



TECHNICAL SPECIFICATION

v2.2 – October 2017

OS MasterMap

Highways Network

Routing and Asset Management Information



Ordnance Survey

OS MasterMap® Highways Network

Version 2.2

Routing and Asset Management Information

Technical specification

Contents

Section	Page no
Contents	2
Introduction	5
Purpose of this specification and disclaimer	5
Copyright in this specification	5
Contact details	5
Data copyright and other intellectual property rights	6
Trademarks	6
Using this specification	6
Chapter 1	7
Introduction	7
Identifiers	7
TOIDs	8
USRNs	8
Unique IDs	8
Available Formats	9
Adherence to Standards	9
Extending INSPIRE Specification	9
Notation	9
UML Diagram and Table Conventions	9
Lexical Conventions	10
Constraints	10
Stereotypes	11
Relationships and Associations	11
Chapter 2	13
Specification Changes	13
Features	13
Code Lists, Data Types and Enumerations	13
Schema changes	13
Chapter 3	14
OS MasterMap Highways Network – Roads and Routing and Asset Management Information	14
Network Referencing	14
Network Reference	15
Node Reference	16
Link Reference	17
Multiple Link Reference	17
Point Reference	17
Common Attribution	18
Temporal Properties	18
Named Date	18
Date Range	18
Day Period	18
Chapter 4	20
Rights and Restrictions	20
Overview	20
Simplification and Priority of Rights and Restrictions	20

	AccessRestriction	20
	Overview	20
	Attribution	21
	HighwayDedication	23
	Overview	23
	Attribution	24
	TurnRestriction	26
	Overview	26
	Attribution	27
	RestrictionForVehicles	28
	Overview	28
	Attributes	29
Chapter 5	Advisory Information	31
	Overview	31
	Hazard	31
	Overview	31
	Attribution	31
	Structure	32
	Overview	32
	Attribution	33
Chapter 6	Asset Management	35
	Overview	35
	Maintenance	35
	Overview	35
	Attribution	36
	Reinstatement	37
	Overview	37
	Attribution	37
	SpecialDesignation	39
	Overview	39
	Attribution	39
Chapter 7	Data Types, Code Lists and Enumerations	42
	DataTypes	42
	TemporalPropertyType	42
	DateRangeType	42
	DayPropertyType	43
	TimePropertyType	43
	TimeRangeType	43
	TrafficRegulationOrderType	44
	VehicleQualifier	44
	ResponsibleAuthority	45
	Identifier	46
	CodeLists	46
	ChangeValue	46
	UseTypeValue	46
	VehicleTypeValue	47
	LoadTypeValue	48
	NamedDateValue	48
	NamedDayValue	49
	NamedPeriodValue	49
	NamedTimeValue	50
	AccessRestrictionValue	50
	DedicationValue	51
	TurnRestrictionValue	51
	RestrictionTypeValue	52

	HazardTypeValue.....	52
	StructureTypeValue	52
	ReinstatementTypeValue.....	53
	SpecialDesignationTypeValue	53
	LinkDirectionValue	55
	Enumerations	56
	MaintenanceValue	56
Chapter 8	How the product fits together?	57
Chapter 9	Change Only Update (COU)	59
	Full Supply	59
	Change Only Update supply	59
Chapter 10	Supply format.....	60
	GML.....	60
	Schema overview and location	60
Annexe A	Product and service performance report form	62
Annexe B	GML Examples	63
	Full Supply.....	63
	Change Only Update	63

V2.2 – 10/2017

Introduction

Purpose of this specification and disclaimer

This is the technical specification (hereafter referred to as the specification) applicable to OS MasterMap Highways Network (hereafter referred to as the product) which is referred to in the Framework Contract (Direct Customers), the Framework Contract (Partners) or your other customer contract for the product.

The terms and conditions on which the product is made available to you and your organisation are contained in that customer contract. If you or your organisation has not signed a valid current customer contract, then you are not entitled to use the product.

We may change the information in this specification at any time, giving you the notice period specified in the customer contract made between you and Ordnance Survey.

We do not accept responsibility for the content of any third party websites referenced or accessed in or through this specification, any other contractual documentation, and/or the Ordnance Survey website.

This product is only populated with information that has been compiled to date.

Copyright in this specification

This specification, (including for the avoidance of doubt any mapping images reproduced herein), is
© Crown copyright 2016. All rights reserved.

Any part of this specification may be copied for use internally in your organisation or business so that you can use OS MasterMap® Highways Network for the purpose for which it is licensed to your organisation or business (but not otherwise).

No part of this specification may be reproduced or transmitted in any form or by any means (including electronically) for commercial exploitation without the prior written consent of Ordnance Survey.

No part of this specification may be copied or incorporated in products, services or publications that you generate for onward sale, or as free promotional or support materials, without the prior written consent of Ordnance Survey.

Contact details

Our Customer Service Centre will be pleased to deal with your enquiries:

Customer Service Centre
Ordnance Survey
Adanac Drive
SOUTHAMPTON
United Kingdom
SO16 0AS

General enquiries (calls charged at local rate): +44 (0)3456 05 05 05

Dedicated Welsh Language HelpLine: 03456 05 05 04

Textphone (deaf and hard of hearing users only please): +44 (0)23 8005 6146

customerservices@os.uk

www.os.uk

This document has been screened in accordance with Ordnance Survey's Equality scheme. If you have difficulty reading this information in its current format and would like to find out how to access it in a different format (Braille, large print, computer disk or in another language), please contact us on: +44 (0)8456 05 05 05.

Data copyright and other intellectual property rights

The Crown (or, where applicable, Ordnance Survey's suppliers) owns the intellectual property rights in Ordnance Survey digital map data.

Full details of the terms and conditions under which Ordnance Survey digital map data may be processed and/or manipulated or copied by a customer – whether or not for use on PCs or workstations or for making hard copies – are available from the Customer Service Centre, please see [contact details](#). You should check the terms and conditions with us before using the data. It is also the responsibility of the holder of the digital map data to ensure that any plotted or printed output contains the required copyright and database acknowledgements in a conspicuous position.

Elements of the data in the product is provided by GeoPlace, a limited liability partnership between the Local Government Group and Ordnance Survey.

© Local Government Information House Limited copyright and database rights 2016 [licence number]

© Hawlfraint a hawliau cronfa ddata cyfyngedig Tŷ Gwybodaeth ar Lywodraeth Leol 2016 [rhif y drwydded]

Trademarks

Ordnance Survey, the OS Symbol, OS MasterMap, AddressBase, TOID, GeoPlace and OSGB36 are registered trademarks and Integrated Transport Network is a trademark of Ordnance Survey, the national mapping agency of Great Britain.

Adobe and Reader are registered trademarks of Adobe Systems Incorporated.

OGC is a registered trademark of Open Geospatial Consortium, Inc.

Using this specification

The documentation is supplied in portable document format (PDF) only. Free Adobe® Reader® software, which displays the specification, incorporates search and zoom facilities and allows you to navigate within. Hyperlinks are used to navigate between associated parts of the specification and to relevant Internet resources by clicking on the blue hyperlinks and the table of contents.

Chapter 1 Introduction

The OS MasterMap® Highways Network is the authoritative highway network for Great Britain. It brings together Ordnance Survey's large scale road and path content, the National Street Gazetteer (NSG) and the Trunk Road Street Gazetteer (TRSG). The current release of the product will only contain NSG and TRSG data for England and Wales.

OS MasterMap Highways Network is made up of four product schemas; Linear Highway Network, Highways Dedication, Routing and Asset Management and Highways Water Transport Network (Figure 1). These four schemas create three products which are a part of the OS MasterMap Highways Network family:

- OS MasterMap Highways Network - Roads
- OS MasterMap Highways Network – Roads and Routing and Asset Management
- OS MasterMap Highways Network - Paths.

This technical specification will cover the OS MasterMap Highways Network – Roads and Routing and Asset Management (from here referred to as RAM) product specification. Providing a focus on the Routing and Asset Management features. To use this product, you will have received the features which make up the Roads product and for further details on this or the Paths product please see their Technical Specifications.

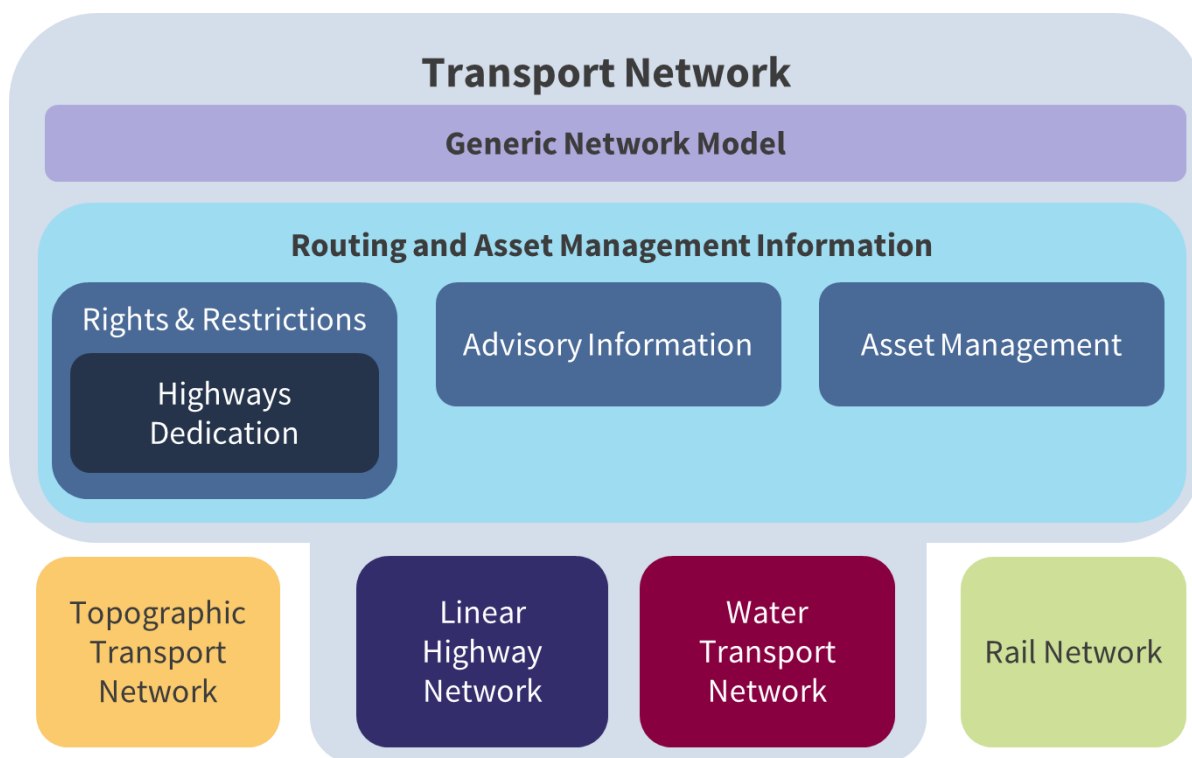


Figure 1: The conceptual INSPIRE Transport Network Model. OS MasterMap Highways will include the Linear Network, Routing and Asset Management Information and the Water Transport Network within the Generic Network Model.

Identifiers

All features that comprise the OS MasterMap Highways Network – will be assigned a persistent identifier, in most instances this is an Ordnance Survey TOID. For features which have originated from the National Street Gazetteer the persistent identifier will be either a Unique Street Reference Number (USRN) for Street features or a unique ID for Maintenance, Reinstatement, Special Designation and Highways Dedication.

Identifiers shall be encoded in three properties in the data:

1. gml:id – this is feature identifier comprised of the shorthand prefix namespace and local identifier which is used to uniquely identify and reference the feature within the dataset. Example: osgb4000000009461245

2. **gml:identifier** – this is a global feature identifier and can be used to identify and reference the feature within other datasets. Example: <http://data.os.uk/id/4000000009461245>
3. **inspireID** – this is a complex property made up of a **localId**, **namespace** and **versionId** which uniquely identifies the feature and version within an INSPIRE dataset.

```
<highway:Road gml:id="osgb4000000009461245">
<gml:identifier codeSpace="http://inspire.jrc.ec.europa.eu/ids">http://data.os.uk/id/4000000009461245</gml:identifier>
<net:beginLifespanVersion>2010-04-01T00:00:00.000</net:beginLifespanVersion>
<net:inspireId>
  <base:Identifier>
    <base:localId>4000000009461245</base:localId>
    <base:namespace>http://data.os.uk/</base:namespace>
    <base:versionId>16</base:versionId>
  </base:Identifier>
</net:inspireId>
```

Where features have come from OS MasterMap ITN Layer the identifier will be persistent and correspond to the same feature in ITN.

The **gml:id** is used throughout the OS MasterMap Highways Network products as the identifier used to reference to other features.

TODs

TODs are strings of up to twenty characters which are comprised as two parts:

- **Namespace**: this is either a HTTP URI (<http://data.os.uk/>) or shorthand prefix ('osgb')
- **Local identifier**: 16-digit numeric string (0-9)

Identifiers that are TODs manifest themselves as the following in the product:

- **gml:id** – 'osgb4000000009461245'
- **localId** – '4000000009461245'
- **identifier** – '<http://data.os.uk/4000000009461245>'

USRNs

USRNs are strings of up to twelve characters which are comprised of two parts:

- **Namespace**: this is either a HTTP URI (<http://data.os.uk/>) or shorthand prefix ('usrn')
- **Local identifier**: up to an 8-digit numeric string (0-9)

Identifiers that are USRNs manifest themselves as the following in the product:

- **gml:id** – 'usrn82101225'
- **localId** – '82101225'
- **identifier** – '<http://data.os.uk/82101225>'

Although the **gml:id** is the identifier used for referencing to features in OS MasterMap Highways Network products the **localId** is the identifier used by the National Street Gazetteer, National Land and Property Gazetteer and the OS AddressBase® family of products.

Unique IDs

Unique IDs for Maintenance, Reinstatement, Special Designation are strings of up to seventeen characters which are comprised of two parts:

- **Namespace**: this is either a HTTP URI (<http://data.os.uk/>) or shorthand prefix ('id_')
- **Local identifier**: 14 alpha numeric string

The ID for HighwayDedication is a string of up to 25 characters comprised of the characters "esu" followed by three parts separated by "_":

- LHA authority code
- ESU it references
- dedication code in the NSG

e.g. [esu4720_4280330430163_8](#), [esu4720_4280340431456_11](#)

Identifiers that are Unique IDs manifest themselves as the following in the product (examples given for both unique ID formats):

- **gml:id** – ‘id_3700MA01862142’ or ‘esu4720_4280330430163_8’
- **localId** – ‘3700MA01862142’ or ‘esu4720_4280330430163_8’
- **identifier** - ‘<http://data.os.uk/3700MA01862142>’ or ‘[https://data.os.uk/id/ esu4720_4280330430163_8](https://data.os.uk/id/esu4720_4280330430163_8)’

Available Formats

OS MasterMap Highways Network will be supplied in GML 3.2.1.

Adherence to Standards

OS MasterMap Highways Network extends the [INSPIRE Transport Networks \(Road and Water\) Technical Specification \(version 3.2\)](#).

OS MasterMap Generic Network model extends the [INSPIRE Base Models - Generic Network Model \(version 3.0rc3\)](#)

Extending INSPIRE Specification

OS MasterMap Highways Network extends the INSPIRE specification to include the additional properties of required by BS 7666-1:2006 defined within the National Street Gazetteer (NSG) Data Transfer Format (DTF) and Scottish DTF (SDTF) to ensure that conformance to both INSPIRE and BS7666-1:2006 can be achieved.

Notation

UML Diagram and Table Conventions

The data structure is described by means of UML class diagrams and accompanying data dictionary tables. The specification conforms to the rules for application schema specified in ISO 19103 Conceptual schema language and ISO 19109 Rules for application schema, as adopted by INSPIRE.

Colour conventions have been used in the diagrams and tables to allow users to easily distinguish the INSPIRE feature classes (coloured grey) from the Ordnance Survey feature classes which extends the INSPIRE specifications (coloured orange). All code lists classes are coloured blue, enumeration classes are green and data types/union classes are purple (Figure 2).

The data dictionary tables use orange for a feature type; blue for a code list; green for enumerations and purple for data types.

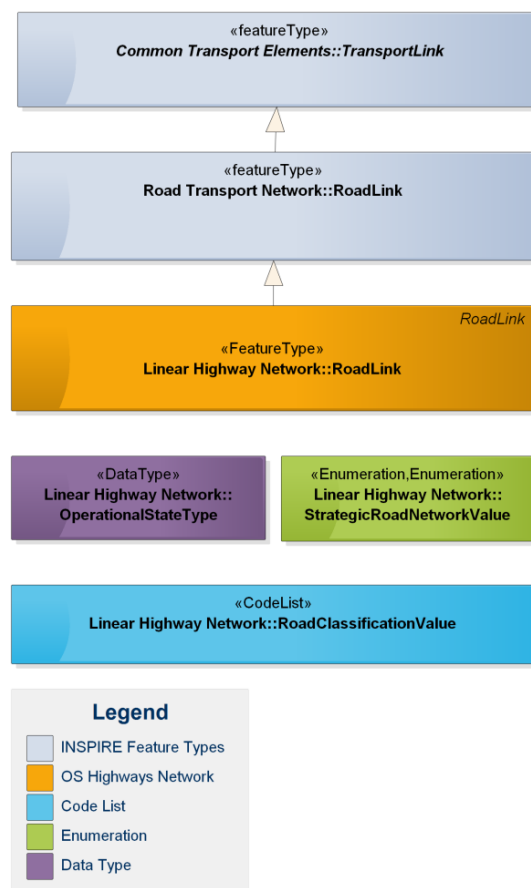


Figure 2: Colour conventions used on classes in the UML diagrams within this Technical Specification

Lexical Conventions

- Class names are assigned conceptually meaningful names (singular noun) in UpperCamelCase
- Class names end in “Value” where the class is assigned the stereotype <<CodeList>> or <<Enumeration>>
- Class names end in “Type” where the class is assigned the stereotype <<DataType>>
- Property names (attributes and associations) are in lowerCamelCase

Constraints

Constraints are defined on the Class using human readable language only. Constraints are displayed on class diagrams (Figure 3). These constraints are used to define co-constraints or restrict INSPIRE properties only.

