



# **European Green Capital Award 2025**

## **Brescia application Indicator 5**

## 5. Noise

### 5.A Present Situation

Please complete the following table providing the most recent data that is available<sup>1</sup>:

Table 1: Benchmarking Data – Noise

\* For EGL applicants the following applies: when the applicant cannot provide certain benchmark data, a brief description of the current situation regarding noise.

Indicator		Unit	Year of Data
Share of population exposed to total noise values of $L_{den}$ above 55 dB(A)	87.2	%	2022
Share of population exposed to total noise values of $L_{den}$ above 65 dB(A)	22.5	%	2022
Share of population exposed to total noise values of $L_n$ (night noise indicator) above 50 dB(A)	79.2	%	2022
Share of population exposed to total noise values of $L_n$ (night noise indicator) above 55 dB(A)	39.2	%	2022
The percentage of citizens living within 300 m of quiet areas	1.6	%	2022
Which limits or reference value does the city apply to residential areas? ( $L_d/L_e/L_n$ )	<p><b>The current Italian legislation is still not fully compliant with the European Noise Directive.</b></p> <p>Limits are expressed as <math>L_{eq}</math> and relate to daytime (6:00 am to 10:00 pm) and night-time (10:00 pm to 6:00 am) hours.</p> <p><b>For residential areas, the reference class is Class II with the following limits:</b></p> <p><b>Night-time <math>L_{eq}</math> = 45 dB(A)</b></p> <p><b>Daytime <math>L_{eq}</math> = 55 dB(A)</b></p> <p><b>(Figure 8)</b></p>		
In the last year how many noise complaints did the city receive related to leisure or recreational activities?	9		

Please describe the present situation in relation to the quality of the acoustic environment. Please provide the following information:

1. The most recent noise map(s) of the city (no older than 5 years according to the Environmental Noise Directive). In addition, figures for noise exposure to individual noise sources (e.g. road, rail, air, industry, and leisure/entertainment) can also be provided.
2. Formally defined and delimited quiet areas and sound improved areas.

<sup>1</sup> In case (some of) the requested benchmarking data is not available, please briefly outline the present situation regarding noise in the city.

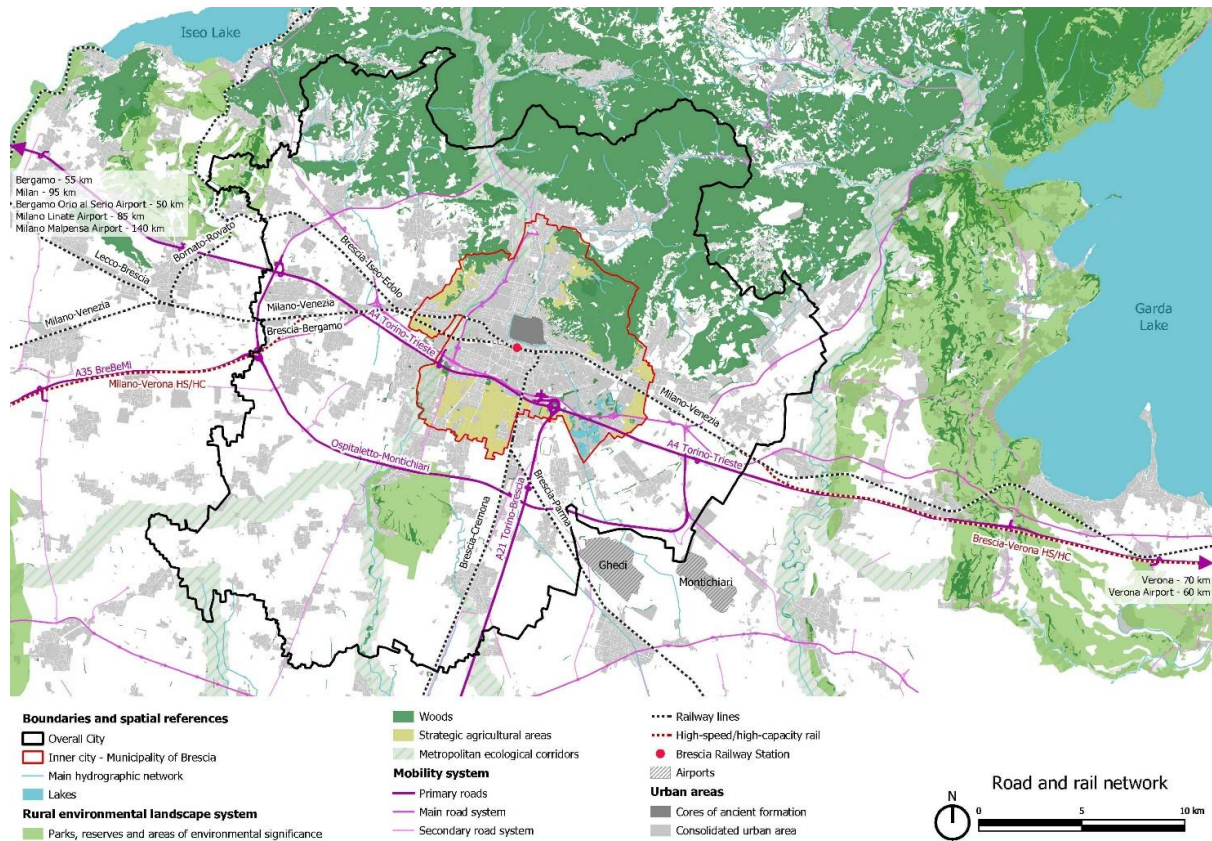
3. Citizen engagement and public awareness initiatives.

