

## Conferenza AMFM 2015

# *Esempi di armonizzazione di dati di reti tecnologiche*

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# Sommario

- INSPIRE US data theme: esperienza nel progetto GeoSmartCity
- Esempio di trasformazione di dati verso il modello dati GSC
- Un possibile mapping verso INSPIRE US per la classe “Infrastruttura di alloggiamento reti”

## Estensione di INSPIRE Utilities and Government Services (US) - “Utility networks” sub-model

Pilot coinvolti:

[P06] Comarca of Pamplona (ES), [P07] Genova (IT), [P08] Oeiras (PT), [P09] Flanders Region (BE), [P10] South Moravian Region (CZ), [P11] Ruda Śląska (PL)

Focus sui casi d’uso Italiani:

GSC data modelling supporta l’allineamento delle Specifiche Nazionali rispetto ai requisiti della Direttiva INSPIRE in materia di Utility networks.

Focus sui casi d’uso della Regione delle Fiandre:

GSC data model estende INSPIRE US data model a partire dalle informazioni necessarie per la gestione delle reti fognarie delle Fiandre (Aquafin’s AQS2.0 data model)

## GeoSmartCity - Underground Data Model

Il data model **GeoSmartCity Underground** estende il core **Utility Networks Profile** del data model INSPIRE per Utilities and Government Services (US).

Le informazioni sono contenute in:

- Un “**New Common Types**” application schema, che contiene tutti I nuovi (cioè inesistenti feature/data type in INSPIRE US core model) common elements condivisi tra i diversi utility network type
- Sei **network-specific extended** application schema:
  - Electricity network
  - Oil, Gas & Chemicals network
  - Sewer network
  - Telecommunications network
  - Thermal network
  - Water network
- Una **theme-specific extension** del Base Model “Activity Complex” application schema
  - Activity Complex

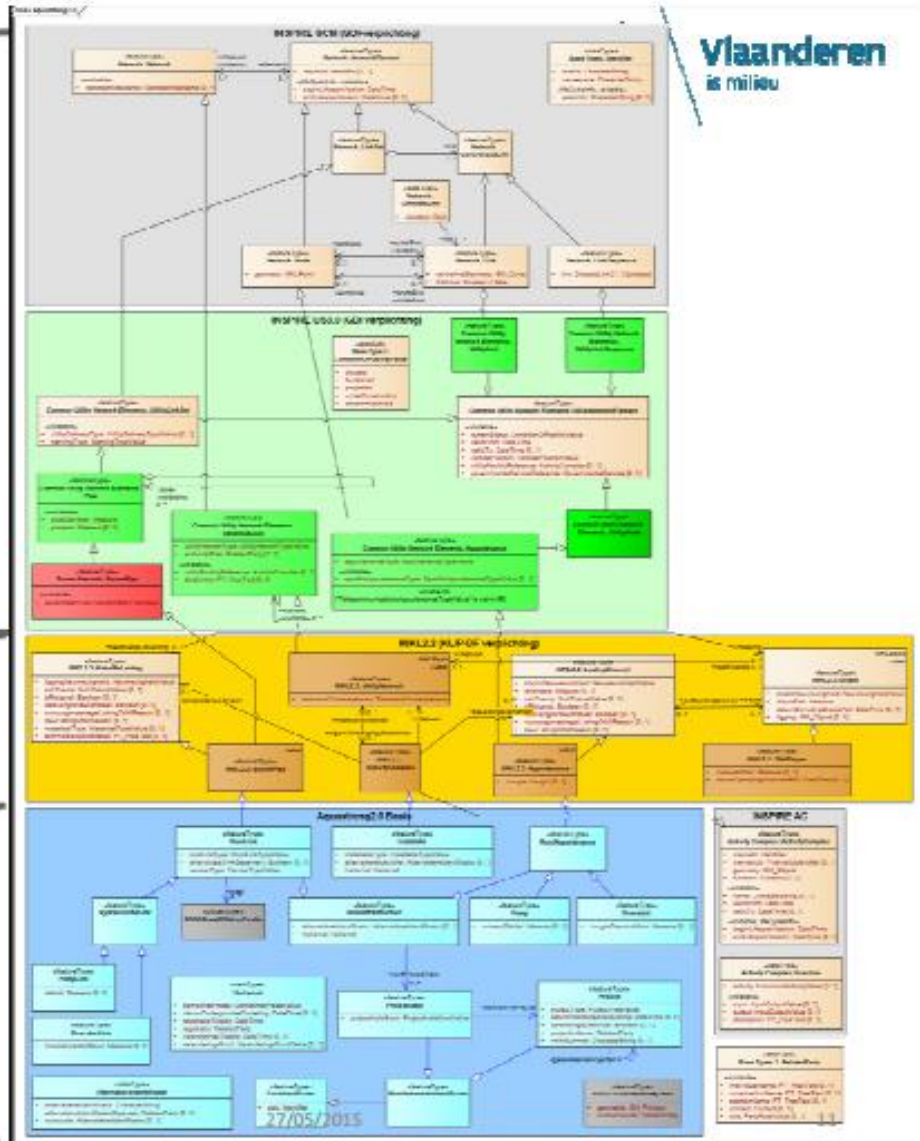
# Flanders Pilot National Specification Data Model

## The data model

INSPIRE

IMKL

AQUASTRENG2.0



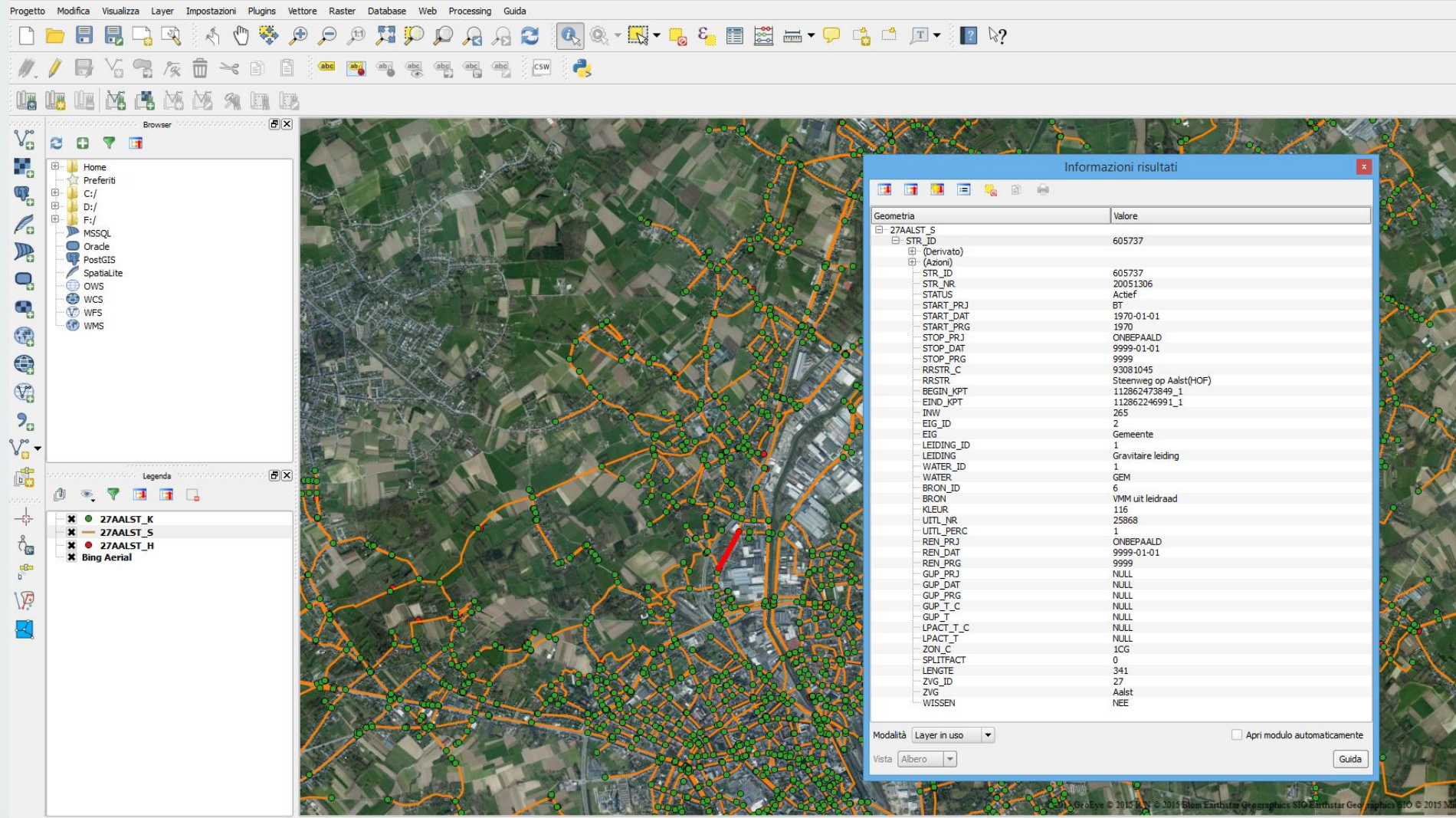
# Mapping Table example: GSC Sewer pipe extended