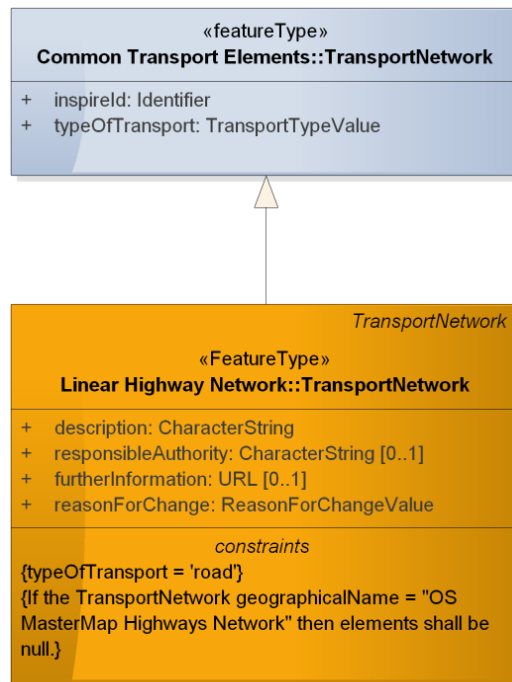


Figure 3: UML Constraints shown in the bottom of a class in human readable language

Stereotypes

The following stereotypes are used on UML elements:

Stereotype	UML Element	Description
<<ApplicationSchema>>	Package	Parent package containing sub-packages and elements that comprise part of the modular specification
<<FeatureType>>	Class	A spatial object type. [ISO 19136].
<<Type>>	Class	A structured data type with identity
<<DataType>>	Class	A structured data type without identity. [ISO/TS 19103]
<<Union>>	Class	A structured data type without identity where exactly one of the properties of the type is present in any instance.
<<Enumeration>>	Class	A fixed controlled set of values for a free text data type.
<<CodeList>>	Class	A controlled set of values for a free text data type that may be extended.
<<Voidable>>	Property	A property that is required but is either not currently captured (unknown) or is partially populated (unpopulated).
<<LifecycleInfo>>	Property	Property considered part of the life cycle information.

Relationships and Associations

There are 3 key types of relationship defined between classes (Figure 4):

- **Generalisation/Specialisation:** this is used to denote either:

- An extension relationship: where the target class represents the same real world entity and is extending it to include additional properties not defined on the parent class.
Note this class will have the same name as the class it is extending.
- A sub typing relationship. The target class defined a specialised sub-type of parent feature. For example, *TransportNode* is a specialised sub-type of a generic *Node* class.
- **Directed Association:** used to denote relationships between features. These relationships are encoded as references to the related feature via the identifier assigned in the gml:id. The directed end shall be assigned a name which describes the relationship between the two features and a multiplicity.
- **Aggregation:** these denote part-of relationships. Aggregations are used to describe loose part-of relationships. If the parent feature ceases to exist, then the part feature can continue to exist. For example, a Road Name may cease to exist but the Road will still exist.

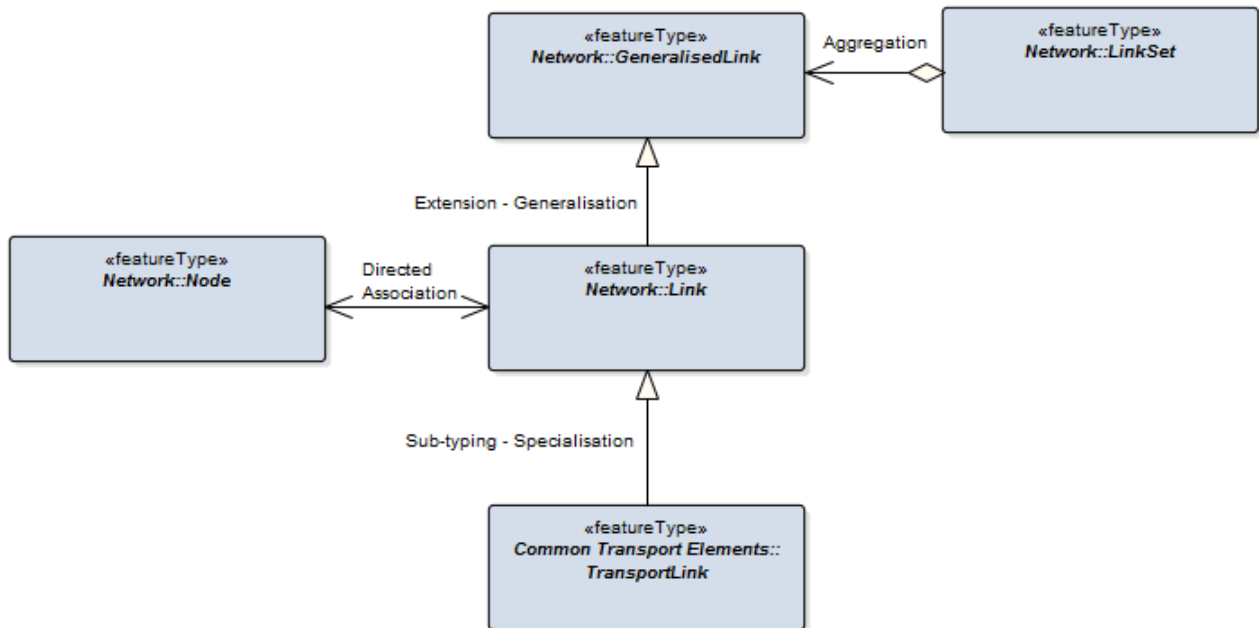


Figure 4: Relationships between Feature Types which will be used on the UML diagrams throughout this Technical Specification

Chapter 2 Specification Changes

There have been small enhancements to the OS MasterMap Highways Network Version 2.2 to enable the release of new features and functionality. This chapter will outline the main changes to the Routing and Asset Management product. For changes to the [Road](#) or [Path](#) product, please see the respective Technical Specifications.

Features

- Added new feature type “[HighwayDedication](#)” to denote dedications of highways as defined in the [Highway Act 1980](#) and [Countryside and Rights of Way Act 2000](#).
- Added new code list, “[DedicationValue](#)” for HighwayDedication features.

Code Lists, Data Types and Enumerations

- The “[NetworkReferenceLocation](#)” has been further extended to accept additional geometry types, lines and polygons, in addition to start and end points. This affects “Maintenance”, “Reinstatement” and “Special Designation” and the information provided on their location for partial records.
- The “[SpecialDesignationTypeValue](#)” code list has been updated with multiple new values added.
- The “[MaintenanceValue](#)” enumeration has been updated with two values added.

Schema changes

- v2.1 Routing and Asset Management schema is being released which will enable the code list and enumerations described above to be brought through
- v1.0 Highways Dedication schema has been introduced which defines the Highways Dedication feature.

Chapter 3 OS MasterMap Highways Network – Roads and Routing and Asset Management Information

The Roads and Routing and Asset Management product contains the base road network and routing and asset management features which reference back to the network. The base road network features are detailed in the [Roads Technical Specification](#). This specification focuses on the Routing and Asset Management Information.

Routing and Asset Management Information has been categorised into the following themes (Figure 5):

- **Rights and Restrictions:** defines properties that restrict, regulate or prohibit the use of the network by traffic such as turn restrictions or access and use restrictions which may affect the allowable route for users.
- **Advisory Information:** these provide additional information that may affect a driver's preferred choice of route or highlight potential hazards such as the presence of a toll, ford or level crossing.
- **Asset Management:** provides additional information to support the management of Highways Assets by Highways Authorities such as detailed physical characteristics relating to the asset (reinstatement), road maintenance responsibility and whether it has any special designations.

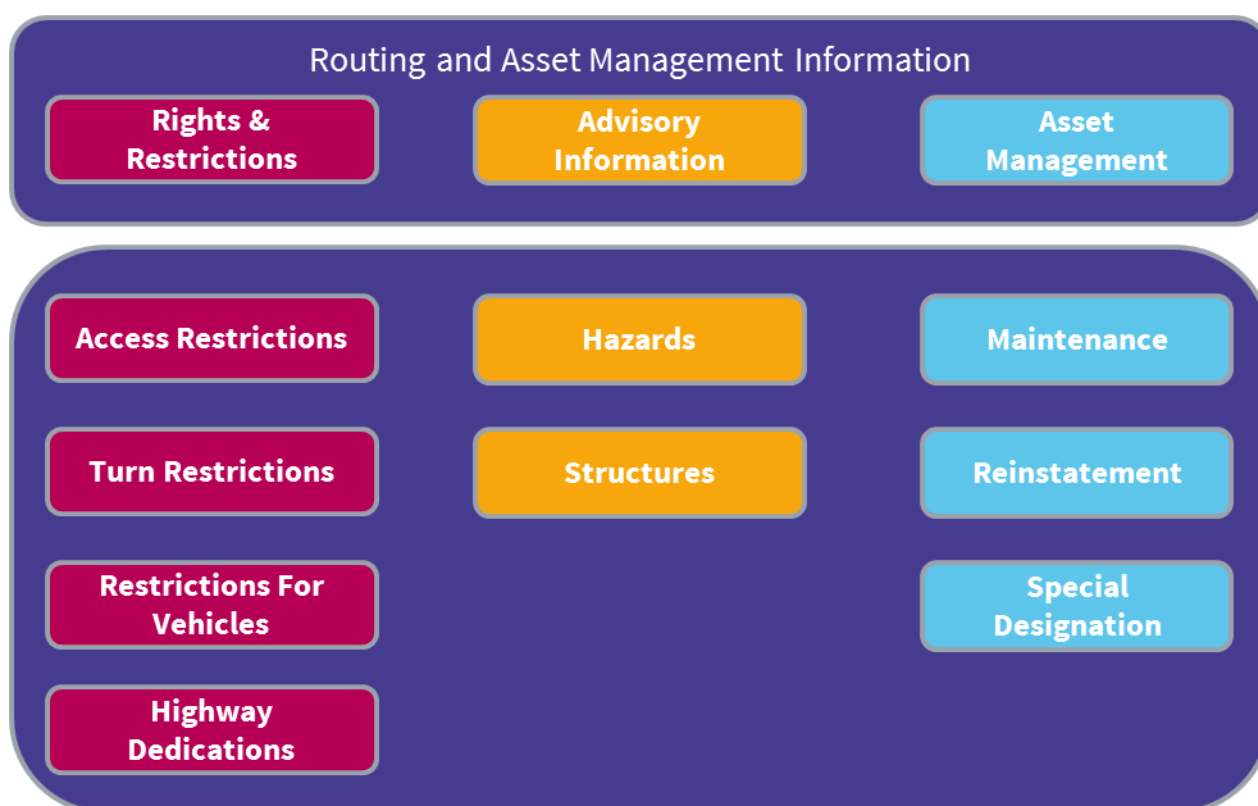


Figure 5: Overview of Routing and Asset Management Information

Network Referencing

Routing and Asset Management Information is related back to features in the OS MasterMap Highways Network – Roads product using Network Referencing, through the networkRef attribute. All Routing and Asset Management Information features extend the INSPIRE NetworkProperty class (Figure 6). This allows several types of Network Referencing to relate the routing and asset management information to the relevant feature:

1. **Network Reference:** this is used to relate the information to a *Street*.
2. **Node Reference:** this is used to relate the information to a *RoadNode*.
3. **Link Reference:** this is used to relate the information to a complete *RoadLink*.

4. **Multiple Link Reference:** this is used to relate the information to more than one complete *RoadLink*.
5. **Point Reference:** this is used when the information is related to a specific point along a *RoadLink*.
6. **Linear Reference:** this is used to relate the information to a specific section of a *RoadLink*. This type of referencing is not used in the Routing and Asset Management specification.

The different types of Network Referencing all extend the INSPIRE Network Reference data type.

In the INSPIRE specification, the networkRef is a voidable field. For all features in the Routing and Asset Management specification the networkRef will never be voided.

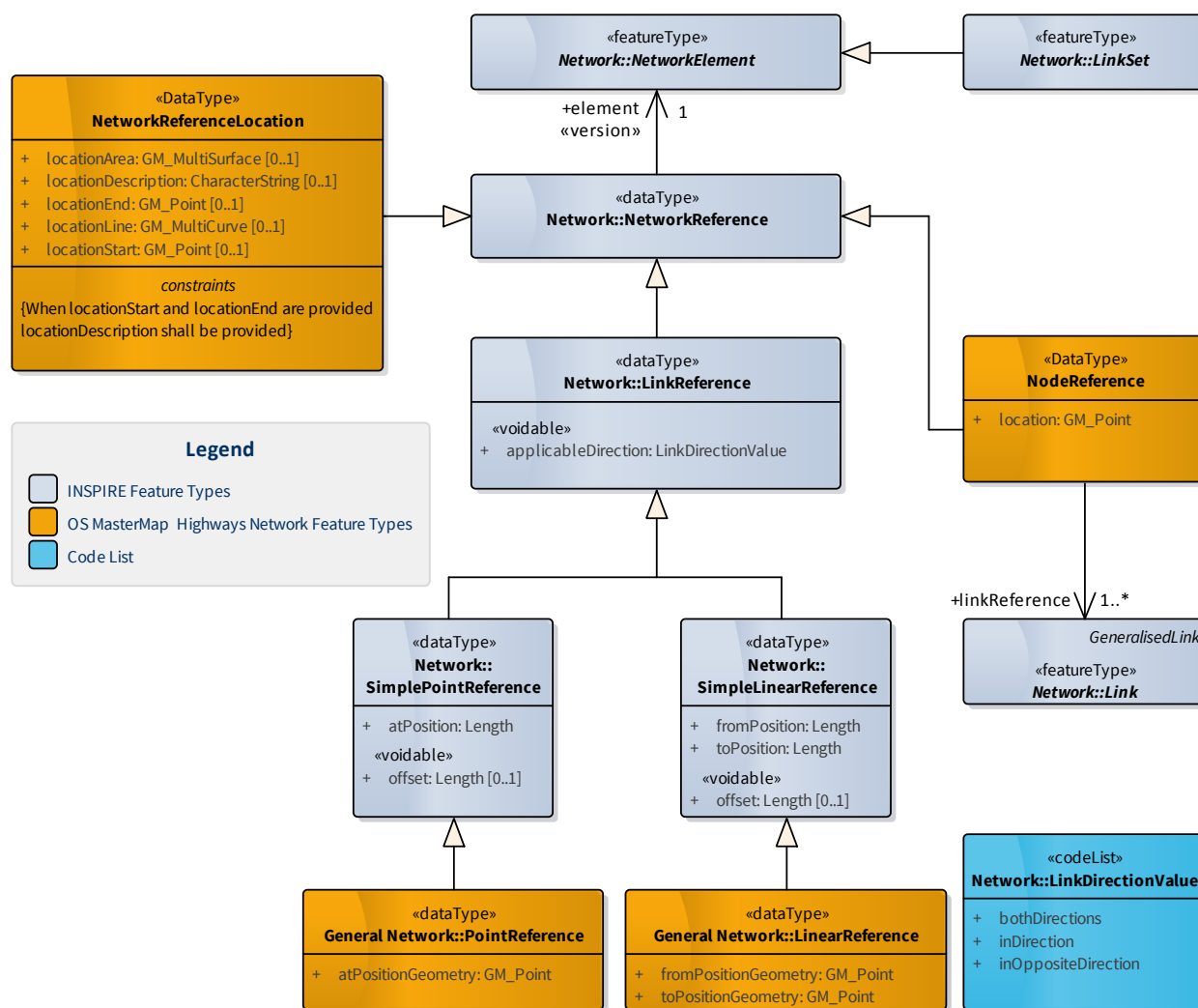


Figure 6: INSPIRE Network Referencing Model

Network Reference

The Network Reference references the feature back to the network element. The Network Reference has been extended and the feature types which solely use Network Referencing are Maintenance, Reinstatement, Special Designation and Highways Dedication. These features will all reference back to the id of the Street feature, the USRN. Geometry will not be provided. However, where these features do not reference an entire Street feature, and are a partial reference, they will provide a Network Reference Location. This is made up of a locationDescription which provides a textual description of where the feature relates to which will be populated directly from the NSG.

The feature types which use the Network Reference Location are Maintenance, Reinstatement, Special Designation and Highways Dedication.

«DataType» NetworkReferenceLocation		
Attribute: element		
Definition: The identifier of the feature being referenced; this will always be the gml:id .		
Multiplicity: [1]	Size: 20	
Attribute: locationDescription		
Definition: Textual description of the location extent of the referenced property when the feature partially references the network.		
Type: CharacterString	Multiplicity: [1]	Size: 250
Attribute: locationStart		
Definition: The geometry of where the feature starts.		
Type: GM_Point	Multiplicity: [0..1]	
Attribute: locationEnd		
Definition: The geometry of where the feature ends.		
Type: GM_Point	Multiplicity: [0..1]	
Attribute: locationLine		
Definition: A linear representation of the feature.		
Type: GM_MultiCurve	Multiplicity: [0..1]	
Attribute: locationArea		
Definition: An area representation of the feature.		
Type: GM_MultiSurface	Multiplicity: [0..1]	

Node Reference

When a feature in the Routing and Asset Management specification occurs at a RoadNode a Node Reference will be provided. As a part of the networkRef an element attribute will be provided which will provide the id of the RoadNode. A location will be provided for Node References which will be the coordinates of the RoadNode the feature references. Finally, a linkReference will provide a reference to the id of the RoadLinks that are affected by the restriction. In most instances, this will be all the RoadLinks that start or end at the referenced RoadNode. However, when a RoadNode has a classification of “Grade Separation” then it will only reference the RoadLinks that are at the same level as the feature. An example of this could be at a bridge with a height restriction. The height restriction will only impact the RoadLinks that are passing under the bridge. The RoadLinks which are travelling over the bridge are not impacted by the height restriction. Therefore, the NodeReference will provide a reference to the RoadLinks which are passing under the bridge and will not reference all RoadLinks which reference the RoadNode through the start or end node references.

The feature types which use a Node Reference are RestrictionForVehicles, Hazard and Structure.

NodeReference		
Attribute: element		INSPIRE
Definition: The identifier of the feature being referenced; this will always be the gml:id of a RoadNode.		
Multiplicity: [1]	Size: 20	
Attribute: location		
Definition: The co-ordinates for the RoadNode the feature is referencing.		
Type: GM_Point	Multiplicity: [1]	
Association: linkReference		

Definition: A reference to the RoadLink(s) that the feature effects.	
Multiplicity: 1..*	Size: 20

Link Reference

When a feature occurs along a complete, single RoadLink then a Link Reference will be used. Geometry is not provided for these features. The direction along the RoadLink that the feature applies is provided through the applicableDirection. If the feature applies to the RoadLink regardless of which direction you travel along it, for example Traffic Calming, then the value will be both directions. If the feature applies to the RoadLink in a specific direction of travel, for example a One Way, then the direction will be provided in relation to the digitisation of the RoadLink (the order of coordinates).

The feature types which use a Link Reference are TurnRestriction and Structure.

LinkReference		
Attribute: element		INSPIRE
Definition: The identifier of the feature being referenced; this will always be the gml:id of a RoadLink.		
Multiplicity: [1]	Size: 20	
Attribute: applicableDirection <<voidable>>		INSPIRE
Definition: The direction of the RoadLink to which the reference applies in relation to the direction the link has been captured in.		
Type: LinkDirectionValue	Size: 21	Multiplicity: [1]

Multiple Link Reference

A Multiple Link Reference is the same as a Link Reference except the feature will provide more than one link reference. This referencing will be used when a feature references multiple, complete RoadLinks, for example a No Turn. The order which these features apply to the RoadLink is important to ensure the feature is being interpreted correctly and therefore the Link References in the product have been ordered to reflect this. In addition to the order, the direction will be provided in relation to the digitisation of the RoadLink and this is important in interpreting the feature. Geometry will not be provided for these features.

The feature types which use a Multiple Link Reference are TurnRestriction and Hazard.

