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URBAN WASTE WATER TREATMENT DIRECTIVE

TOWARD A NEW INFORMATION SYSTEM

SIIF

**(Structured Implementation and Information Framework)
IT ASPECTS**

Annex II

INSPIRE COMPLIANT DATA MODEL

Final Version
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Date: 24 October 2013
Authors: Katharina Lenz, Edith Hödl-Kreuzbauer (both UBA)
Benoît Fribourg-Blanc, Sylvain Grellet (both OIEau)
Contract Manager: Edith Hödl-Kreuzbauer (UBA)

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1 Introduction

This document is part of the UWWTD SIIF concept paper support document and demonstrates the feasibility to generate an Inspire compliant data model for the UWWTD reporting.

For the purpose of the exercise the data structure of the current reporting has been used.

The UWWTD related resources involved are:

- Art: 15(4)-reporting : UWWTD2011_DD.xls (http://forum.eionet.europa.eu/x_wise-reporting/library/treatment_directive/uwwtd_request_2011/supporting_documents/),
- Art: 15(4)-reporting : Short GIS guidance for reporting under UWWTD_21062011.pdf (http://forum.eionet.europa.eu/x_wise-reporting/library/treatment_directive/uwwtd_request_2011/supporting_documents/reporting_uwwtd),
- WaterBase: UWWTD_GIS_reference_v4.pdf (<http://www.eea.europa.eu/data-and-maps/data/waterbase-uwwtd-urban-waste-water-treatment-directive-3>).

The current version of this Inspire compliant data model does not cover all the fields of information defined in the above mentioned resources.

The goal of this version is to recreate the main information classes using Inspire concepts and validate the overall approach.

Other revision rounds (AGILE Sprint) could complete this work

In order to connect UWWTD reporting with other directives' (ex: WFD) reporting it is necessary to also create a draft data model for WFD. Main classes have been generated mainly based on the proposal that circulated during Inspire data specification exercise. This extra model is done for the sake of connecting discharge points to information gathered during WFD reporting. The purpose is not to create a full Inspire compliant WFD reporting scheme.

Inspire resources involved are:

- INSPIRE Directive: Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
- INSPIRE implementing rule on interoperability of spatial data sets and service and its amendments:
 - o COMMISSION REGULATION (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services and
 - o COMMISSION REGULATION (EU) No 102/2011 of 4 February 2011 amending Regulation (EU) No 1089/2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services (with regard to the code lists)
- Proposed legislation for the harmonisation and interoperability of 25 data themes in INSPIRE Annexes II and III presented to the INSPIRE Committee on 8 April 2013.
- INSPIRE Generic Conceptual Model V3.4rc3 : http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/D2.5_v3.4rc3.pdf
- INSPIRE Data Specification for the spatial data theme Utility and governmental services V3.0rc3 (III.6): http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_US_v3.0rc3.pdf
- INSPIRE Data Specification for the spatial data theme Area management/restriction/regulation zones and reporting units V3.0rc3: http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_AM_v3.0rc3.pdf





- INSPIRE Data Specification for the spatial data theme Production and Industrial Facilities V3.0rc3:
http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/INSPIRE_DataSpecification_PF_v3.0rc3.pdf

Data model for DIRECTIVE 2008/50/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 May 2008 on ambient air quality and cleaner air for Europe (CAFE) reportings was also used.

2 Methodology

Each UWWTD concept has been confronted to all Inspire classes in order to identify whether they could be derived from one of those.

When a corresponding class defined in Inspire was available, a specialisation between the UWWTD specific class and the Inspire based one was set up.

This specialisation leads UWWTD specific class to inherit basic pieces of information already asked for in Inspire data models (ex: unique external identifier, names, geometry, ...). This, in turn, implies that part of the information required under UWWTD reporting can be exchanged using Inspire attributes. Mapping between UWWTD fields of information and Inspire attributes are provided into notes.

When no attribute covers a specific UWWTD need, a new attribute is added to the UWWTD class.

To ease the comparison between the current data model and the proposed Inspire compliant one, a mapping between the current reporting and the proposed Inspire structure is available in chapter 7. Reusing Inspire defined classes implies checking whether those bring new constraint to the UWWTD reporting. This exercise done on this version of the model shows that the only constraint is on the Inspire Maintenance side (evolution of the 'ZoneTypeCode' Code List). Detailed analysis is also presented in this chapter.

3 Forward looking aspects

Aspects remain to be considered for other revision rounds:

- definitions needing to be found : UWWTD_UrbanWasteWaterTreatmentPlant, UWWTD_ReceivingArea, UWWTD_DischargePoint,
- the notion of report : the ReportHeader proposed for the CAFE reporting is a good candidate,
- the link to NUTS region in the relevant Inspire theme,
- adding constraint on the Spatial Reference System to be used with all geometry information,
- list of boolean attributes in the current model that are indeed code Lists with multiple occurrence,
- semantic alignment: the prefixes used to demonstrate specific content might be modelled in a different way directly in the data model – by classes, attributes, associations. This way the naming prefixes could be omitted, but the semantic is included in the data model. Ex: in the 'UwwtpAgglo' : 'auc' (standing for agglomerationuwwtpconnection).
- agglomeration could be defined as a zone type (high level) and UWWTD_Agglomeration as a specialised zone type (specialising agglomeration for the purpose of UWWTD). This way other agglomeration could be added.

4 Reading the document

Following the practice initiated by CAFE reporting, all the classes defined in the context of UWWTD reporting are prefixed with 'UWWTD_'





The following parts introduce all UWWTD related classes using class diagrams. Definition of the classes attributes and associations are available in the feature catalogue after the class diagrams description (see chapters 5.2 and **Error! Reference source not found.**).

Class diagrams are vectorised. They support high zoom levels on the document. Some will be easier to read above 100% on a computer screen.

5 UML Data Model – UWWTD

5.1 Description

5.1.1 Narrative description

The UWWTD data model is a conversion of the current UWWTD data dictionary into an Inspire compliant data structure.

In order to ease model reading it has been split into various class diagrams. Each of those is individually described in the chapters below.

5.1.2 Overall point on modelling life-cycle information

5.1.2.1. Inspire viewpoint

Inspire data specifications use different attributes to model life-cycle information depending on whether the information concerns the real world object or the spatial object in the spatial data set.

Generic Conceptual Model Recommendation 17¹ states that

- «*lifeCycleInfo, voidable*» *beginLifespanVersion* : *DateTime*. *Date and time at which this version of the spatial object was inserted or changed in the spatial data set.*
- «*lifeCycleInfo, voidable*» *endLifespanVersion* : *DateTime* [0..1]. *Date and time at which this version of the spatial object was superseded or retired in the spatial data set.*
- «*voidable*» *validFrom* : *DateTime*. *The time when the phenomenon started to exist in the real world.*
- «*voidable*» *validTo* : *DateTime*. *The time from which the phenomenon no longer exists in the real world.*

The first two of these attributes are related to the life-cycle of the spatial object in the data set, the latter two are related to the existence of the phenomenon in the real world.”

This difference is important to keep in mind when looking at the data models.

5.1.2.2. Applied to UWWTD SIIF data model

Common rules should be defined to which event (date) these attributes refer to.

For Urban Waste Water Treatment Plants:

- *validFrom* could be year or date of construction, year when it started to be operational, etc.

¹ Generic Conceptual Model Recommendation V 3.4rc3 :
http://inspire.jrc.ec.europa.eu/documents/Data_Specifications/D2.5_v3.4rc3.pdf





- validTo could be the year or date when the facility is not operational, etc.

For agglomerations:

- validFrom could be the date when it was designated to be used,
- validTo: the date when it is decided that is not used anymore and new agglomeration will exist. If this information doesn't exist in practice, there is no need to provide the values for this attribute.

5.1.3 Urban Waster Water Treatment Plant

Inspire "Utility and Government services" defines the "EnvironmentalManagementFacility" class as follows "

A physical structure designed, built or installed to serve specific functions in relation to environmental material flows, such as waste or waste water flows, or a delimitable area of land or water used to serve such functions."

This class inherits from the "ActivityComplex" defined in Inspire Generic Conceptual Model.

It is proposed that a Urban Waster Water Treatment Plant as exchanged according to the Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC) should be a subtype of this Inspire class.

