

5 Data content and structure

5.1 Application schemas – Overview

5.1.1 Application schema included in the IRs

Articles 3, 4 and 5 of the Implementing Rules lay down the requirements for the content and structure of the data sets related to the INSPIRE Annex themes.

IR Requirement

Article 4

Types for the Exchange and Classification of Spatial Objects

1. For the exchange and classification of spatial objects from data sets meeting the conditions laid down in Article 4 of Directive 2007/2/EC, Member States shall use the spatial object types and associated data types, enumerations and code lists that are defined in Annexes II, III and IV for the themes the data sets relate to.
2. Spatial object types and data types shall comply with the definitions and constraints and include the attributes and association roles set out in the Annexes.
3. The enumerations and code lists used in attributes or association roles of spatial object types or data types shall comply with the definitions and include the values set out in Annex II. The enumeration and code list values are uniquely identified by language-neutral mnemonic codes for computers. The values may also include a language-specific name to be used for human interaction.

The types to be used for the exchange and classification of spatial objects from data sets related to the spatial data theme *Agricultural and Aquaculture Facilities* are defined in the following application schemas (see section 5.3):

- *Agricultural and Aquaculture Facilities Model* application schema.

The application schemas specify requirements on the properties of each spatial object including its multiplicity, domain of valid values, constraints, etc.

An application schema may include references (e.g. in attributes or inheritance relationships) to common types or types defined in other spatial data themes. These types can be found in a sub-section called “Imported Types” at the end of each application schema section. The common types referred to from application schemas included in the IRs are addressed in Article 3.

IR Requirement

Article 3

Common Types

Types that are common to several of the themes listed in Annexes I, II and III to Directive 2007/2/EC shall conform to the definitions and constraints and include the attributes and association roles set out in Annex I.

NOTE Since the IRs contain the types for all INSPIRE spatial data themes in one document, Article 3 does not explicitly refer to types defined in other spatial data themes, but only to types defined in external data models.

Common types are described in detail in the Generic Conceptual Model [DS-D2.7], in the relevant international standards (e.g. of the ISO 19100 series) or in the documents on the common INSPIRE models [DS-D2.10.x]. For detailed descriptions of types defined in other spatial data themes, see the corresponding Data Specification TG document [DS-D2.8.x].

5.1.2 Additional recommended application schema

In addition to the application schemas listed above, the following additional application schemas have been defined for the theme *Agricultural and Aquaculture Facilities* (see section 5.4):

- *Agricultural and Aquaculture Facilities Extended Model* application schema.

These additional application schemas are not included in the IRs. They typically address requirements from specific (groups of) use cases and/or may be used to provide additional information. They are included in this specification in order to improve interoperability also for these additional aspects and to illustrate the extensibility of the application schemas included in the IRs.

Recommendation 1

Additional and/or use case-specific information related to the theme *Agricultural and Aquaculture Facilities* should be made available using the spatial object types and data types specified in the following application schema(s): *Agricultural and Aquaculture Facilities Extended Model*.

These spatial object types and data types should comply with the definitions and constraints and include the attributes and association roles defined in this section.

The enumerations and code lists used in attributes or association roles of spatial object types or data types should comply with the definitions and include the values defined in this section.

5.2 Basic notions

This section explains some of the basic notions used in the INSPIRE application schemas. These explanations are based on the GCM [DS-D2.5].

5.2.1 Notation

5.2.1.1. Unified Modeling Language (UML)

The application schemas included in this section are specified in UML, version 2.1. The spatial object types, their properties and associated types are shown in UML class diagrams.

NOTE For an overview of the UML notation, see Annex D in [ISO 19103].

The use of a common conceptual schema language (i.e. UML) allows for an automated processing of application schemas and the encoding, querying and updating of data based on the application schema – across different themes and different levels of detail.

The following important rules related to class inheritance and abstract classes are included in the IRs.

IR Requirement

Article 5

Types

(...)

2. Types that are a sub-type of another type shall also include all this type's attributes and association roles.
3. Abstract types shall not be instantiated.

The use of UML conforms to ISO 19109 8.3 and ISO/TS 19103 with the exception that UML 2.1 instead of ISO/IEC 19501 is being used. The use of UML also conforms to ISO 19136 E.2.1.1.1-E.2.1.1.4.

NOTE ISO/TS 19103 and ISO 19109 specify a profile of UML to be used in conjunction with the ISO 19100 series. This includes in particular a list of stereotypes and basic types to be used in application schemas. ISO 19136 specifies a more restricted UML profile that allows for a direct encoding in XML Schema for data transfer purposes.

To model constraints on the spatial object types and their properties, in particular to express data/data set consistency rules, OCL (Object Constraint Language) is used as described in ISO/TS 19103, whenever possible. In addition, all constraints are described in the feature catalogue in English, too.

NOTE Since "void" is not a concept supported by OCL, OCL constraints cannot include expressions to test whether a value is a *void* value. Such constraints may only be expressed in natural language.

5.2.1.2. Stereotypes

In the application schemas in this section several stereotypes are used that have been defined as part of a UML profile for use in INSPIRE [DS-D2.5]. These are explained in Table 1 below.

Table 1 – Stereotypes (adapted from [DS-D2.5])

Stereotype	Model element	Description
applicationSchema	Package	An INSPIRE application schema according to ISO 19109 and the Generic Conceptual Model.
leaf	Package	A package that is not an application schema and contains no packages.
featureType	Class	A spatial object type.
type	Class	A type that is not directly instantiable, but is used as an abstract collection of operation, attribute and relation signatures. This stereotype should usually not be used in INSPIRE application schemas as these are on a different conceptual level than classifiers with this stereotype.
dataType	Class	A structured data type without identity.
union	Class	A structured data type without identity where exactly one of the properties of the type is present in any instance.
enumeration	Class	An enumeration.
codeList	Class	A code list.
import	Dependency	The model elements of the supplier package are imported.
voidable	Attribute, association role	A voidable attribute or association role (see section 5.2.2).
lifeCycleInfo	Attribute, association role	If in an application schema a property is considered to be part of the life-cycle information of a spatial object type, the property shall receive this stereotype.

version	Association role	If in an application schema an association role ends at a spatial object type, this stereotype denotes that the value of the property is meant to be a specific version of the spatial object, not the spatial object in general.
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5.2.2 Voidable characteristics

The «voidable» stereotype is used to characterise those properties of a spatial object that may not be present in some spatial data sets, even though they may be present or applicable in the real world. This does *not* mean that it is optional to provide a value for those properties.

For all properties defined for a spatial object, a value has to be provided – either the corresponding value (if available in the data set maintained by the data provider) or the value of *void*. A *void* value shall imply that no corresponding value is contained in the source spatial data set maintained by the data provider or no corresponding value can be derived from existing values at reasonable costs.

Recommendation 2 The reason for a *void* value should be provided where possible using a listed value from the VoidReasonValue code list to indicate the reason for the missing value.

The VoidReasonValue type is a code list, which includes the following pre-defined values:

- *Unpopulated*: The property is not part of the dataset maintained by the data provider. However, the characteristic may exist in the real world. For example when the “elevation of the water body above the sea level” has not been included in a dataset containing lake spatial objects, then the reason for a void value of this property would be ‘Unpopulated’. The property receives this value for all spatial objects in the spatial data set.
- *Unknown*: The correct value for the specific spatial object is not known to, and not computable by the data provider. However, a correct value may exist. For example when the “elevation of the water body above the sea level” of a *certain lake* has not been measured, then the reason for a void value of this property would be ‘Unknown’. This value is applied only to those spatial objects where the property in question is not known.
- *Withheld*: The characteristic may exist, but is confidential and not divulged by the data provider.

NOTE It is possible that additional reasons will be identified in the future, in particular to support reasons / special values in coverage ranges.

The «voidable» stereotype does not give any information on whether or not a characteristic exists in the real world. This is expressed using the multiplicity:

- If a characteristic may or may not exist in the real world, its minimum cardinality shall be defined as 0. For example, if an Address may or may not have a house number, the multiplicity of the corresponding property shall be 0..1.
- If at least one value for a certain characteristic exists in the real world, the minimum cardinality shall be defined as 1. For example, if an Administrative Unit always has at least one name, the multiplicity of the corresponding property shall be 1..*.

In both cases, the «voidable» stereotype can be applied. In cases where the minimum multiplicity is 0, the absence of a value indicates that it is known that no value exists, whereas a value of void indicates that it is not known whether a value exists or not.

EXAMPLE If an address does not have a house number, the corresponding Address object should not have any value for the «voidable» attribute house number. If the house number is simply not known or not populated in the data set, the Address object should receive a value of *void* (with the corresponding void reason) for the house number attribute.

5.2.3 Enumerations

Enumerations are modelled as classes in the application schemas. Their values are modelled as attributes of the enumeration class using the following modelling style:

- No initial value, but only the attribute name part, is used.
- The attribute name conforms to the rules for attributes names, i.e. is a lowerCamelCase name. Exceptions are words that consist of all uppercase letters (acronyms).

IR Requirement

Article 6

Code Lists and Enumerations

(...)

- 5) Attributes or association roles of spatial object types or data types that have an enumeration type may only take values from the lists specified for the enumeration type.”

5.2.4 Code lists

Code lists are modelled as classes in the application schemas. Their values, however, are managed outside of the application schema.

5.2.4.1. Code list types

The IRs distinguish the following types of code lists.

IR Requirement

Article 6

Code Lists and Enumerations

- 1) Code lists shall be of one of the following types, as specified in the Annexes:
 - a) code lists whose allowed values comprise only the values specified in this Regulation;
 - b) code lists whose allowed values comprise the values specified in this Regulation and narrower values defined by data providers;
 - c) code lists whose allowed values comprise the values specified in this Regulation and additional values at any level defined by data providers;
 - d) code lists, whose allowed values comprise any values defined by data providers.

For the purposes of points (b), (c) and (d), in addition to the allowed values, data providers may use the values specified in the relevant INSPIRE Technical Guidance document available on the INSPIRE web site of the Joint Research Centre.

The type of code list is represented in the UML model through the tagged value *extensibility*, which can take the following values:

- *none*, representing code lists whose allowed values comprise only the values specified in the IRs (type a);
- *narrower*, representing code lists whose allowed values comprise the values specified in the IRs and narrower values defined by data providers (type b);
- *open*, representing code lists whose allowed values comprise the values specified in the IRs and additional values at any level defined by data providers (type c); and
- *any*, representing code lists, for which the IRs do not specify any allowed values, i.e. whose allowed values comprise any values defined by data providers (type d).

Recommendation 3 Additional values defined by data providers should not replace or redefine any value already specified in the IRs.