**(max. 1000 words and five graphics, images or tables)**

Noise pollution is one of the main environmental problems, especially in urban agglomerations such as Brescia. Indeed, Brescia is characterized by a high density of national/regional/provincial transport infrastructures and industrial-productive activities generally close to residential areas.

## Infrastructure

The following figure shows the main road, highway and railway infrastructures in the municipality.



**Figure 1: Infrastructure system of the Municipality of Brescia**

Here, it's highlights how, that is also the capital of the province, represents the main services hub and pole of attraction for the surrounding territory in terms of commercial and production infrastructures.

## 2002/49/CE Directive

At the European level, Directive 2002/49/EC, transposed in Italy by Legislative Decree n. 194 of 2005, has laid the foundations to a common approach to avoid, prevent and reduce the harmful effects of exposure, the environmental noise. Under these provisions:

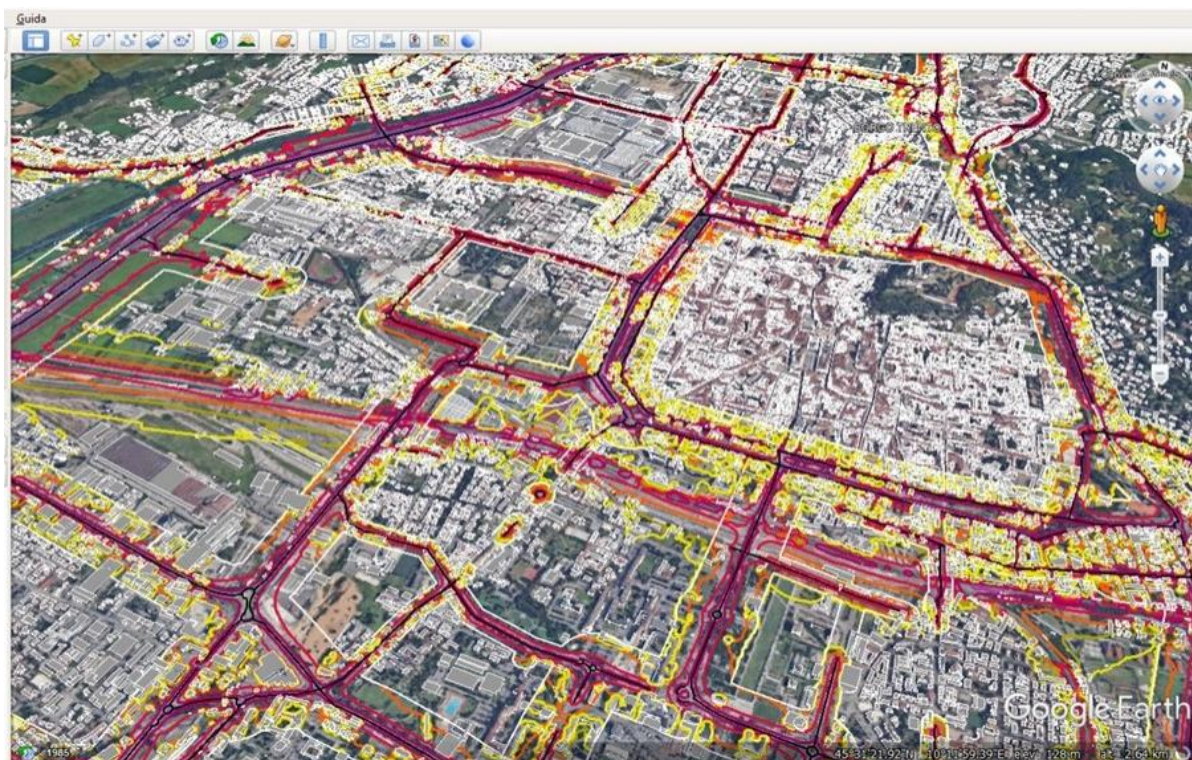
- the Regional Council no. VIII/008299 of October 29, 2008, by the Lombardy Region, identified the municipality of Brescia as an **urban agglomeration**, with a population between 100,000 and 250,000 inhabitants.

