

ORDNANCE SURVEY GB

# OSMM HIGHWAYS NETWORK – ROADS – TECHNICAL SPECIFICATION

## Version history

Version	Date	Description
1.0	03/2016	Initial release.
2.0	10/2016	Minor updates.
2.1	04/2017	Minor updates.
2.2	10/2017	Minor updates.
2.3	03/2021	Addition of Scottish Street information.
2.4	02/2022	Introduction of GeoPackage and Vector Tiles formats to the product. New template attached to the document.
2.5	07/2023	Minor updates.

## Purpose of this document

This is the Technical Specification for the OS MasterMap Highways Network - Roads product. This Specification provides greater insight into this product and its potential applications. For information on the contents and structure of OS MasterMap Highways Network, please refer to the Product Guide and Getting Started Guide.

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# I. Introduction

The OS MasterMap Highways Network is the authoritative highway network for Great Britain. It brings together Ordnance Survey’s large-scale road content, the National Street Gazetteer (NSG), the Trunk Road Street Gazetteer (TRSG) and the Scottish Street Gazetteer (SSG).

OS MasterMap Highways Network is made up of four product schemas: Linear Highway Network, Highways Dedication, Routing and Asset Management Information and Highways Water Transport Network (see [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 - Routing and Asset Management Information
- OS MasterMap Highways Network – Paths

This technical specification will cover the OS MasterMap Highways Network - Roads (from here referred to as Road Network) product specification, for further details on Routing and Asset Management Information or Paths product specification, please see their separate Technical Specifications.

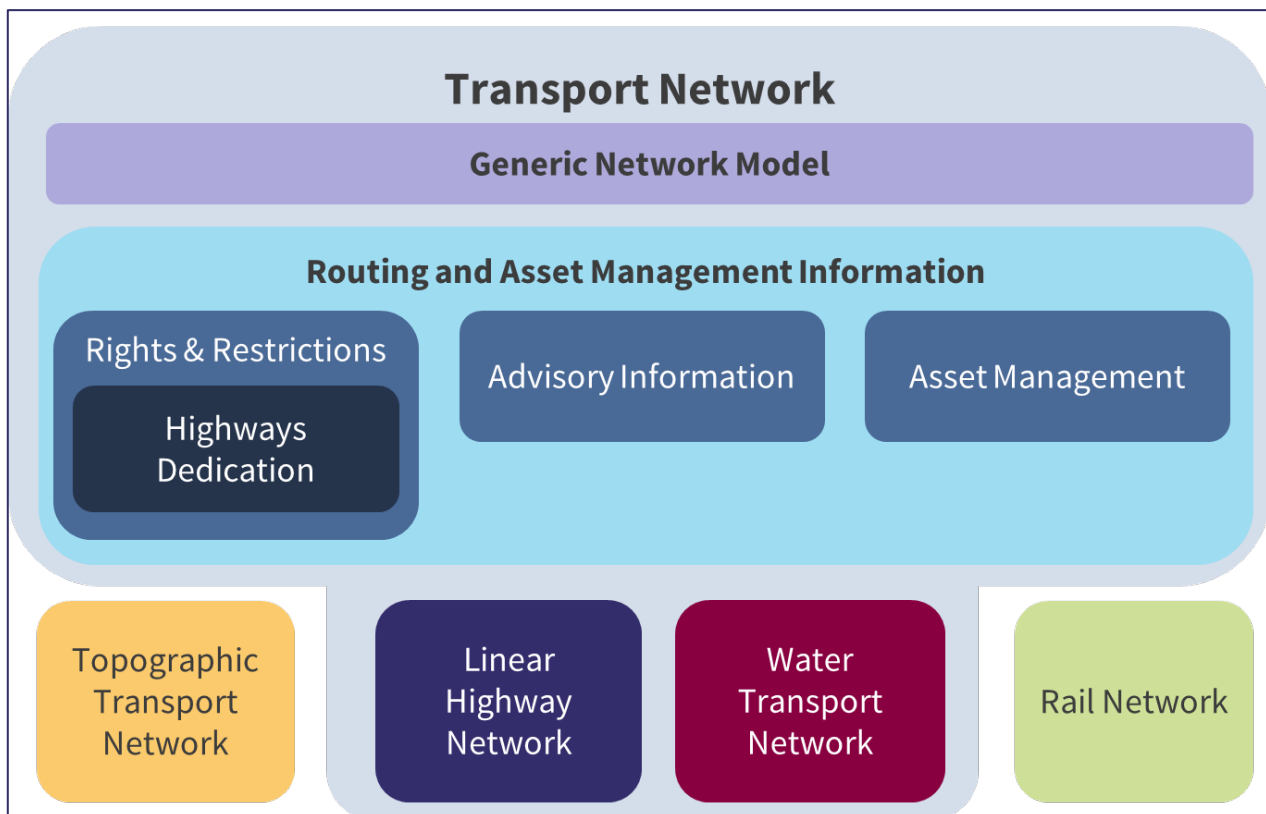


Figure 1. The conceptual INSPIRE transport network model

## 1.1 Identifiers

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

Identifiers shall be encoded in three properties in the data:

- `gml:id` – this is a feature identifier comprising the shorthand prefix namespace and local identifier used to uniquely identify and reference the feature within the dataset. Example: `osgb4000000009461245`.
- `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>.
- `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. The `versionId` will not be populated in the OS MasterMap Highways Network products.