Point Reference

A feature that happens at a specific point, that is not coincident with a RoadNode, then a Point Reference will be used which will reference a RoadLink. The Point Reference will provide the location of the point which will be provided as a distance from the start of the RoadLink in metres through the "atPosition" attribute. In addition the location of the point will be provided which will be a pair of coordinates which are snapped to the RoadLink, through the atPositionGeometry attribute. Finally, the direction along the RoadLink that the feature applies is provided through the applicableDirection. If the feature applies to the RoadLink regardless of which you travel along it, for example a Gate, then the value will be both directions. If the feature applies to the RoadLink in a specific direction of travel, for example an Access Restriction, then the direction will be provided in relation to the digitisation of the RoadLink (the order of coordinates).

The feature types which use a Point Reference are AccessRestriction, RestrictionForVehicles, Hazard and Structure.

PointReference	
Attribute: element	INSPIRE
Definition: The identifier of the feature being referenced; this will always be the gml:id of a RoadLink.	

Multiplicity: [1]	Size: 20	
Attribute: applicableDirection <<voidable>>		INSPIRE
Definition: The direction of the RoadLink to which the reference applies in relation to the direction the link has been captured in.		
Type: LinkDirectionValue	Size: 21	Multiplicity: [1]
Attribute: atPosition <<voidable>>		INSPIRE
Definition: Position of the point, expressed as the distance from the start of the linear network element along its curve geometry.		
Type: Length		Multiplicity: [1]
Attribute: atPositionGeometry		
Definition: The location geometry of the restriction, will be snapped to the RoadLink.		
Type: GM_Point		Multiplicity: [1]

Common Attribution

Each feature within the Routing and Asset Management theme will have the following common attribution:

- gml:id, gml:identifier and inspireId
- beginLifespanVersion
- reasonForChange
- validFrom (NOTE: this is assigned a nilReason value “unknown” for most features)

Temporal Properties

The Routing and Asset Management product holds information on restrictions which apply to a temporal period. The different temporal properties have been categorised and the different categories are detailed below. In addition, they have been given a hierarchy within the Routing and Asset Management product which is illustrated in Figure 7. Temporal Properties are applied to 4 Feature Types in Routing and Asset Management; AccessRestrictions, HighwayDedication, TurnRestrictions, and SpecialDesignation.

Named Date

A Named Date would be when a restriction applies to a specified date which is named. For example, All Year or January. There are no further sub categories of a Named Date.

Date Range

A Date Range is provided when a restriction applies between two dates and there will always be a start date and an end date. These two dates can be specified using two different data types; either StartDate and EndDate or StartMonthDay or EndMonthDay.

The StartDate and EndDate will always be used for Date Ranges for Special Designation features. These are formatted as YYYY-MM-DD for example 2016-09-20. The StartMonthDay and EndMonthDay will always be used for Access Restrictions and Turn Restrictions. These are formatted as --MM--DD for example --03--23.

Day Period

A Day period would be a restriction which applies on a specified day. A Day Period is made up of the following properties:

- Named Day –A restriction which applies to a specified day which is named for example Monday or Weekends
- Named Period – A restriction which applies to a specified period which is named for example School Holidays.
- Time Period – A time period is made up of a further two properties:
 - Named Time - A restriction which applies to a specified time period which is named. That do not necessarily relate to the same time each day consistently across the country, for example Peak Time.
 - Time Range – When a restriction applies between two specified times which will always have a start time and an end time. These data types are formatted as HH:MM:SS and will use the 24hr clock for example 16:30:00.

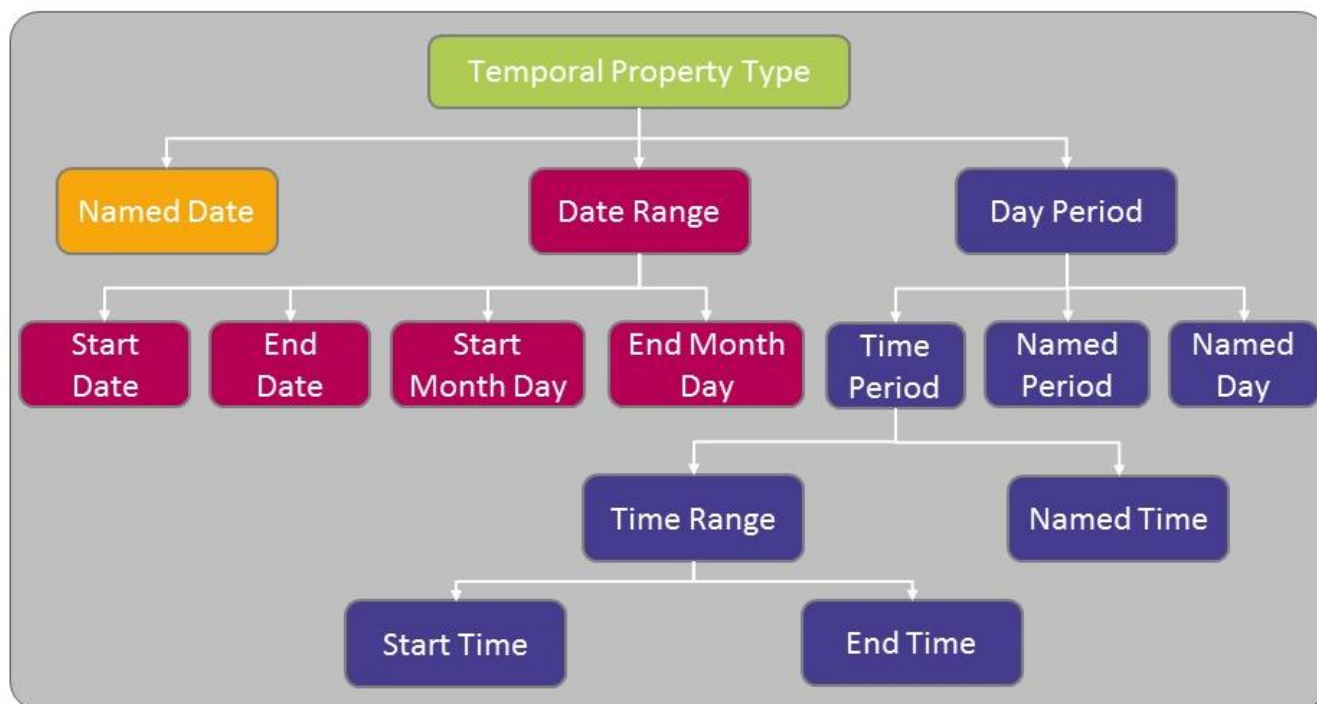


Figure 7: Temporal Properties Structure

Chapter 4 Rights and Restrictions

Overview

The Rights and Restrictions sub-theme includes properties that prohibit, restrict, or regulate the use of the network by traffic. Rights and Restrictions are typically defined through legislation including the **Traffic Regulation Order (TRO)** made under the [Road Traffic Regulation Act 1984](#).

The following types of rights and restrictions are in scope of the current product:

- Access Restrictions
- Turn Restrictions
- Restrictions For Vehicles (Height, Weight, Width and Length restrictions)
- Highways Dedications (indications of Rights of Way)

Simplification and Priority of Rights and Restrictions

Rights and Restrictions features record the effect and nature of the real-world restriction or environmental factors. However, this is not always possible as restrictions may manifest in many different ways yet have the same effect.

For example, a single restriction may consist of a one-way street that has a no entry sign, no right/left turn sign and/or mandatory turn signs on the approach roads. This is represented in the simplest way by recording a one-way street. To ensure a level of consistency, a hierarchy is used when more than one restriction that has the same effect occurs at a given location. Only the restriction that has the highest priority will be captured.

Restriction Priority Table	
Priority	Restriction
1	One Way
2	No entry/Access prohibited to/Access limited to
3	Mandatory Turns
4	No Turn

Therefore, Rights and Restrictions primarily model the effect of any restriction in the simplest possible way and secondary to this is recording the real-world manifestation.

AccessRestriction

Overview

Access to a road or area by vehicles can be legally prohibited. Prohibited access restrictions are indicated by regulatory signs with a red circle or a no entry sign. In addition, access could be limited for use by particular classes of vehicle, these are indicated by regulatory signs with a blue circle. Access restrictions may also include exemptions to the restriction. The Access Restriction feature type comprises of these types of restrictions.

An Access Restriction will reference back to the Roads Product Network through Point Referencing. For more information on Point Referencing please see [Chapter 3](#).

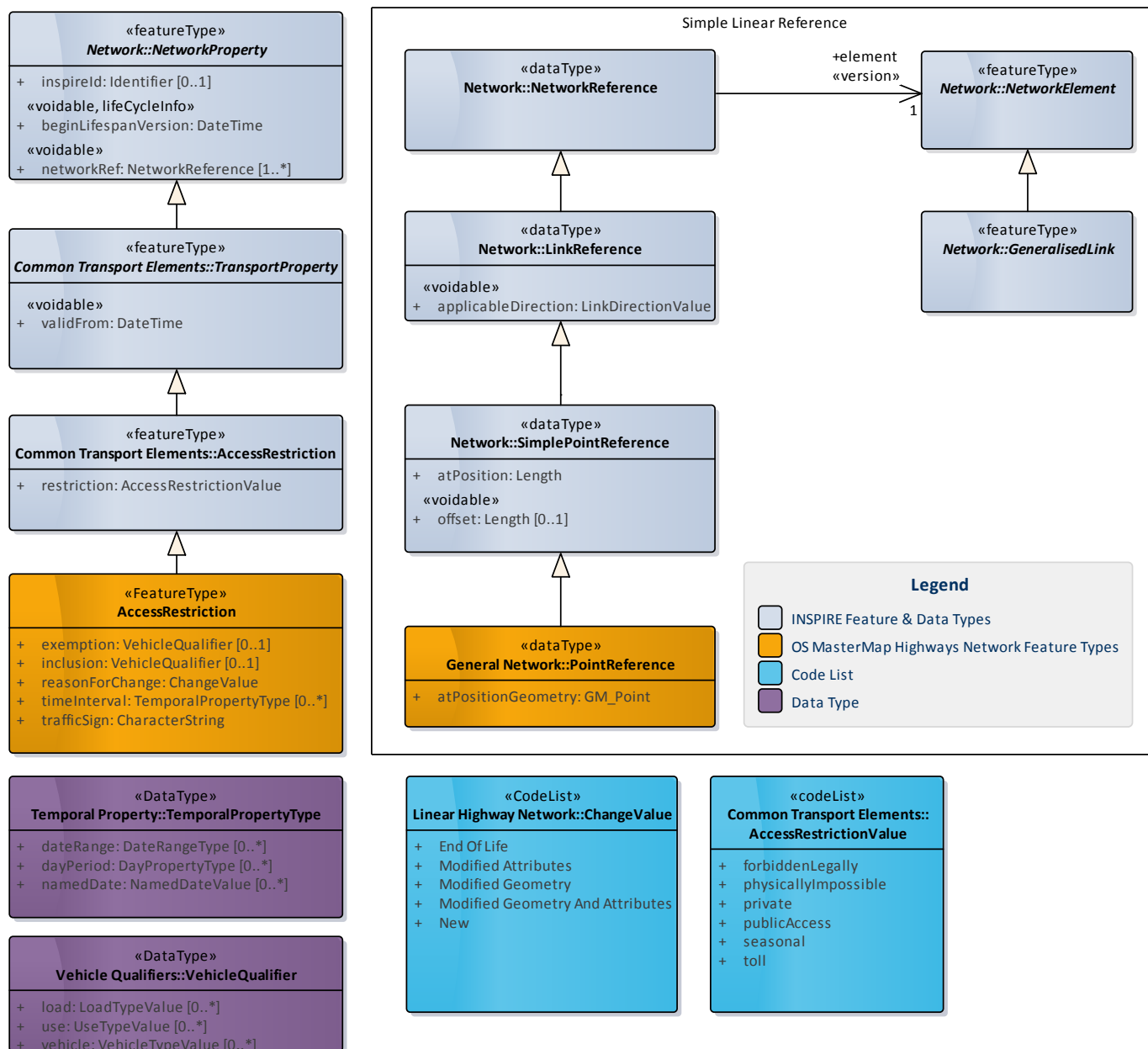


Figure 8 Context diagram for AccessRestriction.

Attribution

«FeatureType» AccessRestriction		
Definition: A restriction based on vehicular access to a highway.		
Attribute: id		
Definition: Unique identifier, for AccessRestriction this is a TOID		
Type: CharacterString	Size: 20	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 37	Multiplicity: [1]
Attribute: inspireId		INSPIRE

Definition: External object identifier of the spatial object.		
Type: Identifier	Multiplicity: [0..1]	
Attribute: beginLifespanVersion «voidable»INSPIRE		
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		
Note: The time part is always set to zero.		
Type: DateTime	Multiplicity: [1]	
Attribute: networkRef «voidable»INSPIRE		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference	Multiplicity: [1..*]	
Attribute: validFrom «voidable»INSPIRE		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime	Multiplicity: [1]	
Attribute: restrictionINSPIRE		
Definition: Nature of the access restriction.		
Type: AccessRestrictionValue	Size: 21	Multiplicity: [1]
Attribute: inclusion		
Definition: Types of vehicle or use that the restriction applies to.		
Type: VehicleQualifier	Multiplicity: [0..1]	
Attribute: exemption		
Definition: Types of vehicle or use that are exempt from the restriction.		
Type: VehicleQualifier	Multiplicity: [0..1]	
Attribute: timeInterval		
Definition: Time period to which the restriction applies.		
Type: TemporalPropertyType	Multiplicity: [0..*]	
Attribute: trafficSign		
Definition: A description of the traffic sign indicating the restriction e.g. Access Limited to Buses.		
Type: CharacterString	Size: 120	Multiplicity: [1]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: ChangeValue	Size: 32	Multiplicity: [1]

HighwayDedication

Overview

Highway dedication provides an indication of the type of Highway user who has access to that particular section of the Highway.

Against every section of geometry supplied by the local highway authority there will be one of 8 different types of Highway Dedication defined in the Highways Act 1980 and the Countryside and Rights of Way Act 2000 which determines the Highway user access.

There can only be one Highway Dedication type applied to the geometry at any given date or time.

It is likely that more than one Highway Dedication type applies to a section of Highway (i.e. a highway open to all vehicles will also have pedestrian way or footway access) so the following is an order of priority where the highway dedications under each is inferred:

- Motorway*
- All Vehicles
- Byway Open to All Traffic
- Restricted byway
- Bridleway
- Cycle Track* or Cycle way
- Pedestrian Way or footpath

*Motorways and Cycle Tracks (not Cycle Ways) impose restrictions on all other Highway users.

The Highway Dedication also identifies if the feature forms part of a National Cycle Route, Public Right of Way, Quiet Route, Physical Obstruction or Planning Order or Vehicular Traffic order exist.

Note: The Highway dedication value is only an inference of where a Public Right of Way exists and therefore not the definitive record of Public Rights of Way, that is the definitive map held by the relevant authority.

A Highway Dedication feature will reference back to the Path Network through Network Reference and will reference a RoadLink or Street Feature. For more information on Network References please see [Chapter 2](#).

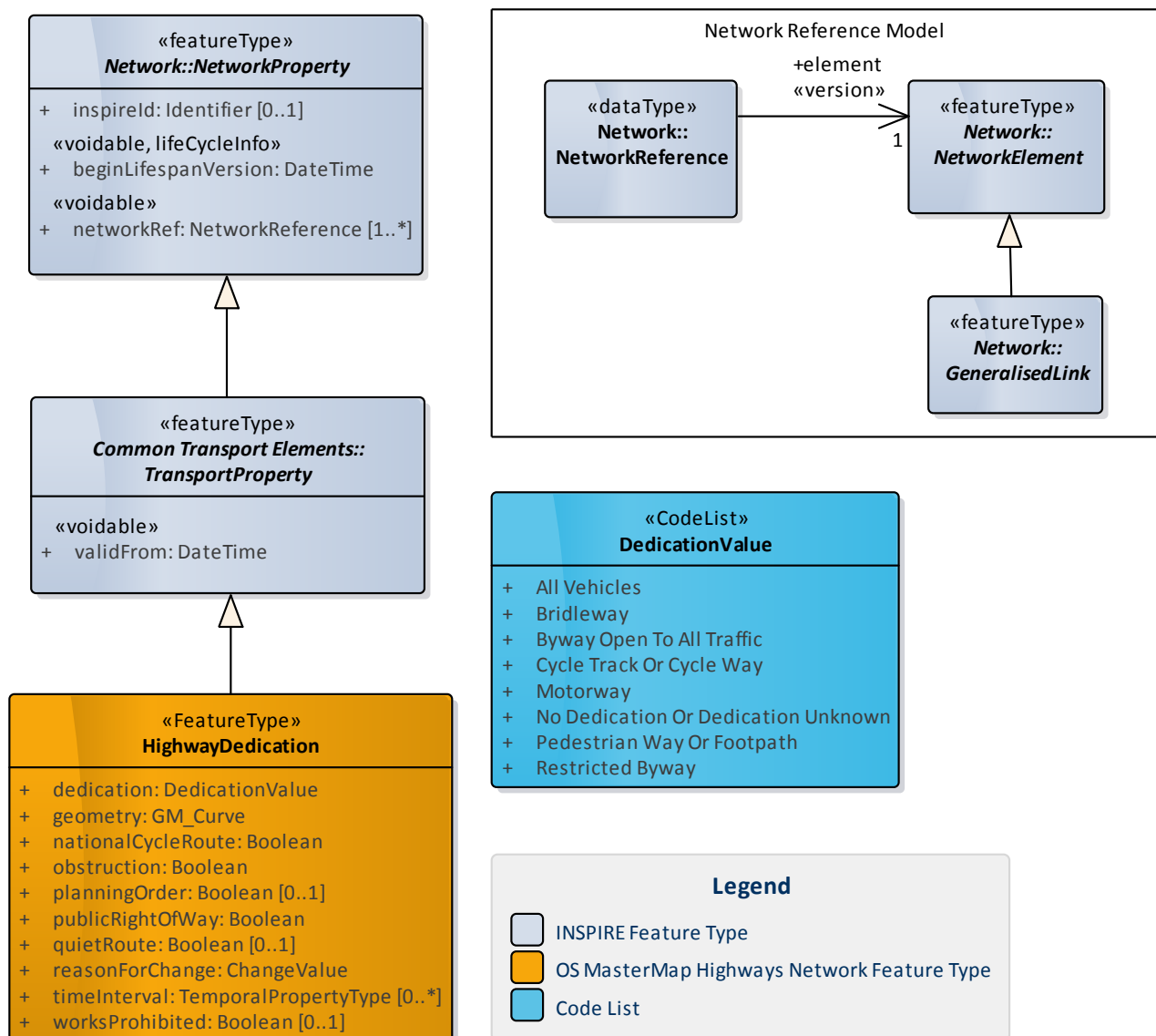


Figure 9 Context Diagram: HighwayDedication

Attribution

«FeatureType» HighwayDedication		
Definition: Definition of which type of Highway user has access to a particular section of the Highway.		
Attribute: id		
Definition: Unique identifier		
Type: CharacterString	Size: 20	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 37	Multiplicity: [1]
Attribute: inspireId		INSPIRE
Definition: External object identifier of the spatial object.		
Type: Identifier		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable»		INSPIRE
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data		

set.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: networkRef «voidable» INSPIRE		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference		Multiplicity: [1..*]
Attribute: validFrom «voidable» INSPIRE		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: ChangeValue	Size: 32	Multiplicity: [1]
Attribute: dedication		
Definition: The type of Highway Dedication that applies to this section of the Street.		
Type: DedicationValue	Size: 35	Multiplicity: [1]
Attribute: timeInterval		
Definition: Time period to which the dedication applies.		
Type: TemporalPropertyType		Multiplicity: [0..*]
Attribute: publicRightOfWay		
Definition: An indication if the dedication is subject to a public right of way.		
Type: Boolean	Size: 5	Multiplicity: [1]
Attribute: nationalCycleRoute		
Definition: An indication if the dedication is subject to a formal cycle classification.		
Type: Boolean	Size: 5	Multiplicity: [1]
Attribute: quietRoute		
Definition: An indication if the dedication is subject to a quiet route.		
Type: Boolean	Size: 5	Multiplicity: [0..1]
Attribute: obstruction		
Definition: An indication if the dedication contains a physical obstruction to vehicles.		
Type: Boolean	Size: 5	Multiplicity: [1]
Attribute: planningOrder		
Definition: An indication if a pedestrian planning order applies to the dedication.		
Type: Boolean	Size: 5	Multiplicity: [0..1]
Attribute: worksProhibited		
Definition: An indication if the dedication has a Traffic Regulation Order prohibiting any works in the Highway at all times.		
Type: Boolean	Size: 5	Multiplicity: [0..1]
Attribute: geometry		
Definition: The geometry that represents the centreline of the dedication.		
Type: GM_Curve		Multiplicity: [1]

TurnRestriction

Overview

Turn restrictions are a restriction based upon a vehicle manoeuvre. The types of restriction includes a prohibitive driving instructions, mandatory driving instruction and implicit restrictions. Prohibited instructions are indicated by road signs within a red circle, examples include No U Turn, No Right Turn or No Left Turn. These can include exceptions to the instruction and are typically elements like “except for buses”. Mandatory driving instructions indicated by road signs within a blue circle or painted on the roadway such as ‘turn right’, ‘ahead only’ and ‘no left turn’. Implicit restrictions occur where a turn is not signed as prohibited but would not be a normal manoeuvre. For example where a road splits around a traffic island or at complex junctions where additional geometry has been captured to reflect the traffic flow. These are not differentiated from actual signed restrictions.

