



MM

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Monitoring the health of water and sewerage networks



Milan Sewage Network

Extent: **1560** km (sewage)

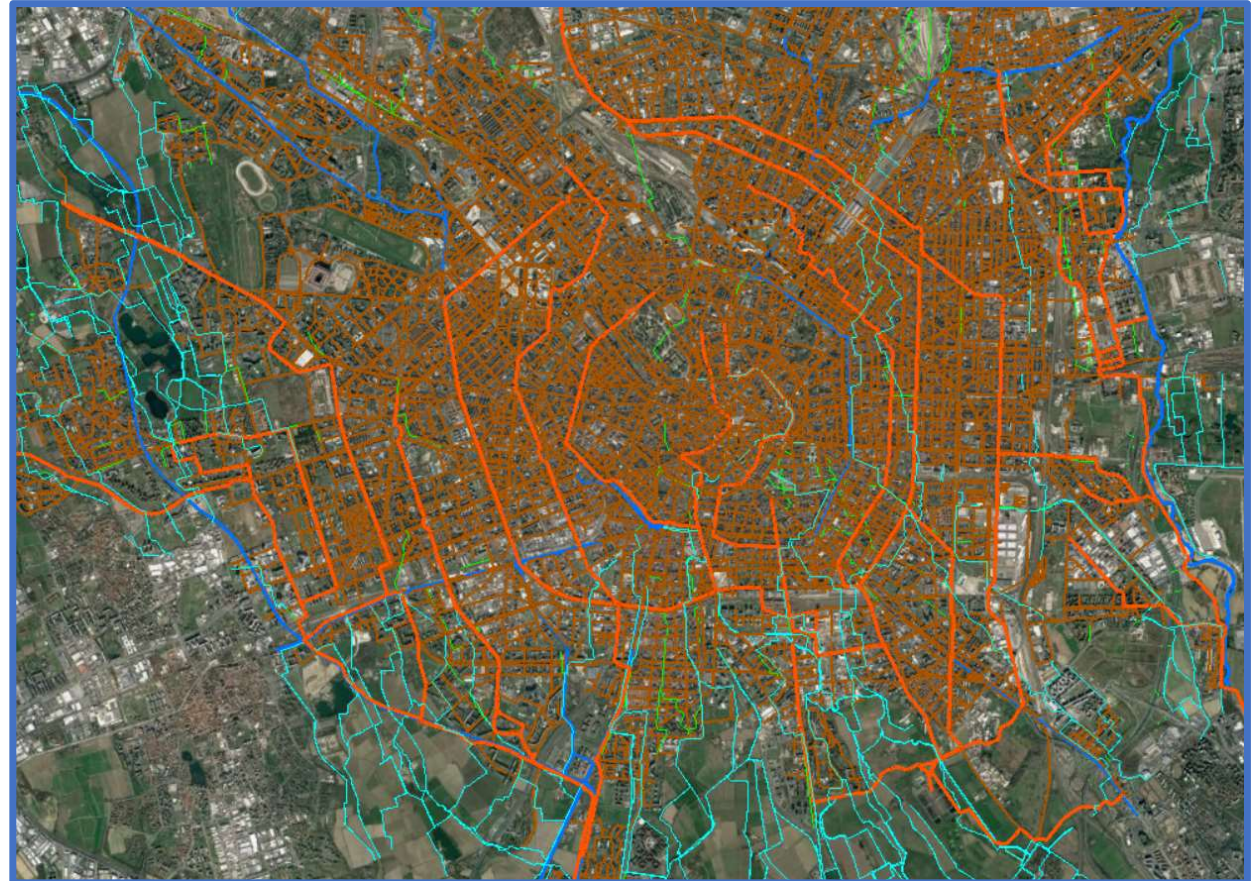
Surface covered: **193** km²

Type of sewage: mixed

Average slope: **1.50** ‰

Terrace system: drainage basins at different heights

Average age: **66** years



Sewage functional diagram

Secondary network
(closed links)



Main network
(tree diagram)

