such as coastal areas, areas of mineral and extractive industry materials close to population centres, and possible areas of intensive agricultural and horticultural production i.e., those areas where land use conflict or competition is significant
Pseudo node	A node that connects a line segment to itself or to only one other line segment.
Qlty_Pnt	An attribute code for Lineage, Positional Accuracy, Attribute Accuracy, Logical Consistency & Completeness

Remote	Sparse grazing areas and wilderness or low population density
Road_Number	The number given to roads e.g. road 10B (by Main Roads) or 111 (by LG's)
RoadID	The identifier for each series of continuous road segments with a single road identifier
Rural	Developed agricultural and grazing areas or medium population density
Spaghetti	Data which is not topologically structured and in raw line work form resembling spaghetti
State Road ID	The gazetted road number for a section of State Controlled Road
Spatial Accuracy	Maximum allowable standard deviation from the absolute position on the earth's surface related to a specified datum
Street	The name used for a generic section of the transportation network
Street Address Range	The range of house numbers along a street. Implemented using the 'FromLeft', 'ToLeft', 'FromRight' and 'ToRight' attributes of a line segment
Suburb	A named geographic area as used in a typical street address. (aka Locality)
ToLeft	The 'To' street address on the Left side of the road (Chain) direction
Topology	The mathematics that deals with characteristics of geometric structures that keep preserved after variation
ToRight	The 'To' street address on the Right side of the road (Chain) direction
Trafficable	An attribute of a physical road indicating that both 2-wheel drive and 4-wheel drive vehicles can be driven on it. Trafficable roads would include formed roads and vehicle tracks – both gazetted and non-gazetted (however non-gazetted vehicle tracks need to be validated)
Urban	Cities, towns (except for Central Business Districts) and settlements built up areas or high population density
Validated data	Data whose positional accuracy has been verified and which have been checked for attribute accuracy, specifically but not exclusively, trafficability. A validated vehicle track must have been 'truthed' by either ground or aerial methods and be maintained as validated on a regular validation cycle. A vehicle track that has not been validated would be regarded as non-trafficable and therefore is not included in the SDRN