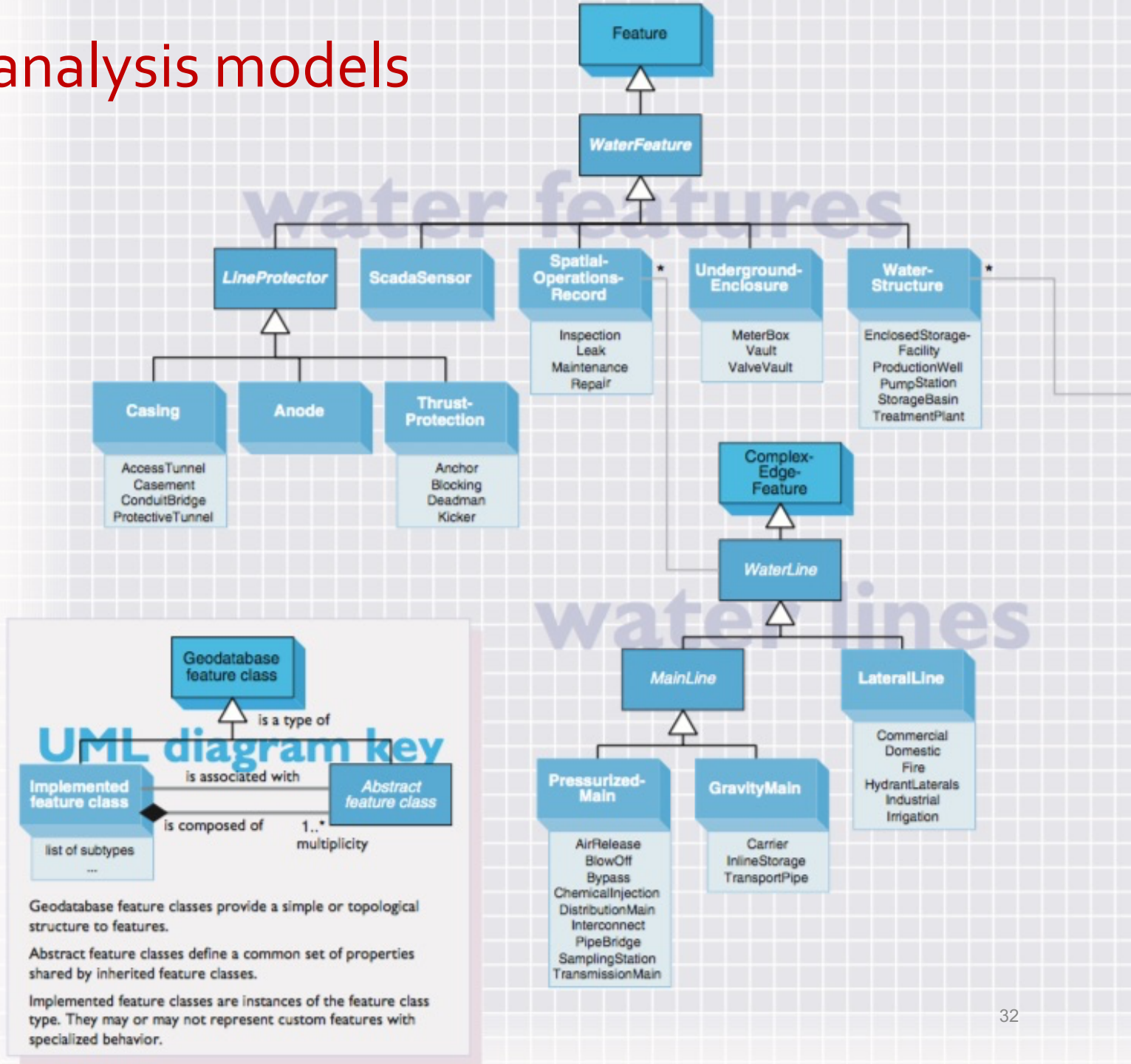
Building analysis models

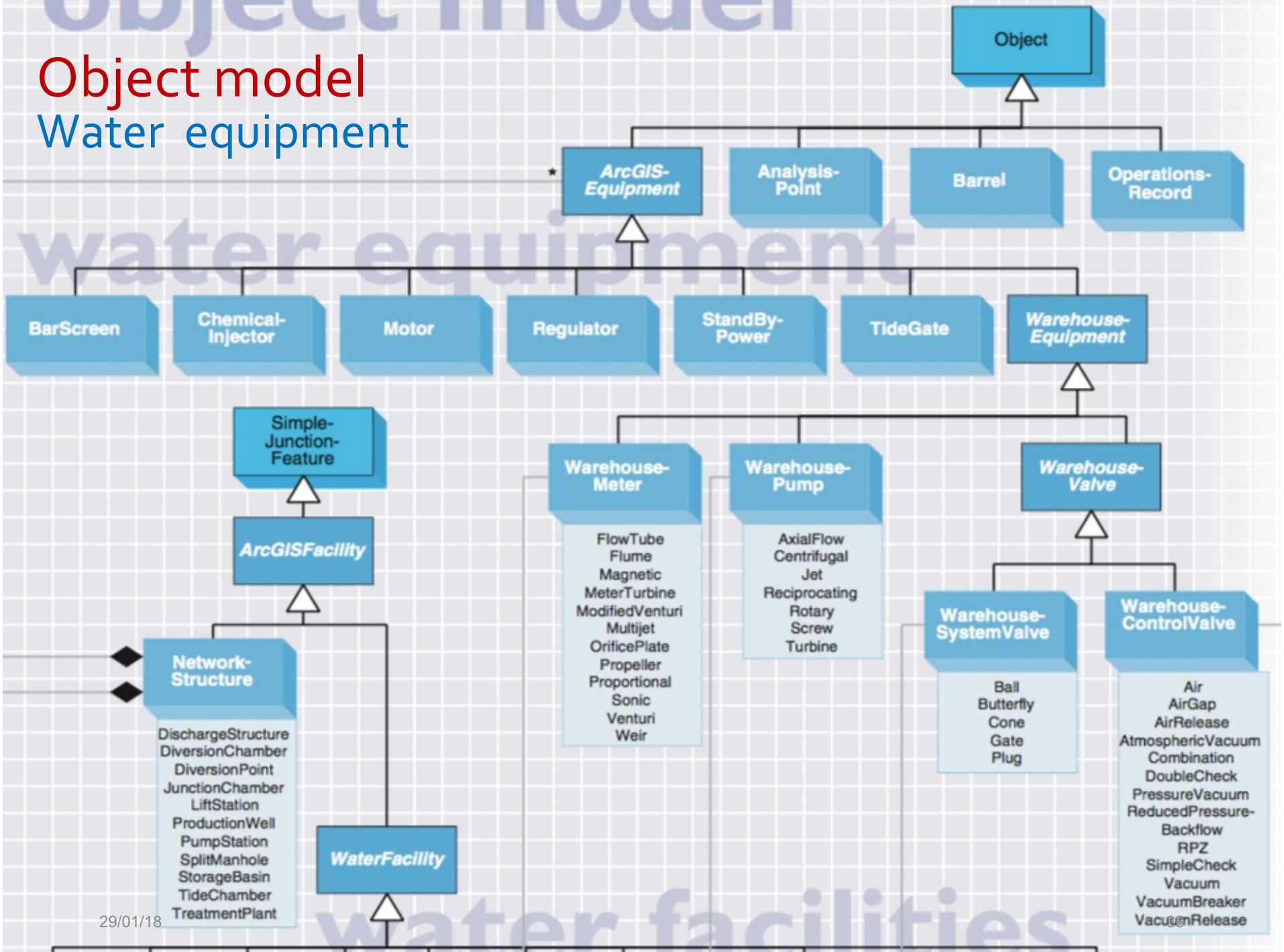
Water fetures

UML (Unified Modeling Language) diagram key and behavior.