A TurnRestriction will reference back to the Roads product through Link References and Multiple Link References. For more information on these different types of Network References please see [Chapter 3](#).

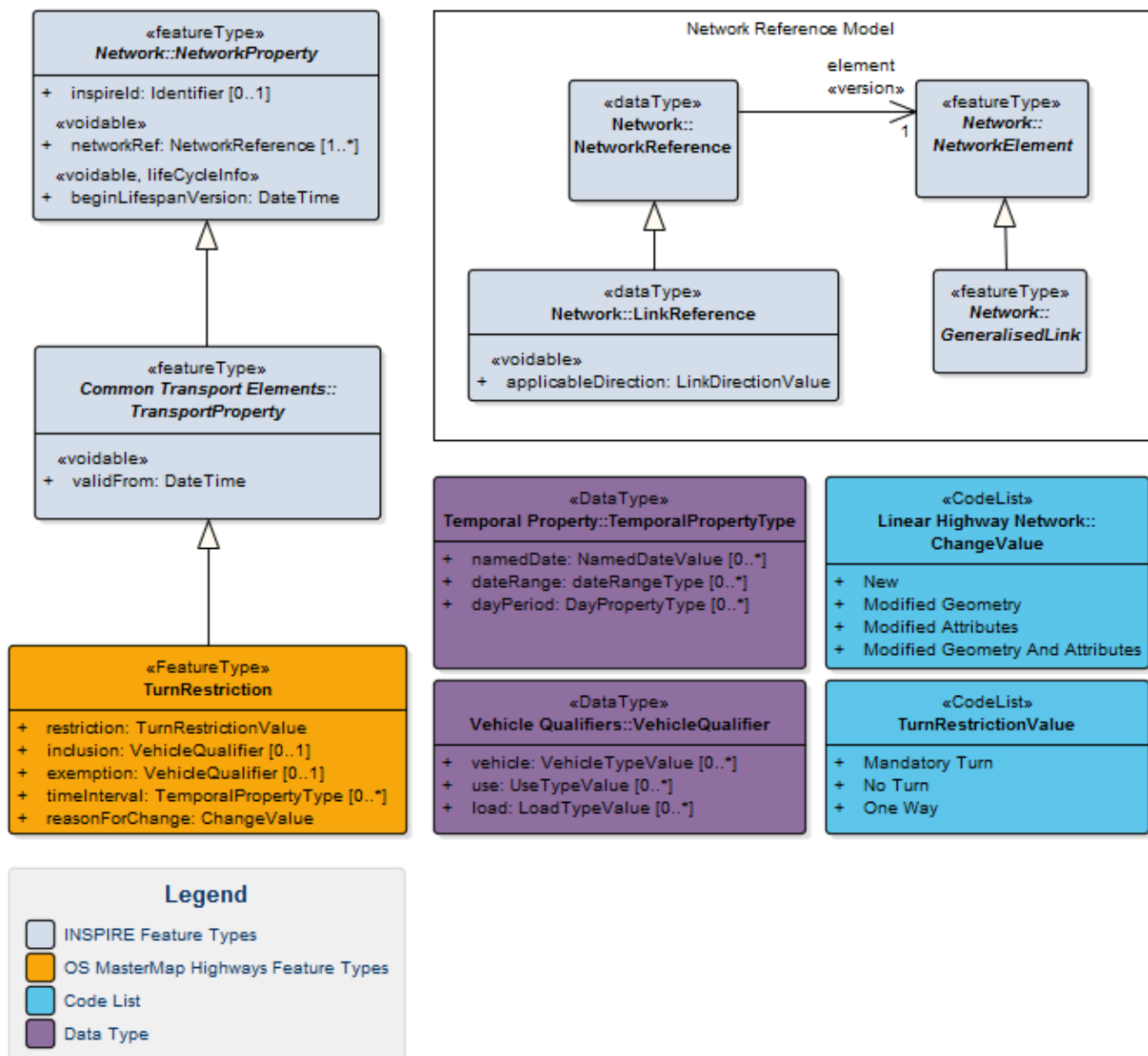


Figure 10 Context Diagram: TurnRestriction

Attribution

«FeatureType» TurnRestriction		
Definition: A restriction on vehicular manoeuvre.		
Attribute: id		
Definition: Unique identifier, for TurnRestriction this is a TOID		
Type: CharacterString	Size: 20	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 37	Multiplicity: [1]
Attribute: inspireId INSPIRE		
Definition: External object identifier of the spatial object.		
Type: Identifier		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable» INSPIRE		
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: networkRef «voidable» INSPIRE		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference		Multiplicity: [1..*]
Attribute: validFrom «voidable» INSPIRE		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: restriction		
Definition: Type of turn constraint.		
Type: TurnRestrictionValue	Size: 34	Multiplicity: [1]
Attribute: inclusion		
Definition: Types of vehicle or use that the restriction applies to.		
Type: VehicleQualifier		Multiplicity: [0..1]
Attribute: exemption		
Definition: Types of vehicle or use that are exempt from the turn restriction.		
Type: VehicleQualifier		Multiplicity: [0..1]
Attribute: timeInterval		
Definition: Time period to which the restriction applies.		
Type: TemporalPropertyType		Multiplicity: [0..1]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: ChangeValue	Size: 32	Multiplicity: [1]

RestrictionForVehicles

Overview

RestrictionForVehicles are constraints that apply to the vehicles based on their physical characteristics: height, weight, width and length. These are required to protect structures such as bridges and tunnels from damage, or to restrict/prohibit use by vehicle that exceed specific dimensions, usually for environmental reasons.

RestrictionForVehicles has been extended to support the full definition of height, weight, width and length restrictions as defined in the UK to ensure that they can:

- apply to specific vehicle types only
- relate to a structure for which the restriction is designed to protect (e.g. a Bridge)

A RestrictionForVehicles will reference back to the Roads product through either a Node Reference or a Point Reference. For more information on these different types of Network References please see [Chapter 3](#).

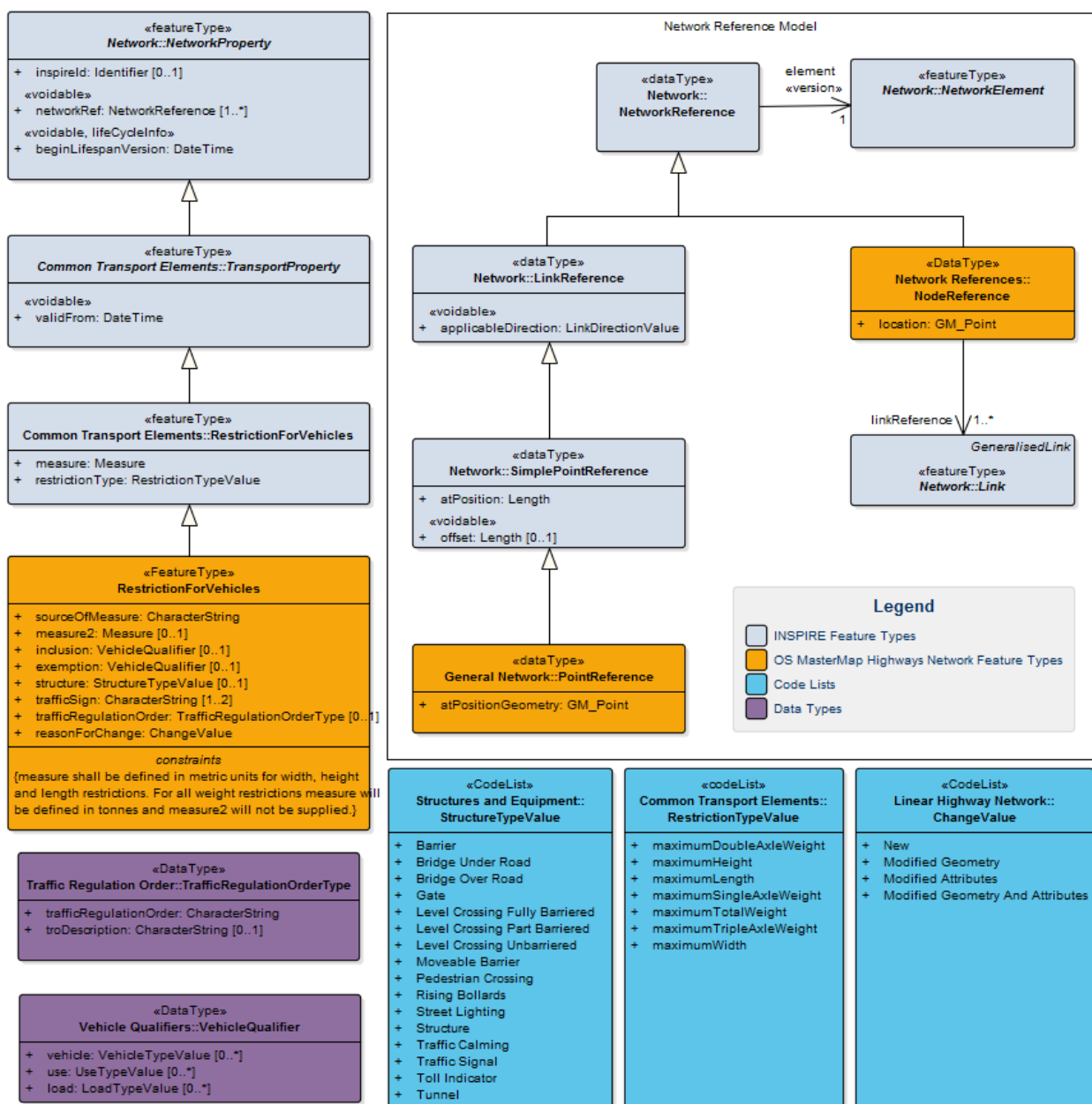


Figure 11: Context Diagram: RestrictionForVehicles

The context diagram (Figure 11) shows how the RestrictionForVehicles has been inherited from INSPIRE and the attribution held on a feature.

Attributes

«FeatureType» RestrictionForVehicles		
Definition: Height, Weight, Width and Length restrictions (HWWL) for vehicles.		
Constraints:		
<ul style="list-style-type: none"> Measure shall be defined in metric units for width, height and length restrictions. For all weight restrictions measure will be defined in tonnes and measure2 will not be supplied. 		
Attribute: id		
Definition: Unique identifier, for RestrictionForVehicle this is a TOID		
Type: CharacterString	Size: 20	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 37	Multiplicity: [1]
Attribute: inspireId		
Definition: External object identifier of the spatial object.		
Type: Identifier		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable»		
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: networkRef «voidable»		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference		Multiplicity: [1..*]
Attribute: validFrom «voidable»		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: measure		
Definition: The measure for the restriction which will be given in metres.		
Note: A Unit of Measure (uom) is provided as part of the attribute.		
Type: Measure	Size: 6,1	Multiplicity: [1]
Attribute: restrictionType		
Definition: The type of restriction.		
Type: RestrictionTypeValue	Size: 26	Multiplicity: [1]
Attribute: sourceOfMeasure		
Definition: Indicates if the measure value is from a sign or has been converted from a different unit of measure.		
Type: CharacterString	Size: 10	Multiplicity: [1]
Attribute: measure2		
Definition: The measure for the restriction in imperial units and will be in inches. It will only be provided if the imperial restriction is present on the sign.		

Note: A Unit of Measure (uom) is provided as part of the attribute.		
Type: Measure	Size: 4	Multiplicity: [0..1]
Attribute: inclusion		
Definition: Vehicle types or uses that the restriction applies to.		
Type: VehicleQualifier		Multiplicity: [0..1]
Attribute: exemption		
Definition: Vehicle types or uses that are exemptions to the restriction.		
Type: VehicleQualifier		Multiplicity: [0..1]
Attribute: structure		
Definition: Description of the structure to which the restriction applies.		
Type: StructureTypeValue	Size: 40	Multiplicity: [0..1]
Attribute: trafficSign		
Definition: A description of the traffic sign indicating the restriction e.g. Maximum Height Restriction 6'-6"		
Type: CharacterString	Size: 120	Multiplicity: [1..2]
Attribute: trafficRegulationOrder		
Definition: Reference to the Traffic Regulation Order that formally created the restriction.		
Note: <i>This is not currently populated.</i>		
Type: TrafficRegulationOrderType	Size: 250	Multiplicity: [0..1]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: ChangeValue	Size: 32	Multiplicity: [1]

Chapter 5 Advisory Information

Overview

Advisory Information provides additional information relating to the highway that affects traffic movement such as:

- **Hazards:** locations which are dangerous and caution should be taken to ensure safe travel. Examples include: Fords and Dangerous Bends.
- **Structures:** are built features which relate to the highway. Examples include Barriers, Bridges and Tunnels.

Hazard

Overview

These are locations which are hazardous and caution should be taken to ensure safe travel. Hazards are usually signed using the warning sign through a red triangle.

A Hazard will reference back to the Roads product through a Node Reference, Point Reference, or Multiple Link Reference. For more information on these different types of Network References please see [Chapter 3](#).

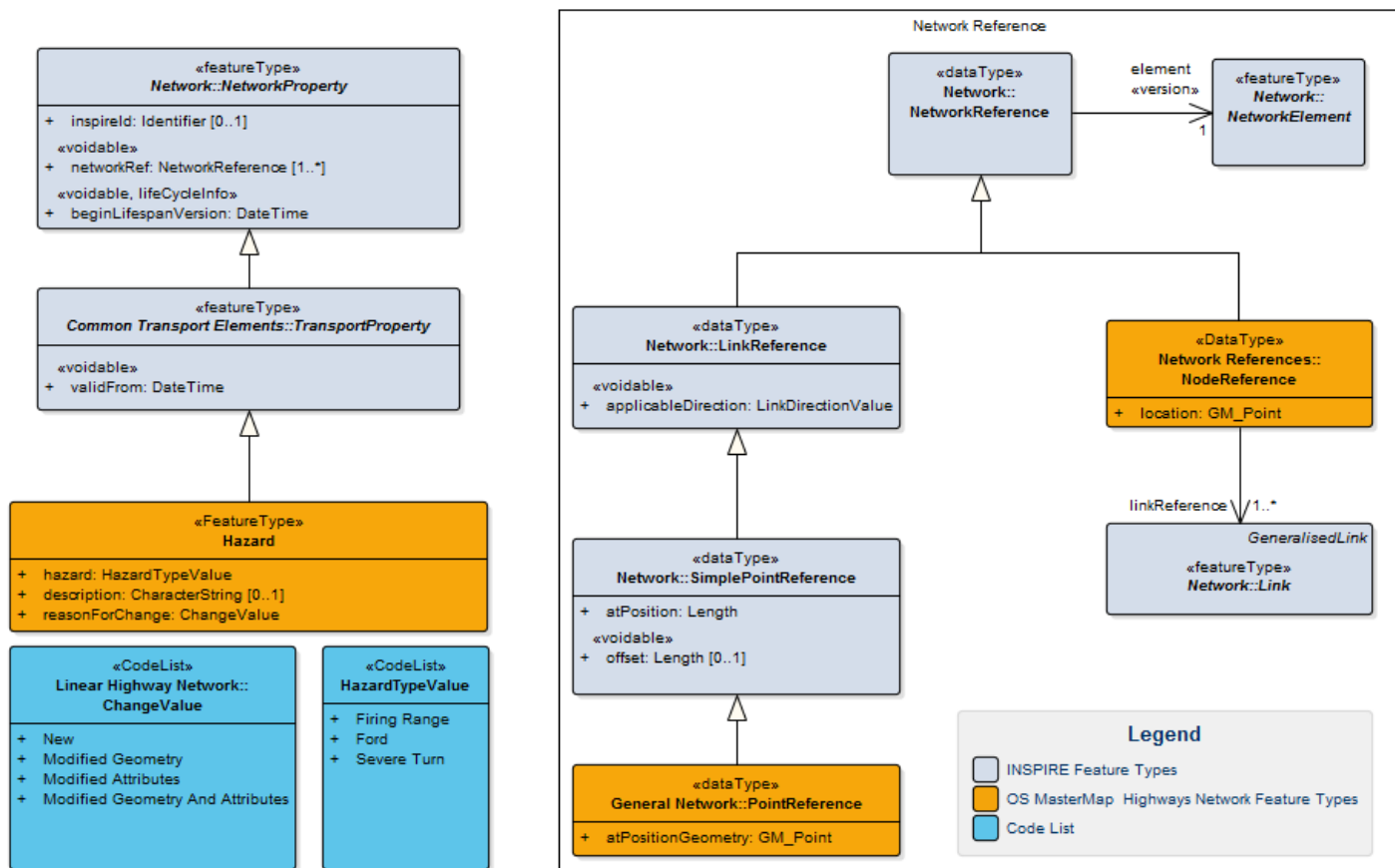


Figure 12: Context Diagram: Hazard

Attribution

«FeatureType» Hazard

Definition: A location where a threat is imposed and caution should be taken.