Type	Documentation	Attribute / Association role	Attribute documentation	Values / Enumerations	Multiplicity	Voidable / Non-voidable	P07	P08	P09	P10	P06	P11		
SewerPipeExtended Supertypes: Pipe UtilityLinkSet UtilityNetworkElement LinkSet NetworkElement	A utility link or link sequence for the conveyance of sewage.	<b>beginLifespanVersion</b>	Date and time at which this version of the spatial object was	DateTime	1	voidable	Underground.LinearClass.L_CREATION					POCZATEKWEKWIJEKTIKU		
		<b>inspireId</b>	External object identifier of the spatial object.NOTE An external	Identifier	0..1		Underground.LinearClass.COD_CLASSE + Underground.LinearClass.FILE_ID						PRZESTRZENNAZW + LOKALNYID KONECWEKWIJEKTIKU	
		<b>endLifespanVersion</b>	Date and time at which this version of the spatial object was	DateTime	0..1	voidable								
		<b>inNetwork</b>	The networks in which a network element is a member.	Network	1..*	voidable								
		<b>link</b>	The set of links and link sequences that constitute the link	Generalised Link	1..*		link to Utility link feature type - See types spreadsheet for Utility link feature type							
		<b>currentStatus</b>	The status of an utility object with regards to its completion and use.	ConditionOf FacilityValue	1	voidable	Underground.LinearClass.L_STA							ISTNIENIE + EKSPLOATACJA STARTROBIEKT
		<b>validFrom</b>	The time when the utility network element started to exist in the real	DateTime	1	voidable	Underground.LinearClass.L_BORN							KONECROBIEKT
		<b>validTo</b>	The time from which the utility network element no longer exists	DateTime	0..1	voidable								KONECROBIEKT
		<b>verticalPosition</b>	Vertical position of the utility object relative to ground.	VerticalPositionValue	1	voidable	Underground.LinearClass.L_POS_SUP							PRZEBIEG
		<b>utilityFacilityReference</b>	Reference to a facility activity complex that is linked (related) to	ActivityComplex	0..1									
		<b>governmentalServiceReference</b>	Reference to a governmental service object that is linked	GovernmentalService	0..1									
		<b>utilityDeliveryType</b>	Kind of utility delivery network e.g. transport, distribution.	UtilityDeliveryTypeValue	0..1					sewerAppurtenance.utilityDeliveryType				FUNKCJA
		<b>warningType</b>	Kind of overground visible warning mechanism used to	WarningTypeValue	1	voidable								
		<b>pipeDiameter</b>	Pipe outer diameter.For convex shaped objects (e.g. a circle) the	Measure	1	voidable	Underground.LinearClass.L_DIA							SREDNICA +
		<b>pressure</b>	The maximum allowable operating pressure at which a product is	Measure	0..1	voidable								
		<b>cables</b>	A pipe may contain one or more cables.	Cable	0..*	voidable								
		<b>pipes</b>	A pipe may contain one or more pipes.	Pipe	0..*	voidable								
		<b>sewerWaterType</b>	Type of sewer water.	codelist SewerWater	1	voidable	SewerNetwork.L_F_TIFFOG			sewerAppurtenance.sewerWaterType				TypKanal
		<b>sewerPipeType</b>	Type of the segment	codelist SewerPipeT	1	voidable	SewerNetwork.L_F_TY			sewerLink.sewerLinkType				ROZJAZDPRZEWODU
		<b>sewerPipeDepthMeasure</b>	Measure of the Depth of the pipe	DepthMeasure	1..*	voidable	See DepthMeasure data type in the types spreadsheet							
		<b>sewerPipeRoadPosition</b>	position relative to the road	Codelist roadPosition	0..1		Underground.LinearClass.L_POS							
		<b>sewerPipeStartNodeTerrainQuote</b>	Terrain quote of initial node	Measure	0..1		SewerNetwork.QUO_INI							
		<b>sewerPipeStartNodeFlowingQuote</b>	Flowing quote of the initial node	Measure	0..1		SewerNetwork.SCO_INI							
		<b>sewerPipeEndNodeTerrainQuote</b>	Terrain quote of final node	Measure	0..1		SewerNetwork.QUO_FIN							
		<b>sewerPipeEndNodeFlowingQuote</b>	Flowing quote of the final node	Measure	0..1		SewerNetwork.SCO_FIN							
		<b>sewerPipeDimensions</b>	length,height,width of the pipe	PipeDimensions	0..1		see pipeDimension type - in the types spreadsheet							
		<b>sewerPipeSourceOfData</b>	info about how data was obtained	sourceOfData	0..1		see sourceOfData type - in the types spreadsheet							
		<b>sewerPipeMaterialType</b>		Codelist PipeMaterial	0..1		Underground.LinearClass.L_MAT							
		<b>sewerPipeOrigin</b>	info about pipe origin	InfrastructureOrigin	0..1	voidable	see InfrastructureOrigin data type - in the types spreadsheet							
		<b>sewerPipeAlternativeId</b>		Identifier	0..*					sewerPipe.alternativeId				
<b>sewerPipeAlternativeAuthorityRole</b>		RelatedParty	0..*					sewerPipe.alternativeOwner						
<b>sewerPipeMunicipality</b>	The municipality where the sewer pipe is located	CharacterString	0..1					sewerPipe.municipality						
<b>sewerPipeStreet</b>	the street where the sewer pipe is located	CharacterString	0..1					sewerPipe.street						
<b>sewerPipeTransportType</b>	The way the transport is carried out (pressure, gravitationary, ...)	Code List	0..1					sewerPipe.transportType						
<b>sewerPipeProjectAction</b>		ProjectAction	1..*	voidable	link to ProjectAction feature type - See GSC-New feature spreadsheet									
<b>sewerPipeRecoveryPresent</b>	Presence of recovery of the pipe	boolean true/false	0..1		SewerNetwork.L_F_RISAN									
<b>sewerPipeRecoveryType</b>	Type of recovery of the pipe	recoveryTypeValue	0..1		SewerNetwork.L_F_T_RIS									
<b>sewerPipeDeliveryLocationType</b>	*sewage treatment plant *soil * surface water body *other	Codelist SewerNetw			SewerNetwork.L_F_REC									
<b>sewerPipeDigsCode</b>		UndergroundWorks	0..1		link to UndergroundWorks feature type - See GSC-New feature spreadsheet									

# Source data model

QGIS 2.8.2-Wien

Progetto Modifica Visualizza Layer Impostazioni Plugins Vettore Raster Database Web Processing Guida



Browser

- Home
- Preferiti
- C:/
- D:/
- F:/
- MSSQL
- Oracle
- PostGIS
- Spatialite
- OWS
- WCS
- WFS
- WMS

Legenda

- 27AALST\_K
- 27AALST\_S
- 27AALST\_H
- Bing Aerial

Informazioni risultati

Geometria	Valore
27AALST_S	
STR_ID	605737
(Derivato)	
(Azioni)	
STR_ID	605737
STR_NR	20051306
STATUS	Actief
START_PRJ	BT
START_DAT	1970-01-01
START_PRG	1970
STOP_PRJ	ONBEPAALED
STOP_DAT	9999-01-01
STOP_PRG	9999
RRSTR_C	93081045
RRSTR	Steenweg op Aalst(HOF)
BEGIN_KPT	112862473849_1
EIND_KPT	11286246991_1
INW	265
EIG_ID	2
EIG	Gemeente
LEIDING_ID	1
LEIDING	Gravitare leiding
WATER_ID	1
WATER	GEM
BRON_ID	6
BRON	WMM uit leidraad
KLEUR	116
UTTL_NR	25868
UTTL_PERC	1
REN_PRJ	ONBEPAALED
REN_DAT	9999-01-01
REN_PRG	9999
GUP_PRJ	NULL
GUP_DAT	NULL
GUP_PRG	NULL
GUP_T_C	NULL
GUP_T	NULL
LPACT_T_C	NULL
LPACT_T	NULL
ZON_C	1CG
SPLITFACT	0
LENGTE	341
ZVG_ID	27
ZVG	Aalst
WISSEN	NEE