The city, in accordance with the procedures and timeframes laid down in the regulation, has drawn up and transmitted to the relevant authorities the following documents:

1. *Strategic Noise Map* of the Brescia agglomeration (latest version submitted to the competent bodies in June 2022) [1];

2. *Action Plan* of the Brescia agglomeration (latest version submitted to the relevant entities in 2018) [2].

The Strategic Noise Map required the 3D modelling of the entire municipal territory (including buildings), as well as the definition of all noise sources, as demanded by legislation (roads, railways and industrial sites).



**Figure 2:** 3D-reconstruction of strategic noise map for the Municipality of Brescia (June 2022)

As requested, two acoustic indicators were assessed, namely:  $L_{den}$  and  $L_{night}$ . The maps are available on the Municipality's website [3]. The major contribution made by the Strategic Noise Map is the identification of the number of people affected by noise divided by exposure class and source type.

The number of people exposed to  $L_{den}$  and  $L_{night}$  (Table 1) show the sources involving the largest numbers of citizens exposed to noise are transport infrastructure and municipal roads. This aspect has already emerged in the previous Strategic Noise Map (2017) [4].

These data validate the information included in the Agency (EEA) report Environmental noise in Europe: "Road traffic is the source of noise with the greatest population exposure in Europe followed by railways, airports and industry".

L <sub>den</sub> noise exposure level [June 2022] Agglomeration Unique Code AG_IT_00_00016						
Level range [dB(A)]	Exposed people to main roads (e.g. municipal roads)	Exposed people to major roads (e.g. provincial and national roads)	Exposed people to industrial noise	Exposed people to main railways (subway)	Exposed people to major railways	Exposed people to Overall Sources
50-54	20.452	2.500	2.104	2.570	0	27.626
55-59	58.772	700	2.016	2.676	17.400	81.564
60-64	41.935	400	529	2.267	13.600	58.731
65-69	27.734	3.900	0	442	6.000	38.076
70-74	3.782	2.900	0	0	2.600	9.282
>75	43	500	0	0	900	1.443
L <sub>night</sub> noise exposure level [June 2022] Agglomeration Unique Code AG_IT_00_00016						
Level range [dB(A)]	Exposed people to main roads (e.g. municipal roads)	Exposed people to major roads (e.g. provincial and national roads)	Exposed people to industrial noise	Exposed people to main railways (subway)	Exposed people to major railways	Exposed people to Overall Sources
45-49	34.954	700	2.086	3.600	0	41.318
50-54	57.861	1.000	1.685	2.200	16.700	79.490
55-59	35.682	900	241	1.100	11.400	49.280
60-64	14.845	5.200	0	0	4.200	24.259
65-69	856	1.000	0	0	1.900	3.756
>70	0	200	0	0	400	600

**Table 1:** Overview of Noise Map on L<sub>den</sub>/L<sub>night</sub> levels

Therefore, the main policies implemented by the municipal administration are aimed at reducing the main element of citizens' exposure to noise: the flow of vehicles on municipal roads.

Even though industrial noise affects a much smaller share of the population, several reports of annoyance are the result of night working shift activities. The administration has committed, with stakeholders and industrial sites, to identify solutions aimed at reducing citizens' exposure to industrial noise.

### **Mobility in the Municipality of Brescia**

The SUMP (Sustainable Urban Mobility Plan) of Brescia, approved by resolution of the Municipality Council no. 7 of February 19, 2018 [5], planned sustainable mobility policies for the decade 2016-2026. It identifies the following strategic guidelines: the promotion of active mobility, the enhancement of local public transport and railway service and the adoption of policies to manage mobility demand.

The main implemented activities include:

- the launch of the automatic subway (2013): implementation cost of approximately 777.1 million euros and annual running costs of 36 million euros;
- full methanization of the bus fleet in the urban area: 20.5 million euros;
- overall readjustment and redevelopment of the railway station (tracks, sidewalks, shelters, elevators, underground passages, etc.);
- redevelopment and strengthening of the bicycle path network, development of bike-sharing and bike parking in the city;
- pedestrianization and establishment of 30 km zones and LTZ.

Supporting investments, combined with an extensive campaign to foster the use of public transport, have resulted in a unique achievement in Italy: a 40% increase of passengers using public transport in the urban area (city and fourteen hinterland municipalities) (2012-2019).