An example of a full identifier is given below:

```
<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 the same source as the 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.

### 1.1.1 TOIDs

TOIDs are strings of up to twenty characters which consist of 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)

#### Examples

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



## 1.1.2 USRNs

USRNs are strings of up to twelve characters which consist 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)

### Examples

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

Although the gml:id is the identifier used for referencing 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.

## 1.1.3 Unique IDs

Unique IDs for Maintenance, Reinstatement, Special Designation are strings of up to 17 characters which consist of two parts:

- Namespace: this is either a HTTP URI (<http://data.os.uk/>) or shorthand prefix ('id\_')
- Local identifier: 14 alphanumeric 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

### Examples (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'

## 1.2 Available formats

OS MasterMap Highways Network– Roads and OS MasterMap Highways Network – Paths will be supplied in three formats: Geography Markup Language (GML 3.2.1), Geopackage and Vector Tiles. All formats are compressed into a regular zip file (.zip).

OS MasterMap Highways Network– RAMI will be supplied in two formats: Geography Markup Language (GML 3.2.1) and Geopackage. All formats are compressed into a regular zip file (.zip).

## 1.3 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).

### 1.3.1 Extending INSPIRE specification

OS MasterMap Highways Network extends the INSPIRE specification to include the additional properties 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.

## 1.4 Notation

### 1.4.1 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 extend the INSPIRE specifications (coloured orange). All code list classes are coloured blue, enumeration classes are green and data types/union classes are purple (see [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.

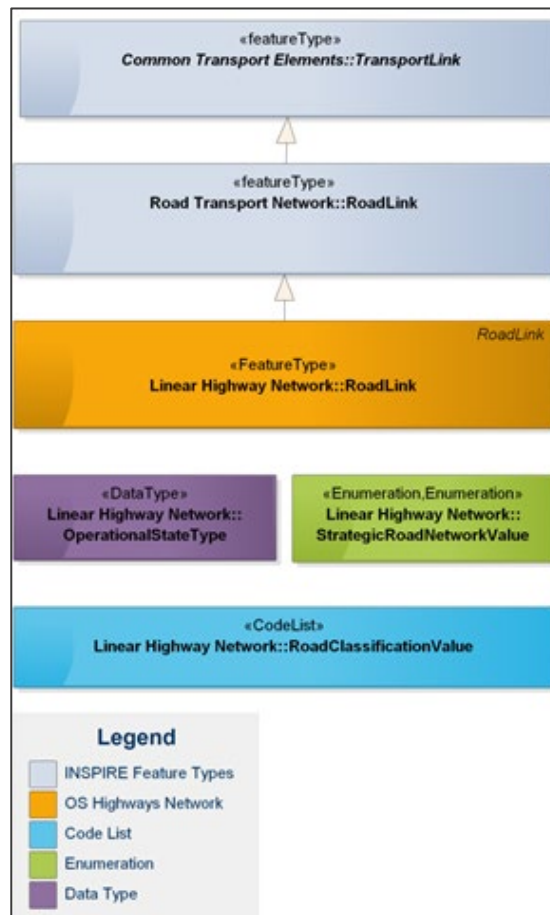


Figure 2. Colour conventions used in UML diagrams

### 1.4.2 Lexical conventions

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

### 1.4.3 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].

Stereotype	UML Element	Description
<<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.

#### 1.4.4 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.

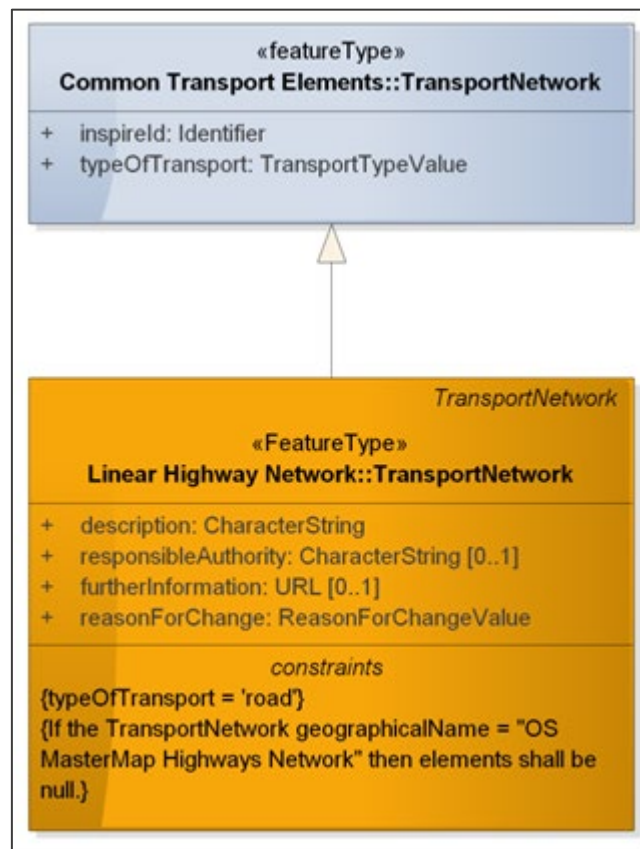


Figure 3. Representation of constraints in UML diagrams

## 1.4.5 Relationships and associations

There are three key types of relationship defined between classes ([Figure 4](#)):

- Generalisation/Specialisation – used to denote either:
  - An extension relationship. 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 has the same name as the class it is extending.

- A sub typing relationship. The target class defines 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 – used to 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.

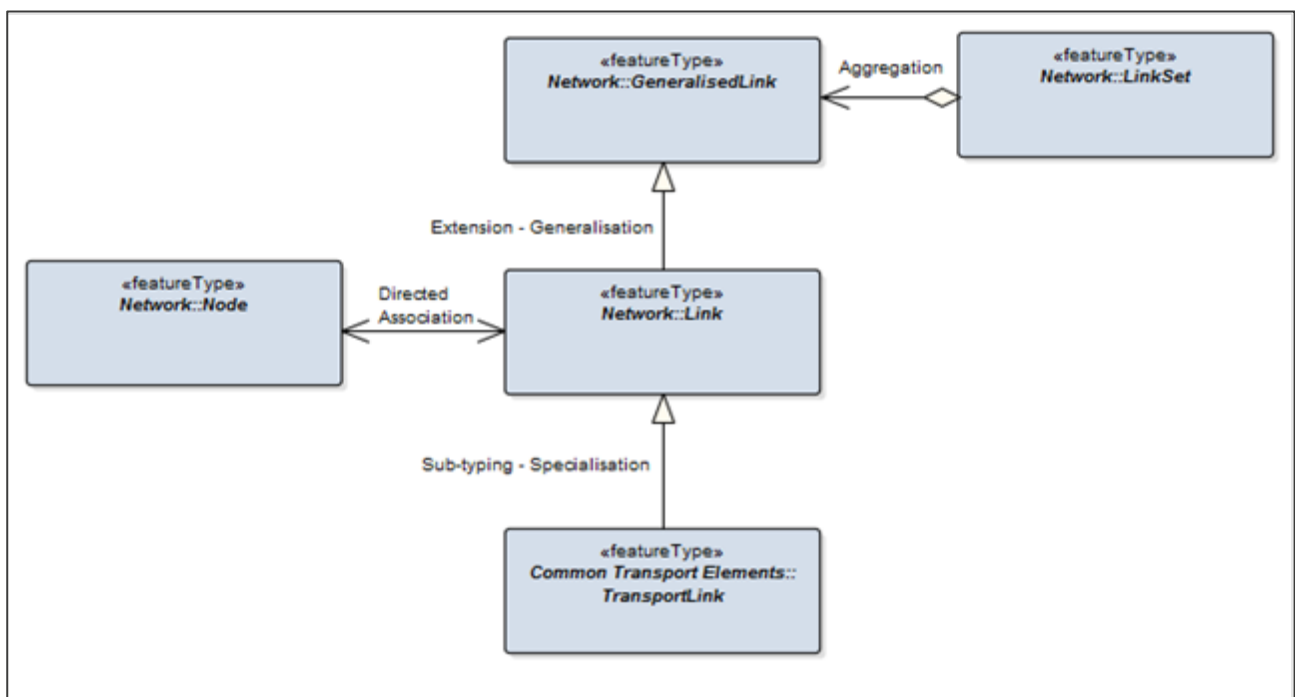


Figure 4. Relationships between feature types

## 2. Specification changes

There have been small enhancements to the OS MasterMap Highways Network. This section will outline the main changes to the Road Network product. For changes to the Routing and Asset Management Information product, please see the Routing and Asset Management Information Technical Specification.

### 2.1 Features

- RoadJunction feature has been populated.
- RoadLink and RoadNode 'z' values have been enhanced to reduce discrepancies when the road passes over a structure, for example a bridge.

### 2.2 Code lists, data types and enumerations

- The "OperationalState" attribute on the Street features has introduced a new value, "Addressing Only", into the "OperationalStateValue" codelist.
- Corrected wrong multiplicity value for minimum width attribute within the "RoadWidthType" Data Type. This had the incorrect value of '1' this has been corrected to '0..1'.

### 3. OS MasterMap Highways Network – Roads

The Road Network is a topologically structured link and node network made up of the following feature types:

Table 1: Roads feature types

Feature type	Description
RoadLink	A line segment representing the general alignment of the carriageway of the road.
RoadNode	A point connecting to at least one RoadLink, providing network connectivity.
Road	A Road defines the complete collection of references to RoadLink features defining the network topology which share the same road name and/or road classification number. For example, the A38 or Romsey Road.
Street	A Street feature is the definition of the street as defined in the National or Scottish Street Gazetteer, made up of aggregated geometry with a unique identifier (USRN).
RoadJunction	A collection of RoadNodes that make up a named or numbered road junction.
FerryLink	A feature which represents a ferry route between two FerryNodes.
FerryNode	A feature representing the point at which a vehicle ferry route or section of ferry route starts or ends.
FerryTerminal	A feature representing the point at which vehicle transfers from the ferry network to the road network or vice versa.

[Figure 5](#) illustrates the relationship between the feature types.

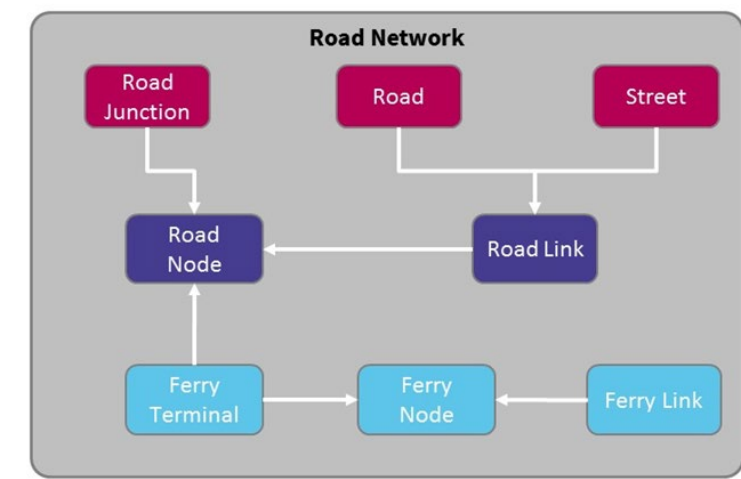


Figure 5. Relationships between Road Network feature types

OS MasterMap Highways Network has been built with the INSPIRE Transport Networks Data Specification as a basis. This has been extended to include the additional properties required by BS 7666-1:2006, defined within the NSG to ensure that conformance to both INSPIRE and BS7666-1:2006 can be achieved.

## 3.1 Common attribution

Each feature within the OS MasterMap Highways Network will have the following common attribution:

- gml:id, gml:identifier and inspireId
- beginLifespanVersion
- inNetwork – this shall always be set to “OSHighwayNetwork”
- reasonForChange
- validFrom

Note: This is assigned a nilReason value “unknown” for most features.

In addition, many of the attributes which have been inherited from the INSPIRE Transport Network model have a stereotype of ‘voidable’, for example “beginLifespanVersion”. Where these attributes have not been populated there is a requirement to give a reason for this. This will be specified in the GML through an attribute called “nilReason”.

## 3.2 RoadLink

### 3.2.1 Overview

A RoadLink is a linear spatial object that defines the geometry and connectivity of a road network between two points in the network. Road links can represent single carriageways, dual carriageways, slip roads, roundabouts and indicative trajectories across traffic squares. RoadLinks will be split for connectivity purposes (for example at junctions) and RoadNodes will connect the RoadLinks together. Each RoadLink will provide a reference to the RoadNodes at the start and end of the RoadLink.



RoadLinks will split where two links cross over or under one another when there is no connectivity, for example at bridges and flyovers. Therefore, the attributes “startGradeSeparation” and “endGradeSeparation” have been populated on the RoadLink. The Grade Separation attribute will indicate where there is or is not a physical connection between the roads in the real world. Grade Separation will determine if a RoadLink is above another; if the two RoadLinks, when referencing the same RoadNode, have different values then it is not possible to move between them at that point.

Where a RoadLink crosses a PathLink at a different level, both the RoadLink and PathLink will split. The attributes “startGradeSeparation” and “endGradeSeparation” will be populated on the RoadLink and PathLink. The Grade Separation attribute will indicate where there is or is not a physical connection between the road and path in the real world. Where the two links cross, the Road Node and Path Node will have the same identifier. Grade Separation will determine if one link is above another. If the two links, when referencing a Road Node and Path Node with the same TOID, have different grade separation values then it is not possible to move between them at that point.

The context diagram ([Figure 6](#)) shows how the RoadLink has been inherited from INSPIRE and the attribution held on the RoadLink.

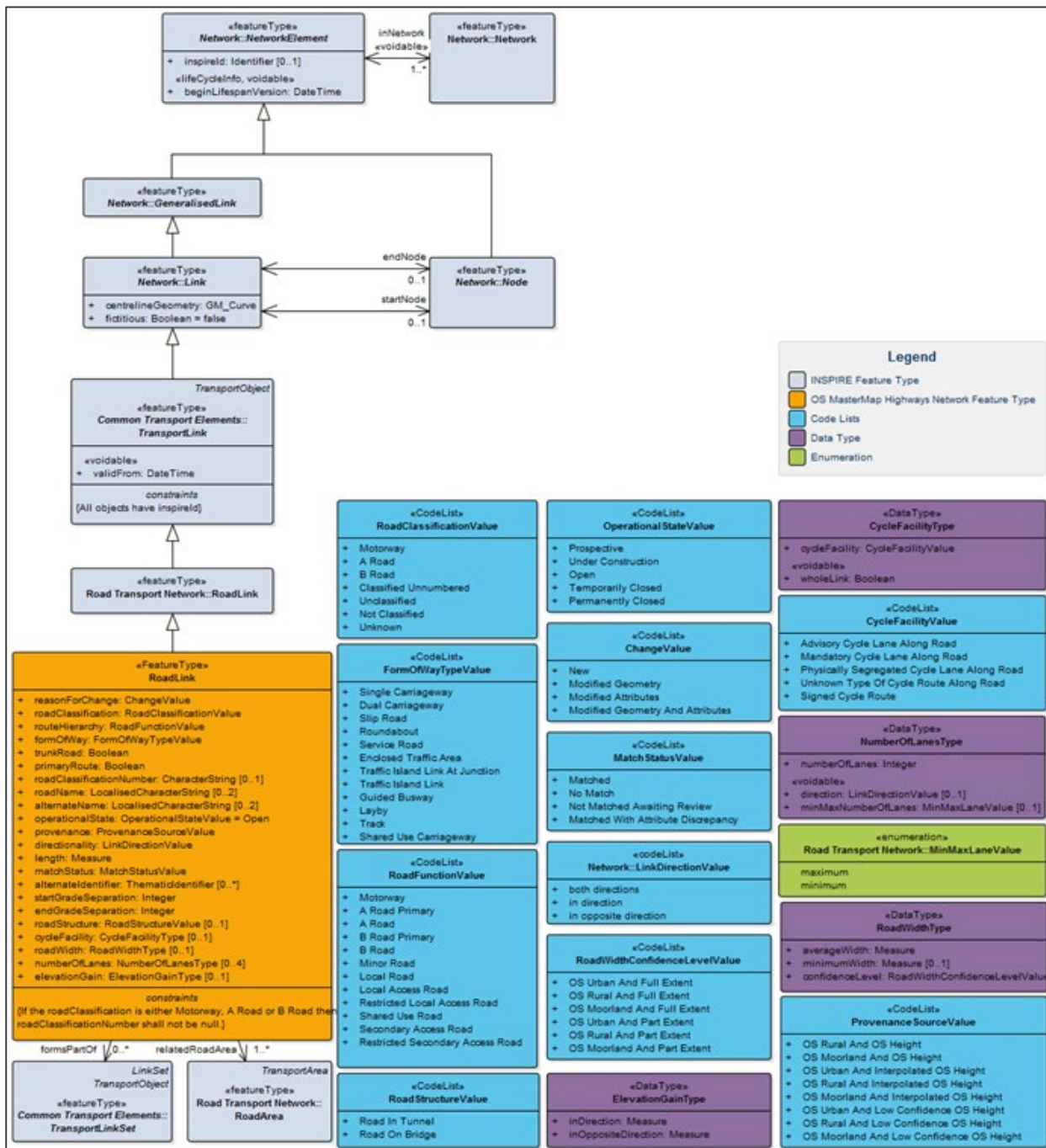


Figure 6. Context diagram: RoadLink

### 3.2.2 Attributes

<b>«FeatureType» RoadLink</b>		
Definition: A feature that represents a part or all of a highway.		
Constraints: If the roadClassification is either Motorway, A Road or B Road then roadClassificationNumber shall not be null.		
Attribute: id		
Definition: Unique identifier, for RoadLink 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: <a href="#">Identifier</a>		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable» «lifeCycleInfo»		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: centrelineGeometry		INSPIRE
Definition: The three-dimensional geometry that represents the alignment of the section of road.		
Type: GM_Curve		Multiplicity: [1]
Attribute: fictitious		INSPIRE
Definition: Indicator that the centreline geometry of the link is a straight line with no intermediate control points – unless the straight line represents the geography in the resolution of the data set appropriately.		
Type: Boolean	Size: 5	Multiplicity: [1]
Attribute: validFrom «voidable»		INSPIRE
Definition: The time when the transport link started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: reasonForChange		

<b>«FeatureType» RoadLink</b>		
Definition: The reason for a change made to a feature.		
Type: <a href="#">ChangeValue</a>	Size: 32	Multiplicity: [1]
<b>Attribute: roadClassification</b>		
Definition: The official designated importance of a road that provides an indication of its expected usage and importance.		
Type: <a href="#">RoadClassificationValue</a>	Size: 21	Multiplicity: [1]
<b>Attribute: routeHierarchy</b>		
Definition: A classification of the road designed to give the most appropriate route.		
Type: <a href="#">RoadFunctionValue</a>	Size: 32	Multiplicity: [1]
<b>Attribute: formOfWay</b>		
Definition: A description of the road based on its nature or use.		
Type: <a href="#">FormOfWayTypeValue</a>	Size: 42	Multiplicity: [1]
<b>Attribute: trunkRoad</b>		
Definition: States if the RoadLink forms part of the Trunk Road network		
Type: Boolean	Size: 5	Multiplicity: [1]
<b>Attribute: primaryRoute</b>		
Definition: States if the RoadLink forms part of the Primary Route network		
Type: Boolean	Size: 5	Multiplicity: [1]
<b>Attribute: roadClassificationNumber</b>		
Definition: The official road number assigned by the appropriate authority. Note that this includes at least one letter. For example, 'A329(M)'		
Type: CharacterString	Size: 10	Multiplicity: [0..1]
<b>Attribute: roadName</b>		
Definition: The name of the road the feature is part of. When a RoadLink is referenced by a Street with a streetStateType of Designated Street Name this is the name used else the name is from Road.		
Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').		
Type: LocalisedCharacterString	Size: 255	Multiplicity: [0..2]
<b>Attribute: alternateName</b>		
Definition: Another name for the road the feature is part of, this is populated with the name captured by Ordnance Survey when it differs from that in Street.		
Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').		

<b>«FeatureType» RoadLink</b>		
Type: LocalisedCharacterString	Size: 255	Multiplicity: [0..2]
<b>Attribute: operationalState</b>		
Definition: Indicator identifying the construction status of the road		
Type: <a href="#">OperationalStateValue</a>	Size: 19	Multiplicity: [1]
<b>Attribute: provenance</b>		
Definition: The origin and derivation of the three-dimensional geometry of the RoadLink.		
Type: <a href="#">ProvenanceSourceValue</a>	Size: 23	Multiplicity: [1]
<b>Attribute: directionality</b>		
Definition: Indication of the direction of traffic flow.		
Type: <a href="#">LinkDirectionValue</a>	Size: 21	Multiplicity: [1]
<b>Attribute: length</b>		
Definition: The calculated two-dimensional length of the RoadLink in metres.		