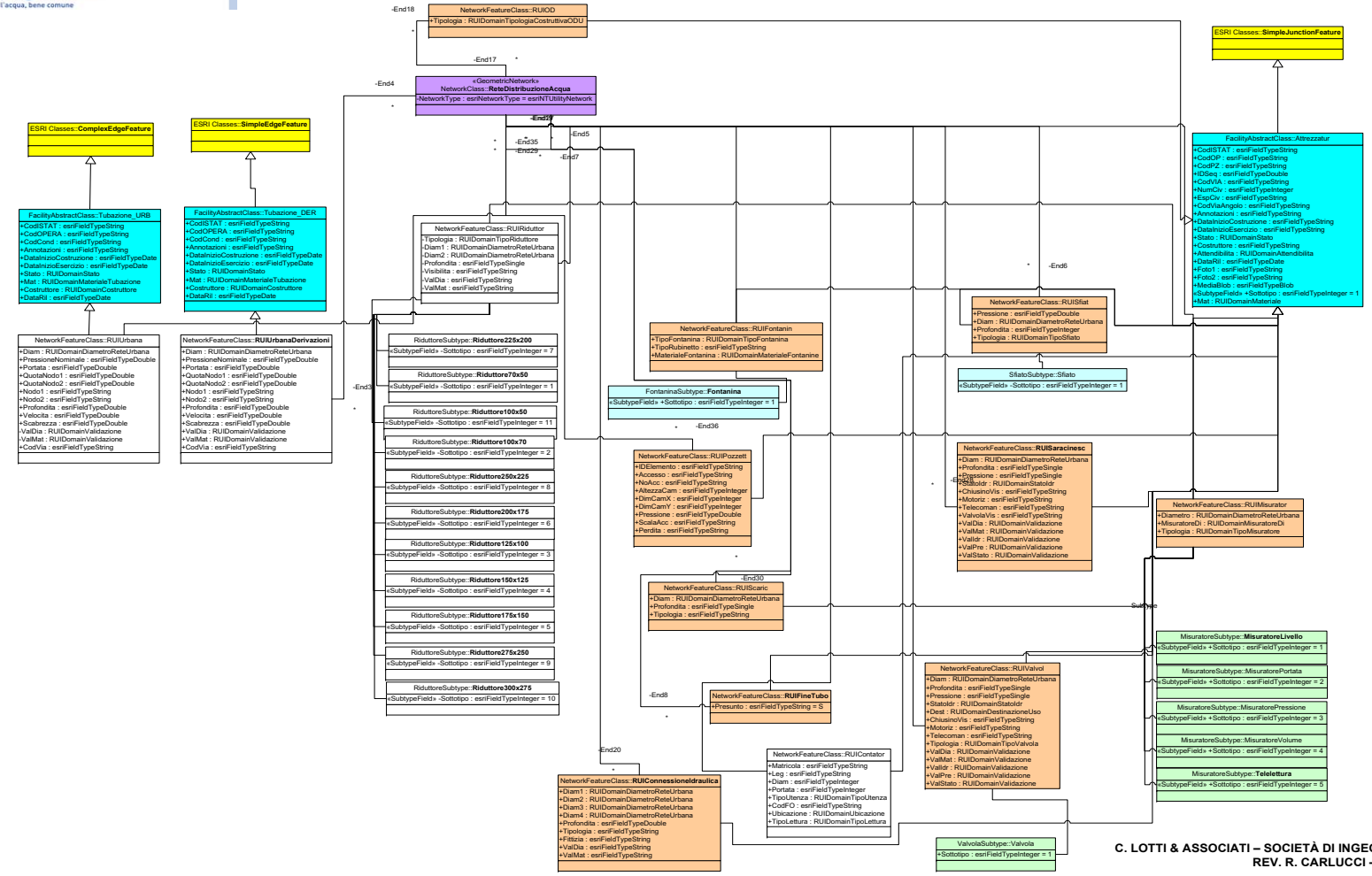
Object model

Water equipment



Modello Dati Rete Idrica Urbana
Domini

Modello Dati Rete Idrica Urbana



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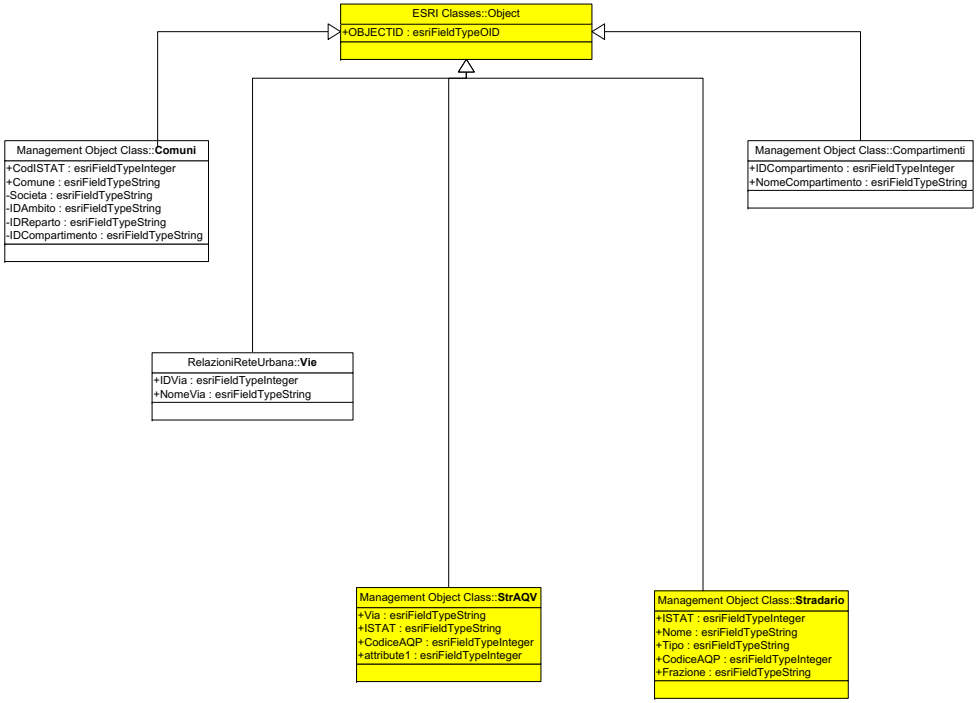
REV. R. CARLUCCI – 19 SET 2008

zoom

Modello Dati Rete Idrica Urbana
Sottosistema Gestione Rete



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REV. R. CARLUCCI – 19 SET 2008