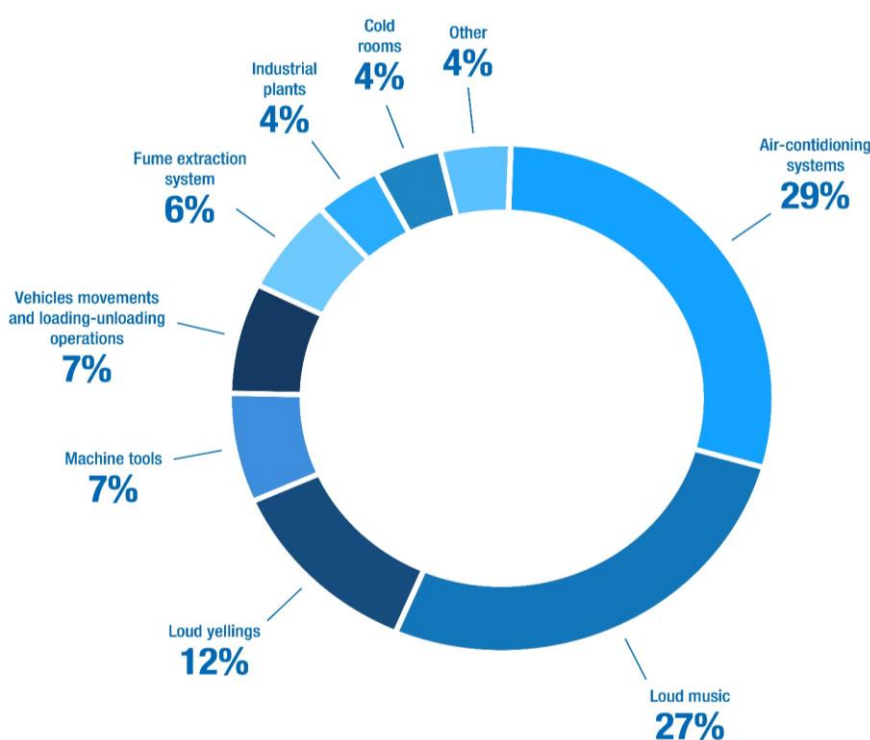
### Brescia Municipality Action Plan and planned initiatives

The Action Plan identifies the main noise reduction actions foreseen by the Municipality, considering the results of the *Strategic Noise Map*. Since the flow of vehicles on municipal roads is the main cause of citizens' noise exposure, the *Action Plan* illustrates the key actions that have been and those that will be implemented within the mobility and SUMP policies.

### Monitoring promoted by the Municipality of Brescia

Since 2000, according to the law 447/'95, Brescia has established an office dedicated to "Noise in the living environment", composed of expert acoustic technicians.

The following figure shows the statistics on the formal complaints sent to the Municipality of Brescia from 2019 to 2022 (statistical sample: 94 data points):



