Address: Conceptual Model for New Zealand

The New Zealand Profile of ISO 19160-1:2015 Addressing – Part 1: Conceptual Model

Land Information New Zealand
Toitū te whenua

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20140929	0.2	Text	Working Group	revisions post WG review
20141013	0.3		Working Group	updated codes model + feature tables, and Annex C
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20150213	0.5		Working Group	amends to AddressedPeriod; new Section 5 inserted
20150317	1.0		Working Group	version registered in ISO Profile repository
20150902	1.1		Working Group	new Annex B (matrix), core codelists model, & descriptions table
20150929	1.2		Working Group	version reviewed by the WG
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20210805	3.02		M Judd	Minor updates post consultation

Contributors

The Working Group for this standard was convened as a sub-group of the Standards New Zealand ISO/TC 211 International Review Group; administered by Standards New Zealand, convened by the New Zealand Geospatial Office (now disestablished).

The following organisations enabled the assembly of the body of experts to develop this standard:

Department of Conservation Statistics New Zealand
Toitū Te Whenua LINZ (lead) Surveying and Spatial Sciences Institute
New Zealand Post Wellington City Council
Spatial Industries Business Association

Contents

Foreword

The New Zealand profile of ISO 19160-1:2015 Addressing — Part 1: Conceptual model (ISO 19160-1) describes the abstract concept of address as a way of expressing a location in New Zealand.

The concept of a geographical address has evolved over time, but not always consistently between different locations, nor defined consistently by different information communities, or within different information systems. There is increasing need to openly share and interoperate address data more systematically. This demands attention to how address data is structured, and removing ambiguity about exactly what address data are being shared. One way to help achieve this is to standardise the underpinning address concept model.

This profile represents a consensus on New Zealand's address concepts. It provides a reference information model to define all the forms of physical addresses used in New Zealand.

This profile claims conformance to ISO 19160-1. This profile inherits appropriate facets of the international standard and specialises those characteristics which apply to New Zealand's addresses.

Convened under authority from Standards New Zealand (NZ's national Member Body of ISO), the International Review Group (IRG) monitors the programme of work of ISO TC211: Geographic Information/Geomatics (TC211). The Group also coordinates New Zealand's contributions to TC211's work programme.

The IRG formed a New Zealand Working Group to contribute to TC211's development of ISO 19160-1. The motivation to actively contribute came from experience of a legacy of challenges arising from sharing address data between New Zealand entities using addresses for different purposes. The aftermath of the Canterbury earthquakes in 2010/2011 also revealed the extent of complexities that can arise when inconsistent address (location) concepts are used and shared en masse by different entities, in different ways, in different information contexts.

As part of New Zealand's contribution to the development of ISO 19160-1, the NZ Working Group developed this New Zealand Profile.

This profile should be read in conjunction with ISO 19160-1.

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Introduction

Around the World addresses are one of the most common ways to reference an object for the purposes of identification and location. Address reference systems vary from country to country. In many Euro-centric countries reference to a road network in the address is common, while addresses in countries such as Japan comprise a hierarchy of administrative areas without reference to a thoroughfare. In the field of intelligent transport systems, an address can be considered as a simplified location system (as opposed to a coordinate reference system) where points of interest and postcodes are addressing information applicable in car navigation.

In New Zealand addresses are used for a wide variety of purposes, including postal delivery, emergency response, customer relationship management, property administration, utility planning and maintenance.

There are many stakeholders concerned with address (including activities involved with addressing), and many of these are the intended audience for this profile:

- assigning addresses (addressing) and managing addresses; this is a responsibility of territorial authorities in New Zealand.
- using and recording addresses in various ways to undertake commerce and services. For example, customer services, electronic business, local and national public services, utility service providers, insurance and banking, identity management, electoral, and the 5-yearly national Census.
- using addresses to discover locations or determine the proximity of people or places in contexts. For example, delivery logistics, emergency response, and in-car navigation.

Representatives of such stakeholders were engaged during the development of this standard.

The goal of this standard is to provide a conceptual foundation for address data which can be adopted during the development of detailed application models and schema. The ultimate aim is to advance interoperability of address data across application domains in New Zealand by encouraging wide use of the same underpinning concepts.

Scope

This document is a Profile of ISO 19160-1:2015, Addressing - Part 1: Conceptual model.

The New Zealand Profile defines a conceptual model for address information (address model), together with the terms and definitions that describe the concepts in the model. Lifecycle, metadata and address aliases are included in the conceptual model. The model is presented in the Unified Modelling Language (UML).[1]

The model provides a common representation of the basic concept of address information, independent of actual addressing implementations. It is not intended to replace conceptual models proposed in other specifications. It is expected to help drive development of consistently formed schema used for interoperating address data. This could also provide a means to cross-map between different conceptual models for address information and enable the conversion of address information between specifications.

Some specific use cases for the application of addresses are out of scope. For example, access points are illustrative of additional characteristics of addressable objects that are out of scope of this model. This model is intended to provide core concepts to be inherited by specific address application schemas.

Conformance

ISO 19160-1 defines five classes of requirements against which a Profile claiming conformance with the international model shall be tested. The test suites for these conformance requirements are defined in Annex A of ISO 19160-1.

The New Zealand Profile inherits all the elements prescribed in 19160-1 except for Locale elements. The Profile conforms to the Core Requirement class (Section 7.1) of ISO 19160-1. It partially conforms to the Lifecycle Requirement class (Section 7.2) and does not conform to the Provenance Requirements class (Section 7.3) of 19160-1, although these Requirements classes are within scope of the profile. Locale information is not applied to New Zealand addresses, so the Requirements class (Section 7.4) does not apply to this profile and conformance is not claimed.

ISO 19160-1 (Section 7.5) also defines requirements and recommendations for the information required in conforming Profile documentation. The New Zealand Profile claims conformance with this Requirements class.

Application schemas claiming conformance with this New Zealand Profile must inherit the elements that are prescribed by this Profile.

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[1] the flavour of UML used is defined by ISO 19103:2015 Geographic information - Conceptual schema language: this is a profile of UML for use with geographic information and includes guidelines on how UML should be used to create standardized geographic information and service models.

References

The following standard is indispensable for the application of the NZ Profile:

ISO 19160-1:2015 *Addressing – Part 1: Conceptual model*

The following documents informed aspects of the address concept model for New Zealand:

AS/NZS 4819:2011 *Rural and urban addressing*

NZ Postal Address File *Technical Guide [undated]*

New Zealand Government OASIS CIQ Address Profile [1]

The Emergency Services and Government Administration (ESA) Core Data Specification [2] [2004]

Other standards referenced:

ISO 8601:2004, *Data elements and interchange formats – Information interchange – Representation of dates and times*

AS/NZS ISO 19103:2006 *Geographic information - Conceptual schema language*

AS/NZS ISO 19106:2005 *Geographic information - Profiles*

AS/NZS ISO 19107:2005 *Geographic information - Spatial schema*

ISO 19115-1:2014 *Geographic information – Metadata – Part 1: Fundamentals*

AS/NZS ISO 19135.2:2012 *Geographic information - Procedures for item registration - Part 2: XML schema implementation*

AS/NZS ISO 19152:2012 *Geographic information - Land Administration Domain Model (LADM)*

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[1] http://ict.govt.nz/guidance-and-resources/standards-compliance/nz-government-ciq-profiles/ (accessed 2014-09-29)

[2] http://www.linz.govt.nz/about-linz/news-publications-and-consultations/consultation-projects-and-reviews/esa (accessed 2014-09-29)

Terms and definitions

These terms and definition are adopted from ISO 19160-1 with the following general changes:

- examples have been localised to New Zealand
- additional notes have been added

Specific changes have been made to the following terms:

- addressee has been restricted: an addressee cannot be an addressable object
- address position has been restricted: see Annex H for more information
- locale has been deprecated: it is out of scope

Locale is deprecated from the Profile because Address Component names are not managed bilingually in New Zealand. If necessary, addresses in different languages would be managed as aliases.

address

structured information that allows the unambiguous determination of an object for purposes of identification and location

EXAMPLE 1   A simple address: 155 Smith Avenue, Wadestown, Wellington

EXAMPLE 2   Address where the object is a business: Shop 3, 7 Waterloo Quay, Pipitea, Wellington 6011

EXAMPLE 3   Address where the object is a building: Carter Observatory, 40 Salamanca Road, Kelburn, 6012, Wellington, New Zealand.

NOTE 1   The object is identifiable in the real world, i.e. electronic and virtual addresses are excluded.

NOTE 2   'Identification' refers to the fact that the structured information in the address unambiguously determines the object, i.e. it helps someone identify the object. In other words, 'identification' here does not refer to unique identifiers in a database or dataset.

NOTE 3   There can be many addresses for an object, but at any moment (or lifecycle stage), an address unambiguously determines a single object.

NOTE 4   Two addresses from two different address classes (i.e. they have different sets of components) for the same addressable object are two different addresses. See Annex B for NZ address classes.

NOTE 5   In addition to the addressable object, there may be a multitude of people, organisations, addressees or objects associated with an address, but these are external to the address model.

addressable object

object that may be assigned an address (4.1)

addressee

party who is the ultimate recipient of a delivery item or service at an address

[SOURCE: adapted from UPU S42:2006]

NOTE 1   A delivery item may be a letter, parcel, couriered item or any other delivered goods or services.

NOTE 2   A party is one or more natural or legal persons or organizations acting as a single recipient of a delivery [SOURCE: adapted from UPU S42:2006].

NOTE 3   For the New Zealand profile, an addressee is not an addressable object.

address alias

one of a set of addresses unambiguously determining the same addressable object

address class

description of a set of addresses that share the same address components, operations, methods,

relationships, and semantics

EXAMPLE 1   '470 Queen Street, Petone, Lower Hutt 5012' and '281 Park Road, Belmont, Auckland 0622' are from the same address class.

EXAMPLE 2   'PO Box 391 Levin 5540' and 'PO Box 2387 Taupo 3351' are from the same address class.

address component

constituent part of the address

NOTE 1   The address component may reference another object, such as a spatial object e.g. an administrative boundary or a land parcel.

NOTE 2   An address component may have one or more alternative values, e.g. abbreviated alternatives.

addressing

activities involving addresses

address position

position representing the address

NOTE 1   An address may be represented by more than one position.

NOTE 2   The NZ Profile takes a restricted view of address position, see Annex E.

address reference system

defined set of address components and the rules for their combination into addresses (4.1)

child address

address defined relative to a parent address

child addressable object

addressable object that is addressed relative to another addressable object

EXAMPLE 1   An apartment within an apartment building.

EXAMPLE 2   A unit within a complex of units.

EXAMPLE 3   A building within a complex of buildings.

lineage

provenance, source(s) and production process(es) used in producing a resource

[SOURCE: ISO 19115-1:2014, 4.9]

locale

definition of the subset of a user's environment that depends on language and cultural conventions

NOTE 1   In computing, a locale is a set of parameters that defines the user's language, country and any special variant preferences that the user wants to see in their user interface. Usually a locale identifier consists of at least a language identifier and a region identifier.

[SOURCE: ISO/IEC/IEEE 9945:2009, 3.211, modified - The notes given in ISO/IEC/IEEE 9945:2009 for this entry have been omitted. The note has been added.]

NOTE 2   deprecated in the NZ Profile

parent address

address of a parent addressable object

NOTE 1   Addresses of the child addressable objects fully inherit the address components of a parent address.

parent addressable object

addressable object that fully encloses one or more other addressable objects

EXAMPLE 1   An apartment building with many apartments within.

EXAMPLE 2   A complex with many units within.

EXAMPLE 3   A complex of many buildings.

profile

set of one or more base standards or subsets of base standards, and, where applicable, the identification of chosen clauses, classes, options and parameters of those base standards, that are necessary for accomplishing a particular function

[SOURCE: ISO 19106:2004, 4.5]

In practice, profiles have also taken on elements that are external to the base standard but belong to the domain of "a particular function". E.g., The Jurisdiction Profiles, including this one, that were developed alongside 19160-1.

provenance

organization or individual that created, accumulated, maintained and used records

NOTE 1   Provenance information includes

- the source or origin of the record;
- all changes to the record; and
- all organisations or individuals who have had custody of the record since its creation.

[SOURCE: ISO 5127:2001, 4.1.1.10, modified – Note 1 has been added]

spatial object

object used for representing a spatial characteristic of a feature

[SOURCE: ISO 19107:2003, 4.69]

Overview of the address model

An address is a way of determining location by referencing things that are nearby, such as a street, suburb, etc. The association of these things communicates an approximate understanding of location as long as something is also known about the objects referenced. An address is an indicator; it helps orient or imply nearness of one place (address) with other places or geographical features. The pattern of reference objects, as well as knowledge about these objects, enables users of addresses to determine orientation or vicinity.

Typically, an address number sequence implies nearness i.e. 15 may be anticipated to be near 17; perhaps neighbouring, and perhaps on the same side of the road. An address using the same street name as other addresses implies that the address is situated within the same street. Addresses that reference the same suburb are expected to be situated somewhere within the extent of that suburb.

Accordingly, within information systems, an address is not a good way to identify digital objects. Where more precision is required, a purpose designed and implemented unique identifier (for example) is a preferred way to index objects and their attributes.

In this way, an address is a relatively imprecise way to reference location (i.e. to determine or imply location by references to other things that are nearby).

This standard helps information architects and others to become familiar with the concept of address in New Zealand. They can then consider how addresses will be used in engineering information solutions to reference things (or locations). Address complexities, including dependencies on other objects, as outlined throughout this standard, reveal some of the considerations and implications if addresses is used to uniquely identify digital objects (such as being implemented as an indexing key within a dataset)

Core elements of the address model

The address model in the New Zealand Profile of ISO 19160-1 is conceptual. It provides a logical framework to communicate the core elements of addresses used within New Zealand.

The model represents agreement on a way to consistently explain address; what the core elements of addresses are, their qualities, and an explanation of the relationships between these elements. The model introduces standard terms, common values to use, and guidance on how to structure various aspects of address data.

Figure 1 shows the two foundation elements of the model: Address and AddressComponent.
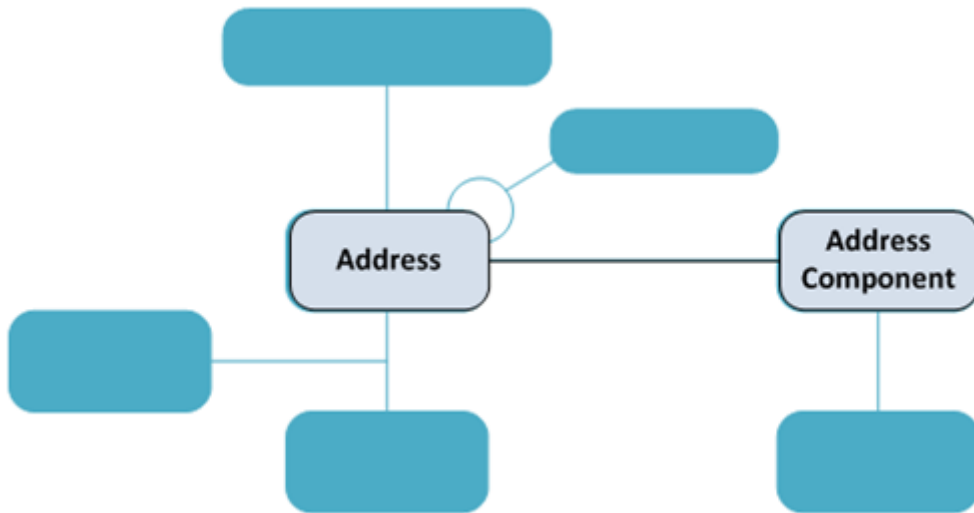
Figure 1: Foundation elements

At the model's core is the notion that an address comprises a pairing of an Address element (containing metadata, for example, identifiers, class of address, etc) and Address Component elements (the component data that form an address, e.g. a road name, an address number, etc.)

An address must have an Address element and a minimum of one Address Component element.

Five additional elements are necessary to create a model that is comprehensive enough to encompass other fundamental characteristics of addresses used in New Zealand. These are shown in Figure 2.
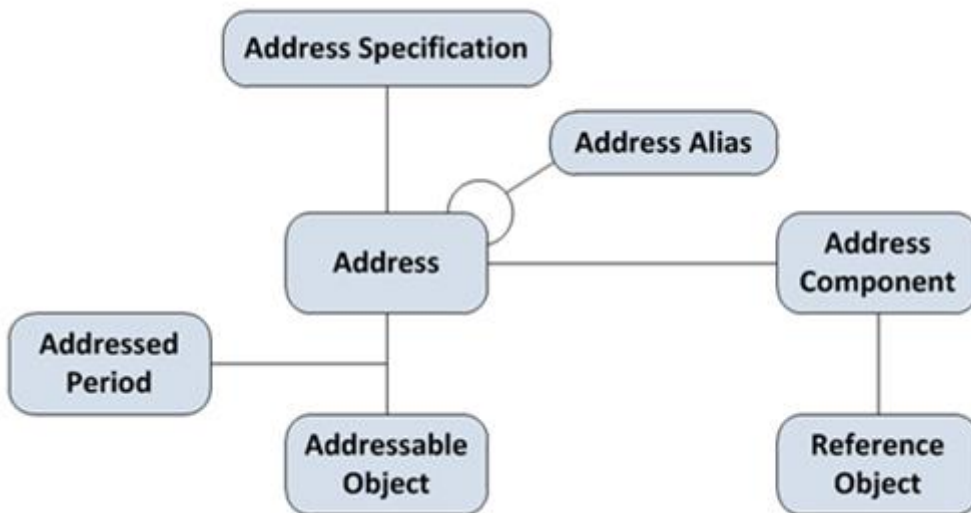
Figure 2: Additional elements

Most addresses relate to an object on the surface of the Earth. In this model whatever the address has been assigned to is called the Addressable Object.

Occasionally an already established address might be re-used (become associated with a different object than it was originally assigned to). This may happen as part of new land subdivisions, in-fill housing, road realignments, or other rationalisations. The model accommodates such complexity

through the Addressed Period element. This provides metadata about the lifecycle of the connection between an Address and an Addressable Object.

Sometimes more than one address may relate to the same Addressable Object (a simple example is a house on the corner of two streets with a potential for either address to be used to define that location). Address Alias enables explicit identification of such connections between addressses and enables disclosure of the preferred address.

A range of different categories of address are used in New Zealand (e.g. street addresses, postal addresses, etc). The Address Specification element of the model provides a mechanism to specify the characteristics of these address schemes and allows every address to declare which class it conforms with. Address Specification assists with the validation of address data as well as address transactions.

The model provides for relationships of the components of an address to their representations as real world geographic features; the Reference Object element exists for this purpose.

Besides these elements, there are numerous other detailed characteristics designed into the address model. Examples include provision for modelling parent-child relationships, lifecycle information, alternative abbreviated component names, etc.

Address model

The material in this section has been exported from Enterprise Architect (information architect modelling software). It does not align with the format found in ISO 19160-1:2015.

Figures 3 to 7 provide the address conceptual model in UML class diagrams.