georeferencing till to last element

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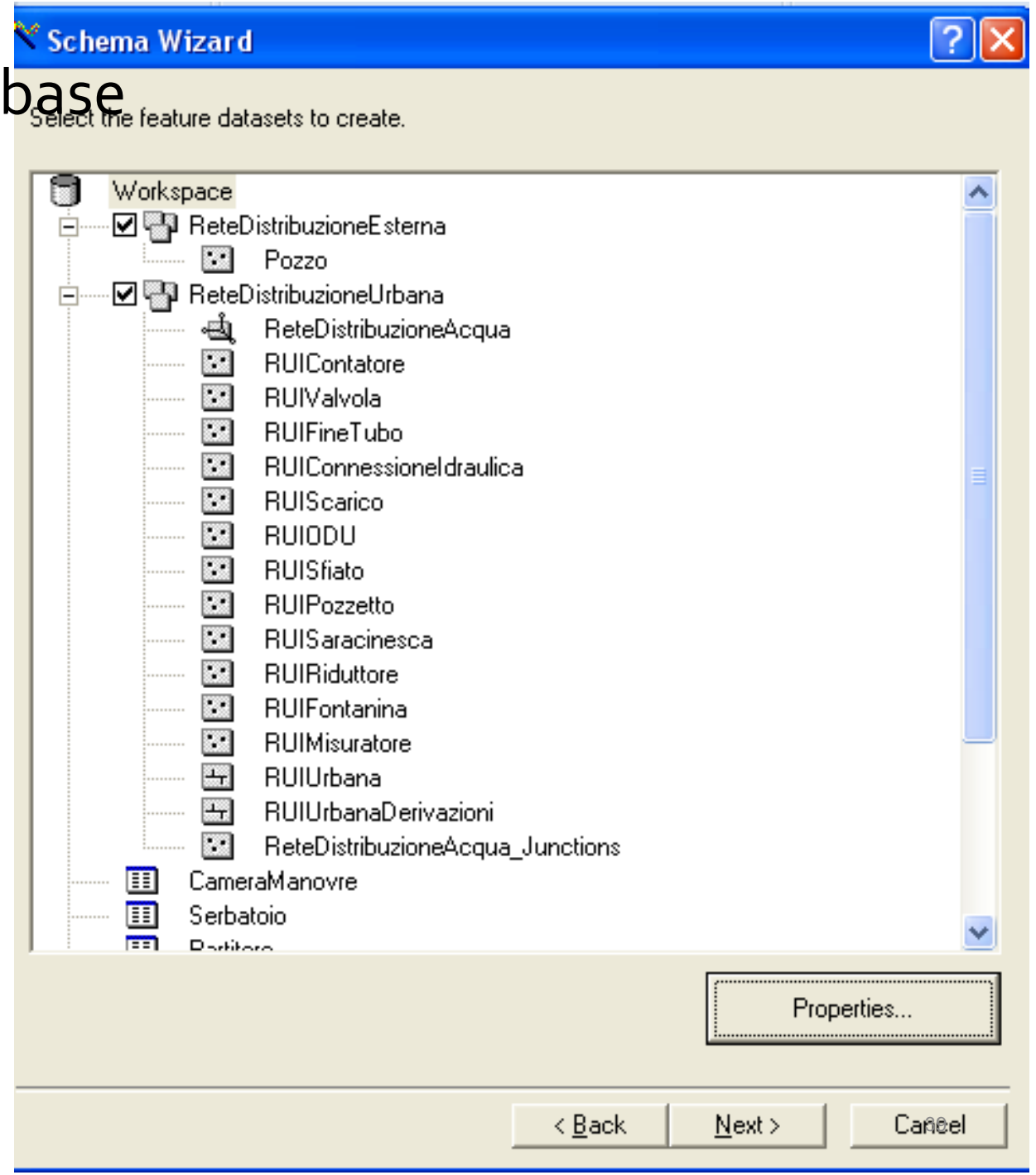
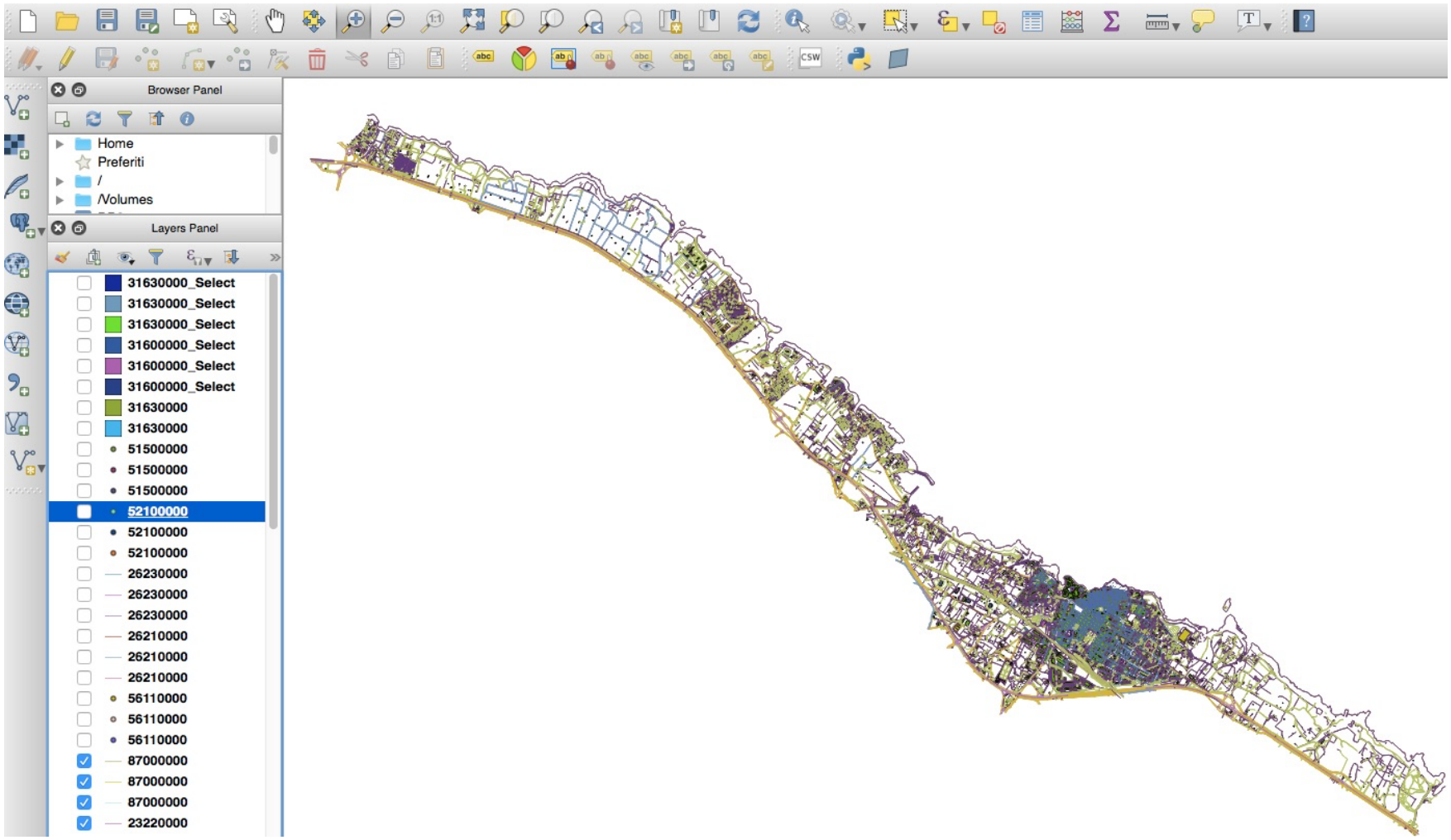
Z=32.992