Note: A Unit of Measure (uom) is provided as part of the attribute which will always be 'm'.		
Type: Measure	Size: 7,2	Multiplicity: [1]
<b>Attribute: matchStatus</b>		
Definition: Indicates whether the feature has been matched to a feature in the NSG.		
Type: <a href="#">MatchStatusValue</a>	Size: 39	Multiplicity: [1]
<b>Attribute: alternateldentifier</b>		
Definition: Identifier(s) of the Elementary Street Unit from NSG or TRSG.		
Type: ThematicIdentifier	Size: 20	Multiplicity: [0..*]
<b>Attribute: startGradeSeparation</b>		
Definition: The relative level of the link at the startNode.		
Type: Integer		Multiplicity: [1]
<b>Attribute: endGradeSeparation</b>		
Definition: The relative level of the link at the endNode.		
Type: Integer		Multiplicity: [1]
<b>Attribute: roadStructure</b>		
Definition: Identifies if this section of road passes through or over a physical structure.		
Type: <a href="#">RoadStructureValue</a>	Size: 14	Multiplicity: [0..1]
<b>Attribute: cycleFacility</b>		
Definition: Identifies if the RoadLink has facilities for a cyclist.		

«FeatureType» RoadLink		
Type: <a href="#">CycleFacilityType</a>	Multiplicity: [0..1]	
Attribute: roadWidth		
Definition: An indication of the width of the road carriageway as recorded in the OS MasterMap Topography layer, this must not be used to identify whether individual vehicles can use a route.		
Type: <a href="#">RoadWidthType</a>	Multiplicity: [0..1]	
Attribute: numberOfLanes		
Definition: The number of lanes along a RoadLink.		
Note: Values not populated in this release.		
Type: <a href="#">NumberOfLanesType</a>	Multiplicity: [0..4]	
Attribute: elevationGain		
Definition: The elevation gain is calculated from three-dimensional geometry to define the total ascent experienced when passing along a RoadLink feature. The value is expressed both with and against the coordinate order.		
Type: <a href="#">ElevationGainType</a>	Multiplicity: [0..1]	
Association: formsPartOf		
Definition: Identifier of the Road or Street to which the RoadLink forms part of.		
Multiplicity: 0..*	Size: 20	
Association: startNode	INSPIRE	
Definition: The node coincident with the first vertex of the geometry attribute.		
Multiplicity: 0..1	Size: 20	
Association: endNode	INSPIRE	
Definition: The node coincident with the last vertex of the geometry attribute.		
Multiplicity: 0..1	Size: 20	
Association: relatedRoadArea		
Definition: Reference to the topographic representation(s) of the same part of the road.		
Multiplicity: 1..*	Size: 20	

## 3.3 RoadNode

### 3.3.1 Overview

A point spatial object that is used to break up the road network for connectivity. The road network splits for the following circumstances:

- The location where an attribute recorded on the road link changes for example its name or form
- The intersection or crossing of Roads (including bridges, flyovers and tunnels where there is no connectivity)
- The start/end of a Road
- Where a One-Way Routing feature starts or ends
- Where a tunnel starts or ends
- Where there is a connection to the Path Network.

The context diagram (Figure 7) shows how the RoadNode has been inherited from INSPIRE and the attribution held on the RoadNode.

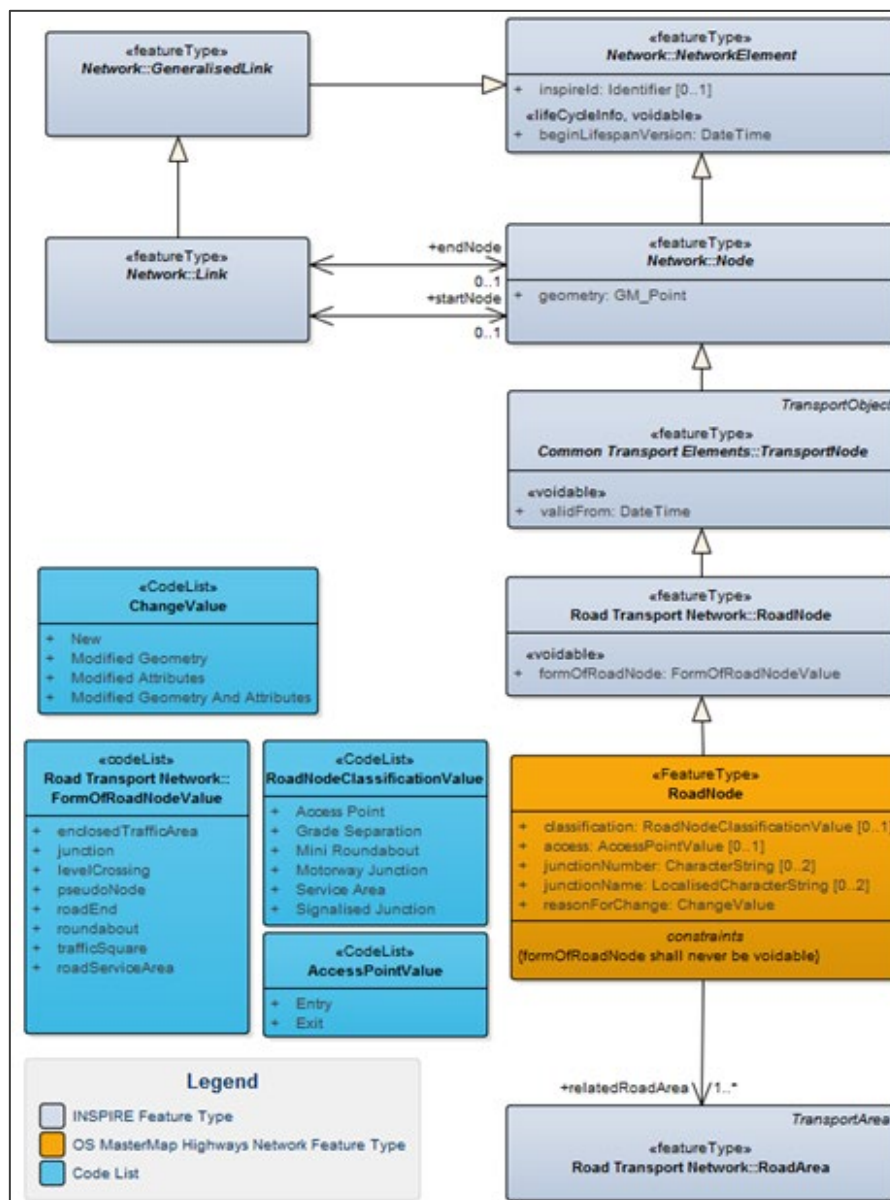


Figure 7. Context diagram: RoadNode

### 3.3.2 Attributes

<b>«FeatureType» RoadNode</b>		
Definition: A point representing either the start/end of a road, the connectivity between two or more roads or where one of the recorded attributes changes along a road.		
Constraints: formOfRoadNode shall never be voidable		
Attribute: id		
Definition: Unique identifier, for RoadNode this is a TOID		
Type: <code>CharacterString</code>	Size: 20	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: <code>CharacterString</code>	Size: 37	Multiplicity: [1]
Attribute: inspireId		INSPIRE
Definition: External object identifier of the spatial object.		
Type: <a href="#">Identifier</a>		Multiplicity: [0..1]
Attribute: beginLifespanVersion «lifeCycleInfo» «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: <code>DateTime</code>		Multiplicity: [1]
Attribute: validFrom «voidable»		INSPIRE
Definition: The time when the transport node started to exist in the real world.		
Note: The time part is always set to zero.		
Type: <code>DateTime</code>		Multiplicity: [1]
Attribute: geometry		INSPIRE
Definition: The three-dimensional location of the node. For nodes representing grade separated intersections the elevation is of the lower road		
Type: <code>GM_Point</code>		Multiplicity: [1]
Attribute: formOfRoadNode «voidable»		INSPIRE
Definition: Description of the function of a road node in the road transport network.		
Type: <a href="#">FormOfRoadNodeValue</a>	Size: 21	Multiplicity: [1]
Attribute: classification		



## «FeatureType» RoadNode

Definition: Further specialisation of the form of road node.

Type: [RoadNodeClassificationValue](#) Size: 19 Multiplicity: [0..1]

### Attribute: access

Definition: Point where vehicles can either exit or enter a controlled-access highway.

Note: Values not populated in the initial release.

Type: [AccessPointValue](#) Size: 5 Multiplicity: [0..1]

### Attribute: junctionName

Definition: The name of any junction that the node represents part of.

Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').

Type: LocalisedCharacterString Size: 120 Multiplicity: [0..2]

### Attribute: junctionNumber

Definition: The number of any motorway junction that the node represents part of, for example M3 J12.

Type: CharacterString Size: 30 Multiplicity: [0..2]

### Attribute: reasonForChange

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

Type: [ChangeValue](#) Size: 32 Multiplicity: [1]

### Association: relatedRoadArea

Definition: Reference to the topographic representation(s) of the same part of the road.

Multiplicity: 1..\* Size: 20

## 3.4 Road

### 3.4.1 Overview

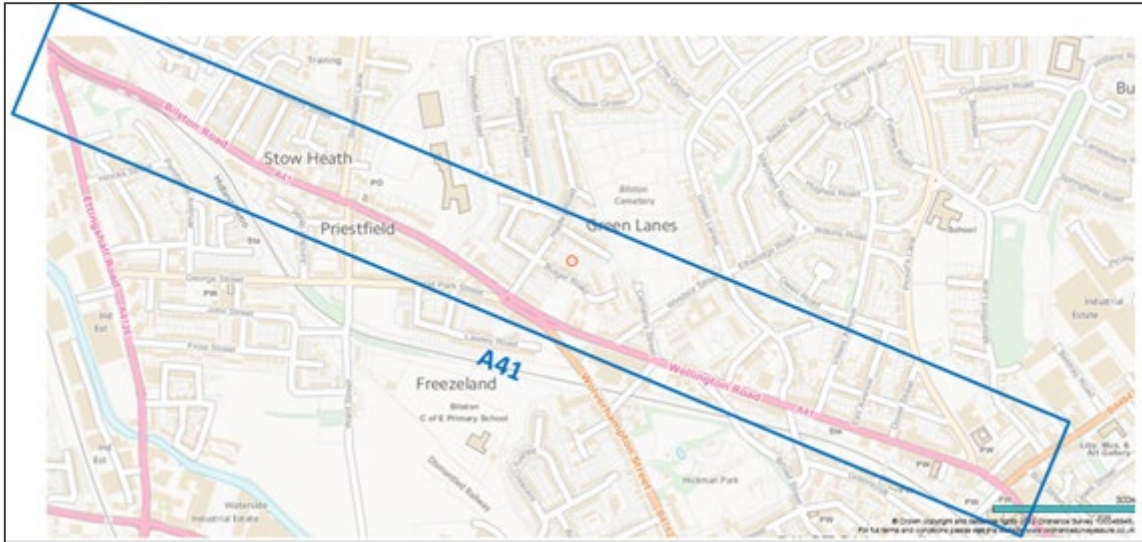


Figure 8. A Road feature for the A41

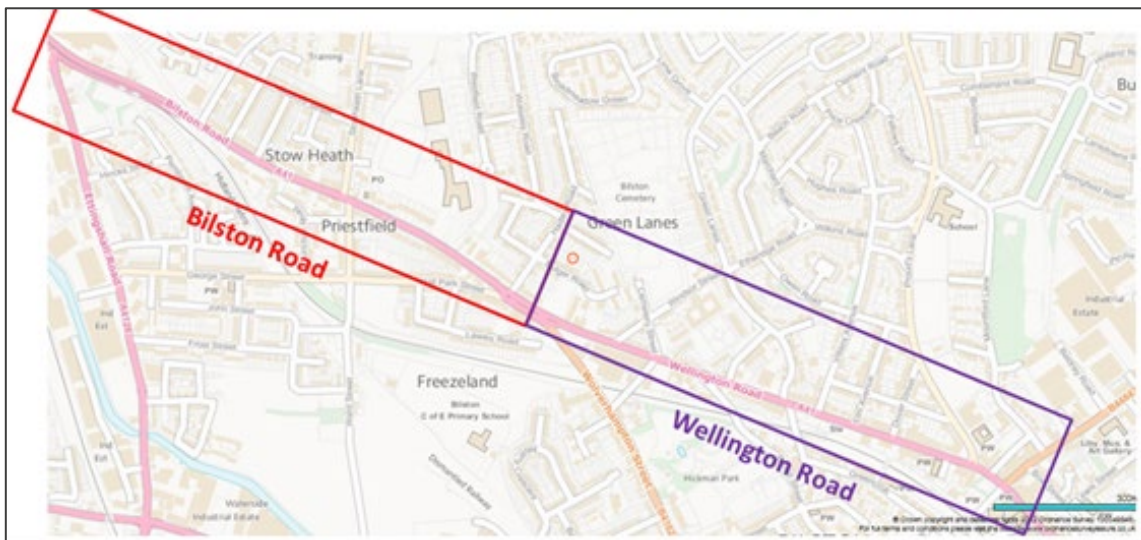


Figure 9. Two Road features covering the two named thoroughfares which make up the A41

A Road feature is a link set which represents a collection of RoadLink features used primarily by motorised vehicles that share the same name (e.g. Bilston Road) or classification number (e.g. A41). A Road will reference the complete collection of RoadLink features irrespective of which authority boundary it falls within. The feature will include Motorways, A Roads, B Roads and Named Thoroughfares (roads), as illustrated in [Figure 8](#) and [Figure 9](#).

The link set may not be contiguous across junctions or where a classified road consists of separate sections, which may be separated by some considerable distance. In addition, the same RoadLink feature may be referenced by multiple Road features.

The context diagram (Figure 10) shows how the Road has been inherited from INSPIRE and the attribution held on the Road.

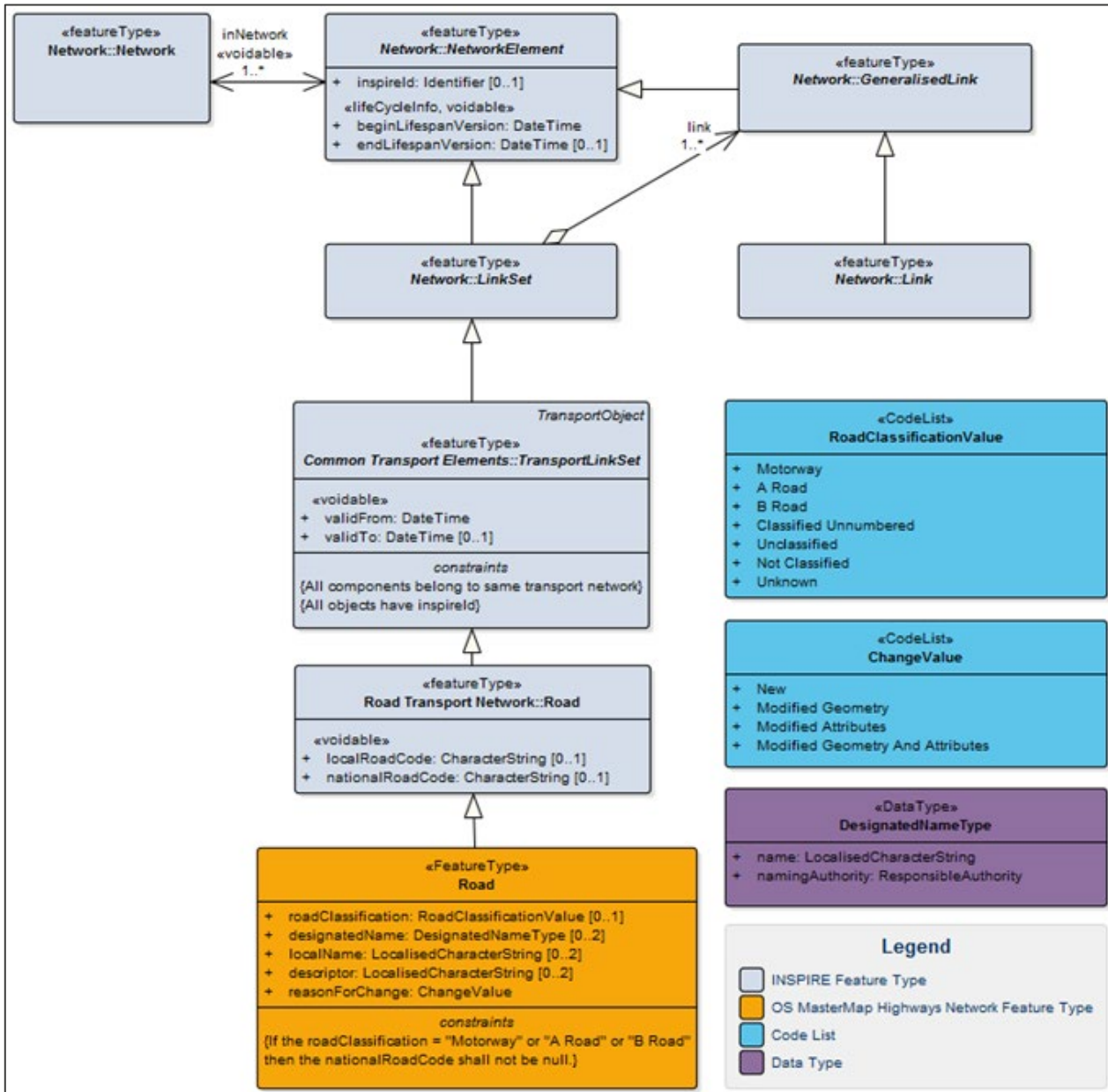


Figure 10.Context diagram: Road

### 3.4.2 Attributes

#### «FeatureType» Road

Definition: A compound feature that represents a road with a name or number. This may be a classified road, such as the A38, or a named road such as Romsey Road. This references a collection of RoadLinks.

Constraints:

<b>«FeatureType» Road</b>		
If the roadClassification = "Motorway" or "A Road" or "B Road" then the nationalRoadCode shall not be null.		
<b>Attribute: id</b>		
Definition: Unique identifier, for Road this is a TOID		
Type: <code>CharacterString</code>	Size: 20	Multiplicity: [1]
<b>Attribute: identifier</b>		
Definition: Uniform Resource Identifier		
Type: <code>CharacterString</code>	Size: 37	Multiplicity: [1]
<b>Attribute: inspireId</b>		<b>INSPIRE</b>
Definition: External object identifier of the spatial object.		
Type: <a href="#">Identifier</a>		Multiplicity: [0..1]
<b>Attribute: beginLifespanVersion «lideCycleInfo» «voidable»</b>		<b>INSPIRE</b>
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: <code>DateTime</code>		Multiplicity: [1]
<b>Attribute: validFrom «voidable»</b>		<b>INSPIRE</b>
Definition: The time when the transport link set started to exist in the real world.		
Note: The time part is always set to zero.		
Type: <code>DateTime</code>		Multiplicity: [1]
<b>Attribute: localRoadCode «voidable»</b>		<b>INSPIRE</b>
Definition: Identification code assigned to the road by the local road authority.		
Type: <code>CharacterString</code>	Size: 10	Multiplicity: [0..1]
<b>Attribute: nationalRoadCode «voidable»</b>		<b>INSPIRE</b>
Definition: The national number of the road.		
Type: <code>CharacterString</code>	Size: 10	Multiplicity: [0..1]
<b>Attribute: roadClassification</b>		
Definition: The national classification of the road.		
Type: <a href="#">RoadClassificationValue</a>	Size: 21	Multiplicity: [0..1]
<b>Attribute: designatedName</b>		
Definition: Official name assigned to the highway by a designated Street Naming Authority.		

<b>«FeatureType» Road</b>		
Note: On the Road feature this will always be the OS name.		
Type: <a href="#">DesignatedNameType</a>	Multiplicity: [0..2]	
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: <a href="#">ChangeValue</a>	Size: 32	Multiplicity: [1]
Aggregation: link	INSPIRE	
Definition: The reference to the RoadLink features which builds up the Road feature.		
Multiplicity: 1..*	Size: 20	

## 3.5 Street

### 3.5.1 Overview

A Street feature ([Figure 11](#)) is the definition of the street as defined in the National or Scottish Street Gazetteer. A Street includes aggregated geometry. Where possible, the geometry of streets captured by a Roads or Highway Authority is spatially matched to the geometry of OS RoadLinks.

1. If any of the Street’s Elementary Street Unit(s) (ESUs) have been matched to a RoadLink(s) then the aggregated geometry of the RoadLink(s) will be provided.
2. If none of the Street’s ESUs have been matched to a RoadLink then the aggregated geometry of the ESUs will be provided.

The provenance of this geometry can be identified through the “geometryProvenance” attribute. They will represent either the complete Street or a section of a Street within an Administrative Unit, Town, or Locality and provides additional information about who is responsible for its naming and or numbering. A RoadLink can be referenced by multiple Street features.

The Street extends the Road to provide the additional attribution required to adhere to BS 7666:

- USRN: The Unique Street Reference Number is the unique and persistent identifier of a Street assigned by the Roads or Highway Authority.
- Street Type: The type of Gazetteer record for which the USRN relates. It is mandatory for all USRNs to be assigned a Street Type.
- Operational State: indicates whether the Street is proposed, under construction, open, or closed (permanently or temporarily).
- Responsible Authority: reference to the authority who performs an administrative function – notably naming and numbering.

A Street will split when it crosses the boundary of an Administrative Area where the local maintenance responsibility changes. A Street could also split at a town or locality boundary to allow properties to be located uniquely upon a street via a unique identifier (i.e. USRN).

Note: In the definitions below, users should read the term Highways as Roads when applied to streets in Scotland.

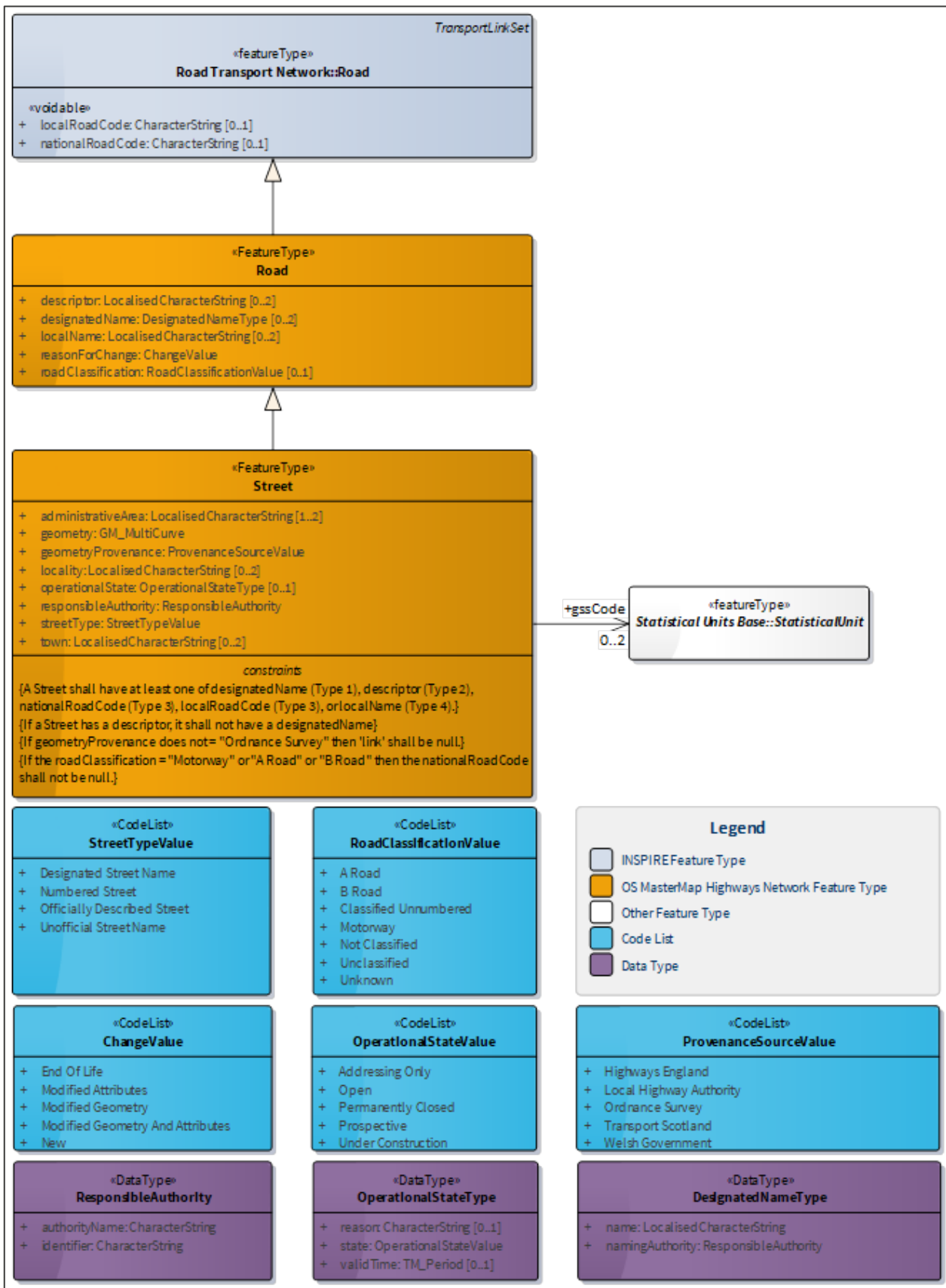


Figure 11.Context diagram: Street



### 3.5.2 Attributes

«FeatureType» Street		
<p>Definition: Any road, footway, path, cycletrack, track or passageway that forms a highway. A highway represents individual subsections of Road which are managed (naming/numbering) by a specified responsible authority.</p>		
<p>Constraints:</p> <ul style="list-style-type: none"> <li>• A Street shall have at least one of designatedName (Type 1), descriptor (Type 2), nationalRoadCode (Type 3), localRoadCode (Type 3), or localName (Type 4).</li> <li>• If a Street has a descriptor, it shall not have a designatedName.</li> <li>• If geometryProvenance does not = "Ordnance Survey" then 'link' shall be null.</li> <li>• If the roadClassification = "Motorway" or "A Road" or "B Road" then the nationalRoadCode shall not be null.</li> </ul>		
Attribute: id		