Attribute: id		
Definition: Unique identifier, for Hazard this is a TOID		
Type: CharacterString	Size: 20	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 37	Multiplicity: [1]
Attribute: inspireId		
Definition: External object identifier of the spatial object.		
Type: Identifier		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable»		
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: networkRef «voidable»		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference		Multiplicity: [1..*]
Attribute: validFrom «voidable»		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: hazard		
Definition: Classification of the type of risk that applies that may impact choice of route or where caution should be observed.		
Type: HazardTypeValue	Size: 15	Multiplicity: [1]
Attribute: description		
Definition: Additional information describing the hazard.		
Type: CharacterString	Size: 50	Multiplicity: [0..1]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: ChangeValue	Size: 32	Multiplicity: [1]

Structure

Overview

These indicate the location of key structures related to the highway network. These may be:

- **Barriers:** structure or equipment constructed to control, obstruct or prevent passage or access.
- **Bridges and Tunnels**
- **Crossings and Signals:** equipment such as traffic signals and locations that control the flow of traffic.

A Structure will reference back to the Roads product through a Node Reference, Link Reference or Point Reference. For more information on these different types of Network References please see [Chapter 3](#).

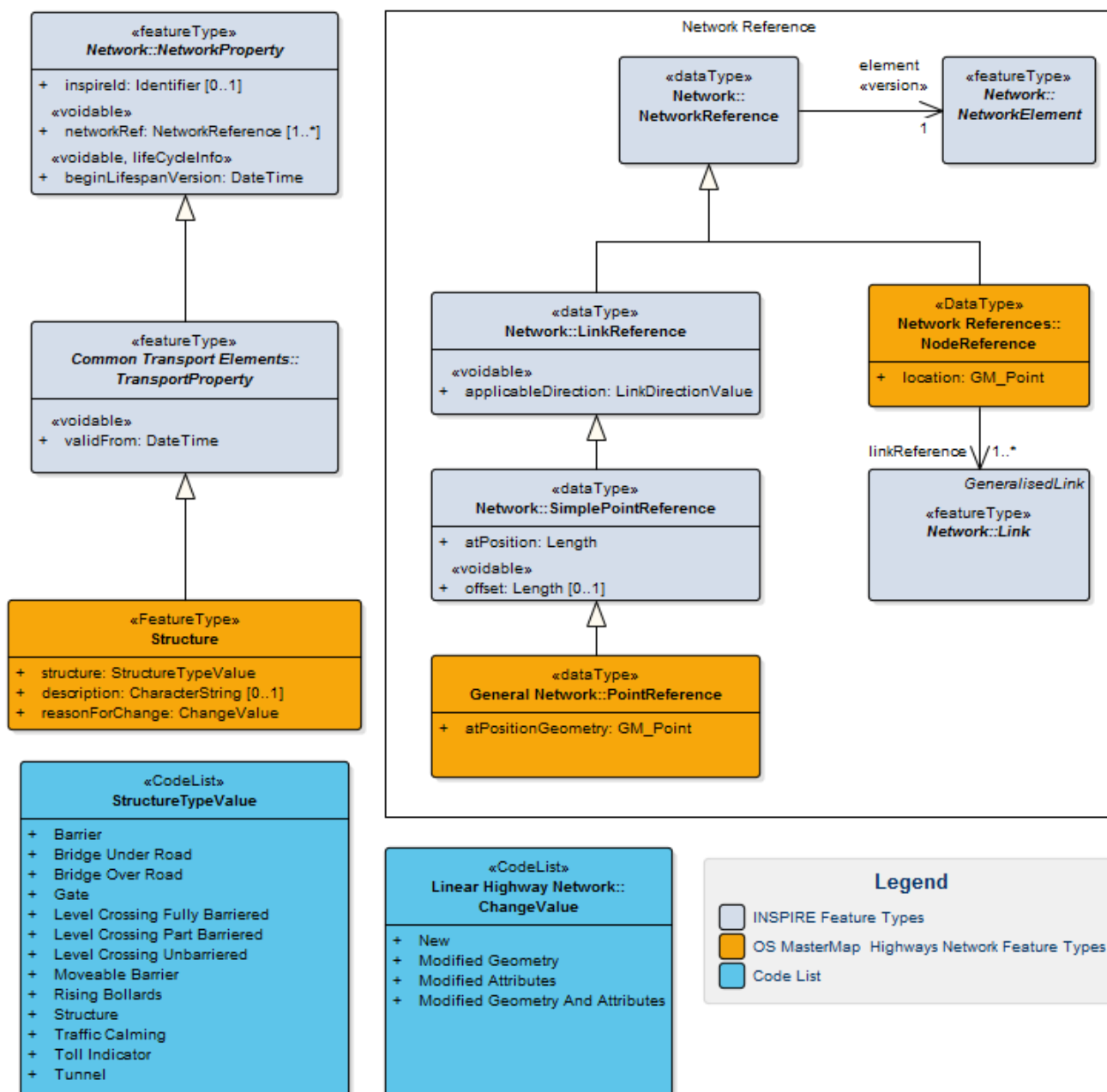


Figure 13 Context Diagram: Structure

Attribution

«FeatureType» Structure		
Definition: A built feature with relation to the highway network		
Attribute: id		
Definition: Unique identifier, for Structure this is a TOID		
Type: CharacterString	Size: 20	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 37	Multiplicity: [1]
Attribute: inspireId		
INSPIRE		

Definition: External object identifier of the spatial object.		
Type: Identifier	Multiplicity: [0..1]	
Attribute: beginLifespanVersion «voidable» INSPIRE		
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		
Note: The time part is always set to zero.		
Type: DateTime	Multiplicity: [1]	
Attribute: networkRef «voidable» INSPIRE		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference	Multiplicity: [1..*]	
Attribute: validFrom «voidable» INSPIRE		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime	Multiplicity: [1]	
Attribute: structure		
Definition: Type of built feature.		
Type: StructureTypeValue	Size: 39	Multiplicity: [1]
Attribute: description		
Definition: Additional information describing the structure.		
Type: CharacterString	Size: 50	Multiplicity: [0..1]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: ChangeValue	Size: 32	Multiplicity: [1]

Attribution

«FeatureType» Maintenance		
Definition: Indication of whether the highway is maintained by a Highways Authority, Local Highways Authority, Road Authority or privately.		
Constraints:		
<ul style="list-style-type: none"> If maintenanceResponsibility = "Maintainable At Public Expense" then maintenanceAuthority will be populated. If partialReference = true then NetworkReferenceLocation shall be expressed. 		
Attribute: id		
Definition: Unique identifier		
Type: CharacterString	Size: 17	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 35	Multiplicity: [1]
Attribute: inspireId INSPIRE		
Definition: External object identifier of the spatial object.		
Type: Identifier		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable» INSPIRE		
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: networkRef «voidable» INSPIRE		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference		Multiplicity: [1..*]
Attribute: validFrom «voidable» INSPIRE		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: maintenanceResponsibility		
Definition: Indication of whether the highway is maintainable at public expense.		
Type: MaintenanceValue	Size: 44	Multiplicity: [1]
Attribute: maintenanceAuthority		
Definition: Authority responsible for maintenance of the highway.		
Note: When maintenanceResponsibility = 'Not Maintained at Public Expense' the maintenanceAuthority will be null.		
Type: ResponsibleAuthority		Multiplicity: [0..1]
Attribute: partialReference		
Definition: Flag to indicate that the maintenance feature partially references a Street.		
Type: Boolean	Size: 5	Multiplicity: [1]
Attribute: highwayAuthority		
Definition: The authority which the highway resides in.		
Note: When the maintenanceAuthority is Highways England then highwayAuthority will be set to Highways England.		

When maintenanceResponsibility = 'Not Maintained at Public Expense' then this is the authority the works operator must contact when applying to carry out works on this street.

Type: ResponsibleAuthority **Multiplicity:** [1]

Attribute: reasonForChange

Definition: The reason for a change made to a feature.

Type: ChangeValue **Size:** 32 **Multiplicity:** [1]

Reinstatement

Overview

Reinstatement defines the standard to which the path must be restored to following opening due to works in the highway, as defined in the [New Roads and Street Works Act Specification for the Reinstatement of Openings in Highways](#) in England and Wales and the [New Roads and Street Works Act 1991 Specification for the Reinstatement of Openings in Roads](#) in Scotland.

A Reinstatement feature will reference back to the Road Network through a Network Reference and will reference a Street Feature. Features which are a partial reference will provide a Network Reference Location. For more information on Network References please see [Chapter 3](#).

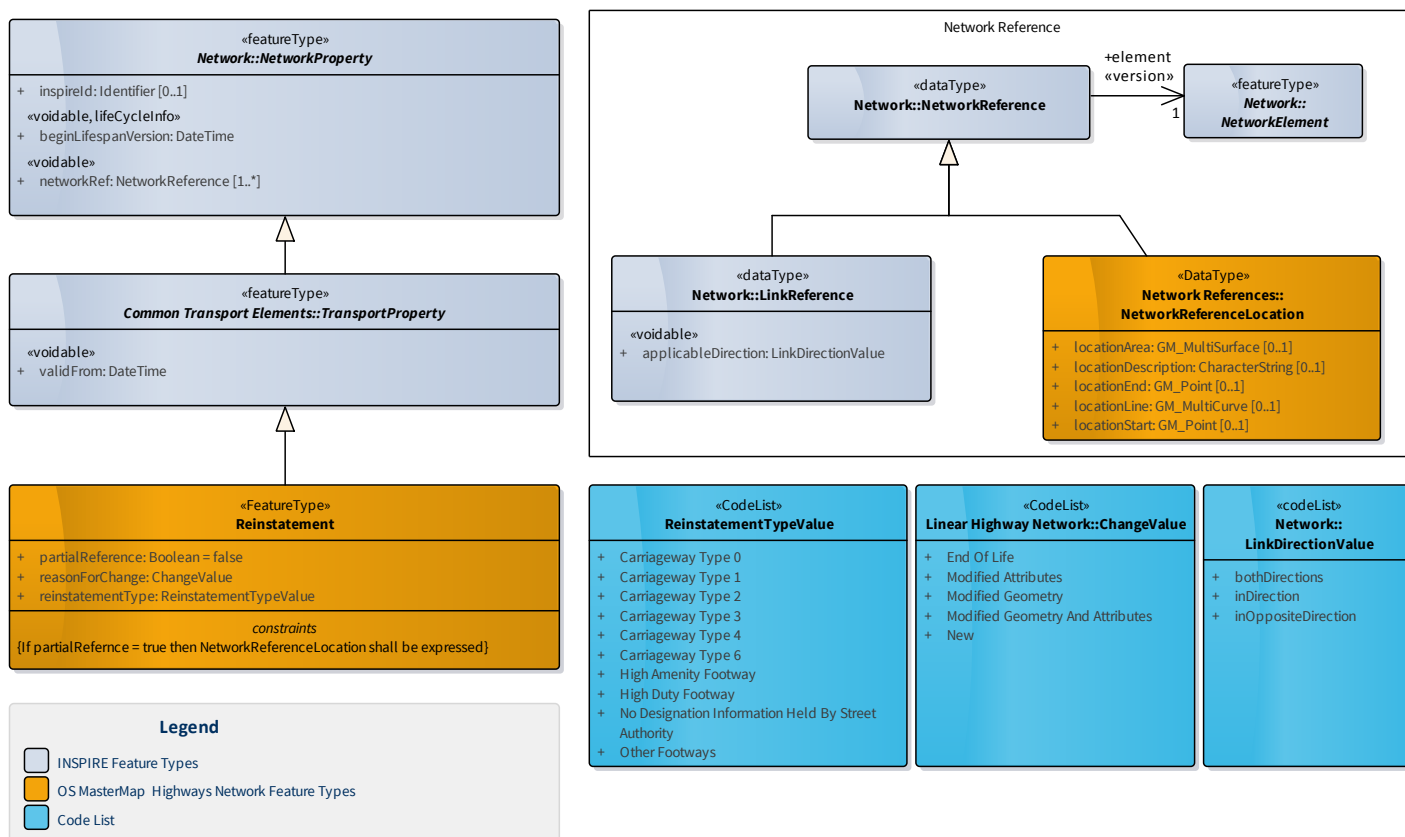


Figure 15 Context Diagram: Reinstatement

Attribution

«FeatureType» Reinstatement

Definition: The standard to which the highway must be restored to following street works.

Constraints:

- If partialReference = true then NetworkReferenceLocation shall be expressed.

Attribute: id		
Definition: Unique identifier		
Type: CharacterString	Size: 17	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 35	Multiplicity: [1]
Attribute: inspireId INSPIRE		
Definition: External object identifier of the spatial object.		
Type: Identifier		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable» INSPIRE		
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: networkRef «voidable» INSPIRE		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference		Multiplicity: [1..*]
Attribute: validFrom «voidable» INSPIRE		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: reinstatementType		
Definition: Reinstatement as defined in the Specification for Reinstatement of Opening in Highways codes of practice in England and Wales and the Specification for the Reinstatement of Openings in Roads in Scotland.		
Type: ReinstatementTypeValue	Size: 51	Multiplicity: [1]
Attribute: partialReference		
Definition: Flag to indicate that the maintenance feature partially references a Street.		
Type: Boolean	Size: 5	Multiplicity: [1]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: ChangeValue	Size: 32	Multiplicity: [1]

SpecialDesignation

Overview

Special Designations are statutory and advisory designations that can be applied to protect a highway when street or road works are to be undertaken. A Special Designation feature will reference back to the Roads product through Network Reference and will reference a Street Feature. Features which are a partial reference will provide a Network Reference Location. For more information on Network References please see [Chapter 3](#).

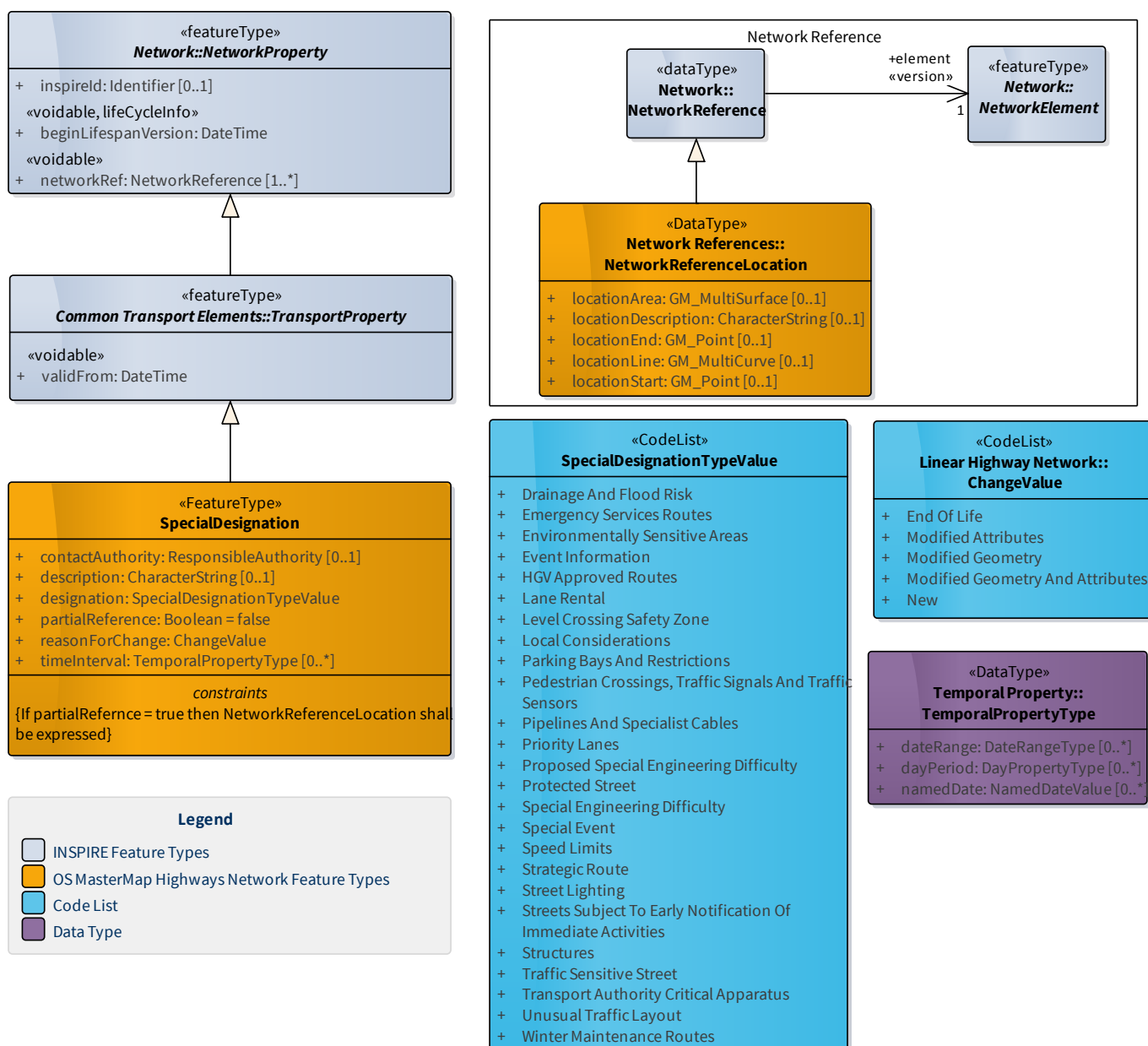


Figure 16 Context Diagram: SpecialDesignation

Attribution

«FeatureType» SpecialDesignation

Definition: A description applied to a highway to protect it during Street or Road Works

Constraints:		
<ul style="list-style-type: none"> If partialReference = true then NetworkReferenceLocation shall be expressed. 		
Attribute: id		
Definition: Unique identifier		
Type: CharacterString	Size: 17	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: CharacterString	Size: 35	Multiplicity: [1]
Attribute: inspireId INSPIRE		
Definition: External object identifier of the spatial object.		
Type: Identifier		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable» INSPIRE		
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: networkRef «voidable» INSPIRE		
Definition: Spatial reference of the network-related property.		
Type: NetworkReference		Multiplicity: [1..*]
Attribute: validFrom «voidable» INSPIRE		
Definition: The time when the transport property started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: validTo «voidable» INSPIRE		
Definition: The time from which the transport property no longer exists in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [0..1]
Attribute: designation		
Definition: Type of Special Designation.		
Type: SpecialDesignationTypeValue	Size: 30	Multiplicity: [1]
Attribute: description		
Definition: Additional information describing the special designation.		
Type: CharacterString	Size: 250	Multiplicity: [0..1]
Attribute: timeInterval		
Definition: Time period to which the restriction applies.		
Type: TemporalPropertyType		Multiplicity: [0..1]
Attribute: contactAuthority		
Definition: Highway authority to be contacted for further consultation about the special designation.		
Type: ResponsibleAuthority		Multiplicity: [0..1]
Attribute: partialReference		
Definition: Flag to indicate that the maintenance feature partially references a Street.		
Type: Boolean	Size: 5	Multiplicity: [1]

Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: ChangeValue	Size: 32	Multiplicity: [1]

Chapter 7 Data Types, Code Lists and Enumerations

DataTypes

TemporalPropertyType

SpecialDesignations, TurnRestrictions and AccessRestrictions have a property of 'timeInterval' which has the type of 'TemporalPropertyType'. The below table describes this data type and Figure 17 illustrates how it is made up. There is a hierarchal structure to the Temporal Properties which is shown in Figure 7.