Modalità Layer in uso

Vista Albero

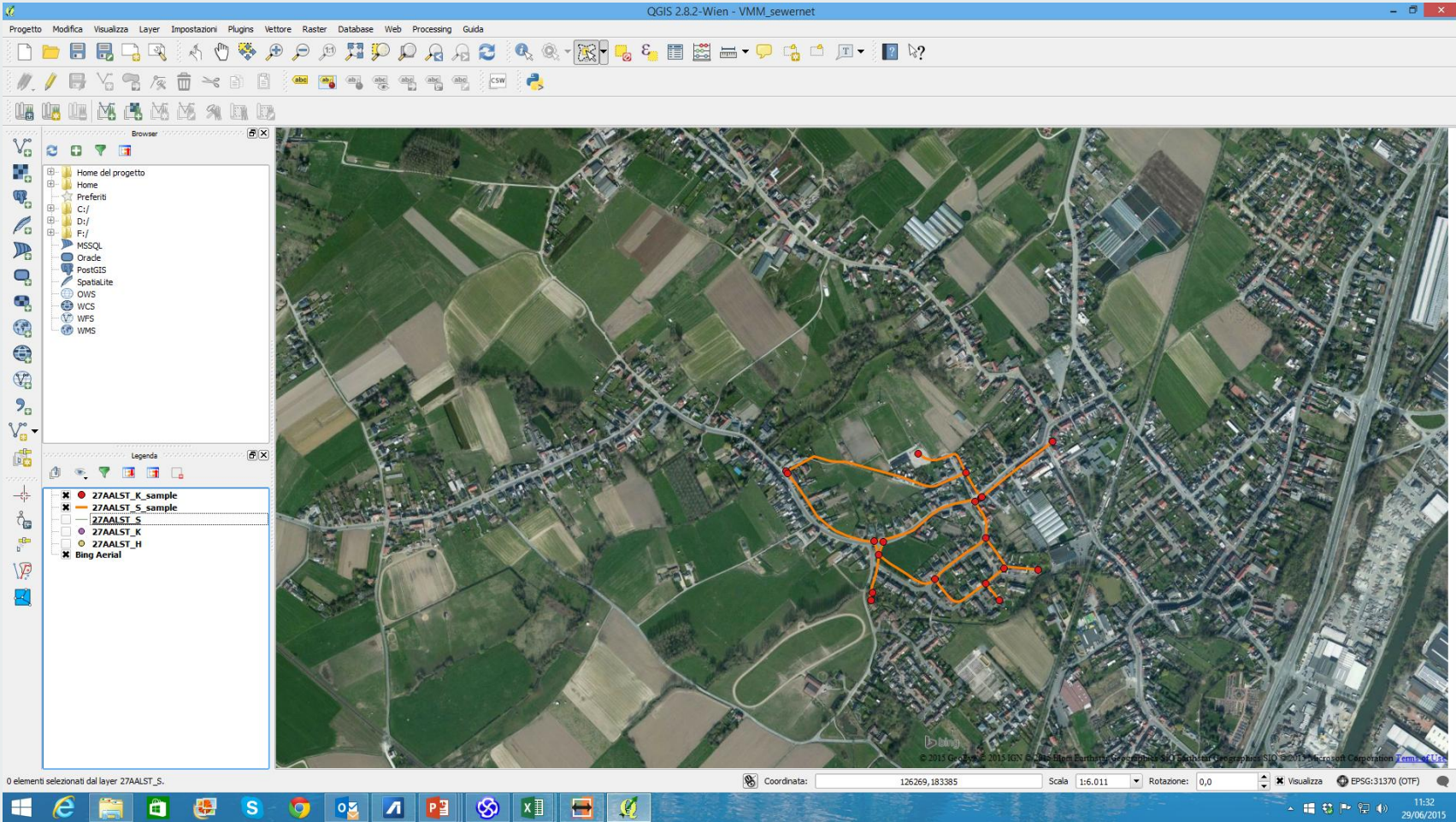
Apri modulo automaticamente

Guida

Non ci sono geometrie in questa posizione.

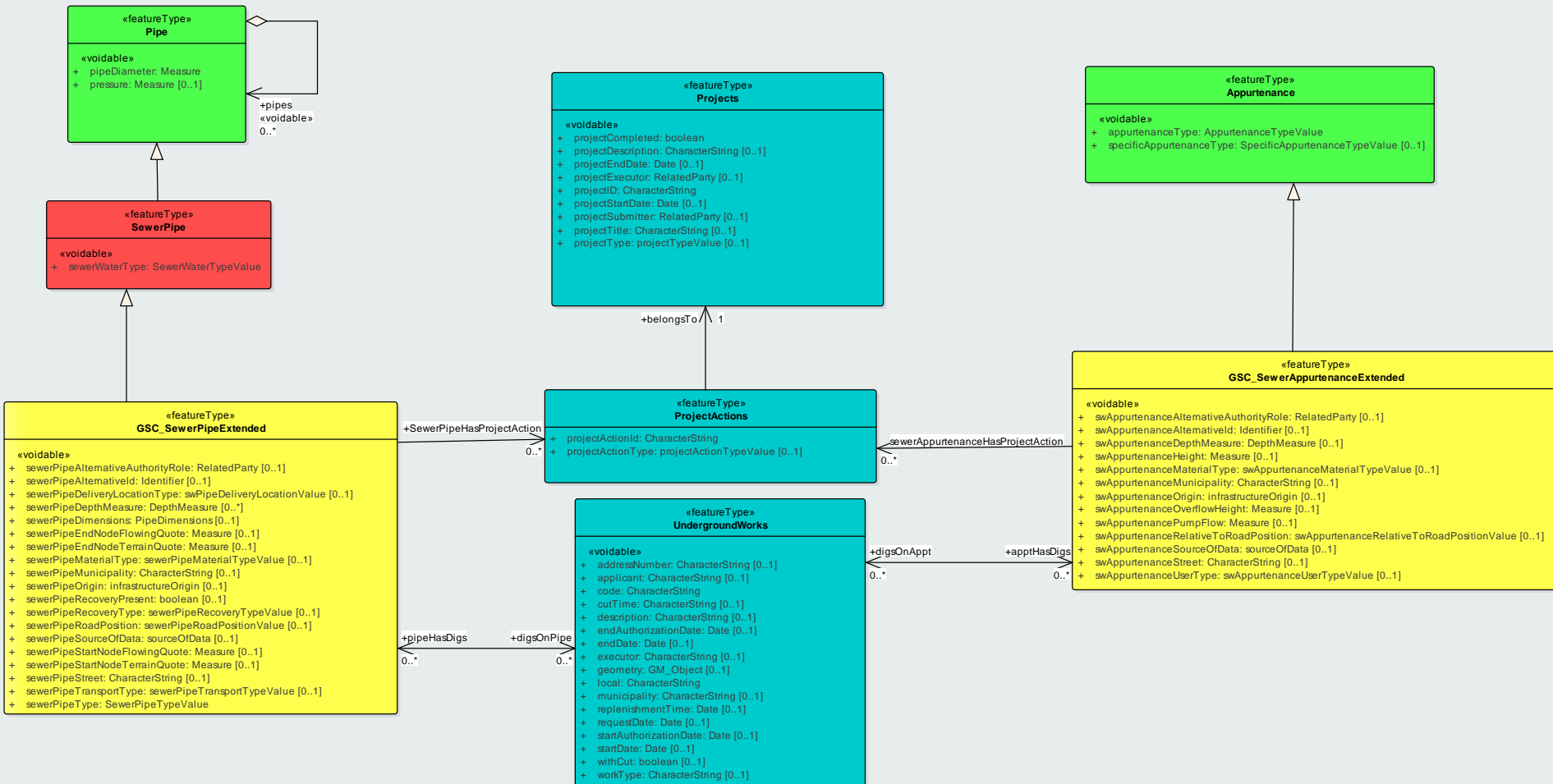
Coordinata: 448900,6613130 Scala: 1:40,844 Rotazione: 0,0 Visualizza

# Source data





## Target data model: GeoSmartCity – Sewer Network Extended



# HALE transformation of source data

File Transformation Edit Window Help

Alignment 27AALST\_S x 16 Retype GSC\_SewerPipeExtended x 16

Source Data 27AALST\_S

Transformed Data GSC\_SewerPipeExtended

Properties link.href

General Namespace: http://www.w3.org/1999/xlink  
 Constraints Local name: href  
 ParentType Location: Open Location  
 PropertyType http://www.w3.org/1999/xlink.xsd#0:0