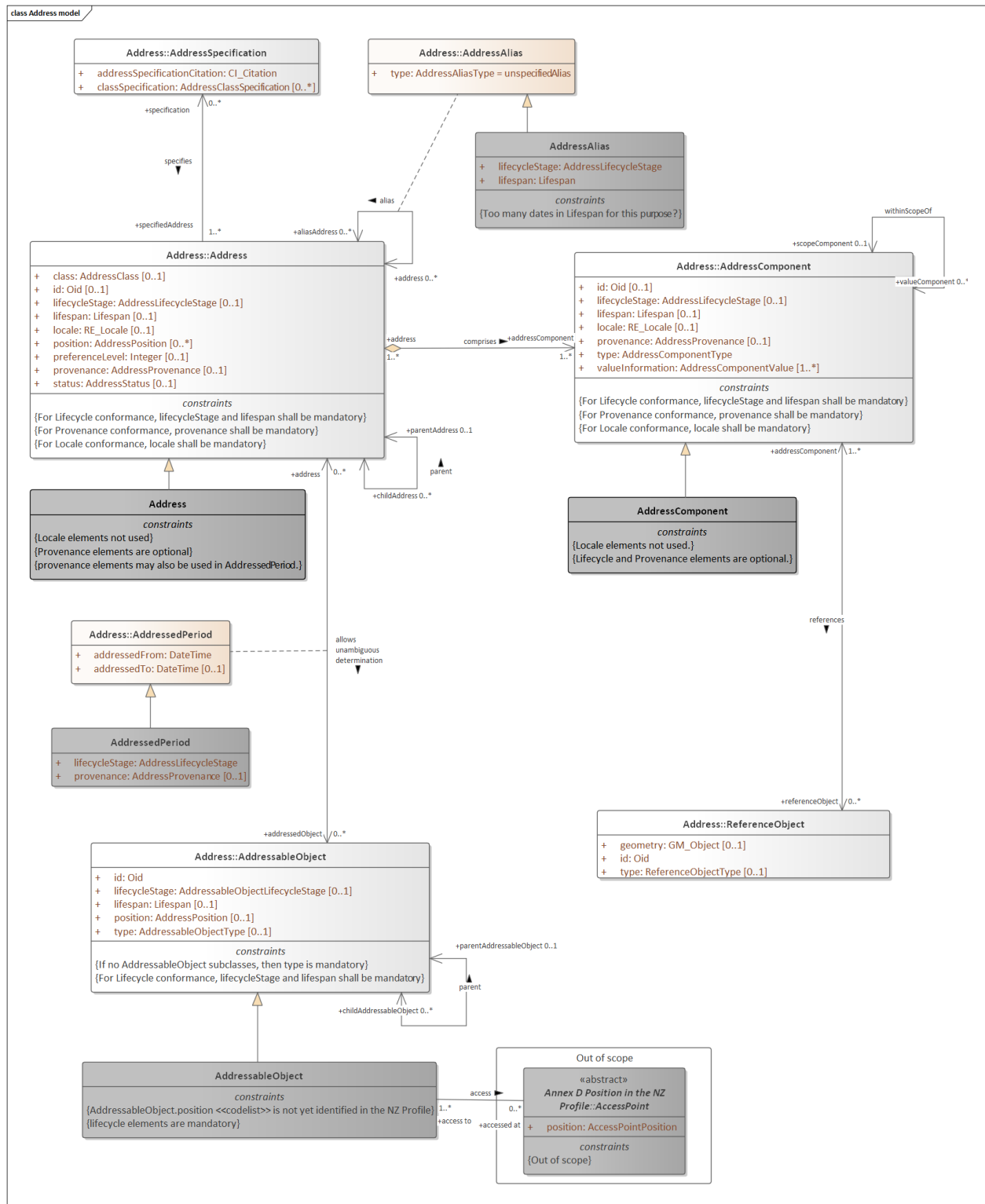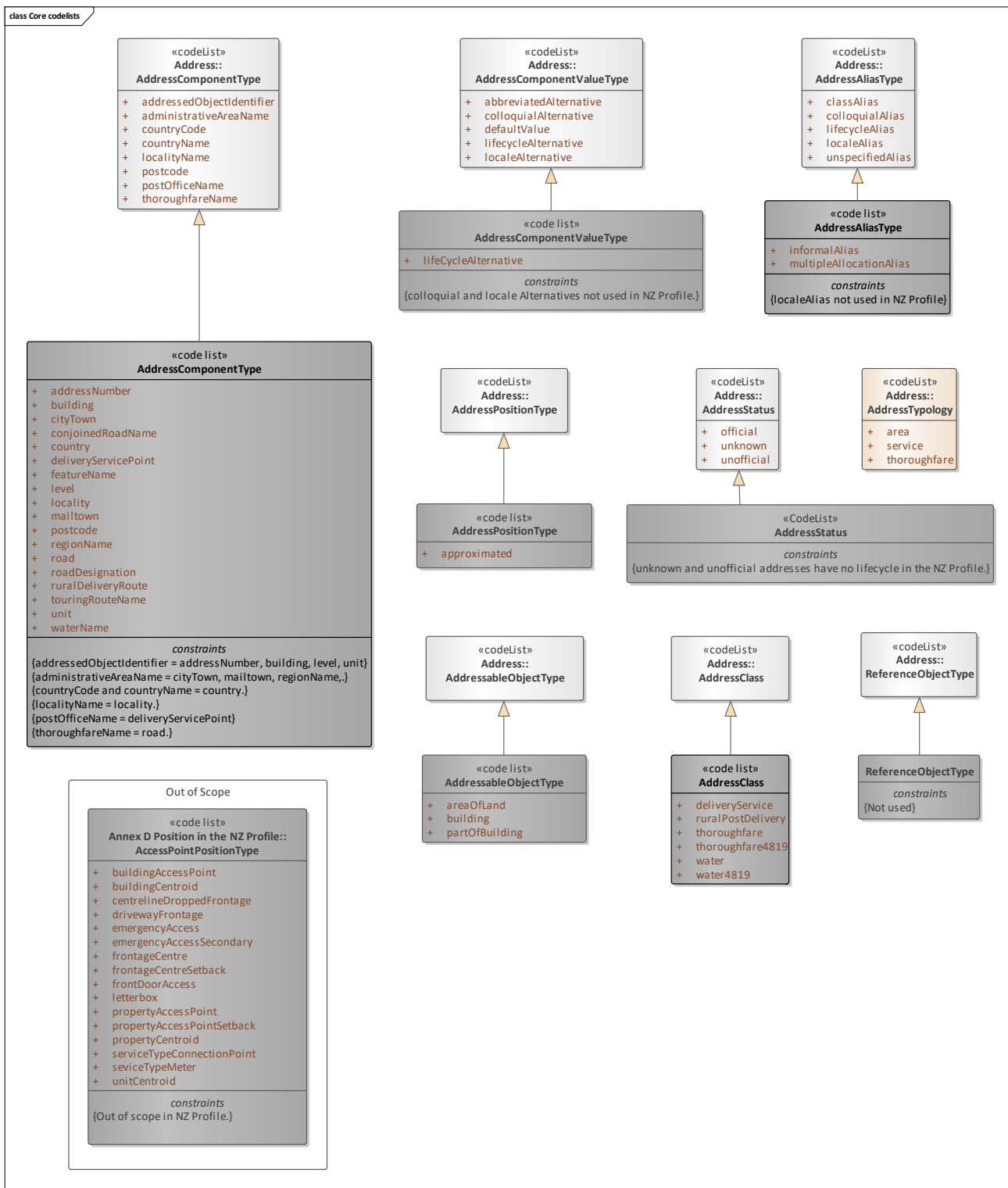**Figure 3: Address model diagram**

class Core codelists

«codeList»
Address::
AddressComponentType

+ addressedObjectIdentifier
+ administrativeAreaName
+ countryCode
+ countryName
+ localityName
+ postcode
+ postOfficeName
+ thoroughfareName

«codeList»
Address::
AddressComponentValueType

+ abbreviatedAlternative
+ colloquialAlternative
+ defaultValue
+ lifecycleAlternative
+ localeAlternative

«codeList»
Address::
AddressAliasType

+ classAlias
+ colloquialAlias
+ lifecycleAlias
+ localeAlias
+ unspecifiedAlias

«code list»
AddressComponentValueType

+ lifeCycleAlternative

constraints
{colloquial and locale Alternatives not used in NZ Profile.}

«code list»
AddressAliasType

+ informalAlias
+ multipleAllocationAlias

constraints
{localeAlias not used in NZ Profile}

«code list»
AddressComponentType

+ addressNumber
+ building
+ cityTown
+ conjoinedRoadName
+ country
+ deliveryServicePoint
+ featureName
+ level
+ locality
+ mailtown
+ postcode
+ regionName
+ road
+ roadDesignation
+ ruralDeliveryRoute
+ touringRouteName
+ unit
+ waterName

constraints
{addressedObjectIdentifier = addressNumber, building, level, unit}
{administrativeAreaName = cityTown, mailtown, regionName,.}
{countryCode and countryName = country.}
{localityName = locality.}
{postOfficeName = deliveryServicePoint}
{thoroughfareName = road.}

«codeList»
Address::
AddressPositionType

«codeList»
Address::
AddressStatus

+ official
+ unknown
+ unofficial

«codeList»
Address::
AddressTypology

+ area
+ service
+ thoroughfare

«code list»
AddressPositionType

+ approximated

«CodeList»
AddressStatus

constraints
{unknown and unofficial addresses have no lifecycle in the NZ Profile.}

«codeList»
Address::
AddressableObjectType

«codeList»
Address::
AddressClass

«codeList»
Address::
ReferenceObjectType

«code list»
AddressableObjectType

+ areaOfLand
+ building
+ partOfBuilding

«code list»
AddressClass

+ deliveryService
+ ruralPostDelivery
+ thoroughfare
+ thoroughfare4819
+ water
+ water4819

ReferenceObjectType

constraints
{Not used}

Out of Scope

«code list»
Annex D Position in the NZ Profile::
AccessPointPositionType

+ buildingAccessPoint
+ buildingCentroid
+ centrelineDroppedFrontage
+ drivewayFrontage
+ emergencyAccess
+ emergencyAccessSecondary
+ frontageCentre
+ frontageCentreSetback
+ frontDoorAccess
+ letterbox
+ propertyAccessPoint
+ propertyAccessPointSetback
+ propertyCentroid
+ serviceTypeConnectionPoint
+ seviceTypeMeter
+ unitCentroid

constraints
{Out of scope in NZ Profile.}

Figure 4: Core NZ codelists in the address model

class Core types

«dataType»
Address::AddressClassSpecification

+   class: AddressClass
+   component: AddressComponentType [1..*]
+   typology: AddressTypology

«dataType»
Address::AddressPosition

+   geometry: GM_Object
+   type: AddressPositionType [0..1]

«dataType»
Address::AddressComponentValue

+   locale: RE_Locale [0..1]
+   preferenceLevel: Integer [0..1]
+   type: AddressComponentValueType [0..1] = defaultValue
+   value: Any

Out of scope

«type»
Annex D Position in the NZ Profile::AccessPointPosition

+   geometry: GM_Object
+   positionCode: AccessPointPositionType

constraints
{Out of scope}

Figure 5: Core types in the address model

class Lifecycle

«dataType»
Address::Lifespan

+   closeRecord: DateTime [0..1]
+   openRecord: DateTime [0..1]
+   validFrom: DateTime
+   validTo: DateTime [0..1]
+   version: CharacterString [0..1]

«codeList»
Address::AddressLifecycleStage

+   current
+   proposed
+   rejected
+   reserved
+   retired
+   unknown

«codeList»
**Address::
AddressableObjectLifecycleStage**

+   approved
+   ceasedToExist
+   exists
+   proposed
+   underConstruction
+   unknown

«code list»
AddressLifecycleStage

+   error

«CodeList»
AddressableObjectLifecycleStage
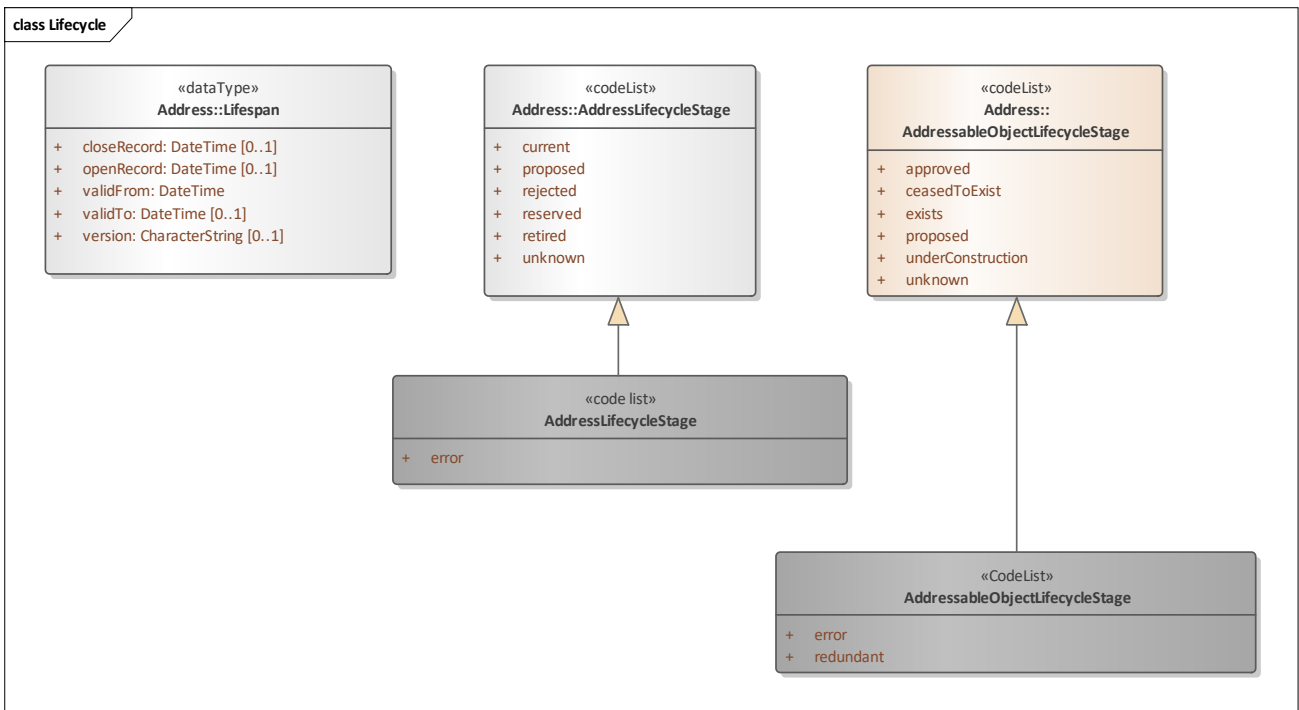
+   error
+   redundant

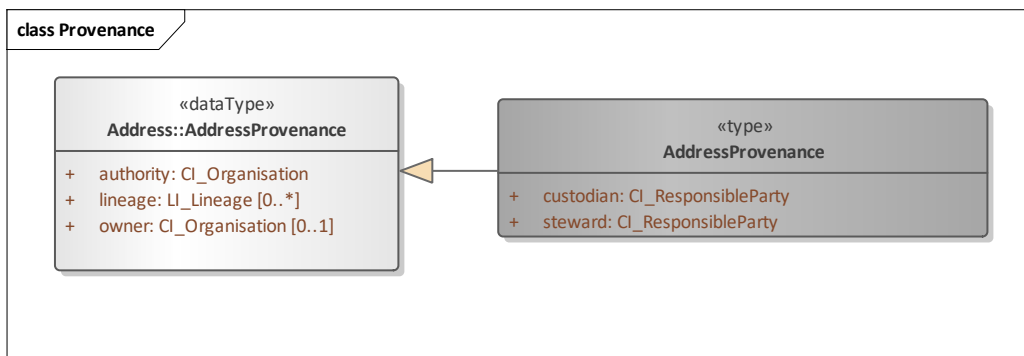Figure 6: Types and codelists in the address model for lifecycle information

Figure 7: Type in the address model for provenance information

Classes

The classes and attributes in the New Zealand profile of ISO 19160-1 are listed in Table 1. The class name, class description, class constraints, attribute names, and attribute descriptions for each class are provided.

Table 1: Classes

Class Name	Class Description
Address	A specialisation of the Address class that defines constraints for the NZ Addressing Profile.
Class Constraint	
provenance and lifecycleStage elements may also be used in AddressedPeriod.	

Class Name	Class Description
AddressAlias	A specialisation of the AddressAlias Class to define an attribute for the NZ Address Profile.
Class Constraint	
Too many dates in Lifespan for this purpose?	
Attribute Name	**Attribute Description**
lifecycleStage	The current stage in the lifecycle of the alias address.
lifespan	Information about the current lifespan stage of the alias address.

Class Name	Class Description
AddressAliasType	A codelist, being a specialisation of AddressAliasType, to define additional coded values for the NZ Addressing Profile.

Class Constraint	
localeAlias not used in NZ Profile	

Attribute Name	Attribute Description
informalAlias	An alias that has not been authorised by an authoritative source, e.g., one that has been adopted by an occupant.
multipleAllocationAlias	An alias that has been authorised for a secondary access point to an AddressableObject. Likely to be the same address class as the primary address.

Class Name	Class Description
AddressClass	A codelist, being a specialisation of AddressClass, that defines the set of Address Classes for the NZ Addressing Profile. NOTE: an Address Class is not the same as a UML Class.

Attribute Name	Attribute Description
deliveryService	An address containing a New Zealand Post PO Box, Private Bag, Community Mailbox (CMB), Counter Delivery or Poste Restante.
ruralPostDelivery	An address containing a New Zealand Post Rural Delivery Number for postal delivery purposes.
thoroughfare	A physical street address, used to locate the addressable object on the surface of the globe, and also to deliver mail in an urban area.
thoroughfare4819	A physical street address that conforms strictly to AS/NZS 4819:2011. Used to locate the addressable object on the surface of the globe, and also to deliver mail in an urban area.
water	A physical address, similar to a thoroughfare address but applied to AddressableObjects accessible by water.

water4819	A physical address that conforms strictly to AS/NZS 4819:2011; similar to a thoroughfare address but applied to AddressableObjects accessible by water.

Class Name	Class Description
AddressComponent	A specialisation of AddressComponent to define constraints for the NZ Addressing Profile.
Class Constraint	
Locale element not used.	
Lifecycle and Provenance elements are optional.	

Class Name	Class Description
AddressComponentValueType	A codelist, specialised from AddressComponentValueType, that defines encoded values particular to the NZ Addressing Profile.x
Class Constraint	
colloquial and locale Alternatives not used in NZ Profile.	
Attribute Name	**Attribute Description**
lifeCycleAlternative	An address that has been replaced, e.g., because of a change of thoroughfare name; that is retained for an historic record.
	This has been reinstated after being removed from the draft international standard, to fit the NZ Street Name Change instance.

Class Name	Class Description
AddressComponentType	A codelist, specialised from AddressComponentType, to define the set of component types for the NZ Address Profile.
	This is the set defined by the Optionality Matrix in Annex B and the Specialisations Matrix in Annex C.
	Note that some component types have two levels of granularity. Where components have sub-components, the high level address components map to Reference Objects, but the sub-components do not.
	Sub-components are defined in Annexes B and C. Optionality rules apply to the sub-components per Annex B.