NOTE This data specification may specify recommended values for some of the code lists of type (b), (c) and (d) (see section 5.2.4.3). These recommended values are specified in a dedicated Annex.

In addition, code lists can be hierarchical, as explained in Article 6(2) of the IRs.

IR Requirement

Article 6

Code Lists and Enumerations

(...)

- 2) Code lists may be hierarchical. Values of hierarchical code lists may have a more generic parent value. Where the valid values of a hierarchical code list are specified in a table in this Regulation, the parent values are listed in the last column.

The type of code list and whether it is hierarchical or not is also indicated in the feature catalogues.

5.2.4.2. Obligations on data providers

IR Requirement

Article 6

Code Lists and Enumerations

(....)

- 3) Where, for an attribute whose type is a code list as referred to in points (b), (c) or (d) of paragraph 1, a data provider provides a value that is not specified in this Regulation, that value and its definition shall be made available in a register.
- 4) Attributes or association roles of spatial object types or data types whose type is a code list may only take values that are allowed according to the specification of the code list.

Article 6(4) obliges data providers to use only values that are allowed according to the specification of the code list. The “allowed values according to the specification of the code list” are the values explicitly defined in the IRs plus (in the case of code lists of type (b), (c) and (d)) additional values defined by data providers.

For attributes whose type is a code list of type (b), (c) or (d) data providers may use additional values that are not defined in the IRs. Article 6(3) requires that such additional values and their definition be made available in a register. This enables users of the data to look up the meaning of the additional values used in a data set, and also facilitates the re-use of additional values by other data providers (potentially across Member States).

NOTE Guidelines for setting up registers for additional values and how to register additional values in these registers is still an open discussion point between Member States and the Commission.

5.2.4.3. Recommended code list values

For code lists of type (b), (c) and (d), this data specification may propose additional values as a recommendation (in a dedicated Annex). These values will be included in the INSPIRE code list register. This will facilitate and encourage the usage of the recommended values by data providers since the obligation to make additional values defined by data providers available in a register (see section 5.2.4.2) is already met.

Recommendation 4 Where these Technical Guidelines recommend values for a code list in addition to those specified in the IRs, these values should be used.

NOTE For some code lists of type (d), no values may be specified in these Technical Guidelines. In these cases, any additional value defined by data providers may be used.

5.2.4.4. Governance

The following two types of code lists are distinguished in INSPIRE:

- *Code lists that are governed by INSPIRE (INSPIRE-governed code lists)*. These code lists will be managed centrally in the INSPIRE code list register. Change requests to these code lists (e.g. to add, deprecate or supersede values) are processed and decided upon using the INSPIRE code list register's maintenance workflows.

INSPIRE-governed code lists will be made available in the INSPIRE code list register at <http://inspire.ec.europa.eu/codelist/<CodeListName>>. They will be available in SKOS/RDF, XML and HTML. The maintenance will follow the procedures defined in ISO 19135. This means that the only allowed changes to a code list are the addition, deprecation or supersession of values, i.e. no value will ever be deleted, but only receive different statuses (valid, deprecated, superseded). Identifiers for values of INSPIRE-governed code lists are constructed using the pattern <http://inspire.ec.europa.eu/codelist/<CodeListName>/<value>>.

- *Code lists that are governed by an organisation outside of INSPIRE (externally governed code lists)*. These code lists are managed by an organisation outside of INSPIRE, e.g. the World Meteorological Organization (WMO) or the World Health Organization (WHO). Change requests to these code lists follow the maintenance workflows defined by the maintaining organisations. Note that in some cases, no such workflows may be formally defined.

Since the updates of externally governed code lists is outside the control of INSPIRE, the IRs and these Technical Guidelines reference a specific version for such code lists.

The tables describing externally governed code lists in this section contain the following columns:

- The *Governance* column describes the external organisation that is responsible for maintaining the code list.
- The *Source* column specifies a citation for the authoritative source for the values of the code list. For code lists, whose values are mandated in the IRs, this citation should include the version of the code list used in INSPIRE. The version can be specified using a version number or the publication date. For code list values recommended in these Technical Guidelines, the citation may refer to the "latest available version".
- In some cases, for INSPIRE only a subset of an externally governed code list is relevant. The subset is specified using the *Subset* column.
- The *Availability* column specifies from where (e.g. URL) the values of the externally governed code list are available, and in which formats. Formats can include machine-readable (e.g. SKOS/RDF, XML) or human-readable (e.g. HTML, PDF) ones.

Code list values are encoded using http URIs and labels. Rules for generating these URIs and labels are specified in a separate table.

Recommendation 5 The http URIs and labels used for encoding code list values should be taken from the INSPIRE code list registry for INSPIRE-governed code lists and generated according to the relevant rules specified for externally governed code lists.

NOTE Where practicable, the INSPIRE code list register could also provide http URIs and labels for externally governed code lists.

5.2.4.5. Vocabulary

For each code list, a tagged value called “vocabulary” is specified to define a URI identifying the values of the code list. For INSPIRE-governed code lists and externally governed code lists that do not have a persistent identifier, the URI is constructed following the pattern *http://inspire.ec.europa.eu/codelist/<UpperCamelCaseName>*.

If the value is missing or empty, this indicates an empty code list. If no sub-classes are defined for this empty code list, this means that any code list may be used that meets the given definition.

An empty code list may also be used as a super-class for a number of specific code lists whose values may be used to specify the attribute value. If the sub-classes specified in the model represent all valid extensions to the empty code list, the subtyping relationship is qualified with the standard UML constraint “{complete,disjoint}”.

5.2.5 Identifier management

IR Requirement

Article 9

Identifier Management

1. The data type Identifier defined in Section 2.1 of Annex I shall be used as a type for the external object identifier of a spatial object.
2. The external object identifier for the unique identification of spatial objects shall not be changed during the life-cycle of a spatial object.

NOTE 1 An external object identifier is a unique object identifier which is published by the responsible body, which may be used by external applications to reference the spatial object. [DS-D2.5]

NOTE 2 Article 9(1) is implemented in each application schema by including the attribute *inspireId* of type Identifier.

NOTE 3 Article 9(2) is ensured if the *namespace* and *localId* attributes of the Identifier remains the same for different versions of a spatial object; the *version* attribute can of course change.

5.2.6 Geometry representation

IR Requirement

Article 12

Other Requirements & Rules

1. The value domain of spatial properties defined in this Regulation shall be restricted to the Simple Feature spatial schema as defined in Herring, John R. (ed.), OpenGIS® Implementation Standard for Geographic information – Simple feature access – Part 1: Common architecture, version 1.2.1, Open Geospatial Consortium, 2011, unless specified otherwise for a specific spatial data theme or type.

NOTE 1 The specification restricts the spatial schema to 0-, 1-, 2-, and 2.5-dimensional geometries where all curve interpolations are linear and surface interpolations are performed by triangles.

NOTE 2 The topological relations of two spatial objects based on their specific geometry and topology properties can in principle be investigated by invoking the operations of the types defined in ISO 19107 (or the methods specified in EN ISO 19125-1).

5.2.7 Temporality representation

The application schema(s) use(s) the derived attributes "beginLifespanVersion" and "endLifespanVersion" to record the lifespan of a spatial object.

The attributes "beginLifespanVersion" specifies the date and time at which this version of the spatial object was inserted or changed in the spatial data set. The attribute "endLifespanVersion" specifies the date and time at which this version of the spatial object was superseded or retired in the spatial data set.

NOTE 1 The attributes specify the beginning of the lifespan of the version in the spatial data set itself, which is different from the temporal characteristics of the real-world phenomenon described by the spatial object. This lifespan information, if available, supports mainly two requirements: First, knowledge about the spatial data set content at a specific time; second, knowledge about changes to a data set in a specific time frame. The lifespan information should be as detailed as in the data set (i.e., if the lifespan information in the data set includes seconds, the seconds should be represented in data published in INSPIRE) and include time zone information.

NOTE 2 Changes to the attribute "endLifespanVersion" does not trigger a change in the attribute "beginLifespanVersion".

IR Requirement

Article 10

Life-cycle of Spatial Objects

(...)

3. Where the attributes beginLifespanVersion and endLifespanVersion are used, the value of endLifespanVersion shall not be before the value of beginLifespanVersion.

NOTE The requirement expressed in the IR Requirement above will be included as constraints in the UML data models of all themes.

Recommendation 6

If life-cycle information is not maintained as part of the spatial data set, all spatial objects belonging to this data set should provide a void value with a reason of "unpopulated".

5.2.7.1. Validity of the real-world phenomena

The application schema(s) use(s) the attributes "validFrom" and "validTo" to record the validity of the real-world phenomenon represented by a spatial object.

The attributes "validFrom" specifies the date and time at which the real-world phenomenon became valid in the real world. The attribute "validTo" specifies the date and time at which the real-world phenomenon is no longer valid in the real world.

Specific application schemas may give examples what "being valid" means for a specific real-world phenomenon represented by a spatial object.

IR Requirement
Article 12
Other Requirements & Rules

(...)

3. Where the attributes validFrom and validTo are used, the value of validTo shall not be before the value of validFrom.

NOTE The requirement expressed in the IR Requirement above will be included as constraints in the UML data models of all themes.

5.3 Application schema Agricultural and Aquaculture Facilities Model

5.3.1 Description

5.3.1.1. Narrative description

The *Agricultural and Aquaculture Facilities* model is composed by core information in relation to the geographical description of entities under the Agriculture and Aquaculture scope. It is based on the *Activity Complex* model (Doc 2.10.3). This Activity Complex model is extended to the basic Agricultural and Aquaculture features Holding and Site. These features contains only basic information about the location of the Holding and the Site, the type of activities performed on that locations, and just in case that animals are kept, what type of animals is kept on the Site.

A Holding is regarded as a specialisation of an Activity Complex. Each Activity Complex - Holding contains at least one or more Sites. On a Site animals can be kept. On a Site, none, one or more animal species can be recorded.

The location of Holding and Site can be expressed as a point or a surface (polygon).

The activity of Holding and Site is expressed by using the standard NACE classification list.

The data type *FarmAnimalSpecies* is expressed by using a standard code list for livestock animal species and a standard FAO code list for aquaculture species.

- Activity Complex: The whole area and all infrastructures on it, under the control of an operator. In the AF theme the Activity Complex has the specialised representation named Holding.
- Holding: The whole area and all infrastructures included on it, under the control of an operator to perform agricultural or aquaculture activities. It may be composed of one or more "Sites".

This concept is related to all the common information that applies over all the different entities related to the Agricultural and Aquaculture activity or activities under the responsibility of one legal operator. It could be considered as the synthetic geographical representation of a unique operational, economical or legal body.