**Figure 3:** Typologies of acoustic annoyance in the living environment

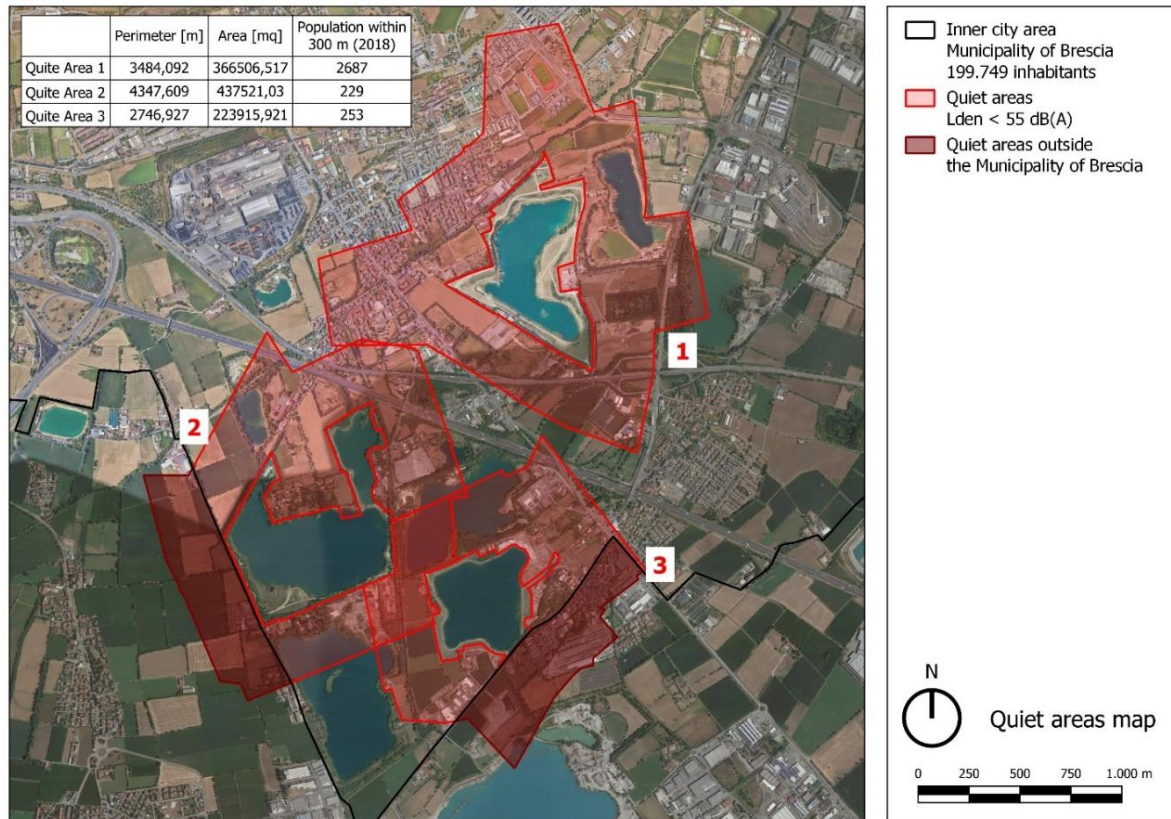
### Quiet areas

While the territory is characterised by high noise levels (as described in the sections above), large areas of the city's territory are green, with **lower** noise levels. In fact, the city has an area of 5.377.319 m<sup>2</sup> public green areas divided as follows:

- parks and gardens: **4'708'494** m<sup>2</sup>
- green school areas: **527'942** m<sup>2</sup>
- green cemetery areas: **140'883** m<sup>2</sup>
- Local Parks of Supra-municipal Interest: **35'061'899** m<sup>2</sup>.

By Decree no. 16 of March 24, 2022 of the General Director of the Ministry of Ecological Transition, arrangements have been established at the national level in order to identify and manage the quiet areas within an agglomeration, in accordance with the provisions of Directive 2002/49/EC.

In this context, by decision of the Municipal Council of April, 2023, the Municipality of Brescia has identified the quiet areas shown in the map below [6].



**Figure 4:** Quiet areas in the Municipality of Brescia

**Stakeholder involvement**

A complete overview of the subject has been made available to citizens through the Report on the State of the Environment of the Municipality of Brescia, a document periodically updated by the institution. Since 2016, this document has been developed relying on the Driving forces – Pressure – State – Impact - Response framework (DPSIR) [7].

The Municipality of Brescia devotes a section of its website to noise, with the aim of raising awareness and informing citizens. This web page contains the Strategic Noise Map and the Action Plan.



## 5.B Past Performance

The aim of this section is to make clear how the situation described in the previous section has been achieved in the past ten years. Please provide the following information:

3. Trends or changes in terms of noise in the city that have taken place over the last ten years.
4. Actions and measures taken by the city authorities in the last 10 years that significantly affected the trends and changes mentioned under 1.

**(max. 600 words and five graphics, images or tables)**

As displayed in the previous section, the Municipality of Brescia published the 2017 and 2022 Strategic Noise Maps that identify the transport infrastructure and, in particular, municipal roads as the main sources of noise pollution.

In order to evaluate the positive effects of the implemented policies, the following figures offer a comparison, related to **vehicle traffic on main roads**, between the  $L_{den}/L_{night}$  indicators of 2017 and 2022 Strategic Noise Map.