Class Constraint
addressedObjectIdentifier = addressNumber, building, level, unit
administrativeAreaName = cityTown, mailtown, regionName
countryCode and countryName = country
localityName = locality
postOfficeName = deliveryServicePoint
thoroughfareName = road

Attribute Name	Attribute Description
addressNumber	A compound AddressComponent that identifies a property number (that may include alpha characters) along a thoroughfare or water feature. It contains: • alpha; The non-numeric value that may appear in an address number. • number; The numeric value that appears in an address number. • numberHigh; The higher order value may appear in an address number range. • numberLow; The lower order value that may appear in an address number range.
building	A compound AddressComponent that identifies a building, but is not an Address Number. It contains: • part; The name of an addressed subsection of a building eg. East Wing. • name; the designated identifier of a building. Eg BNZ Centre, The Beehive.
cityTown	The name of an urban area, in which the address is situated, that is generally known by a city or a town name.
conjoinedRoadName	A road name made of the names of places or localities at either end of the road. Also known as an origin-destination road name e.g. Brydone Glencoe Road. It is not a valid road name under AS/NZS 4819 but is sometimes used when a Territorial Authority has not assigned any other name to a segment of thoroughfare.
country	The name of the national jurisdiction (i.e. country) in which the address is situated.

deliveryServicePoint	A compound AddressComponent that identifies a New Zealand Post Box Lobby or Agency outlet where a PO Box, Private Bag, CMB (Community Mail Box), Poste Restante or Counter Delivery is physically located. It contains: • name; the designated identifier of the collection point, the place where a Delivery Service is operated, e.g., "Lambton Quay PO". • number; the value of the numeric id allocated to the Box, Bag, etc. by the Service Provider. • type; the classification of the service, whether Box, Bag, Counter, etc.
featureName	Identifies a discrete feature that may be used in an address, e.g. Stockton Mine, Fernglen Station, Linton Military Camp.
level	A compound AddressComponent that identifies a floor or level within a multi level building. It contains: • type; Level Types and Codes are defined in Table 5.1, AS/NZS 4819. Examples are Floor or Level. • value; the designated identifier within a multi level building.
locality	A named geographical area (place name) defining a community of interest, which may be rural or urban in character, and is usually a suburb in the latter case.
mailtown	Identifies the service centre associated with a NZ Post Rural Delivery Number. This is a mandatory component of a NZ Post rural delivery address.
postcode	A four digit code defined by New Zealand Post, which is used to identify the locations linked to sorting zones for mail distribution purposes.
regionName	Identifies a large, named geographic extent eg. "Waikato", "King Country", etc.
road	A compound AddressComponent that identifies a thoroughfare. It contains: • name; the designated identifier of the road; excluding prefix, suffix or type. e.g., taking "Lambton Quay" and "Horokiwi Road West" as examples: the roadName is "Lambton" excluding "Quay", or "Horokiwi" excluding "Road" and "West". • type; e.g. Terrace, Lane, Road. See the AddressRoadType <<>codelist>>.

	• prefix; a backwards extension allowing for additional descriptors such as "Upper", "Lower". • suffix; a forward extension allowing for additional descriptors such as East/West/North/South etc.
roadDesignation	An identifier for a long distance primary route; e.g. "SH1". Its use is not preferred but is sometimes used as a fall back when a proper name doesn't exist for a segment of thoroughfare which happens to also be a designated State Highway.
ruralDeliveryRoute	The identifier assigned by NZ Post to their Rural Delivery Routes. It is Numeric or Alpha Numeric (in Oamaru) and. unique within a Mailtown.
touringRouteName	A long thoroughfare that has been designated, for example, to encourage tourism; e.g. "Classic NZ Wine Trail", "Forgotten World Highway", "Surf Coast Highway", etc.. Not preferred for addressing purposes.
unit	A compound Address Component, being a sub-structure, eg., Kiosk, Flat, Studio, Carpark; used as an identifier for a specific sub address within a building or property. The definitive set of values, as found in AS/NZS 4819, is defined in the <<codelist>> AddressUnitType. OR the identifier for a specific sub address within a building or property. It consists of: • type; the classifier for a sub-structure, eg., Kiosk, Flat, Studio, Carpark. The definitive set of values, as found in AS/NZS 4819, is defined in the <<codelist>> AddressUnitType. • value; the identifier for a specific sub address within a building or property.
waterName	The name that identifies a water feature or island name where a water address is situated e.g. "Ruakaka Bay", "Moturua Island", etc

Class Name	Class Description
AddressLifecycleStage	A code list, specialised from AddressLifecycleStage, defining additional coded values for stage type(s) for the NZ Address Profile.
Attribute Name	**Attribute Description**
error	Records that an address was created in error.

Class Name	Class Description
AddressPositionType	A codelist, specialised from AddressPositionType, to define an address position for the NZ Address Profile.
	NOTE: "approximated" is a non-specific geocode assigned to an address when it is allocated to a property, and it is not deemed to be out of scope for the NZ Address Profile.
Attribute Name	**Attribute Description**
approximated	Inside the boundary of an AddressableObject but attached to an Address by the TA assigning it.

Class Name	Class Description
AddressProvenance	A type, not a code list (values are not alternatives), specialised from AddressProvenance; defining additional types of authority for Address or AddressComponent, in the NZ Address Profile.
Attribute Name	**Attribute Description**
custodian	Responsible for ensuring appropriate care in the collection, storage, maintenance and supply of the information.
steward	Responsible for ensuring that appropriate data management policies and standards are developed and maintained on behalf of the Crown. Stewardship covers all aspects of managing spatial information. This includes data architecture, quality, metadata, pricing, licensing, access and dissemination, bearing in mind any statutory responsibilities and government data management policies.

Class Name	Class Description
AddressRoadType	A codelist defining the values that may be taken by AddressComponentType.roadType. Sourced from AS/NZS 4819.
Attribute Name	**Attribute Description**
alley	Usually a narrow roadway in a city or town.
ara[1]	Te Reo Māori, meaning way, path, lane, passageway, track, course, route.
arcade	Covered walkway with shops along the sides.
avenue	Broad roadway, usually planted on each side with trees.
boulevard	Wide roadway, well paved, usually ornamented with trees and grass plots
circle	Roadway that generally forms a circle; or a short enclosed roadway bounded by a circle.
close	Short enclosed roadway.
court	Short enclosed roadway, usually surrounded by buildings.
crescent	Crescent shaped roadway, especially where both ends join the same thoroughfare.
drive	Wide main roadway without many cross-streets.
esplanade	Level roadway along the seaside, lake, or a river
glade	Roadway usually in a valley of trees.
green	Roadway often leading to a grassed public recreation area.
grove	Roadway that features a group of trees standing together.
highway	Main thoroughfare between major destinations.
lane	Narrow roadway between walls, buildings or a narrow country roadway.
loop	Roadway that diverges from and rejoins the main thoroughfare.
mall	Wide walkway, usually with shops along the sides.
mews	Public roadway or promenade that has good pedestrian facilities along the side.
parade	Public roadway or promenade that has good pedestrian facilities along the side.
place	Short, sometimes narrow, enclosed roadway.
promenade	Wide flat walkway, usually along the water's edge.
quay	Roadway alongside or projecting into water.
rise	Roadway going to a higher place or position.

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[1] The guidelines to infill addressing (released in 2020) added ara to the list of road types in AS4819

road	Open roadway primarily for vehicles.
square	Roadway which generally forms a square shape, or an area of roadway bounded by four sides.
steps	Walkway consisting mainly of steps.
street	Public roadway in an urban area, especially where paved and with footpaths along one or both sides.
terrace	Roadway on a hilly area that is mainly flat.
track	Walkway in a natural setting.
walk	Thoroughfare for pedestrians.
way	Short enclosed roadway.
wharf	A roadway on a wharf or pier.

Class Name	Class Description
AddressStatus	A specialisation of AddressStatus for the NZ Address Profile, defining a constraint on the AddressStatus codelist attributes. Note that it contains no attributes, only the constraint.
Class Constraint	
unknown and unofficial addresses have no lifecycle in the NZ Profile.	

Class Name	Class Description
AddressUnitType	A codelist defining the values that may be taken by AddressComponentType.unitType.
Attribute Name	**Attribute Description**
apartment	A dwelling unit within an apartment building
carPark	An address site defining an area assigned for vehicle parking
dwelling	A self contained unit of accommodation
flat	A self-contained dwelling that (usually) occupies only part of a building. Sometimes synonymous with *apartment* and *unit*.
kiosk	A small shop.
room	A single room within a building. Similar to suite.
shop	A shop within a building.
studio	A small apartment within a building.
suite	An office within a building where the building contains multiple businesses, or may also be a hotel room.
unit	see *apartment* and *flat*.

| villa | May be a unit within a village, such as a retirement village or other complex comprising several self contained accommodations, but may also refer to various types and sizes of residences beyond such complexes. Sometimes referred to as "Townhouse" |

Class Name	Class Description
AddressableObject	A specialisation of AddressableObject to define constraints (but not attributes) for the NZ Address Profile.
Class Constraint	
AddressableObject.position <<codelist>> is not yet identified in the NZ Profile	
lifecycle elements are mandatory in the NZ Profile.	

Class Name	Class Description
AddressableObjectLifecycleStage	A code list, specialised from AddressableObjectLifecycleStage, defining additional stage type(s) for the NZ Address Profile.
Attribute Name	**Attribute Description**
error	Records that an object was created in error
redundant	Used when a proposed development has not proceeded.

Class Name	Class Description
AddressableObjectType	A codelist, specialised from AddressableObjectType, to define the set of types for an Addressable Object in the NZ Address Profile. NOTE: these are as defined in the Local Government Act 1974 s.319B (1), Allocation of property numbers.
Attribute Name	**Attribute Description**
areaOfLand	For electoral, postal and other purposes the council may allocate a number to any area of land
building	The name of a building. (not an object definition)
partOfBuilding	The name of a part of a building.

Class Name	Class Description
AddressedPeriod[1]	An assignment of an Address to an AddressableObject at a particular time.

Attribute Name	Attribute Description
provenance	Information about the provenance of the assignment of the Address to the AddressableObject
AddresslifecycleStage	Specifies the lifecycle phase for an AddressedPeriod

Class Name	Class Description
ReferenceObjectType	A specialisation of ReferenceObjectType, to define a constraint for the NZ Address Profile.
Class Constraint	
Not used	

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[1] Some potential uses of AddressedPeriod may require attributes not identified in this profile. Further investigation may be required.

Requirements

The NZ Profile of ISO 19160-1 has been developed by inheriting appropriate elements from the conceptual model in ISO 19160-1, then specialising or extending these as necessary to detail all the characteristics of New Zealand's address classes. Most of the Requirements specified in ISO 19160-1 Section 7 apply in this profile, the exceptions are explained below.

Requirements Class: Core

Dependencies

19160-1 7.1.1 Table 20 – Dependencies of the Core requirements class, applies to the New Zealand Profile except for the last row, which specifies a dependency for Locale.

Core Requirement 1: Classes

19160-1 section 7.1.2 applies to the New Zealand Profile, except for the following:

- EXAMPLE 1 Reference to "addressee", which is not a ReferenceObject or AddressComponent type in New Zealand.
- EXAMPLE 2 Landmarks are not AddressableObjects in New Zealand, apartments are units and levels.
- EXAMPLE 5 Not relevant, New Zealand does not use land parcel addresses.
- EXAMPLE 6 Not relevant, mail recipient is not a ReferenceObject or AddressComponent type in New Zealand.
- NOTE In the New Zealand Profile the association between external data and an address component is in Annex F.

Core Requirement 2: Associations

19160-1 section 7.1.3 applies to the New Zealand Profile, except for the following:

- EXAMPLE 2 "city" is "cityTown" in the New Zealand Profile.
- EXAMPLES 4 and 5 In the New Zealand Profile a water feature shore or centre line could also be a ReferenceObject.
- EXAMPLE 6 mail recipient is not relevant to the New Zealand Profile.
- EXAMPLES 8, 9, 11, and 12 are not relevant in New Zealand.
- EXAMPLES 13 to 16 and preceding NOTE There is no single definitive New Zealand standard. The ESA, PAF, xAL (New Zealand Profile) and AS/NZS 4819: 2011 have contributed to a composite view of a New Zealand Address Requirement that is explained in Annex F.

Core Requirement 3: Attributes

19160-1 section 7.1.4 applies to the New Zealand Profile, except the Address attribute of provenance may alternatively occur in AddressedPeriod, meaning it may not be in the same class as in 19160-1.

Requirements Class: Lifecycle

19160-1 section 7.2 applies to the New Zealand Profile, except Lifecycle attributes shall be optional in AddressComponent. Lifecycle conformance is not claimed for AddressComponent.

Requirements Class: Provenance

19160-1 section 7.3 applies to the New Zealand Profile, except Provenance attributes shall be optional. Provenance conformance is not claimed.

Requirements Class: Locale

19160-1 section 7.4 does not apply to the New Zealand Profile, and Locale conformance is not claimed. New Zealand does not distinguish addresses based on language.[1]

Requirements Class: Address profile documentation

19160-1 section 7.5 applies to the New Zealand Profile.

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[1] Though some small localities use French street names, and some locations have alternative Maori or European names, these do not change the way addresses are used. If necessary, addresses in different languages would be managed as aliases.

Annex A (normative):[1] Abstract Test Suites

This Profile has been developed by inheriting and specialising elements from the conceptual model in ISO 19160-1. Most of the abstract tests defined in Annex A of 19160-1 apply to the New Zealand profile without modification. The exceptions are those relating to Lifecycle, Provenance and Locale, as specified below:

- Clause A.3, Lifecycle, applies except for Address Component
- Clause A.4, Provenance, does not apply
- Clause A.5, Locale, does not apply
- Clause A.6, documentation, substantially applies, however has not been fully tested. Prior to publication this document's conformance to the Address profile documentation Conformance Class will be considered.

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[1] a 'normative' annex is an integral part of this Profile. An 'informative' annex is only for information and guidance.

Annex B (normative): New Zealand Address Classes and Components

Address Classes

An address class is a set of addresses that share the same address components, operations, methods, relationships, and semantics. Addresses in the same address class may use any combination of address components that are valid for that class of address. See Table 4: Address class components matrix for valid combinations.

Four general address classes have been defined. These are described in Table 2.

Table 2: General classes

Address Class	Purpose
thoroughfare	physical addresses used to reference a location
water	
service delivery	postal addresses used by NZ Post for postal services
rural post delivery	

Two special purpose address classes have been defined. These are described in Table 3.

Table 3: Special purpose classes

Address Class	Purpose
thoroughfare 4819	for validation of addresses conforming with the address allocation standard AS/NZS 4819:2011
water 4819	

The special purpose address classes conform to the requirements of AS/NZS 4819:2011 and allow for validation of the address components of thoroughfare or water addresses against that standard. They do not test all the requirements for an address in AS/NZS4819:2011, only the requirements that relate to address components. For example, position is an attribute of the address itself and not of the address components, so cannot be validated by these address classes.

Addresses assigned by addressing authorities since the publication of AS/NZS 4819:2011 should conform to the special purpose address classes. Although AS/NZS4819:2011 is not

retrospective, most addresses existing prior to 2011 will also conform to the special purpose address classes, and this may include informal addresses.

The extent to which AS/NZS 4819:2011 is applied to existing addressing anomalies is the prerogative of addressing authorities. Numerous well established, well-known officially allocated addresses will not conform to the special purpose address classes. For example, addresses on The Terrace, Wellington, because The Terrace does not contain the required road type component.

An address may conform to the specifications of more than one address class, but at a point in time an address may only be a member of one address class. For example, an address conforming to both the thoroughfare class and the thoroughfare4819 class can be assigned to either one or the other, but not both.

No assumption can be made about the official (allocated) status of an address from the address class that it is a member of. To identify which addresses are official or unofficial the address status attribute should be used.

This Profile provides a framework for consistently defining New Zealand address classes and the intent is to define common examples. A service provider may wish to define additional address classes.

Description of the Address Classes

Thoroughfare

All addresses belonging to this Class must relate to a thoroughfare. A thoroughfare is most easily thought of as a normal, named, formed road or street. It may carry traffic or be pedestrianised. It can be public or private.

Water

Water based addresses use the name of relevant water features e.g. islands, rivers, bays, or peninsulas. They may be associated with piers, wharves, or other buildings. Addresses in this Class are likely to be accessible only by means such as a boat or aircraft; they do not reference a thoroughfare or walkway.

Delivery Service

Refer to *About the Postal Address File* published by NZ Post. Addresses that conform to this class are valid NZ Post Postal Addresses of types PO Box, Private Bag, and Counter Delivery.

Rural Post Delivery

Refer to *About the Postal Address File* published by NZ Post. Addresses that conform to this class are valid NZ Post Postal Addresses of type Rural Postal Delivery

Thoroughfare4819

Addresses in this Class are thoroughfare addresses whose characteristics, in respect to the use of address components, conform to the addressing standard AS/NZS 4819:2011.

Water4819

Addresses in this Class are water addresses whose characteristics, in respect to the use of address components, conform to the addressing standard AS/NZS 4819:2011.

Parent components and sub-components

The value of an address component may reference another object (the Reference Object), such as a spatial feature e.g. a locality boundary, geographical extent of a road, etc.

The NZ Profile has identified that in some cases, to reference another object, some address components may need to be aggregated together. The aggregated component has been termed a parent component, and the constituent components have been termed sub-components. Sub-components cannot directly reference another object, but the parent component is able to be linked to reference objects.

The rationale for declaring the sub-components is that different methods or operations may apply to them. For example, for validating address data, attempting to match addresses, or in applications where operations (like abbreviating components) might be desired for specific components. Therefore it is necessary to define, and be able to exchange, all address components including sub-components (for example, road name, road suffix, road type).

The address class components matrix in Table 4 declares all the address components identified in New Zealand (including parent components and sub-components), along with known business rules (optionalities) for each.

The component column in Table 4: Address class components matrix declares the component types that can be linked to spatial features (reference objects) using values such as the name or identifier of a component and the equivalent reference object.

The NZ Profile uses the <<union>> class to define these levels of address components. Classes with stereotype "Union" contains a list of types where only one may be used in one instance

Definition of Address Class Optionalities

The address class components matrix in Table 4 shows the permitted optionality for an address component in each of the address classes. This can be used to validate the membership of an address to a class of address. For each class of address, an address component may be either mandatory, optional, conditional, or 'deprecated'.

Mandatory (M):

> Components which must be present for addresses in the address class. If any of these components are missing the address cannot belong to that class e.g. a thoroughfare address must include a thoroughfare name such as a road or street name.

Optional (O):

> Components that may also appear. Addresses without these components may still belong to the class e.g. a unit number.

Conditional (C):

> Components which must exist because of a dependency upon, or existence of, other components e.g. a unit type may only be present if a unit number exists.

Deprecated (D):

> Informal components that exist and are used in the real world but they do not conform to AS/NZS 4819:2011 and their use is discouraged. Provision for them in the matrix allows for these components to be transacted with physical address classes, but flags them as an anomaly that may require attention to improve address quality.