- Site: Belonging to a holding, it is the geographical representation of land that constitutes a management unit. It includes all infrastructure, equipment and materials.

The concept of "Site" is related to polygonal areas. Its definition and scope derived from the legal definition of "Site" where the term is described as:

All land at a distinct geographic location under the management control of an operator [Directive 2006/21/EC];

All land at a distinct geographic location under the management control of an organisation covering activities, products and services. This includes all infrastructure, equipment and materials [REGULATION (EC) 761/2001];

All “Holding” must be related at least to one “Site” but a Holding can manage one or more “Sites”.

The geographical extension of the “Site” has been described as *GM_Object* to allow its representation as a point (inherited from holding) or more complex representations as a Set of Isolated Polygons (Multisurface). Topologically all the rest of geographical elements should be included under the limits of one “Site”. If necessary a “Site” should be created to include each of these representative sub-elements.

- Farm Animal Species: It is a Data Type related with “Site” which allows to describe the presence of animals on it.

5.3.1.2. UML Overview

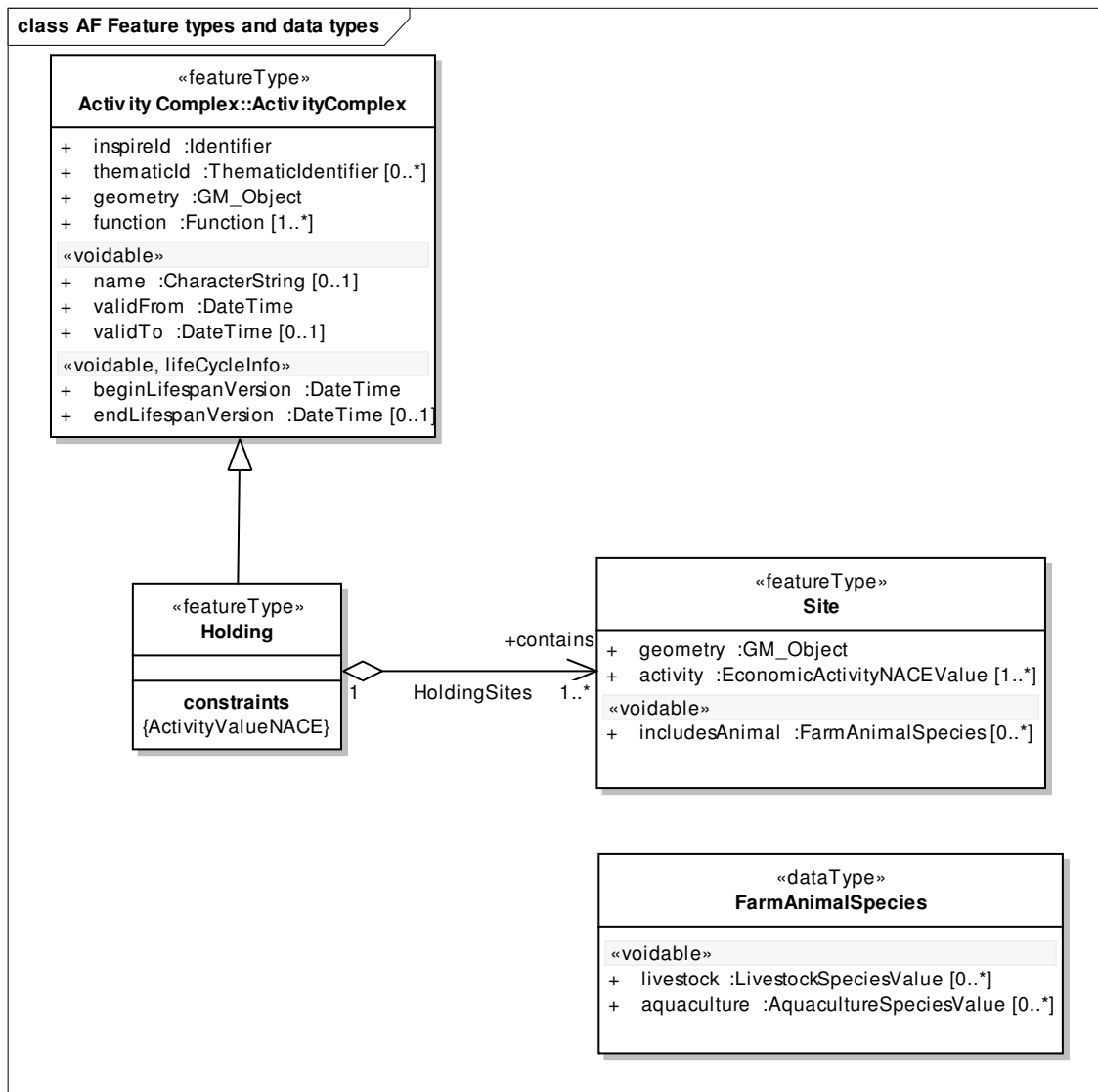


Figure 2 – UML class diagram: Overview of the feature types and data types of the Agricultural and Aquaculture Facilities Model application schema

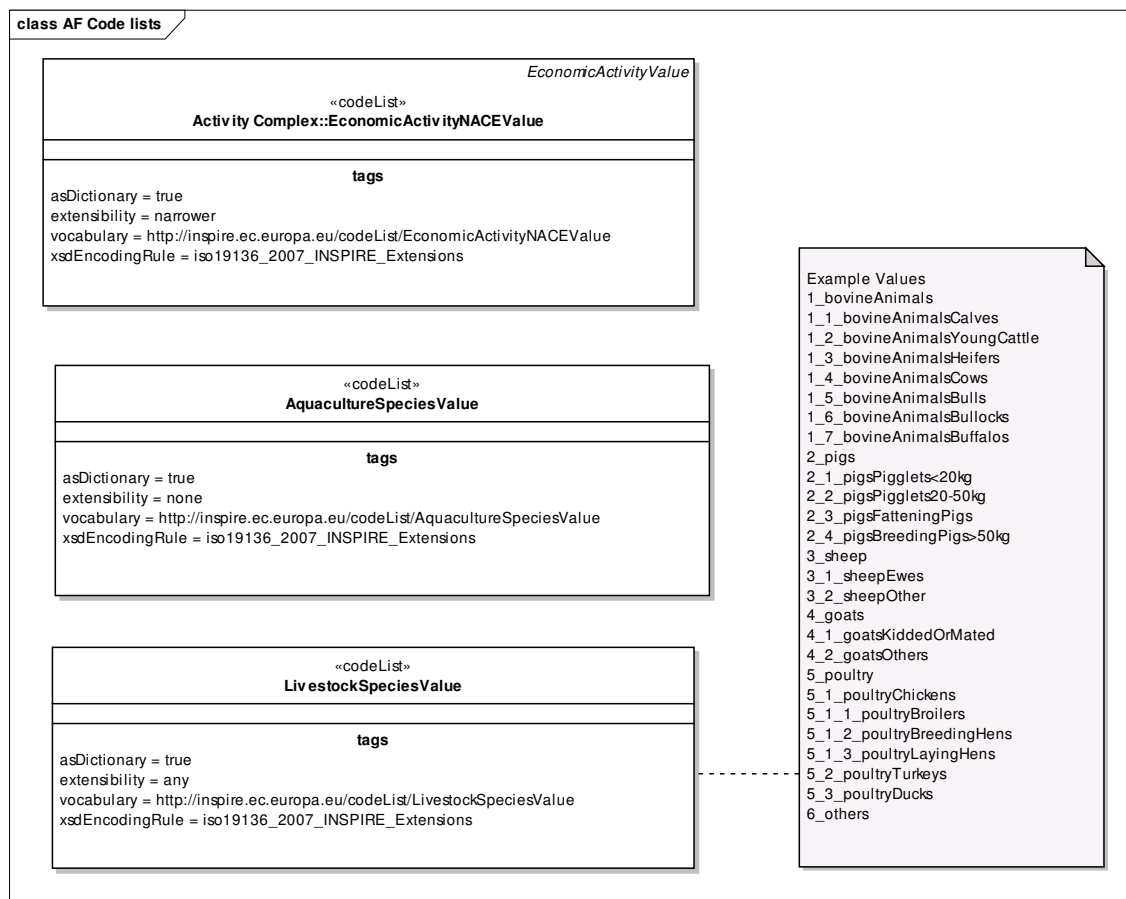


Figure 3 – UML class diagram: Overview of the code lists of the Agricultural and Aquaculture Facilities Model application schema

5.3.1.3. Consistency between spatial data sets

The geographical representation of *Agricultural and Aquaculture Facilities* (Holdings specially) must be considered as independent. That means entities described should have their own geographical definition. Although in the majority of cases a direct relation could be established with other geographical elements, this relation could become a source of errors in the accuracy of the geo-position of the elements included on the Datasets. Addresses or Cadastral Parcels information must be managed carefully to avoid overlaps and inconsistencies with information stored in existing Datasets.

Internally, information related to the same “facilities” or elements included on them can exist isolated in different datasets from different institutions or data providers. All this information should be unified in order to avoid duplications or redundancy of information. Other important question is the maintenance of the Topological relationship between entities mainly on those provided by different sources (data providers).

5.3.1.4. Identifier management

The *Agricultural and Aquaculture Facilities* data specification uses the Identifier data type from the INSPIRE General Conceptual Model [DS-D2.5]. These identifiers include version number, so they can be used to track changes to an object.

Agricultural and Aquaculture Facilities are subject to a multitude of identifiers depending on the applicability of the datasets in which are originally included (legal registration, registry based on legislation, ...). Based on this multiplicity it is quite difficult to harmonize a criterion in order to avoid duplicity. For this reason, and based on the applicability of layers to specific use cases the model has included identifiers only at the level of the Activity Complex - Holding.

At the Sites level unique identifiers are not implemented.

5.3.1.5. Modelling of object references

If data providers choose to implement external object references to spatial object types in other themes, they should ensure that update mechanisms are in place in order to ensure consistency among the referenced objects.

5.3.1.6. Geometry representation

In general, the geographical information (datasets) should be provided by different organizations (Private and Public Administration related with *Agricultural and Aquaculture Facilities* referring at least the geographical position of the main “Holdings” as a “points” independently of the level of detail.

Onto the most generic legislation (Waste, IPPC, E-PRTR) the geographical information is required on Geographical coordinates (X,Y). In certain cases the geographical position could be estimated by automatic process through the “Address” provided on the registration forms. This kind of activity can derive on wrong geospatial location as result of the source information provided (e.g. legal address instead of facility address). A clean-up process over datasets should guarantee the accuracy geo-location of entities.

