ECOMAWARU

ECO-sustainable MAnagement of WAter and wastewater in RUral communities

D3B – A3
Technical report on the GIS platform implementation

30th September 2013

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ACTION 3: Analysis of the territory and the present management

Action 3 is devoted to the survey and acquisition of data regarding the management of wastewaters and storm water discharges and the related state of degradation of runoff quality particularly focusing on the impact of the main infrastructure of the urban environment. Municipality of Varese Ligure is responsible for this action. The final object of the task is to implement a GIS platform concerning the management and treatment of wastewater effluents and storm water runoff. This report is organized in two sections named sewer network and stormwater drainage network. In the sewer network section, the data of the sewer system that have been collected and implemented in the GIS platform have been described. The data collected refer to the layout of the network and to the technical characteristics of the waste water treatment system (Waste water treatment system and Imhoff tank).In the stormwater drainage network section the data of the drainage system that have been collected and implemented in the GIS platform have been described together with to the main characteristics of receiving water bodies. This action has been implemented by the Municipality of Varese Ligure.

Action 3 is devoted to the survey and acquisition of data regarding the management of wastewaters and storm water discharges and the related state of degradation of runoff quality particularly focusing on the impact of the main infrastructure of the urban environment. Municipality of Varese Ligure is responsible for this action.
The data collected have been organized on a GIS platform. The Municipality of Varese Ligure has selected the GeoMedia software that is a powerful, flexible GIS management platform. GeoMedia provides simultaneous access to geospatial data in almost any form, uniting them in a single map view for efficient processing, analysis, presentation, and sharing. In addition, it has some specialized functionality that makes it ideal for anyone who needs to extract information from an array of ever-changing data to support smarter decisions.

The data collection have been focused on the overall drainage system including the sewer network, the local treatment systems (Imhoff tanks), the treatment plants and the storm water network.
As for the sewer network the following information have been collected and implemented in the GIS platform:

- Layout of the sewer network;
- Technical details for each pipe (Depth of the laying, Material, Size in mm, Cross section shape, Water Typology and Construction Year).

As for the local treatments the following information have been collected and implemented in the GIS platform:

- Details for each building/settlement (owner, hamlet name, address, building typology, authorization number and data);
- Technical details for treatment system (Typology of treatment system, geometry data, Water Typology and Construction Year);
- Technical details for each pipe (Depth of the laying, Material, Size in mm, Cross section shape, Water Typology and Construction Year);
- Technical details for the receiving body (Depth of the laying, Material, Size in mm, Cross section shape, Water Typology and Construction Year).

As for the stormwater drainage network the following information have been collected and implemented in the GIS platform:

- Layout of the drainage network;
- Technical details for each pipe (Depth of the laying, Material, Size in mm, Cross section shape, Water Typology and Construction Year).

The collected information contribute to complete the level of knowledge relating to the management of water and wastewater in the territory of the Municipality of Varese Ligure. Such information have been included within the database used in the implementation of the GIS of Varese Ligure.
The data have been collected from public authorities acting on the territory and from the local community.

SEWER NETWORK

The municipal sewerage extends for about 10 km with PVC and PEAD collectors with diameters ranging from 110 to 400 mm. in the last two years, restructuring works were completed on the sewer in the hamlet of Salino, the sewer of Comuneglia was enlarged and a new separated sewer was made in Cassego; these works caused a reduction of the private civilian sewers, with certain benefits for each individual area.
In the last years, works were performed on the most important collectors in the main villages (Varese Ligure and San Pietro Vara); the works significantly reduced the problems occasionally arising from increases in the flow caused by seepage and heavy rains.

The layout of the sewer network for the main villages of Varese Ligure and San Pietro Vara has been reported in the following figures (Figure 1 to Figure 5). As an example in Figure 5 the technical details (depth of the laying, material, size, cross section shape, etc.) for a selected pipe of the San Pietro Vara sewer network have been reported. The location of the sewer system treatment plants of Varese Ligure and San Pietro Vara(Depuratore) is also reported on the corresponding map together with the main production activities.

The layout of the sewer network for the main hamlets of the Municipality of Varese Ligure (Cassego, Codivara, Codivilla, Comuneglia, Toceto and Costola) has been reported in the following figures (Figure 5 to Figure 9). The corresponding Imhoff tank (Fossa Imhoff) is also reported on the map.

Because of the high number of hamlets and single buildings/settlements dotted around the Varese Ligure territory there is not the economic feasibility/sustainability for the realization of an overall sewer system by the local authorities, therefore the area is not yet completely served by a public sewer system and local treatment systems have been installed. The location of the local treatment systems that are installed on the territory of Varese Ligure Municipality is reported in Figure 10.

For each local treatment systems the following data have been collected and implemented in the GIS platform:

- Technical details of the building/settlement: owner name, hamlet, adress, typology of Building, typology of discharge, authorization number and data authorization (see Figure 11);
- Technical details of the treatment system: treatment typology, geometry information, overall capacity and water typology (see Figure 12);
- Technical details of the conduit from the building/settlement to the local treatment system (see Figure 12);
- Technical details of the final receiving water body (see Figure 13).

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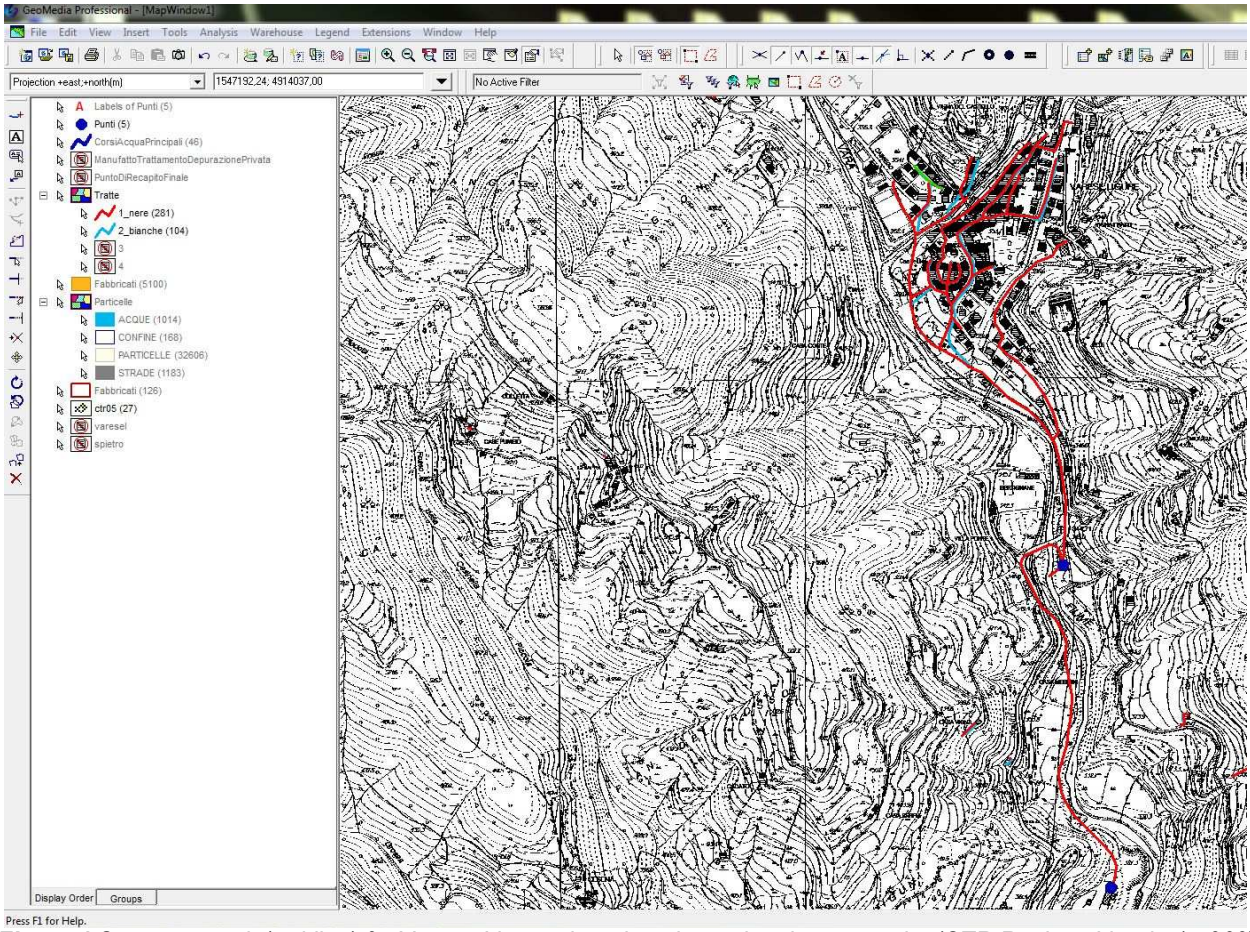