Information elements relating to Urban Waster Water Treatment Plant come from those defined in the 'UWWTPs' worksheet tab of the "UWWTD2011_DD.xls" document.

No clear definition from a 91/271/EEC was identified when preparing this model. This aspect should be solved to ensure a pan-european common understanding.



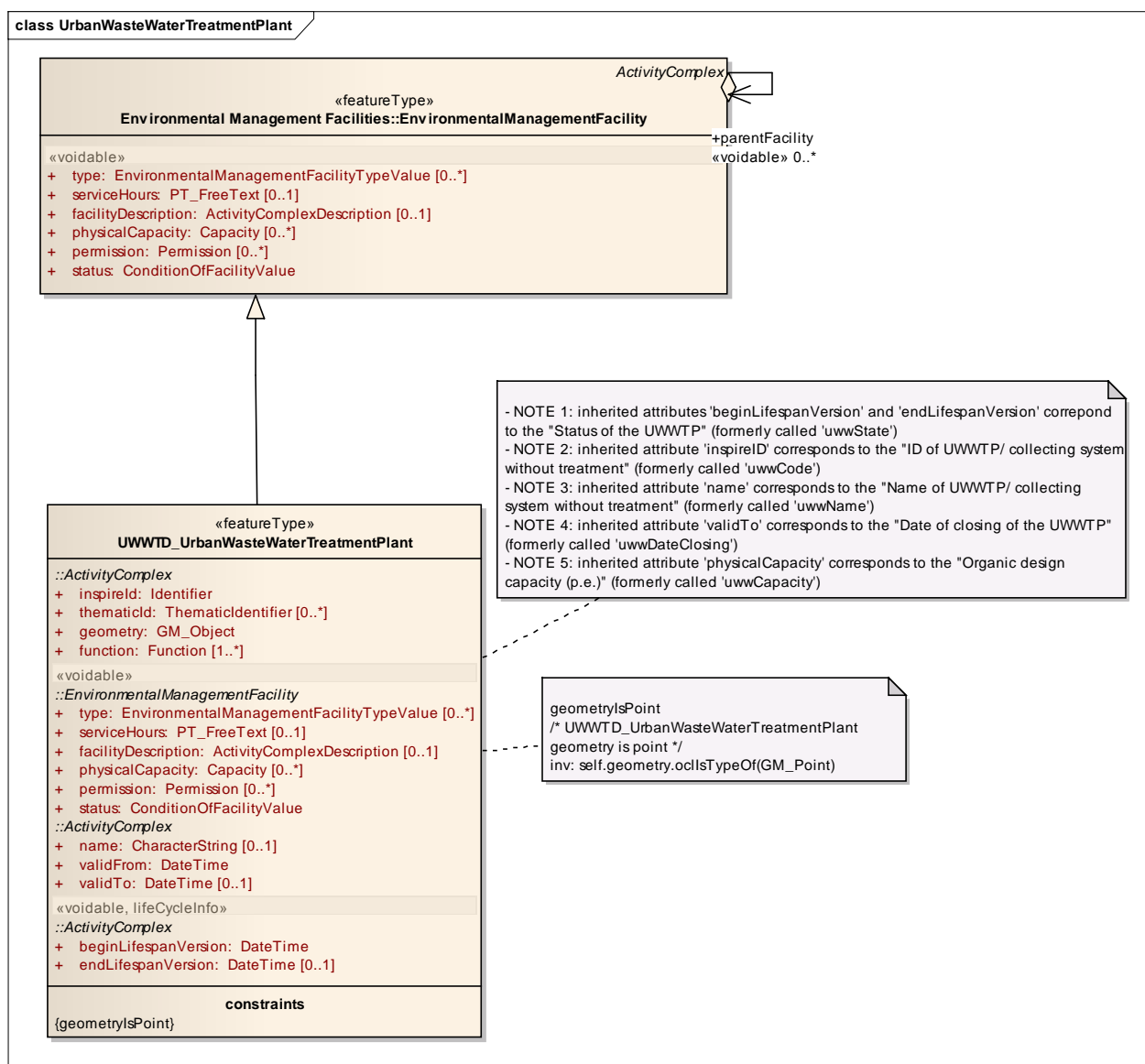


Figure 1 – class diagram: UWWTP

5.1.4 Agglomeration

Inspire "Area management/restriction/regulation zones and reporting units" theme defines the "ManagementRestrictionOrRegulationZone" class as follows: "Area managed, restricted or regulated in accordance with a legal requirement related to an environmental policy or a policy or activity that may have an impact on the environment at any level of administration (or used for reporting at international, European, national, regional and local) levels".

A UWWTD_Agglomeration is defined by the Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC) as a: "An area where the population and/or economic activities are sufficiently concentrated for urban waste water to be collected and conducted to an urban waste water treatment plant or to a final discharge point".

Proposal is to model UWWTD_Agglomeration as a subtype of ManagementRestrictionOrRegulationZone.





Information elements relating to Agglomeration come from those defined in the 'Agglomerations' worksheet tab of the "UWWTD2011_DD.xls" document.

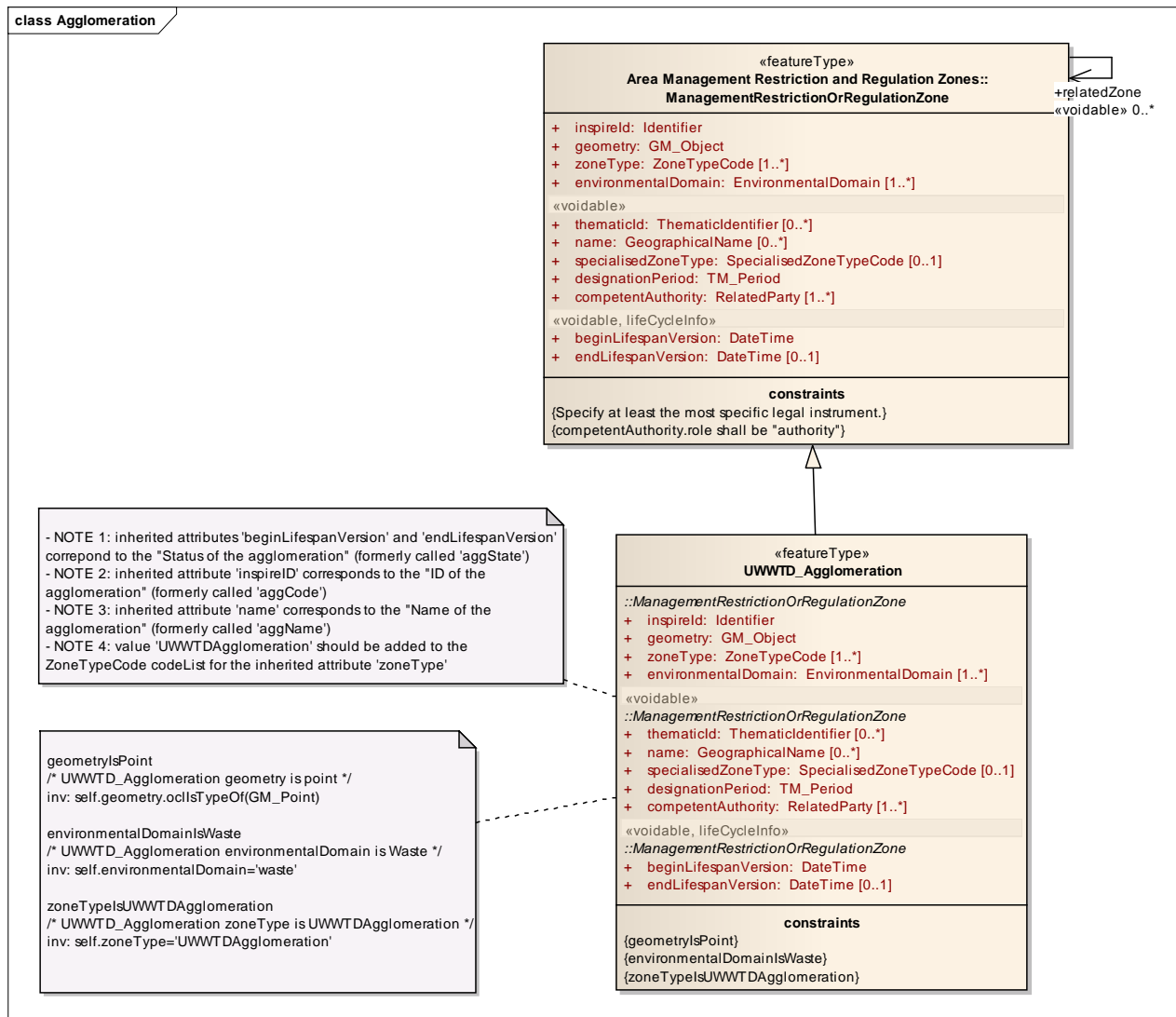
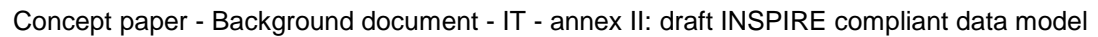