In case of “Holdings” composed by different “Sites” not continuous geographically, it would be valid to provide the geographical information related to the main one. It would not be valid, if lacks between different “Sites” are representative, defining the position as a “*centroid*” of all of them as geo-representation.

If the *GM_Object* element is applied as *GM_Multisurface*, it involves that all different “Sites” share all the attributes. This has to be considered when Farm Animal Species are described.

In some cases related with agricultural or aquaculture activities which cover a representative extension of land (maritime or terrestrial), “Sites”, this could be provided as most detailed geographical representation of the “Holding”, described as polygons (2D) in Local – Regional Datasets. Based on this option, the model include and extension for this particular case. In some cases “Sites” or Polygons in which other kind of elements included on the model are placed could be linked with cadastral parcels but this relation seems to be quite complex from the ontological point of view and it has not been considered.

Other kind of potential geo-referenced information is required under the legislation embedded on documents and descriptions requested without references to specific formats. This option only could be resolved with external elements (like URL's) or the inclusion of raster layers (out of the scope).

The model is open to other kind of detailed elements included on the “Holding” (e.g. Installations, Plots, Technical Units). These elements should be represented by geographical entities topologically related with the “Site”. In same cases the geographical representation could be coincident and inherited from the higher hierarchical level to which they belong.

5.3.2 Feature catalogue

Feature catalogue metadata

Application Schema	INSPIRE Application Schema <i>Agricultural and Aquaculture Facilities</i> Model
Version number	3.0

Types defined in the feature catalogue

Type	Package	Stereotypes
<i>AquacultureSpeciesValue</i>	<i>Agricultural and Aquaculture Facilities</i> Model	«codeList»
<i>FarmAnimalSpecies</i>	<i>Agricultural and Aquaculture Facilities</i> Model	«dataType»
<i>Holding</i>	<i>Agricultural and Aquaculture Facilities</i> Model	«featureType»
<i>LivestockSpeciesValue</i>	<i>Agricultural and Aquaculture Facilities</i> Model	«codeList»
<i>Site</i>	<i>Agricultural and Aquaculture Facilities</i> Model	«featureType»

5.3.2.1. Spatial object types

5.3.2.1.1. Holding

Holding	
Name:	Holding
Subtype of:	ActivityComplex
Definition:	The whole area and all infrastructures included on it, covering the same or different "sites", under the control of an operator to perform agricultural or aquaculture activities. The holding includes one specialisation of ActivityComplex, ie. Activity. the values of ActivityType are expressed conform the classification of the economic activity of the holding, according to the NACE rev. 2.0 coding. Holding is a thematic extension of the generic Class "Activity Complex" shared with other thematic areas describing entities related with Economical Activities (Legal Entity Class – Business).
Description:	<p>Accessible at Eurostat repository from URL http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_CLS_DLD&StrNom=NACE_REV2&StrLanguageCode=EN&StrLayoutCode=HIERARCHIC.</p> <p>The valid nace codes are first level 01 and 03 second level 01.1 - 01.6 and 03.2 third level 01.11 - 01.64 and 03.21 - 03.22</p> <p>01.7 hunting trapping an related services is exclude. 02. forestry and logging are excluded 03.1 fishing is excluded.</p>
Stereotypes:	«featureType»
Association role: contains	
Value type:	Site
Multiplicity:	1..*
Constraint: ActivityValueNACE	
Natural language:	
OCL:	At least one of the function attributes of the Holding spatial object shall be provided using the EconomicActivityNACEValue code list (for the activity attribute of the Function data type).

5.3.2.1.2. Site

Site

Site	
Name:	Site
Definition:	All land at a same or distinct geographic location under the management control of a holding covering activities, products and services. This includes all infrastructure, equipment and materials. The geometry of the site must be a point or a surface. Multipoint or multisurface is not allowed.
Description:	The site can be represented by a point or by a surface. the site can have only one geometry.
Stereotypes:	«featureType»
Attribute: geometry	
Name:	geometry
Value type:	GM_Object
Definition:	The geometry defining the extent or position of the site.
Description:	The geometry must be a GM_surface, when it includes installations, plots or buildings with a polygon type geometry. In case the site only includes single object with a point type geometry, the site can have a GM_point geometry.
Multiplicity:	1
Attribute: activity	
Name:	activity
Value type:	EconomicActivityNACEValue
Definition:	The classification of the economic activity of the site, according to the NACE rev. 2.0 coding.
Description:	Accessible at Eurostat repository from URL http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_CLS_DLD&StrNom=NACE_REV2&StrLanguageCode=EN&StrLayoutCode=HIERARCHIC .
	The valid nace codes are first level 01 and 03 second level 01.1 - 01.6 and 03.2 third level 01.11 - 01.64 and 03.21 - 03.22
Multiplicity:	1..*
Attribute: includesAnimal	
Value type:	FarmAnimalSpecies
Multiplicity:	0..*
Stereotypes:	«voidable»

5.3.2.2. Data types

5.3.2.2.1. FarmAnimalSpecies

FarmAnimalSpecies	
Name:	farm animal
Definition:	Identifies an animal or group of animals of the same species kept on the specific site.
Stereotypes:	«dataType»
Attribute: livestock	
Name:	livestock
Value type:	LivestockSpeciesValue

FarmAnimalSpecies	
Definition:	Define the presence of livestock species in the site.
Description:	The terrestrial species are coded specified according to regulation (EC) No 1165/2008.
Multiplicity:	0..*
Stereotypes:	«voidable»
Attribute: aquaculture	
Name:	aquaculture
Value type:	AquacultureSpeciesValue
Definition:	Define the presence of aquaculture species in the site.
Description:	Aquaculture species are listed in aquacultureSpecies attribute. The allowed values for this code list comprise only the values specified in the February 2012 version of the ASFIS (Aquatic Sciences and Fisheries Information System) List of Species for Fishery Statistics Purposes maintained by FAO.
Multiplicity:	0..*
Stereotypes:	«voidable»

5.3.2.3. Code lists

5.3.2.3.1. LivestockSpeciesValue

LivestockSpeciesValue	
Name:	LivestockSpeciesValue
Definition:	Express the species name by using a codevalue.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/LivestockSpeciesValue
Values:	The allowed values for this code list comprise the values specified in "Annex II to Regulation (EC) No 1165/2008" and additional values at any level defined by data providers.

5.3.2.3.2. AquacultureSpeciesValue

AquacultureSpeciesValue	
Name:	AquacultureSpeciesValue
Definition:	The name of the species , coded according to the FAO ISCAAP 3 alfa code list. ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf
Extensibility:	none
Identifier:	http://inspire.ec.europa.eu/codelist/AquacultureSpeciesValue
Values:	The allowed values for this code list comprise only the values specified in "ASFIS (Aquatic Sciences and Fisheries Information System) List of Species for Fishery Statistics Purposes published by the Food and Agriculture Organization of the United Nations" .

5.3.2.4. Imported types (informative)

This section lists definitions for feature types, data types and enumerations and code lists that are defined in other application schemas. The section is purely informative and should help the reader understand the feature catalogue presented in the previous sections. For the normative documentation of these types, see the given references.

5.3.2.4.1. ActivityComplex

ActivityComplex	
Package:	Activity Complex
Reference:	INSPIRE Data Specifications – Base Models – Activity Complex, version 1.0 [DS-D2.10.3]
Definition:	A "single unit", both technically and economically, under the management control of the same legal entity (operator), covering activities as those listed in the Eurostat NACE classification, products and services. Activity Complex includes all infrastructure, equipment and materials. It must represent the whole area, at

ActivityComplex	
Description:	<p>the same or different geographical location, managed by a "single unit".</p> <p>NOTE 1 This class describes the minimal set of elements necessary to describe and identify geographically a legal entity and the activities taken place on it under the context of a Environmental purposes.</p> <p>NOTE 2 "Activity Complex" could be assimilated to terms described on the legislation as Facility, Establishment, Plant, Holding, Organization ,Farm, Extractive Industries or Aquaculture Production Business among others</p> <p>EXAMPLE i.e. an Agro-business that is legally registered under the Emissions Directive.</p>

5.3.2.4.2. *EconomicActivityNACEValue*

EconomicActivityNACEValue	
Package:	Activity Complex
Reference:	INSPIRE Data Specifications – Base Models – Activity Complex, version 1.0 [DS-D2.10.3]
Definition:	Classification of economic activities according to Eurostat NACE.

5.3.2.4.3. *GM_Object*

GM_Object (abstract)	
Package:	Geometry root
Reference:	Geographic information -- Spatial schema [ISO 19107:2003]

5.3.3 Externally governed code lists

The externally governed code lists included in this application schema are specified in the tables in this section.

5.3.3.1. Governance and authoritative source

Code list	Governance	Authoritative Source (incl. version ¹⁴ and relevant subset, where applicable)
AquacultureSpeciesValue	FAO ISCAAP	FAO – Latest version available - http://www.fao.org/fishery/collection/asfis/en Subset: ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf
LivestockSpeciesValue	European Commission, EEA	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:321:0001:0013:en:PDF
EconomicActivityNACEValue	Commission of the European Communities (Statistical Office/Eurostat)	Eurostat – Latest version available - http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

5.3.3.2. Availability

Code list	Availability	Format
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¹⁴ If no version or publication date are specified, the "latest available version" shall be used.

AquacultureSpeciesValue	ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf	PDF
LivestockSpeciesValue	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:321:0001:0013:en:PDF	PDF
EconomicActivityNACEValue	http://ec.europa.eu/competition/mergers/cases/index/nace_all	html

The values of selected external code lists are included in Annex C for information.

5.3.3.3. Rules for code list values

Code list	Identifiers	Examples
AquacultureSpeciesValue	As described on ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf	ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf
LivestockSpeciesValue	lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:321:0001:0013:en:PDF	lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:321:0001:0013:en:PDF
EconomicActivityNACEValue	Upper-case letters code and numeration split by dots. (e.g A1.1.9)	http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

5.4 Application schema Agricultural and Aquaculture Facilities Extended Model

5.4.1 Description

5.4.1.1. Narrative description

The Extended Model represents complementary information about *Agricultural and Aquaculture Facilities*. It is based on extensions about plots, agri-buildings, installations, irrigation and drainage, farm animals and animal health.

In the extended model complementary information describes entities and process directly related to the core part entities. Elements of this part of the model can exist independently and geographically (and in the real world) but always included on the Site. There are two different extensions:

- Detailed components: Related to physical elements that have to be independently described because of their particular function or position (quantitative information).
- Operations: Alphanumerical information related to variables derived from operational process performed on the Site as part of one activity.