Nord= 4492413.911 East= 2700411.493 H=35.860

the geodatabase

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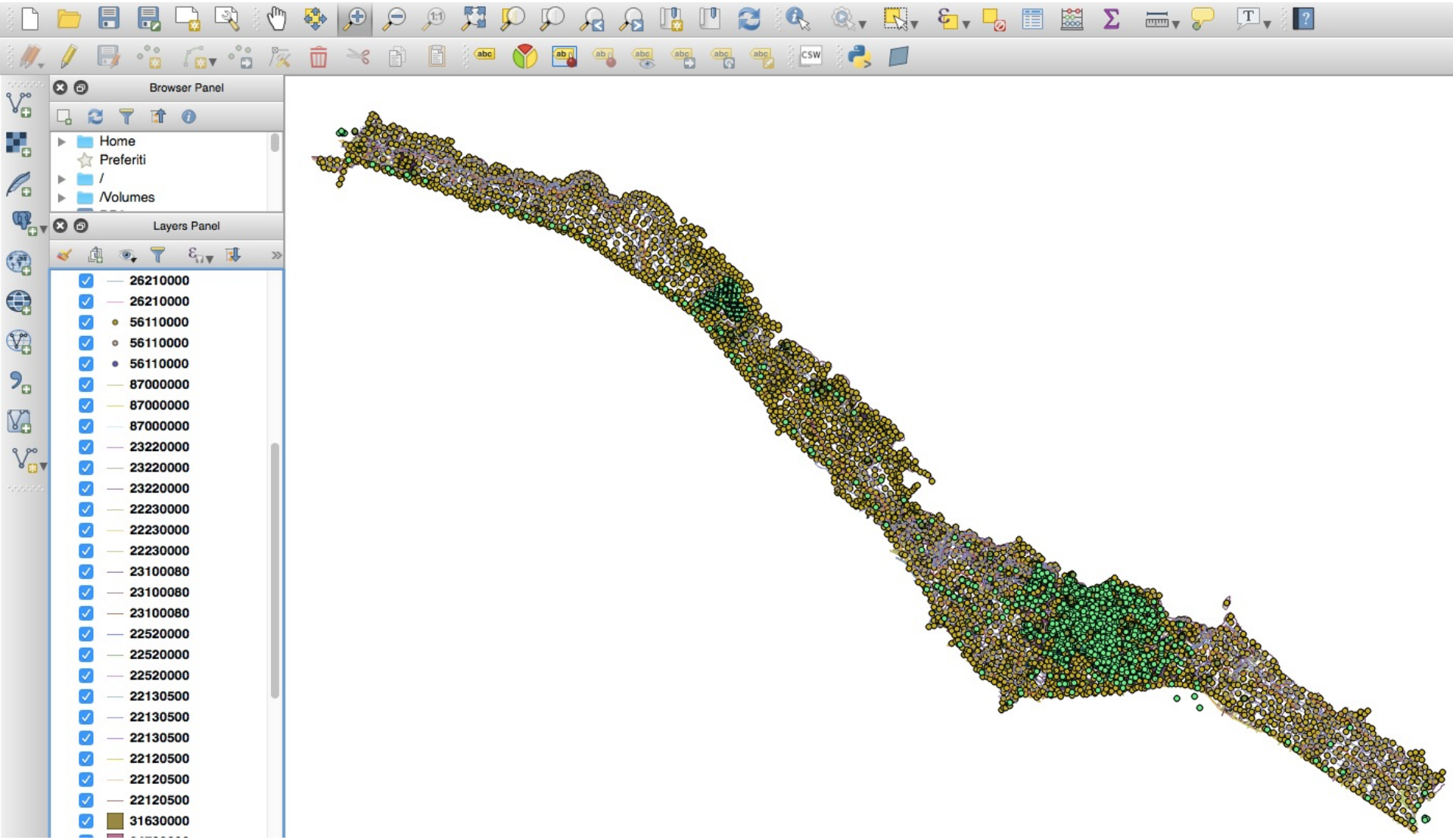
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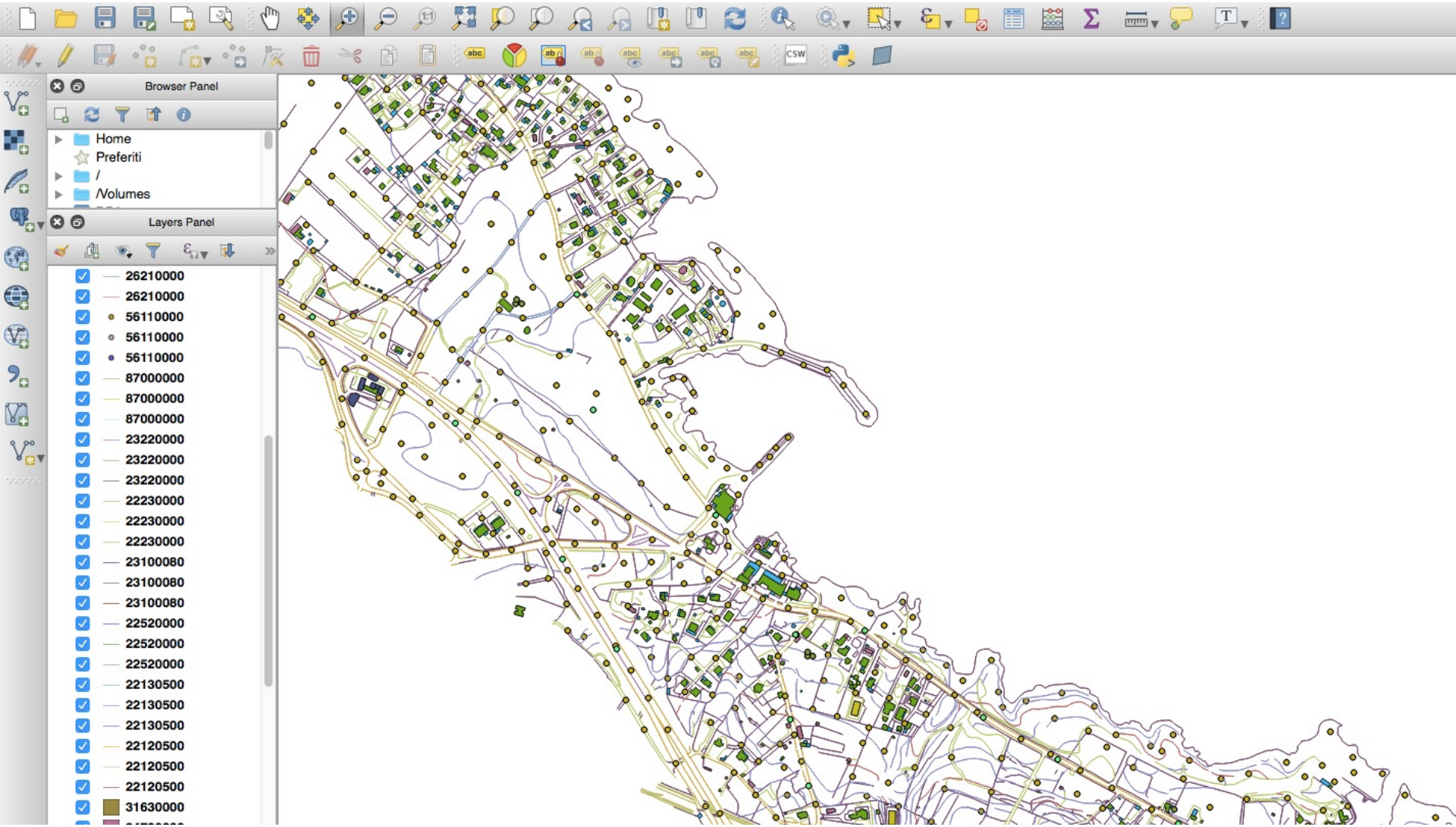
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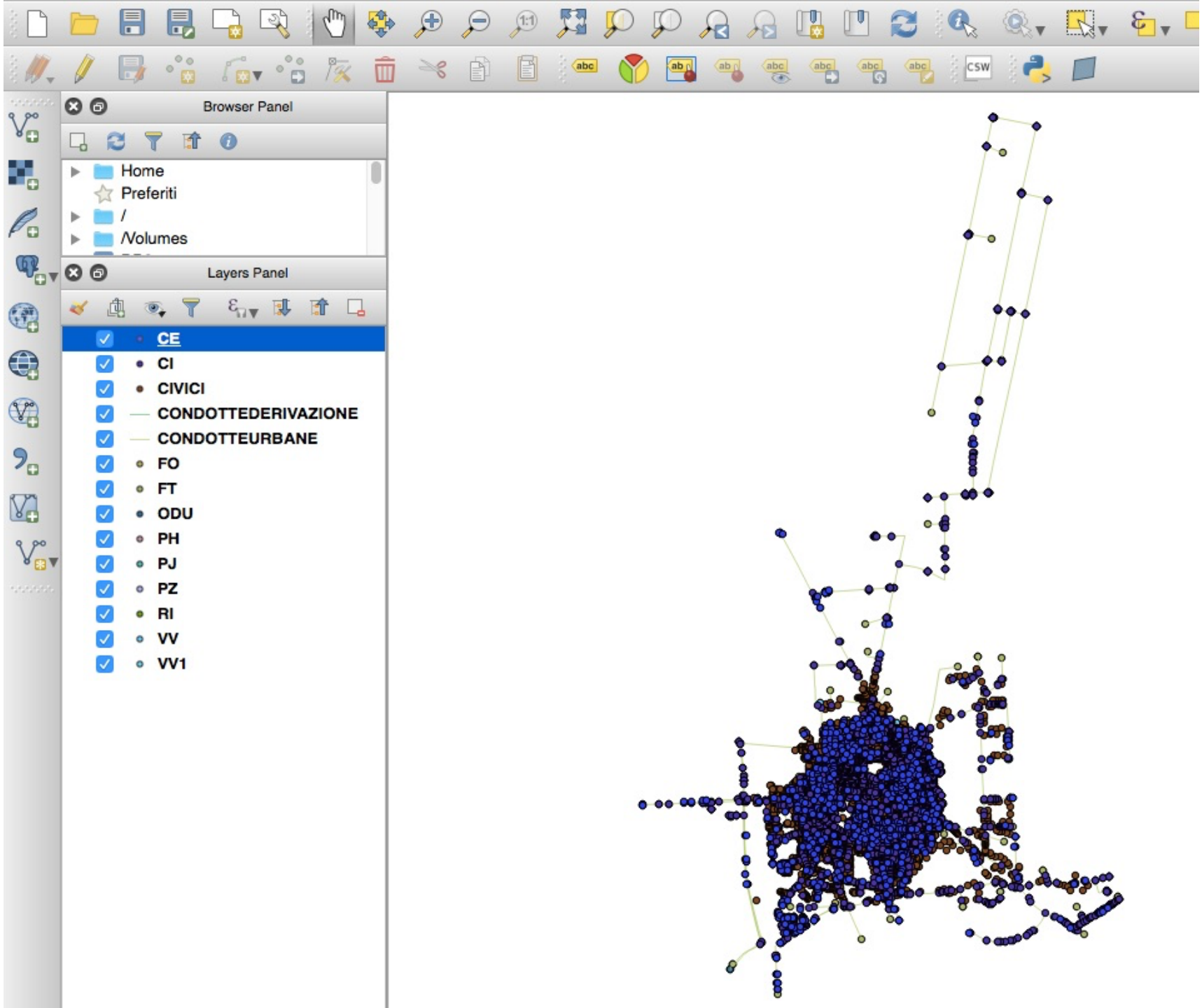
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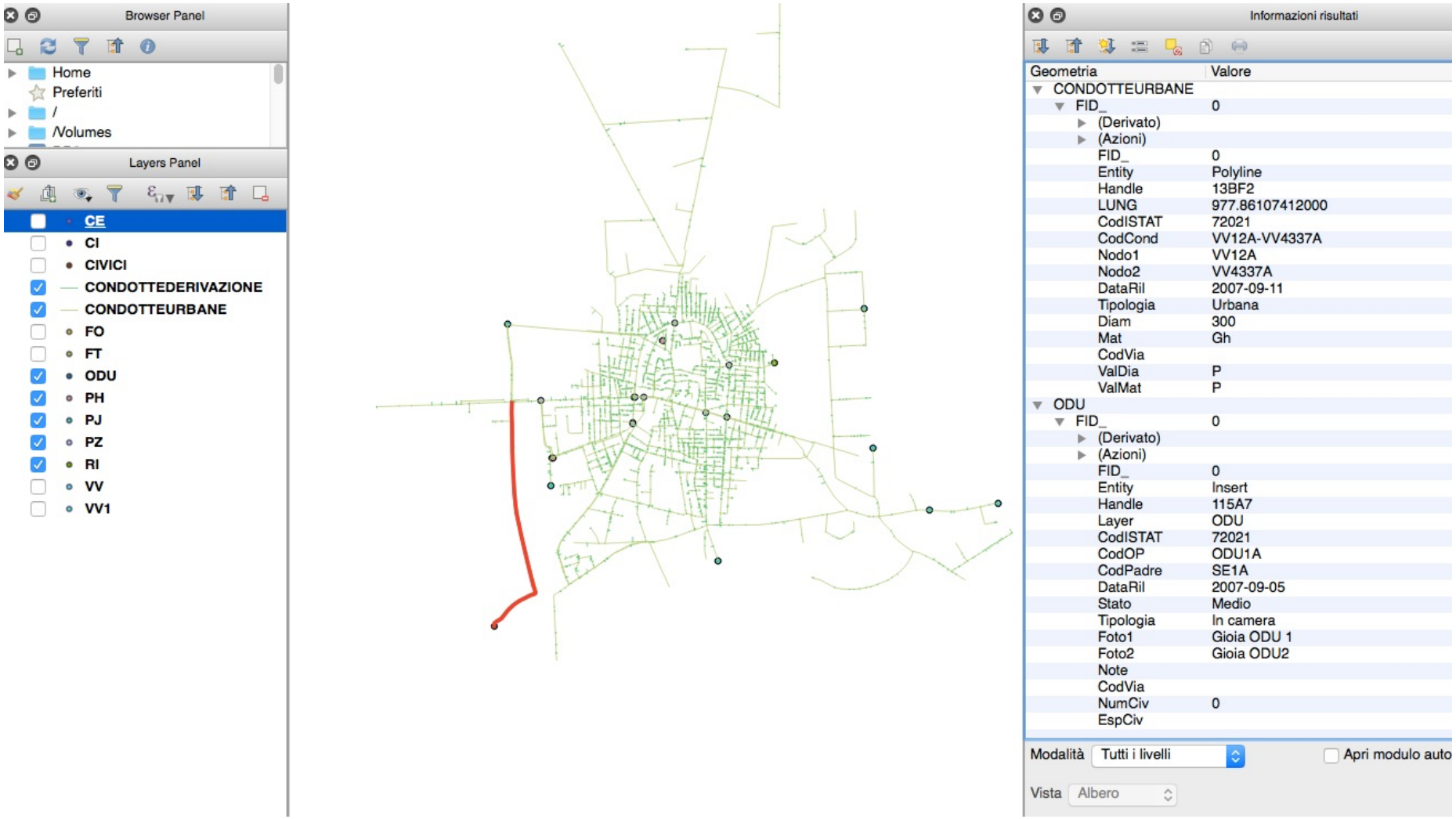
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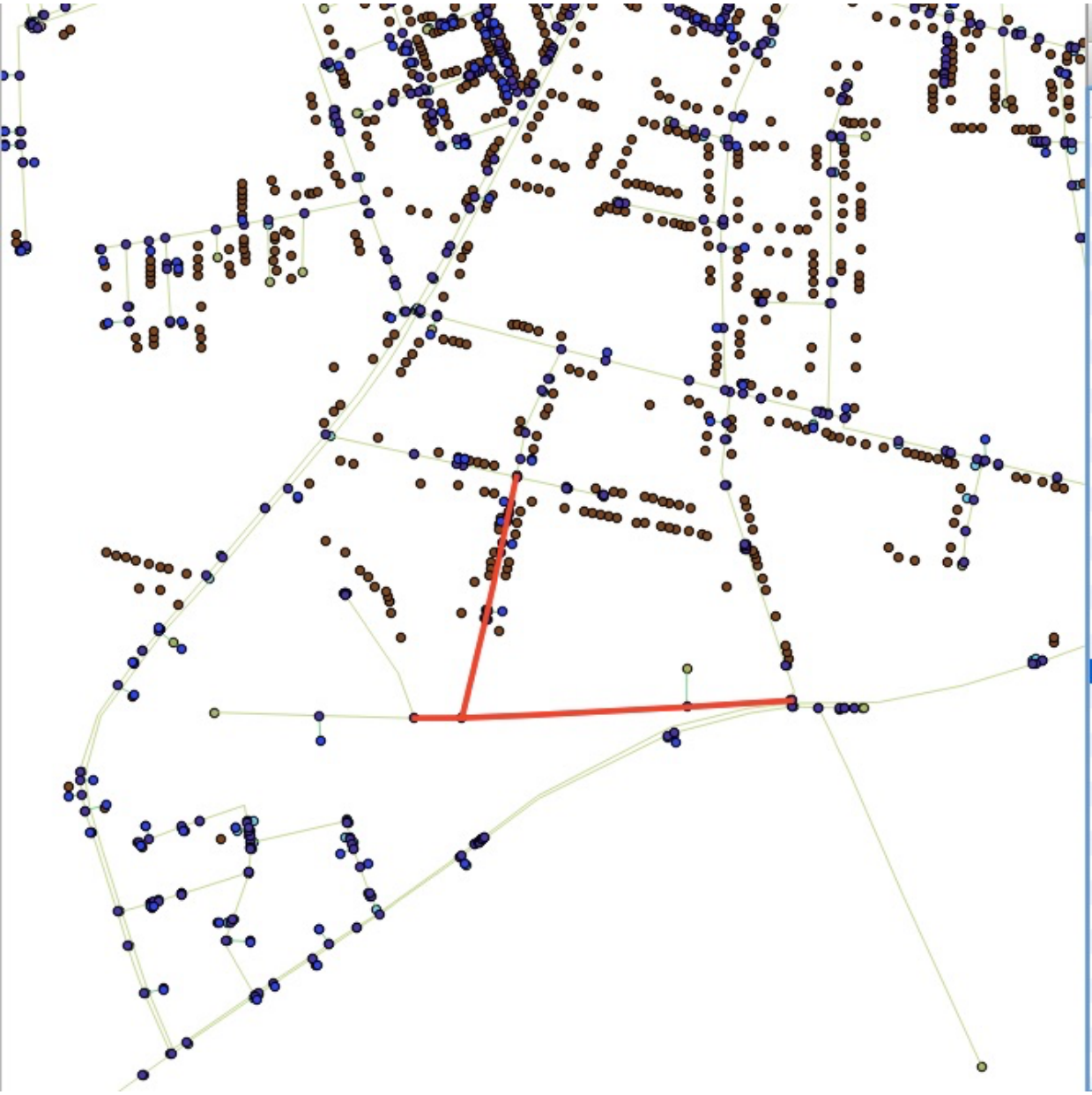
Informazioni risultati
Geometria
Valore
CONDOTTEURBANE
FID_ 0
(Derivato)
(Azioni)
FID_ 0
Entity Polyline
Handle 13BF2
LUNG 977.86107412000
CodISTAT 72021
CodCond VV12A-VV4337A
Nodo1 VV12A
Nodo2 VV4337A
DataRil 2007-09-11
Tipologia Urbana
Diam 300
Mat Gh
CodVia
ValDia P
ValMat P
ODU
FID_ 0
(Derivato)
(Azioni)
FID_ 0
Entity Insert
Handle 115A7
Layer ODU
CodISTAT 72021
CodOP ODU1A
CodPadre SE1A
DataRil 2007-09-05
Stato Medio
Tipologia In camera
Foto1 Gioia ODU 1
Foto2 Gioia ODU2
Note
CodVia
NumCiv 0
EspCiv
Modalità Tutti i livelli
Apri modulo auto
Vista Albero