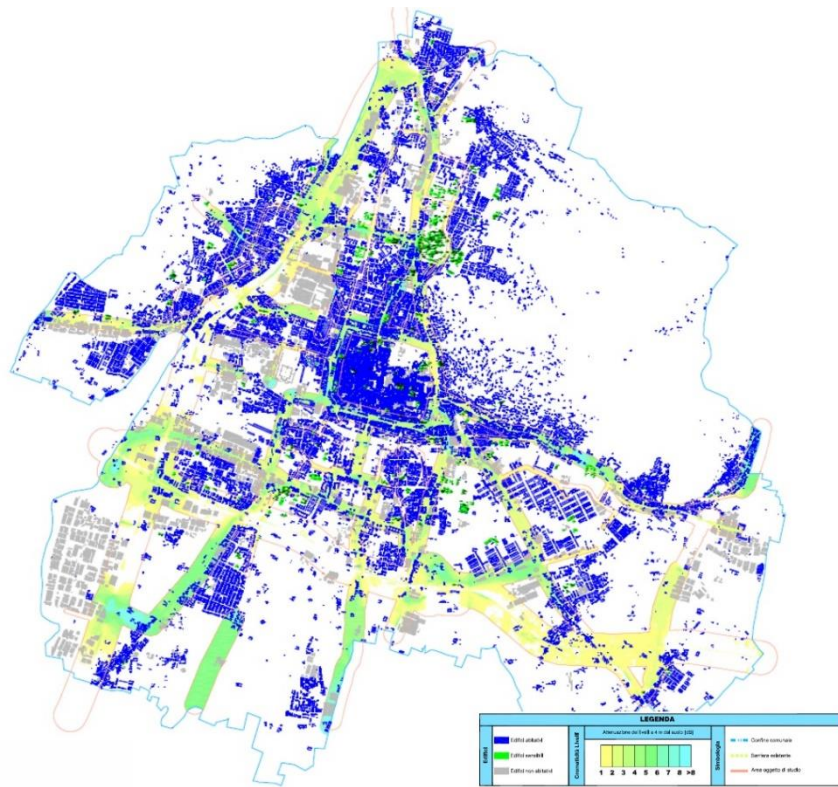
	Number of people exposed to $L_{DEN}$ dB(A) from 2017 to 2022					
	50-55	55-60	60-65	65-70	70-75	>75
2017	16.800	55.900	44.300	26.700	5.400	200
2022	20.452	58.772	41.935	27.734	3.782	43
Variation	3.652	2.872	-2.365	1.034	-1.618	-157
	Number of people exposed to $L_{night}$ dB(A) from 2017 to 2022					
	45-50	50-55	55-60	60-65	65-70	>70
2017	33.200	54.100	36.800	15.300	1.700	100
2022	34.954	57.861	35.682	14.845	856	0
Variation	1.754	3.761	-1.118	-455	-844	-100

**Table 2:** Comparison Strategic Noise Map 2017-2022

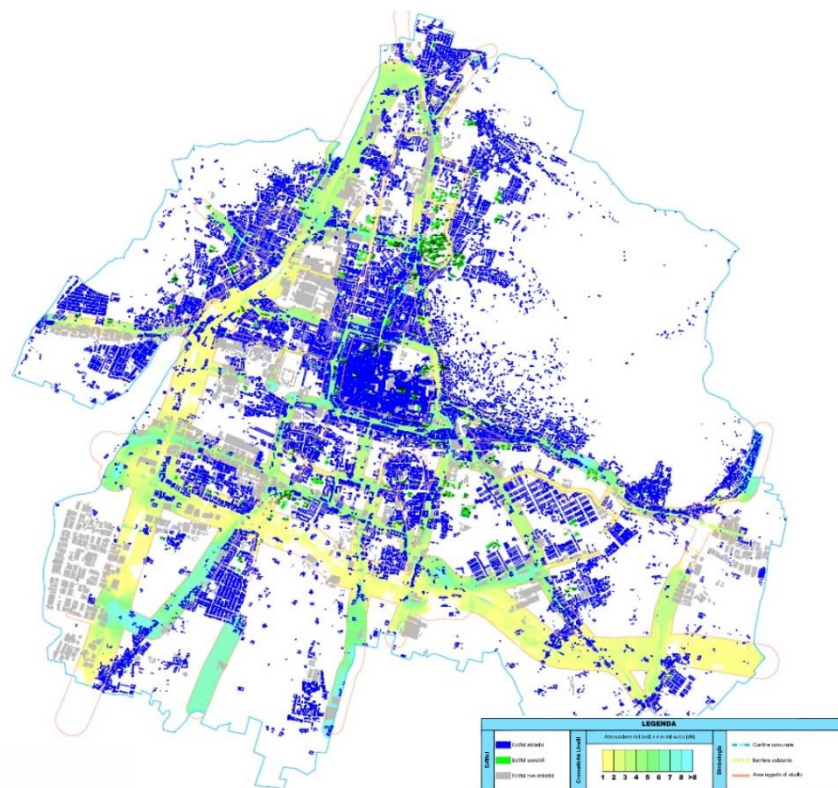
The table, at the variation row, shows the differences between 2017 and 2022: negative numbers indicate the decrease of exposed people, while positive numbers indicate the increase of exposed people. In particular, negative numbers are noted in exposure classes with higher levels and positive numbers are found in classes with lower levels.

As assumed by the Action Plan, these tables confirm that decreases in the higher noise exposure classes correspond to population increases in the lower noise classes.