NOTE 1   The Address Component "Locality" is also known as suburb. Locality is the component name used by the Profile. This aligns with usage in AS/NZS 4819:2011. As a component name it maps satisfactorily to either a rural or an urban context. Suburb is a synonym for locality in urban areas only (suburb is used by NZ Post standards)

NOTE 2   Non structured addresses are out of scope. This is because the scope of this Profile is standardising address data concepts and specifying a structure to aid consistent interpretation and handling of New Zealand addresses. ISO 19160-1:2015 Annex C.2 provides a simple address profile which can be used to represent addresses comprising only address lines (character strings).

Address class components matrix

Table 4: Address class components matrix

AddressComponentType <<codelist>> attributes (parent component where sub-components are present)	Sub-component types	addressClass					
		physical		postal		validation	
		thoroughfare	water	deliveryService	ruralPostDelivery	thoroughfare4819	water4819
unit	type	C	C		C	C^1	C^1
	value	O	O		O	O	O
level	type	C	C		C	C^2	C^2
	value	O	O		O	O	O
building	part	O	O		O	O	O
	name	O	O		O	O^3	O^3
featureName	N/A	O	O		O		
addressNumber	number	O	O		O^4	M^5	M^5
	alpha	C^6	C^6		C^6	C^7	C^7
	numberLow	C^8	C^8				
	numberHigh	C^8	C^8				
road	name	M			M^9	M	
	type	O			O	M^{10}	
	prefix	O			O		
	suffix	O			O		
roadDesignation	N/A	D^{11}			D^{12}		
touringRouteName	N/A	D^{13}			D^{14}		

conjoinedRoadName	N/A	D[15]			D[15]		
waterName	N/A		M				M
locality	N/A	O	O			M[16]	M[16]
cityTown	N/A	O	O	C[17]		C[18]	C[18]
mailtown	N/A			C[19]	M		
regionName	N/A	D[20]	D[20]				
deliveryServicePoint	type			M			
	number			C[21]			
	name			C[22]			
ruralDeliveryRoute	N/A			C[23]	M		
postcode	N/A	O	O	O	O	O[24]	O[24]
country	N/A	O	O	O	O	O[24]	O[24]

1   unit type may only be present if unit value is present. AS/NZS 4819 5.10.6 states a type may be assigned to a sub-address as appropriate e.g. 'Unit', 'Flat', 'Shop'

2   level type may only be present if level value is present. AS/NZS 4819 5.11 makes provision for sub-addressing a multilevel site.

3   AS/NZS 4819 2.2.4 - assigned addresses can include additional components such as building name or postcode, etc

4   if the street number is not present or not known, then for this address class NZ Post uses addressee to identify the delivery point. Addressee is outside the scope of this Profile

5   to address a building or property unambiguously, at least one of addressNumber or a building name must be present. Ref AS/NZS 4819 2.2.2

6   may be present if addressNumber is present; address Alpha on its own is meaningless

7   may be present if addressNumber is present. Ref AS/NZS 4819 2.2.2(a)(ii) "... a number may include other characters". Values A - E only are valid, see AS/NZS 4819 5.4.8

8   address numberLow and address numberHigh define an address range. If one is present the other must be present as well. Ranges are encountered with historical addresses. For new allocated addresses AS/NZS 4819 5.4.9 specifies that number ranges shall not be assigned.

9 NZ Post will use SH # (roadDesignation) as the road name if no other local road name exists for that segment of thoroughfare

10 road type may be absent for some thoroughfares e.g. The Terrace. This is allowed if the name is historic and does not invalidate the address. Valid road types are defined in AS/NZS 4819 Appendix B. All new roads shall have a road type.

11 prefer to retire these Address Component Types e.g. 'SH 6' etc. Their use may be unavoidable where the Territorial Authority has not assigned a standard local thoroughfare name

12 as with 11; NZ Post will use a SH name as the road name when there is no other local road name

13 prefer to retire use of such component types; scenic or tourist routes are not recognised by AS/NZS 4819 (4.5)

14 as with 13; NZ Post may use a touring route name when there is no other local road name

15 prefer to retire these component types. Ref AS/NZS 4819 4.4.9: a road name shall not consist of the conjoined names of places or localities. Their use may be unavoidable where the Territorial Authority has not assigned a standard thoroughfare name.

16 at least one must be present, to satisfy the "Locality" rule. See AS/NZS 4819 2.2.2 (c). cityTown is Mandatory if locality does not give uniqueness (AS/NZS4819 2.2.3).

17 there must be a value if it is a PO Box, Private Bag, Urban CMB or Counter Delivery

18 conditional on the value of "Locality". cityTown is mandatory if locality does not give uniqueness (AS/NZS 4819 2.2.3). At least one must be present, to satisfy the "Locality" rule. See AS/NZS 4819 2.2.2 (c).

19 there must be a value if it is a Rural CMB (Community Mail Box)

20 not used if there is a locality name. See AS/NZS 4819 3.2.6

21 required if it is a PO Box, Private Bag or CMB

22 required if it is a PO Box or Counter Delivery; not required if delivery service name is cityTown

23 required if it is a Rural CMB

24 ref AS/NZS 4819 2.2.4: assigned addresses can include additional components such as a building name, postcode, country, etc

Annex C (informative): Address Class contents and Address Components

The diagrams in this Annex illustrate how mappings between Address Classes and Address Components, which are defined in Annex B, can also be directly represented in UML.

In an Implementation Profile they may be normative.

AddressClass Specialisations

Figure 8 illustrates that the Address Classes defined for the NZ Address Profile are specialisations of Address
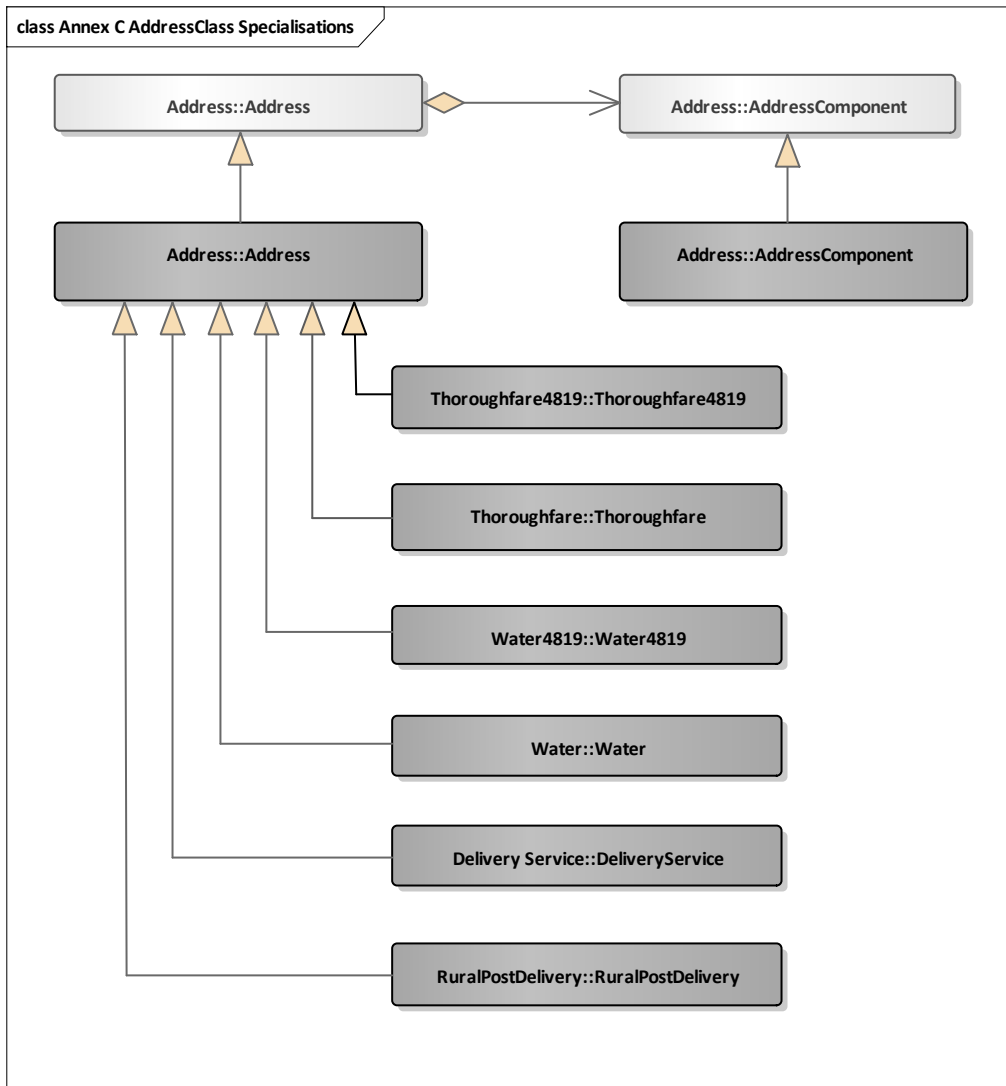

Figure 8: AddressClass specialisations

DeliveryServiceElements

Figure 9 illustrates the data content of elements that are deemed to best fit to the DeliveryService Address Class.
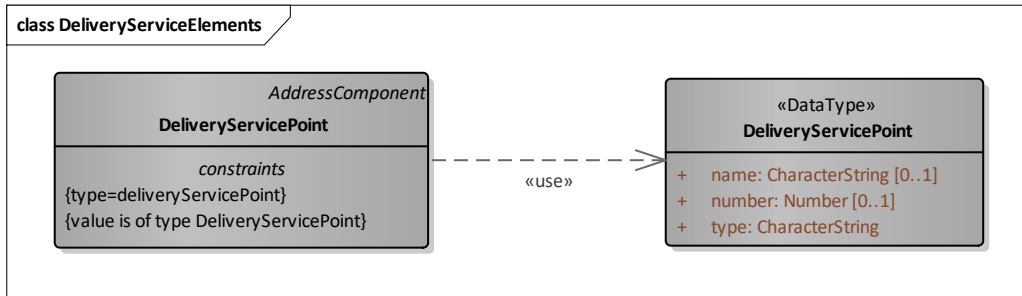
Figure 9: DeliveryService elements

RuralPostDeliveryElements

Figure 10 illustrates the data content of elements that are deemed to best fit to the RuralPostDelivery Address Class.
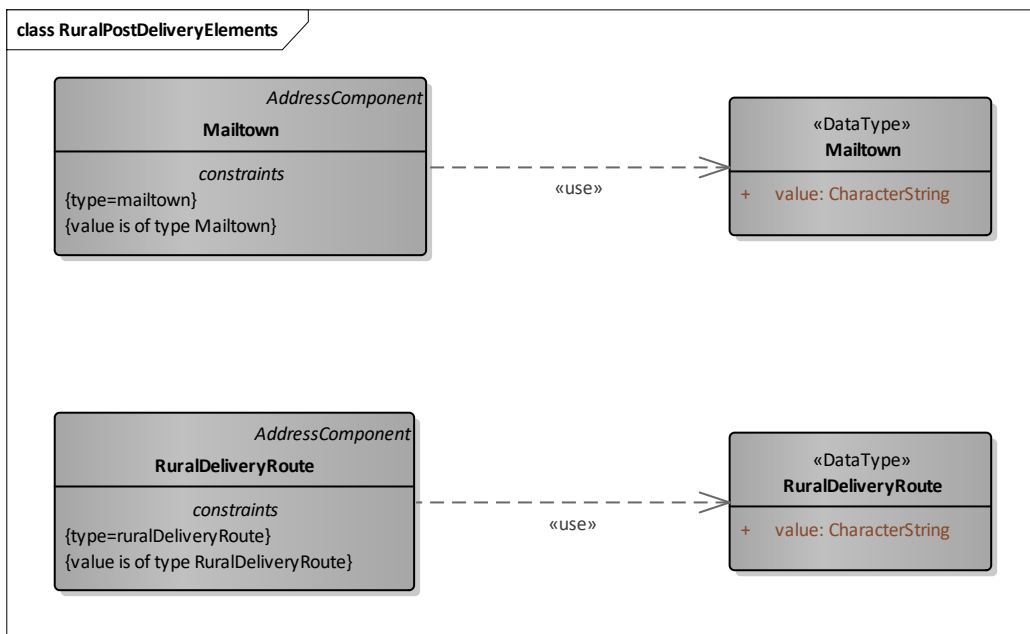
Figure 10: RuralPostDeliveryElements

ThoroughfareElements

Figure 11 illustrates the data content of elements that are deemed to best fit to the Thoroughfare Address Class.
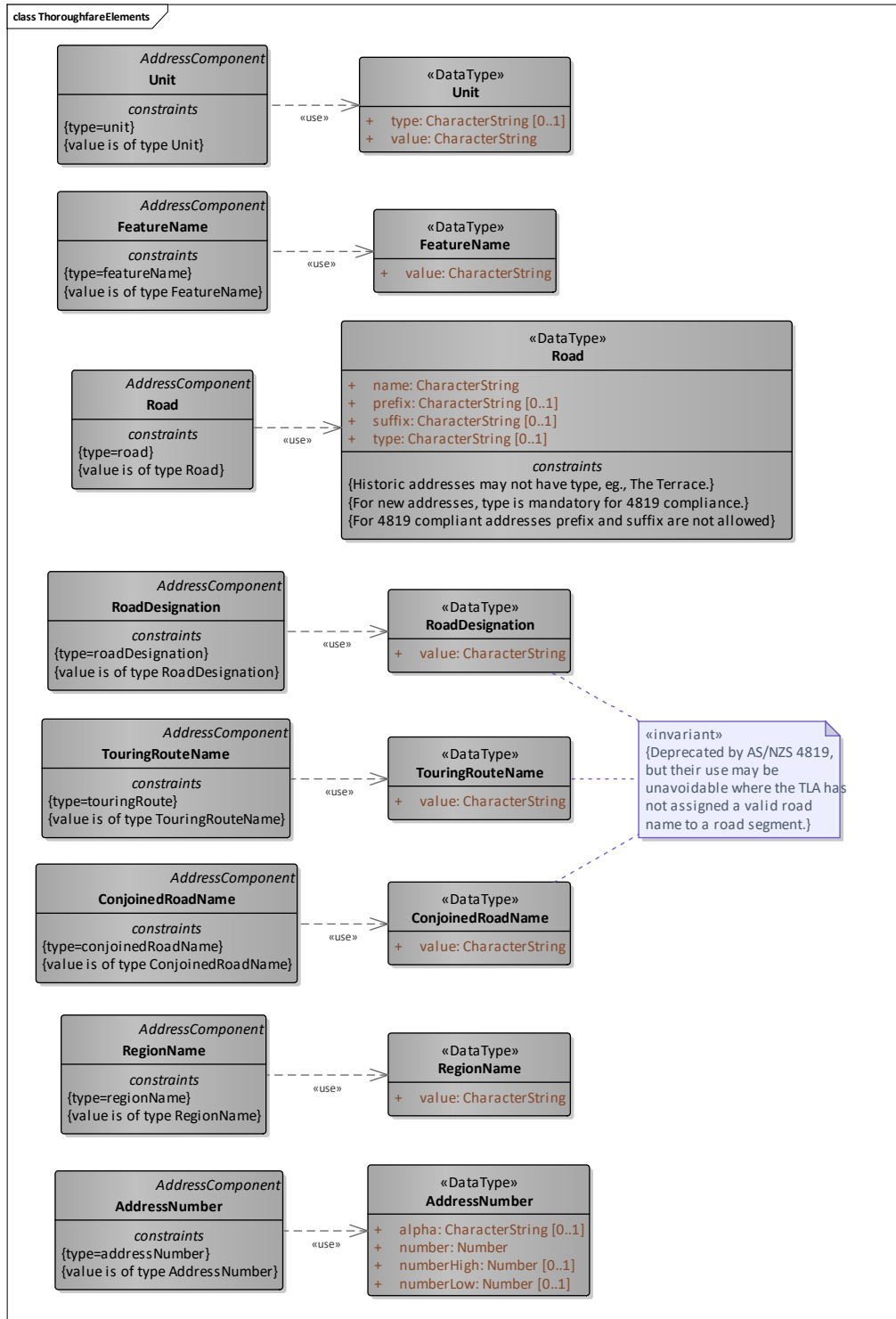
Figure 11: ThoroughfareElements

Thoroughfare4819Elements

Figure 12 illustrates the data content of elements that are deemed to best fit to the Thoroughfare4819 Address Class.
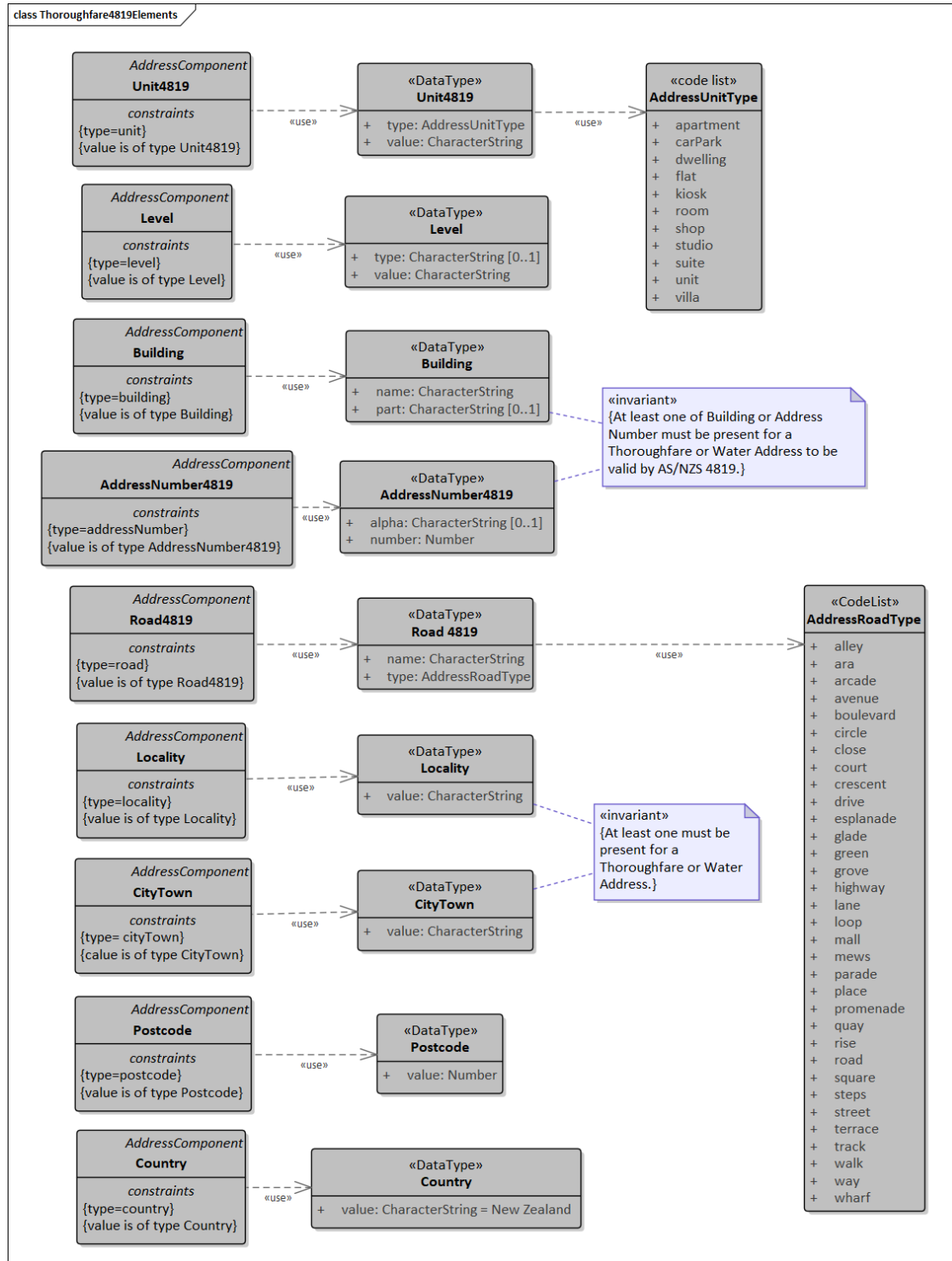
Figure 12: Thoroughfare4819Elements

WaterElements

No AddressComponentTypes have been defined from within the Water package. A note has been made to this effect so that the omission can be seen to be deliberate.