«DataType» TemporalPropertyType		
Definition: The time period which a restriction is in place.		
Constraints		
A TemporalPropertyType shall have at least one of namedDate, dateRange, or dayPeriod		
When namedDate = 'All Dates' no other values for namedDate or dateRange shall be populated		
Attribute: namedDate		
Definition: The named month or period this time interval applies.		
Type: NamedDateValue	Size: 10	Multiplicity: [0..*]
Attribute: dateRange		
Definition: The range of dates the time restriction is in place for.		
Type: DateRangeType		Multiplicity: [0..*]
Attribute: dayPeriod		
Definition: A restriction which applies on a specified day.		
Type: DayPropertyType		Multiplicity: [0..*]

DateRangeType

The "dateRange" attribute on the 'TemporalPropertyType' has a data type of "DateRangeType". The below table describe how this data type is constructed.

«DataType» DateRangeType		
Attribute: startDate		
Definition: The date which the restriction applies starts. This will be in the format YYYY-MM-DD.		
Type: Date		Multiplicity: [0..1]
Attribute: endDate		
Definition: The date which the restriction applies ends. This will be in the format YYYY-MM-DD.		
Type: Date		Multiplicity: [0..1]
Attribute: startMonthDay		
Definition: The date which the restriction applies starts. This will be in the format -MM-DD.		
Type: gMonthDay		Multiplicity: [0..1]
Attribute: endMonthDay		
Definition: The date which the restriction applies ends. This will be in the format -MM-DD.		
Type: gMonthDay		Multiplicity: [0..1]

DayPropertyType

The “dayPeriod” attribute on the ‘TemporalPropertyType’ has a data type of “DayPropertyType”. The below table describe how this data type is constructed.

«DataType» DayPropertyType		
Constraints <ul style="list-style-type: none">A DayPropertyType shall have at least one of namedDay, namedPeriod, or timePeriodWhen namedDay = 'All Days' no other values for namedDay or namedPeriod shall be populated		
Attribute: namedDay		
Definition: The named day this restriction applies.		
Type: NamedDayValue	Size: 15	Multiplicity: [0..*]
Attribute: namedPeriod		
Definition: A specified period which the restriction applies.		
Type: NamedPeriodValue	Size: 28	Multiplicity: [0..*]
Attribute: timePeriod		
Definition: The period of time on the specified day which the restriction applies.		
Type: TimePropertyType		Multiplicity: [0..*]

TimePropertyType

The “timePeriod” attribute on the ‘DayPropertyType’ has a data type of “TimePropertyType”. The below table describe how this data type is constructed.

«DataType» TimePropertyType		
Constraints <ul style="list-style-type: none">A TimePropertyType shall have at least one of timeRange, or namedTime.When namedTime = 'All Day' no other values for namedTime or timeRange shall be populated		
Attribute: namedTime		
Definition: These are named time periods that do not relate to the same time each day		
Type: NamedTimeValue	Size: 17	Multiplicity: [0..*]
Attribute: timeRange		
Definition: The range of time which a restriction applies.		
Type: TimeRangeType		Multiplicity: [0..*]

TimeRangeType

The “timeRange” attribute on the ‘TimePropertyType’ has a data type of “TimeRangeType”. The below table describe how this data type is constructed.

«DataType» timeRangeType	
Attribute: startTime	
Definition: The time the restriction begins	
Type: Time	Multiplicity: [1]

Attribute: endTime	
Definition: The time the restriction ends.	
Type: Time	Multiplicity: [1]

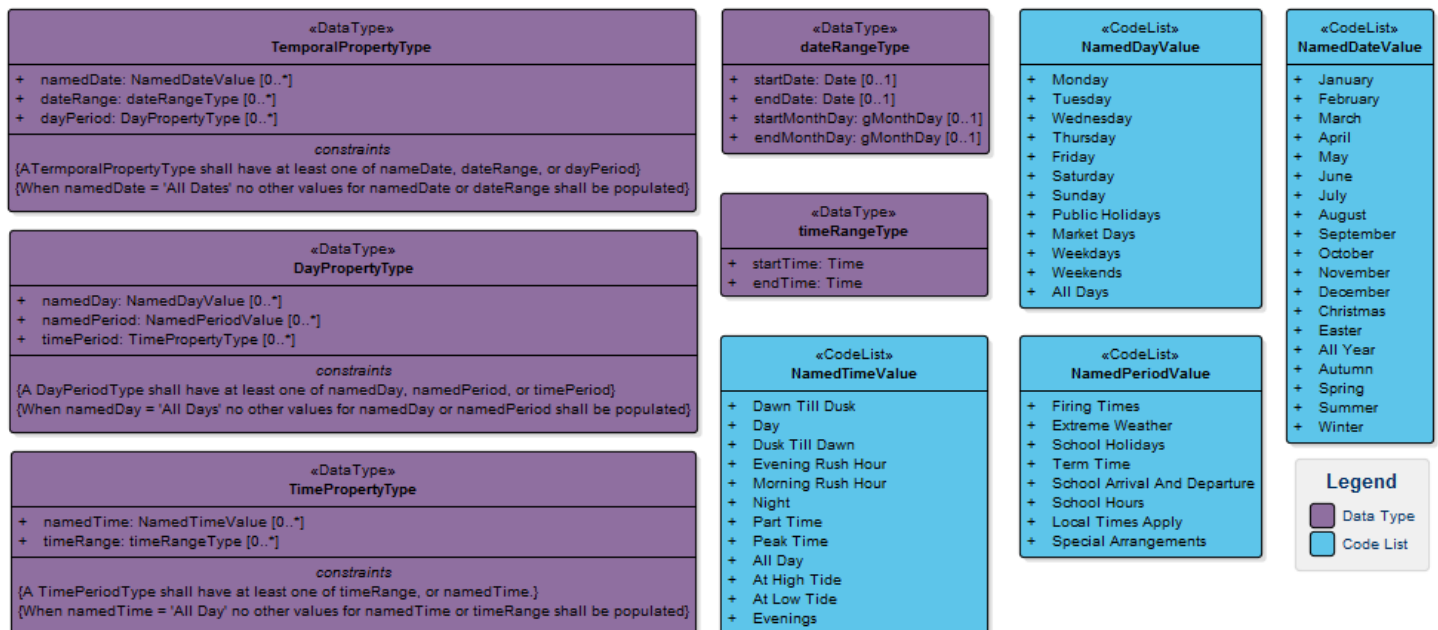


Figure 17 Components which make up the TemporalPropertyType.

TrafficRegulationOrderType

The RestrictionForVehicles feature contains the data type, 'TrafficRegulationOrderType'. The table below describes the attribution that makes up the data type.

Please note this will not be populated in the current product offering.

«DataType» TrafficRegulationOrderType	
Definition: Traffic management controls which highway authorities apply to their roads.	
Attribute: trafficRegulationOrder	
Definition: Reference to the Traffic Regulation Order that formally created the restriction.	
Type: CharacterString	Multiplicity: [1]
Attribute: troDescription	
Definition: Description of restriction defined in the Traffic Regulation Order.	
Type: CharacterString	Multiplicity: [0..1]

VehicleQualifier

Each feature type in the 'Rights and Restrictions' sub theme contain the attributes 'inclusion' and 'exemption', which are of data type 'VehicleQualifier'. The below table describes this data type and Figure 18 illustrates what it is made up of.

«DataType» VehicleQualifier	
Definition: Types and uses of vehicles that a restriction can apply to or restrict	

Attribute: vehicle		
Definition: List of vehicles exempt from the restriction.		
Type: VehicleTypeValue	Size: 38	Multiplicity: [0..*]
Attribute: use		
Definition: List of uses exempt from the restriction.		
Type: UseTypeValue	Size: 30	Multiplicity: [0..*]
Attribute: load		
Definition: List of loads considered to be dangerous and exempt from the restriction.		
Type: LoadTypeValue	Size: 16	Multiplicity: [0..*]

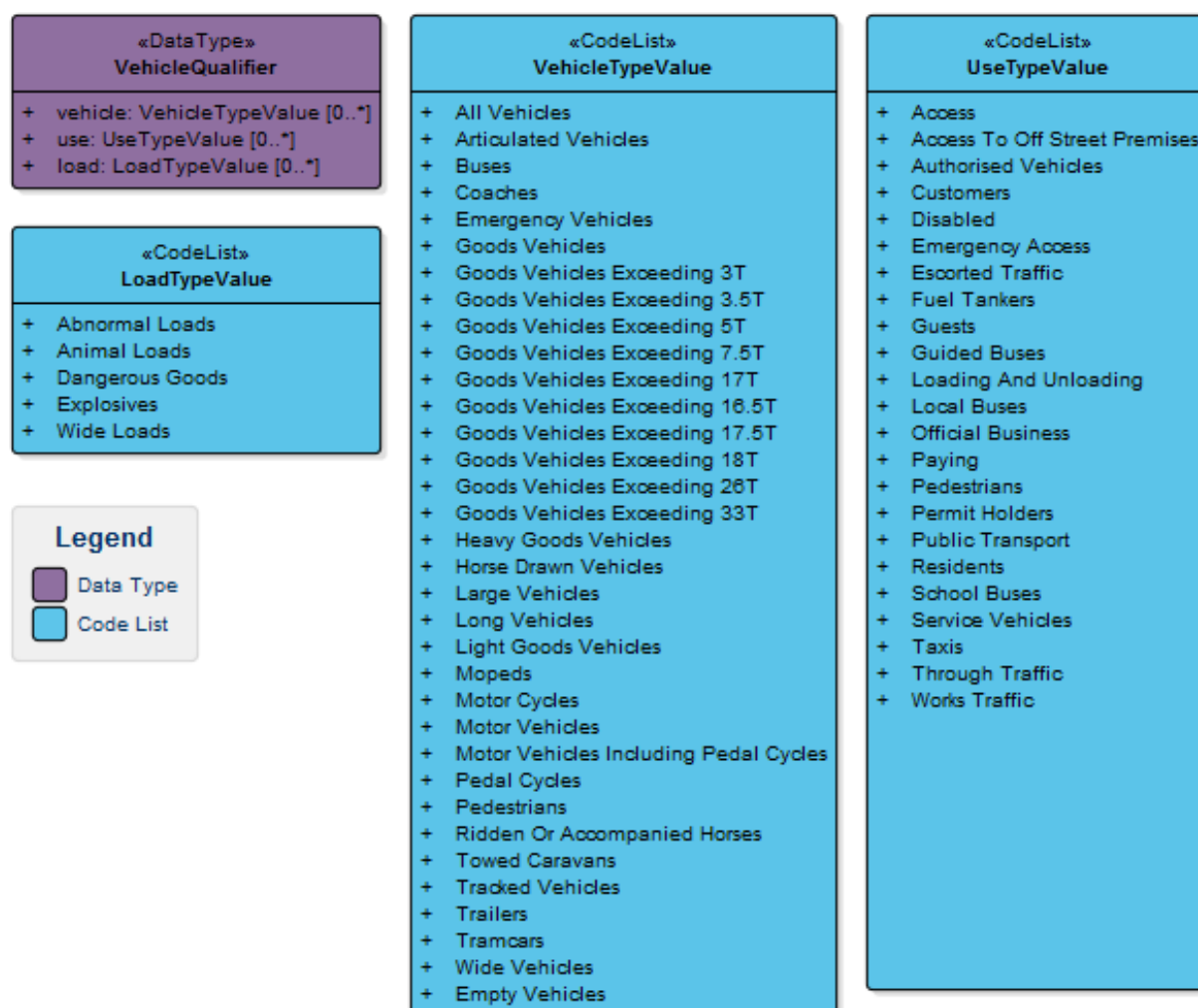


Figure 18 The components which make up the VehicleQualifier

ResponsibleAuthority

The Maintenance and SpecialDesignation feature types are made up with the 'ResponsibleAuthority' feature type. The below table illustrates what attribution makes up this data type.

«DataType» ResponsibleAuthority
Definition: The authority responsible for the street naming and numbering or maintenance.

Attribute: identifier		
Definition: Identification code used to identify the authority Example: 0114		
Type: CharacterString	Size: 4	Multiplicity: [1]
Attribute: authorityName		
Definition: Official name of the authority Example: Bath and North East Somerset		
Type: CharacterString	Size: 100	Multiplicity: [1]

Identifier

The Identifier is an INSPIRE data type and its elements make up the “inspireId” attribute which can be found across all feature type in the OS MasterMap Highways Network.

«DataType» Identifier		
Definition: External unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object.		
Attribute: localId		
Definition: The local identifier is unique within the namespace, that is no other spatial object carries the same unique identifier.		
Type: CharacterString	Size: 16	Multiplicity: [1]
Attribute: namespace		
Definition: Namespace uniquely identifying the data source of the spatial object.		
Type: CharacterString	Size: 18	Multiplicity: [1]

CodeLists

ChangeValue

The ‘reasonForChange’ attribute is used across all features found within the OS MasterMap Highways Network. The table below describes the codes which will be used to populate this field and the description for each code.

Code List: ChangeValue https://www.ordnancesurvey.co.uk/xml/codelists/ChangeTypeValue.xml	
Code	Description
New	New feature has been added.
Modified Geometry	The geometry of the feature has been altered
Modified Attributes	One or more attribute properties have been altered
Modified Geometry and Attributes	Geometry and attribution properties have been altered
End of Life	The feature has been removed from Ordnance Surveys master database. This value will only be used with Change Only Update orders.

UseTypeValue

The “UseTypeValue” is used to describe exceptions to a specific use, for example no entry except for access. This code list is used for the property ‘use’ within the data type “VehicleQualifier”. The following table lists the codes which can be found.

Code List: UseTypeValue	
https://www.ordnancesurvey.co.uk/xml/codelists/highways/UseTypeValue.xml	
Codes	
Access	Official Business
Access To Off Street Premises	Paying
Authorised Vehicles	Permit Holders
Customers	Public Transport
Disabled	Residents
Emergency Access	School Buses
Escorted Traffic	Service Vehicles
Fuel Tankers	Taxis
Guests	Through Traffic
Guided Buses	Works Traffic
Loading And Unloading	
Local Buses	

VehicleTypeValue

The “VehicleTypeValue” is used to describe exceptions to specific vehicles, for example no access, except for buses. This code list is used for the property ‘vehicle’ within the data type “VehicleQualifier”. The following table lists the codes which can be found.

Code List: VehicleTypeValue	
https://www.ordnancesurvey.co.uk/xml/codelists/highways/VehicleTypeValue.xml	
Codes	
All Vehicles	Horse Drawn Vehicles
Articulated Vehicles	Large Vehicles
Buses	Light Goods Vehicles
Coaches	Long Vehicles
Emergency Vehicles	Mopeds
Goods Vehicles	Motor Cycles
Goods Vehicles Exceeding 3T	Motor Vehicles
Goods Vehicles Exceeding 3.5T	Motor Vehicles Including Pedal Cycles
Goods Vehicles Exceeding 5T	Pedal Cycles
Goods Vehicles Exceeding 7.5T	Pedestrians
Goods Vehicles Exceeding 16.5T	Ridden Or Accompanied Horses
Goods Vehicles Exceeding 17T	Towed Caravans
Goods Vehicles Exceeding 17.5T	Tracked Vehicles
Goods Vehicles Exceeding 18T	Trailers
Goods Vehicles Exceeding 26T	Tramcars
Goods Vehicles Exceeding 33T	Wide Vehicles
Heavy Goods Vehicles	Empty Vehicles

LoadTypeValue

The “LoadTypeValue” is used to describe exceptions to specific loads a vehicle may carry. This code list is used for the property ‘load’ within the data type “VehicleQualifier”. The following table lists the codes which can be found.

Code List: LoadTypeValue https://www.ordnancesurvey.co.uk/xml/codelists/highways/LoadTypeValue.xml	
Code	Description
Abnormal Loads	A vehicle which is carrying a usually large weight or an unusually large width or length.
Animal Loads	A vehicle which is carrying livestock and animals.
Dangerous Goods	A substance which could harm people, living organisms, property or the environment.
Explosives	A substance which can explode
Wide Loads	A vehicle which is wide.

NamedDateValue

The “NamedDateValue” is used to name specific dates a restriction may apply. This code list is used for the property ‘namedDate’ within the data type “TemporalPropertyType”. The following table lists the codes which can be found.

Code List: NamedDateValue http://www.ordnancesurvey.co.uk/xml/codelists/highways/NamedDateValue.xml	
Value	Description
January	This is the month of January.
February	This is the month of February.
March	This is the month of March.
April	This is the month of April.
May	This is the month of May.
June	This is the month of June
July	This is the month of July.
August	This is the month of August
September	This is the month of September.
October	This is the month of October.
November	This is the month of November.
December	This is the month of December.
Christmas	This is a holiday season in December.
Easter	This is a holiday season in March or April which varies each year.
All Year	Applies throughout the entire year.
Autumn	This is the season of Autumn, usually by the months September, October and November.
Spring	This is the season of Spring, covered by March, April and May.
Summer	This is the season of Summer, covered by June, July and August.
Winter	This is the season of Winter covered by December, January and February.

NamedDayValue

The “NamedDayValue” is used to name specific days a restriction may apply. This code list is used for the property ‘namedDay’ within the data type “DayPropertyType”. The following table lists the codes which can be found.

Code List: NamedDayValue http://www.ordnancesurvey.co.uk/xml/codelists/highways/NamedDayValue.xml	
Value	Description
Monday	This is the day of Monday.
Tuesday	This is the day of Tuesday.
Wednesday	This is the day of Wednesday.
Thursday	This is the day of Thursday.
Friday	This is the day of Friday.
Saturday	This is the day of Saturday.
Sunday	This is the day of Sunday.
Public Holidays	A holiday established by law.
Market Days	The day which a market is regularly held.
Weekdays	A time interval which occurs during the working week, Monday to Friday.
Weekends	A time interval which occurs over the non-working days, Saturday and Sunday.
All Days	Applies to every day of the week.

NamedPeriodValue

The “NamedPeriodValue” is used to name specific periods a restriction may apply. This code list is used for the property ‘namedPeriod’ within the data type “DayPropertyType”. The following table lists the codes which can be found.

Code List: NamedPeriodValue http://www.ordnancesurvey.co.uk/xml/codelists/highways/NamedPeriodValue.xml	
Value	Description
Firing Times	A period when the activities of defence forces make it unsafe.
Extreme Weather	A period when weather conditions are dangerous.
School Holidays	A period which schools are closed.
Term Time	A period where schools are open.
School Arrival And Departure	The time when pupils will be arriving for the start of the school day and the end of the school day.
School Hours	The period of the day when schools are open.
Local Times Apply	A time which varies locally.
Special Arrangements	

NamedTimeValue

The “NamedTimeValue” is used to name specific time periods a restriction may apply. This code list is used for the property ‘namedTime’ within the data type “TimePropertyType”. The following table lists the codes which can be found.