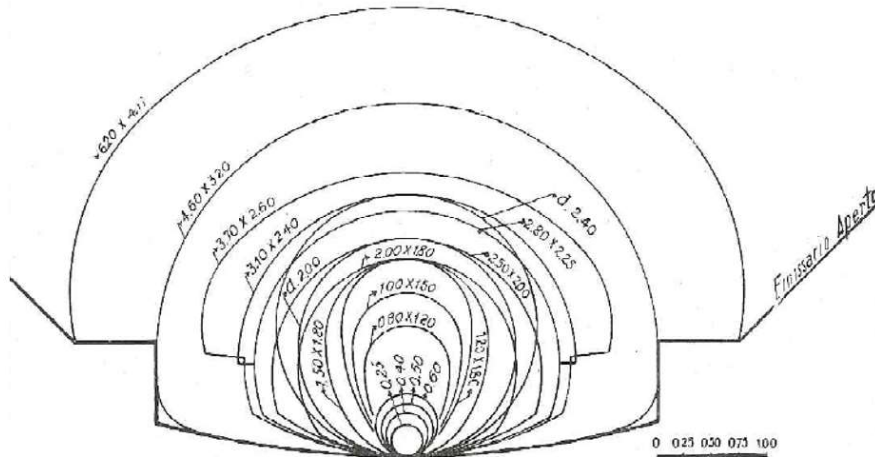


Water purifier



Milan Sewage Network

FORMA E DIMENSIONI DELLE CANALIZZAZIONI DELLE RETI DI MILANO



CONSTRUCTION MATERIALS

Main construction materials used:

- Bricks and concrete
- Simple concrete
- Reinforced concrete
- Ceramic stoneware

TYPE OF DUCTS	Extent (km)	%	Reservoir (m ³)
Minor ducts (A <1 m ²)	1.212,70	77,70%	688.144,46
Interzonal Collectors (1 <A <3 m ²)	242,97	15,57%	401.271,93
Big Collectors (3 <A <20 m ²)	105,13	6,73%	696.768,47
Total	1.560,80	100%	1.786.184,87



Milan Sewage Network

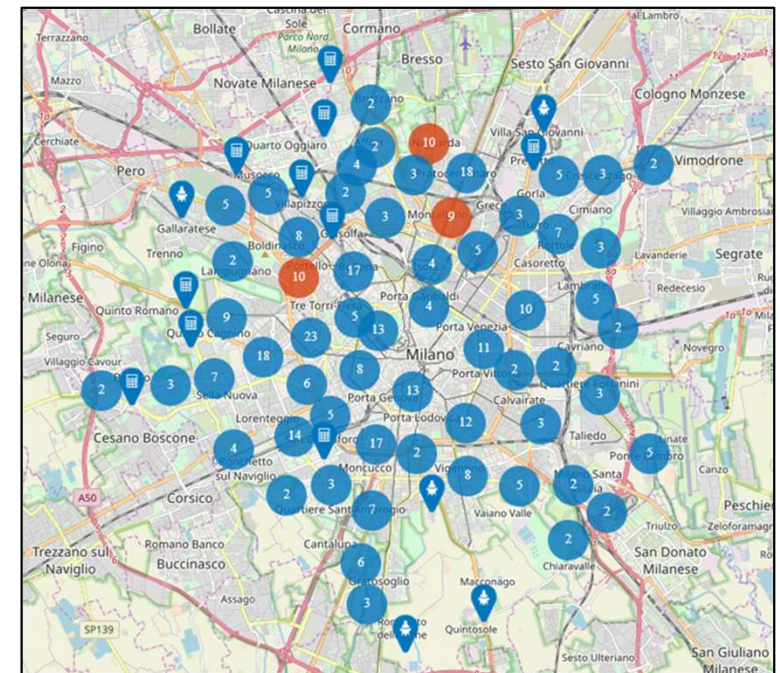
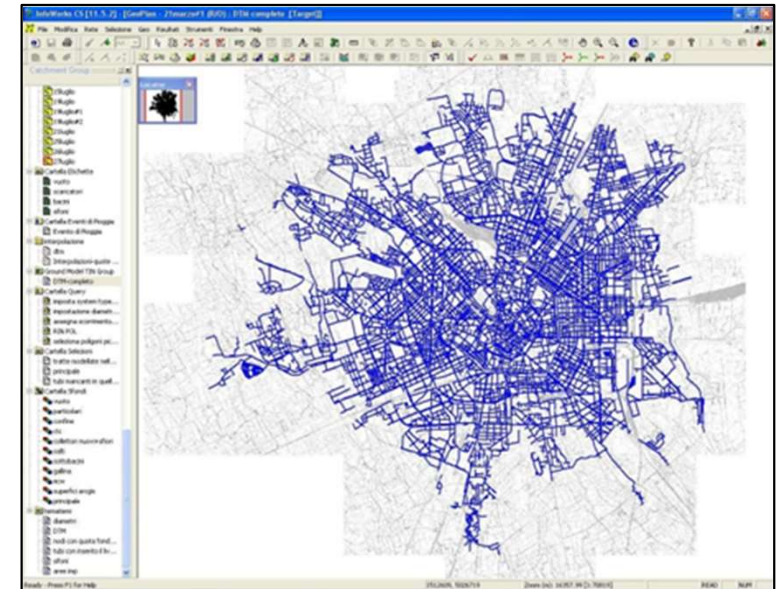