Informazioni risultati

Geometria	Valore
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FID_	0
(Derivato)	
(Azioni)	
FID_	0
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Layer	CONNESSIONIIDRAULICHE
CodISTAT	72021
CodOP	CI2880B
CodPZ	
DataRil	2007-10-04
Diam1	60
Diam2	60
Diam3	80
Diam4	0
Mat	Gh
Profondita	1.00000000000
Tipologia	Y
Fittizia	0
ValDia	P
ValMat	P
CONDOTTEURBANE	
FID_	0
(Derivato)	
(Azioni)	
FID_	0
Entity	Polyline
Handle	1AED1
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CodCond	CI2880B-VV52A
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Nodo2	VV52A
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Diam	60
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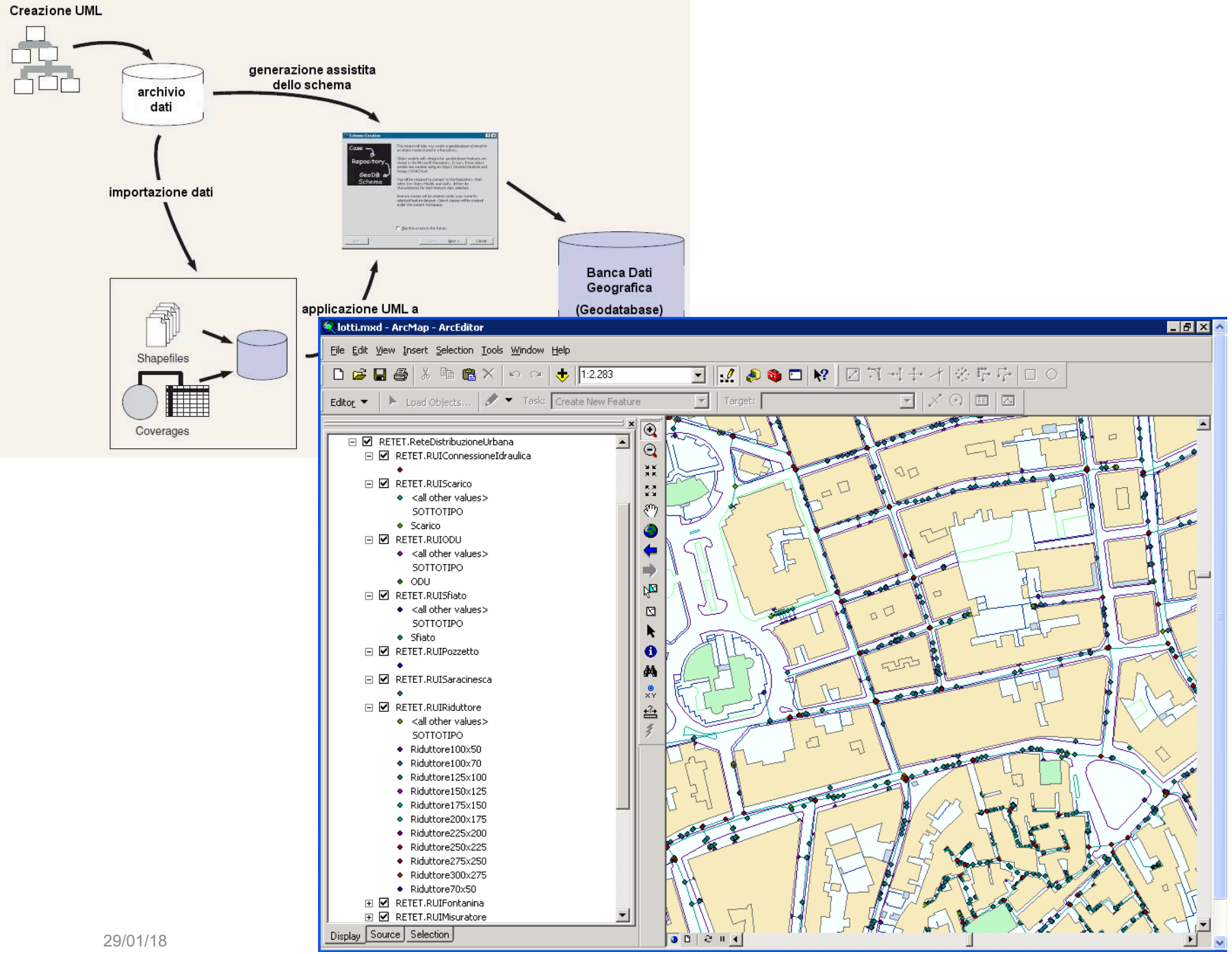
ValDia	P