<p>Definition: Unique identifier, for Street the characters "USRN" appended with the USRN e.g. USRN12345678</p>		
Type: CharacterString	Size: 12	Multiplicity: [1]
Attribute: identifier		
<p>Definition: Uniform Resource Identifier</p>		
Type: CharacterString	Size: 29	Multiplicity: [1]
Attribute: inspireId		INSPIRE
<p>Definition: External object identifier of the spatial object.</p>		
<p>Note: This is the USRN from the NSG or TRSG or SSG.</p>		
Type: <a href="#">Identifier</a>		Multiplicity: [0..1]
Attribute: beginLifespanVersion «lifeCycleInfo» «voidable»		INSPIRE
<p>Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.</p>		
<p>Note: The time part is always set to zero.</p>		
Type: DateTime		Multiplicity: [1]
Attribute: validFrom «voidable»		INSPIRE
<p>Definition: The time when the transport link set started to exist in the real world.</p>		
<p>Note: The time part is always set to zero.</p>		
Type: DateTime		Multiplicity: [1]
Attribute: localRoadCode «voidable»		INSPIRE
<p>Definition: Identification code assigned to the road by the local road authority.</p>		



«FeatureType» Street		
Note: This is only used for classified unnumbered roads.		
Type: CharacterString	Size: 120	Multiplicity: [0..1]
Attribute: nationalRoadCode «voidable»		INSPIRE
Definition: The national number of the road.		
Type: CharacterString	Size: 10	Multiplicity: [0..1]
Attribute: designatedName		
Definition: Official name assigned to the highway by the Street Naming Authority.		
Type: <a href="#">DesignatedNameType</a>		Multiplicity: [0..2]
Attribute: localName		
Definition: Unofficial local name associated to the highway.		
Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').		
Type: LocalisedCharacterString	Size: 120	Multiplicity: [0..2]
Attribute: descriptor		
Definition: Street description allocated by a Street Naming Authority or Highway Authority used to identify a street that does not have a designated name.		
Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').		
Type: LocalisedCharacterString	Size: 120	Multiplicity: [0..2]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: <a href="#">ChangeValue</a>	Size: 32	Multiplicity: [1]
Attribute: roadClassification		
Definition: The national classification of the road.		
Type: <a href="#">RoadClassificationValue</a>	Size: 21	Multiplicity: [0..1]
Attribute: streetType		
Definition: Classification of the type of Street from the National Street Gazetteer.		
Type: <a href="#">StreetTypeValue</a>	Size: 35	Multiplicity: [1]
Attribute: operationalState		
Definition: Indicator identifying the physical nature of the road e.g. Under Construction.		
Type: <a href="#">OperationalStateType</a>		Multiplicity: [0..1]

<b>«FeatureType» Street</b>		
<b>Attribute: locality</b>		
Definition: The Populated Place representing the locality that the Street is located within.		
Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').		
Type: LocalisedCharacterString	Size: 35	Multiplicity: [0..2]
<b>Attribute: town</b>		
Definition: The settlement that the Street falls within.		
Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').		
Type: LocalisedCharacterString	Size: 30	Multiplicity: [0..2]
<b>Attribute: administrativeArea</b>		
Definition: The administrative area that the Street is located within		
Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').		
Type: LocalisedCharacterString	Size: 30	Multiplicity: [1..2]
<b>Attribute: responsibleAuthority</b>		
Definition: Reference to the authority that has current responsibility for naming and numbering.		
Type: <a href="#">ResponsibleAuthority</a>		Multiplicity: [1]
<b>Attribute: geometryProvenance</b>		
Definition: Identify where the geometry of the feature originated.		
Type: <a href="#">ProvenanceSourceValue</a>	Size: 23	Multiplicity: [1]
<b>Attribute: geometry</b>		
Definition: The aggregated geometry of either the matched RoadLinks or the Elementary Street Units.		
Type: GM_MultiCurve		Multiplicity: [1]
<b>Association: gssCode</b>		
Definition: A reference to the unique identifier of administrative areas managed by the Office for National Statistics. Role is used to describe the authority - 'Upper Tier Local Authority', 'Lower Tier Local Authority' and 'Unitary Local Authority'		
Multiplicity: 0..2		Size: 9
<b>Aggregation: link &lt;&lt;voidable&gt;&gt;</b>		<b>INSPIRE</b>
Definition: The reference to the RoadLink features which builds up the Street feature. Where the Street has not been matched to a RoadLink this attribute will be voided.		

## «FeatureType» Street

Multiplicity: 1..\*

Size: 20

### 3.6 RoadJunction

A RoadJunction feature is a collection of RoadNode features that share the same road junction name or number. The collection of RoadNodes will include all RoadNodes that constitute part of a “slip road” or other link between two or more crossing road features ([Figure 12](#)). A RoadNode could be referenced by multiple RoadJunction features.

Motorway Junctions will be populated completely, other junctions are being supplied as data is improved for future releases.



Figure 12. Collection of RoadNodes making up a road junction (highlighted red). RoadLinks representing the slip road are highlighted red for clarification only.

The context diagram ([Figure 13](#)) shows how the RoadJunction feature relates back to the Network Elements.

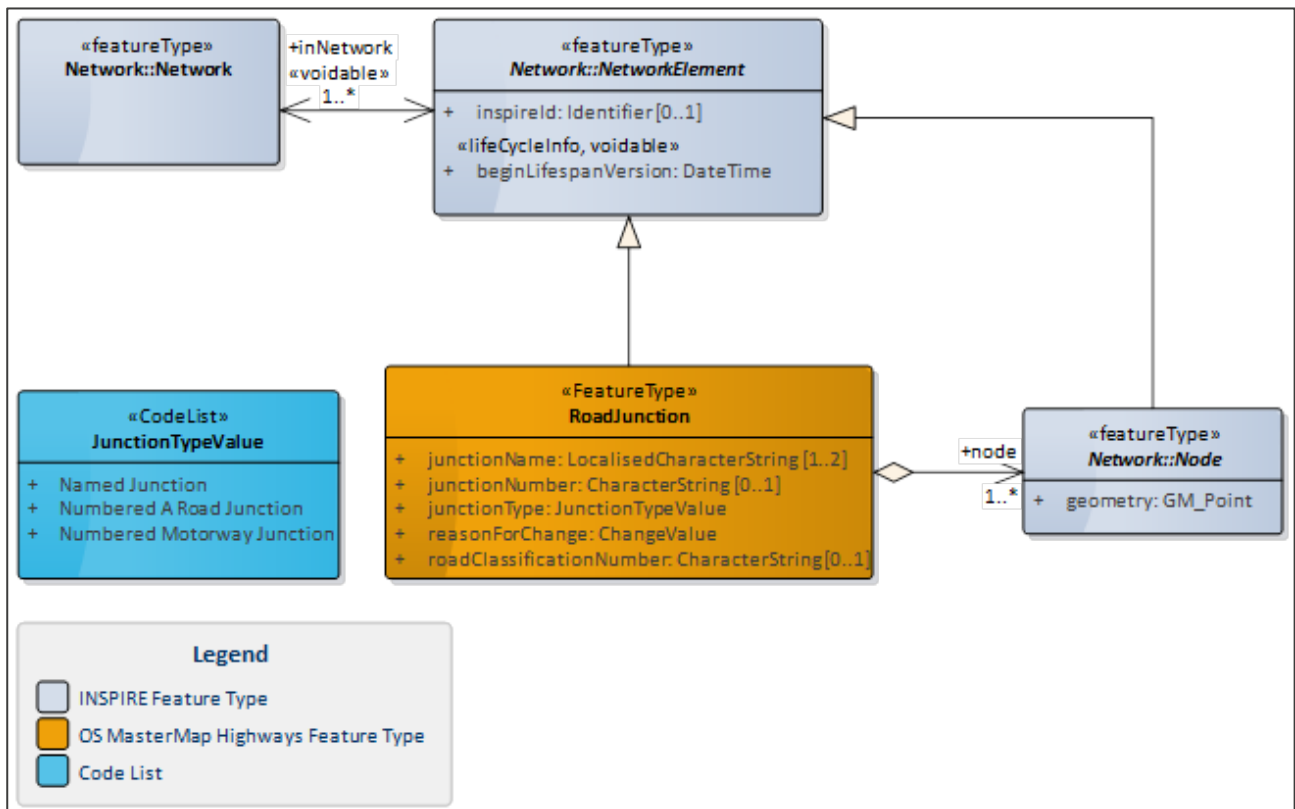


Figure 13.Context diagram: RoadJunction

### 3.6.1 Attributes

«FeatureType» RoadJunction		
Definition: A compound feature that represents a road junction with a name or number.		
Attribute: id		
Definition: Unique identifier, for RoadJunction 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: <a href="#">Identifier</a>		Multiplicity: [0..1]
Attribute: beginLifespanVersion «voidable» «lifeCycleInfo»		INSPIRE
Definition: Date and time at which this version of the spatial object was inserted or changed in the spatial data set.		

## «FeatureType» RoadJunction

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: junctionType

Definition: A classification for the Road Junction.

Type: [JunctionTypeValue](#) Size: 26 Multiplicity: [1]

### Attribute: junctionName

Definition: The name of the junction. For numbered junctions, this will provide a description of the junction, for example, M6 Junction 6.

Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').

Type: LocalisedCharacterString Size: 120 Multiplicity: [1..2]

### Attribute: roadClassificationNumber

Definition: The official road number assigned by the appropriate authority. For example, M6.

Type: CharacterString Size: 5 Multiplicity: [0..1]

### Attribute: junctionNumber

Definition: The number of the junction. For example, 6.

Type: CharacterString Size: 3 Multiplicity: [0..1]

### Association: node

Definition: The reference to the RoadNode features which builds up the RoadJunction feature.

Multiplicity: 1..\* Size: 20

## 3.7 FerryLink

### 3.7.1 Overview

A FerryLink is a linear spatial object which represents the connectivity of a vehicular ferry route across a body of water. A FerryLink will only be captured where both terminals are within Great Britain, and there is a timetabled service which is available to the public. Ferry routes with a terminal outside of Great Britain are not captured, for example Dover to Calais, or where the service is not available to the public.

The context diagram (Figure 14) shows how the FerryLink has been inherited from INSPIRE, the attribution held on the FerryLink and how it relates to the other Ferry components.

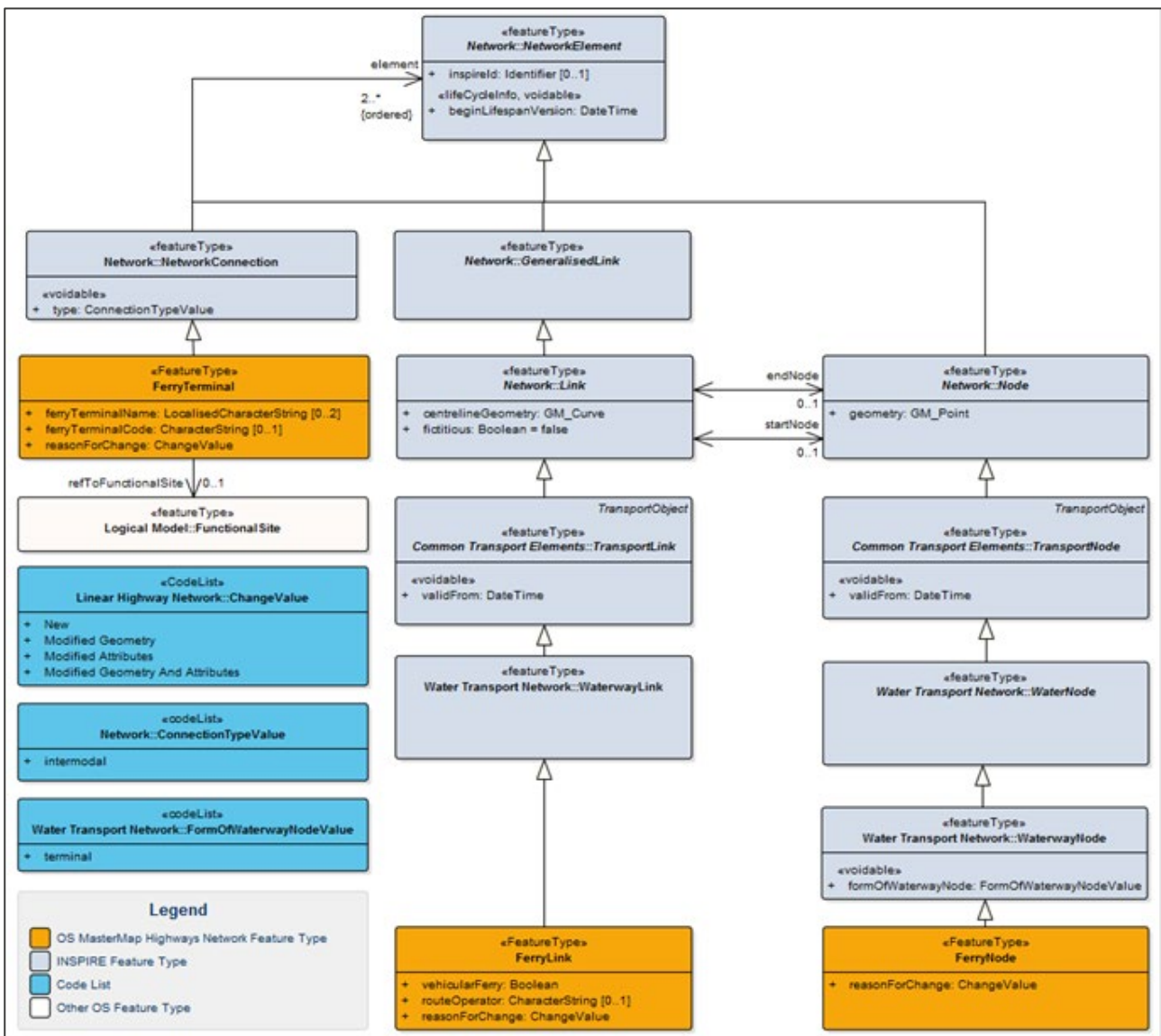


Figure 14.Context diagram: FerryLink, FerryNode and FerryTerminal

### 3.7.2 Attributes

<b>«FeatureType» FerryLink</b>		
Definition: A network link representing a route for a vehicular or pedestrian ferry route.		
Attribute: id		
Definition: Unique identifier, for FerryLink 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: <a href="#">Identifier</a>		Multiplicity: [1]
Attribute: beginLifespanVersion «lifeCycleInfo» «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: centrelineGeometry		INSPIRE
Definition: The three-dimensional geometry that represents the connection between the ferry terminals. Where a detailed alignment is provided it is only an indication of the route a vessel would take. The third dimension is only provided for connectivity and does not reflect any real-world value.		
Type: GM_Curve		Multiplicity: [1]
Attribute: fictitious		INSPIRE
Definition: Indicator that the centreline geometry of the link is a straight line with no intermediate control points – unless the straight line represents the geography in the resolution of the data set appropriately.		
Type: Boolean	Size: 5	Multiplicity: [1]
Attribute: validFrom «voidable»		INSPIRE
Definition: The time when the transport node started to exist in the real world.		
Note: The time part is always set to zero.		
Type: DateTime		Multiplicity: [1]
Attribute: vehicularFerry		
Definition: An indicator if this FerryLink represents a ferry that can be used by vehicles.		



«FeatureType» FerryLink		
Type: Boolean	Size: 5	Multiplicity: [1]
Attribute: routeOperator		
Definition: The URL of the operator of this Ferry route.		
Type: CharacterString	Size: 250	Multiplicity: [0..1]
Attribute: reasonForChange		
Definition: The reason for a change made to a feature.		
Type: <a href="#">ChangeValue</a>	Size: 32	Multiplicity: [1]
Association: startNode		INSPIRE
Definition: The node coincident with the first vertex of the geometry attribute.		
Multiplicity: 0..1	Size: 20	
Association: endNode		INSPIRE
Definition: The node coincident with the last vertex of the geometry attribute.		
Multiplicity: 0..1	Size: 20	

## 3.8 FerryNode

### 3.8.1 Overview

A FerryNode is a point spatial object which is used to represent the connectivity where the FerryLink features start and end. A FerryNode feature may serve multiple FerryLink features if more than one destination is served from the same location. FerryNodes will always be referenced by at least one FerryLink.

The context diagram ([Figure 14](#) above) shows how the FerryNode has been inherited from INSPIRE, the attribution held on the FerryNode and how it relates to the other Ferry components.

### 3.8.2 Attributes

«FeatureType» FerryNode		
Definition: A feature representing the point at which a vehicular or pedestrian ferry route or section of ferry route starts or ends.		
Attribute: id		
Definition: Unique identifier, for FerryNode this is a TOID		
Type: CharacterString	Size: 20	Multiplicity: [1]
Attribute: identifier		

<b>«FeatureType» FerryNode</b>		
Definition: Uniform Resource Identifier		
Type: <code>CharacterString</code>	Size: 37	Multiplicity: [1]
Attribute: <code>inspireId</code>		INSPIRE
Definition: External object identifier of the spatial object.		
Type: <a href="#">Identifier</a>		Multiplicity: [0..1]
Attribute: <code>beginLifespanVersion</code>		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: <code>DateTime</code>		Multiplicity: [1]
Attribute: <code>geometry</code>		INSPIRE
Definition: The location of the node.		
Type: <code>GM_Point</code>		Multiplicity: [1]
Attribute: <code>validFrom</code>		INSPIRE
Definition: The time when the transport node started to exist in the real world.		
Note: The time part is always set to zero.		
Type: <code>DateTime</code>		Multiplicity: [1]
Attribute: <code>formOfWaterwayNode</code>		INSPIRE
Definition: Description of the function of a waterway node in the water transport network.		
Type: <a href="#">FormOfWaterwayNodeValue</a>	Size: 14	Multiplicity: [1]
Attribute: <code>reasonForChange</code>		
Definition: The reason for a change made to a feature.		
Type: <a href="#">ChangeValue</a>	Size: 32	Multiplicity: [1]

## 3.9 FerryTerminal

### 3.9.1 Overview

The ferry and road network elements are linked together through a `FerryTerminal` feature. A `FerryTerminal` is a logical connection between the two networks and therefore there is no geometry supplied with these features. They will reference one `RoadNode` and one `FerryNode`. The `FerryTerminals` will also provide a reference to the OS MasterMap Site feature.

The context diagram ([Figure 14](#) above) shows how the FerryTerminal has been inherited from INSPIRE, the attribution held on the FerryTerminal and how it relates to the other Ferry components.