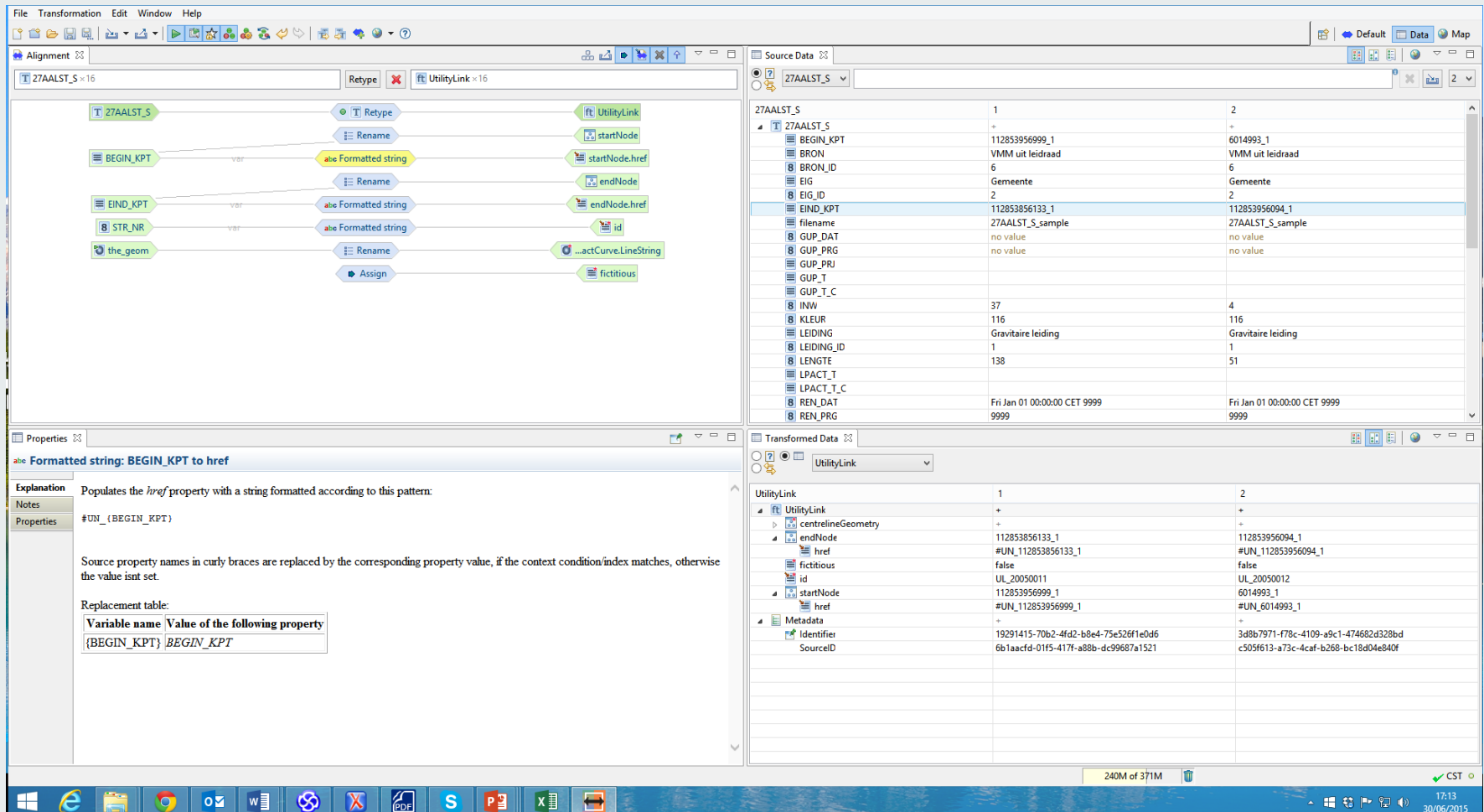
27AALST\_S

27AALST_S	1	2
27AALST_S	1	2
BEGIN_KPT	112853956999_1	6014993_1
BRON	VMM uit leidraad	VMM uit leidraad
BRON_ID	6	6
EIG	Gemeente	Gemeente
EIG_ID	2	2
EIND_KPT	112853956133_1	112853956094_1
filename	27AALST_S_sample	27AALST_S_sample
GUP_DAT	no value	no value
GUP_PRG	no value	no value
GUP_PRJ		
GUP_T		
GUP_T_C		
INW	37	4
KLEUR	116	116
LEIDING	Gravitaire leiding	Gravitaire leiding
LEIDING_ID	1	1
LENGTE	138	51
LPACT_T		
LPACT_T_C		
REN_DAT	Fri Jan 01 00:00:00 CET 9999	Fri Jan 01 00:00:00 CET 9999
REN_PRG	9999	9999

GSC\_SewerPipeExtended

GSC_SewerPipeExtended	1	2
GSC_SewerPipeExtended	1	2
currentStatus	Actief	Actief
href	http://inspire.ec.europa.eu/codelist/ConditionOffFacilityVSP_20050011	http://inspire.ec.europa.eu/codelist/ConditionOffFacilityVSP_20050012
inspireId	+	+
Identifier	+	+
localId	SP_20050011	SP_20050012
namespace	BE.VMM.SewerNetwork	BE.VMM.SewerNetwork
versionId	1.0	1.0
link	+	+
href	#UL_20050011	#UL_20050012
pipeDiameter	+	+
sewerPipeDimensions	+	+
PipeDimensions	+	+
sewerPipeStreet	Doriksveld	Doriksveld
sewerPipeType	+	+
href	http://www.geosmartcity.eu/codelist/SewerPipeTypeValu	http://www.geosmartcity.eu/codelist/SewerPipeTypeValu
sewerWaterType	+	+
href	http://inspire.ec.europa.eu/codelist/SewerWaterTypeValu	http://inspire.ec.europa.eu/codelist/SewerWaterTypeValu

# HALE transformation of source data



The screenshot displays a software interface for data transformation, showing the mapping of source data to transformed data.

**Alignment View:** Shows the mapping of source data properties to transformed data properties. The source data is mapped to the transformed data via a `UtilityLink` transformation.

**Source Data Table:**

Property	Value 1	Value 2
27AALST_S	1	2
27AALST_S	+	+
BEGIN_KPT	112853956999_1	6014993_1
BRON	VMM uit leidraad	VMM uit leidraad
BRON_ID	6	6
EIG	Gemeente	Gemeente
EIG_ID	2	2
EIND_KPT	112853856133_1	112853956094_1
filename	27AALST_S_sample	27AALST_S_sample
GUP_DAT	no value	no value
GUP_PRG	no value	no value
GUP_PRJ	no value	no value
GUP_T		
GUP_T_C		
INW	37	4
KLEUR	116	116
LEIDING	Gravitaire leiding	Gravitaire leiding
LEIDING_ID	1	1
LENGTE	138	51
LPACT_T		
LPACT_T_C		
REN_DAT	Fri Jan 01 00:00:00 CET 9999	Fri Jan 01 00:00:00 CET 9999
REN_PRG	9999	9999

**Transformed Data Table:**

Property	Value 1	Value 2
UtilityLink	+	+
UtilityLink	+	+
centrelineGeometry	+	+
endNode	112853856133_1	112853956094_1
href	#UN_112853856133_1	#UN_112853956094_1
fictitious	false	false
id	UL_20050011	UL_20050012
startNode	112853956999_1	6014993_1
href	#UN_112853956999_1	#UN_6014993_1
Metadata	+	+
Identifier	19291415-70b2-4fd2-b0e4-75e526f1e0d6	3d8b7971-f78c-4109-a9c1-474682d328bd
SourceID	6b1aacfd-01f5-417f-a88b-dc99687a1521	c505f613-a73c-4caf-b268-bc18d04e840f

**Properties View:** Shows the configuration for the `Formatted string: BEGIN_KPT to href` transformation.

**Explanation:** Populates the `href` property with a string formatted according to this pattern:

**Notes:** #UN\_{BEGIN\_KPT}

**Properties:** #UN\_{BEGIN\_KPT}

**Source property names in curly braces are replaced by the corresponding property value, if the context condition/index matches, otherwise the value is set.**