Figure 1 Sewer network (red line) for Varese Ligure plotted on the regional cartography (CTR Regione Liguria 1:5000)

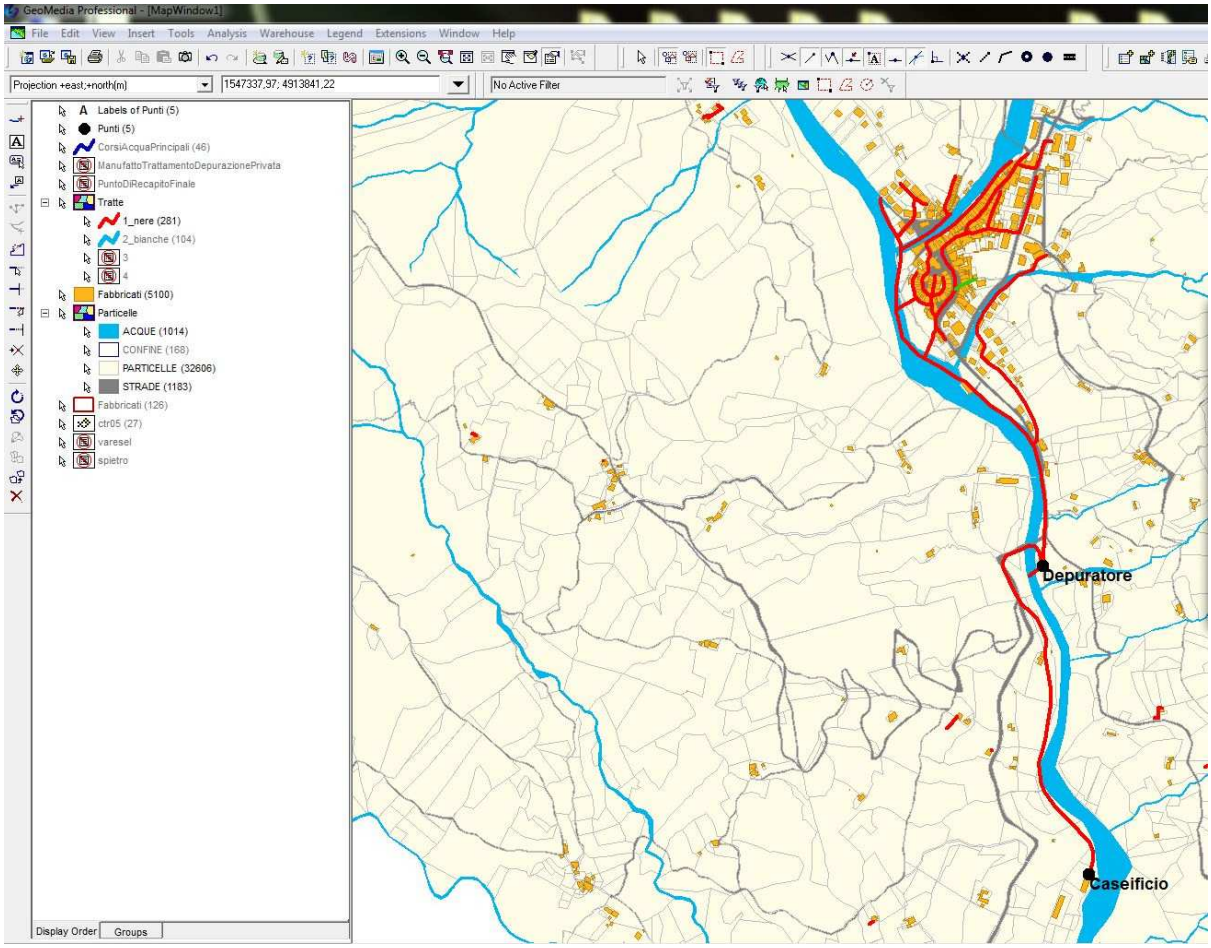

Figure 2 Sewer network (red line) for Varese Ligure plotted on the Land Registry Map. The location of the sewer system treatment plant of Varese Ligure (Depuratore) is reported on the map together with the main production activity that is the dairy factory (Caseificio).

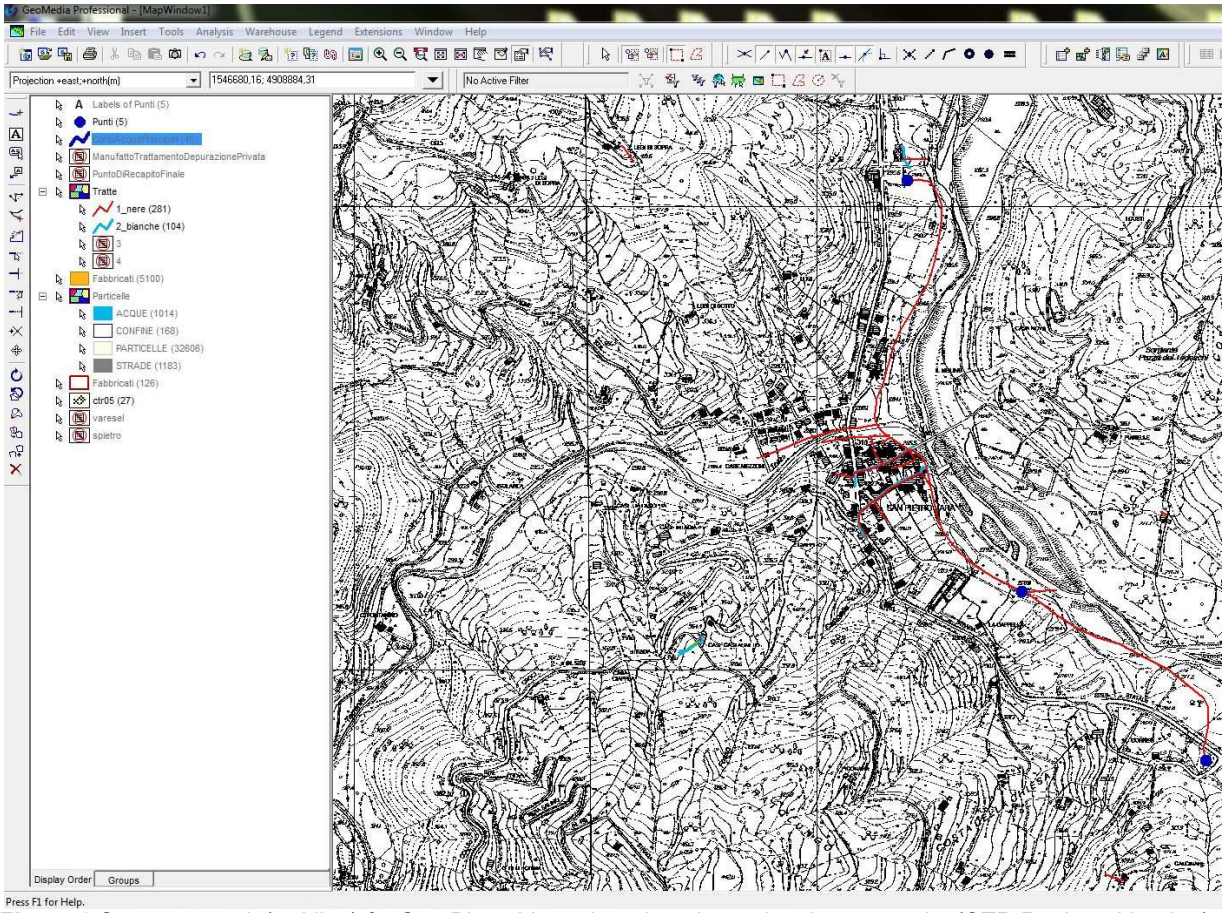

Figure 3 Sewer network (red line) for San Pietro Vara plotted on the regional cartography (CTR Regione Liguria 1:5000)