Figure 2 – class diagram: Agglomeration



Information elements relating to the association between both those concepts are defined in the 'UwwtpAgglo' worksheet tab of the "UWWTD2011_DD.xls" document.

```

classDiagram
    class Agglomeration_UWWTP {
        + aucPercEnteringUWWTP: Real
        + aucMethodPercEnteringUWWTP: MethodPercEnteringUWWTPValue
        + aucPercC2T: Real
    }
    class EnvironmentalManagementFacility {
        «featureType»
        UWWTD_UrbanWasteWaterTreatmentPlant
        constraints {
            geometryIsPoint
        }
    }
    class ManagementRestrictionOrRegulationZone {
        «featureType»
        UWWTD_Agglomeration
        constraints {
            geometryIsPoint
            environmentalDomainsIsWaste
            zoneTypeIsUWWTD_Agglomeration
        }
    }
    class MethodPercEnteringUWWTPValue {
        «codeList»
        tags
    }
    Agglomeration_UWWTP -- EnvironmentalManagementFacility : +connectedTo
    Agglomeration_UWWTP -- ManagementRestrictionOrRegulationZone : +collects
    EnvironmentalManagementFacility "0..*" -- "1..*" ManagementRestrictionOrRegulationZone
    MethodPercEnteringUWWTPValue -.- Note["- C\n- E"]
    
```

Figure 3 – class diagram: UWWTP_Agglomeration



5.1.6 Discharge Point

Inspire “Utility and Government services” theme defines the “UtilityNode” class. This class enables to define “A point spatial object which is used for connectivity” in a utility network.

UtilityNode definition is: “A point spatial object which is used for connectivity”. Most important the UtilityNode inherits from the “UtilityNetworkElement” class: “Abstract base type representing an utility network element in an utility network. Every element in an utility network provides some function that is of interest in the utility network.”

A “UtilityNode” can per se be connected to an “ActivityComplex” by the ‘utilityFacilityReference’ attribute. An “EnvironmentalManagementFacility” being a subtype of “ActivityComplex”, a “UtilityNode” can be attached to a “EnvironmentalManagementFacility” via the ‘utilityFacilityReference’.

It is proposed to model a “DischargePoint” as exchanged according to the Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC) as a subtype of “UtilityNode”.

No clear definition from a 91/271/EEC was identified when preparing this model. This aspect should be solved to ensure a pan-european common understanding.



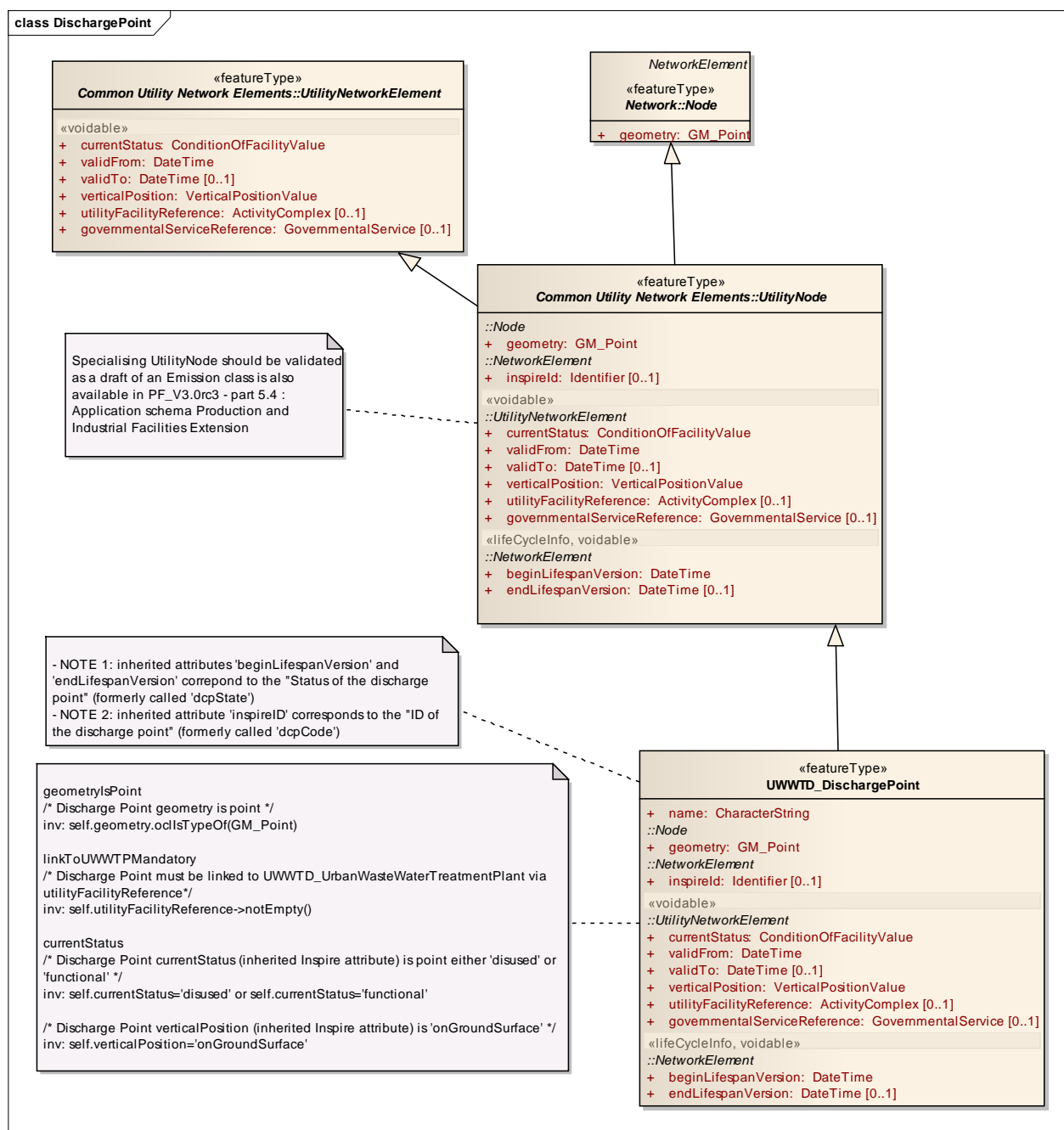


Figure 4 – class diagram: DischargePoint





5.1.7 Discharge Point connexion

Discharge Points are connected to various elements. Some come from the WFD reporting
There is no direct association to the WFD_RiverBasinDistrict as this information can be derived from the association (composition) between WFD_RiverBasinDistrict and WFD_SubUnit (see 6.1.3 6.1.3- WFD River Basin District – Sub Units part)