Milan Sewage Network

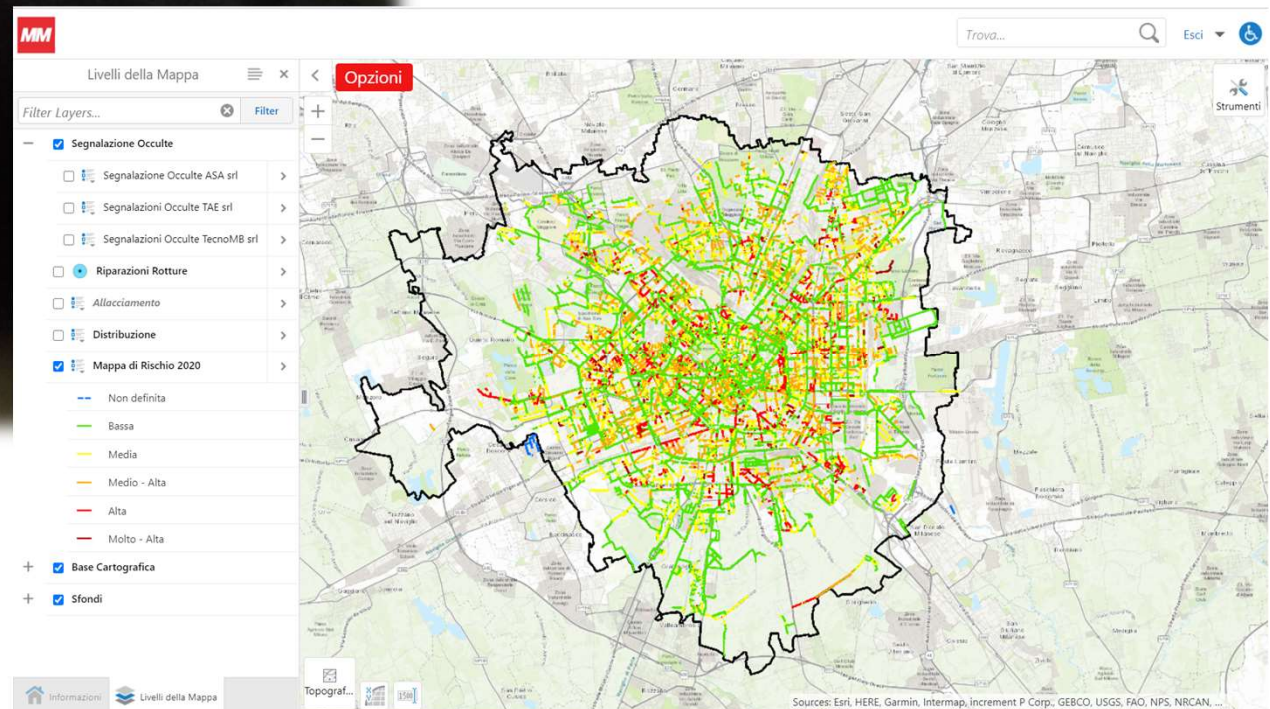
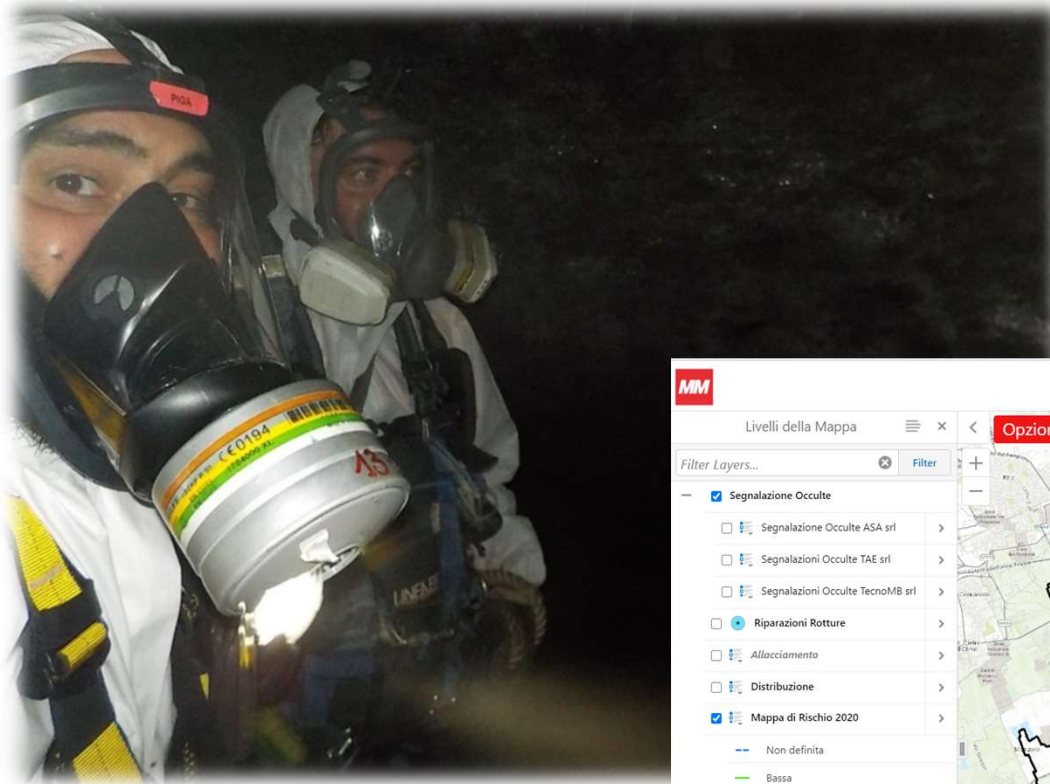
The structure of the Milan sewage - mesh network and interconnection of ducts - is homogeneous over the entire urban basin and differs from the networks of the surrounding municipalities (tree networks):

- ❑ **High reservoir capacity**
in case of rainy events of significant intensity, the dimensions of the ducts and their interconnection allow for the accumulation of rainwater in the network ($1,650,000 \text{ m}^3$; $\approx 130 \text{ m}^3 / \text{ha}$) and for the transfer of the excess flows to the contiguous areas, slowing down the flow towards the purification plants and final receiving bodies.
- ❑ **Interconnection of pipelines and drainage basins**
in a period of dry weather, it makes possible localised diversions of the water (facilitating ordinary and extraordinary maintenance); it also allows to regulate the transfer of waste water between the drainage basins of the purification system.
- ❑ **Centralised electronic control of the operation of the network, of the switching systems and of the dischargers**
- ❑ **Permanent monitoring of the sewage system through the installation of 350 meters (level / flow)**
- ❑ **Advanced development of the mathematical model of network operation**