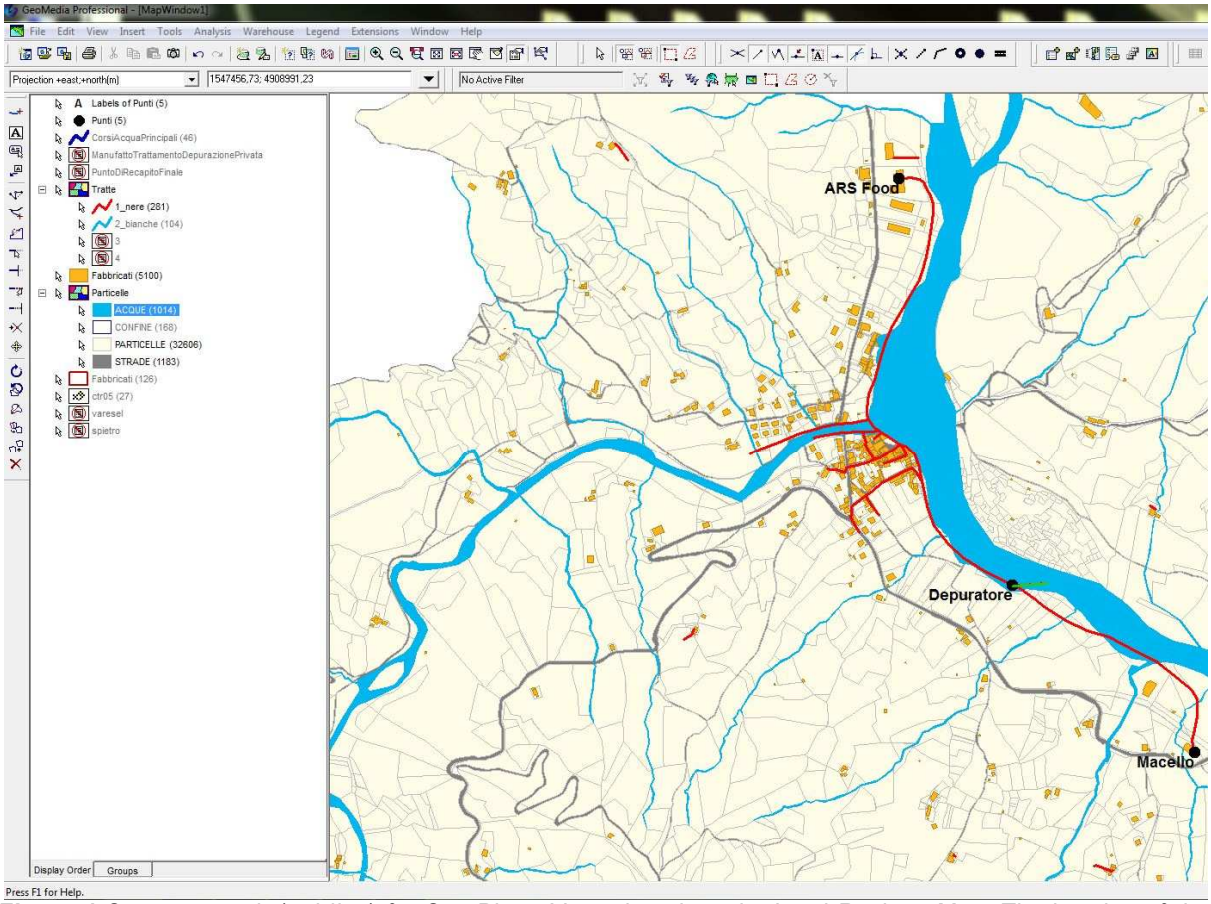

Figure 4 Sewer network (red line) for San Pietro Vara plotted on the Land Registry Map. The location of the sewer system treatment plant of San Pietro Vara (Depuratore) is reported on the map together with the two main production activities that are the yoguth factory and the slaughterhouse (ARS Food and Macello respectively).

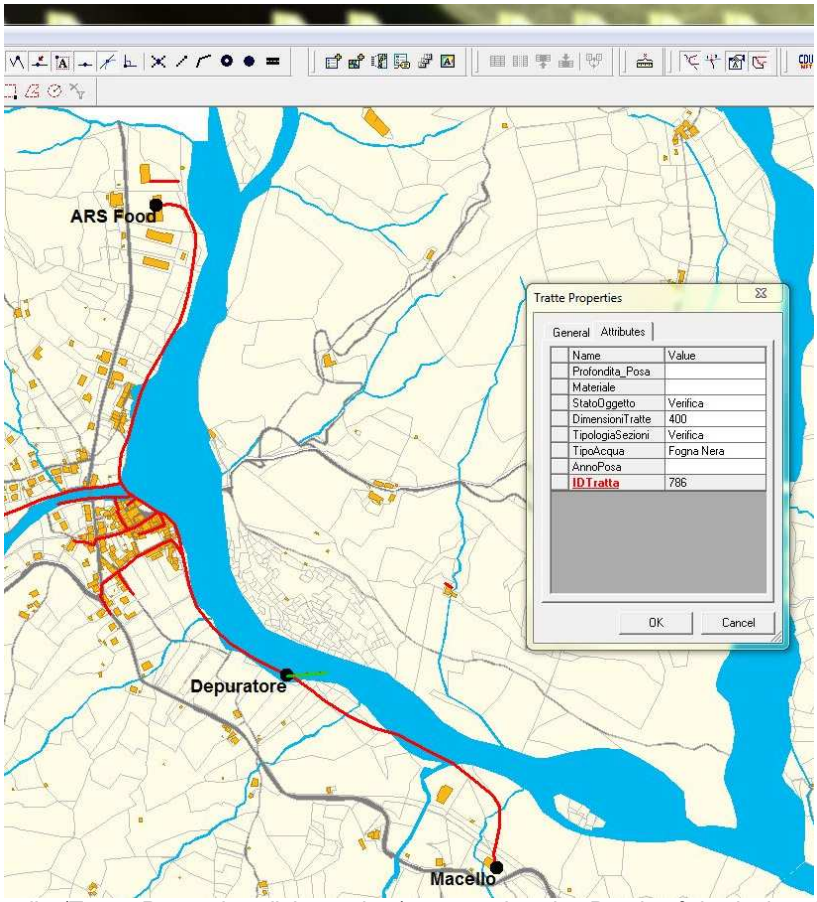

Figure 5 Technical details (Tratte Properties dialogue box) concerning the Depth of the laying, Material, Size in mm, Cross section shape, Water Typology and Construction Year for a selected pipe (green line) of the San Pietro Vara sewer network.

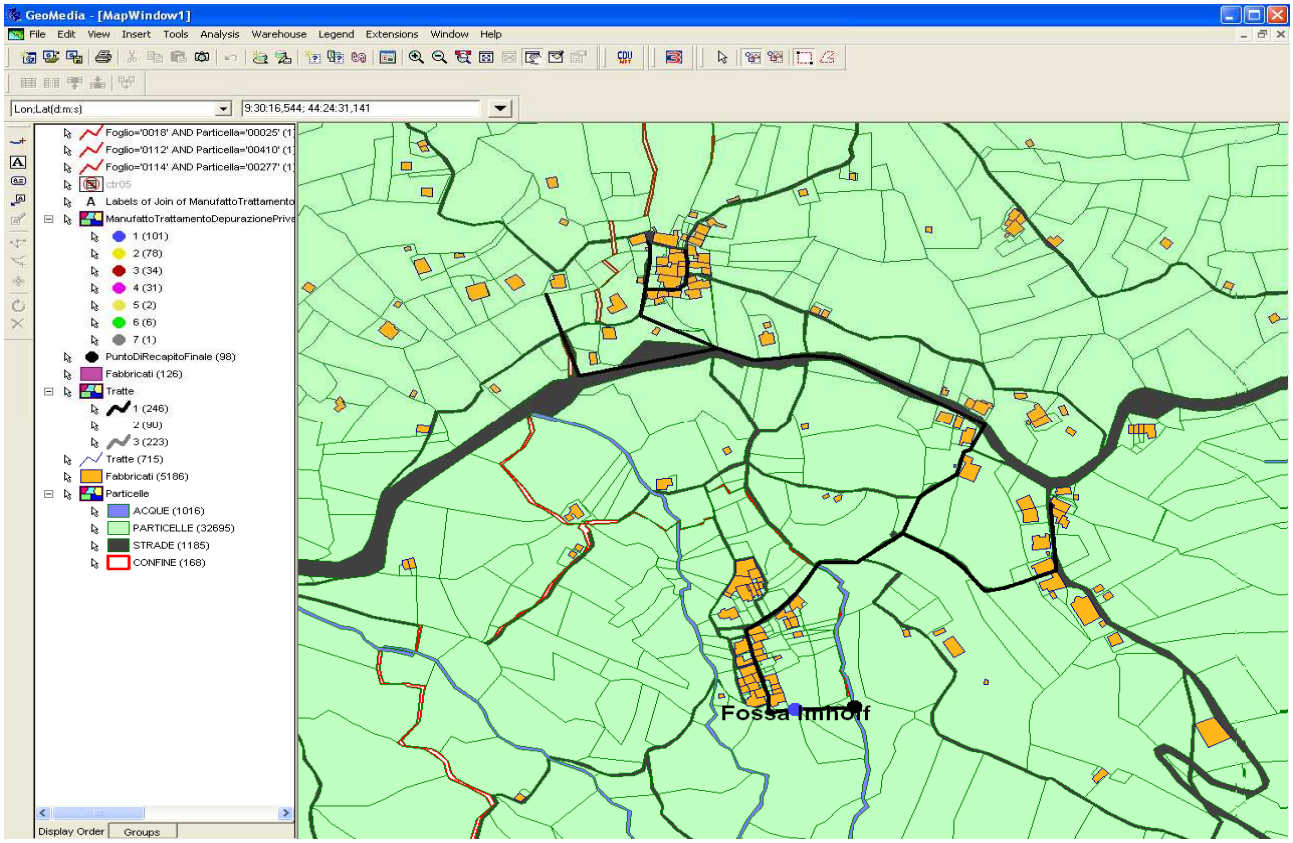

Figure 6 Sewer network (black line) for the Cassego hamlet. The corresponding Imhoff tank (Fossa Imhoff) is also reported on the map.