Water4819Elements

Figure 13 illustrates the data content of elements that are deemed to best fit to the Water4819 Address Class.
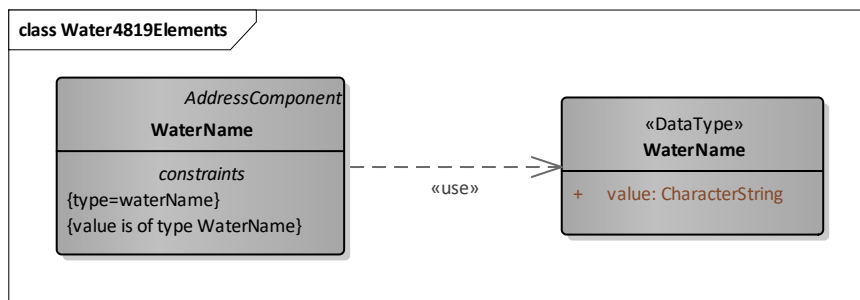
Figure 13: Water4819Elements

DeliveryService

Figure 14 illustrates the structure of a Delivery Service Address
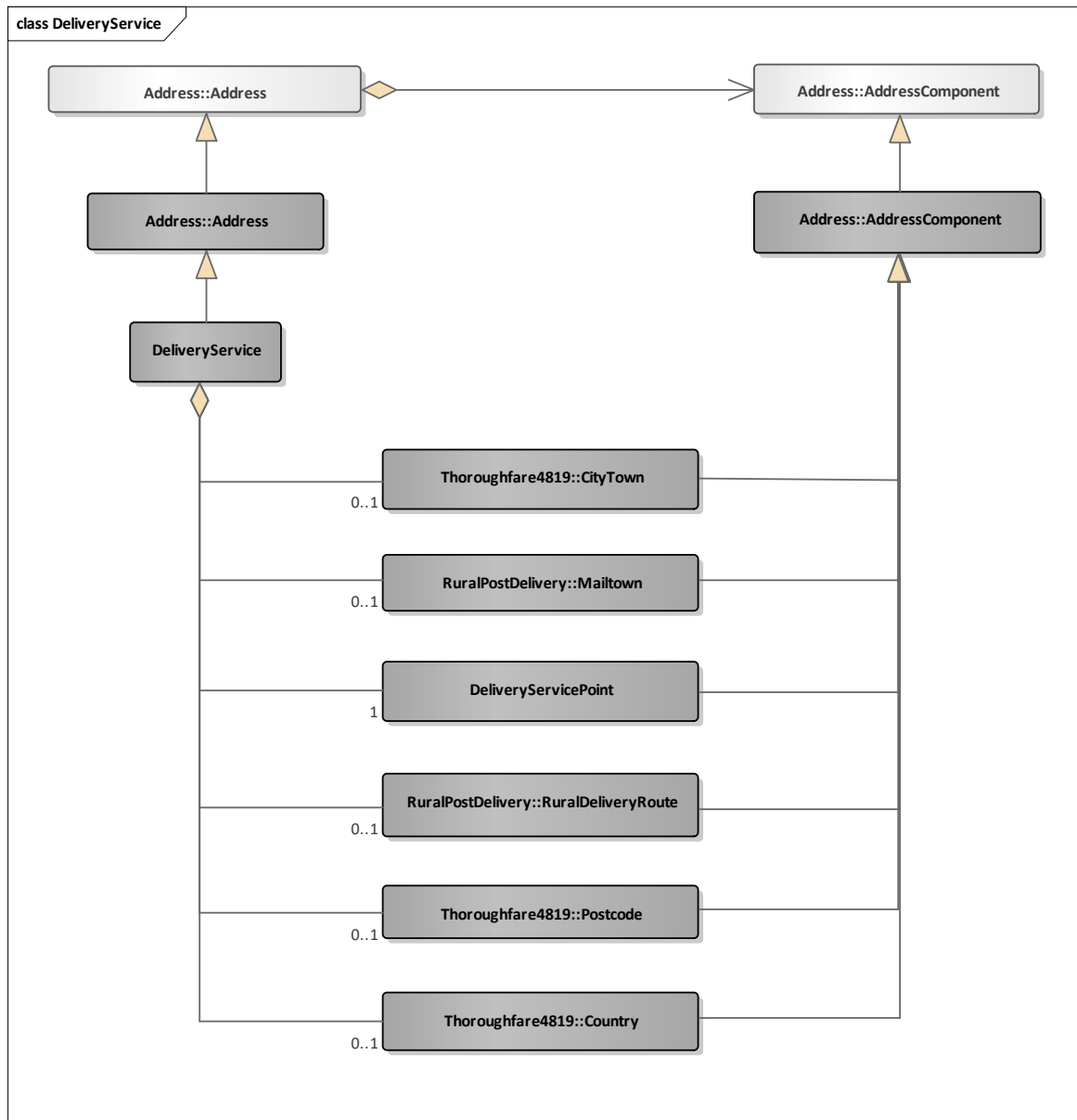
Figure 14: DeliveryService.

RuralPostDelivery

Figure 15 illustrates the structure of a Rural Post Delivery Address.
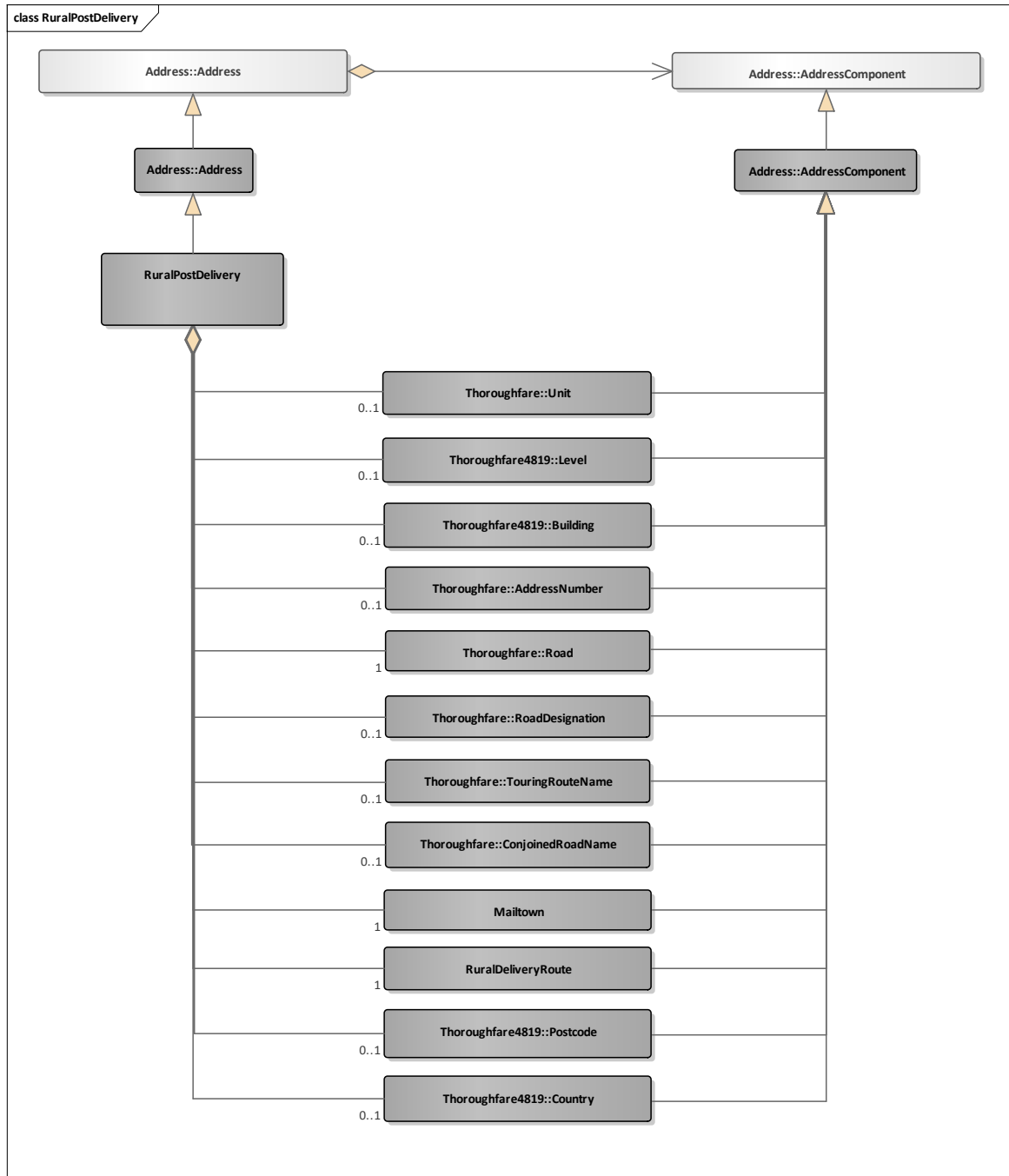
Figure 15: RuralPostDelivery

Thoroughfare

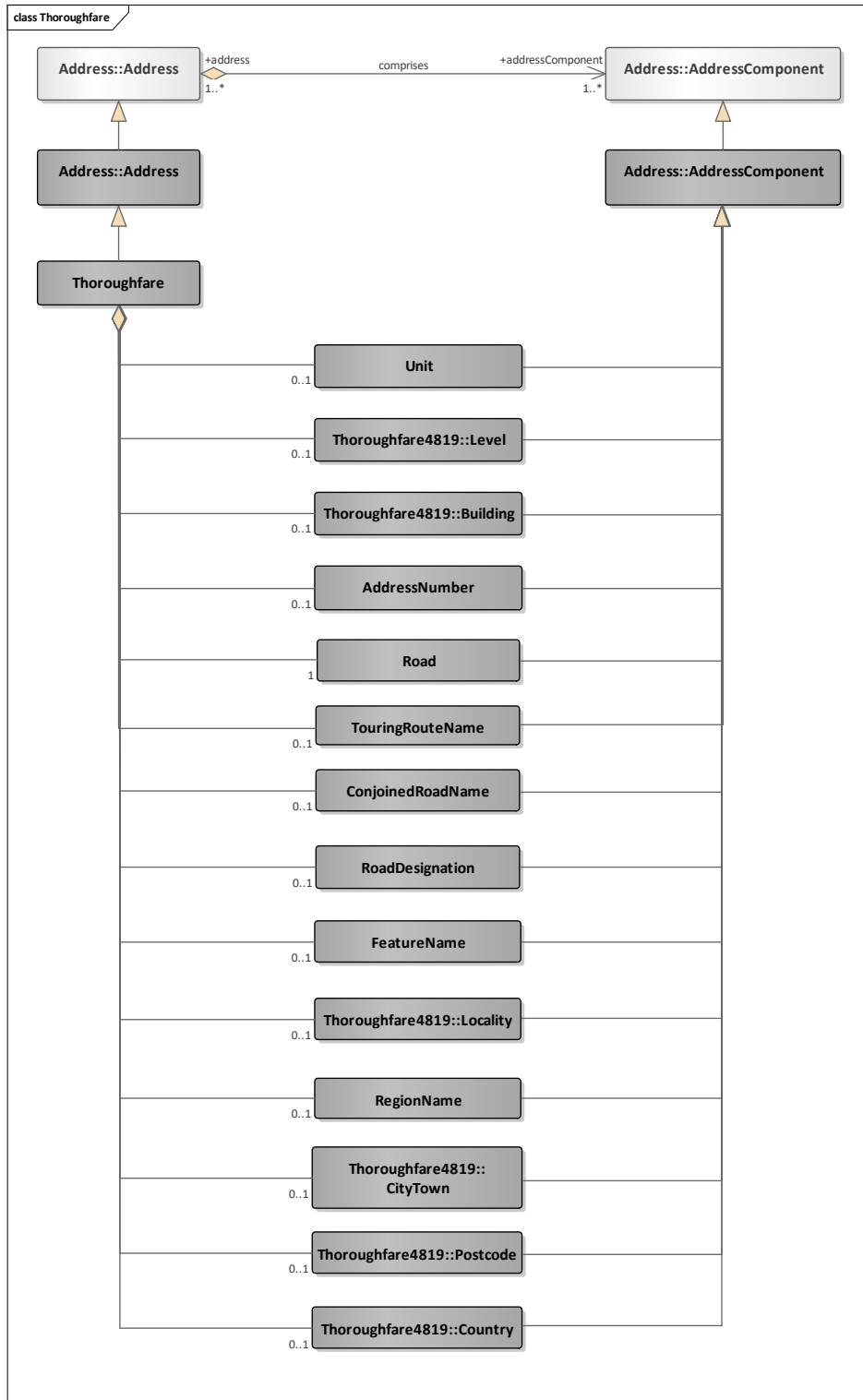Figure 16 illustrates the structure of a Thoroughfare Address.

Figure 16: Thoroughfare

Thoroughfare4819

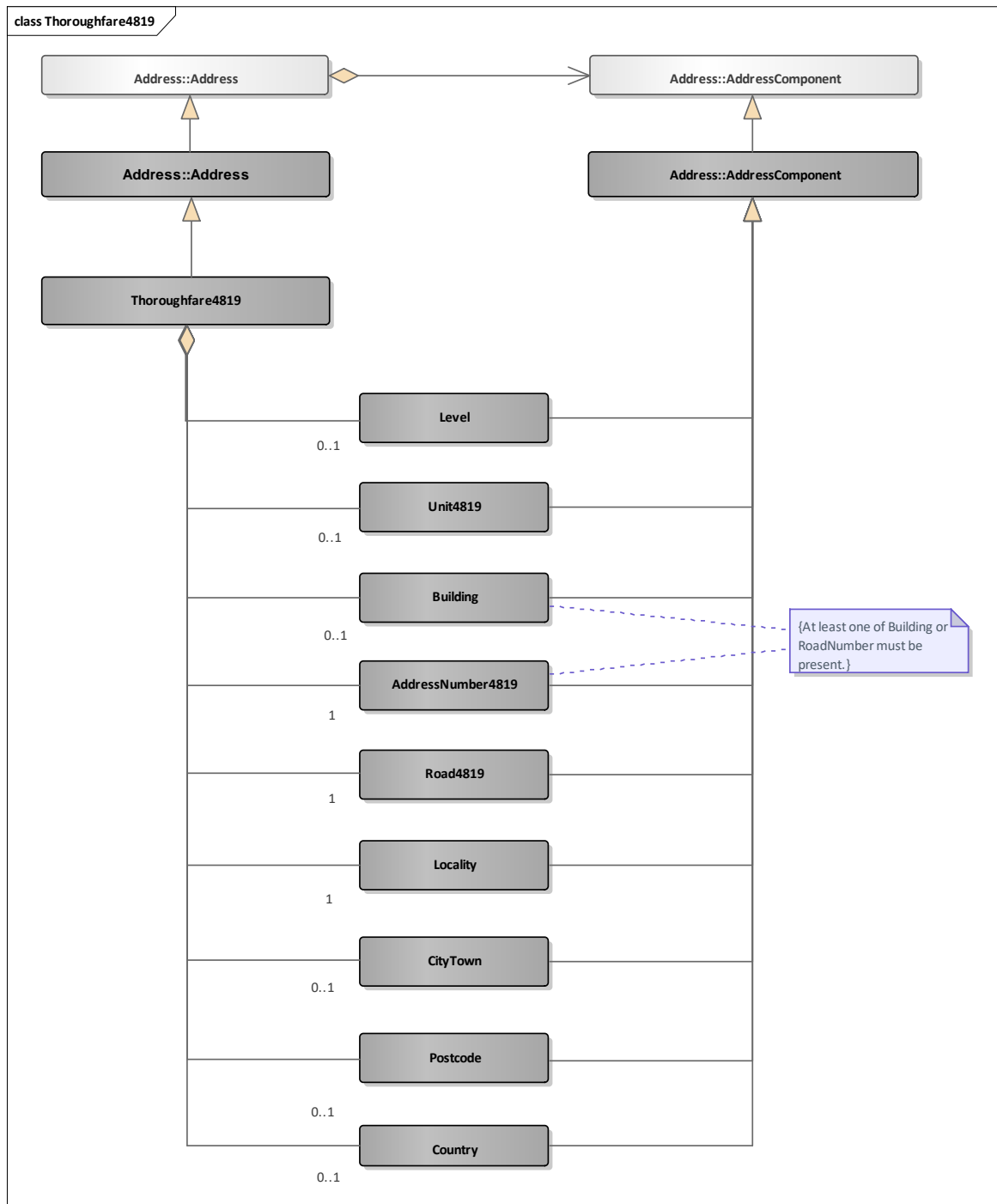Figure 17 illustrates the structure of a Thoroughfare4819 Address.