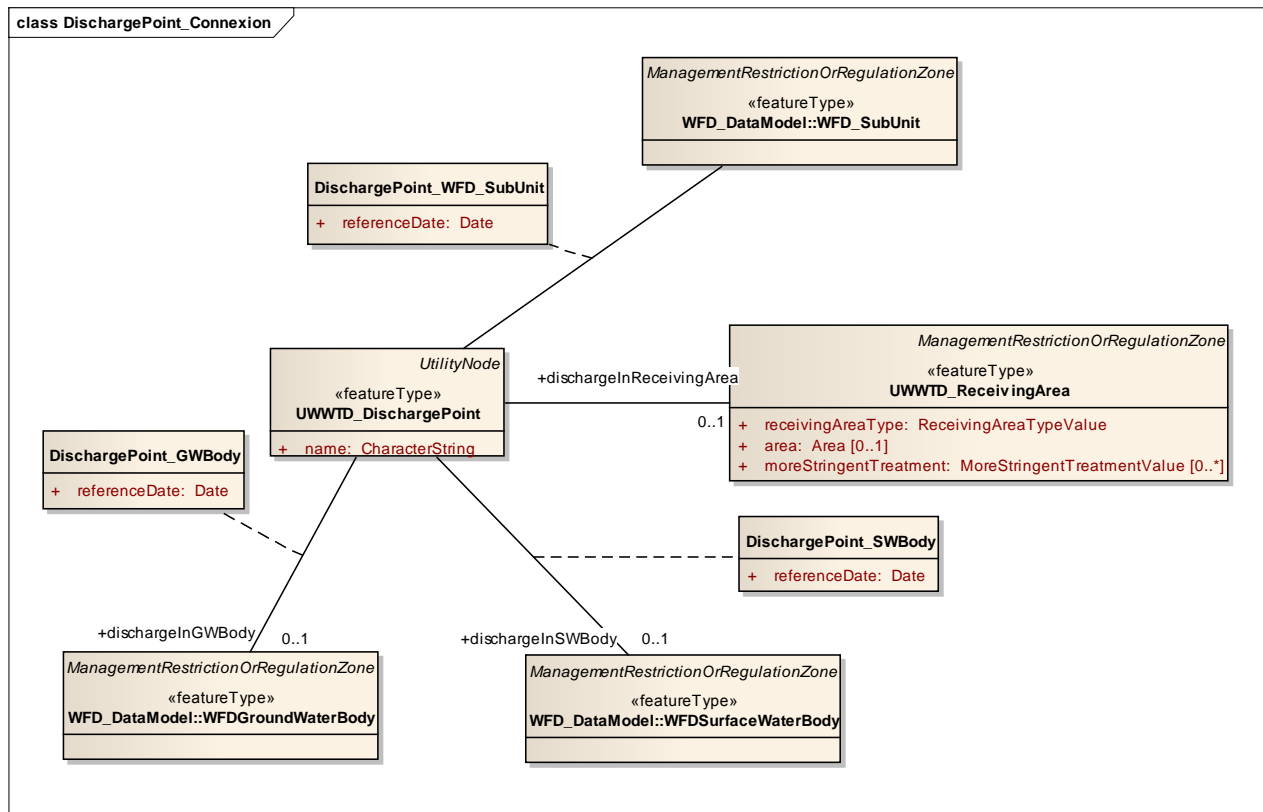


Figure 5 – class diagram: DischargePoint_Connexion



5.1.8 Receiving Area

As for “Agglomeration”, “Receiving Area” is a subtype of the “ManagementRestrictionOrRegulationZone” class defined by the Inspire “Area management/restriction/regulation zones and reporting units” theme.

As suggested by the attribute ‘rcaType’ (Type of the area) and one of its values: ‘SA’, a Sensitive Area is a subtype of Receiving Area.

Two solutions have been identified to model this aspect:

- Having the UWWTD_ReceivingArea being a subtype of ManagementRestrictionOrRegulationZone and the UWWTD_SensitiveArea a subtype of the UWWTD_ReceivingArea,
- Using the relatedZone modelled at the ManagementRestrictionOrRegulationZone level. But this solution can cause misunderstandings with the domain need to model ‘Related Sensitive area’ (exchanged via the ‘rcaSensitiveArea’ attribute).

The first solution is the one presented in the class diagram below. One aspect though; both definitions for ReceivingArea and SensitiveArea are missing in 91/271/EEC. Inspire AM reuses 91/271/EEC Annex II as a proxy for a definition of a Sensitive Area but this annex does not mention catchments that are in practice exchanged for the reporting.

Various Sensitive Area types are defined the ‘Short GIS guidance for reporting under UWWTD_21062011.pdf’ document prepared by ‘ETC ICM’ p9 / 17.

A specific attribute has been added to exchange that information.

Conceptually speaking all those Sensitive Area have an identifier, a name and a geometry. Those attributes are directly inherited from the ‘ManagementRestrictionOrRegulationZone’ via the ‘ReceivingArea’ (inheritance chain).

Thus the proposed model does not apply what is in the ‘UWWTD_GIS_reference_v4.pdf’ available from WaterBase. In this document the name attribute changes from a class to another : MemberStateSARiverCode (for Receiving areas (sensitive rivers)), MemberStateSACatchmentCode (for Receiving areas (catchments of sensitive areas)), ...



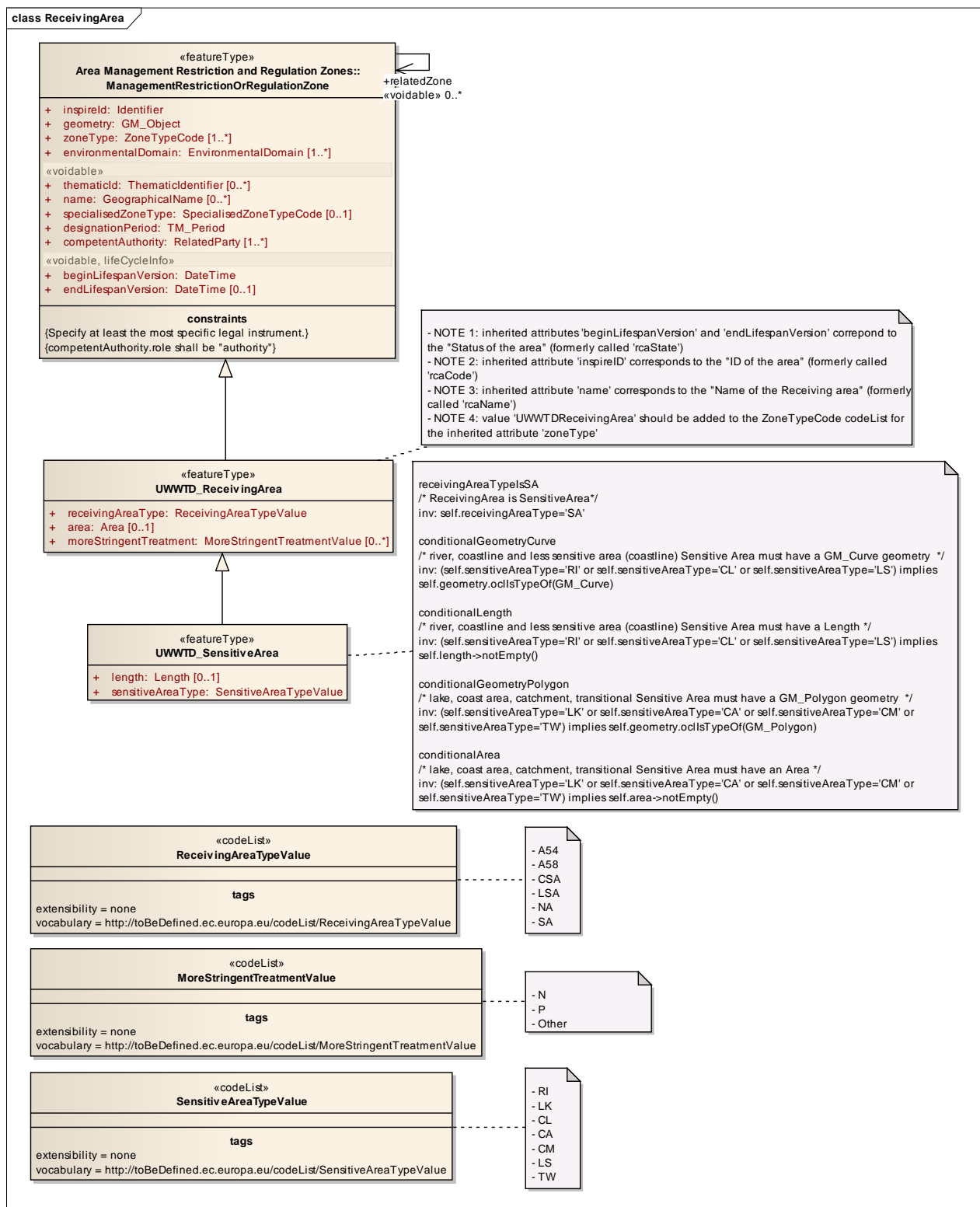


Figure 6 – class diagram: ReceivingArea and sensitiveArea





5.2 Feature catalogue

Type	Package	Stereotypes
MethodPercEnteringUWWTPValue	UWWTD_DataModel	«codeList»
MoreStringentTreatmentValue	UWWTD_DataModel	«codeList»
ReceivingAreaTypeValue	UWWTD_DataModel	«codeList»
SensitiveAreaTypeValue	UWWTD_DataModel	«codeList»
UWWTD_Agglomeration	UWWTD_DataModel	«featureType»
UWWTD_DischargePoint	UWWTD_DataModel	«featureType»
UWWTD_ReceivingArea	UWWTD_DataModel	«featureType»
UWWTD_SensitiveArea	UWWTD_DataModel	«featureType»
UWWTD_UrbanWasteWaterTreatmentPlant	UWWTD_DataModel	«featureType»