### 3.9.2 Attributes

«FeatureType» FerryTerminal		
Definition: A logical connection between a PathNode or RoadNode and the FerryNode. It represents the connection between the Road or Path network and the Ferry network.		
Attribute: id		
Definition: Unique identifier, for FerryTerminal this is a TOID		
Type: <code>CharacterString</code>	Size: 20	Multiplicity: [1]
Attribute: identifier		
Definition: Uniform Resource Identifier		
Type: <code>CharacterString</code>	Size: 37	Multiplicity: [1]
Attribute: inspireId		INSPIRE
Definition: External object identifier of the spatial object.		
Type: <a href="#">Identifier</a>		Multiplicity: [0..1]
Attribute: beginLifespanVersion		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: <code>DateTime</code>		Multiplicity: [1]
Attribute: type		INSPIRE
Definition: Categorisation of the network connection.		
Type: <a href="#">ConnectionTypeValue</a>	Size: 10	Multiplicity: [1]
Attribute: ferryTerminalName		
Definition: The name of the Ferry Terminal.		
Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').		
Type: <code>LocalisedCharacterString</code>	Size: 120	Multiplicity: [0..2]
Attribute: ferryTerminalCode		
Definition: The recognised NaPTAN code of the Ferry Terminal.		
Type: <code>CharacterString</code>	Size: 10	Multiplicity: [0..1]
Attribute: reasonForChange		

«FeatureType» FerryTerminal		
Definition: The reason for a change made to a feature.		
Type: <a href="#">ChangeValue</a>	Size: 32	Multiplicity: [1]
Association: refToFunctionalSite		
Definition: Reference to the Site representation of the Ferry Terminal in OS MasterMap Sites Layer.		
Multiplicity: 0..1		Size: 20
Aggregation: element		INSPIRE
Definition: The reference to the RoadNode or PathNode and the FerryNode. The type of node the element is referencing will be identified through the xlink:title.		
Multiplicity: 2..*	Size: 20	

## 3.10 Data Types

### 3.10.1 Identifier

The Identifier is an INSPIRE data type and its elements make up the “inspireId” attribute which can be found across all feature types 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: <code>CharacterString</code>	Size: 16	Multiplicity: [1]
Attribute: namespace		
Definition: Namespace uniquely identifying the data source of the spatial object.		
Type: <code>CharacterString</code>	Size: 18	Multiplicity: [1]

### 3.10.2 OperationalStateType

Streets are attributed with an “operationalState” with a data type of “OperationalStateType”. The attribution of this data type is detailed below.

«DataType» OperationalStateType		
Attribute: state		

### «DataType» OperationalStateType

Definition: Indicator identifying the physical nature of the road, e.g. Under Construction, as reported by the highway authority.

Type: [OperationalStateValue](#)

Size: 19

Multiplicity: [1]

#### Attribute: validTime

Definition: If known, the real-world start and end date/times when the state applies.

Type: TM\_Period

Multiplicity: [0..1]

#### Attribute: reason

Definition: When a street has been closed a short description of the reason for closure.

Type: CharacterString

Size: 120

Multiplicity: [0..1]

### 3.10.3 DesignatedNameType

RoadLink, Road and Street are attributed with a “designatedName” with a data type of “DesignatedNameType”. The attribution of this data type is detailed below.

### «DataType» DesignatedNameType

Definition: The name assigned to the road or street by a designated Street Naming Authority.

#### Attribute: name

Definition: Official name assigned to the highway by a designated Street Naming Authority.

Note: Where a feature has more than one name, the language of each name is provided as a 3-digit ISO 639-2 code ('eng', 'cym', 'gla').

Type: LocalisedCharacterString

Size: 255

Multiplicity: [1]

#### Attribute: namingAuthority

Definition: The local authority that assigned the designatedName.

Type: [ResponsibleAuthority](#)

Multiplicity: [1]

### 3.10.4 ResponsibleAuthority

RoadLink and Street are attributed with “designatedName” and Street is attributed with a “responsibleAuthority” with a data type of “ResponsibleAuthority”. The attribution of this data type is detailed below.

### «DataType» ResponsibleAuthority

Definition: The authority responsible for the street naming and numbering or maintenance.

#### Attribute: identifier

Definition: The code used to identify the authority

«DataType» ResponsibleAuthority		
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]

### 3.10.5 CycleFacilityType

A RoadLink could be attributed with “cycleFacility” with a data type of “CycleFacilityType”. The attribution of this data type is detailed below.

«DataType» CycleFacilityType		
Attribute: cycleFacility		
Definition: The cycle amenity available along the link.		
Type: <a href="#">CycleFacilityValue</a>	Size: 45	Multiplicity: [1]
Attribute: wholeLink		
Definition: Identifies if the facility applies to entirety of the link.		
Type: Boolean	Size: 5	Multiplicity: [1]

### 3.10.6 ElevationGainType

A RoadLink is attributed with “elevationGain” with a data type of “ElevationGainType”. The attribution of this data type is detailed below.

«DataType» ElevationGainType		
Attribute: inDirection		
Definition: Total increase in height experienced when passing along the link from the start to the end.		
Type: Measure		Multiplicity: [1]
Attribute: inOppositeDirection		
Definition: Total increase in height experienced when passing along the link from the end to the start.		
Type: Measure		Multiplicity: [1]

### 3.10.7 NumberOfLanesType

A RoadLink could be attributed with “numberOfLanes” with a data type of “NumberOfLanesType”. The attribution of this data type is detailed below.

Note: The “numberOfLanes” attribute is not being populated in the initial product releases.

«DataType» NumberOfLanesType		
Attribute: numberOfLanes		
Definition: The number of lanes represented.		
Type: Integer		Multiplicity: [1]
Attribute: direction		
Definition: Indicates which direction the number of lanes is valid for.		
Type: <a href="#">LinkDirectionValue</a>	Size: 21	Multiplicity: [0..1]
Attribute: minMaxNumberOfLanes		
Definition: Indicates if the number of lanes is counted as minimum or maximum value.		
Type: <a href="#">MinMaxLaneValue</a>	Size: 7	Multiplicity: [0..1]

### 3.10.8 RoadWidthType

A RoadLink could be attributed with “roadWidth” with a data type of “RoadWidthType”. The attribution of this data type is detailed below.

This value is based upon the Topographic Area features supplied in OS MasterMap Topography Layer and must not be used to indicate if a vehicle of a specific width can use a particular section of road.

«DataType» RoadWidthType		
Attribute: averageWidth		
Definition: The average width of the road carriageway.		
Type: Measure		Multiplicity: [1]
Attribute: minimumWidth		
Definition: The minimum width of the topographic area feature the RoadLink is representing.		
Type: Measure		Multiplicity: [0..1]
Attribute: confidenceLevel		
Definition: Records the original capture specification for the OS MasterMap Topography layer feature used to indicate the width of the carriageway. This provides an indication of the confidence that can be placed in the value provided.		
Type: <a href="#">RoadWidthConfidenceLevelValue</a>	Size: 27	Multiplicity: [1]

## 3.12 Code lists

### 3.12.1 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.

<b>Code List: ChangeValue</b>	
<a href="https://www.ordnancesurvey.co.uk/xml/codelists/ChangeTypeValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/ChangeTypeValue.xml</a>	
<b>Code</b>	<b>Description</b>
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.

### 3.12.2 RoadClassificationValue

Road classification is used by government to ensure that there is a feasible, logical road network throughout the country. Road classifications are set to take into account the traffic management goals and road categorisation approach of the Local Highway Authority (LHA) in England and Wales. Currently in Scotland only Motorway, A Road and B Road classifications are provided.

RoadLink, Road and Street features are attributed with a “roadClassification” with a data type of “RoadClassificationValue”. The table below describes the codes which will be used to populate this field and the description for each code.

<b>Code List: RoadClassificationValue</b>	
<a href="https://www.ordnancesurvey.co.uk/xml/codelists/RoadClassificationValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/RoadClassificationValue.xml</a>	
<b>Code</b>	<b>Description</b>
Motorway	A multi-carriageway public road connecting important cities.
A Road	A major road intended to provide large-scale transport links within or between areas.
B Road	A road intended to connect different areas, and to feed traffic between A roads and smaller roads on the network.
Classified Unnumbered	Smaller roads intended to connect unclassified roads with A and B roads, and often linking a housing estate or a village to the rest of the network. NOTE 1: A Street may be assigned a local classification number by the Local Highways Authority.



Code List: RoadClassificationValue	
<a href="https://www.ordnancesurvey.co.uk/xml/codelists/RoadClassificationValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/RoadClassificationValue.xml</a>	
Unclassified	Roads intended for local traffic. NOTE 1: These may be designated Unofficial local road classifications. For example: D, E, F and G roads.
Not Classified	Roads that have not been assigned a road classification at national or local level by a designation authority.
Unknown	The classification of the road is unknown because the RoadLink is not a Motorway, A or B road and the RoadLink has not been matched to the National Street Gazetteer.

### 3.12.3 RoadFunctionValue

The RoadLink feature is attributed with a “routeHierarchy” with a data type of “RoadFunctionValue”. The table below describes the codes used to populate this field and the description for each code. In addition, INSPIRE provides an attribute “Functional Road Class” which identifies the importance of the role that the road performs in the road network. Therefore, these values have been mapped to the INSPIRE values.

Code List: RoadFunctionValue		
<a href="https://www.ordnancesurvey.co.uk/xml/codelists/RoadFunctionValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/RoadFunctionValue.xml</a>		
Code	Description	Functional Road Class
Motorway	A multi-carriageway public road connecting important cities.	mainRoad
A Road Primary	A major road intended to provide the principal link between the most significant destinations in the country, as defined by the DfT, and that is currently classified by the DfT as an A Road.	firstClass
A Road	A major road intended to provide large-scale transport links within or between areas.	secondClass
B Road Primary	A major road intended to provide the principal link between the most significant destinations in the country, as defined by the DfT, and that is currently classified by the DfT as a B Road.	firstClass
B Road	A road intended to connect different areas, and to feed traffic between A roads and smaller roads on the network.	thirdClass
Minor Road	A public road that provides interconnectivity to higher classified roads or leads to a point of interest.	fourthClass
Local Road	A public road that provides access to land and/or houses, usually named with addresses. Generally, not intended for through traffic.	fifthClass
Local Access Road	A road intended for the start or end of a journey, not intended for through traffic but will be openly accessible.	sixthClass
Restricted Local Access Road	A road intended for the start or end of a journey, not intended for through traffic and will have a restriction on who can use it.	seventhClass

<b>Code List: RoadFunctionValue</b> <a href="https://www.ordnancesurvey.co.uk/xml/codelists/RoadFunctionValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/RoadFunctionValue.xml</a>		
Secondary Access Road	A road that provides alternate/secondary access to property or land not intended for through traffic.	ninthClass