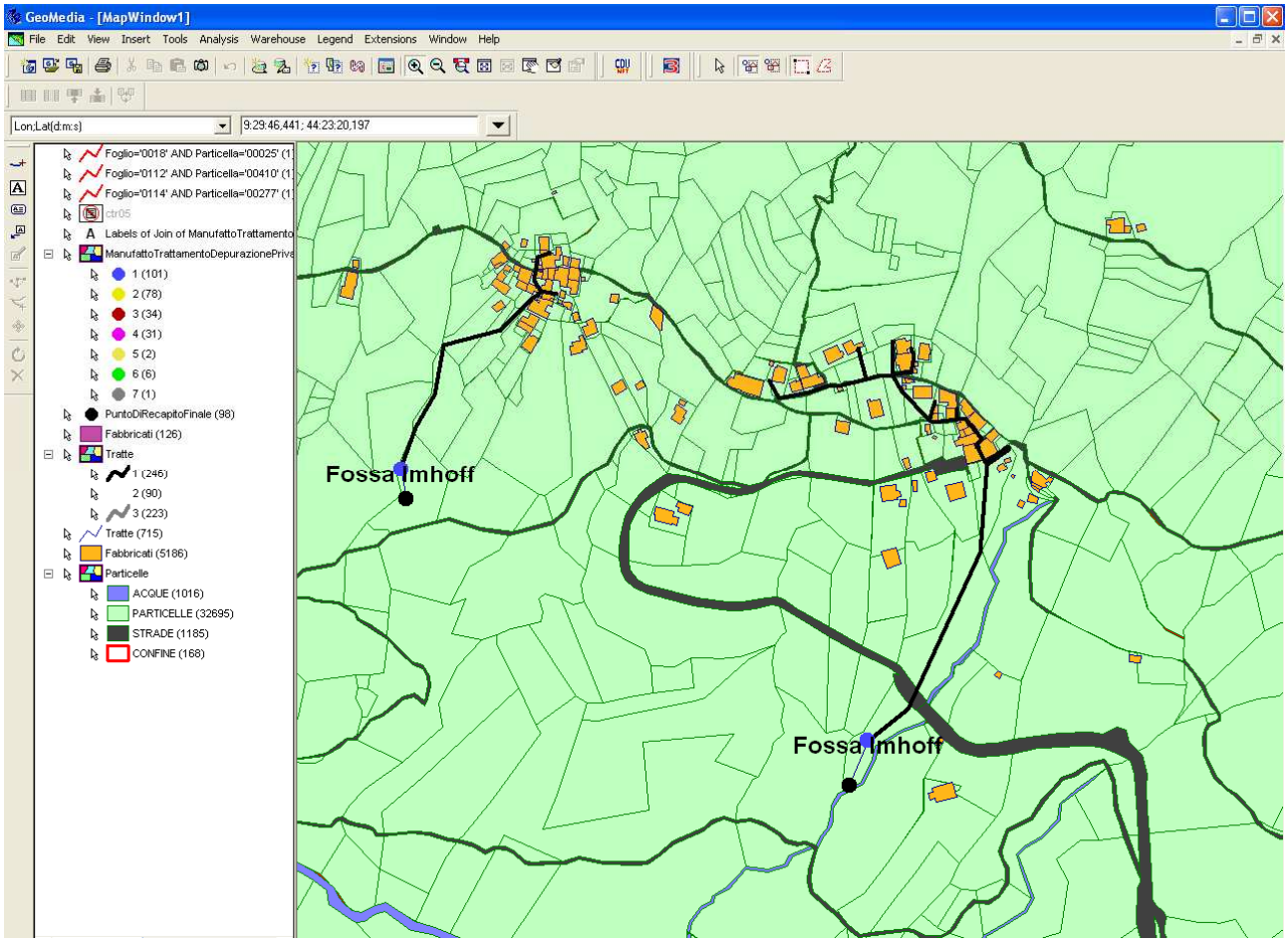

Figure 7 Sewer network (black line) for the Codivara and Codivilla hamlets. The corresponding Imhoff tank (Fossa Imhoff) is also reported on the map.

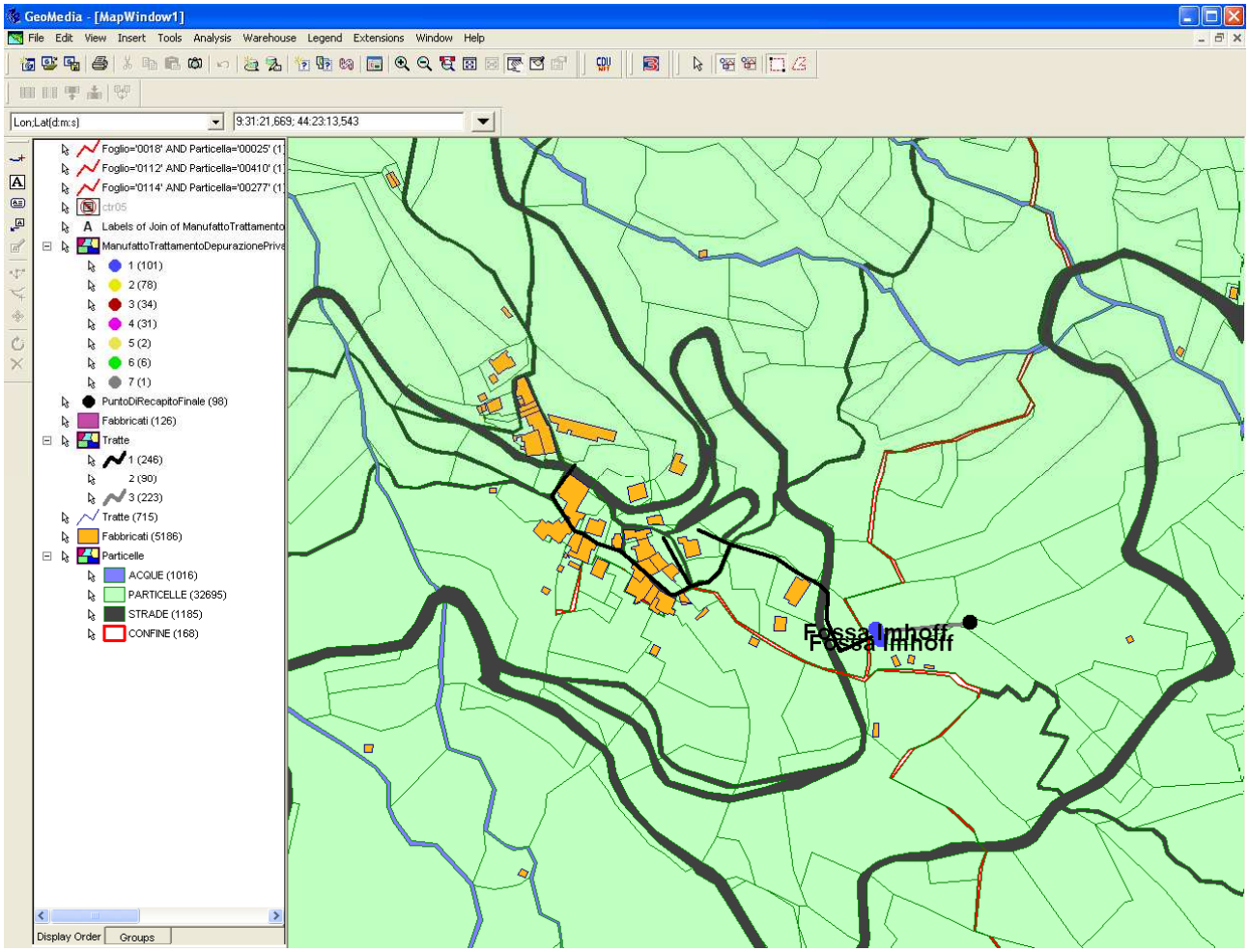

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Figure 8 Sewer network (black line) for the Comuneglia and Toceto hamlets. The corresponding Imhoff tank (Fossa Imhoff) is also reported on the map.