Figure 17: Thoroughfare4819

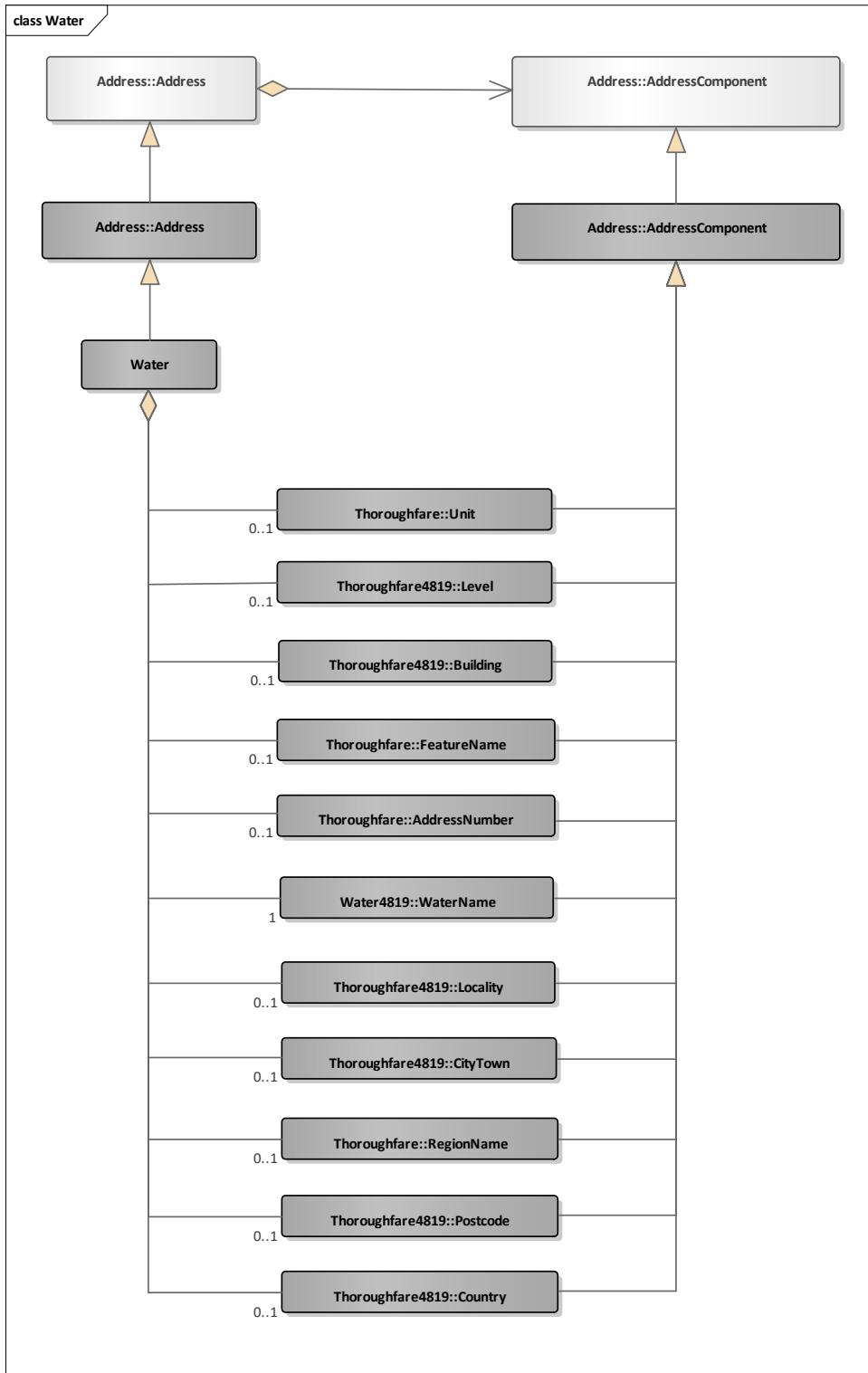# Water

Figure 18 illustrates the structure of a Water Address.

Figure 18: Water

Water4819

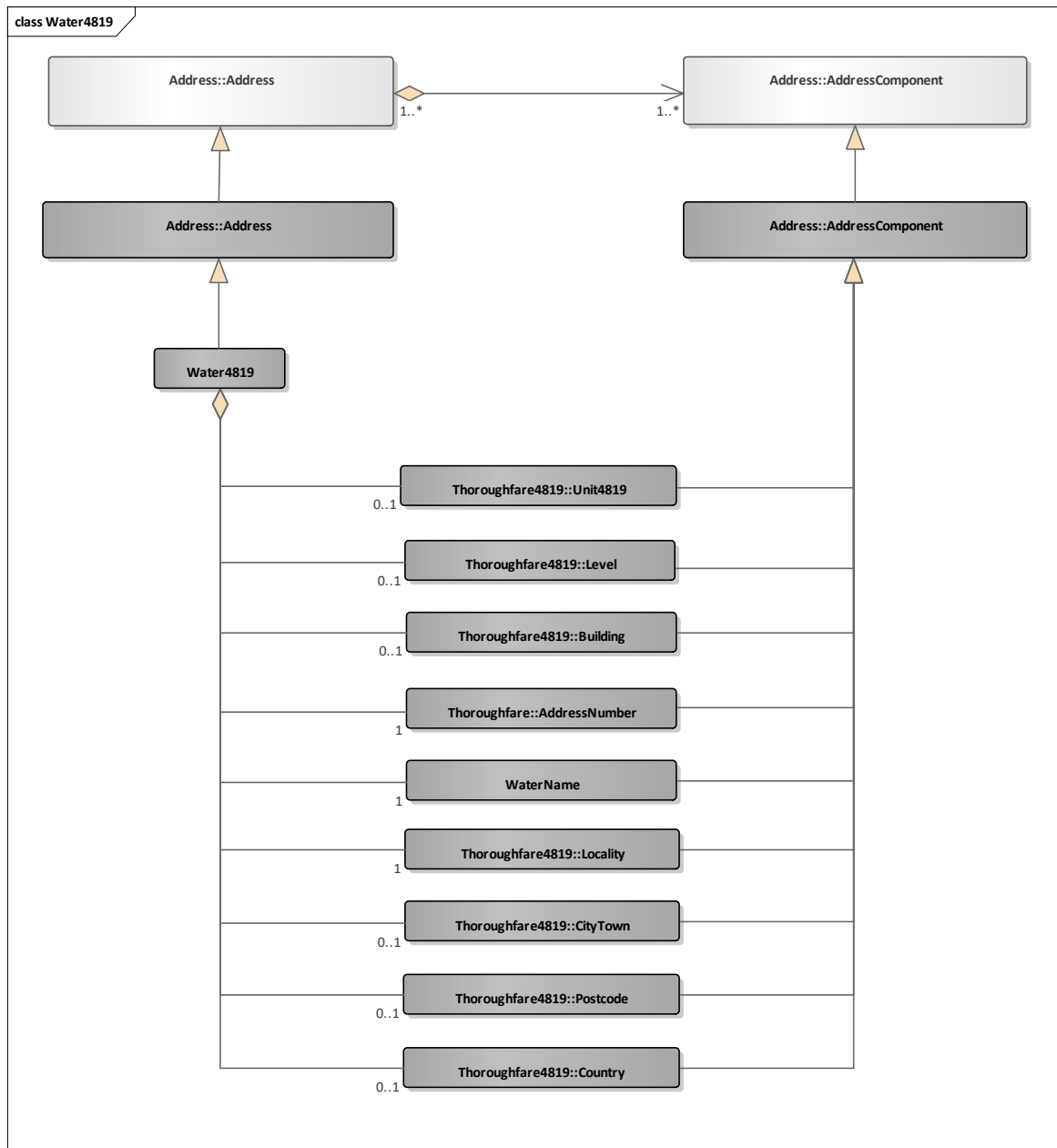Figure 19 illustrates the structure of a Water4819 Address.

Figure 19: Water4819

Annex D: (informative): Datatypes realise ANY

Figure 20 illustrates that the Data Types used to model Address Component Types are realisations of the Any universal root type, described in ISO 19103:2015, paragraph 7.6, page 41.

They are realisations rather than specialisations because Any is an Abstract Schema concept and the NZ Address Profile is an Application Schema. For an explanation of Realisations and Schemas, see ISO 19103:2015, paragraph 6.8.4, pages 17 and 18.
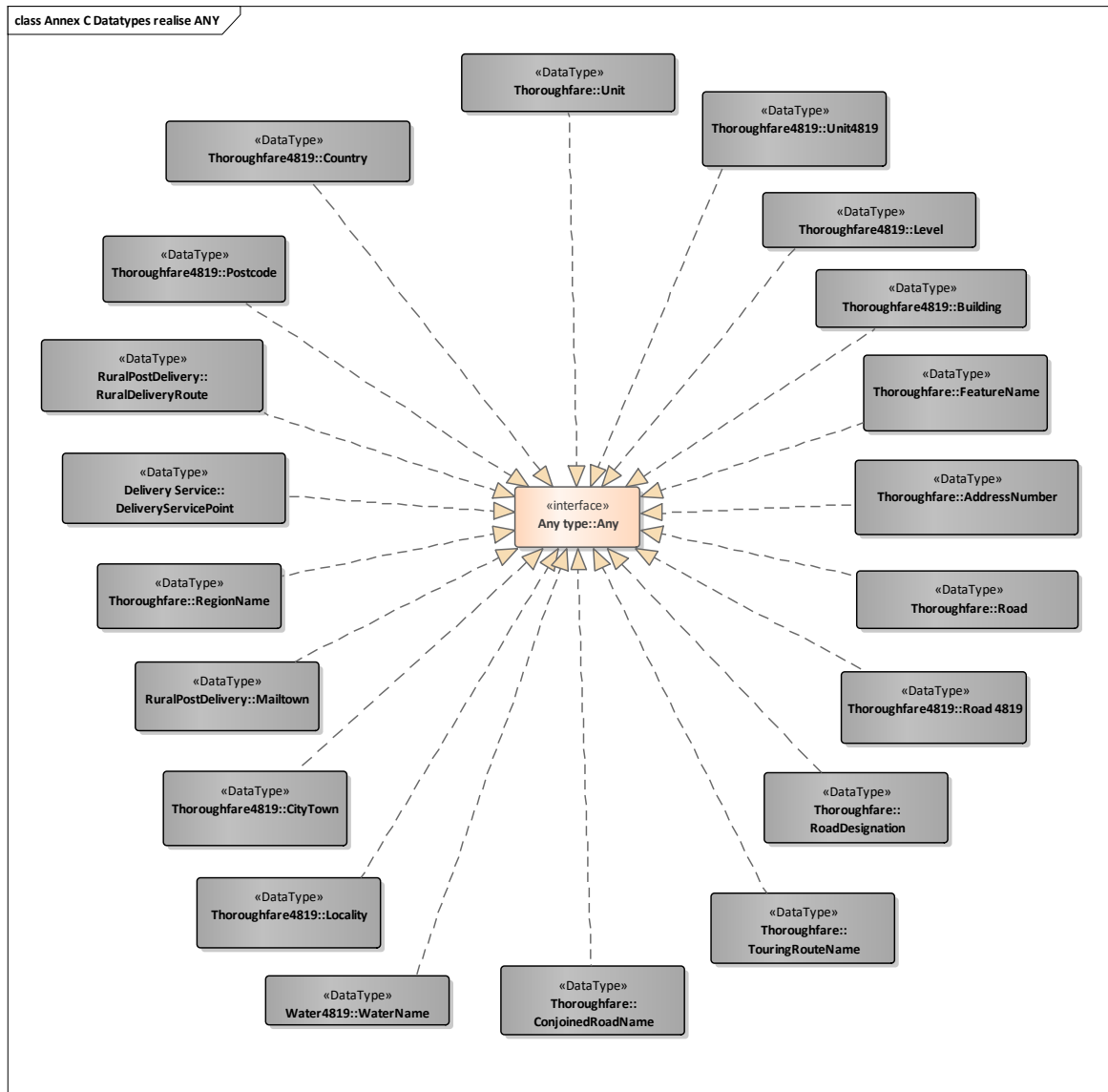
Figure 20: Datatypes realise ANY

AddressComponentType Data Types

Table 5 defines the data type for each AddressComponentType in the Profile. The data types used are defined in ISO 19103:2015 except for AddressUnitType and AddressRoadType. They replace the <Any> type used in ISO 19160-1, Figure 5 (AddressComponentValue) and Table 8. AddressUnitType and AddressRoadType are defined in Table 1.

Table 5: AddressComponent data types

<<Data Type>>	addressComponent *(from Annex B)*	Data type *(defined by ISO 19103)*
Unit	type	CharacterString
	value	CharacterString
Unit4819	type	AddressUnitType
	value	CharacterString
Level	type	CharacterString
	value	CharacterString
Building	part	CharacterString
	name	CharacterString
FeatureName	value	CharacterString
AddressNumber	number	Number
	alpha	CharacterString
	numberLow	Number
	numberHigh	Number
AddressNumber4819	number	Number
	alpha	CharacterString
Road	name	CharacterString
	type	CharacterString
	prefix	CharacterString
	suffix	CharacterString

Road4819	name	CharacterString
	type	AddressRoadType
RoadDesignation	value	CharacterString
TouringRouteName	value	CharacterString
ConjoinedRoadName	value	CharacterString
WaterName	waterName	CharacterString
Locality	value	CharacterString
CityTown	value	CharacterString
Mailtown	value	CharacterString
RegionName	value	CharacterString
DeliveryServicePoint	type	CharacterString
	number	Number
	name	CharacterString
RuralDeliveryRoute	ruralDeliveryRoute	CharacterString
Postcode	value	Number
Country	value	CharacterString = New Zealand

Annex E (informative): Treatment of position in New Zealand

ISO 19160-1 defines a codelist: AddressPositionType. There are no attributes provided but the Notes field contains example values: "centroid, streetFront, and approximated".

AS/NZS 4819:2011 provides a full set of address position types that may be geocoded for an address.

Early drafts of the NZ Profile of 19160-1 used the address position types found in AS/NZS 4819:2011 as the attribute values for the New Zealand version of the AddressPositionType codelist. Subsequently, the NZ Address model Working Group decided that the address position types overburdened the address model with information that best belongs to other domains or applications.

In this version of the NZ Profile, the AS/NZS 4819 address position types have been abstracted and documented as out of scope. However, the list and the associated <<type>> and AccessPoint class has been retained as pointers for developers of application schema for specific domains.

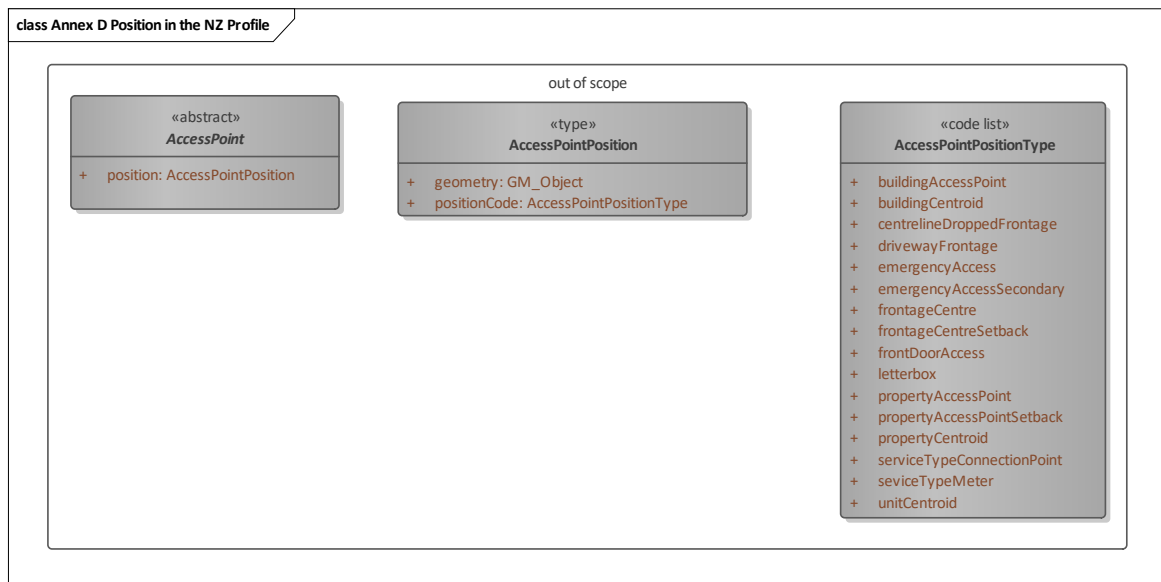Figure 21 shows how address position has been treated in the model.

Figure 21: Teatment of position

The out of scope classes and attributes are listed in Table 6.

Table 6: Out of scope classes and attributes

Class Name	Class Description
AccessPoint	A feature associated with a property, having a geocoded position and an access function; e.g., driveway, meter point. Deemed to be "out of scope" for Addressing but retained to be used in a Property domain model.
Class Constraint	
Out of scope	
Attribute Name	**Attribute Description**
position	A position for property access cases.

Class Name	Class Description
AccessPointPosition	A complex type used to define position and purpose for an AccessPoint.
Class Constraint	
Out of scope	
Attribute Name	**Attribute Description**
geometry	Geometry (coordinates) of position
positionCode	A code defining an access instance e.g. the preferred position on a property from which to access a utility terminus.

Class Name	Class Description
AccessPointPositionType	A codelist that defines the set of access points that may be known for a Property.
Class Constraint	
Out of scope in NZ Profile.	
Attribute Name	**Attribute Description**
buildingAccessPoint	Point of access to the building.
buildingCentroid	Point as centre of building and lying within its bounds (e.g. for U-shaped building).
centrelineDroppedFrontage	A point on the road centre-line opposite the centre of the road frontage of an address site.

drivewayFrontage	Centre of driveway on address site frontage.
emergencyAccess	Specific building or property access point for emergency services.
emergencyAccessSecondary	Specific building or property secondary access point for emergency services.
frontageCentre	Point on the centre of the address site frontage.
frontageCentreSetback	A point set back from the centre of the road frontage within an address site.
frontDoorAccess	Front door of building
letterbox	Place where mail is deposited.
propertyAccessPoint	Access point (centre of) at road frontage of the property.
propertyAccessPointSetback	A point set back from the (centre of the) access point at the road frontage of the property.
propertyCentroid	Point of centre of parcels making up a property and lying within its boundaries (e.g. for L-shaped property).
serviceTypeConnectionPoint	The utility connection point (e.g. box, or underground chamber). "Service type" to be specified (e.g. water, electricity, gas, telephone).
seviceTypeMeter	The utility meter (e.g. box, or underground chamber). "Service type" to be specified (e.g. water, electricity, gas, telephone).
unitCentroid	Point at centre of unit and lying within its bounds (e.g. for U-shaped unit).

Annex F (informative): NZ Address Requirements mapped to the Profile

Although there has been no single address standard in New Zealand, there are several documents that describe addresses and their components from various perspectives:

AS/NZS 4819:2011, Rural and urban addressing, Standards Australia and Standards New Zealand.

The standard specifies the rules for address allocation; a function undertaken by Territorial Authorities. It contains examples of Address and Address Component types presently advocated.

NOTE: the NZ profile of ISO 19160-1 allows older address data, including forms less favoured today by addressing stewards. Information systems need to consistently transact address data that were legitimate in different eras that are not necessarily aligned with the current addressing specifications.

New Zealand Post. Postal Address File Technical Guide (2006).

http://www.nzpost.co.nz/sites/default/files/uploads/shared/paftechguide.pdf, accessed 4 December, 2014.

This defines the physical schema for the Postal Address File and is confined in its view to addresses that are postal delivery points.

The Emergency Services and Government Administration (ESA) model.

http://www.linz.govt.nz/about-linz/what-were-doing/projects/emergency-services-government-administration-esa accessed on 4 December, 2014.

This is a Conceptual Schema concerned with "defining location anywhere in New Zealand". It treats addresses as one of several means of defining location with commonly used location identifiers.

New Zealand Government OASIS CIQ Address Profile. NZ Department of Internal Affairs.

https://ict.govt.nz/assets/Uploads/Documents/NZ%20CIQ%20Address%20Profile%20October%202012%20Final.pdf accessed 4 December, 2014.

This is part of a larger standard concerned with encoding of Customer information, and views Address as a set of Party attributes.