A Holding is regarded as a specialisation of an Activity Complex. Each Activity Complex - Holding contains at least 1 or more Sites. On a Site animals can be kept. On a Site, none, one or more animal species can be recorded.

A Site can contain one or more Plots. Plots are geographical features with detailed information about the activities performed on them, irrigation and drainage.

A Site can contain one or more AgriBuildings. These AgriBuildings can be related to Buildings (a feature defined in the Annex III theme Buildings).

A site can also contain one or more Installations, constructions not being buildings. These Installations can be related to Other Constructions (a feature defined in the Annex III theme Buildings).

In case the Installation is a *waterinstallation*, a water inlet or outlet device, the installation can be connected to the Appurtenance (annex III, US.core water network) or to a HydroObject (Annex I hydrography).

The FarmAnimalSpecies data type contains detailed information about the kind of animals kept on the site, the amount and the health status of that type of animals. The type of FarmAnimalSpecies is expressed by using a standard code list for livestock animal species. For aquaculture a standard FAO code list is used.

The location of Holding and Site can be expressed as a point or a surface (polygon).

The activity of Holding and Site is expressed by using the standard NACE codes.

Dedicated specialized association at the level of Site with Cadastral Parcels is implemented.

- Holding: The whole area and all infrastructures included on it, under the control of an operator to perform Agricultural or Aquaculture activities. It may be composed of one or more "Sites".

This concept is related to all the common information that applies over all the different entities related to the Agricultural and Aquaculture activity or activities under the responsibility of one legal operator. It could be consider as the synthetic geographical representation of a unique operational, economical or legal body.

Activity Complex, considered as legal activities that take place over a permanent or semi-permanent portion of the territory, can be linked in several ways with other type of geographical information related on the Annex.I "reference themes".

Holding in the extended model include detailed information of the Holding based on the common data types described on Activity Complex general model. This allows to define a set of elements related to the activity as Inputs (understood as consumed material) and Outputs (understood as materials resulting of the activity, including pollutants, waste, final goods, waste water, ...) and legal issues as permissions, and responsible parties and the role these parties have.

- Site: Belonging to a holding, it is the geographical representation of land that constitutes a management unit. It includes all infrastructure, equipment and materials.

The concept of "Site" is related to polygonal areas. Its definition and scope derived from the legal definition of "Site" where the term is described as:

All land at a distinct geographic location under the management control of an operator [Directive 2006/21/EC];

All land at a distinct geographic location under the management control of an organisation covering activities, products and services. This includes all infrastructure, equipment and materials [REGULATION (EC) 761/2001];

All "Holding" must be related at least to one "Site" (multiplicity [1..*]) but a Holding can manage one or more "Sites". Relations must be done as constrained among both extended classes Site-Holding.

The geographical extension of the “Site” has been described as *GM_Object* to allow its representation as a point (inherited from holding) or more complex representations as a Set of Isolated Polygons (Multisurface). Topologically all the rest of geographical elements should be included under the limits of one “Site”. If necessary a “Site” should be created to include each of these representative sub-elements.

Extended Site includes Identifier and information about the permissions based on the common data types described on Activity Complex general model.

- Installation: It refers to all technical instruments and constructions included on the “Site” that should be described independently. It allows referring to specific sub-elements included on the “Site” and legally related to the “Holding”.
- Plot: This entity allows describing in a abstract sense delimited portions of land or water (independently of their size or delimitation method) included on a “Site” dedicated to a specific function as part of a major activity and geographically identifiable. “Plot” concept shouldn’t be confused with Cadastral entities despite in some cases it could be coincident on the real world with them.
- AgriBuilding: The relation between “Buildings” and specific uses is quite fuzzy, for this reason, only buildings dedicated to specific functions related to the Activity should be linked with the Agricultural and Aquaculture model, otherwise the consistency of datasets could be quite complicated.
- AgriBuilding: The relation between “Buildings” and specific uses is quite fuzzy, for this reason, only buildings dedicated to specific functions related to the Activity should be linked with the Agricultural and Aquaculture model, otherwise the consistency of datasets could be quite complicated.
- HydroObject: The relation between “HydroObject” and “Installation” illustrates the link between the hydrographic system (irrigation and drainage systems) of the Site and the natural hydro objects, like ponds, lakes, rivers and canals, which are identified by annex1 theme Hydrography.

5.4.1.2. UML Overview

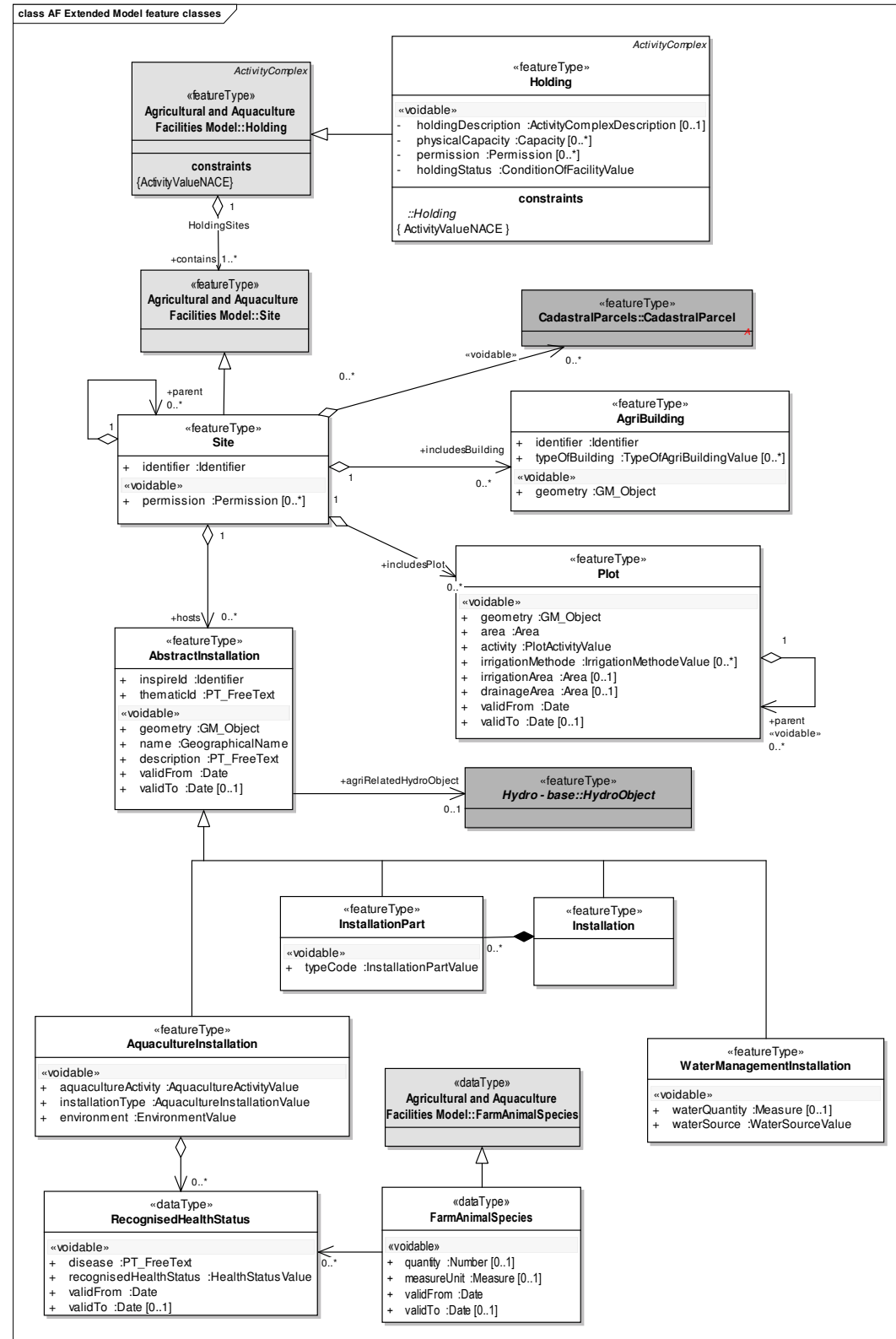


Figure 4 – UML class diagram: Overview of the Agricultural and Aquaculture Facilities Extended Model, feature classes.

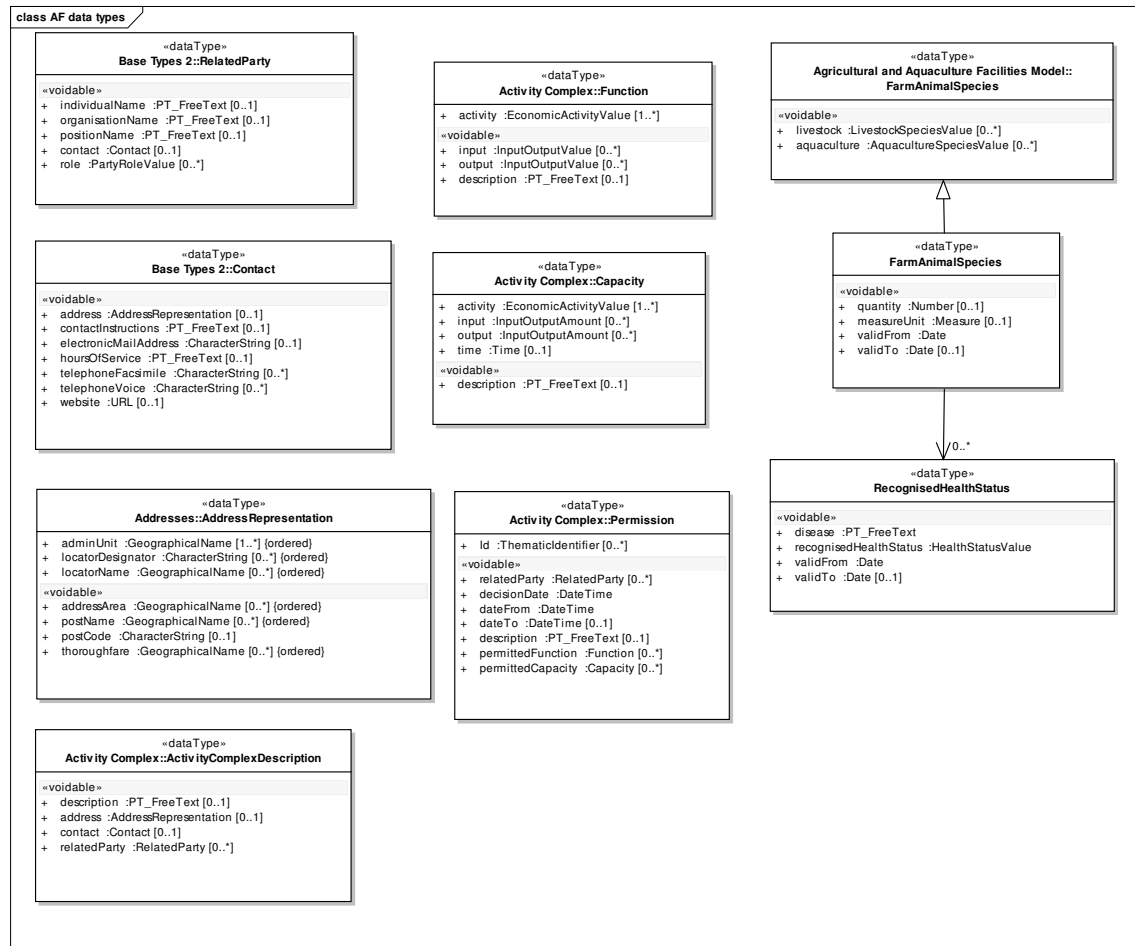


Figure 5 – UML class diagram: Overview of the Agricultural and Aquaculture Facilities Extended Model, data types