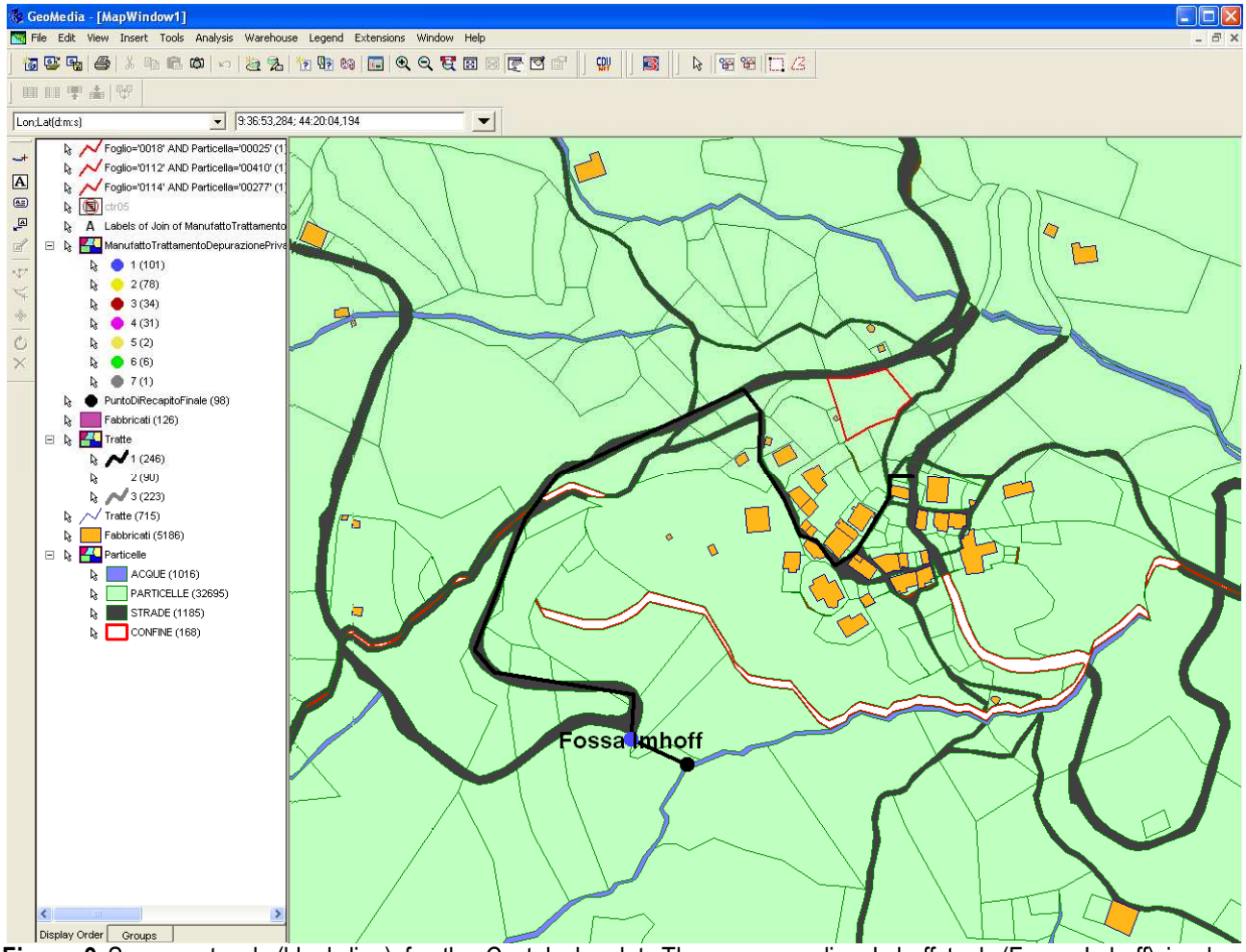

Figure 9 Sewer network (black line) for the Costola hamlet. The corresponding Imhoff tank (Fossa Imhoff) is also reported on the map.

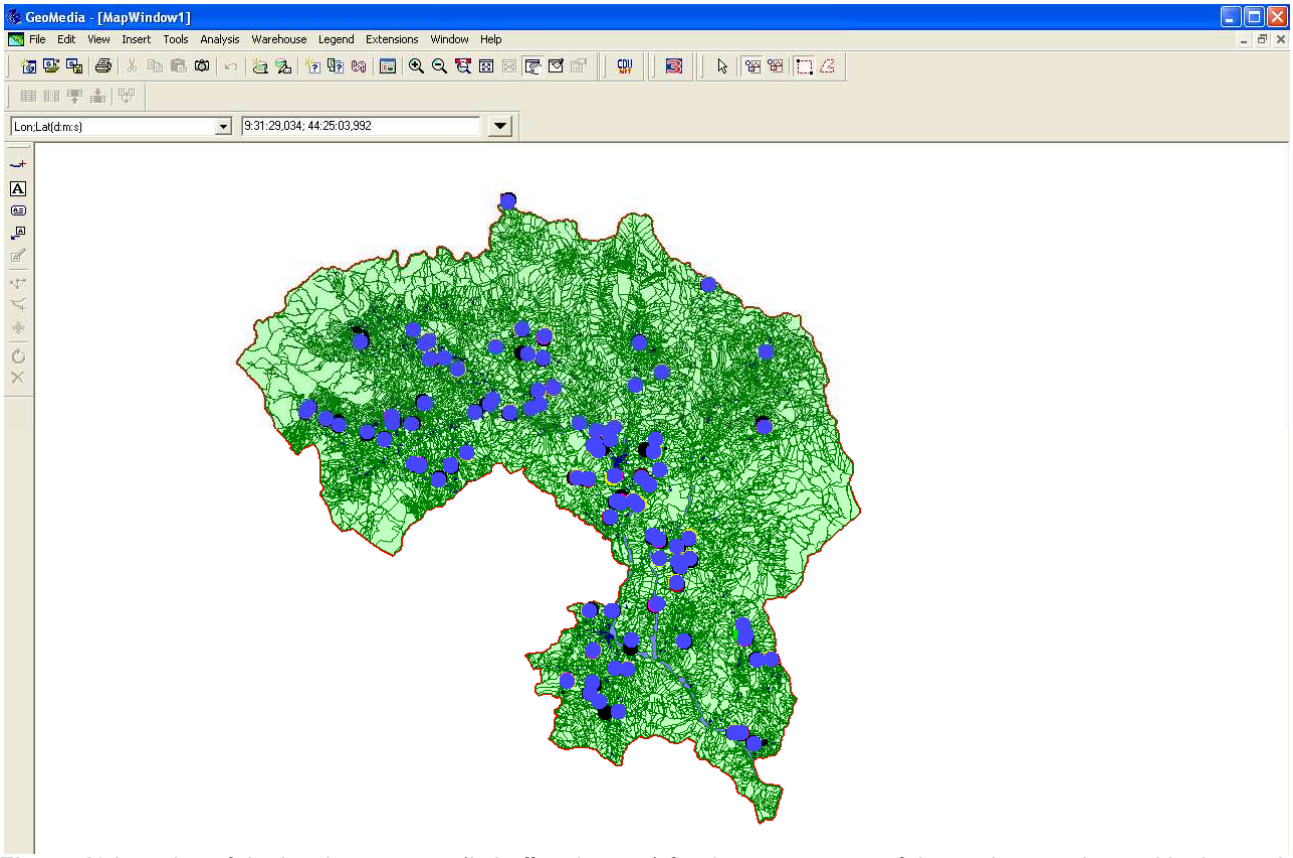

Figure 10 Location of the local treatments (Imhoff tanks, etc.) for the waste water of the settlements located in the rural areas of the Municipality of Varese Ligure.