Code List: NamedTimeValue http://www.ordnancesurvey.co.uk/xml/codelists/highways/NamedTimeValue.xml	
Value	Description
Dawn Till Dusk	Time period between dawn and dusk. Dawn is the time that marks the beginning of the twilight before sunrise. Dusk is the darkest stage of twilight in the evening.
Day	A twenty four hour period, from 00:00 – 23:59.
Dusk Till Dawn	Time period between dusk and dawn. Dawn is the time that marks the beginning of the twilight before sunrise. Dusk is the darkest stage of twilight in the evening.
Evening Rush Hour	A busy part of the day where people are travelling usually after work, in the evening.
Morning Rush Hour	A busy part of the day where people are travelling usually before work, in the morning.
Night	The period from sunset to sunrise.
Part Time	For only some of the time.
Peak Time	A time when a lot of people are using the same service.
All Day	Applies to the entire day.
At High Tide	When the tide is at its highest level.
At Low Tide	When the tide is at its lowest level.
Evenings	The period of time at the end of the day.

AccessRestrictionValue

The AccessRestriction feature type has a property of ‘restriction’ which has the type ‘AccessRestrictionValue’. The table below describes the codes which will be used to populate this field and the description for each code.

This is an INSPIRE code list which cannot be extended.

Code List: AccessRestrictionValue Types of access restrictions for a transport element. http://inspire.ec.europa.eu/codelist/AccessRestrictionValue/	
Code	Description
forbidden legally	Access to the transport element is forbidden by law.
physically impossible	Access to the transport element is physically impossible due to the presence of barriers or other physical obstacles.
private	Access to the transport element is restricted because it is privately owned.
public access	The transport element is open to public access.
seasonal	Access to the transport element depends on the season.

toll	Access to the transport element is subject to toll.
------	---

DedicationValue

The HighwayDedication feature has the field 'dedication' which has the value populated from 'DedicationValue'. The table below identifies the codes used to populate this field and a description for each code.

These codes conform to the legal categories of highway as defined in the Highway Act 1980 and Countryside and Rights of Way Act 2000, with the exception of "No Dedication Or Dedication Unknown".

Dedications indicate the legal access status for a given feature only, no indication as to its physical accessibility is made in this attribute.

Code List: DedicationValue http://www.ordnancesurvey.co.uk/xml/codelists/highways/HighwayDedicationValue.xml	
Code	Description
Byway Open To All Traffic	A Byway with rights for all vehicles
Pedestrian Way Or Footpath	A Way for pedestrians only. Also known as a Pedestrian Way or Walkway. Excludes Footway.
Cycle Track or Cycle Way	Cycle Track: A highway for cyclists and pedestrians which is maintainable at public expense. Cycle Way: Any Way designed for the use of cycles and from which other wheeled traffic is excluded.
All Vehicles	Highway open for all vehicles
Restricted Byway	Highway with rights for pedestrians, horse riders, cyclists and horse-drawn vehicles, but not for mechanically propelled vehicles.
Bridleway	A highway with rights of passage for pedestrians, cyclists and horse riders only.
Motorway	The commonest type of Special Road which is restricted to two classes of vehicles
No Dedication Or Dedication Unknown	A Highway Dedication type that is currently unknown and is still under investigation, or has been proven to have no public rights of access.

TurnRestrictionValue

The TurnRestriction feature type has the property 'restriction' which has the type 'TurnRestrictionValue'. The table below identifies the codes used to populate this field and a description for each code.

Code List: TurnRestrictionValue http://www.ordnancesurvey.co.uk/xml/codelists/highways/TurnRestrictionValue.xml	
Codes	
Mandatory Turn	One Way
No Turn	

RestrictionTypeValue

The RestrictionForVehicles feature type has the property 'restrictionType' which has the type 'RestrictionTypeValue'. The table below identifies the codes used to populate this field and a description for each code.

This is an INSPIRE code list and cannot be extended.

Code List: RestrictionTypeValue Possible restrictions on vehicles that can access a transport element. http://inspire.ec.europa.eu/codelist/RestrictionTypeValue/	
Code	Description
maximum double axle weight	The maximum weight per double axle of a vehicle allowed at a transport element. <i>Note This value applies to wheeled vehicles only.</i>
maximum height	The maximum height of a vehicle which can pass under another object.
maximum length	The maximum length of a vehicle allowed at a transport element.
maximum single axle weight	The maximum weight per single axle of a vehicle allowed at a transport element. <i>Note This value applies to wheeled vehicles only.</i>
maximum total weight	The maximum total weight of a vehicle allowed at a transport element.
maximum triple axle weight	The maximum weight per triple axle of a vehicle allowed at a transport element. <i>Note This value applies to wheeled vehicles only.</i>
maximum width	The maximum width of a vehicle allowed on a transport element.

HazardTypeValue

The Hazard feature type has the property 'hazard' which has the type 'HazardTypeValue'. The table below identifies the codes used to populate this field.

Code List: HazardTypeValue http://www.ordnancesurvey.co.uk/xml/codelists/highways/HazardTypeValue.xml	
Code	Description
Firing Range	A sign indicating a highway which may have access and use restrictions applied when the Ministry of Defence is active on the site.
Ford	Location where the highway passes through a watercourse which passes over and/or along the carriageway. <i>Note: the watercourse may be permanent or temporary.</i>
Severe Turn	A manoeuvre that by virtue of the geometry of the joining roads is difficult or dangerous to perform. An angle of less than 50 degrees is considered severe.

StructureTypeValue

The Structure and RestrictionForVehicles feature type has the property 'structure' which has the type 'StructureTypeValue'. The table below identifies the codes used to populate this field.

Code List: StructureTypeValue http://www.ordnancesurvey.co.uk/xml/codelists/highways/StructureTypeValue.xml	
Code	Description
Barrier	A barrier that can be moved horizontally or vertically to allow access
Bridge Over Road	The representation of a bridge or structure

Bridge Under Road	The representation of a bridge passing over an obstruction that is not another road
Gate	A moveable barrier, hinged at one end, that moves through the horizontal plane to control access
Level Crossing On Route Fully Barriered	A railway intersects with the road network and rail or road vehicles are controlled by warning signs, lights and fully gated barriers.
Level Crossing On Route Part Barriered	A railway intersects with the road network and rail or road vehicles are controlled by warning signs, lights and part gated barriers.
Level Crossing On Route Unbarriered	A railway intersects with the road network and rail or road vehicles are controlled by warning signs, lights and no gated barriers.
Moveable Barrier	A barrier that can be moved horizontally or vertically to allow access
Pedestrian Crossing	A place dedicated to pedestrians to cross the road
Rising Bollards	A bollard that that can be retracted/hinged to allow access
Structure	A structure over the road
Toll Indicator	An indication that there is a charge payable to use the highway.
Traffic Calming	A physical feature on the road surface designed to slow down the flow of traffic.
Tunnel	A road which passes underground or water.

ReinstatementTypeValue

The Reinstatement feature type has the property 'reinstatementType' which has the type 'ReinstatementTypeValue'. The table below identifies the codes used to populate this field.

Code List: ReinstatementTypeValue	
http://www.ordnancesurvey.co.uk/xml/codelists/highways/ReinstatementTypeValue.xml	
Codes	Descriptions
Carriageway Type 0	The carriageway has a limiting capacity between 30 and 125 Million Standard Axles
Carriageway Type 1	The carriageway has a limiting capacity between 10 and 30 Million Standard Axles
Carriageway Type 2	The carriageway has a limiting capacity between 2.5 and 10 Million Standard Axles
Carriageway Type 3	The carriageway has a limiting capacity between 0.5 and 2.5 Million Standard Axles
Carriageway Type 4	The carriageway has a limiting capacity up to 0.5 Million Standard Axles
Carriageway Type 6	The carriageway has a capacity over 125 Million Standard Axles
High Amenity Footway	Routes which have been constructed maintained and surfaced to a high standard.
High Duty Footway	Routes used by an exceptionally large number of pedestrians and/or cyclists
Other Footways	Neither high duty or high amenity.
No designation information held by Street Authority	There is no reinstatement information.

SpecialDesignationTypeValue

The SpecialDesignation feature type has the property 'designationType' which has the type 'SpecialDesignationTypeValue'. The table below identifies the codes used to populate this field and a description for each code.

'SpecialDesignationTypeValue' coverage varies between LHAs and the individual codes. While coverage for statutory designations is good overall, coverage for some other values may be sporadic and inconsistent.

Code List: SpecialDesignationTypeValue

Designation of highways that are subject to special controls when undertaking street or road works
<http://www.ordnancesurvey.co.uk/xml/codelists/highways/SpecialDesignationTypeValue.xml>

Code	Description
Protected Street	Statutory designation which restricts the placement of apparatus by a street or road works undertaker.
Special Engineering Difficulty	Statutory designation relating to streets or parts of streets associated with structures, or streets of extraordinary construction.
Traffic Sensitive Street	Statutory designation that restricts street works to be undertaken during period of high traffic.
Lane Rental	Indication that Street is part of a Lane Rental scheme. Section 74A of NRSWA enables highway authorities, with the approval of the Secretary of State, to charge street works undertakers a daily charge for each day during which their works occupy the highway – commonly referred to as “lane rental” schemes.
Event Information	Indication that this Street has an event planned.
Drainage And Flood Risk	Optional designation that provides details of areas that are susceptible to drainage and flood risk.
Emergency Services Routes	Optional designation that alerts the Works Promoter if there is a need to keep the emergency services informed of proposed works and progress
Environmentally Sensitive Areas	Optional designation that identifies information about the local environment. This includes environmentally sensitive areas, such as sites of specific scientific interest and ancient monuments, or specially cultivated areas containing shrubs, plants or bulbs which shall be reinstated using the same or similar species
HGV Approved Routes	Optional designation that allows Works Promoters to consider the impact on HGVs of restricted traffic flow or alerts the Works Promoter that wide vehicles are commonplace.
Level Crossing Safety Zone	Optional designation and mainly created by a Railway Operator. It identifies an area around a level crossing where, if occupied to carry out works, there is a risk of traffic obstructing the crossing.
Local Considerations	Optional designation that should be used to inform the Works Promoter of any special schemes that may impact working, for example noise levels.
Parking Bays And Restrictions	Optional designation that provides details of streets with parking meters, residents parking bays and parking restrictions such as yellow lines, red routes, and other permanent parking restrictions.
Pedestrian Crossings, Traffic Signals And Traffic Sensors	Optional designation that captures streets that have signalled controlled pedestrian crossings and permanent traffic signals or any Traffic Sensors in the highway.
Pipelines And Specialist Cables	Optional designation that is created by the Local Highway Authority on behalf of the private sector oil or gas pipeline owner. This designation should be treated as a reminder to consult further, not as an absolute indicator of the nature of the pipeline or cable.
Priority Lanes	Optional designation that allows the Local Highway Authority to identify the location of bus lanes, and Cycle Routes in the street.
Proposed Special Engineering Difficulty	Optional designation used to identify new streets or assets of extraordinary construction. One typical use is to identify the location of a designation during any consultation period. On conclusion of the consultation period this feature will typically become a ‘Special Engineering Difficulty’.
Special Event	Optional designation that provides early awareness of special events to Work Promoters to enable them to consider any actions that they may need to take to

	avoid any works taking place on the street during the time(s) of the Special Event.
Speed Limits	Optional designation that provides information about the speed limit applicable for the street. Only speed limits (signed or as per the legal order) over 40mph are recorded as standard with some LHAs providing 30mph speed limits as well. This data is intended to be used for planning of traffic management and works safety measures.
Strategic Route	Optional designation that is used by Local Highway Authorities to identify Strategic Routes, such as the Primary Route Network. Strategic Routes are identified by the Highways Agency, TfL in London and the South Wales Trunk Road Agent (SWTRA) and North & Mid Wales Trunk Road Agent (NMWTRA) in Wales.
Street Lighting	Optional designation that helps Works Promoters to carry out works in the evenings and at nights by providing relevant information about Street lighting. It is particularly useful for when Part night lighting where a council has a policy of turning lights off during specific hours.
Streets Subject To Early Notification Of Immediate Activities	Optional designation that enables street authorities to designate streets that are particularly vulnerable to traffic. Work Promoters are required to provide early warning of activities to the authority immediately after the activity has commenced.
Structures	Optional designation used by asset owners to identify the existence of a structure that has not been designated as an SED. In cases where this identifies a Bridge, Works Promoters should regard it as a reminder that under Section 88 they must consult the Bridge Authority prior to serving Notices.
Transport Authority Critical Apparatus	Optional designation that provides details of transport authority apparatus critical to operations of that authority which if damaged or if interrupted could disrupt or temporarily stop services (for example HV cables to a rail network).
Unusual Traffic Layout	Optional designation that provides details of where the layout of existing traffic signs, road markings, studs or verge markers is not in accordance with the Traffic Signs Manual.
Winter Maintenance Route	Optional designation that helps determine the relative importance a route is given by a Local Highway Authority for clearing and treatment during the winter months.

LinkDirectionValue

Features which use either Point Referencing, Link Referencing or Multiple Link Referencing will include an 'applicableDirection' attribute. The 'LinkDirectionValue' code list are the codes used to populate this attribute.

The code list has been inherited from INSPIRE and is not extendable.

Code List: LinkDirectionValue List of values for directions relative to a link http://inspire.ec.europa.eu/codelist/LinkDirectionValue/	
Code	Description
both directions	In both directions.
in direction	In direction of the link.
in opposite direction	In the opposite direction of the link.

Enumerations

MaintenanceValue

The Maintenance feature type has the property 'maintenanceResponsibility' which has the type 'MaintenanceValue'. The table below identifies the codes used to populate this field and a description for each code.

MaintenanceValue	
Code	Description
Maintainable At Public Expense	The highway is maintained at public expense by a responsible highways authority.
Prospectively Maintainable At Public Expense	An application has been submitted to maintain the highway at public expense.
Not maintained at public expense	The highway is not maintained at public expense.
Maintenance Responsibility Is To Another Highway Authority	A National Highway Authority or a Regional Highway Authority is responsible for maintaining the highway.
Street Outside Scope Of EToN	A Street which exists for National Land Property Gazetteer purposes only and is not identifiable as a street on the ground.

Chapter 8 How the product fits together?

OS MasterMap Highways Network – Roads and Routing and Asset Management is a relational product. This results in there being relationships between different feature types. This chapter summarises how the different feature types relate to one another and which attributes are the primary and foreign keys for the Routing and Asset Management feature. For information on the Roads features please see the [Roads Technical Specification](#).

The below tables identifies how the feature types relate to one another and which attributes are the primary and foreign keys. This is also represented diagrammatically in **Error! Reference source not found.**, the attribute at the arrow head is the primary key and the attribute at the base of the arrow is the foreign key.

Feature Type	Foreign Key Attribute	Feature Type	Primary Key Attribute
AccessRestriction	element	RoadLink	id
TurnRestriction	element	RoadLink	id
RestrictionForVehicles	element	RoadLink	id
RestrictionForVehicles	element	RoadNode	id
RestrictionForVehicles	linkReference	RoadLink	id
Hazard	element	RoadLink	id
Hazard	element	RoadNode	id
Hazard	linkReference	RoadLink	id
Structure	element	RoadLink	id
Structure	element	RoadNode	id
Structure	linkReference	RoadLink	id
Maintenance	element	Street	id
Reinstatement	element	Street	id
SpecialDesignation	element	Street	id
HighwayDedication	element	Street	id
HighwayDedication	element	RoadLink	id

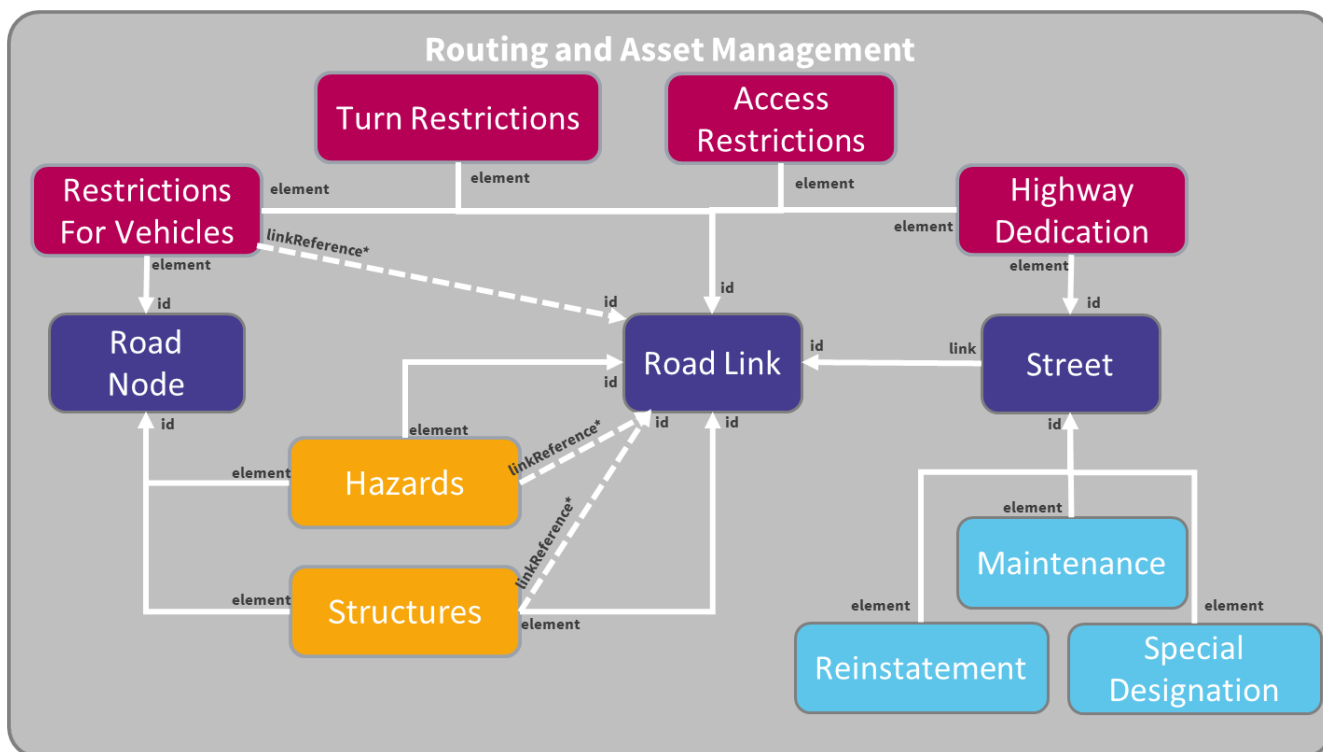


Figure 19 OS MasterMap Highways Network - Routing and Asset Management relational model. Base of the arrow is the foreign key attribute and the arrow head is the primary key attribute.

Chapter 9 Change Only Update (COU)

The OS MasterMap Highways Network – Roads can be ordered as either Full Supply or Change Only Update. The GML structure for Full Supply and COU are different. The differences are fundamentally the open and closing tags which will have an impact on how you choose to load the product. Examples of the different opening and closing tags can be found in [Annex B](#). If a customer wishes to move their order from Full Supply to COU then they will need to receive an initial supply and apply the COU file to an initial supply. The COU should not be applied to a Full Supply order.