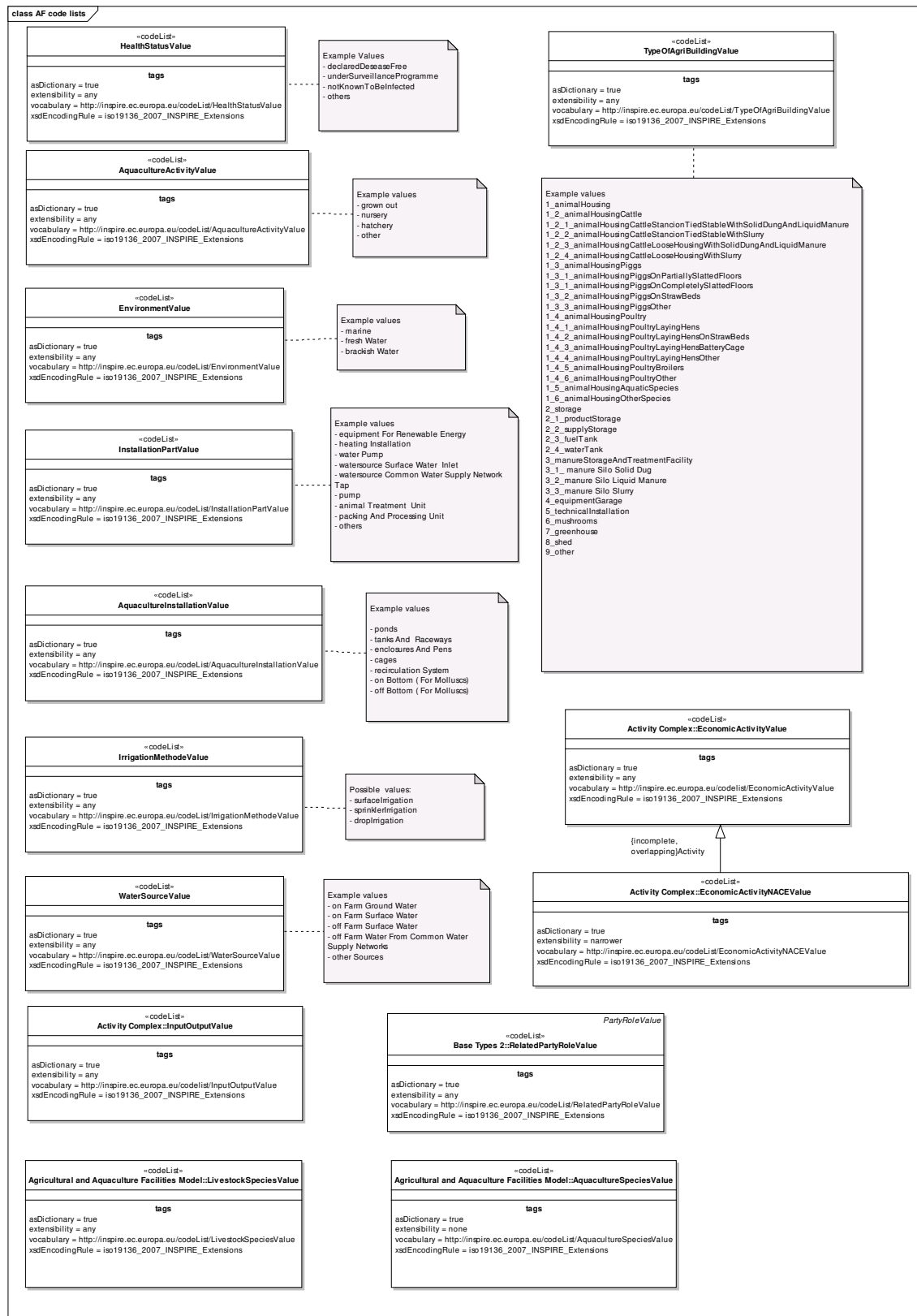


Figure 6 – UML class diagram: Overview of the Agricultural and Aquaculture Facilities Extended Model, code lists part 1



Figure 7 – UML class diagram: Overview of the Agricultural and Aquaculture Facilities Extended Model, code lists part 2

5.4.1.3. Consistency between spatial data sets

No further ones to those described on 5.3.1.3

5.4.1.4. Identifier management

No further ones to those described on 5.3.1.4

5.4.1.5. Modelling of object references

No further ones to those described on 5.3.1.5

5.4.1.6. Geometry representation

No further ones to those described on 5.3.1.6

5.4.1.7. Temporality representation

No further ones to those described on 5.3.1.7

5.4.2 Feature catalogue

Feature catalogue metadata

Application Schema	INSPIRE Application Schema <i>Agricultural and Aquaculture Facilities</i> Extended Model
Version number	3.0

Types defined in the feature catalogue

Type	Package	Stereotypes
<i>AbstractInstallation</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>AgriBuilding</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>AquacultureActivityValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»
<i>AquacultureInstallation</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>AquacultureInstallationValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»
<i>EnvironmentValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»
<i>FarmAnimalSpecies</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«dataType»
<i>HealthStatusValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»
<i>Holding</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>Installation</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>InstallationPart</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>InstallationPartValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»

Type	Package	Stereotypes
<i>IrrigationMethodeValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»
<i>Plot</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>PlotActivityValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»
<i>RecognisedHealthStatus</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«dataType»
<i>Site</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>TypeOfAgriBuildingValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»
<i>WaterManagementInstallation</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«featureType»
<i>WaterSourceValue</i>	<i>Agricultural and Aquaculture Facilities</i> Extended Model	«codeList»

5.4.2.1. Spatial object types

5.4.2.1.1. AgriBuilding

AgriBuilding	
Name:	AgriBuilding
Definition:	A building used for agricultural or aquaculture activities.
Description:	A construction to store agricultural and aquaculture commodities, harvested crops , keeping of animals or storing equipment.
Stereotypes:	«featureType»
Attribute: identifier	
Name:	identifier
Value type:	Identifier
Definition:	The identifier of the agribuilding.
Multiplicity:	1
Attribute: geometry	
Name:	geometry
Value type:	GM_Object
Definition:	Representation of the geographical dimension/position of the “building”. Can be GM_Polygon or GM_Point.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: typeOfBuilding	
Name:	typeOfBuilding
Value type:	TypeOfAgriBuildingValue
Definition:	The type of the building, expressed as a code.
Description:	A building can consists out of one or more building parts. each building part can be of an other type.
Multiplicity:	0..*
Association role:	
Value type:	AbstractBuilding
Multiplicity:	1
Stereotypes:	«voidable»

5.4.2.1.2. AquacultureInstallation

AquacultureInstallation	
Name:	AquacultureInstallation
Subtype of:	AbstractInstallation
Definition:	A technical unit or a delimited area operated by the same owner of the (aquaculture) holding, where one or more activities listed in Annex I of Regulation (EC) No 1893/2006 are carried out.
Description:	Source (Plan4all - modified)
Stereotypes:	«featureType»
Attribute: aquacultureActivity	
Name:	aquacultureActivity
Value type:	AquacultureActivityValue
Definition:	Type of aquaculture activity expressed as a code.
Description:	In the enumeration next values are possible: grown out, nursery, hatchery, other.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: installationType	
Name:	installationType
Value type:	AquacultureInstallationValue
Definition:	Type of aquaculture installation.
Description:	In the enumeration fixed values for the types of installation are listed, like: ponds, tanks and raceways, enclosures and pens, etc.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: environment	
Name:	environment
Value type:	EnvironmentValue
Definition:	The type of the environment in which the aquaculture organisms are kept. (a water classification).
Description:	The type of water can be: marine, freshwater or brackish water. (enumeration).
Multiplicity:	1
Stereotypes:	«voidable»
Association role:	
Value type:	RecognisedHealthStatus
Multiplicity:	0..*

5.4.2.1.3. Holding

Holding	
Name:	Holding
Subtype of:	ActivityComplexHolding
Definition:	The whole area and all infrastructures included on it, covering the same or different "sites", under the control of an operator to perform agricultural or aquaculture activities. The holding includes one specialisation of ActivityComplex, ie. Activity. the values of ActivityType are expressed in conformity with the classification of the economic activity of the holding, according to the NACE rev. 2.0 coding. Holding is a thematic extension of the generic Class "Activity Complex" shared with other thematic areas describing entities related with Economical Activities (Legal Entity Class – Business). Holding is a thematic extension of the generic Class "Activity Complex" shared with other thematic areas describing entities related with Economical Activities

Holding	
Description:	<p>(Legal Entity Class – Business).</p> <p>Accessible at Eurostat repository from URL http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_CLS_DLD&StrNom=NACE_REV2&StrLanguageCode=EN&StrLayoutCode=HIERARCHIC.</p> <p>The valid nace codes are: the first level codes: 01 and 03 the second level codes: 01.1 - 01.6 and 03.2 and the third level codes: 01.11 - 01.64 and 03.21 - 03.22</p> <p>The next codes from the range 01 to 03.22 are excluded: 01.7 hunting trapping an related services; 02. forestry and logging; 03.1 fishing.</p>
Stereotypes:	«featureType»
Attribute: holdingDescription	
Name:	holdingDescription
Value type:	ActivityComplexDescription
Definition:	Additional information on an Holding, including its address, a contact, related parties and a free text description.
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: physicalCapacity	
Name:	physicalCapacity
Value type:	Capacity
Definition:	A quantification of an actual or potential ability to perform an activity, that typically does not change, does not change often, or does not change to a significant degree.
Description:	NOTE Capacity could refer to different concepts included on the legislation as “emission limits”, “capacity incineration”, “nominal capacity”, “objective estimation”
Multiplicity:	0..*
Stereotypes:	«voidable»
Attribute: permission	
Name:	permission
Value type:	Permission
Definition:	Official Decision (formal consent) granting authorization to operate all or part of a Holding , subject to certain conditions which guarantee that the installation or parts of installations on the same site operated by the same operator complies with the requirements fixed by the law or standards. A permit may cover one or more functions and fix parameters of capacity; The term may be extended to other kind of certificates or documents of special relevance depending of the scope (e.g. ISO, EMAS, National Quality Standards, etc).
Description:	<p>NOTE This terms is referred in several legislative acts as “permit” , “authorization”, “development consent” or “exploration permit” among others.</p> <p>EXAMPLE 1 “...a [written] decision by which the competent authority grants permission to operate all or part of an installation” ;</p> <p>EXAMPLE 2 “.. the decision of the competent authority or</p>