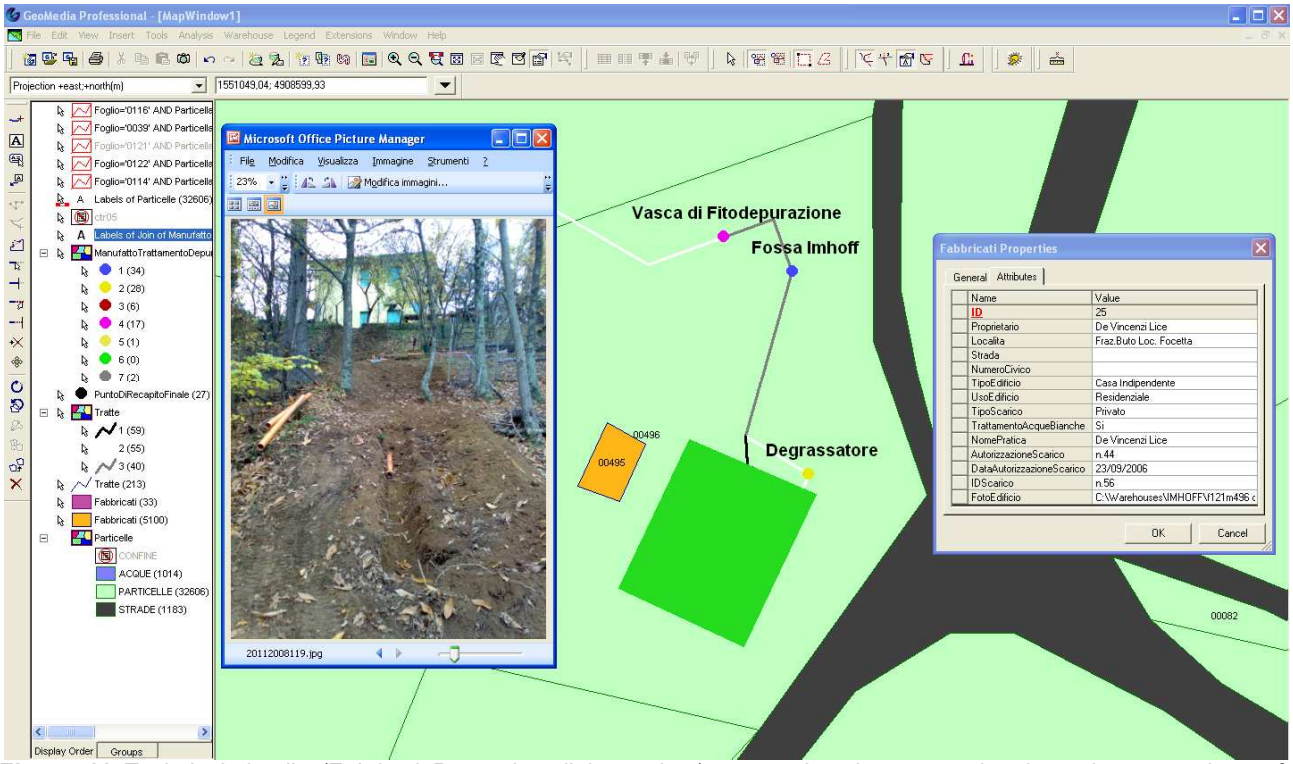

Figure 11 Technical details (Fabricati Properties dialogue box) concerning the owner, hamlet, adress, typology of Building, typology of discharge, authorization number and data authorization and pictures of the building that are jointed to a specific Imhoff tank.

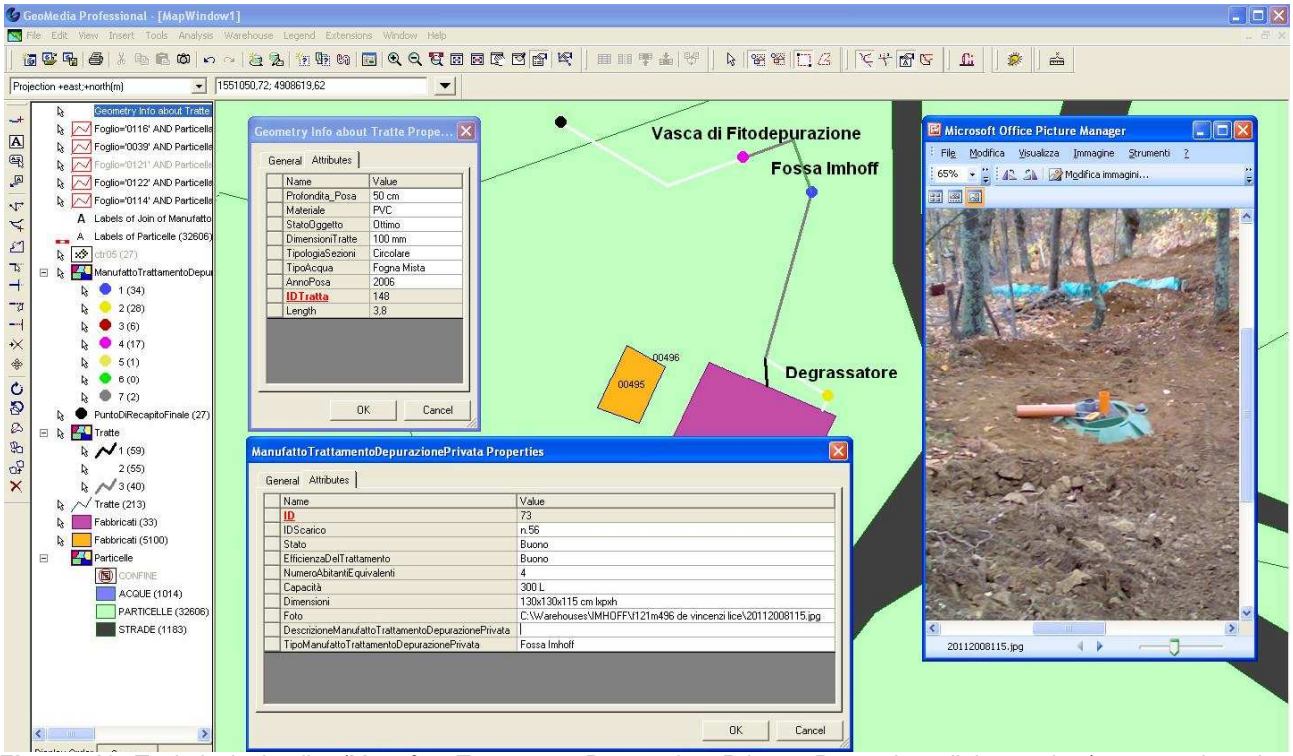

Figure 12 Technical details (ManufattoTrattamentoDepurazionePrivata Properties dialogue box) concerning the typology, dimension, and overall capacity of the local treatment system together with technical details (Geometry Info dialogue box) concerning the private pipe from the building to the local treatment system.

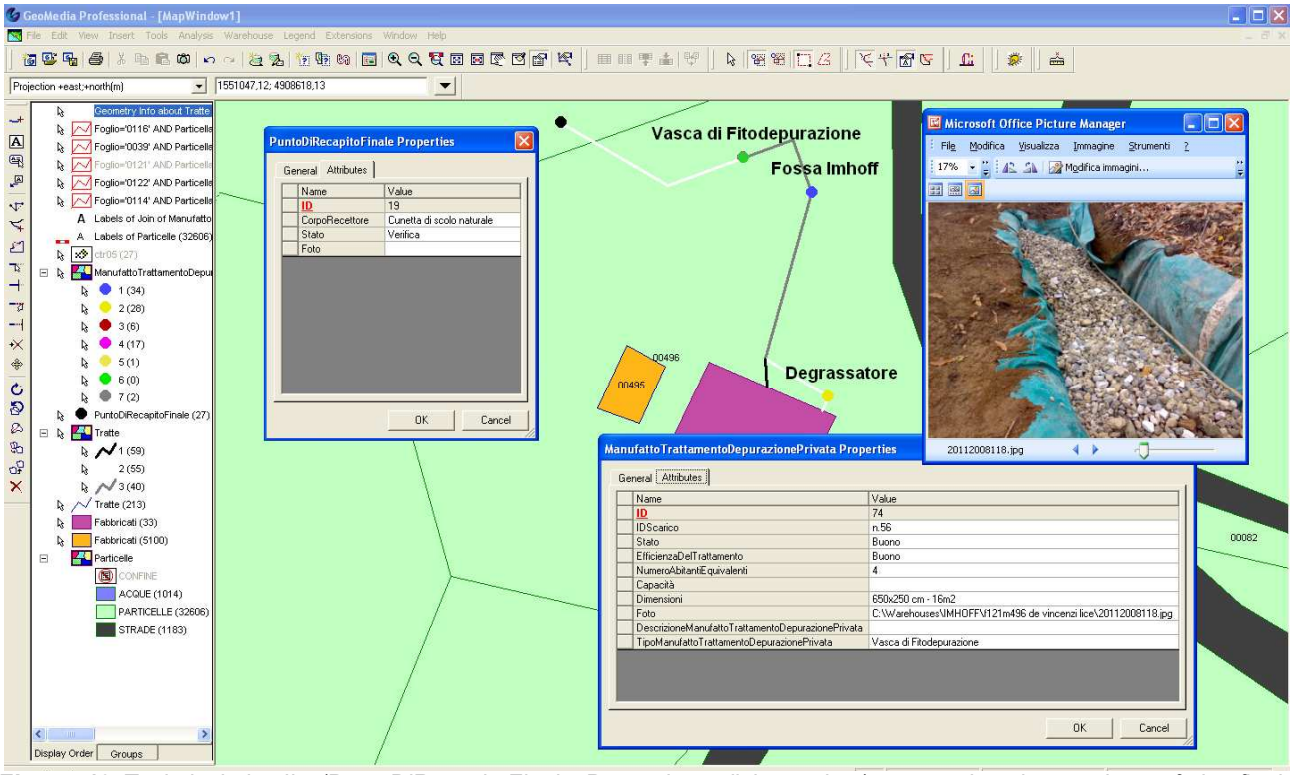

Figure 13 Technical details (PuntoDiRecapitoFinale Properties dialague box) concerning the typology of the final receiving water body.