Tableau 1 - Types defined in the feature catalogue

5.2.1 Spatial object types

5.2.1.1. UWWTD_Agglomeration

UWWTD_Agglomeration	
Subtype of:	ManagementRestrictionOrRegulationZone
Definition:	An area where the population and/or economic activities are sufficiently concentrated for urban waste water to be collected and conducted to an urban waste water treatment plant or to a final discharge point.
Description:	SOURCE [Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC) Article 2]. NOTE 1: Inherited attributes 'beginLifespanVersion' and 'endLifespanVersion' corresponds to the "Status of the agglomeration" (formerly called 'aggState') NOTE 2: inherited attribute 'inspireID' corresponds to the "ID of the agglomeration" (formerly called 'aggCode') NOTE 3: inherited attribute 'name' corresponds to the "Name of the agglomeration" (formerly called 'aggName') NOTE 4: value 'UWWTD_Agglomeration' should be added to the ZoneTypeCode codeList for the inherited attribute 'zoneType'
Status:	Proposed
Stereotypes:	«featureType»
Constraint: geometryIsPoint	
Natural guage:	lan- UWWTD_Agglomeration geometry is point
OCL:	inv: self.geometry.ocIsTypeOf(GM_Point)
Constraint: environmentalDomainIsWaste	
Natural guage:	lan- UWWTD_Agglomeration environmentalDomain is Waste
OCL:	inv: self.environmentalDomain='waste'
Constraint: zoneTypeIsUWWTD_Agglomeration	
Natural guage:	lan- UWWTD_Agglomeration zoneType is UWWTD_Agglomeration
OCL:	inv: self.zoneType='UWWTD_Agglomeration'





5.2.1.2. UWWTD_DischargePoint

UWWTD_DischargePoint	
Subtype of:	UtilityNode
Definition:	Find a definition according to 91/271/EEC
Description:	SOURCE [Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC)]. NOTE 1: Inherited attributes 'beginLifespanVersion' and 'endLifespanVersion' corresponds to the "Status of the discharge point" (formerly called 'dcpState') NOTE 2: inherited attribute 'inspireID' corresponds to the "ID of the discharge point" (formerly called 'dcpCode')
Status:	Proposed
Stereotypes:	«featureType»
Attribute: name	
Value type:	CharacterString
Definition:	
Description:	
Multiplicity:	1
Constraint: geometryIsPoint	
Natural	lan- Discharge Point geometry is point
guage:	
OCL:	inv: self.geometry.ocllsTypeOf(GM_Point)
Constraint: linkToUWWTPMandatory	
Natural	lan- Discharge Point must be linked to UWWTD_UrbanWasteWaterTreatmentPlant
guage:	via utilityFacilityReference
OCL:	inv: self.utilityFacilityReference->notEmpty()
Constraint: currentStatus	
Natural	lan- Discharge Point currentStatus (inherited Inspire attribute) is point either 'disused'
guage:	or 'functional'
OCL:	inv: self.currentStatus='disused' or self.currentStatus='functional'
Constraint: verticalPositionIsOnGroundSurface	
Natural	lan- Discharge Point verticalPosition (inherited Inspire attribute) is 'onGroundSurface'
guage:	
OCL:	inv: self.verticalPosition='onGroundSurface'

5.2.1.3. UWWTD_ReceivingArea

UWWTD_ReceivingArea	
Subtype of:	ManagementRestrictionOrRegulationZone
Definition:	Find a definition according to 91/271/EEC
Description:	SOURCE [Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC)]. NOTE 1: Inherited attributes 'beginLifespanVersion' and 'endLifespanVersion' corresponds to the "Status of the area" (formerly called 'rcaState') NOTE 2: inherited attribute 'inspireID' corresponds to the "ID of the area" (formerly called 'rcaCode') NOTE 3: inherited attribute 'name' corresponds to the "Name of the Receiving area" (formerly called 'rcaName') NOTE 4: value 'UWWTDReceivingArea' should be added to the ZoneTypeCode codeList for the inherited attribute 'zoneType'





UWWTD_ReceivingArea	
Status:	Proposed
Stereotypes:	«featureType»
Attribute: area	
Value type:	Area
Definition:	
Description:	
Multiplicity:	0..1
Attribute: moreStringentTreatment	
Value type:	MoreStringentTreatmentValue
Definition:	
Description:	
Multiplicity:	0..*
Attribute: receivingAreaType	
Value type:	ReceivingAreaTypeValue
Definition:	Type of receiving area
Description:	
Multiplicity:	1

5.2.1.4. UWWTD_SensitiveArea

UWWTD_SensitiveArea	
Subtype of:	UWWTD_ReceivingArea
Definition:	Find a definition according to 91/271/EEC
Description:	SOURCE [Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC)].
Status:	Proposed
Stereotypes:	«featureType»
Attribute: length	
Value type:	Length
Definition:	
Description:	
Multiplicity:	0..1
Attribute: sensitiveAreaType	
Value type:	SensitiveAreaTypeValue
Multiplicity:	1
Constraint: receivingAreaTypeIsSA	
Natural	lan-ReceivingArea is SensitiveArea
guage:	
OCL:	inv: self.receivingAreaType='SA'
Constraint: conditionalGeometryCurve	
Natural	lan- river, coastline and less sensitive area (coastline) Sensitive Area must have a
guage:	GM_Curve geometry
OCL:	inv: (self.sensitiveAreaType='RI' or self.sensitiveAreaType='CL' or self.sensitiveAreaType='LS') implies self.geometry.ocllsTypeOf(GM_Curve)
Constraint: conditionalLength	
Natural	lan- river, coastline and less sensitive area (coastline) Sensitive Area must have a
guage:	Length





UWWTD_SensitiveArea	
OCL:	inv: (self.sensitiveAreaType='RI' or self.sensitiveAreaType='CL' or self.sensitiveAreaType='LS') implies self.length->notEmpty()
Constraint: conditionalGeometryPolygon	
Natural guage:	lan- lake, coast area, catchment, transitional Sensitive Area must have a GM_Polygon geometry
OCL:	inv: (self.sensitiveAreaType='LK' or self.sensitiveAreaType='CA' or self.sensitiveAreaType='CM' or self.sensitiveAreaType='TW') implies self.geometry.ocllsTypeOf(GM_Polygon)
Constraint: conditionalArea	
Natural guage:	lan- lake, coast area, catchment, transitional Sensitive Area must have an Area
OCL:	inv: (self.sensitiveAreaType='LK' or self.sensitiveAreaType='CA' or self.sensitiveAreaType='CM' or self.sensitiveAreaType='TW') implies self.area->notEmpty()

5.2.1.5. UWWTD_UrbanWasteWaterTreatmentPlant

UWWTD_UrbanWasteWaterTreatmentPlant	
Subtype of:	EnvironmentalManagementFacility
Definition:	Find a definition according to 91/271/EEC
Description:	SOURCE [Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC)]. NOTE 1: Inherited attributes 'beginLifespanVersion' and 'endLifespanVersion' correponds to the "Status of the UWWTP" (formerly called 'uwwState') NOTE 2: inherited attribute 'inspireID' corresponds to the "ID of UWWTP/ collecting system without treatment" (formerly called 'uwwCode') NOTE 3: inherited attribute 'name' corresponds to the "Name of UWWTP/ collecting system without treatment" (formerly called 'uwwName') NOTE 4: inherited attribute 'validTo' corresponds to the "Date of closing of the UWWTP" (formerly called 'uwwDateClosing') NOTE 5: inherited attribute 'physicalCapacity' corresponds to the "Organic design capacity (p.e.)" (formerly called 'uwwCapacity')
Status:	Proposed
Stereotypes:	«featureType»
Constraint: geometryIsPoint	
Natural guage:	lan- UWWTD_UrbanWasteWaterTreatmentPlant geometry is point
OCL:	inv: self.geometry.ocllsTypeOf(GM_Point)

5.2.2 Code lists

5.2.2.1. MethodPercEnteringUWWTPValue

MethodPercEnteringUWWTPValue	
Definition:	Categories for the Method used to obtain the % value of the attribute 'aucPercEnteringUWWTP'
Status:	Proposed
Stereotypes:	«codeList»
Governance:	May be extended by Member States.