Creazione UML
archivio dati
generazione assistita dello schema
importazione dati
Banca Dati Geografica
(Geodatabase)
applicazione UML a
Shapefiles
Coverages
lotti.mxd - ArcMap - ArcEditor
File Edit View Insert Selection Tools Window Help
1:2.283
Editor
Load Objects...
Task:
Create New Feature
Target:
RETET.ReteDistribuzioneUrbana
RETET.RUIConnessioneIdraulica
RETET.RUIScarico
<all other values>
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Scarico
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RETET.RUIRiduttore
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Riduttore225x200
Riduttore250x225
Riduttore275x250
Riduttore300x275
Riduttore70x50
RETET.RUIFontanina
RETET.RUIMisuratore
Display
Source
Selection

Estimating loss

For an assessment of the degree of loss, reference was made to the night-time analysis method.

The value of the minimum night-time flow was determined as the average value recorded from 02:00 to 04:00 during the reference period adopted.

It should be noted that the assessments carried out using the night-time method provide indications that are not always precise or even usable, for example when there are network maneuvrers or legitimate nightly consumption such as the filling of tanks in the network and must therefore be considered as one of the many indicators arrangement.

Mathematical model

For the construction of the mathematical model phase it was analyzed the three groups of input data of the model that is:

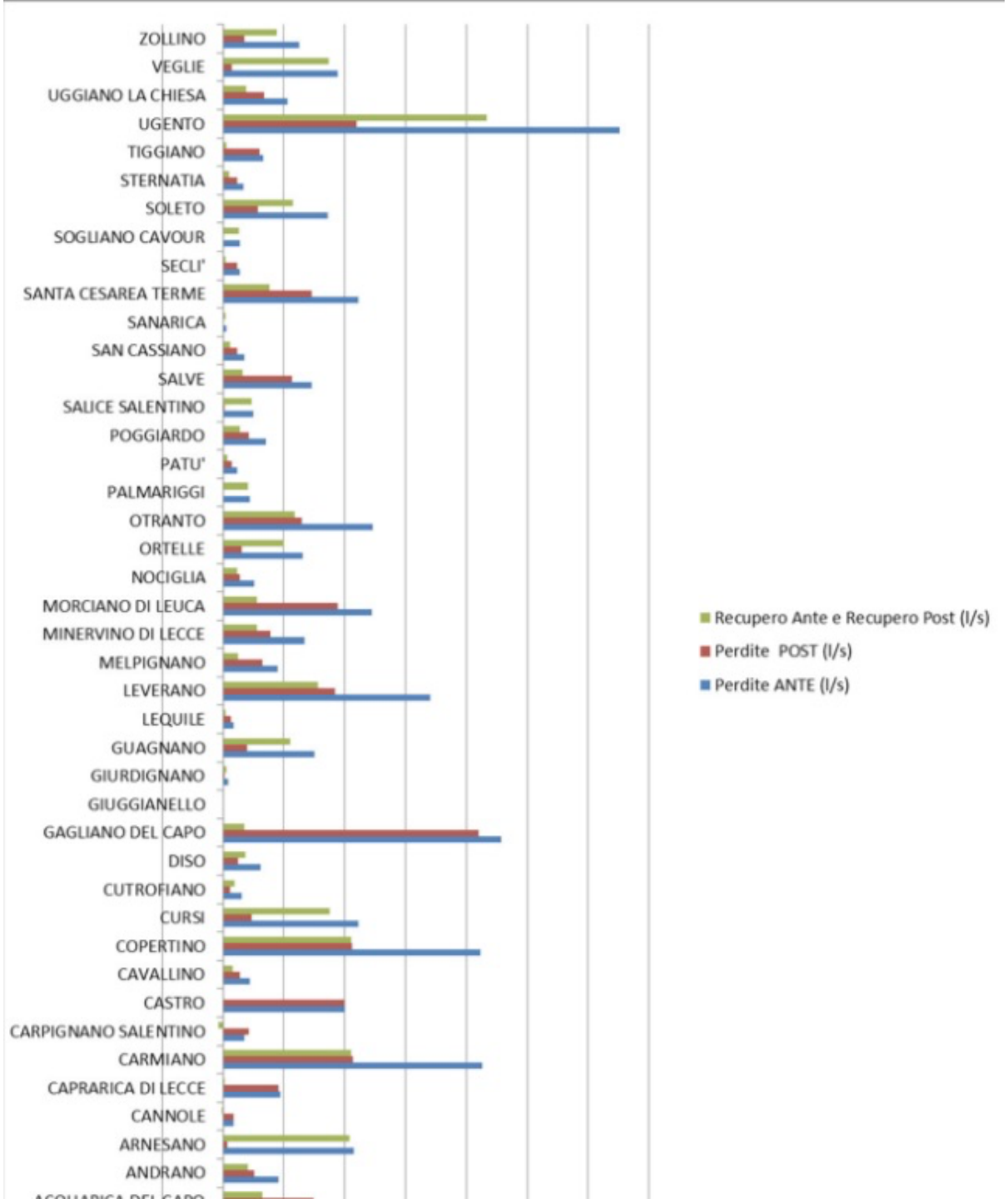
- Network geometry,
- Consumption of utilities,
- Flow and pressure measurements.