Monitoring of the large sewer pipes





Monitoring of the large sewer pipes





The Space Based Solution



and 3476 warnings in 48896 selected segments



Network segments by level

ROADWAY	~10000
ROAD	~10000

Network segments by status

OK	~10000
WARNING	~10000
ALARM	~10000
N/A	~10000

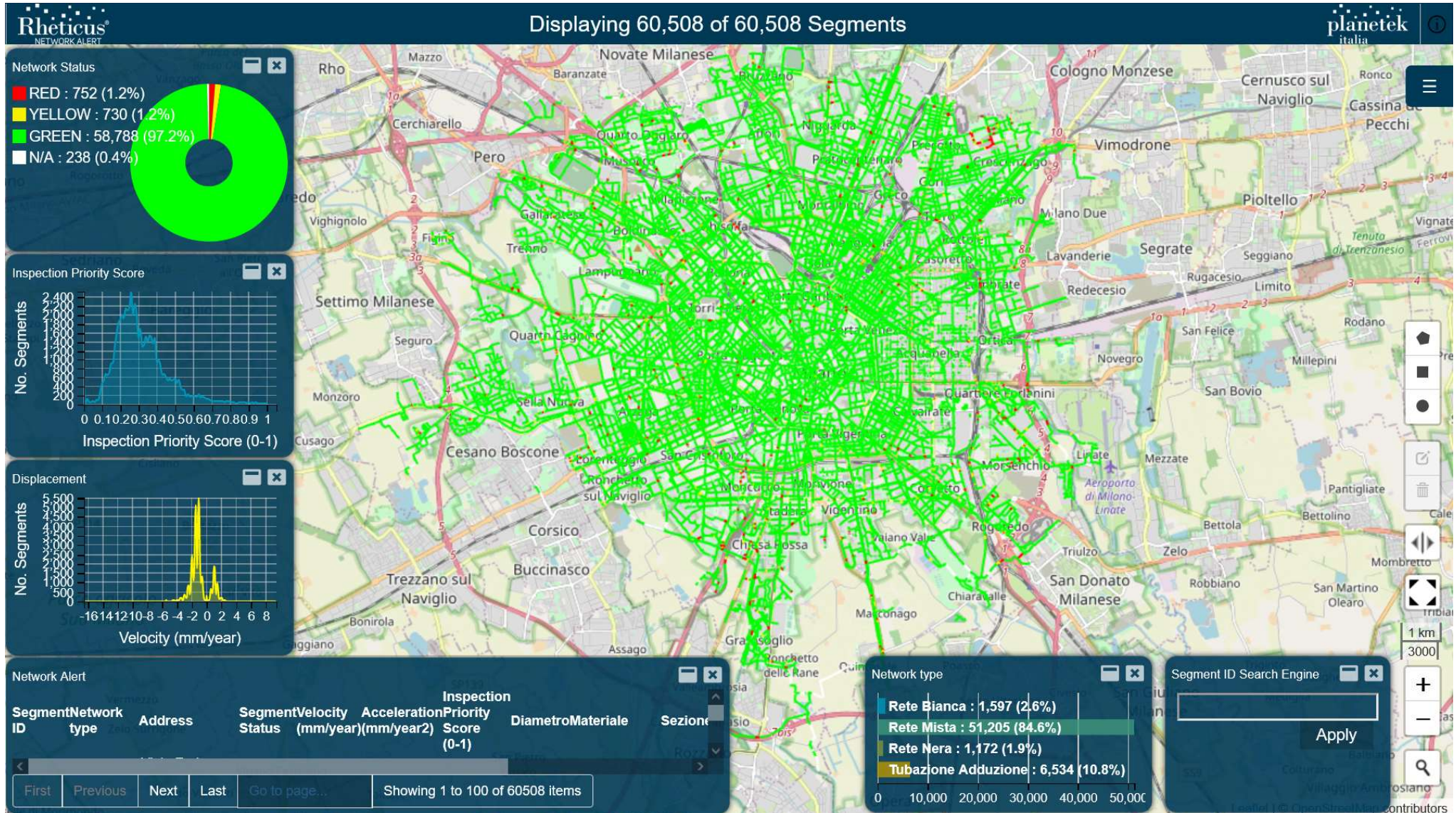
Network Alerts

14558	Via Casoria Bellaria, 20153 Milano MI, Italia	ALARM	230m
14704	Via San Romanello, 77, 20153 Milano MI, Italia	ALARM	230m
14705	Via San Romanello, 20153 Milano MI, Italia	ALARM	230m
14706	Via San Romanello, 73, 20153 Milano MI, Italia	ALARM	230m
18155	Basiglio, Milano, Lombardia, Italia	ALARM	230m
18156	20155 Milano MI, Italia	ALARM	230m
18163	Basiglio, Milano, Lombardia, Italia	ALARM	230m
19085	Fiera Milano, Lombardia, Italia	ALARM	230m
19845	Fiera Milano, Lombardia, Italia	ALARM	230m
20517	Via Monte Rosa, 20, 20149 Milano MI, Italia	ALARM	230m

Previous Next



The Space Based Solution





The Space Based Solution

Rheticus NETWORK ALERT planetek italia

Displaying 60,508 of 60,508 Segments

Network Status

- RED : 752 (1.2%)
- YELLOW : 730 (1.2%)
- GREEN : 58,788 (97.2%)
- N/A : 238 (0.4%)

Inspection Priority Score

No. Segments vs Inspection Priority Score (0-1)

Displacement

No. Segments vs Velocity (mm/year)

Network Alert

Segment ID	Network type	Address	Segment Status	Velocity (mm/year)	Acceleration (mm/year ²)	Inspection Priority Score (0-1)	Diametro	Materiale	Sezione
Showing 1 to 100 of 60508 items									

Network type