Restricted Secondary Access Road	A road that provides alternate/secondary access to property or land, not intended for through traffic and will have a restriction on who can use it.	ninthClass

### 3.12.4 MatchStatusValue

The RoadLink feature is attributed with a “matchStatus” with a data type of “MatchStatusValue”. The table below describes the codes used to populate this field and the description for each code.

<b>Code List: MatchStatusValue</b> <a href="https://www.ordnancesurvey.co.uk/xml/codelists/highways/MatchStatusValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/highways/MatchStatusValue.xml</a>	
<b>Value</b>	<b>Description</b>
Matched	The RoadLink has been matched with an Elementary Street Unit from the NSG.
No Match	The RoadLink has not been matched with an Elementary Street Unit from the NSG which has been accepted.
Not Matched Awaiting Review	The RoadLink has not been matched with an Elementary Street Unit from the NSG and is waiting to be manually reviewed to identify if there is an Elementary Street Unit it should have been matched too.
Matched With Attribute Discrepancy	The RoadLink has been matched with an Elementary Street Unit from the NSG and there is a discrepancy between the attribution supplied by the NSG and information from OS.

### 3.12.5 OperationalStateValue

RoadLink is attributed with "operationalState" with a data type of "OperationalStateValue" and Street is attributed with an “operationalState” with a data type of “OperationalStateType”. This data type has the attribute of ‘state’ with a data type of “OperationalStateValue”. The table below describes the codes which will be used to populate attributes with the data type “OperationalStateValue”.

<b>Code List: OperationalStateValue</b> <a href="http://www.ordnancesurvey.co.uk/xml/codelists/highways/OperationalStateValue.xml">http://www.ordnancesurvey.co.uk/xml/codelists/highways/OperationalStateValue.xml</a>	
<b>Code</b>	<b>Description</b>
Prospective	Plans have been submitted for development, but construction has not commenced.
Under Construction	Construction has commenced but the road cannot be used.
Open	Open
Temporarily Closed	The way has been temporarily closed for a specified reason under Road Traffic Regulation Act 1984 Section 14 I(b):

Code List: OperationalStateValue	
<a href="http://www.ordnancesurvey.co.uk/xml/codelists/highways/OperationalStateValue.xml">http://www.ordnancesurvey.co.uk/xml/codelists/highways/OperationalStateValue.xml</a>	
	<ul style="list-style-type: none"> <li>Streetworks;</li> <li>likelihood of danger to public; and</li> <li>Litter clearing or cleaning (duty imposed by section 89(1)(a) or (2) of the Environmental Protection Act 1990 (litter clearing and cleaning) to be discharged).</li> </ul> <p>Note: The operationalState shall only be set to Temporarily Closed when the duration of the closure is intended to last more than 4 weeks.</p>
Permanently Closed	A Street that has been permanently blocked up according to a Stopping Up Order Constraint: If the Street operationalState = Permanently Closed then the endLifespanVersion shall be set.
Addressing Only	A street which has been created for addressing purposes of the Local Land and Property Gazetteer (LLPG).

### 3.12.6 ProvenanceSourceValue

The RoadLink and Street feature is attributed with a 'provenance' property with the data type of ProvenanceSourceValue. The following table describes the codes used to populate this field.

Code List: ProvenanceSourceValue	
<a href="https://www.ordnancesurvey.co.uk/xml/codelists/highways/ProvenanceSourceValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/highways/ProvenanceSourceValue.xml</a>	
Value	Description
Highways England	The source for the geometry of the feature is Highways England.
Local Highway Authority	The source for the geometry of the feature is Local Highways Authority.
Ordnance Survey	The source for the geometry of the feature is Ordnance Survey.
Transport Scotland	The source for the geometry of the feature is Transport Scotland.
Welsh Government	The source for the geometry of the feature is Welsh Government.
OS Urban And OS Height	Data captured to 0.5m planimetric accuracy and elevation obtained from drupe of OS detailed height content.
OS Rural And OS Height	Data captured to 1.1 planimetric accuracy and elevation obtained from drupe of OS detailed height content.
OS Moorland And OS Height	Data captured to 4.1m planimetric accuracy and elevation obtained from drupe of OS detailed height content.
OS Urban And Interpolated OS Height	Data captured to 0.5m planimetric accuracy and elevation interpolated from OS detailed height content and other OS data.
OS Rural And Interpolated OS Height	Data captured to 1.1m planimetric accuracy and elevation interpolated from OS detailed height content and other OS data.

Code List: ProvenanceSourceValue	
<a href="https://www.ordnancesurvey.co.uk/xml/codelists/highways/ProvenanceSourceValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/highways/ProvenanceSourceValue.xml</a>	
OS Moorland And Interpolated OS Height	Data captured to 4.1m planimetric accuracy and elevation interpolated from OS detailed height content and other OS data.
OS Urban And Low Confidence OS Height	Data captured to 0.5m planimetric accuracy, elevation obtained from drupe of OS detailed height content but expected to be low quality.
OS Rural And Low Confidence OS Height	Data captured to 1.1m planimetric accuracy, elevation obtained from drupe of OS detailed height content but expected to be low quality.
OS Moorland And Low Confidence OS Height	Data captured to 4.1m planimetric accuracy, elevation obtained from drupe of OS detailed height content but expected to be low quality.

### 3.12.7 RoadStructureValue

The RoadLink feature is attributed with a “roadStructure” property with the data type of RoadStructureValue. The following table describes the codes used to populate this field.

Code List: RoadStructureValue	
<a href="https://www.ordnancesurvey.co.uk/xml/codelists/RoadStructureValue.xml">https://www.ordnancesurvey.co.uk/xml/codelists/RoadStructureValue.xml</a>	
Code	Description
Road In Tunnel	A road which passes underground or water.
Road On Bridge	A road that passes over a river, railway, road or ravine on a structure. Not Currently used.

### 3.12.8 LinkDirectionValue

The RoadLink feature is attributed with a “directionality” property and the “NumberOfLanesType” data type has “direction” with the data type of LinkDirectionValue. The following table describes the codes used to populate this field.

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

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

### 3.12.9 FormOfWayValue

The RoadLink feature is attributed with a “formOfWay” property with the data type of FormOfWayValue. The following table describes the codes used to populate this field.

Code List: FormOfWayValue <a href="http://www.ordnancesurvey.co.uk/xml/codelists/FormOfWayTypeValue.xml">http://www.ordnancesurvey.co.uk/xml/codelists/FormOfWayTypeValue.xml</a>	
Code	Description
Single Carriageway	A road consisting of one carriageway with traffic in one or both directions. There may be more than one lane in any particular direction
Dual Carriageway	A road consisting of two separate carriageways with separate flow directions. The carriageways are partitioned by physical features, such as a barrier and/or verge.
Slip Road	A road that provides exit from or entry to another road.
Roundabout	A method of controlling traffic flow by allowing vehicles from a particular direction priority.
Service Road	Road running parallel to and connecting to a road with a relatively high connectivity function, which is especially designed to enable access from the connecting roads to roads with a low connectivity function in its vicinity.
Enclosed Traffic Area	Area with no internal structure of legally defined driving directions. At least two roads are connected to the area, for example, a car park.
Traffic Island Link At Junction	Where an island that is over 8m <sup>2</sup> exists in the middle of a road on the approaches to a junction, the road link is split around it.
Traffic Island Link	Where an island that is over 8m <sup>2</sup> exists in the middle of a road, the road link is split around it
Entrance Way	Link that provides entry to a site (e.g. Car Park, Hospital, Police Station or Ambulance Station)
Entrance Or Exit Way	Link that provides access in both directions (entry and exit) to a site (e.g. Car Park, Hospital, Police Station, or Ambulance Station)
Exit Way	Link that provides exit from a site (e.g. Car Park, Hospital, Police Station or Ambulance Station)
Layby	An area at the side of the road where vehicles can stop on an ad hoc basis usually for a short time.
Track	An unmade way for a vehicle.
Guided Busway	A specially constructed or modified route for passenger road vehicles that have been built or adapted to be steered by external means. Typically, along guided busways, a raised kerb acts upon small wheels protruding from the sides of the modified vehicle.  This classification is only for the specific cases where buses run along specifically designed tracks or channels that remove the need for steering.
Shared Use Carriageway	Roads that have been altered for use principally by pedestrians but may provide some access for certain types of vehicle.

### 3.12.10 CycleFacilityValue

The “CycleFacilityType” data type is attributed with a “cycleFacility” property with the data type of “CycleFacilityValue”. The following table describes the codes used to populate this field.

This value is provided from the National Street Gazetteer. Currently only “Unknown Type Of Cycle Route Along Road” is available for population. The other values are for future use.

Code List: CycleFacilityValue <a href="https://www.ordnancesurvey.co.uk/xml/codelists/highways/CycleFacilityType.xml">https://www.ordnancesurvey.co.uk/xml/codelists/highways/CycleFacilityType.xml</a>	
Value	Description
Advisory Cycle Lane Along Road	A cycle way along a road carriageway where motorised vehicles are allowed to drive or park. Does not require a Traffic Regulation Order. Normally indicated by road markings consisting of a broken line.
Mandatory Cycle Lane Along Road	A cycle way along a road carriageway where motorised vehicles are prohibited from driving or parking. Requires a Traffic Regulation Order to prohibit the use by vehicles. Normally indicated by road markings consisting of a solid line.
Physically Segregated Cycle Lane Along Road	A cycle way along a road carriageway that has been physically separated by kerbs, posts, barriers or similar.
Unknown Type Of Cycle Route Along Road	A cycle way along a road carriageway where the detailed nature is not known.
Signed Cycle Route	A route identified for cyclists along roads that is signed but does not have any significant infrastructure along the road such as road markings or kerbs. For example, Sustrans routes along quiet roads

### 3.12.11 RoadWidthConfidenceLevelValue

The “RoadWidthType” data type is attributed with a “confidenceLevel” property with the data type of “RoadWidthConfidenceLevelValue”. The following table describes the codes used to populate this field.

Code List: RoadWidthConfidenceLevelValue <a href="http://www.ordnancesurvey.co.uk/xml/codelists/highways/RoadWidthConfidenceLevelValue.xml">http://www.ordnancesurvey.co.uk/xml/codelists/highways/RoadWidthConfidenceLevelValue.xml</a>	
Value	Description
OS Urban And Full Extent	Data captured to 0.5m planimetric accuracy and entire link within relevant Topographic Area
OS Rural And Full Extent	Data captured to 1.1m planimetric accuracy and entire link within relevant Topographic Area
OS Moorland And Full Extent	Data captured to 4.1m planimetric accuracy and entire link within relevant Topographic Area
OS Urban And Part Extent	Data captured to 0.5m planimetric accuracy and part of link not within relevant Topographic Area

Code List: RoadWidthConfidenceLevelValue <a href="http://www.ordnancesurvey.co.uk/xml/codelists/highways/RoadWidthConfidenceLevelValue.xml">http://www.ordnancesurvey.co.uk/xml/codelists/highways/RoadWidthConfidenceLevelValue.xml</a>	
OS Rural And Part Extent	Data captured to 1.1m planimetric accuracy and part of link not within relevant Topographic Area