5.2.2.2. MoreStringentTreatmentValue

MoreStringentTreatmentValue

Definition:	Categories for parameters subject to More Stringent Treatment.
Status:	Proposed
Stereotypes:	«codeList»
Governance:	May be extended by Member States.

5.2.2.3. ReceivingAreaTypeValue

ReceivingAreaTypeValue

Definition:	Categories for the receiving area type
Status:	Proposed
Stereotypes:	«codeList»
Governance:	May be extended by Member States.

5.2.2.4. SensitiveAreaTypeValue

SensitiveAreaTypeValue

Status:	Proposed
Stereotypes:	«codeList»
Governance:	May be extended by Member States.

5.2.3 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.

5.2.3.1. Area

Area

Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Derived::Units of Measure [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
----------	---

5.2.3.2. CharacterString

CharacterString

Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Primitive::Text [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
----------	---

5.2.3.3. Date

Date

Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Primitive::Date and Time [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
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5.2.3.4. EnvironmentalManagementFacility

EnvironmentalManagementFacility	
Package:	INSPIRE Consolidated UML Model::Themes::Annex III::US::Environmental Management Facilities [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	A physical structure designed, built or installed to serve specific functions in relation to environmental material flows, such as waste or waste water flows, or a delimitable area of land or water used to serve such functions.
Description:	EXAMPLE In the context of waste management the "specific function" may be a waste recovery or disposal operation. Typically, waste management sites and waste management installations (such as incineration plants, landfills or storages) get distinguished. Multiple waste management installations may be found at the same site. Waste management installations can be a part of other waste management installations. The functions considered for the Environmental Facilities Theme fall mainly under the NACE rev. 2 category E "Water supply; Sewerage; Waste management and remediation activities".

5.2.3.5. Length

Length	
Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Derived::Units of Measure [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]

5.2.3.6. ManagementRestrictionOrRegulationZone

ManagementRestrictionOrRegulationZone	
Package:	INSPIRE Consolidated UML Model::Themes::Annex III::AM::Area Management Restriction and Regulation Zones [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	Area managed, restricted or regulated in accordance with a legal requirement related to an environmental policy or a policy or activity that may have an impact on the environment at any level of administration (or used for reporting at international, European, national, regional and local) levels.

5.2.3.7. Real

Real	
Package:	INSPIRE Consolidated UML Model::Foundation Schemas::ISO TC211::ISO 19103:2005 Schema Language::Basic Types::Primitive::Numerics [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]

5.2.3.8. UtilityNode

UtilityNode (abstract)	
Package:	INSPIRE Consolidated UML Model::Themes::Annex III::US::Utility Networks Profile::Common Utility Network Elements [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	A point spatial object which is used for connectivity.
Description:	Nodes are found at both ends of the UtilityLink.





6 UML Data Model - WFD

6.1 Description

6.1.1 Narrative description

This draft WFD data model was done so that the UWWTD DischargePoint class can connect to WFD related classes.

In order to ease model reading it has been split into various class diagrams. Each of those is individually described in the chapters below.

6.1.2 WFD water bodies

As proposed during Inspire data specification process, WFD water bodies are sub-types of the “ManagementRestrictionOrRegulationZone” class defined by Inspire “Area management/restriction/regulation zones and reporting units” theme².

It is assumed that the inspireId will be used to exchange the EU code/identifier of those WFD water bodies.

² See Data Specification on Area management/restriction/regulation zones and reporting units - Draft Technical Guidelines V3.0rc3 - Annex E (informative) Application schema Water Framework Directive



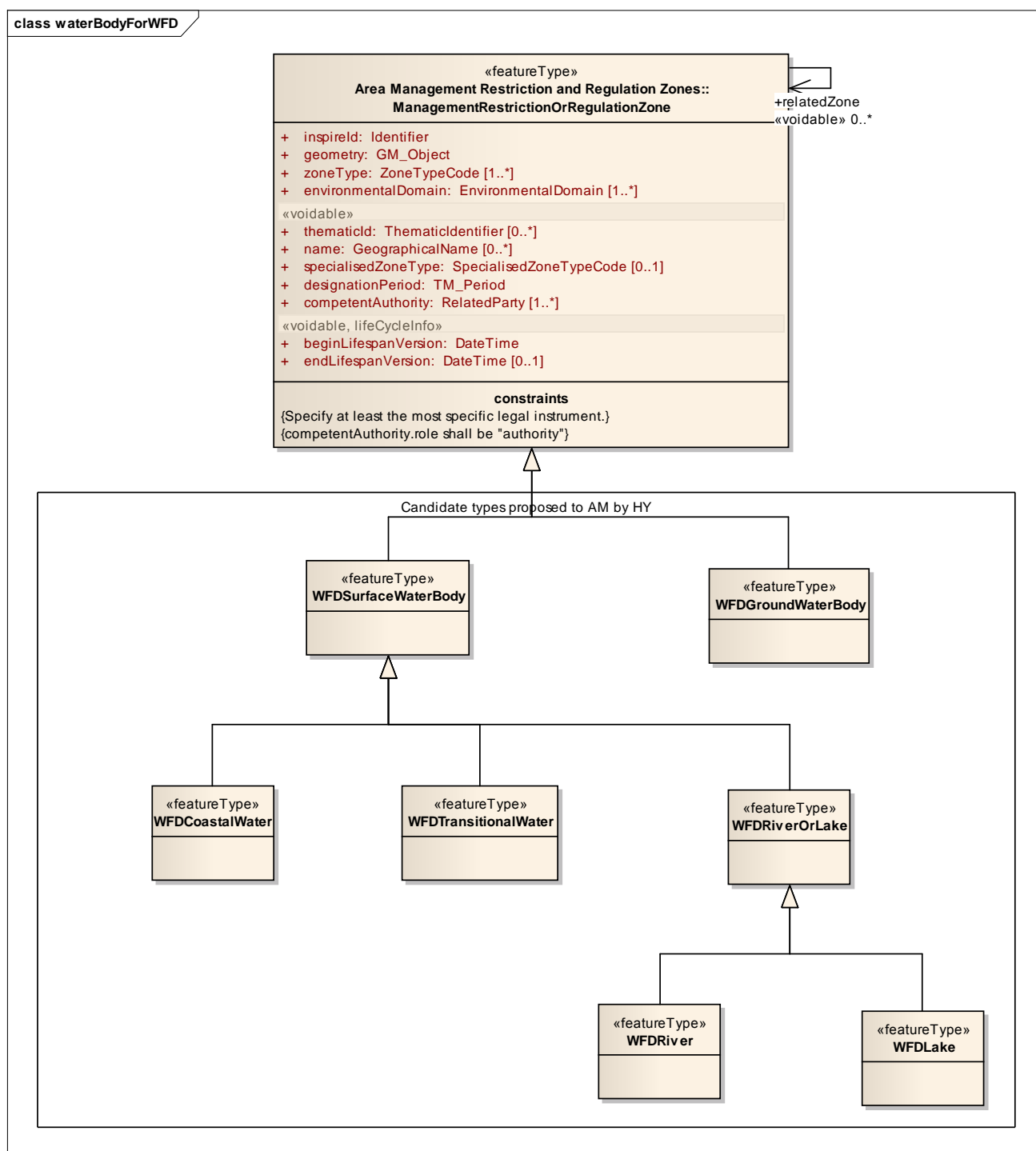


Figure 7 – class diagram: waterBodyForWFD





6.1.3 WFD River Basin District – Sub Units

The content below does not correspond exactly to what is proposed in annex of the Inspire “Area management/restriction/regulation zones and reporting units” data specification document (V.3.0rc3 - annex D3).