**Replacement table:**

Variable name	Value of the following property
{BEGIN_KPT}	BEGIN_KPT

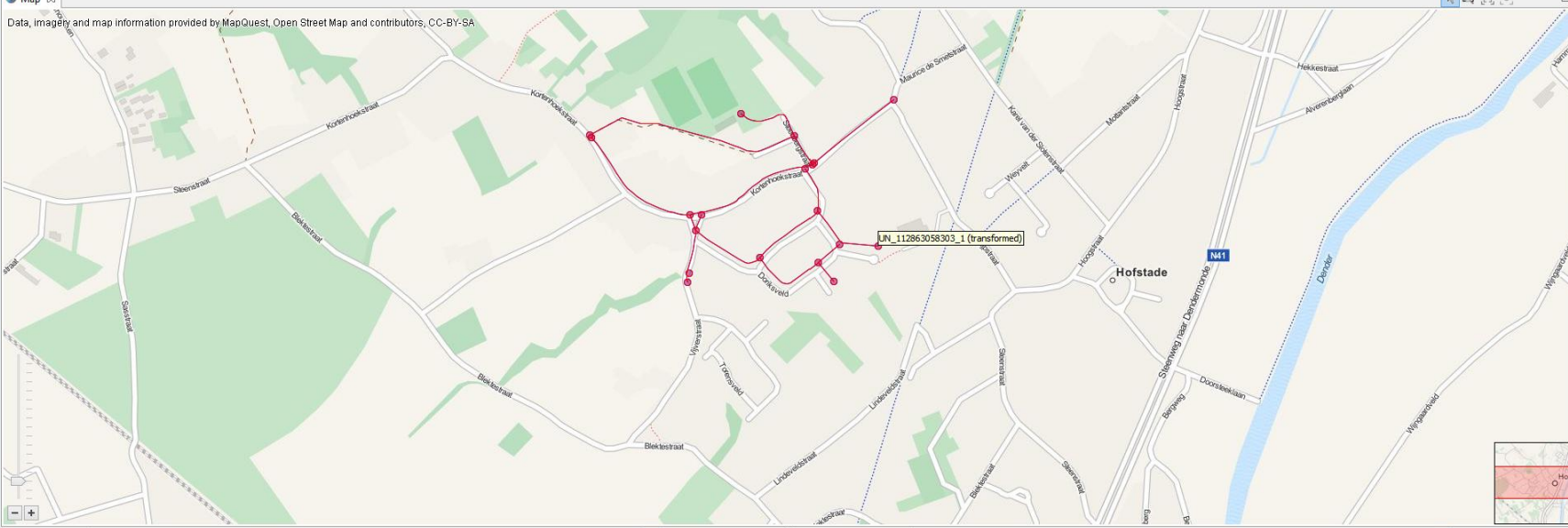
# HALE Map view of transformed data

HUMBOLDT Alignment Editor 2.9.2 - GSC-Webinar-Underground - D:\AreaShared\GSC-Webinar-Underground\GSC-Webinar-29.06.15.hale\*

File Transformation Edit Map Window Help

Map

Data, imagery and map information provided by MapQuest, Open Street Map and contributors, CC-BY-SA



Source Data

27AALST_S	1	2
27AALST_S	+	+
BEGIN_KPT	112853956999_1	6014993_1
BRON	VMM uit leidraad	VMM uit leidraad
BRON_ID	6	6
EIG	Gemeente	Gemeente
EIG_ID	2	2
EIND_KPT	112853856133_1	112853956094_1
Filename	27AALST_S_sample	27AALST_S_sample
GUP_DAT	no value	no value
GUP_PRG	no value	no value

Transformed Data

GSC_SewerPipeExtended	1	2
GSC_SewerPipeExtended	+	+
location	no value	no value
beginLifespanVersion	no value	no value
boundedBy	no value	no value
cables	no value	no value
currentStatus	+	+
description	no value	no value
descriptionReference	no value	no value
digsOnPipe	no value	no value
endLifespanVersion	no value	no value

EPSG:4326 - 4.0283 / 50.9616

Condivisione screenshot  
È stato copiato nei tuoi appunti un link al tuo screenshot  
478166816@visu@zario)

# Transformed data

US\_test\_nodes.gml [D:\AreaShared\GSC-Webinar-Underground\US\_test\_nodes.gml] - <oxygen/> XML Editor

File Edit Find Project Options Tools Document Window Help

XPath 2.0 Execute XPath on 'Current File'

Project: sample.xpr

Attributes: gsc-us-net-sw-ext:GSC\_SewerAppurtenanceEx

Attribute	Value
gml:id	UN_112853856133_1

```

49  xmlns:us-net-ogc="http://inspire.ec.europa.eu/schemas/us-net-ogc/4.0"
50  xmlns:gsc-us-net-sw-ext="http://www.epsilon-italia.it/public/geosmartcity/schemas/gsc-us-net-sw-ext/2.1"
51  xmlns:gmd="http://www.isotc211.org/2005/gmd"
52  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
53  gml:id="_60b651fb-2e32-497f-8f75-629f03166a1f"
54  xsi:schemaLocation="http://www.epsilon-italia.it/public/geosmartcity/schemas/gsc-us-net-sw-ext/2.1
55  http://www.epsilon-italia.it/public/geosmartcity/schemas/gsc-US/2.1/GSC-SewerNetworkExtended.xsd">
56  <gml:featureMember>
57  <gsc-us-net-sw-ext:GSC_SewerPipeExtended gml:id="SP_20050011">
58  <net:beginLifespanVersion xsi:nil="true"/>
59  <net:inspireId>
60  <base:Identifier>
61  <base:localId>SP_20050011</base:localId>
62  <base:namespace>BE.VMM.SewerNetwork</base:namespace>
63  <base:versionId>1.0</base:versionId>
64  </base:Identifier>
65  </net:inspireId>
66  <net:inNetwork xsi:nil="true"/>
67  <net:link xlink:href="#UL_20050011"/>
68  <us-net-common:currentStatus>
69  <xlink:href="http://inspire.ec.europa.eu/codelist/ConditionOfFacilityValue/functional"/>
70  <us-net-common:validFrom xsi:nil="true"/>
71  <us-net-common:verticalPosition xsi:nil="true"/>
72  <us-net-common:warningType xsi:nil="true"/>
73  <us-net-common:pipeDiameter uom="meter" nilReason="unknown" xsi:nil="true"/>
74  <us-net-sw:sewerWaterType>
75  <xlink:href="http://inspire.ec.europa.eu/codelist/SewerWaterTypeValue/reclaimed"/>
76  <gsc-us-net-sw-ext:sewerPipeType>
77  <xlink:href="http://www.geosmartcity.eu/codelist/SewerPipeTypeValue/ML_GM"/>
78  <gsc-us-net-sw-ext:sewerPipeStreet>Doriksveld</gsc-us-net-sw-ext:sewerPipeStreet>
79  <gsc-us-net-sw-ext:sewerPipeDimensions>
80  <gsc-us-net-common:PipeDimensions>
81  <gsc-us-net-common:pipeLenght uom="meter">138.0</gsc-us-net-common:pipeLenght>
82  </gsc-us-net-common:PipeDimensions>
83  </gsc-us-net-sw-ext:sewerPipeDimensions>
84  </gsc-us-net-sw-ext:GSC_SewerPipeExtended>
85  </gml:featureMember>
86  <gml:featureMember>
87  <gsc-us-net-sw-ext:GSC_SewerPipeExtended gml:id="SP_20050012">
88  <net:beginLifespanVersion xsi:nil="true"/>
89  <net:inspireId>
90  <base:Identifier>
91  <base:localId>SP_20050012</base:localId>
92  <base:namespace>BE.VMM.SewerNetwork</base:namespace>
93  <base:versionId>1.0</base:versionId>
94  </base:Identifier>
95  </net:inspireId>
96  <net:inNetwork xsi:nil="true"/>
97  <net:link xlink:href="#UL_20050012"/>
98  <us-net-common:currentStatus>

```

Document is valid.

D:\AreaShared\GSC-Webinar-Underground\US\_test\_nodes.gml U+000A 66 : 50 Modified 10:42 01/07/2015

# Transformed data

US\_test\_nodes.gml [D:\AreaShared\GSC-Webinar-Underground\US\_test\_nodes.gml] - <oXygen/> XML Editor

File Edit Find Project Options Tools Document Window Help

XPath 2.0 - Execute XPath on 'Current File'

Project: GSC-NewCommonTypes.xsd x US\_test\_nodes.gml x

Attributes: us-net-common:UtilityLink [http://inspire.ec.europa.eu/...]