Merged Elements

Figure 22 defines a common address "standard", of merged elements adopted from the documents above as a baseline for developing a New Zealand Profile of ISO 19160-1 Addressing - Part 1: Conceptual Model.
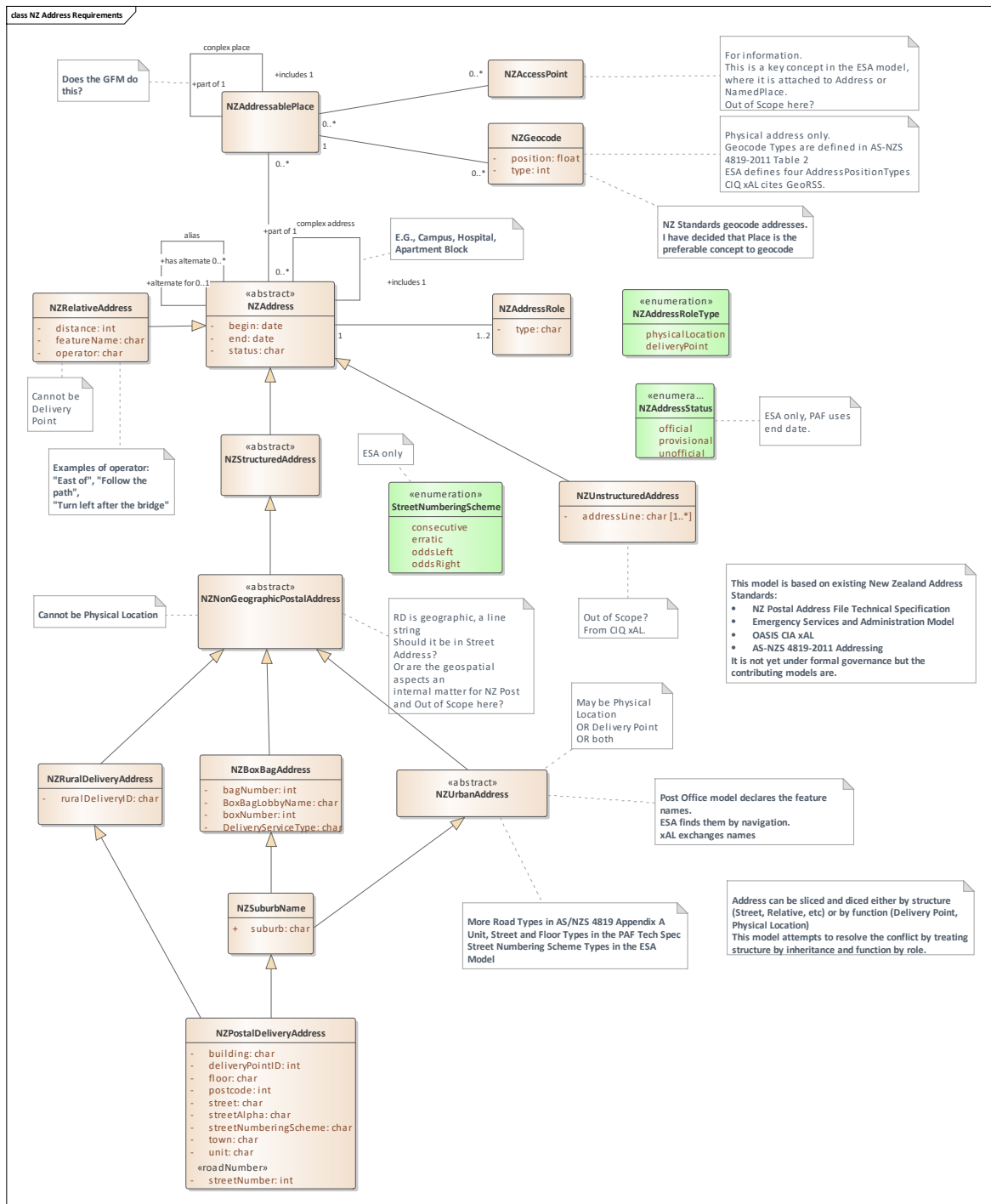

Figure 22: Merged elements of address documents

Table 7 describes the mappings between the various address documents.

Table 7: Address document mappings

Class Name	Class Description	Mapping Notes
NZAccessPoint	A physical point of access to a place. Placeholder for a similar concept in the ESA model.	AddressedPeriod.position. This is restricted to the "generic" geocode allocated to an Address when it is assigned to an AddressableObject. All other access points are out of scope for the NZ Address Profile.

Class Name	Class Description	Mapping Notes
NZAddress	The conventional means of describing, labelling or identifying an object, place or property. The means by which one person finds another person in order to communicate. (from the ESA model) The PAF spec does not define Address, but these is a clear inference that it is a delivery point in that context (may also be a place, if it is not a numbered box or bag).	Address
Attribute Name	**Attribute Description**	**Mapping Notes**
begin	The date from which an address is operative.	Lifecycle.validFrom
end	The date on which an address ceases to be used.	Lifecycle.validTo
status	Official or unofficial (ESA), valid or invalid (PO)	AddressedPeriod.lifecycleStage

Class Name	Class Description	Mapping Notes
NZAddressRole	Defines what purpose(s) an address may have.	Out of scope

Attribute Name	Attribute Description	Mapping Notes
type	Location or Delivery	

Class Name	Class Description	Mapping Notes
NZAddressablePlace	A distinct place in the real world whose location is of interest; whether for physical access, postal delivery or both.	AddressableObject

Class Name	Class Description	Mapping Notes
NZBoxBagAddress	Fill in from NZ Post Spec	Address, where type = deliveryService

Attribute Name	Attribute Description	Mapping Notes
bagNumber	Id for a private postal bag.	AddressComponent.type = deliveryServiceNumber and deliveryServiceType = bag
BoxBagLobbyName	The name of the New Zealand Post outlet or agency outlet where the Post Office Box or Private Bag number is physically located.	AddressComponent.type = deliveryServiceName
boxNumber	Id for a private postal box. (There appears to be no functional difference between a bag and a box, other than one is canvas and other is metal.)	AddressComponent.type = deliveryServiceNumber and deliveryServiceType = box
DeliveryServiceType	Describes the type of Delivery Service applicable to this delivery point.	AddressComponent.type = deliveryServiceType

Class Name	Class Description	Mapping Notes
NZGeocode	A set of geospatial coordinates defining the location of a place, or one of	AddressPosition but note that this is mostly "Out of Scope".

	a number of points belonging to a place.	
Attribute Name	**Attribute Description**	**Mapping Notes**
position	A set of geospatial coordinates	AddressPosition.geometry
type	The type of point related to a place, which the coordinates locate.	AddressPosition.type

Class Name	**Class Description**	**Mapping Notes**
NZNonGeographicPostal Address	A non-locational address using a delivery box or bag. Only suitable for a Delivery Point.	Address where class = deliveryService

Class Name	**Class Description**	**Mapping Notes**
NZPostalDeliveryAddress	A delivery point recorded in the NZ Postal Address File	No exact equivalent All Address Classes may be used for Postal Delivery. Delivery Service addresses must be used for Postal Delivery. Usage is "Out of Scope". The attributes below map onto NZ Address Component Types.
Attribute Name	**Attribute Description**	**Mapping Notes**
building		buildingName, buildingPart
deliveryPointID	A record identifier within the NZ Postal Address File.	No equivalent
floor		levelNumber, levelType
postcode		postcode
street		roadName, roadType
streetAlpha		roadPrefix, roadSuffix
streetNumber		
streetNumberingScheme		No equivalent
town		cityTown, mailtown
unit		unitNumber, unitType

Class Name	Class Description	Mapping Notes
NZRelativeAddress	A place location defined by a spatial relationship with another place. Used by Emergency Services to define incident locations.	No equivalent
Attribute Name	**Attribute Description**	**Mapping Notes**
distance	The measure of distance between a place and the alternate place it is located from.	No equivalent
featureName	The name of an alternate place, from which a place is located.	No equivalent
operator	A function describing how one place is located from another.	No equivalent

Class Name	Class Description	Mapping Notes
NZRuralDeliveryAddress		Address where Class = ruralPostDelivery
Attribute Name	**Attribute Description**	**Mapping Notes**
ruralDeliveryID	The Id of a rural delivery route.	ruralDeliveryRoute

Class Name	Class Description	Mapping Notes
NZStructuredAddress	An address having a clear structure of components.	All NZ Address Classes are structured except addressLine.

Class Name	Class Description	Mapping Notes
NZSuburbName		Address Component Type = suburb
Attribute Name	**Attribute Description**	**Mapping Notes**
suburb		suburb

Class Name	Class Description	Mapping Notes
NZUnstructuredAddress	An address without clearly defined components, typically found in legacy	Address where Class = addressLine.

	datasets and requiring parsing and often cleaning before it can be used. Is defined in CIQ xAL as a warning, not a prescription.	
Attribute Name	**Attribute Description**	**Mapping Notes**
addressLine	Unstructured text that may contain any of the elements that are more properly contained in part of a structured address. In a simple case line 1 may contain building and street, line 2 suburb town or RD, line 3 town. Or all elements may be compounded into a single blob of text.	addressLine

Class Name	**Class Description**	**Mapping Notes**
NZUrbanAddress	An Address compounded of geographic place names. May be a delivery point or a accessible location or both (distinction key for emergency services). Attribute names are deemed self explanatory.	No exact equivalent. A Thoroughfare Address might be expected to be in a urban area and a Water Address could be in an Urban Area, but this is not a necessary property of either.

Class Name	**Class Description**	**Mapping Notes**
NZAddressRoleType	An enumeration of the purposes an address may have.	Out of scope.
Attribute Name	**Attribute Description**	**Mapping Notes**
physicalLocation	A defined point at which a place may be found.	Out of scope.
deliveryPoint	A defined point to which post may be delivered.	Out of scope.

Class Name	Class Description	Mapping Notes
NZAddressStatus		AddressedPeriod.lifecycleStage
Attribute Name	**Attribute Description**	**Mapping Notes**
official		AddressStatus.official
provisional	Not yet allocated	No equivalent (?)
unofficial		AddressStatus.unofficial

Class Name	Class Description	Mapping Notes
StreetNumberingScheme		No equivalent
Attribute Name	**Attribute Description**	**Mapping Notes**
consecutive		No equivalent
erratic		No equivalent
oddsLeft		No equivalent
oddsRight		No equivalent

Annex G (informative): How Reference Objects relate to Address Components

This Annex illustrates how an application schema based on the NZ Profile of ISO 19160-1 might specialise the abstract ReferenceObject concept into the concrete geospatial objects (Roads, Suburbs, etc.) that are used in addresses.

Figure 23 illustrates how ReferenceObject may be specialised into real-world geographic entities. Each of these entities may introduce new elements into ReferenceObject or modify ones already there.
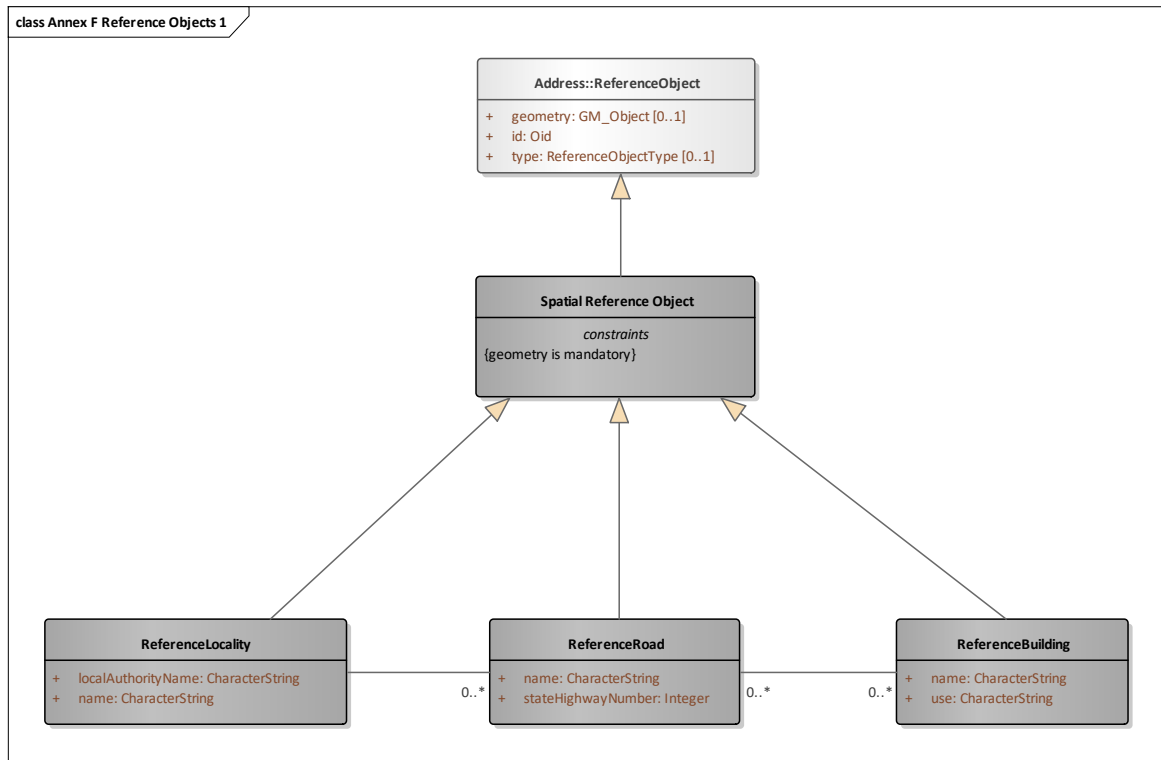

Figure 23: Specialisation of ReferenceObject

Figure 24 illustrates how the specialisations in Figure 23 may be used in an Address Class, in this case Thoroughfare4819.
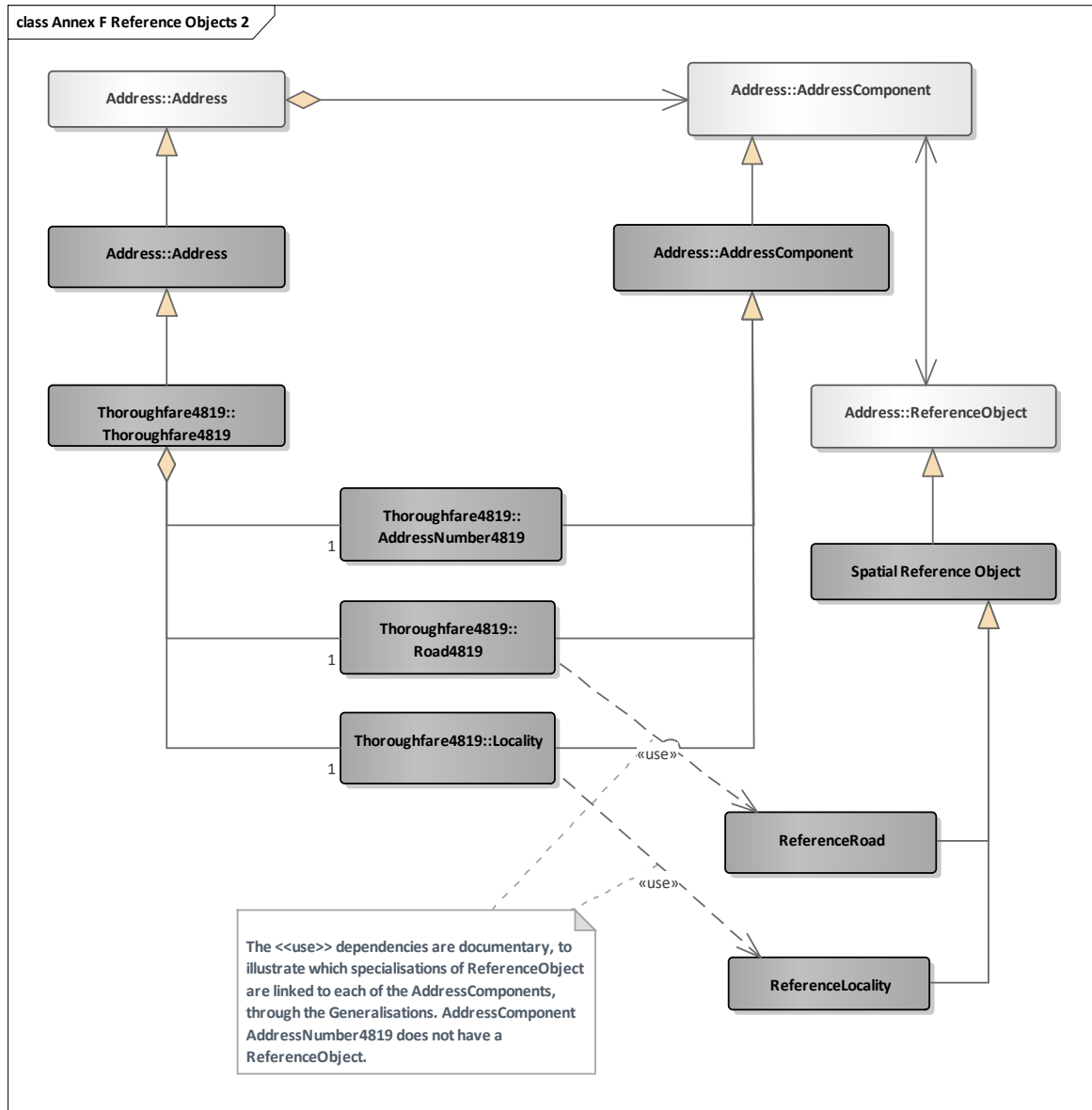

Figure 24: Reference Object appied to Throughfare address class

Annex H (informative): Instance Diagrams

This Annex illustrates how the Profile represents real addresses in a dataset. Abstract Classes become concrete Instances. The purpose is both to validate the Profile and to aid understanding of how it works.
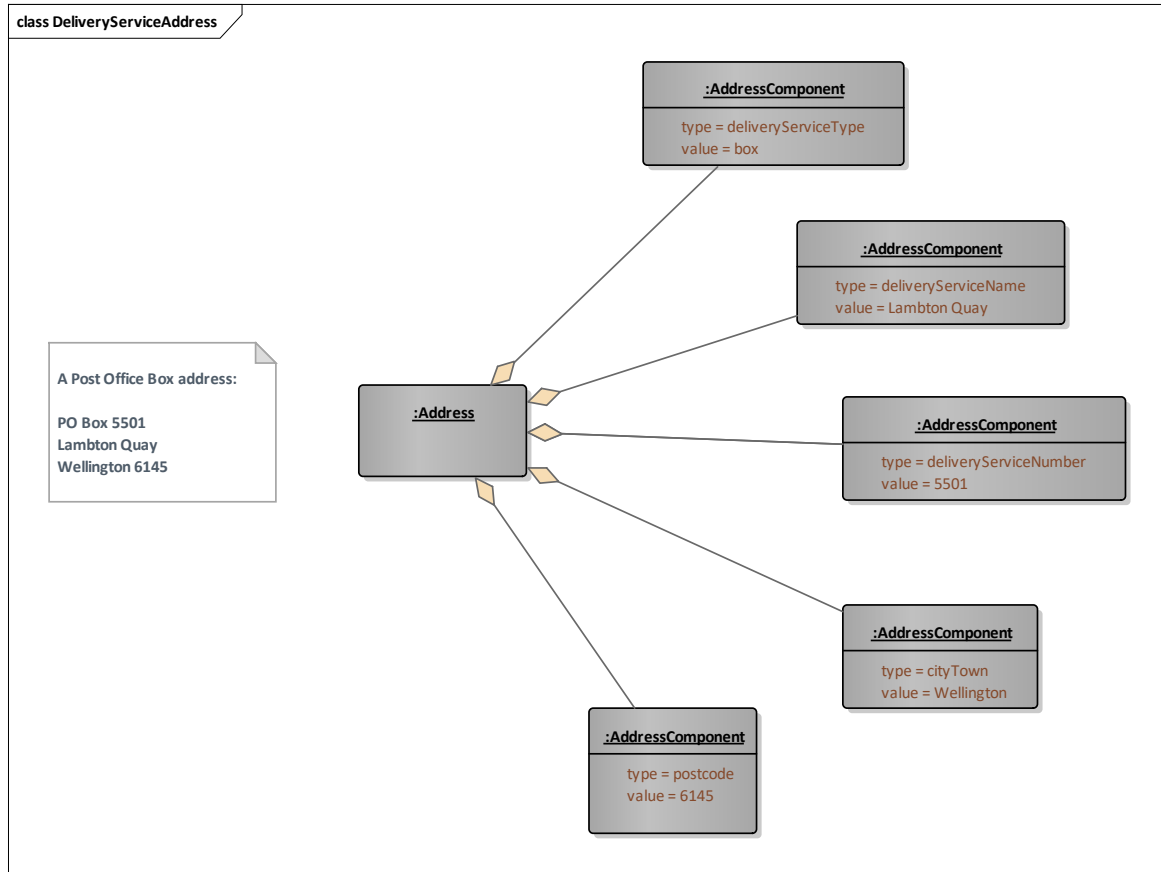