STORM WATER DRAINAGE NETWORK

Nowadays, the two main villages of the Municipality of Varese Ligure are characterized by a separated sewer system, indeed recently the sewer system was refurbished and the separated sewer system (waste water and storm water drainage network) was accomplished in Varese Ligure and San Pietro Vara. The other main hamlets (Cassego, Codivara, Codivilla, Comuneglia, Toceto and Costola) are equipped only with the waste water network while the stormwater are directly discharge on the stream network.

The layout of the stormwater drainage network for the main villages of Varese Ligure and San Pietro Vara has been respectively reported in Figure 14 and Figure 16. As two examples in Figure 15 and Figure 17, the technical details (depth of the laying, material, size, cross section shape, etc.) for a selected pipe of the Varese Ligure and San Pietro Vara stormwater drainage network have been reported respacetively.

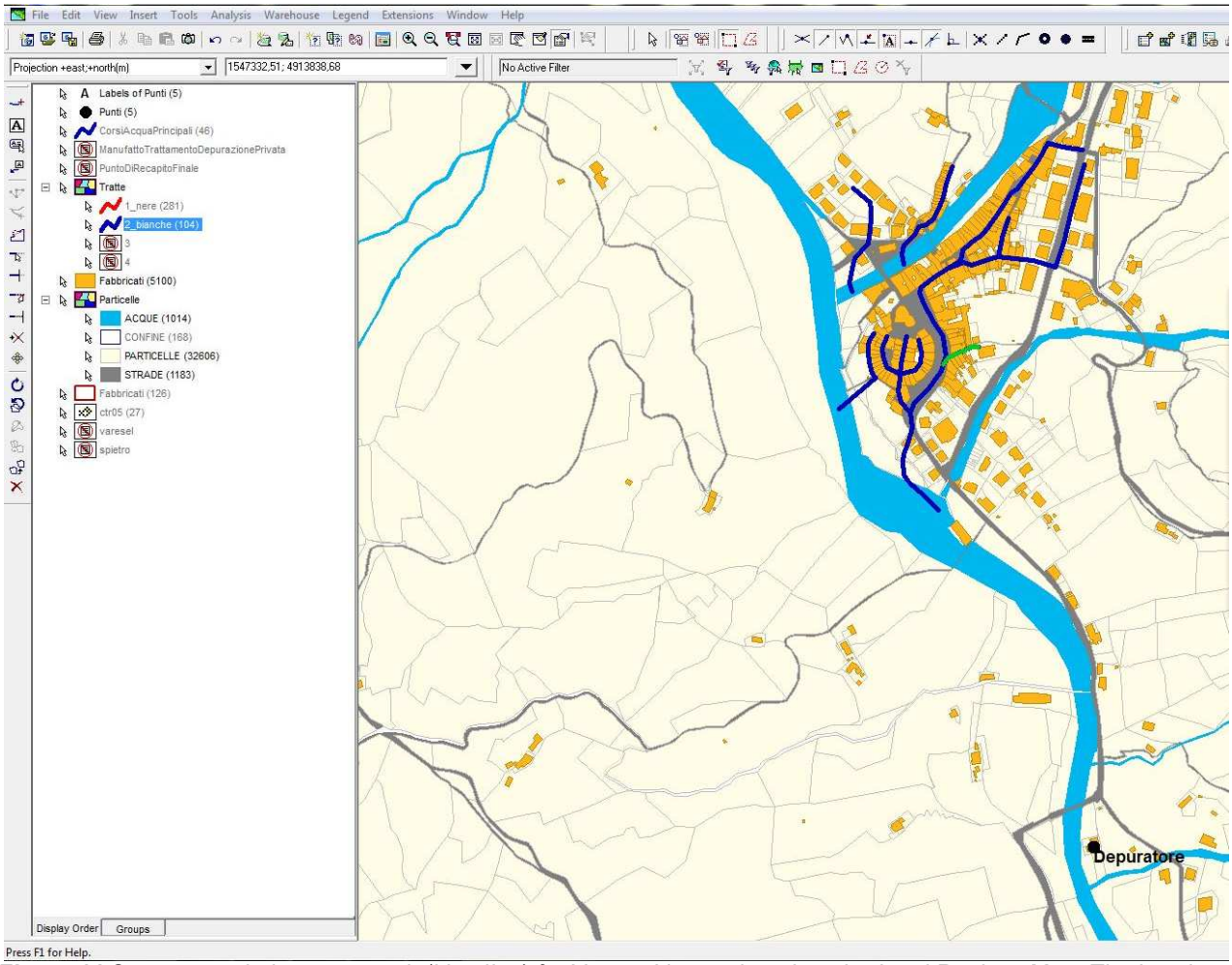

Figure 14 Stormwater drainage network (blue line) for Varese Ligure plotted on the Land Registry Map. The location of the sewer system treatment plant of Varese Ligure (Depuratore) is reported on the map.

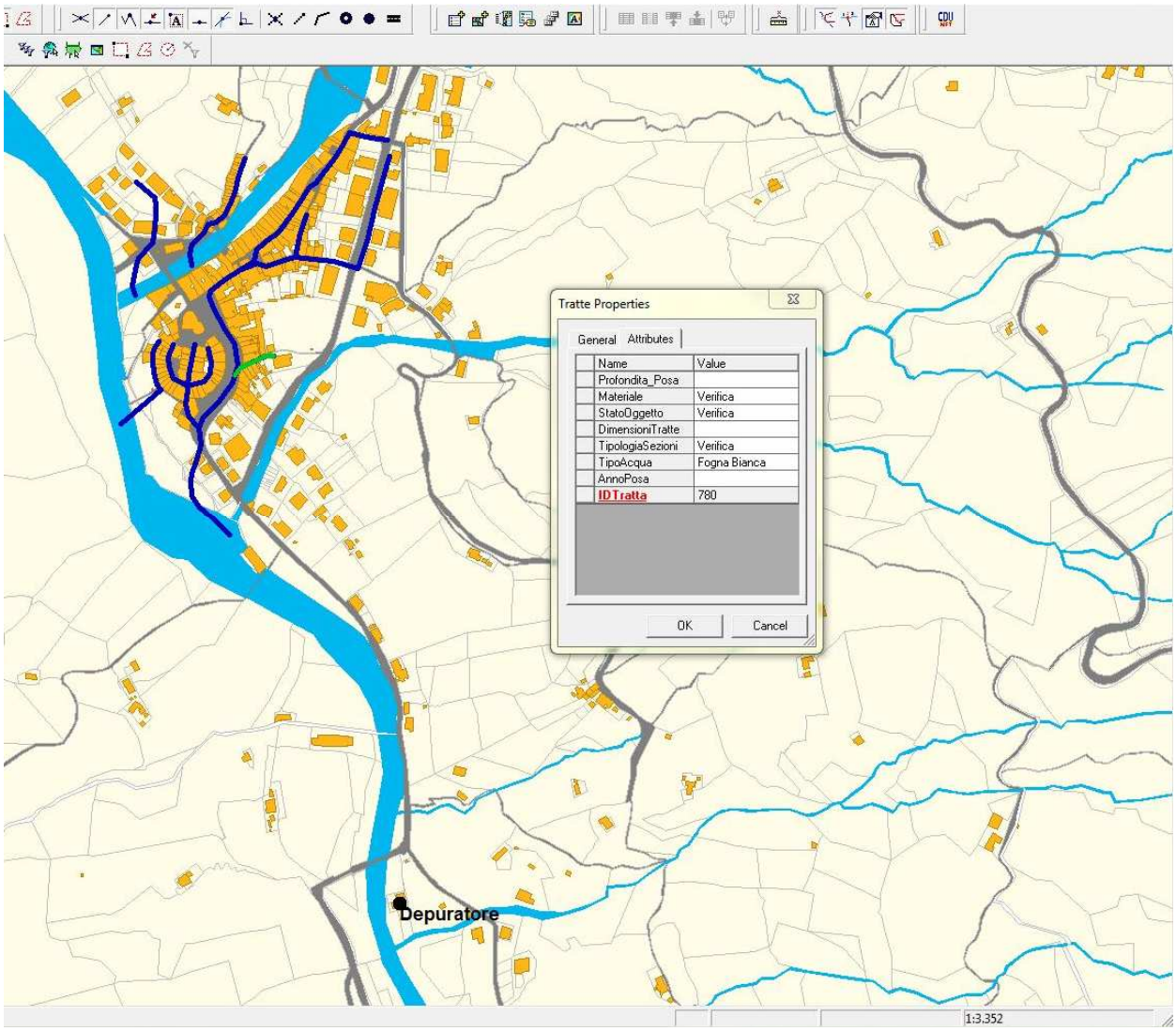

Figure 15 Technical details (Tratte Properties dialogue box) concerning the Depth of the laying, Material, Size in mm, Cross section shape, Water Typology and Construction Year for a selected pipe (green line) of the Varese Ligure stormwater drainage network.