OS Moorland And Part Extent	Data captured to 4.1m planimetric accuracy and part of link not within relevant Topographic Area

### 3.12.12 FormOfRoadNodeValue

The RoadNode feature is attributed with a “formOfRoadNode” property with the data type of FormOfRoadNodeValue. The following table describes the codes used to populate this field.

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

Code List: FormOfRoadNodeValue <a href="http://inspire.ec.europa.eu/codelist/FormOfRoadNodeValue/">http://inspire.ec.europa.eu/codelist/FormOfRoadNodeValue/</a>	
Code	Description
enclosed traffic area	The road node is situated inside and/or represents an enclosed traffic area. A traffic area is an area with no internal structure of legally defined driving directions. At least two roads are connected to the area.
Junction	Three or more road links intersect at the road node.
level crossing	A railway crosses a road on the same level at the position of the road node.
pseudo node	Exactly two road links connect to the road node.
road end	Only one road link connects to the road node. It signifies the end of a road.
roundabout	The road node represents or is a part of a roundabout.
traffic square	The road node is situated inside and/or represents a traffic square. A traffic square is an area (partly) enclosed by roads which is used for non-traffic purposes and which is not a roundabout.
road service area	Surface annexed to a road and devoted to offer particular services for it.

### 3.12.13 RoadNodeClassificationValue

The RoadNode feature is attributed with a “classification” property with the data type of RoadNodeClassificationValue. The following table describes the codes used to populate this field.

It is possible for a RoadNode to have more than one RoadNodeClassificationValue, in these rare instances the highest value in the table below is applied.

**Code List: RoadNodeClassificationValue**  
**Additional classification of the road node.**

For example, if a node represents a roundabout it may also be classified as a mini roundabout.  
<https://www.ordnancesurvey.co.uk/xml/codelists/highways/RoadNodeClassificationValue.xml>

Code	Description
Grade Separation	A RoadNode which represents where there is a difference in physical level of either two RoadLinks, or a RoadLink and a PathLink, and in the real world they do not meet and split here.
Mini Roundabout	A road junction where the effects of a roundabout on traffic flow are recreated by use of a delineated circular area of road markings or surface changes.
Motorway Junction	A named intersection where a vehicle gains access or exits the motorway

### 3.12.14 AccessPointValue

The RoadNode feature is attributed with an “access” property with the data type AccessPointValue. The following table describes the codes used to populate this field.

Not currently populated.

**Code List: AccessPointValue**

Description of whether the junction acts as an exit or entry point onto a controlled-access highway.  
<https://www.ordnancesurvey.co.uk/xml/codelists/highways/AccessPointValue.xml>

Code	Description
Entry	The junction facilitates entry onto the adjoining link.
Exit	The junction facilitates exit from the link.

### 3.12.15 StreetTypeValue

The Street feature is attributed with a “streetType” property with the data type of StreetTypeValue. The following table describes the codes used to populate this field.

**Code List: StreetTypeValue**

<https://www.ordnancesurvey.co.uk/xml/codelists/highways/StreetTypeValue.xml>

Code	Description
Designated Street Name	Officially named street
Officially Described Street	Officially Described Street
Numbered Street	Officially numbered street
Unofficial Street Name	Unofficial local name for a street



### Code List: StreetTypeValue

<https://www.ordnancesurvey.co.uk/xml/codelists/highways/StreetTypeValue.xml>

Street for addressing purposes only	A street which has been created for addressing purposes of the Local Land and Property Gazetteer (LLPG).
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### 3.12.16 JunctionTypeValue

The RoadJunction feature is attributed with a “junctionType” property with the data type of JunctionTypeValue. The following table describes the codes used to populate this field.

### Code List: JunctionTypeValue

<http://www.ordnancesurvey.co.uk/xml/codelists/highways/JunctionTypeValue.xml>

Value	Description
Named Junction	A Road Junction that is officially named. For example, Gravelly Hill.
Numbered Motorway Junction	A Road Junction that is part of a Road classified as Motorway.
Numbered A Road Junction	A Road Junction that is part of a Road classified as A Road.

### 3.12.17 ConnectionTypeValue

The FerryTerminal feature is attributed with a “type” property with the data type of ConnectionTypeValue. The following table describes the codes used to populate this field.

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

### Code List: ConnectionTypeValue

#### Types of connections between different networks.

<http://inspire.ec.europa.eu/codelist/ConnectionTypeValue>

Code	Description
intermodal	Connection between two network elements in different transport networks that use a different transport mode. The connection represents a possibility for the transported media (people, goods, etc) to change from one transport mode to another.

### 3.12.18 FormOfWaterwayNodeValue

The FerryNode feature is attributed with a “formOfWaterwayNode” property with the data type of FormOfWaterwayNode Value. The following table describes the codes used to populate this field.

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

**Code List: FormOfWaterwayNode Value**  
**Function of a Waterway Node in the water transport network.**

<http://inspire.ec.europa.eu/codelist/FormOfWaterwayNodeValue>

Code	Description
water terminal	The location where goods are transhipped.

### 3.13 Enumeration

#### 3.13.1 MinMaxLaneValue

The “NumberOfLanesType” data type is attributed with a “minMaxNumberOfLanes” property with the data type of “MinMaxLaneValue”. The following table describes the codes used to populate this field.

The enumeration has been inherited from INSPIRE and is not extendable.

Not currently populated.

**MinMaxLaneValue**

<http://inspire.ec.europa.eu/enumeration/MinMaxLaneValue>

Value	Description
Maximum	The number of lanes is the maximum value for a given part of the road network.
Minimum	The number of lanes is the minimum value for a given part of the road network.

## 4. How the product fits together

OS MasterMap Highways Network – Roads is a relational product. This results in there being relationships between different feature types.

The table below identifies how the feature types relate to one another, and which attributes are the primary and foreign keys. This is also represented in [Figure 15](#). The attribute at the arrowhead is the primary key and the attribute at the base of the arrow is the foreign key.

Source Feature Information		Destination Feature Information	
Feature Type	Foreign Key Attribute	Feature Type	Primary Key Attribute
RoadLink	startNode	RoadNode	id
RoadLink	endNode	RoadNode	id
RoadLink	relatedRoadArea	TopographicArea	TOID
RoadLink	formsPartOf	Road	id
RoadLink	formsPartOf	Street	id
RoadNode	relatedRoadArea	TopographicArea	TOID
Road	link	RoadLink	id
Street	link	RoadLink	id
RoadJunction	node	RoadNode	id
FerryTerminal	element	RoadNode	id
FerryTerminal	element	FerryNode	id
FerryTerminal	refToFunctionalSite	FunctionalSite	id
FerryLink	startNode	FerryNode	id
FerryLink	endNode	FerryNode	id

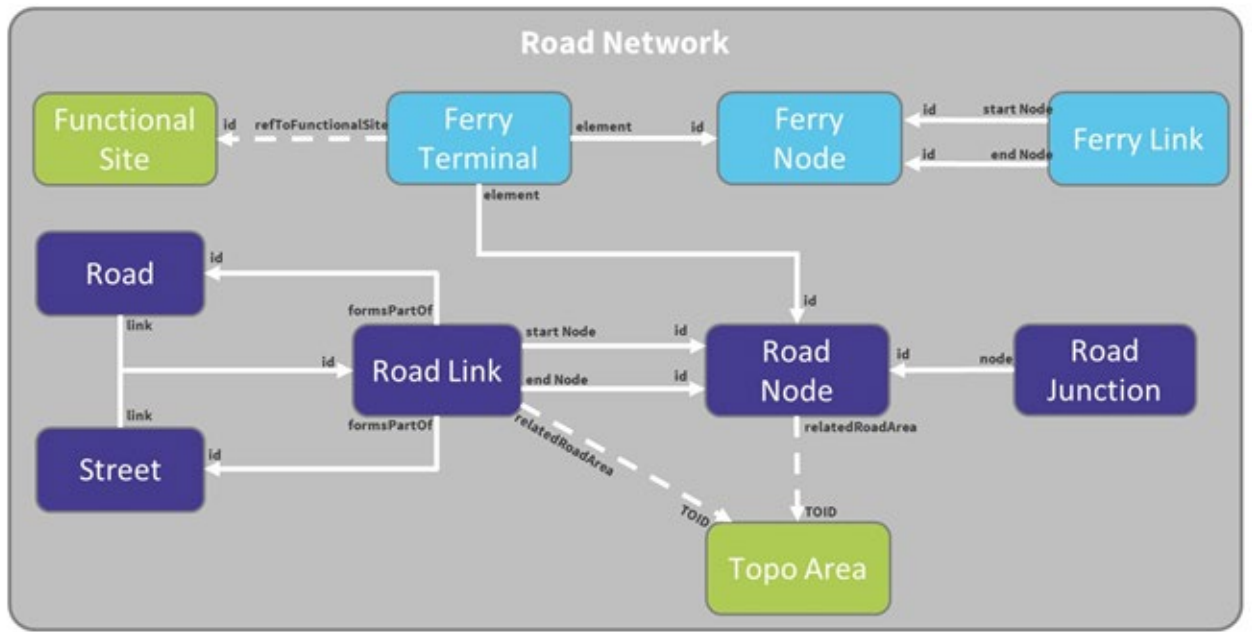


Figure 15.OS MasterMap Highways Network – Roads relational model

## 5. Change Only Update (COU)

The OS MasterMap Highways Network – Roads can be ordered as either Full Supply or Change Only Update. The Geopackage and Vector Tiles files are full GB coverage so are not available as a COU. The GML structures 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 A](#). If a customer wishes to move their order from Full Supply to COU, they will need to receive an initial supply first and apply the COU file to that initial supply. The COU should not be applied to a Full Supply order.

### 5.1 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.

### 5.2 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:

- `<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.
- `<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.

- <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 customer's 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 A](#) of the different types of transactions.

## 6. Supply format

OS MasterMap Highways Network– Roads is supplied in three formats: Geography Markup Language (GML 3.2.1), Geopackage and Vector Tiles. All formats are compressed into a regular zip file (.zip).

## 7. GML overview

### 7.1 GML

This section describes how OS MasterMap Highways Network is defined in GML. An understanding of XML (Extensible Mark-up Language) and XML schema is required.

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>.

### 7.2 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 Road Network uses the following application schemas; LinearHighwayNetwork.xsd, HighwaysWaterTransportNetwork.xsd and OSProducts.xsd which are referenced by the data. The LinearHighwaysNetwork.xsd defines the features which make up the Road Network. Therefore, it imports the INSPIRE transport network road application schema. The HighwaysWaterTransportNetwork.xsd defines the features which make up the Ferry Network. Therefore, it imports the INSPIRE transport network water application schema. Through the INSPIRE schemas both the LinearHighwayNetwork.xsd and HighwaysWaterTransportNetwork.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 Linear Highway Network schema document defines the <http://namespaces.os.uk/mastermap/highwayNetwork/2.0> namespace, this is defined in the XSD at: <http://www.os.uk/xml/schema/highwaysnetwork/2.0/linearhighwaynetwork.xsd>

The Highways Water Transport Network schema document defines the <http://namespaces.os.uk/mastermap/highwaysWaterTransportNetwork/1.0> namespace, this is defined in the XSD at: <http://www.os.uk/xml/schema/highwaysnetwork/1.0/linearhighwaynetwork.xsd>.

The application schema uses the following XML namespaces and their associated definitions:



Prefix	Namespace identifier	Definition available at
gml	<a href="http://www.opengis.net/gml">http://www.opengis.net/gml</a>	<a href="http://schemas.opengis.net/gml/3.2.1/gml.xsd">http://schemas.opengis.net/gml/3.2.1/gml.xsd</a>
xsi	<a href="http://www.w3.org/2001/XMLSchema-instance">http://www.w3.org/2001/XMLSchema-instance</a>	Built in to XML <a href="http://www.w3.org/TR/xmlschema-1/">http://www.w3.org/TR/xmlschema-1/</a>
xlink	<a href="http://www.w3.org/1999/xlink">http://www.w3.org/1999/xlink</a>	<a href="http://www.w3.org/1999/xlink.xsd">http://www.w3.org/1999/xlink.xsd</a>
net	<a href="http://inspire.ec.europa.eu/schemas/net/4.0">http://inspire.ec.europa.eu/schemas/net/4.0</a>	<a href="http://inspire.ec.europa.eu/schemas/net/4.0/Network.xsd">http://inspire.ec.europa.eu/schemas/net/4.0/Network.xsd</a>
tn	<a href="http://inspire.ec.europa.eu/schemas/tn/4.0">http://inspire.ec.europa.eu/schemas/tn/4.0</a>	<a href="http://inspire.ec.europa.eu/schemas/tn/4.0/CommonTransportElements.xsd">http://inspire.ec.europa.eu/schemas/tn/4.0/CommonTransportElements.xsd</a>
tn-ro	<a href="http://inspire.ec.europa.eu/schemas/tn-ro/4.0">http://inspire.ec.europa.eu/schemas/tn-ro/4.0</a>	<a href="http://inspire.ec.europa.eu/schemas/tn-ro/4.0/RoadTransportNetwork.xsd">http://inspire.ec.europa.eu/schemas/tn-ro/4.0/RoadTransportNetwork.xsd</a>
tn-w	<a href="http://inspire.ec.europa.eu/schemas/tn-w/4.0">http://inspire.ec.europa.eu/schemas/tn-w/4.0</a>	<a href="http://inspire.ec.europa.eu/schemas/tn-w/4.0/WaterTransportNetwork.xsd">http://inspire.ec.europa.eu/schemas/tn-w/4.0/WaterTransportNetwork.xsd</a>
os	<a href="http://namespaces.os.uk/product/1.0">http://namespaces.os.uk/product/1.0</a>	<a href="http://www.ordnancesurvey.co.uk/xml/schema/product/1.0/OSProduct.xsd">http://www.ordnancesurvey.co.uk/xml/schema/product/1.0/OSProduct.xsd</a>