Holding	
Multiplicity:	0..*
Stereotypes:	«voidable»
Attribute: holdingStatus	
Name:	holdingStatus
Value type:	ConditionOfFacilityValue
Definition:	The status of the Holding, such as operational or decommissioned.
Multiplicity:	1
Stereotypes:	«voidable»

5.4.2.1.4. *AbstractInstallation*

AbstractInstallation	
Name:	AbstractInstallation
Definition:	Stationary technical unit part of a facility where one or more Agricultural and Aquacultural activities are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site.
Description:	Agricultural and Aquacultural Activities refers to the production of primary materials (animal and vegetal) for human use, or as base material for industrial processing (animal feed, human food or other industries). Depending on the scale, the installations would be represented by areas or points and always linked with a Facility (at less in a 1:1 relation).
Stereotypes:	«featureType»
Attribute: inspireId	
Name:	inspireId
Value type:	Identifier
Definition:	The identifier of the installation.
Description:	NOTE An external object identifier is a unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object. The identifier is an identifier of the spatial object, not an identifier of the real-world phenomenon.
Multiplicity:	1
Attribute: thematicId	
Name:	thematicId
Value type:	PT_FreeText
Definition:	The identifier for the installation using a specified identification schema, such as a national register.
Multiplicity:	1
Attribute: geometry	
Name:	geometry
Value type:	GM_Object
Definition:	The geometry defining the extent or position of the installation part.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: name	
Name:	name
Value type:	GeographicalName
Definition:	The name of the facility.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: description	

AbstractInstallation	
Name:	description
Value type:	PT_FreeText
Definition:	The description of the facility.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: validFrom	
Name:	validFrom
Value type:	Date
Definition:	The time when the facility started to exists in the real world.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: validTo	
Name:	validTo
Value type:	Date
Definition:	The time when the facility no longer exists in the real world.
Multiplicity:	0..1
Stereotypes:	«voidable»
Association role: agriRelatedHydroObject	
Value type:	HydroObject
Multiplicity:	0..1

5.4.2.1.5. Installation

Installation	
Name:	Installation
Subtype of:	AbstractInstallation
Definition:	Stationary technical unit part of a facility where one or more Agricultural and Aquacultural activities are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site.
Description:	Agricultural and Aquacultural Activities refers to the production of primary materials (animal and vegetal) for human use, or as base material for industrial processing (animal feed, human food or other industries). Depending on the scale, the installations would be represented by areas or points and always linked with a Facility (at less in a 1:1 relation).
Stereotypes:	«featureType»

5.4.2.1.6. InstallationPart

InstallationPart	
Name:	InstallationPart
Subtype of:	AbstractInstallation
Definition:	Specific technical part of the Installation which is developing a representative functionality that should be registered under the legislation.
Description:	This level of description should applied for specific parts of the installations which must be register following the legislation. Manure Storage, Tanks (Special or Raw Products) ,... would be included under this definition. Independently the dimension this entity would be represented as points.
Stereotypes:	«featureType»
Attribute: typeCode	
Name:	typeCode
Value type:	InstallationPartValue
Definition:	Describes the type of the installation part, according to a code list.
Multiplicity:	1

InstallationPart	
Stereotypes:	«voidable»
Association role:	
Value type:	Installation
Multiplicity:	
5.4.2.1.7. <i>Site</i>	
Site	
Name:	Site
Subtype of:	Site
Definition:	All land at a same or distinct geographic location under the management control of an organization covering activities, products and services. This includes all infrastructure, equipment and materials. The geometry of the site must be a point or a surface.
Description:	The site can be represented by a point or by a surface.
Stereotypes:	«featureType»
Attribute: identifier	
Name:	identifier
Value type:	Identifier
Definition:	The identifier of the site.
Multiplicity:	1
Attribute: permission	
Name:	permission -- Definition – Permissions, licensed or Certifications holds by the Site to carry out “Functions” or activities under certain conditions of “Capacity” and “Time”.
Value type:	Permission
Multiplicity:	0..*
Stereotypes:	«voidable»
Association role:	
Value type:	CadastralParcel
Multiplicity:	0..*
Stereotypes:	«voidable»
Association role: includesBuilding	
Value type:	AgriBuilding
Multiplicity:	0..*
Association role: includesPlot	
Value type:	Plot
Multiplicity:	0..*
Association role: parent	
Value type:	Site
Multiplicity:	0..*
Association role: hosts	
Value type:	AbstractInstallation
Multiplicity:	0..*
Constraint: SiteExtended	
Natural language:	The Site of the Holding shall be represented using the Site type of the AF Extended package.

Site	
OCL:	inv: self.parts->oclIsKindOf(AF Extended Model feature classes::Site)

5.4.2.1.8. Plot

Plot	
Name:	Plot
Definition:	Independent portion of the land or water surface, clearly delimited, including or matching the limits of a Site, that is Holding.
Stereotypes:	«featureType»
Attribute: geometry	
Name:	geometry
Value type:	GM_Object
Definition:	Representation of the geographical dimension/position of the plot. (polygons).
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: area	
Name:	area
Value type:	Area
Definition:	Express the size of the plot, expressed in M2.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: activity	
Name:	activity
Value type:	EconomicActivityNACEValue
Definition:	The economic activity executed on the plot, as coded accoring to EU regulation (EC) 1200/2009, annexII, chapter 2. (codes 2.01 - 2.04.07 an 2.06.03 - 2.06.04).
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: irrigationMethod	
Name:	irrigationMethod
Value type:	IrrigationMethodValue
Definition:	Method of irrigation.
Description:	Source FAO Corporate document repository Source Plan4all.
Multiplicity:	0..*
Stereotypes:	«voidable»
Attribute: irrigationArea	
Name:	irrigationArea
Value type:	Area
Definition:	The area of the plot which can be irrigated, expressed in m2.
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: drainageArea	
Name:	drainageArea
Value type:	Area
Definition:	The area of the plot which is equipped with artificial subsurface drainage system(s), expressed in m2.
Multiplicity:	0..1
Stereotypes:	«voidable»

Plot	
Attribute: validFrom	
Name:	validFrom
Value type:	Date
Definition:	First time at which this plot exist on this site in reality.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: validTo	
Name:	validTo
Value type:	Date
Definition:	The time from which this plot no longer exist on this site in the real world.
Multiplicity:	0..1
Stereotypes:	«voidable»
Association role: parent	
Value type:	Plot
Multiplicity:	0..*
Stereotypes:	«voidable»

5.4.2.1.9. *WaterManagementInstallation*

WaterManagementInstallation	
Name:	WaterManagementInstallation
Subtype of:	AbstractInstallation
Definition:	The source of water useful for all kinds of activities of the facility site.
Stereotypes:	«featureType»
Attribute: waterQuantity	
Name:	waterQuantity
Value type:	Measure
Definition:	The quantity of water given by the water source, in cubic metres per second.
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: waterSource	
Name:	waterSource
Value type:	WaterSourceValue
Definition:	Type of water source, according to Regulation (EC) No 1200/2009.
Multiplicity:	1
Stereotypes:	«voidable»

5.4.2.2. **Data types**

5.4.2.2.1. *FarmAnimalSpecies*

FarmAnimalSpecies	
Name:	farm animal
Subtype of:	FarmAnimalSpecies
Definition:	Identifies an animal or group of animals of the same specie kept on the specific site and the amount of them.
Stereotypes:	«dataType»
Attribute: quantity	
Name:	quantity
Value type:	Number
Definition:	Numerical representation of the quantity of Animals of a certain specie (counted,

FarmAnimalSpecies	
Multiplicity:	estimated, weight, ..).
Stereotypes:	«voidable»
Attribute: measureUnit	
Name:	measureUnit
Value type:	Measure
Definition:	Unit in which the quantity of animals of a certain specie is expressed.
Multiplicity:	0..1
Stereotypes:	«voidable»
Attribute: validFrom	
Name:	validFrom
Value type:	Date
Definition:	First time at which this quantity of animals of the specified species exist on this site in the real world.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: validTo	
Name:	validTo
Value type:	Date
Definition:	The time from at which this quantity of animals of the specified species no longer exist on this site in real world.
Multiplicity:	0..1
Stereotypes:	«voidable»
Association role:	
Value type:	RecognisedHealthStatus
Multiplicity:	0..*

5.4.2.2.2. *RecognisedHealthStatus*

RecognisedHealthStatus	
Name:	RecognisedHealthStatus
Definition:	The granted health status of the animal or animalgroup kept on the site, expressed as a staus indicator per species.
Stereotypes:	«dataType»
Attribute: disease	
Name:	disease
Value type:	PT_FreeText
Definition:	The name of the observed disease, pest or infection of which the animal or goup of animals is suffering.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: recognisedHealthStatus	
Name:	recognisedHealthStatus
Value type:	HealthStatusValue
Definition:	Indicator for the healthstatus, expressed per disease.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: validFrom	

RecognisedHealthStatus	
Name:	validFrom
Value type:	Date
Definition:	The date from when the healthstatus was granted.
Multiplicity:	1
Stereotypes:	«voidable»
Attribute: validTo	
Name:	validTo
Value type:	Date
Definition:	The date from when the granted healthstatus is no longer valid.
Multiplicity:	0..1
Stereotypes:	«voidable»
Constraint: SiteHasFarmAnimalSpecies	
Natural language:	
OCL:	-- Definition -- RecognisedHealthStatus only applies when about at least one FarmAnimalSpecie is provided

5.4.2.3. Code lists

5.4.2.3.1. PlotActivityValue

PlotActivityValue	
Name:	PlotActivityValue
Definition:	The economic activity executed on the plot, as coded accoring to EU regulation (EC) 1200/2009, annex II, chapter 2. (codes 2.01 - 2.04.07 and 2.06.03 - 2.06.04).
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/PlotActivityValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.3.2. HealthStatusValue