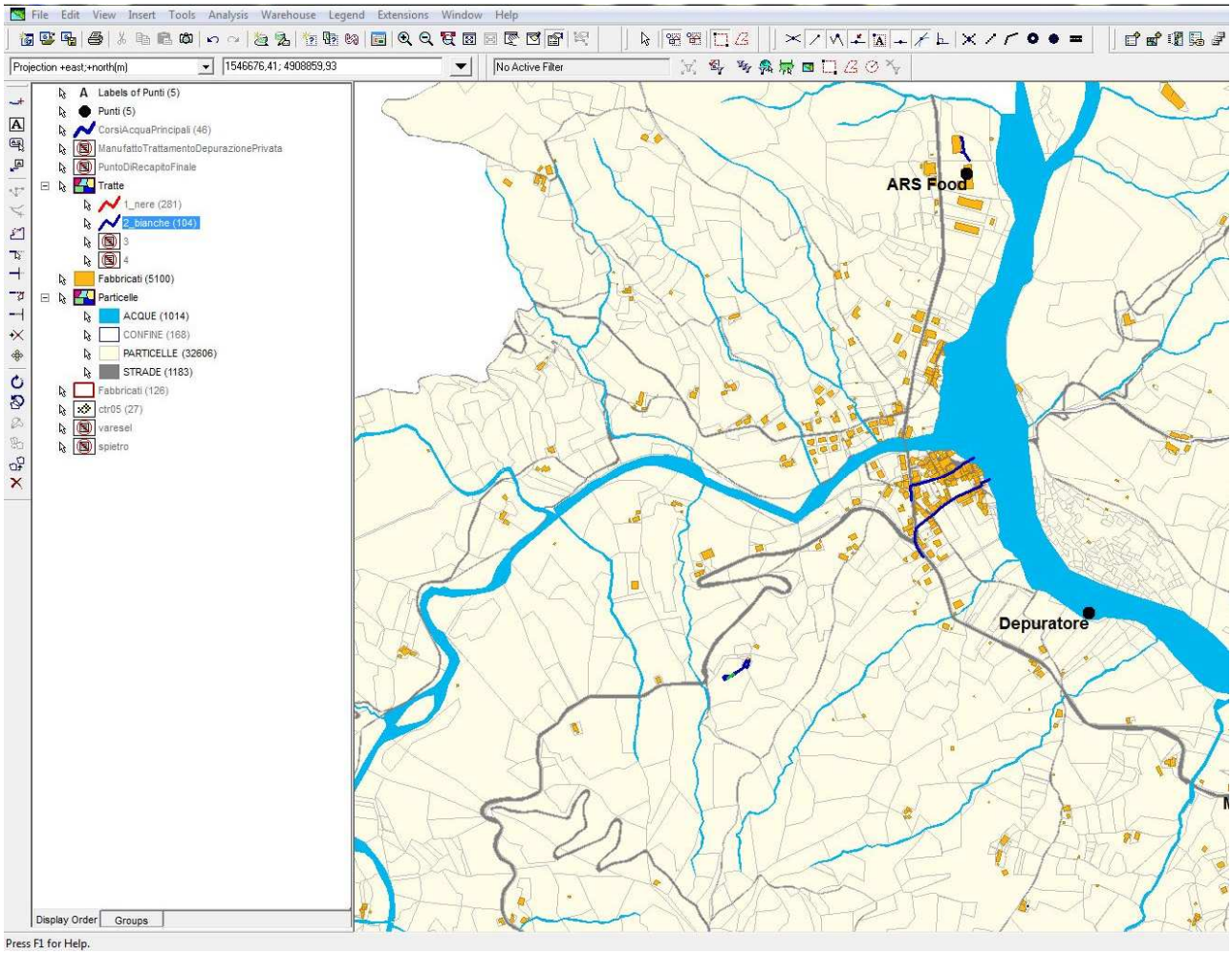

Figure 16 Stormwater drainage network (blue line) for San Pietro Vara plotted on the Land Registry Map. The location of the sewer system treatment plant of San Pietro Vara (Depuratore) is reported on the map.

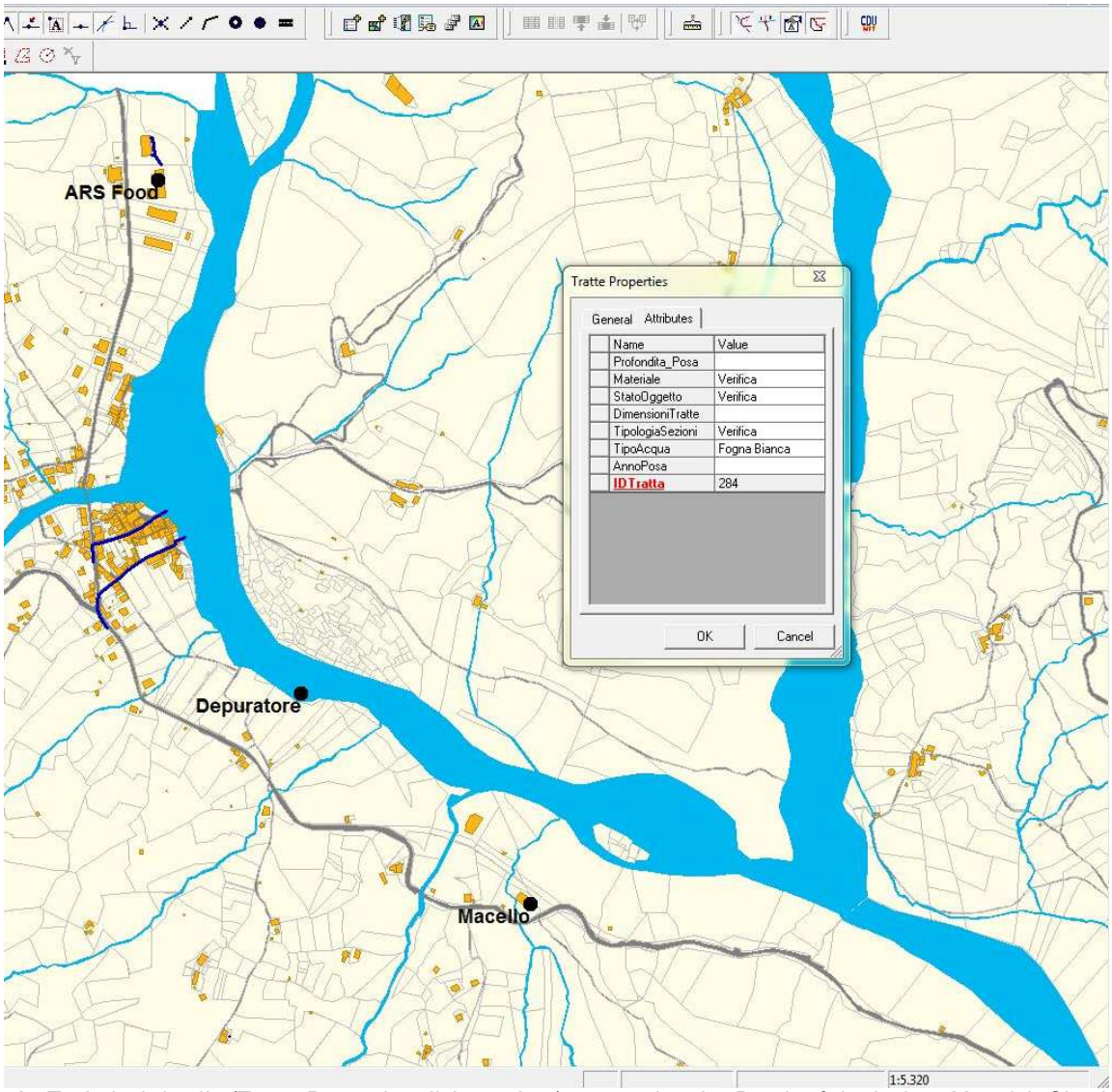

Figure 17 Technical details (Tratte Properties dialogue box) concerning the Depth of the laying, Material, Size in mm, Cross section shape, Water Typology and Construction Year for a selected pipe (green line) of the San Pietro Vara stormwater drainage network.