In order to illustrate these changes at the municipal level, the following maps (Figure 5 and Figure 6) show the mitigation of  $L_{den}$  and  $L_{night}$  calculated at four meters above ground level.



**Figure 5:** Comparison Strategic Noise Map 2017-2022:  $L_{Den}$  reduction



**Figure 6:** Comparison Strategic Noise Map 2017-2022:  $L_{Night}$  reduction

The municipal administration's attention over the past 10 years to the protection of the population from noise pollution has been formalised in the following main documents.

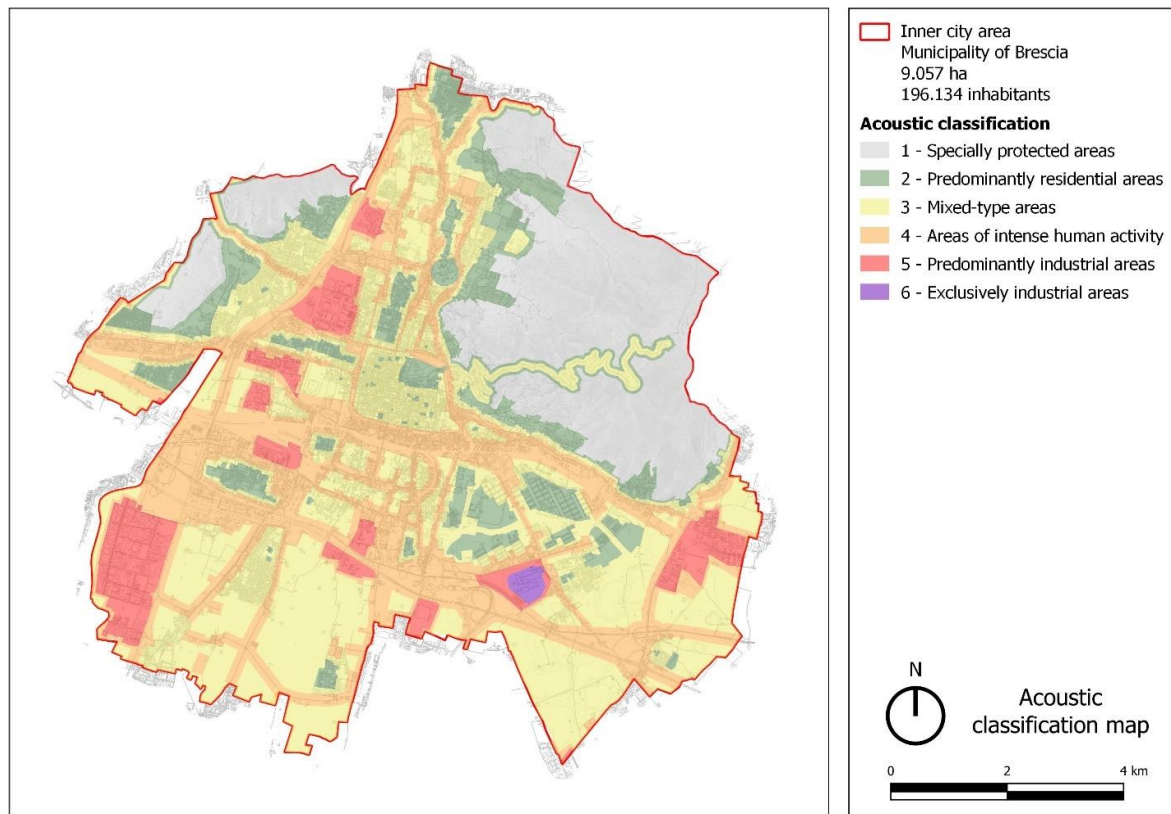
### **Urban Police Regulation**

Articles 40, 44 and 53 of the Urban Police Regulation (approved in 2002 and amended in 2005 and 2009) includes prohibitions and indicate appropriate behaviours to address the issue of acoustic annoyance in living environments [9].

### **Municipal Acoustic Classification**

The **Municipal Acoustic Classification** (as required by national and regional regulations) of **2006 [10]**, represents the first systematic document of the Municipality of Brescia concerning noise. In particular, this document identifies the noise limits to be respected within the municipal territory.

The following map and table illustrate the acoustic classes.



*Figure 7: Noise zoning in the municipal territory*

### **Municipal Council Resolution: Noise control for public performance and entertainment**

Resolution no. 639 of July 18, 2008 [11] issued by the Municipal Council regulates public performance and entertainment activities on the municipal territory in order to reduce critical noise pollution conditions.