Attribute	Value
gmlid	UL_20050011

```

593 <us-net-common:verticalPosition xsi:nil="true"/>
594 </us-net-common:UtilityLink>
595 </gml:featureMember>
596 <gml:featureMember>
597 <us-net-common:UtilityLink gml:id="#UL_20050011">
598 <net:beginLifespanVersion xsi:nil="true"/>
599 <net:inNetwork xsi:nil="true"/>
600 <net:centrelineGeometry>
601 <gml:LineString gml:id="#_42bc5329-8be3-4e2e-b7e3-1e9783ac6da5" srsName="EPSG:3035">
602 <gml:posList>3901876.036783958 3111660.684359382 3901868.467787573
603 3111652.989941523 3901856.92613308 3111645.7319800407 3901834.050102738
604 3111633.916698539 3901812.9727297584 3111620.2805581456 3901793.50612178
605 3111607.4255461176 3901777.073097746 3111595.37104614 3901763.555619249
606 3111582.5736422995</gml:posList>
607 </gml:LineString>
608 </net:centrelineGeometry>
609 <net:fictitious>false</net:fictitious>
610 <net:endNode xlink:href="#UN_112853956133_1"/>
611 <net:startNode xlink:href="#UN112853956999_1"/>
612 <us-net-common:currentStatus xsi:nil="true"/>
613 <us-net-common:validFrom xsi:nil="true"/>
614 <us-net-common:verticalPosition xsi:nil="true"/>
615 </us-net-common:UtilityLink>
616 </gml:featureMember>
617 <gml:featureMember>
618 <us-net-common:UtilityLink gml:id="UL_20050017">
619 <net:beginLifespanVersion xsi:nil="true"/>
620 <net:inNetwork xsi:nil="true"/>
621 <net:centrelineGeometry>
622 <gml:LineString gml:id="#_24d93ee6-18df-4c39-be08-811f836df523" srsName="EPSG:3035">
623 <gml:posList>3901895.6453982096 3111528.900652323 3901869.1577788033
624 3111566.004800643</gml:posList>
625 </gml:LineString>
626 </net:centrelineGeometry>
627 <net:fictitious>false</net:fictitious>
628 <net:endNode xlink:href="#UN_112853956094_1"/>
629 <net:startNode xlink:href="#UN112853949699_1"/>
630 <us-net-common:currentStatus xsi:nil="true"/>
631 <us-net-common:validFrom xsi:nil="true"/>
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637 <net:beginLifespanVersion xsi:nil="true"/>
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642 3111597.668279988 3901892.2557142153 3111636.274996849 3901876.036783958

```

Text Grid Author

D:\AreaShared\GSC-Webinar-Underground\US\_test\_nodes.gml

Format and indent successful

U+0055 597 : 44 Modified

09:43 01/07/2015

# Transformed data

US\_test\_nodes.gml [D:\AreaShared\GSC-Webinar-Underground\US\_test\_nodes.gml] - <oxygen/> XML Editor

File Edit Find Project Options Tools Document Window Help

XPath 2.0 | Execute XPath on 'Current File'