Figure 25: Delivery Service Address

In figure 25, the Abstract classes: deliveryServiceType, deliveryServiceName, deliveryServiceNumber, cityTown, and postcode becomes concrete instances with the values: box, Lambton Quay, 5501, Wellington, and 6145.
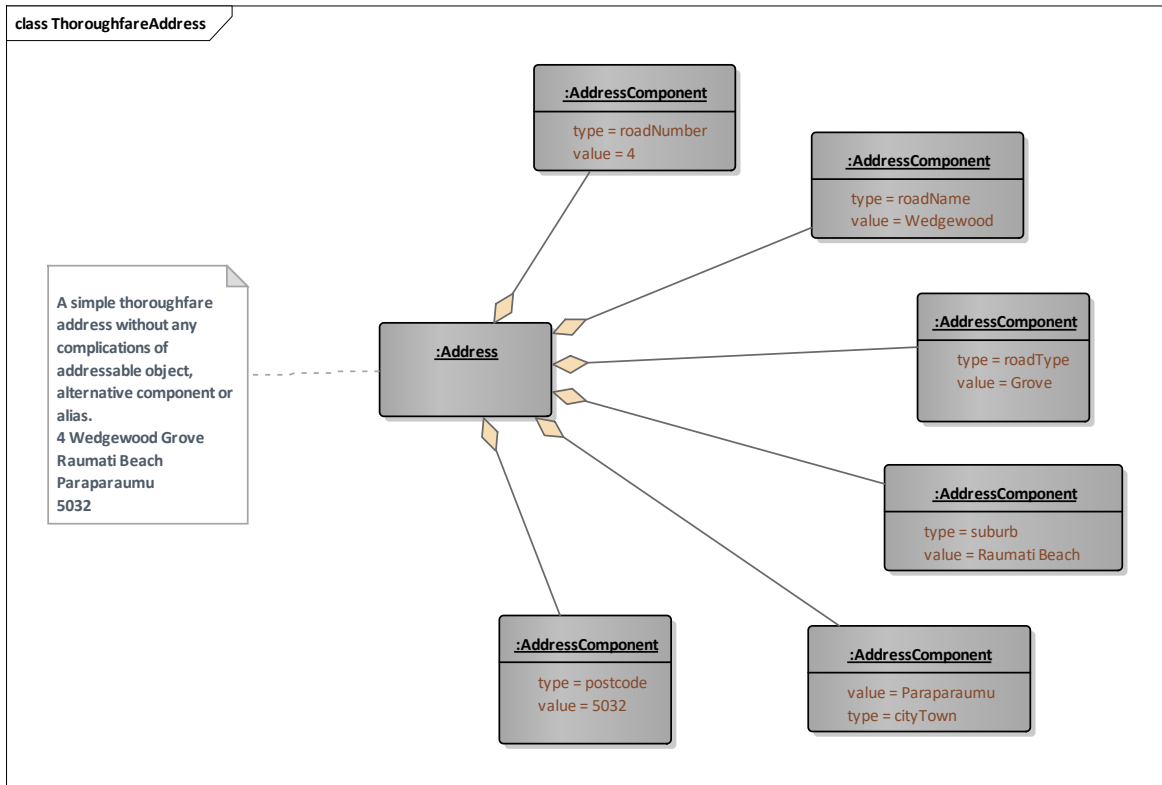
class ThoroughfareAddress

:AddressComponent
type = roadNumber
value = 4

:AddressComponent
type = roadName
value = Wedgewood

:AddressComponent
type = roadType
value = Grove

:AddressComponent
type = suburb
value = Raumati Beach

:Address

A simple thoroughfare address without any complications of addressable object, alternative component or alias.
4 Wedgewood Grove
Raumati Beach
Paraparaumu
5032

:AddressComponent
type = postcode
value = 5032

:AddressComponent
value = Paraparaumu
type = cityTown

Figure 26: Thoroughfare Address

In figure 26, the Abstract classes: roadNumber, roadName, roadType, suburb, and cityTown, and postcode become concrete instances with the values: 4, Wedgewood, Grove, Raumati Beach, Paraparaumu, and 5032.

Annex I (informative): Turning Concept Models into Implementation Models

The NZ Profile of ISO 19160-1 has been developed by inheriting appropriate elements from the conceptual model in ISO 19160-1, then specialising or extending these as necessary to detail all the characteristics of New Zealand's address classes.

To transition from the conceptual model contained in the NZ Profile, to an implementation model, and then to a machine readable schema, these transitions are required:

> **conceptual Model** (UML)
>
> > *>transform to an>*
>
> **implementation Model** (UML)
>
> > *>generate an>*
>
> **implementation Schema** (XML)

Creation of an implementation schema is not discussed in this annex.

Creating a profile

The procedure for developing a Profile from a Standard is defined in AS/NZS ISO 19106:2005 Geographic information - Profiles. In ISO 19160-1:2015 this is extended by informative Annex B "Guidelines for developing a profile." It is based on the experience of the standards working group which tested the ISO standard during its development with a trial set of Profiles, including one provided by New Zealand.

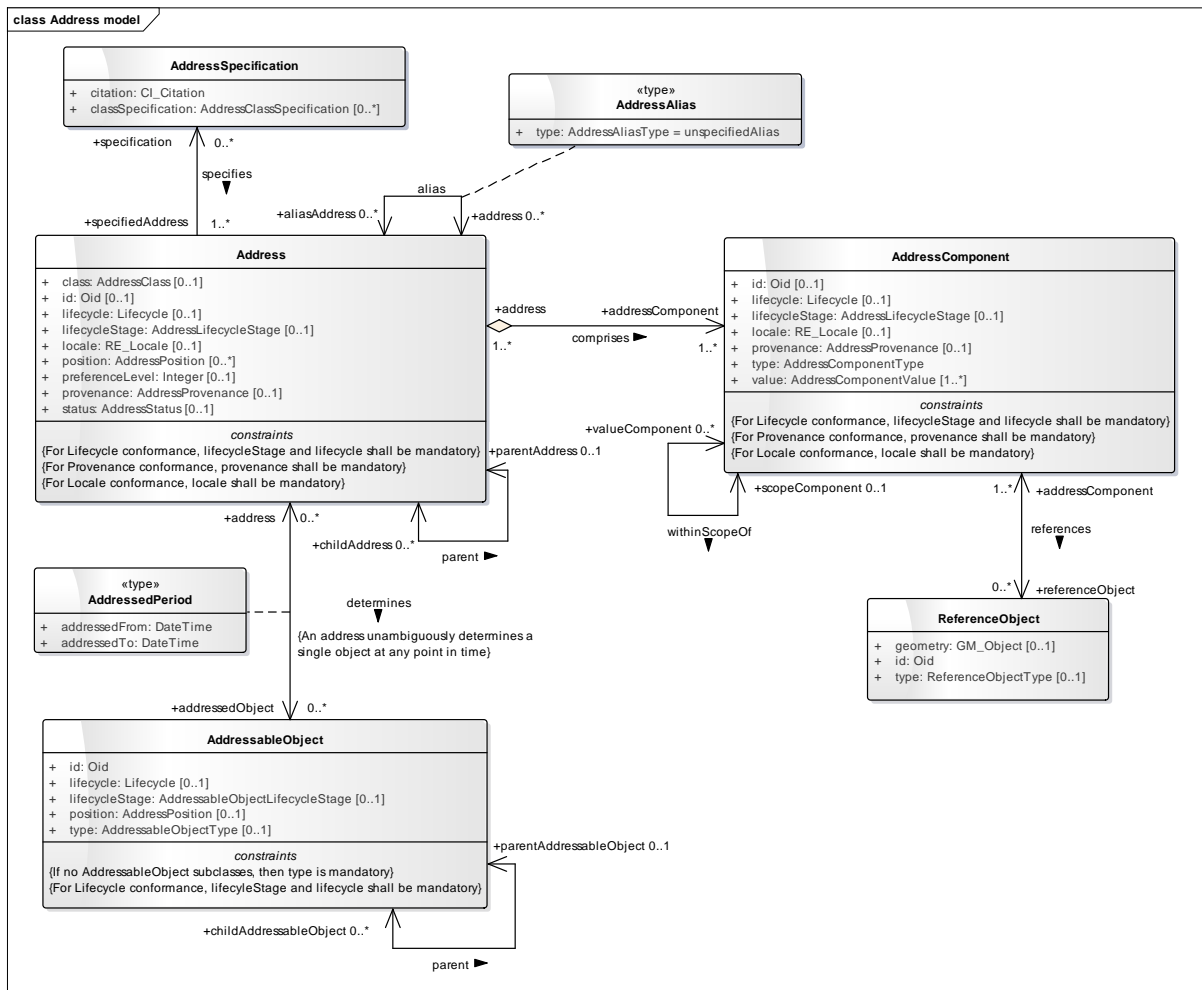Figure 27 shows the core conceptual model from ISO 19160-1.

Figure 27: Core diagram from ISO 19160-1

The NZ Profile of ISO 19160-1 then inherits appropriate elements from the conceptual model in ISO 19160-1, and specialises or extends them as necessary to detail all the characteristics of New Zealand's address classes. Figure 28 shows the New Zealand profile of the ISO19160-1 core conceptual model.
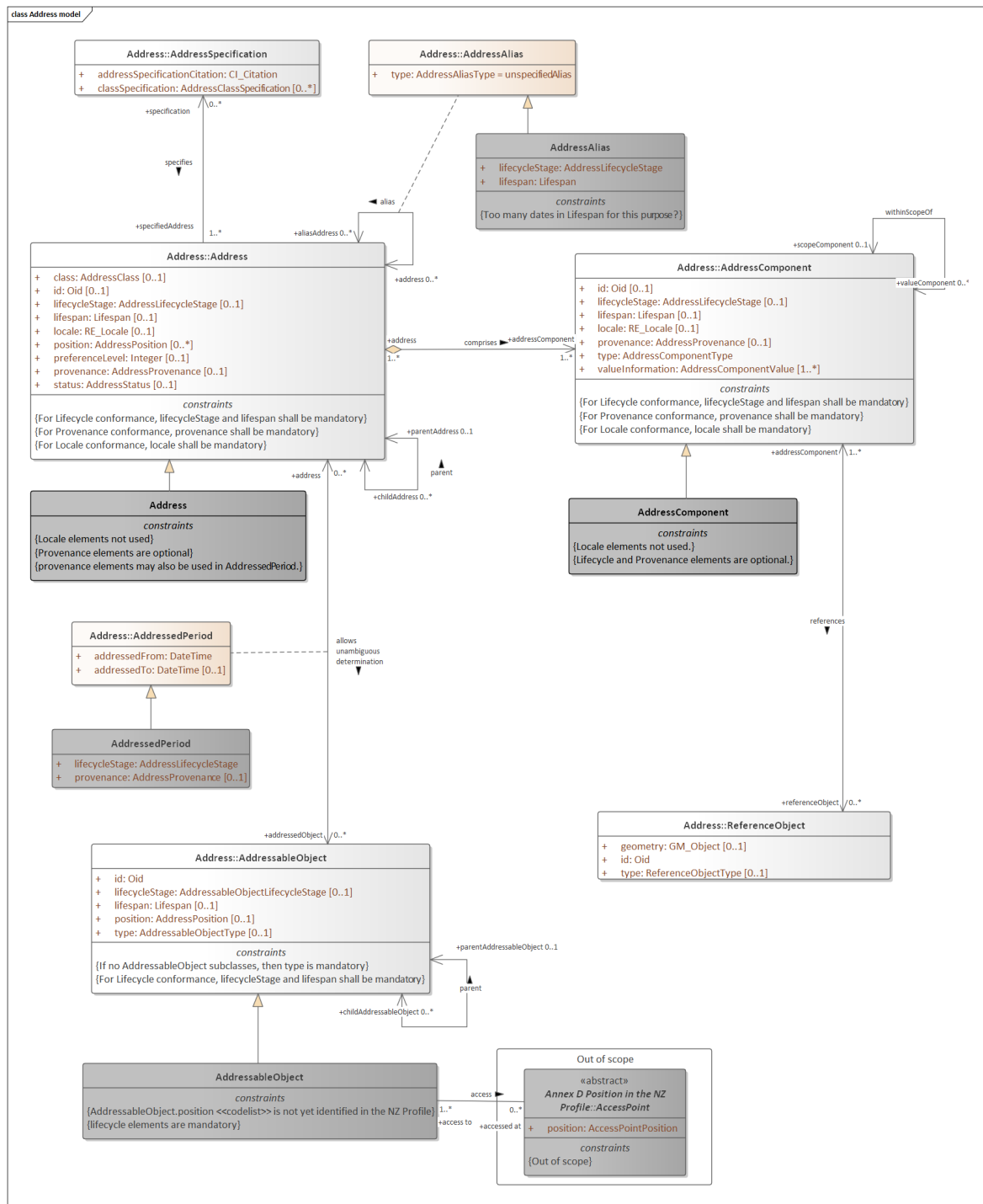
Figure 28: NZ Profile applied to the ISO 19160-1 core diagram

The model in Figure 28 is still conceptual and uses constraints to define how the core conceptual model has been modified. It requires further editing to make an Implementation Profile.

Developing an Implementation Model from a Conceptual Model

The following process was used to convert the NZ Profile conceptual model into an NZ Profile implementation model:

1 Copy the Profile into a parallel Package structure
2 Convert the shortcuts (links) to local copies
3 For each specialisation, add the defined attributes and associations to the general Class; making the changes documented by the constraints
4 Delete each specialisation, once the documented changes have been made to the general Class.

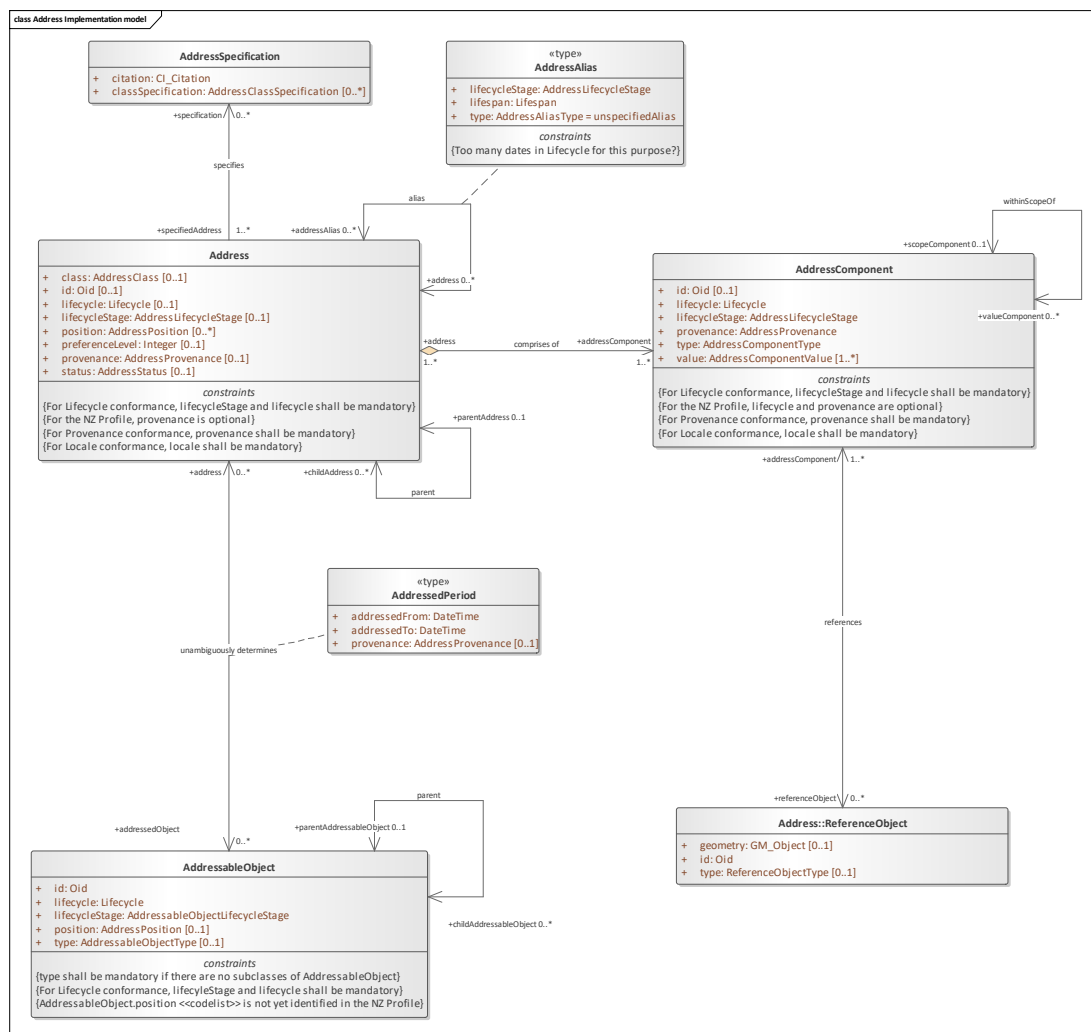Figure 29 shows the NZ Profile implementation model created from the NZ Profile conceptual model

Figure 29: New Zealand profile implementation model

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Postal Address File Technical Guide. New Zealand Post

https://www.nzpost.co.nz/sites/default/files/uploads/shared/paftechguide.pdf (last accessed 20150529)

The Emergency Services and Government Administration (ESA) Core Data Specification (2004)
http://www.linz.govt.nz/about-linz/what-were-doing/projects/emergency-services-government-administration-esa (last accessed 20141218)