It has been decided to create specific classes to ease modelling and reading of the associations to those concepts from the DischargePoint one. This is no duplication of information as both classes are subtypes of “ManagementRestrictionOrRegulationZone”. It provides a more complete modelling of the link between both classes.

Concerning that link, a composition is used as in WFD reporting xsds³, the cardinality of the association between those classes is 1..* with the following : “At least one Sub-unit must be declared for each RBD”.

It is assumed that the inspireId will be used to exchange the EU code/identifier of the WFD_SubUnit and WFD_RiverBasinDistrict.

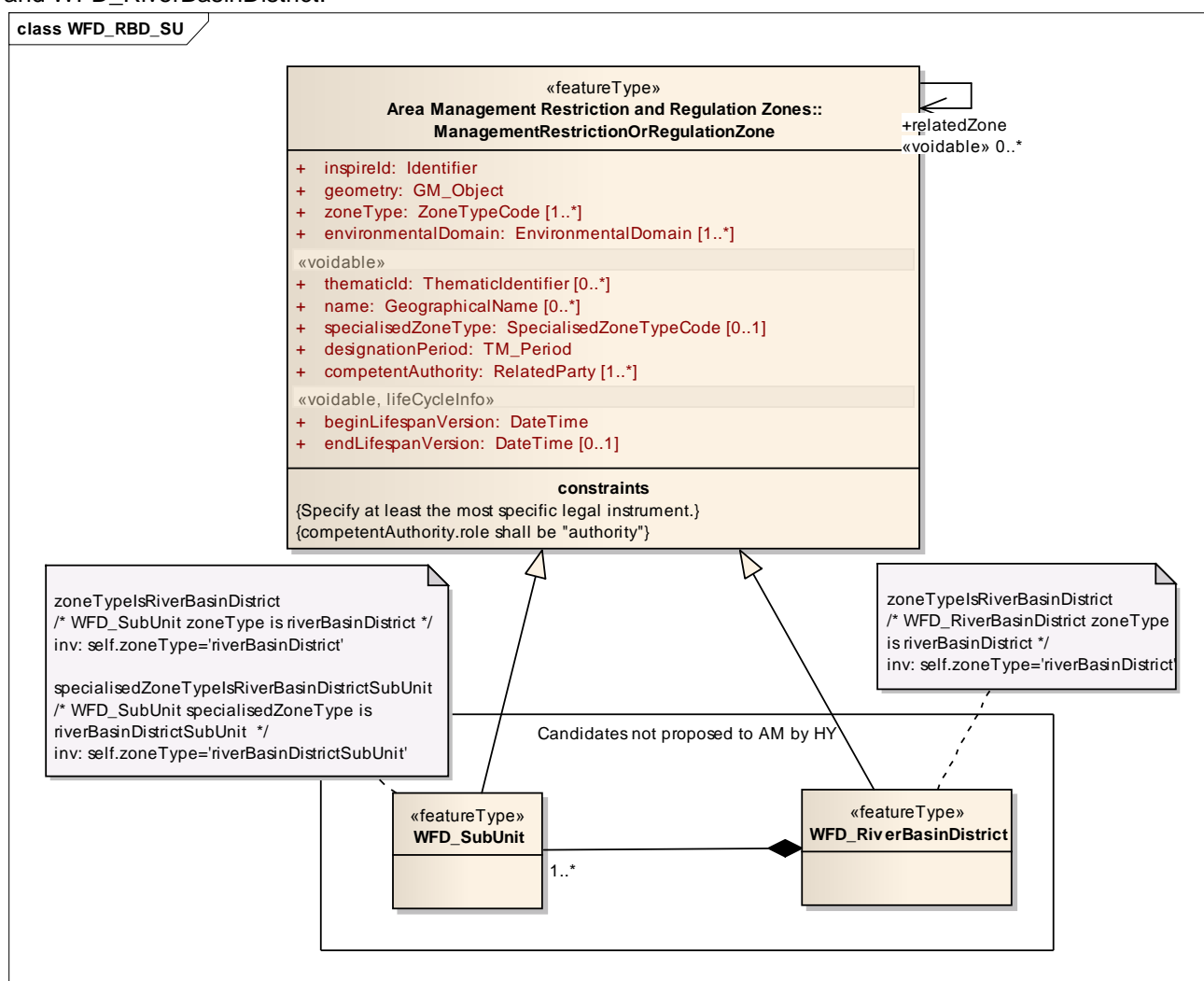


Figure 8 – class diagram: WFD_RBD_SU

³ RBDSUCA_3p0.xsd





6.2 Feature catalogue

Type	Package	Stereotypes	Section
WFDCoastalWater	WFD_DataModel	«featureType»	5.2.2.1.1
WFDGroundWaterBody	WFD_DataModel	«featureType»	5.2.2.1.2
WFDLake	WFD_DataModel	«featureType»	5.2.2.1.3
WFDRiver	WFD_DataModel	«featureType»	5.2.2.1.4
WFDRiverOrLake	WFD_DataModel	«featureType»	5.2.2.1.5
WFDSurfaceWaterBody	WFD_DataModel	«featureType»	5.2.2.1.6
WFDTransitionalWater	WFD_DataModel	«featureType»	5.2.2.1.7
WFD_RiverBasinDistrict	WFD_DataModel	«featureType»	5.2.2.1.8
WFD_SubUnit	WFD_DataModel	«featureType»	5.2.2.1.9

Tableau 2 - Types defined in the feature catalogue

6.2.1 Spatial object types

6.2.1.1. WFDCoastalWater

WFDCoastalWater	
Subtype of:	WFDSurfaceWaterBody
Definition:	'Coastal water' means surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters.
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»

6.2.1.2. WFDGroundWaterBody

WFDGroundWaterBody	
Subtype of:	ManagementRestrictionOrRegulationZone
Definition:	'Groundwater' means all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. 'Body of groundwater' means a distinct volume of groundwater within an aquifer or aquifers.
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»

6.2.1.3. WFDLake

WFDLake





WFDLake	
Subtype of:	WFDRiverOrLake
Definition:	'Lake' means a body of standing inland surface water.
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»

6.2.1.4. WFDRiver

WFDRiver	
Subtype of:	WFDRiverOrLake
Definition:	'River' means a body of inland water flowing for the most part on the surface of the land but which may flow underground for part of its course.
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»

6.2.1.5. WFDRiverOrLake

WFDRiverOrLake	
Subtype of:	WFDSurfaceWaterBody
Definition:	Find a definition according to DIRECTIVE 2000/60/EC.
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»

6.2.1.6. WFDSurfaceWaterBody

WFDSurfaceWaterBody	
Subtype of:	ManagementRestrictionOrRegulationZone
Definition:	'Surface water' means inland waters, except groundwater; transitional waters and coastal waters, except in respect of chemical status for which it shall also include territorial waters. 'Body of surface water' means a discrete and significant element of surface water such as a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, a transitional water or a stretch of coastal water.
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»

6.2.1.7. WFDTransitionalWater

WFDTransitionalWater	
Subtype of:	WFDSurfaceWaterBody
Definition:	'Transitional waters' are bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows.





WFDTransitionalWater	
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»

6.2.1.8. WFD_RiverBasinDistrict

WFD_RiverBasinDistrict	
Subtype of:	ManagementRestrictionOrRegulationZone
Definition:	'River basin district' means the area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified under Article 3(1) as the main unit for management of river basins.
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»
Constraint: zoneTypeIsRiverBasinDistrict	
Natural guage:	lan- WFD_RiverBasinDistrict zoneType is riverBasinDistrict
OCL:	inv: self.zoneType='riverBasinDistrict'

6.2.1.9. WFD_SubUnit

WFD_SubUnit	
Subtype of:	ManagementRestrictionOrRegulationZone
Definition:	Find a definition according to DIRECTIVE 2000/60/EC.
Description:	SOURCE [DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. Article 2].
Status:	Proposed
Stereotypes:	«featureType»
Association role :	
Value type:	WFD_RiverBasinDistrict
Multiplicity:	
Constraint: zoneTypeIsRiverBasinDistrict	
Natural guage:	lan- WFD_SubUnit zoneType is riverBasinDistrict
OCL:	inv: self.zoneType='riverBasinDistrict'
Constraint: specialisedZoneTypeIsRiverBasinDistrictSubUnit	
Natural guage:	lan- WFD_SubUnit specialisedZoneType is riverBasinDistrictSubUnit
OCL:	inv: self.zoneType='riverBasinDistrictSubUnit'

6.2.2 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.