Project: GSC-NewCommonTypes.xsd | US\_test\_nodes.gml\*

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975 <us-net-common:appurtenanceType xsi:nil="true"/>
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977 </gml:featureMember>
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1016 </net:geometry>
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1018 <us-net-common:validFrom xsi:nil="true"/>
1019 <us-net-common:verticalPosition xsi:nil="true"/>
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1024 <gsc-us-net-sw-ext:GSC_SewerAppurtenanceExtended gml:id="UN_112853956094_1">

```

Attributes: gsc-us-net-sw-ext:GSC\_SewerAppurtenanceEx

Attribute	Value
gml:id	UN_112853856133_1

Transformation Scenarios - US\_tes...

Type filter text

Association	Scenario
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Format and Indent successful | U+0055 | 979 : 66 | Modified | 09:44 01/07/2015

# Mapping delle specifiche nazionali italiane

INSPIRE core

INSPIRE extended

GSC extended

Type	Documentation	Attribute / Association role	Attribute documentation	Values / Enumerations	Multiplicity	Voidable / Non	P07
INSPIRE core		<b>beginLifespanVersion</b>	Date and time at which this version of the spatial object was	Date Time	1	voidable	Underground.LinearClass.L_CREATION
		<b>inspireId</b>	External object identifier of the spatial object NOTE An external	Identifier	0..1		Underground.LinearClass.COD_CLASSE + Underground.LinearClass.FILE_ID
		<b>endLifespanVersion</b>	Date and time at which this version of the spatial object was	Date Time	0..1	voidable	
		<b>inNetwork</b>	The networks in which a network element is a member.	Network	1..*	voidable	
		<b>link</b>	The set of links and link sequences that constitute the link	Generalised Link	1..*		link to Utility link feature type - See types spreadsheet for Utility link feature type
		<b>currentStatus</b>	The status of an utility object with regards to its completion and use.	ConditionOf Facility Value	1	voidable	Underground.LinearClass.L_STA
		<b>validFrom</b>	The time when the utility network element started to exist in the real	Date Time	1	voidable	Underground.LinearClass.L_BORN
		<b>validTo</b>	The time from which the utility network element no longer exists	Date Time	0..1	voidable	
		<b>verticalPosition</b>	Vertical position of the utility object relative to ground.	Vertical Position Value	1	voidable	Underground.LinearClass.L_POS_SUP
		<b>utilityFacilityReference</b>	Reference to a facility activity complex that is linked (related) to	ActivityComplex	0..1		
		<b>governmentalServiceReference</b>	Reference to a governmental service object that is linked	GovernmentalService	0..1		
		<b>utilityDeliveryType</b>	Kind of utility delivery network e.g. transport, distribution.	UtilityDeliveryType Value	0..1		
		<b>warningType</b>	Kind of overground visible warning mechanism used to	WarningType Value*	1	voidable	COD_CL_SEG
		<b>pipeDiameter</b>	Pipe outer diameter. For convex shaped objects (e.g. a circle) the	Measure	1	voidable	Underground.LinearClass.L_DIA
		<b>pressure</b>	The maximum allowable operating pressure at which a product is	Measure	0..1	voidable	
		<b>cables</b>	A pipe may contain one or more cables.	Cable	0..*	voidable	
		<b>pipes</b>	A pipe may contain one or more pipes.	Pipe	0..*	voidable	
		INSPIRE extended		<b>sewerWaterType</b>	Type of sewer water.	codelist	1
<b>SewerPipeExtended</b>							
GSC extended	Activity line of link sequence for the conveyance of sewage.	<b>sewerPipeType</b>	Type of the segment	codelist	1	voidable	SewerNetwork.L_F_TY
		<b>sewerPipeDepthMeasure</b>	Measure of the Depth of the pipe	DepthMeasure	1..*	voidable	See DepthMeasure data type in the types spreadsheet
		<b>sewerPipeRoadPosition</b>	position relative to the road	Codelist roadPosition	0..1		Underground.LinearClass.L_POS
		<b>sewerPipeStartNodeTerrainQuote</b>	Terrain quote of initial node	Measure	0..1		SewerNetwork.QUO_INI
		<b>sewerPipeStartNodeFlowingQuote</b>	Flowing quote of the initial node	Measure	0..1		SewerNetwork.SCO_INI
		<b>sewerPipeEndNodeTerrainQuote</b>	Terrain quote of final node	Measure	0..1		SewerNetwork.QUO_FIN
		<b>sewerPipeEndNodeFlowingQuote</b>	Flowing quote of the final node	Measure	0..1		SewerNetwork.SCO_FIN
		<b>sewerPipeDimensions</b>	length,height,width of the pipe	PipeDimensions	0..1		see pipeDimension type - in the types spreadsheet
		<b>sewerPipeSourceOfData</b>	info about how data was obtained	sourceOfData	0..1		see sourceOfData type - in the types spreadsheet
		<b>sewerPipeMaterialType</b>		Codelist PipeMaterial	0..1		Underground.LinearClass.L_MAT
		<b>sewerPipeOrigin</b>	Info about pipe origin	InfrastructureOrigin	0..1	voidable	see InfrastructureOrigin data type - in the types spreadsheet
		<b>sewerPipeAlternativeId</b>		Identifier	0..*		
		<b>sewerPipeAlternativeAuthorityRole</b>		RelatedParty	0..*		
		<b>sewerPipeMunicipality</b>	The municipality where the sewer pipe is located	CharacterString	0..1		
		<b>sewerPipeStreet</b>	the street where the sewer pipe is located	CharacterString	0..1		
		<b>sewerPipeTransportType</b>	The way the transport is carried out (pressure, gravitational, ...)	Code List	0..1		
		<b>sewerPipeProjectAction</b>		ProjectAction	1..*	voidable	link to ProjectAction feature type - See GSC-New feature spreadsheet
		<b>sewerPipeRecoveryPresent</b>	Presence of recovery of the pipe	boolean* true /false	0..1		SewerNetwork.L_F_RISAN
		<b>sewerPipeRecoveryType</b>	Type of recovery of the pipe	recoveryType Value	0..1		SewerNetwork.L_F_T_RIS
		<b>sewerPipeDeliveryLocationType</b>	* sewage treatment plant *soil * surface water body *other	Codelist SewerNetwork			SewerNetwork.L_F_REC
		<b>sewerPipeDigsCode</b>		UndergroundWorks	0..1		link to UndergroundWorks feature type - See GSC-New feature spreadsheet

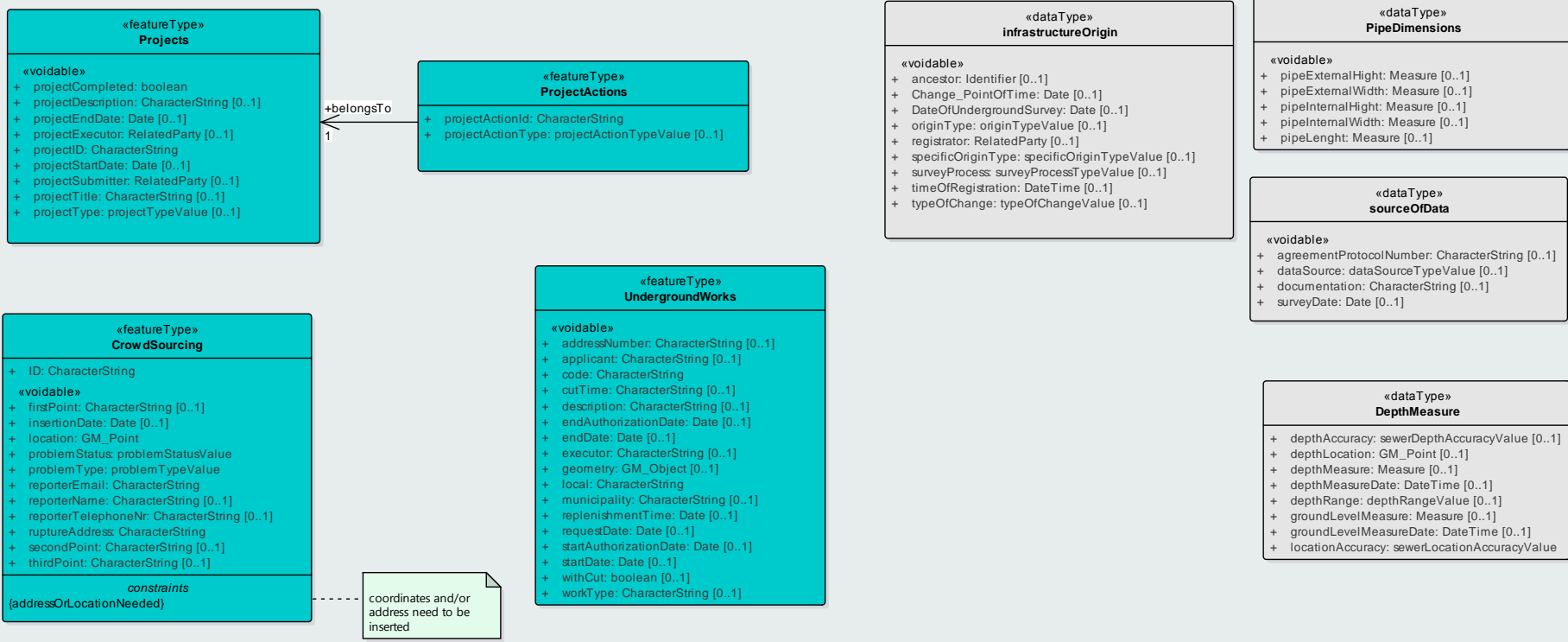


# Mapping delle specifiche nazionali italiane

Type	Documentati	Attribute / Association role	Attribute documentati	Values / Enumerations	Multiplicity	Voidable / Non-	P07
INSPIRE core	electricity cable A utility link or link sequence used to convey electricity from one location to another.	<b>currentStatus</b>	-- Name -- current status	ConditionOfFacilityValue*	1	voidable	Underground.LinearClass.L_STA