Full Supply

When an order for Full Supply is placed, the product will contain all features for the customer's area of interest. When a product refresh is ordered, for this type of order, the supply will contain all the features for the area of interest which will include features that have not changed. This supply mechanism will not explicitly identify which features are new, have been modified or have been removed. This can still be identified by querying the `reasonForChange` and the `beginLifespanVersion` attribute.

Change Only Update supply

When an order is placed for COU the first order received will be an initial supply. Initial supply refers to the first order that a customer takes of OS MasterMap Highways Network under the COU order type. An initial supply contains all features for the complete area covered by the order, and every feature will be an "insert". Updates, which contain the latest changes to the features are automatically sent out.

Following the initial order, a COU will be supplied, at the selected update schedule of the customer. COU only contains new features, new versions of features and information about deleted features. A feature can be deleted from the customers holdings for two reasons; the feature has been deleted and the id will no longer exist in the product or the feature has moved outside of the customers area of interest but still exists in the national product and therefore could be reinstated in a customer's holdings. To identify the difference between the two deletes the `reasonForChange` can be used. If the value is "end of life" then this feature has been permanently deleted whilst any other change value would indicate the feature has moved outside of the holdings and could be reinstated in future. Any feature within the area of interest that has not undergone any change will not be supplied.

The features within the initial supply and COU are provided as transactions. A transaction identifies if the feature is new, modified or removed from the product. The three types of transactions are:

1. `<os:insert>`
These are features which have been newly inserted into the product or the customer's area of interest since the last product supply.
2. `<os:replace>`
These are features which have had either a geometry change or an attribute change since the last product supply. The whole feature will be supplied, not just the changed attributes. The recommended action would be to completely replace the feature which currently exists in the customer's holdings.
3. `<os:delete>`
These are features which have ceased to exist in the last product release or have moved out of the customer's area of interest. Features which have been deleted will be supplied with the entire feature's attribution. These features should be removed from the customers live data holding.

The initial supply will contain an insert transaction for all features in the customer's holdings. The following COU supplies will have insert and replace transactions in one GML file and deleted features will be supplied in a separate file. Where a delete file has been supplied, this must be loaded before the file containing inserted and replaced features. There are examples in [Annex B](#) of the different types of transactions.

Chapter 10 Supply format

The OS MasterMap Highways Network product is supplied in GML version 3.2.1. This chapter describes how OS MasterMap is defined in GML. An understanding of XML (Extensible Mark-up Language) and XML schema is required.

GML

GML is an XML grammar for expressing geographic features. GML serves as a modelling language for geographic systems as well as an open interchange format for geographic transactions on the Internet. More information can be found on the Open Geospatial Consortium (OGC®).

<http://www.opengeospatial.org/standards/gml>

The XML specifications that GML is based on are available from the World Wide Web Consortium (W3C):

<http://www.w3.org>.

Information about Unicode and UTF-8, the character encoding we have chosen, is available on the Unicode Consortium website: <http://www.unicode.org>.

Schema overview and location

XML schemas are used to define and validate the format and content of GML. The GML 3.2 specification provides a set of schemas that define the GML feature constructs and geometric types. These are designed to be used as a basis for building application-specific schemas, which define the data content.

The Routing and Asset Management Information uses the following application schemas;

RoutingAndAssetManagement.xsd, GeneralNetwork.xsd and OSProducts.xsd which are referenced by the data.

The RoutingAndAssetManagement.xsd defines the features which make up the Routing and Asset Management Information features. Therefore, it imports the INSPIRE transport network road application schema. The GeneralNetwork.xsd defines how the Routing and Asset Management features reference back to the network.

Therefore, it imports the INSPIRE network application schema. Through the INSPIRE schemas both the **RoutingAndAssetManagement.xsd and GeneralNetwork.xsd** import the GML 3.2 schemas. These in turn import schemas produced by the W3C, which are available from the W3C website at

<http://www.w3.org/XML/1998/namespace.html>. The OSProducts.xsd defines the feature collection and feature members. In addition, this application schema will define the transactions used for a Change Only Update supply.

The Routing and Asset Management schema document defines the

<http://namespaces.os.uk/mastermap/routingAndAssetManagement/2.1> namespace, this is defined in the XSD at:

<http://www.os.uk/xml/schema/highwaysnetwork/2.1/RoutingAndAssetManagement.xsd>

The General Network schema document defines the <http://namespaces.os.uk/mastermap/generalNetwork/2.0> namespace, this is defined in the XSD at:

<https://www.ordnancesurvey.co.uk/xml/schema/network/2.0/generalNetwork.xsd>.

The Highways Dedication schema document defines the

<http://namespaces.os.uk/mastermap/highwayDedication/1.0> namespace, this is defined in the XSD at:

<https://www.ordnancesurvey.co.uk/xml/schema/highwaysnetwork/1.0/HighwayDedication.xsd>

The application schema uses the following XML namespaces, for which definitions are available as given here:

Prefix	Namespace identifier	Definition available at
gml	http://www.opengis.net/gml	http://schemas.opengis.net/gml/3.2.1/gml.xsd
xsi	http://www.w3.org/2001/XMLSchema-instance	Built in to XML http://www.w3.org/TR/xmlschema-1/
xlink	http://www.w3.org/1999/xlink	http://www.w3.org/1999/xlink.xsd
net	http://inspire.ec.europa.eu/schemas/net/4.0	http://inspire.ec.europa.eu/schemas/net/4.0/Network.xsd

tn	http://inspire.ec.europa.eu/schemas/tn/4.0	http://inspire.ec.europa.eu/schemas/tn/4.0/CommonTransportElements.xsd
tn-ro	http://inspire.ec.europa.eu/schemas/tn-ro/4.0	http://inspire.ec.europa.eu/schemas/tn-ro/4.0/RoadTransportNetwork.xsd
tn-w	http://inspire.ec.europa.eu/schemas/tn-w/4.0	http://inspire.ec.europa.eu/schemas/tn-w/4.0/WaterTransportNetwork.xsd
os	http://namespaces.os.uk/product/1.0	http://www.ordnancesurvey.co.uk/xml/schema/product/1.0/OSProduct.xsd
network	http://namespaces.os.uk/mastermap/generalNetwork/2.0	https://www.ordnancesurvey.co.uk/xml/schema/network/2.0/generalNetwork.xsd
highway	http://namespaces.os.uk/mastermap/highwayNetwork/2.0	http://www.os.uk/xml/schema/highwaysnetwork/2.0/LinearHighwayNetwork.xsd
ram	http://namespaces.os.uk/mastermap/routingAndAssetManagement/2.1	http://www.os.uk/xml/schema/highwaysnetwork/2.1/RoutingAndAssetManagement.xsd
hwtn	http://namespaces.os.uk/mastermap/highwaysWaterTransportNetwork/1.0	http://www.os.uk/xml/schema/highwaysnetwork/v1/HighwaysWaterTransportNetwork.xsd
dedication	http://namespaces.os.uk/mastermap/highwayDedication/1.0	https://www.ordnancesurvey.co.uk/xml/schema/highwaysnetwork/1.0/HighwayDedication.xsd

Annexe A Product and service performance report form

Ordnance Survey welcomes feedback from its customers about OS MasterMap Highways Network.

If you would like to share your thoughts with us, please print a copy of this form and when completed post or fax it to the address below.

Your name:

Organisation:

Address:

.....

.....

Postcode:

Phone:

Fax:

Email:

Quotation or order reference:

Please record your comments or feedback in the space below. We will acknowledge receipt of your form within three (3) working days and provide you with a full reply or a status report within 21 working days.

If you are posting this form, please send it to:

OS MasterMap Highways Network, Product Manager, Ordnance Survey, Adanac Drive, SOUTHAMPTON, SO16 0AS.

If you wish to return it by fax, please dial 023 8005 6159.

Any personal information that you supply with this report form will be used by Ordnance Survey only in the improvement of its products and services. It will not be made available to third parties.

Annexe B GML Examples

Examples of the different GML structure for Full Supply orders and Change Only Update orders and the transactions within.

Full Supply

An example of the Full Supply GML including the opening and closing tags.

<os:FeatureCollection>

<os:FeatureMember>

```
<highway:RoadNode gml:id="osgb5000005193042483">
  <gml:identifier codeSpace="http://inspire.jrc.ec.europa.eu/ids">http://data.os.uk/id/5000005193042483</gml:identifier>
  <net:beginLifespanVersion>2017-01-13T00:00:00.000</net:beginLifespanVersion>
  <net:inspireId>
    <base:Identifier>
      <base:localId>5000005193042483</base:localId>
      <base:namespace>http://data.os.uk/</base:namespace>
    </base:Identifier>
  </net:inspireId>
  <net:inNetwork xlink:href="#OSHHighwayNetwork"/>
  <net:geometry>
    <gml:Point srsName="urn:ogc:def:crs:EPSG::27700" gml:id="LOCAL_ID_6">
      <gml:pos>611319.332 231278.275</gml:pos>
    </gml:Point>
  </net:geometry>
  <tn:validFrom nilReason="unknown" xsi:nil="true"/>
  <tn-ro:formOfRoadNode xlink:title="junction" xlink:href="http://inspire.ec.europa.eu/codelist/FormOfRoadNodeValue/junction"/>
  <highway:reasonForChange codeSpace="http://www.os.uk/xml/codelists/ChangeTypeValue.xml">New</highway:reasonForChange>
  <highway:relatedRoadArea xlink:href="#osgb5000005193041468"/>
</highway:RoadNode>
```

</os:FeatureMember >

</os:FeatureCollection >

Change Only Update

An example of the Change Only Update GML including opening and closing tags and the different types of transactions.

<os:Transaction>

<os:insert>

```
<highway:RoadNode gml:id="osgb5000005193042483">
  <gml:identifier codeSpace="http://inspire.jrc.ec.europa.eu/ids">http://data.os.uk/id/5000005193042483</gml:identifier>
  <net:beginLifespanVersion>2017-01-13T00:00:00.000</net:beginLifespanVersion>
  <net:inspireId>
    <base:Identifier>
      <base:localId>5000005193042483</base:localId>
```

```

    <base:namespace>http://data.os.uk/</base:namespace>
  </base:Identifier>
</net:inspireId>
<net:inNetwork xlink:href="#OSHighwayNetwork"/>
<net:geometry>
  <gml:Point srsName="urn:ogc:def:crs:EPSG::27700" gml:id="LOCAL_ID_6">
    <gml:pos>611319.332 231278.275</gml:pos>
  </gml:Point>
</net:geometry>
<tn:validFrom nilReason="unknown" xsi:nil="true"/>
<tn-ro:formOfRoadNode xlink:title="junction" xlink:href="http://inspire.ec.europa.eu/codelist/FormOfRoadNodeValue/junction"/>
<highway:reasonForChange codeSpace="http://www.os.uk/xml/codelists/ChangeTypeValue.xml">New</highway:reasonForChange>
<highway:relatedRoadArea xlink:href="#osgb5000005193041468"/>
</highway:RoadNode>

```

</os:insert>

<os:replace>

```

<highway:RoadNode gml:id="osgb4000000003855390">
  <gml:identifier codeSpace="http://inspire.jrc.ec.europa.eu/ids">http://data.os.uk/id/4000000003855390</gml:identifier>
  <net:beginLifespanVersion>2016-08-21T00:00:00.000</net:beginLifespanVersion>
  <net:inspireId>
    <base:Identifier>
      <base:localId>4000000003855390</base:localId>
      <base:namespace>http://data.os.uk/</base:namespace>
    </base:Identifier>
  </net:inspireId>
  <net:inNetwork xlink:href="#OSHighwayNetwork"/>
  <net:geometry>
    <gml:Point srsName="urn:ogc:def:crs:EPSG::27700" gml:id="LOCAL_ID_2497055">
      <gml:pos>398309.376 865124.714</gml:pos>
    </gml:Point>
  </net:geometry>
  <tn:validFrom nilReason="unknown" xsi:nil="true"/>
  <tn-ro:formOfRoadNode xlink:title="junction" xlink:href="http://inspire.ec.europa.eu/codelist/FormOfRoadNodeValue/junction"/>
  <highway:reasonForChange codeSpace="http://www.os.uk/xml/codelists/ChangeTypeValue.xml">New</highway:reasonForChange>
  <highway:relatedRoadArea xlink:href="#osgb1000002063990526"/>
</highway:RoadNode>

```

</os:replace>

<os:delete>

```

<highway:RoadNode gml:id="osgb4000000003334901">
  <gml:identifier codeSpace="http://inspire.jrc.ec.europa.eu/ids">http://data.os.uk/id/4000000003334901</gml:identifier>
  <net:beginLifespanVersion>2017-01-13T00:00:00.000</net:beginLifespanVersion>
  <net:inspireId>
    <base:Identifier>

```



```

<base:localId>4000000003334901</base:localId>
<base:namespace>http://data.os.uk/</base:namespace>
</base:Identifier>
</net:inspireId>
<net:endLifespanVersion>2017-01-13T00:00:00.000</net:endLifespanVersion>
<net:inNetwork xlink:href="#OSHHighwayNetwork"/>
<net:geometry>
  <gml:Point srsName="urn:ogc:def:crs:EPSG::27700" gml:id="LOCAL_ID_0">
    <gml:pos>215328.243 943956.030</gml:pos>
  </gml:Point>
</net:geometry>
<tn:validFrom nilReason="unknown" xsi:nil="true"/>
<tn-ro:formOfRoadNode xlink:title="road end" xlink:href="http://inspire.ec.europa.eu/codelist/FormOfRoadNodeValue/roadEnd"/>
<highway:reasonForChange codeSpace="http://www.os.uk/xml/codelists/ChangeTypeValue.xml">End Of Life</highway:reasonForChange>
<highway:relatedRoadArea xlink:href="#osgb9999"/>
</highway:RoadNode>

```

</os:delete>

<os:delete>

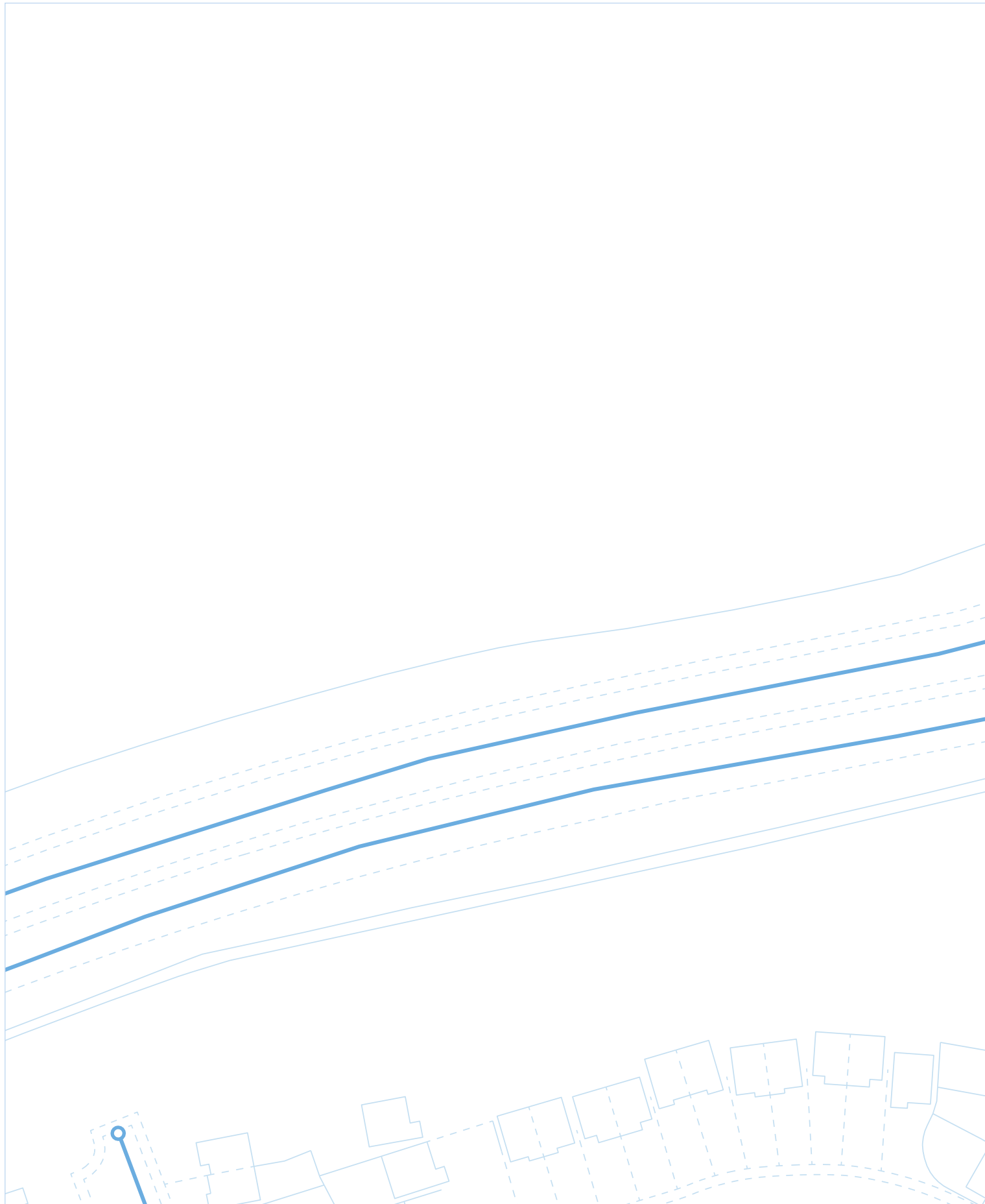
```

<highway:RoadNode gml:id="osgb4000000003336706">
  <gml:identifier codeSpace="http://inspire.jrc.ec.europa.eu/ids">http://data.os.uk/id/4000000003336706</gml:identifier>
  <net:beginLifespanVersion>2017-02-17T00:00:00.000</net:beginLifespanVersion>
  <net:inspireId>
    <base:Identifier>
      <base:localId>4000000003336706</base:localId>
      <base:namespace>http://data.os.uk/</base:namespace>
    </base:Identifier>
  </net:inspireId>
  <net:endLifespanVersion>2017-02-17T00:00:00.000</net:endLifespanVersion>
  <net:inNetwork xlink:href="#OSHHighwayNetwork"/>
  <net:geometry>
    <gml:Point srsName="urn:ogc:def:crs:EPSG::27700" gml:id="LOCAL_ID_16">
      <gml:pos>287295.241 935655.346</gml:pos>
    </gml:Point>
  </net:geometry>
  <tn:validFrom nilReason="unknown" xsi:nil="true"/>
  <tn-ro:formOfRoadNode xlink:title="junction" xlink:href="http://inspire.ec.europa.eu/codelist/FormOfRoadNodeValue/junction"/>
  <highway:reasonForChange codeSpace="http://www.os.uk/xml/codelists/ChangeTypeValue.xml">Modified
Geometry</highway:reasonForChange>
  <highway:relatedRoadArea xlink:href="#osgb1000000288453345"/>
</highway:RoadNode>

```

</os:delete>

</os:Transaction>



**Customer Service Centre, Ordnance Survey,
Adanac Drive, Southampton, United Kingdom, SO16 0AS**

+44 (0)3456 050505 (General enquiries)
+44 (0)3456 050504 (Welsh helpline)
+44 (0)2380 056146 (Textphone)

customerservices@os.uk
www.os.uk