6.2.2.1. ManagementRestrictionOrRegulationZone

ManagementRestrictionOrRegulationZone	
Package:	INSPIRE Consolidated UML Model::Themes::Annex III::AM::Area Management Restriction and Regulation Zones [Include reference to the document that includes the package, e.g. INSPIRE data specification, ISO standard or the GCM]
Definition:	Area managed, restricted or regulated in accordance with a legal requirement related to an environmental policy or a policy or activity that may have an impact on the environment at any level of administration (or used for reporting at international, European, national, regional and local) levels.

7 Mapping between the current reporting and the proposed Inspire structure

7.1 Narrative description

This part provides an overview where the information exchanged in the current UWWTD reporting is located in the Inspire compliant data model.

The mapping is only provided for the class and attributes for which the model proposes an alternative.

The entry point is the tab structure of the current Data Dictionnary 'UWWTD2011_DD.xls'

As described in chapter "1 Introduction": The current version of this Inspire compliant data model does not cover all the fields of information defined in the UWWTD related resources involved. The goal of this version is to recreate the main information classes using Inspire concepts and validate the overall approach.

Extra attributes added by reusing Inspire defined classes are commented in order to identify whether they create new constraint on the information to be reported.

It has to be precised that attributes carrying the stereotype "voidable" (marked <<voidable>> in the datamodel) allow not to fill the information in. The value of "void" should then be used with the following VoidReasonValue qualification⁴:

- *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.*
- *Unpopulated: The characteristic is not part of the dataset maintained by the data provider. However, the characteristic may exist in the real world.*
- *Withheld: The characteristic may exist, but is confidential and not divulged by the data.*

Thus it is considered <<voidable>> attributes do not add extra-constraints to the UWWTD reporting exercise. If it is deemed useful for pan-European data exchanges, a common fixed value to be used can however be defined for the entire reporting flows.

⁴ See INSPIRE Generic Conceptual Model V3.4rc3 – Requirement 18.





7.2 UWWTD_UrbanWasteWaterTreatmentPlant

Class in the new model	Attribute in the new model	Current attribute Fieldname	Label/Explanation
Association between UWWTD_UrbanWasteWaterTreatmentPlant and UWWTD_Agglomeration		aggID	ID of agglomeration
UWWTD_UrbanWasteWaterTreatmentPlant	beginLifespanVersion endLifespanVersion	uwwState	Status of the UWWTP
	inspireId	uwwCode	ID of UWWTP/collecting system without treatment
	name	uwwName	Name of UWWTP/collecting system without treatment
	validTo	uwwDateClosing	Date of closing of the UWWTP
	geometry	uwwLatitude uwwLongitude	Latitude Longitude
	physicalCapacity	uwwCapacity	Organic design capacity (p.e.)
	thematicId	extra Inspire attribute	ID of UWWTP/collecting system without treatment already exchanged in inspireId. no need to be filled.
	function		Mandatory attribute: NACE code(s) to be used can be fixe reportingsheet level.
	type		voidable
	serviceHours		
	facilityDescription		
	permission		
	status		

7.3 UWWTD_Agglomeration

Class in the new model	Attribute in the new model	Current attribute Fieldname	Label/Explanation
UWWTD_Agglomeration	beginLifespanVersion endLifespanVersion	aggState	Status of the agglomeration
	inspireId	aggCode	ID of the agglomeration
	name	aggName	Name of the agglomeration
	geometry	uwwLatitude uwwLongitude	Latitude Longitude
	zoneType	extra Inspire attribute	Value 'UWWTD_Agglomeration' should be added to the





			'ZoneTypeCode codeList'. Could be managed at Inspire Maintenance level
	environmentalDomain		Fixed value:'waste'
	thematicId		voidable
	specialisedZoneType:		
	designationPeriod:		
	competentAuthority:		

7.4 Agglomeration_UWWTP

Class in the new model	Attribute in the new model	Current attribute Fieldname	Label/Explanation
Association to UWWTD_UrbanWasteWaterTreatmentPlant provides the inspireID		aucUwwCode	ID of the UWWTP
Association to UWWTD_UrbanWasteWaterTreatmentPlant provides the name		aucUwwName	Name of the UWWTP
Association to UWWTD_Agglomeration provides the inspireID		aucAggCode	Selected agglomeration (ID of the agglomeration connected to this UWWTP)
Association to UWWTD_Agglomeration provides the name		aucAggName	Selected agglomeration (Name of the agglomeration connected to this UWWTP)
Agglomeration_UWWTP	aucPercEnteringUWWTP	aucPercEnteringUWWTP	Insert % of load of agglomeration collected in collecting system and entering that treatment plant
	aucMethodPercEnteringUWWTP	aucMethodPercEnteringUWWTP	Method used to obtain the % value
	aucPercC2T	aucPercC2T	Rate of generated load of agglomeration transported to this UWWTP by trucks (%)





7.5 UWWTD_DischargePoint

Class in the new model	Attribute in the new model	Current attribute name	Field-name	Label/Explanation
UWWTD_DischargePoint	beginLifespanVersion endLifespanVersion	dcpState		Status of the discharge point
	utilityFacilityReference	uwwID		ID of UWWTP (or collecting system without treatment)
	inspireId	dcpCode		ID of the discharge point
	name	dcpName		Name of the discharge point
	geometry	dcpLatitude dcpLongitude		Latitude Longitude
	currentStatus	extra Inspire attribute		voidable
	validFrom / validTo			
	verticalPosition			
	governmental-ServiceReference			
Association to UWWTD_Agglomeration provides the inspireId and receivingAreaType		dcpTypeOfReceivingArea		Select degree of sensitivity of receiving area
		rcalID		ID of receiving area
Association to WFD_SurfaceWaterBody provides the inspireId		dcpWaterbodyID		ID of WFD water-body
Association to WFD_GroundWaterBody provides the inspireId		dcpGroundWater		ID of WFD groundwater body
Association to WFD_SubUnit provides the inspireId		dcpWFDSubUnit		ID of WFD sub-unit
Can be deducted from the association between WFD_SubUnit and WFD_RiverBasinDistrict		dcpWFDRBD		ID of WFD river basin district
DischargePoint_SWBody	referenceDate	dcpWaterBodyReference-Date		Reference date of the WFD water-body
DischargePoint_GWBody	referenceDate	dcpGroundWaterReference-Date		Reference date of the WFD ground-water body
DischargePoint_WFD_SubUnit	referenceDate	dcpWFDSubUnitReference-Date		Reference date of the WFD sub-unit
Can be deducted from the association between WFD_SubUnit and WFD_RiverBasinDistrict		dcpWFDRBDReferenceDate		Reference date of the WFD river basin district





7.6 UWWTD_ReceivingArea

Class in the new model	Attribute in the new model	Current attribute Fieldname	Label/Explanation
ReceivingArea	beginLifespanVersion endLifespanVersion	rcaState	Status of the area
	inspireId	rcaCode	ID of the area
	name	rcaName	Name of the Receiving area
	receivingAreaType	rcaType	Type of the area
	relatedZone	rcaSensitiveArea	Related Sensitive area
	moreStringentTreatment	- rcaParameterN - rcaParameterP - rcaParameterOther	Parameters subject to More Stringent Treatment: - N - P - Other
	geometry	From the shapefiles	
	zoneType	extra Inspire attribute	Value 'UWWTD_ReceivingArea' should be added to the 'ZoneTypeCode codeList'. Could be managed at Inspire Maintenance level
	environmentalDomain		Fixed value: 'waste'
	thematicId		voidable
	specialisedZoneType:		
	designationPeriod:		
	competentAuthority:		