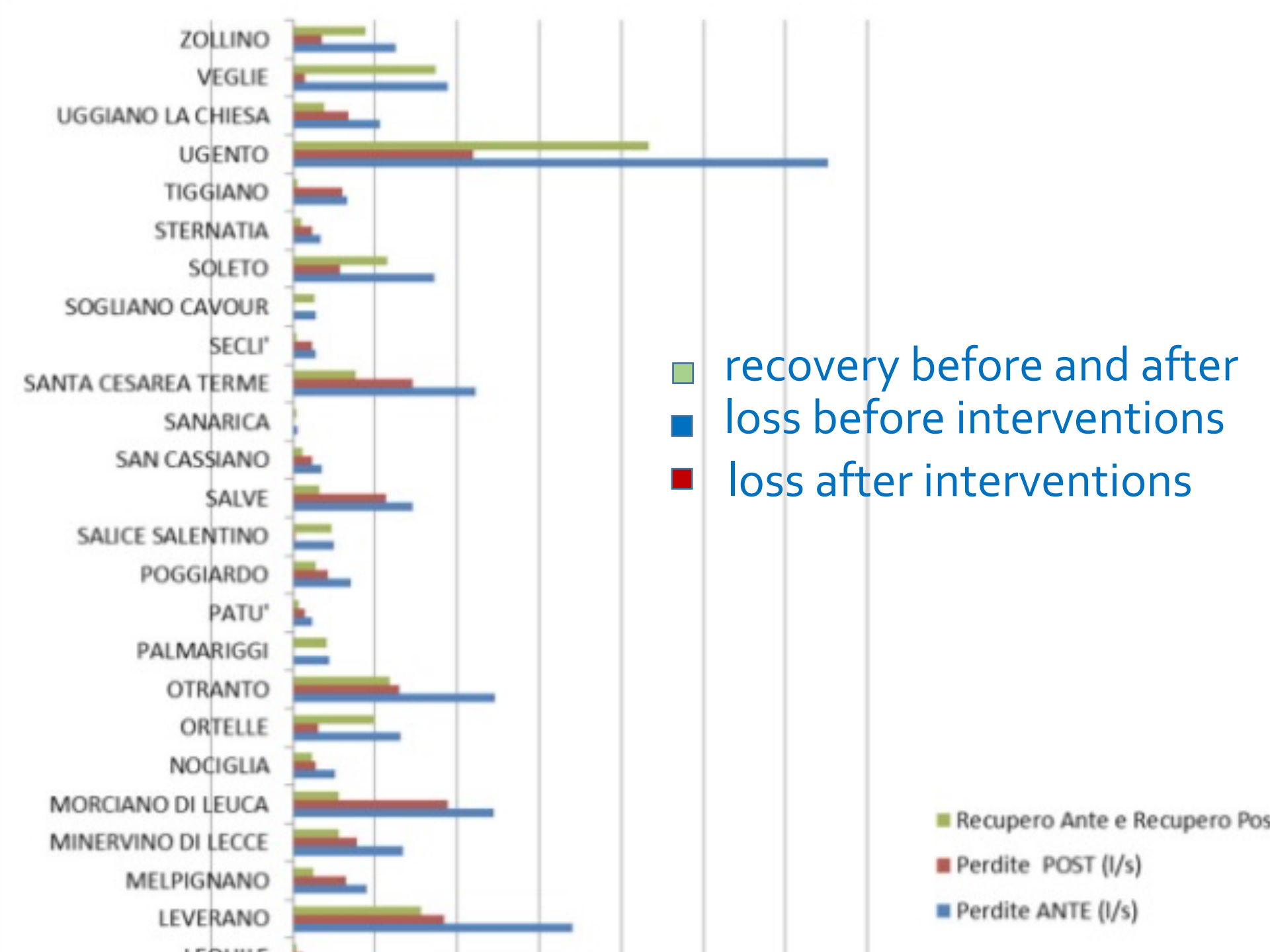
With reference to the input data relating to the geometry of the network, only the necessary changes were made following verification of the survey and the implementation of structural interventions.

Mathematical model

As far as the flow measurements are concerned, updated data were used from pre-existing stations as well as data from fixed locations.

Using the values recorded by the pre-existing monitoring stations, the hydraulic model was calibrated, in order to configure a model that is as representative as possible of the real operation of the network and complies with the prescribed calibration values.


ZOLLINO
VEGLIE
UGGIANO LA CHIESA
UGENTO
TIGGIANO
STERNATIA
SOLETO
SOGLIANO CAVOUR
SECLI'
SANTA CESAREA TERME
SANARICA
SAN CASSIANO
SALVE
SALICE SALENTINO
POGGIARDO
PATU'
PALMARIGGI
OTRANTO
ORTELLE
NOCIGLIA
MORCIANO DI LEUCA
MINERVINO DI LECCE
MELPIGNANO
LEVERANO
LEQUILE
GUAGNANO
GIURDIGNANO
GIUGGIANELLO
GAGLIANO DEL CAPO
DISO
CUTROFIANO
CURSI
COPERTINO
CAVALLINO
CASTRO
CARPIGNANO SALENTINO
CARMIANO
CAPRARICA DI LECCE
CANNOLE
ARNESANO
ANDRANO
Recupero Ante e Recupero Post (l/s)
Perdite POST (l/s)
Perdite ANTE (l/s)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POGGIARDO
PATU'
PALMARIGGI
OTRANTO
ORTELLE
NOCIGLIA
MORCIANO DI LEUCA
MINERVINO DI LECCE
MELPIGNANO
LEVERANO
recovery before and after
loss before interventions
loss after interventions
Recupero Ante e Recupero Pos
Perdite POST (l/s)
Perdite ANTE (l/s)

The Apulian Aqueduct S.p.a. is engaged in a significant work of modernization and upgrading of infrastructures to adhere to the renewed needs of the territorial fabric served, taking into account the progressive drying up of traditional sources of supply (artificial reservoirs, artesian wells).

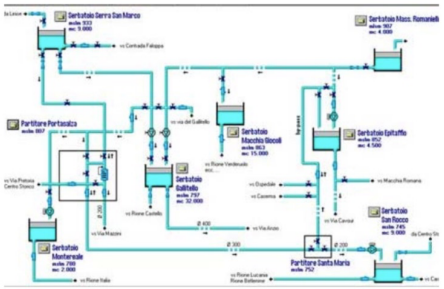
At today the loss is still at 40%

Among the most significant actions, the creation of an innovative network remote control system that will guarantee a rational management of the available resource, an extraordinary plan for the search for losses and reorganization of the networks.

Integration of "software based" control of water systems

Geographical Information System

Georeferencing of water networks (and other infrastructures) with the possibility of integration with other information systems of the operator: georeferencing of water meters, consumption data, historicized logging of breakdowns and breakdowns.



SCADA

Remote control in real time of management measures (tank levels, pressures, flow rates, water quality, etc.) with the possibility of automation of processes and equipment (control valves, pumps, etc.).

Smart metering

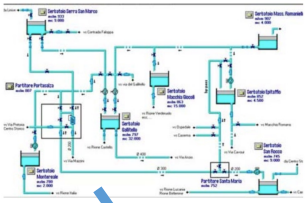
The remote reading systems significantly improve the quality of the service rendered to users, but they will allow the management of the distribution networks in a more efficient way in a "smart water grid" perspective.

Net simulation models

Of fundamental support for the planning of rehabilitation interventions but also for orienting decisions in the operations

GIS

SCADA



Smart metering

Work register

Net simulation

Automatic integration
of data and their "smart" use through mathematical analysis algorithms , hydraulic data and statistics

Other Data

- Demographic data
- Climate data
- Customer Service
- Users

Decision Support System

Integration of management data (physical, process, user, work, etc.) to build decision support systems. Users

search for losses through satellite images

In 2016, AQP began a search for losses through an innovative technology, developed by an Israeli company UTILIS, based on satellite data acquisition. The satellite technology is based on the analysis, through an algorithm, of a subsoil scan using images acquired from a dedicated satellite, which uses electromagnetic signals with a wavelength able to penetrate the ground.

In a pilot project, using satellite imagery, the company UTILIS analyzed 1500 km of urban network and some tens of km of supply pipelines included in a geographical territory comprising 15 municipalities in the province of Bari.

In the third quarter of 2016, a result map containing the pre-location of approximately 400 presumed water leaks in the areas subject to experimentation.

The checks carried out in the field made it possible to ascertain that in less than 50% of the cases there were actually water leaks.

Furthermore, for many distribution networks the number of presumed leaks reported with this technology was significantly lower than expected on the basis of the AQP water balance data.

BUILDING A SIMPLE ANSWER TO A COMPLICATED SUBSIDENCE PROBLEM

RHETICUS® DISPLACEMENT MONITORS THE HEALTH OF UNDERGROUND INFRASTRUCTURE FROM SPACE

Satellite displacement monitoring to reveal loss (Rheticus by Planetek)

Water, ABC Naples testing satellite platform against loss

A "Remoted Operated Vehicle" (Rov), or an underwater drone, to make it through the main pipeline of water supply which, from the sources of the Sele river, reaches Puglia, and verify the existence of losses.

Video here: https://youtu.be/MOk8adZtNTY?t=1m5s