network	<a href="http://namespaces.os.uk/mastermap/generalNetwork/2.0">http://namespaces.os.uk/mastermap/generalNetwork/2.0</a>	<a href="https://www.ordnancesurvey.co.uk/xml/schema/network/2.0/generalNetwork.xsd">https://www.ordnancesurvey.co.uk/xml/schema/network/2.0/generalNetwork.xsd</a>
highway	<a href="http://namespaces.os.uk/mastermap/highwayNetwork/2.0">http://namespaces.os.uk/mastermap/highwayNetwork/2.0</a>	<a href="http://www.os.uk/xml/schema/highwaysnetwork/2.0/LinearHighwayNetwork.xsd">http://www.os.uk/xml/schema/highwaysnetwork/2.0/LinearHighwayNetwork.xsd</a>
ram	<a href="http://namespaces.os.uk/mastermap/routingAndAssetManagement/2.1">http://namespaces.os.uk/mastermap/routingAndAssetManagement/2.1</a>	<a href="http://www.os.uk/xml/schema/highwaysnetwork/2.1/RoutingAndAssetManagement.xsd">http://www.os.uk/xml/schema/highwaysnetwork/2.1/RoutingAndAssetManagement.xsd</a>
hwtn	<a href="http://namespaces.os.uk/mastermap/highwaysWaterTransportNetwork/1.0">http://namespaces.os.uk/mastermap/highwaysWaterTransportNetwork/1.0</a>	<a href="http://www.os.uk/xml/schema/highwaysnetwork/v1/HighwaysWaterTransportNetwork.xsd">http://www.os.uk/xml/schema/highwaysnetwork/v1/HighwaysWaterTransportNetwork.xsd</a>
dedication	<a href="http://namespaces.os.uk/mastermap/highwayDedication/1.0">http://namespaces.os.uk/mastermap/highwayDedication/1.0</a>	<a href="https://www.ordnancesurvey.co.uk/xml/schema/highwaysnetwork/1.0/HighwayDedication.xsd">https://www.ordnancesurvey.co.uk/xml/schema/highwaysnetwork/1.0/HighwayDedication.xsd</a>

## 8. GeoPackage overview

OS MasterMap Highways Network – Roads is supplied as one GeoPackage file for GB. GeoPackage (\*.gpkg) is an open, standards-based data format, as is defined by the Open Geospatial Consortium (OGC). It is designed to be a lightweight format that can contain large amounts of varied and complex data in a single, easy to distribute and ready to use file.

GeoPackage can be used in most GIS software in its native format without translation. GeoPackage attribute names are not limited in length. A GeoPackage file has no size limit, and it supports raster, vector and database formats, making it a highly versatile solution.

### 8.1 Attribute naming differences between GML and GeoPackage formats

The naming of attributes between GeoPackage and the Geography Markup Language (GML) file is very similar as GeoPackage files are not limited in the number of characters for an attribute name. The following tables map the GML attribute name to the attribute name in the GeoPackage files.

The GML contains an attribute which describes the geometry of the feature; this is not applicable for a GeoPackage file as they are separated by their geometry. Please note not all GML attributes have been mapped to Geopackage. In the tables below a greyed-out box with an asterisk (\*) marks a GeoPackage attribute that is not mapped from a GML attribute.

#### 8.1.1 ferry\_link

GML attribute	GeoPackage attribute
*	fid
gml_id	toid
identifier	identifier
localId	local_id
beginLifespanVersion	begin_lifespan_version
descriptiveGroup	descriptive_group
descriptiveTerm	descriptive_term
fictitious	fictitious
validFrom	valid_from
vehicularFerry	vehicular_ferry
routeOperator	route_operator
reasonForChange	reason_for_change
startNode	start_node
endNode	end_node

## 8.1.2 ferry\_node

GML attribute	GeoPackage attribute
*	fid
gml_id	toid
identifier	identifier
localId	local_id
beginLifespanVersion	begin_lifespan_version
*	geometry
validFrom	valid_from
formOfWaterwayNode	form_of_waterway_node
reasonForChange	reason_for_change

## 8.1.3 ferry\_terminal

GML attribute	GeoPackage attribute
*	id
gml_id	toid
identifier	identifier
localId	local_id
beginLifespanVersion	begin_lifespan_version
type	type
ferryTerminalName	ferry_terminal_name
ferryTerminalNameLang	ferry_terminal_name_lang
ferryTerminalCode	ferry_terminal_code
reasonForChange	reason_for_change
refToFunctionalSite	ref_to_functional_site
elementId	element_id
elementRole	element_role

## 8.1.4 road

GML attribute	GeoPackage attribute
*	id
gml_id	toid
identifier	identifier

GML attribute	GeoPackage attribute
localId	local_id
beginLifespanVersion	begin_lifespan_version
validFrom	valid_from
localRoadCode	local_road_code
nationalRoadCode	national_road_code
roadClassification	road_classification
designatedName	designated_name
reasonForChange	reason_for_change
link	link

### 8.1.5 road\_junction

GML attribute	GeoPackage attribute
*	id
gml_id	toid
identifier	identifier
localId	local_id
beginLifespanVersion	begin_lifespan_version
reasonForChange	reason_for_change
junctionType	junction_type
junctionName	junction_name
junctionNameLang	junction_name_lang
roadClassificationNumber	road_classification_number
junctionNumber	junction_number
node	node

### 8.1.6 road\_link

GML attribute	GeoPackage attribute
*	fid
gml_id	toid
identifier	identifier
localId	local_id

<b>GML attribute</b>	<b>GeoPackage attribute</b>
beginLifespanVersion	begin_lifespan_version
*	geometry
fictitious	fictitious
validFrom	valid_from
reasonForChange	reason_for_change
roadClassification	road_classification
routeHierarchy	route_hierarchy
formOfWay	form_of_way
trunkRoad	trunk_road
primaryRoute	primary_route
roadClassificationNumber	road_classification_number
roadName	road_name
roadNameLang	road_name_lang
alternateName	alternate_name
alternateNameLang	alternate_name_lang
operationalState	operational_state
provenance	provenance
directionality	directionality
length	length
matchStatus	match_status
alternateIdentifier	alternate_identifier
alternateIdentifierScheme	alternate_identifier_scheme
startGradeSeparation	start_grade_separation
endGradeSeparation	end_grade_separation
roadStructure	road_structure
cycleFacility	cycle_facility
roadWidthAverage	road_width_average
roadWidthMinimum	road_width_minimum
roadWidthConfidenceLevel	road_width_confidence_level
elevationGainInDirection	elevation_gain_in_direction

GML attribute	GeoPackage attribute
elevationGainInOppositeDirection	elevation_gain_in_opposite_direction
formsPartOf	forms_part_of
formsPartOfRole	forms_part_of_role
startNode	start_node
endNode	end_node
relatedRoadArea	related_road_area

### 8.1.7 road\_node

GML attribute	GeoPackage attribute
*	fid
gml_id	toid
identifier	identifier
localId	local_id
beginLifespanVersion	begin_lifespan_version
validFrom	valid_from
*	geometry
formOfRoadNode	form_of_road_node
classification	classification
junctionName	junction_name
junctionNameLang	junction_name_lang
junctionNumber	junction_number
reasonForChange	reason_for_change
relatedRoadArea	related_road_area

### 8.1.8 street

GML attribute	GeoPackage attribute
*	fid
gml_id	usrn
identifier	identifier
localId	local_id
beginLifespanVersion	begin_lifespan_version
validFrom	valid_from

<b>GML attribute</b>	<b>GeoPackage attribute</b>
localRoadCode	local_road_code
nationalRoadCode	national_road_code
designatedName	designated_name
namingAuthorityId	naming_authority_id
namingAuthority	naming_authority
localName	local_name
localNameLang	local_name_lang
descriptor	descriptor
descriptorLang	descriptor_lang
reasonForChange	reason_for_change
roadClassification	road_classification
streetType	street_type
operationalState	operational_state
operationalStateTimePeriodId	operational_state_time_period_id
operationalStateBeginPosition	operational_state_begin_position
operationalStateEndPosition	operational_state_end_position
locality	locality
localityLang	locality_lang
town	town
townLang	town_lang
administrativeArea	administrative_area
administrativeAreaLang	administrative_area_lang
responsibleAuthority	responsible_authority
responsibleAuthorityId	responsible_authority_id
geometryProvenance	geometry_provenance
*	geometry
gssCode	gss_code
gssCodeRole	gss_code_role
link	link

## 9. Vector tiles overview

OSMM Highways Network – Roads is supplied as a national vector tiles set in a single MBTiles file. This is a lightweight set of tiles that are efficient and fast to render in your software, and which provide high-resolution data and give a seamless experience when zooming in and out. The data is supplied in Web Mercator projection (ESPG:3857).

### 9.1 Vector tiles schema

The vector tiles schema is detailed in the following table. In the zoom levels columns within the table, the letter N indicates that the specified layer and attribute are not mapped within that zoom level, whereas the letter Y indicates that the specified layer and attribute are mapped within that zoom level.

Layer	Attribute	Zoom level		
		0 to 13	14	15
ferry_link	toid	N	Y	Y
	vehicula_ferry	N	Y	Y
	route_operator	N	Y	Y

Layer	Attribute	Zoom level		
		0 to 13	14	15
ferry_node	toid	N	Y	Y
	form_of_waterway_node	N	Y	Y
	ferry_terminal_name	N	Y	Y
	ferry_terminal_name_lang	N	Y	Y
	ferry_terminal_code	N	Y	Y

Layer	Attribute	Zoom level		
		0 to 13	14	15
road_link	toid	N	Y	Y
	local_id	N	Y	Y
	road_classification	N	Y	Y
	route_hierarchy	N	Y	Y
	form_of_way	N	Y	Y
	trunk_road	N	Y	Y
	primary_route	N	Y	Y
	road_classification_number	N	Y	Y



Layer	Attribute	Zoom level		
		0 to 13	14	15
	road_name	N	Y	Y
	road_name_lang	N	Y	Y
	alternate_name	N	Y	Y
	alternate_name_lang	N	Y	Y
	length	N	Y	Y
	road_structure	N	Y	Y
	cycle_facility	N	Y	Y
	road_width_average	N	Y	Y
	road_width_minimum	N	Y	Y

Layer	Attribute	Zoom level		
		0 to 13	14	15
road_node	toid	N	Y	Y
	form_of_road_node	N	Y	Y
	classification	N	Y	Y
	junction_name	N	Y	Y
	junction_name_lang	N	Y	Y
	junction_number	N	Y	Y

Layer	Attribute	Zoom level		
		0 to 13	14	15
street	usrn	N	Y	Y
	local_road_code	N	Y	Y
	national_road_code	N	Y	Y
	designated_name	N	Y	Y
	road_classification	N	Y	Y
	street_type	N	Y	Y
	responsible_authority	N	Y	Y

## 9.2 Attribute naming differences between GML and vector tiles formats

The naming of attributes between vector tiles and the Geography Markup Language (GML) file is very similar as the vector tiles set within the MBTiles file is not limited in the number of characters for an attribute name. The following tables map the GML attribute name to the attribute name in the vector tiles. Please note not all GML attributes have been mapped to vector tile attributes.

### 9.2.1 ferry\_link

GML attribute	Vector tiles attribute
gml_id	toid
vehicularFerry	vehicula_ferry
routeOperator	route_operator

### 9.2.2 ferry\_node

GML attribute	Vector tiles attribute
gml_id	toid
formOfWaterwayNode	form_of_waterway_node
ferryTerminalName	ferry_terminal_name
ferryTerminalNameLang	ferry_terminal_name_lang
ferryTerminalCode	ferry_terminal_code

### 9.2.3 road\_link

GML attribute	Vector tiles attribute
gml_id	toid
localId	local_id
roadClassification	road_classification
routeHierarchy	route_hierarchy
formOfWay	form_of_way
trunkRoad	trunk_road
primaryRoute	primary_route
roadClassificationNumber	road_classification_number
roadName	road_name
roadNameLang	road_name_lang
alternateName	alternate_name

GML attribute	Vector tiles attribute
alternateNameLang	alternate_name_lang
length	length
roadStructure	road_structure
cycleFacility	cycle_facility
roadWidthAverage	road_width_average
roadWidthMinimum	road_width_minimum

#### 9.2.4 road\_node

GML attribute	Vector tiles attribute
gml_id	toid
formOfRoadNode	form_of_road_node
roadClassification	classification
junctionName	junction_name
junctionNameLang	junction_name_lang
junctionNumber	junction_number

#### 9.2.5 street

GML attribute	Vector tiles attribute
gml_id	usrn
localRoadCode	local_road_code
nationalRoadCode	national_road_code
designatedName	designated_name
roadClassification	road_classification
streetType	street_type
responsibleAuthority	responsible_authority

## Annex A: GML examples

This annex contains 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="#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: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>
  <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:delete>
<os:insert>
<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: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:insert>
</os:replace>
```

```
</base:Identifier>
</net:inspireId>
<net:endLifespanVersion>2017-01-13T00:00:00.000</net:endLifespanVersion>
<net:inNetwork xlink:href="#OSHighwayNetwork"/>
<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="#OSHighwayNetwork"/>
  <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>
```