- Rete Bianca : 1,597 (2.6%)
- Rete Mista : 51,205 (84.6%)
- Rete Nera : 1,172 (1.9%)
- Tubazione Adduzione : 6,534 (10.8%)

Segment ID Search Engine

20 m / 50 ft

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The Space Based Solution

Rheticus NETWORK ALERT

Displaying 2 of 60,508 Segments

planetek italia

Network Status

- RED : 2 (100%)
- YELLOW : 0 (0%)
- GREEN : 0 (0%)
- N/A : 0 (0%)

Inspection Priority Score

Displacement

Segment ID: 5591
Network type: Rete Mista

Lat: 45.4774154720906
Lon: 9.19795200409749
Materiale: Non Conosciuto
Diametro: 0,3
Sezione: CIRCOLARE

Segment Status: 1||| RED
Velocity (mm/year): -4.1
Acceleration (mm/year²): 1.1
Measure Distance (m): 2.8
Inspection Priority Score (0-1): 1.00

Ispezionato: si
Tipo di ispezione: videoispezione
Data dell'ispezione: 13-09-2022
Classe di danno: 5

Analyze trends in Rheticus Displacement

Classe di danno

- Classe di danno 1
- Classe di danno 4
- Classe di danno 5
- N/A

Network Alert

Segment ID	Network type	Address	Segment Status	Velocity (mm/year)	Acceleration (mm/year ²)	Priority Score (0-1)	Diametro	Materiale	Sezione	Lat
5591	Rete Mista		RED	-4.1	1.1	1.00	0,3	Non Conosciuto	CIRCOLARE	45.4774154720906

Network type

- Rete Bianca : 0 (0%)
- Rete Mista : 2 (100%)
- Rete Nera : 0 (0%)
- Tubazione Adduzione : 0 (0%)

Segment ID Search Engine

Apply

Showing 1 to 2 of 2 items



The Space Based Solution



Segment ID: 5591

Piazza della Repubblica, 10, 20121 Milano
Fessurazioni profonde e diffuse