		<b>validFrom</b>	-- Name -- valid from	DateTime	1	voidable	Underground.LinearClass.L_BORN
		<b>validTo</b>	-- Name -- valid to	DateTime	0..1	voidable	
		<b>verticalPosition</b>	-- Name -- vertical	VerticalPositionValue*	1	voidable	Underground.LinearClass.L_POS_SUP
		<b>utilityFacilityReference</b>	-- Name -- utility facility	ActivityComplex	0..1	voidable	
		<b>governmentalServiceReference</b>	-- Name -- governmental service	GovernmentalService	0..1	voidable	
		<b>beginLifespanVersion</b>	Date and time at which this	DateTime	1	voidable	Underground.LinearClass.L_CREATION
		<b>inspireId</b>	External object identifier of the	Identifier	0..1		Underground.LinearClass.COD_CLASSE + Underground.LinearClass.FILE_ID
		<b>endLifespanVersion</b>	Date and time at which this	DateTime	0..1	voidable	
		<b>inNetwork</b>	The networks in which a	Network	1..*	voidable	
		<b>link</b>	The set of links and link	GeneralisedLink	1..*		link to Utility link feature type - See types spreadsheet for Utility link feature type
		<b>utilityDeliveryType</b>	-- Name -- utility delivery	UtilityDeliveryTypeValue*	0..1	voidable	
		INSPIRE extended		<b>warningType</b>	-- Name -- warning type	WarningTypeValue*	1
<b>operatingVoltage</b>	-- Name -- operating			Measure	1	voidable	TR_ELE_VOP
<b>nominalVoltage</b>	-- Name -- nominal			Measure	1	voidable	TR_ELE_VNO
<b>electricityCableType</b>	Type of electricity			ElectricityCableTypeValue*	1	voidable	ElectricityNetwork.ElectricityCable.L_E_TUBALL
<b>electricityCableConductorMaterialType</b>	Cable conductor			ElectricityCableConductorMaterialType	1	voidable	ElectricityNetwork.ElectricityCable.L_E_CONDUT
GSC extended		<b>conductorSize</b>	Size of the conductor	Length	1	voidable	ElectricityNetwork.ElectricityCable.L_E_SEZCAV
		<b>electricitySegmentType</b>	Type of the segment	ElectricitySegmentTypeValue*	0..1		ElectricityNetwork.ElectricityCable.L_E_TY
		<b>electricityLineType</b>	Sequence of contiguous	Text(50)	0..1		ElectricityNetwork.ElectricityCable.L_E_LINEL
		<b>electricityLineName</b>	Name of the electricity line	Text(100)	0..2		ElectricityNetwork.ElectricityCable.L_E_DENL
		<b>electricityStartPlant</b>	Origin plant	Text(100)	0..3		ElectricityNetwork.ElectricityCable.L_E_IMP_DA
<b>electricityEndPlant</b>	Destination plant	Text(100)	0..4		ElectricityNetwork.ElectricityCable.L_E_IMP_A		

# GeoSmartCity - New Common Types

class GSC-NewCommonTypes



Type	Documentation	Attribute / Association role	Attribute documentation	Values / Enumerations	Multiplicity	Voidable	P07
UndergroundWorks	feature type describing the works related to underground networks (soil digs, municipal intervention ..)	code	ID of the underground work (soil digs / municipal intervention...)	CharacterString	1	voidable	SoilDigs.Code <b>Note:</b> it's the Number of the authorization in Monic@ service
		applicant	Society asking for authorization	CharacterString	0..1		SoilDigs.Applicant
		executor	Society executing the work	CharacterString	0..1		SoilDigs.Executor
		workType	Type of the authorized work	CharacterString	0..1		SoilDigs.WorkType
		description	Short description of the work	CharacterString	0..1		SoilDigs.Description
		municipality	municipality in which the work is realized	CharacterString	1	voidable	SoilDigs.Municipio
		addressNumber	Address number of the working area (if available)	CharacterString	0..1		SoilDigs.AddressNumber
		geometry		GM_Object	0..1		
		startAuthorizationDate	Beginning date of the authorization	Date	0..1		SoilDigs.BeginningAuthorizationDate
		endAuthorizationDate	Ending date of the authorization	Date	0..1		SoilDigs.EndingAuthorizationDate
		startDate	date in which works begin	Date	0..1		
		endDate	date in which works end	Date	0..1		
		replenishmentTime	Date / Time Replenishment	Date	0..1		
		requestDate	Date / Time of the request of intervention	Date	0..1		
		local	Local	CharacterString	0..1		
		withCut	With / without cut	Boolean	0..1		
cutTime	Cut time	CharacterString	0..1				
Projects	feature type giving information about the transformation projects	projectID	ID of project	CharacterString	1		UrbanTransformationAreas.ID
		projectTitle	Name of the project	CharacterString	1		UrbanTransformationAreas.Title
		projectDescription	Short description of the project	CharacterString	0..1		UrbanTransformationAreas.Description
		projectSubmitter	Organization that submits the project	RelatedParty	1		UrbanTransformationAreas.Promoter
		projectExecutor	Organization that realizes the project	RelatedParty	0..1		UrbanTransformationAreas.Executor
		projectStartDate	Beginning year of the project	Date	0..1		UrbanTransformationAreas.WorkBeginning
		projectType	The value from this attribute is a code from the "ProjectTypeValue" code list.	Code list	0..1		
		projectEndDate	End Date of project (can be the actual or the foreseen one)	Date	0..1		
		projectCompleted	indicates if the end date is the actual or the assumed one	Boolean	0..1		
geometry	The area interested by the project	GM_Polygon	0..1		UrbanTransformationAreas.GEOMETRY_2D		
ProjectActions	feature type giving info about the type of the action performed by the project on	projectActionType	The type of project action: "construct," stop, "renovation," "change	Code list	1		
		projectActionID		CharacterString	1		
CrowdSourcing	feature type describing information needed for crowdsourcing purposes	reporterName	Name	CharacterString	0..1		
		reporterTelephoneNr	Telephone contact	CharacterString	0..1		
		reporterEmail	email	CharacterString	1		
		ruptureAddress	Address of the rupture	CharacterString	0..1		
		location	coordinates of the rupture	GM_POINT	0..1		
		problemType	type of reported problem	odelist	1		
		statusOfTheProblem	*reported *inCharge *resolved	odelist	0..1		
		insertionDate	date in which rupture has been reported	date	1		
		firstPoint	First point of reference	CharacterString	1		
		secondPoint	Second reference point	CharacterString	0..1		
		thirdPoint	Third point of reference	CharacterString	0..1		
addressOrLocationNeeded	coordinates and/or address need to be inserted						

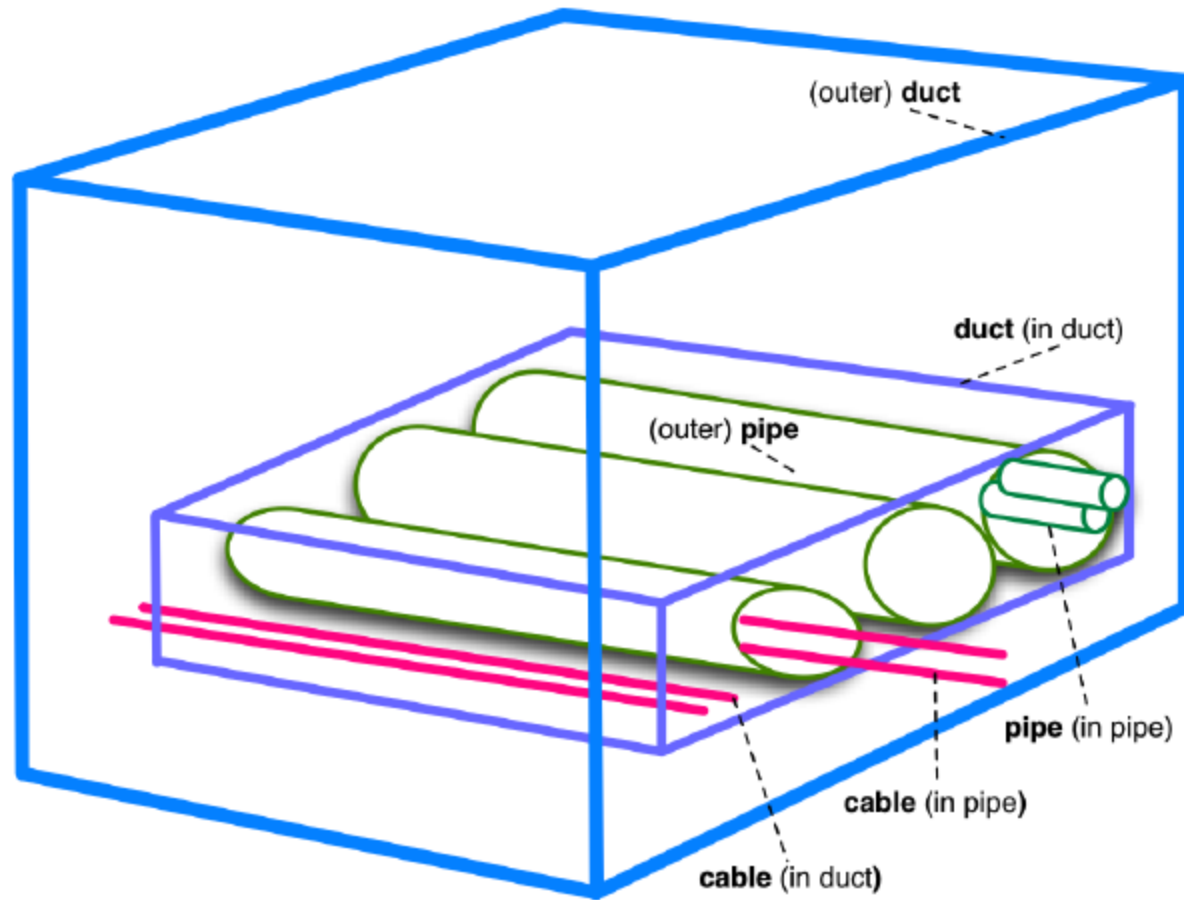
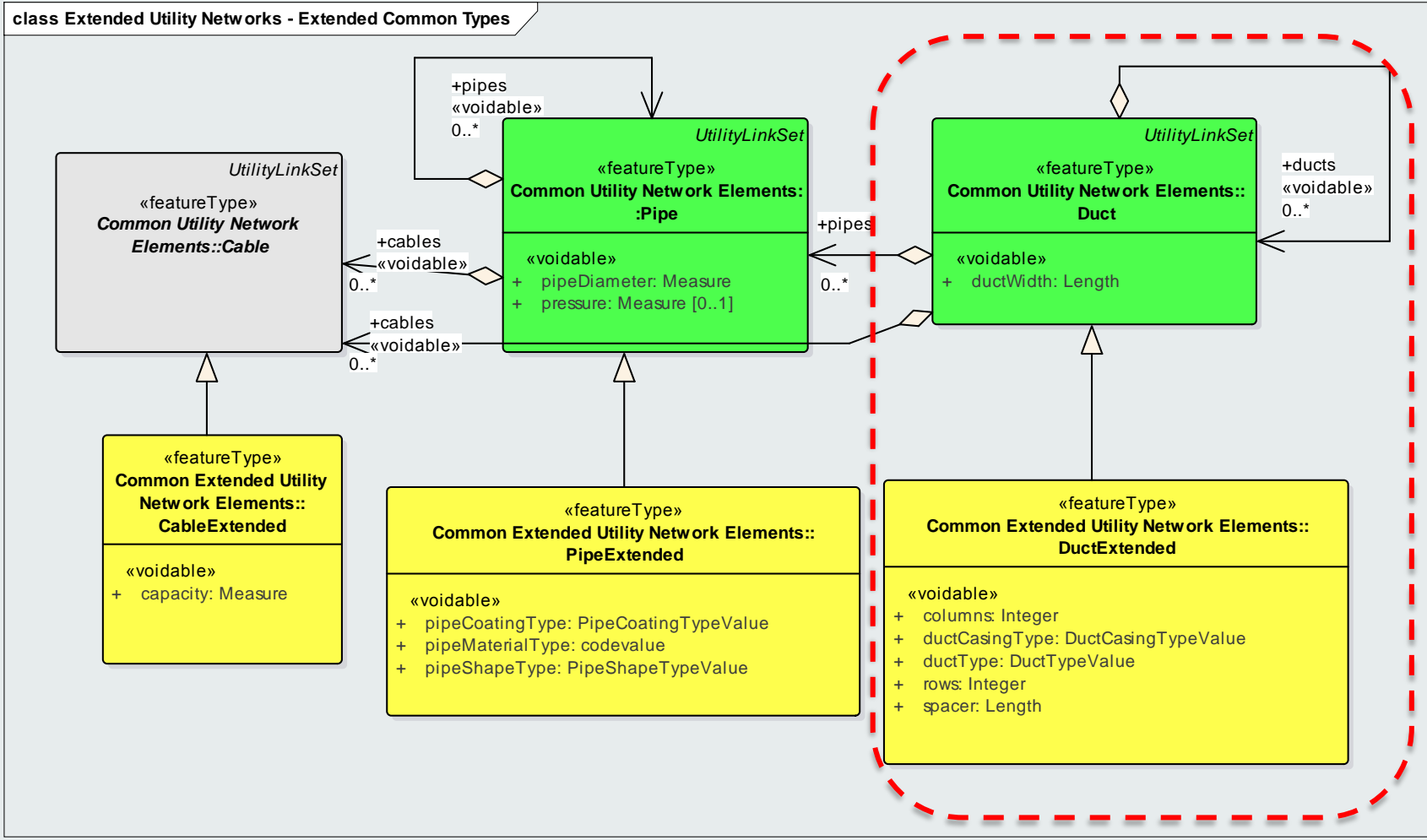


Figure 9 – Physical relations between cables, pipes and ducts



# GRAZIE!

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