HealthStatusValue	
Name:	HealthStatusValue
Definition:	A code list with the possible status values indicating the granted health status.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/HealthStatusValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.3.3. AquacultureActivityValue

AquacultureActivityValue	
Name:	AquacultureActivityValue
Definition:	Type of aquaculture activity.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/AquacultureActivityValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.3.4. EnvironmentValue

EnvironmentValue	
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EnvironmentValue	
Name:	EnvironmentValue
Definition:	The type of the environment in which the aquaculture organisms are kept. (a water type classification).
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/EnvironmentValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.3.5. *InstallationPartValue*

InstallationPartValue	
Name:	InstallationPartValue
Definition:	Describes the type of the installation part, according to a code list.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/InstallationPartValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.3.6. *AquacultureInstallationValue*

AquacultureInstallationValue	
Name:	AquacultureInstallationValue
Definition:	Type of aquaculture installation.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/AquacultureInstallationValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.3.7. *IrrigationMethodValue*

IrrigationMethodValue	
Name:	IrrigationMethodValue
Definition:	List the different methods of irrigation, according to EU regulation EC 1200/2009, annex III, chapter VIII.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/IrrigationMethodValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.3.8. *TypeOfAgriBuildingValue*

TypeOfAgriBuildingValue	
Name:	TypeOfAgriBuildingValue
Definition:	The type of building, expressed as a code.
Description:	animal housing according to EU regulation (EC) 1200/2009 annex III chapter V, codes 5.01 - 5.03.99.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/TypeOfAgriBuildingValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.3.9. *WaterSourceValue*

WaterSourceValue	
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WaterSourceValue	
Name:	WaterSourceValue
Definition:	The type of water source, according to Regulation (EC) No 1200/2009.
Extensibility:	open
Identifier:	http://inspire.ec.europa.eu/codelist/WaterSourceValue
Values:	The allowed values for this code list comprise the values specified in <i>Annex C</i> and additional values at any level defined by data providers. <i>Annex C</i> includes recommended values that may be used by data providers.

5.4.2.4. Imported types (informative)

This section lists definitions for feature types, data types and enumerations and code lists that are defined in other application schemas. The section is purely informative and should help the reader understand the feature catalogue presented in the previous sections. For the normative documentation of these types, see the given references.

5.4.2.4.1. AbstractBuilding

AbstractBuilding (abstract)	
Package:	BuildingsBase
Reference:	INSPIRE Data specification on Buildings [DS-D2.8.III.2]
Definition:	Abstract spatial object type grouping the common semantic properties of the spatial object types Building and BuildingPart.

5.4.2.4.2. ActivityComplex

ActivityComplex	
Package:	Activity Complex
Reference:	INSPIRE Data Specifications – Base Models – Activity Complex, version 1.0 [DS-D2.10.3]
Definition:	A "single unit", both technically and economically, under the management control of the same legal entity (operator), covering activities as those listed in the Eurostat NACE classification, products and services. Activity Complex includes all infrastructure, equipment and materials. It must represent the whole area, at the same or different geographical location, managed by a "single unit".
Description:	<p>NOTE 1 This class describes the minimal set of elements necessary to describe and identify geographically a legal entity and the activities taken place on it under the context of a Environmental purposes.</p> <p>NOTE 2 "Activity Complex" could be assimilated to terms described on the legislation as Facility, Establishment, Plant, Holding, Organization ,Farm, Extractive Industries or Aquaculture Production Business among others</p> <p>EXAMPLE i.e. an Agro-business that is legally registered under the Emissions Directive.</p>

5.4.2.4.3. ActivityComplexDescription

ActivityComplexDescription	
Package:	Activity Complex
Reference:	INSPIRE Data Specifications – Base Models – Activity Complex, version 1.0 [DS-D2.10.3]
Definition:	Additional information about an activity complex, including its description, address, contact and related parties.

5.4.2.4.4. Area

Area	
Package:	Units of Measure
Reference:	Geographic information -- Conceptual schema language [ISO/TS 19103:2005]

5.4.2.4.5. CadastralParcel

CadastralParcel

Package:	CadastralParcels
Reference:	INSPIRE Data specification on Cadastral Parcels [DS-D2.8.I.6]
Definition:	Areas defined by cadastral registers or equivalent.
Description:	SOURCE [INSPIRE Directive:2007]. NOTE As much as possible, in the INSPIRE context, cadastral parcels should be forming a partition of national territory. Cadastral parcel should be considered as a single area of Earth surface (land and/or water), under homogeneous real property rights and unique ownership, real property rights and ownership being defined by national law (adapted from UN ECE 2004 and WG-CPI, 2006). By unique ownership is meant that the ownership is held by one or several joint owners for the whole parcel.

5.4.2.4.6. Capacity

Capacity

Package:	Activity Complex
Reference:	INSPIRE Data Specifications – Base Models – Activity Complex, version 1.0 [DS-D2.10.3]
Definition:	A quantification of an actual or potential ability to perform an activity, that typically does not change, does not change often, or does not change to a significant degree.
Description:	NOTE Capacity could refer depending of the thematic scope to different concepts included on the legislation as “emission limits”, “capacity incineration”, “livestock units”, “nominal capacity”, “objective estimation data”, “rate of desulphurization” or “recycling rate”.

5.4.2.4.7. ConditionOfFacilityValue

ConditionOfFacilityValue

Package:	Base Types
Reference:	INSPIRE Generic Conceptual Model, version 3.4 [DS-D2.5]
Definition:	The status of a facility with regards to its completion and use.

5.4.2.4.8. Date

Date

Package:	Date and Time
Reference:	Geographic information -- Conceptual schema language [ISO/TS 19103:2005]

5.4.2.4.9. EconomicActivityNACEValue

EconomicActivityNACEValue

Package:	Activity Complex
Reference:	INSPIRE Data Specifications – Base Models – Activity Complex, version 1.0 [DS-D2.10.3]
Definition:	Classification of economic activities according to Eurostat NACE.

5.4.2.4.10. GM_Object

GM_Object (abstract)

Package:	Geometry root
Reference:	Geographic information -- Spatial schema [ISO 19107:2003]

5.4.2.4.11. GeographicalName

GeographicalName

Package:	Geographical Names
Reference:	INSPIRE Data specification on Geographical Names [DS-D2.8.I.3]
Definition:	Proper noun applied to a real world entity.

5.4.2.4.12. *HydroObject*

HydroObject (abstract)

Package:	Hydro - base
Reference:	INSPIRE Data specification on Hydrography [DS-D2.8.I.8]
Definition:	An identity base for hydrographic (including man-made) objects in the real world.
Description:	NOTE Derived 'views' of real-world hydrographic objects are represented through specialisations in other application schemas; all representations of the same real-world object share a common geographic name or hydrographic identifier.

5.4.2.4.13. *Identifier*

Identifier

Package:	Base Types
Reference:	INSPIRE Generic Conceptual Model, version 3.4 [DS-D2.5]
Definition:	External unique object identifier published by the responsible body, which may be used by external applications to reference the spatial object.
Description:	NOTE1 External object identifiers are distinct from thematic object identifiers. NOTE 2 The voidable version identifier attribute is not part of the unique identifier of a spatial object and may be used to distinguish two versions of the same spatial object. NOTE 3 The unique identifier will not change during the life-time of a spatial object.

5.4.2.4.14. *Measure*

Measure

Package:	ProductionAndIndustrialFacilitiesExtension
Reference:	INSPIRE Data specification on Production and Industrial Facilities [DS-D2.8.III.8]
Definition:	Declared or measured quantity of any kind of physical entity.

5.4.2.4.15. *Number*

Number (abstract)

Package:	Numerics
Reference:	Geographic information -- Conceptual schema language [ISO/TS 19103:2005]

5.4.2.4.16. *PT_FreeText*

PT_FreeText

Package:	Cultural and linguistic adaptability
Reference:	Geographic information -- Metadata -- XML schema implementation [ISO/TS 19139:2007]

5.4.2.4.17. *Permission*

Permission

Package:	Activity Complex
Reference:	INSPIRE Data Specifications – Base Models – Activity Complex, version 1.0 [DS-D2.10.3]
Definition:	Official Decision (formal consent) granting authorization to operate all or part of an Activity Complex, subject to certain conditions which guarantee that the installations or parts of installations on the same site operated by the same operator comply with the requirements fixed by a competent authority. A permit may cover one or more functions and fix parameters of capacity. The term could be extended to other kind of certificates or documents of special relevance depending of the scope (e.g. ISO, EMAS, National Quality Standards, etc). The term may be extended to other kind of certificates or documents of special relevance depending of the scope (e.g. ISO, EMAS, National Quality Standards, etc).

Permission	
Description:	<p>NOTE This terms is referred in several legislative acts as “permit” , “authorization”, “development consent” or “exploration permit” among others.</p> <p>EXAMPLE 1 “...a [written] decision by which the competent authority grants permission to operate all or part of an installation” ;</p> <p>EXAMPLE 2 “.. the decision of the competent authority or authorities which entitles the developer to proceed with the project..”.</p>

5.4.3 Externally governed code lists

The externally governed code lists included in this application schema are specified in the tables in this section.

5.4.3.1. Governance and authoritative source

Code list	Governance	Authoritative Source (incl. version ¹⁵ and relevant subset, where applicable)
aquacultureSpeciesName	FAO ISCAAP	<p>FAO – Latest version available - http://www.fao.org/fishery/collection/asfis/en Subset: ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf</p>
EconomicActivityNACEvalue	Commission of the European Communities (Statistical Office/Eurostat)	<p>Eurostat – Latest version available - http://ec.europa.eu/environment/emas/pdf/general/nacecodes_en.pdf Subset : http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=DSP_GEN_DESC_VIEW_NOHDR&StrNom=NACE_REV2&StrLanguageCode=EN</p>

5.4.3.2. Availability

Code list	Availability	Format
aquacultureSpeciesName	ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf	PDF
EconomicActivityNACEvalue	http://ec.europa.eu/environment/emas/pdf/general/nacecodes_en.pdf	PDF

The values of selected external code lists are included in Annex C for information.

5.4.3.3. Rules for code list values

Code list	Identifiers	Examples
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¹⁵ If no version or publication date are specified, the “latest available version” shall be used.

aquacultureSpeciesName	As described on ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf	ftp://ftp.fao.org/FI/STAT/DATA/ASFIS_structure.pdf
EconomicActivityNACEvalue	Upper-case letters code and numeration split by dots. (e.g A1.1.9)	http://ec.europa.eu/competition/mergers/cases/index/nace_all.html