## **Building Code**

The Municipality of Brescia's Building Code of May 25, 2007 introduced several articles concerning the reduction of citizens' noise exposure. Then, the regulation was updated in 2022 [12], devoting some articles to noise prevention, such as:

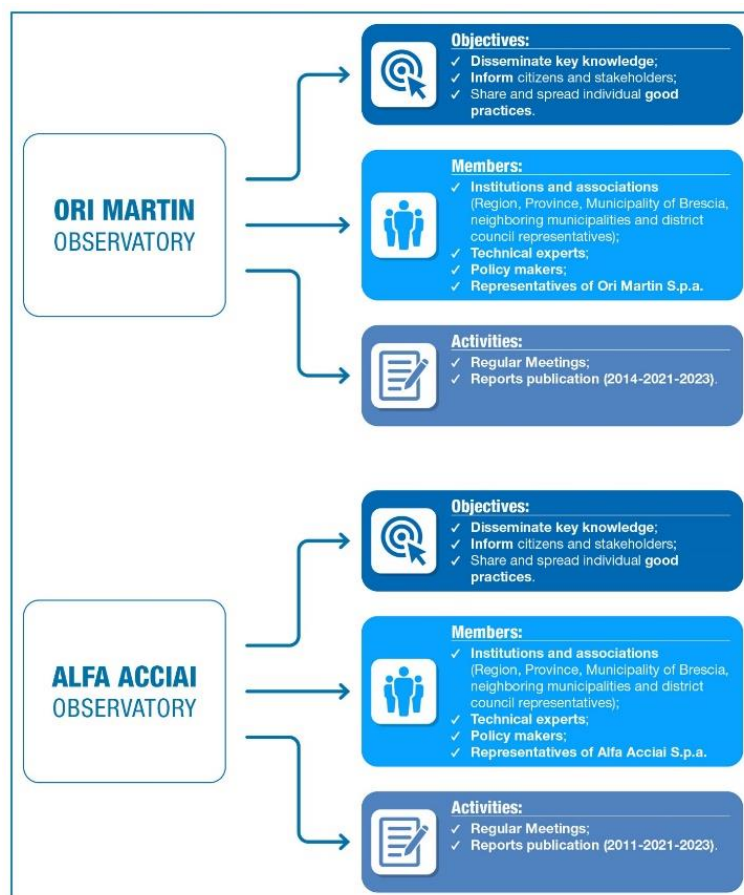
1. Acoustic climate
2. Noise impact
3. Passive acoustic requirements
4. Noise protection

## **Citizen involvement and awareness-raising: Observatories**

The debate on environmental issues represents a complex issue involving several relevant aspects of citizens' lives. The presence in the city of large 2 steel mills (Alfa Acciai and Ori Martin) close to residential areas has led citizens to frequently request a reduction of the environmental impact of the plants and, in particular, the noise impact.

In this regard, the main initiative at the local level concerns the development of **Observatories**, a monitoring, participatory watchdogs set up by the municipal administration. In particular, the aspect of noise pollution is considered within the **Alfa Acciai Observatory** (active since 2011) and the **Ori Martin Observatory** (active since 2013).

In order to evaluate the activity carried out, two web pages for both Observatories are available on the web site of the Municipality of Brescia. [13] [14].



*Figure 8: Alfa Acciai and Ori Martin Observatories*

## 5.C Future Plans

Please describe the following:

1. The medium term (2030) and long term (2050) objectives in for the quality of the acoustic environment.
2. The planned measures to achieve the ambitions described under 1. Please also indicate which innovative approaches your city is planning to use in this regard.
3. To what extent measures and ambitions described under 1 and 2 are supported by:
  - a. strategic and policy commitments
  - b. budget and resource allocations
  - c. plans for monitoring of impacts
  - d. participatory approaches
4. Current or outstanding ongoing environmental legal proceedings, including infringements regarding the Environmental Noise Directive (2002/49/EC). If there are, please indicate how and when you are planning to comply.

**(max. 600 words and five graphics, images or tables)**

## **Action Plan**

As established by national legislation, the new *Action Plan for the Brescia agglomeration* is currently in the drafting phase and will be submitted to the Ministry by **April 2024**. For the above-mentioned reasons, noise reduction activities in the municipal territory will continue to address the reduction of road traffic on municipal roads.

Since the SUMP policies are aimed at minimising the environmental costs arising from the transport system, it is essential to pursue such objectives in order to reduce noise emissions.

In particular, the main actions related to public transport are:

1. Extension of the underground line (M1) northwards and strengthening of park and ride services (work in progress at Prealpino [16 million] and Poliambulanza station; upcoming works in Sant'Eufemia station. End of works in 2024);
2. Reorganisation of the urban transport network through: the development of two new tram lines (T2 funded by MIMS Decree No. 464 of November 22, 2021; €360 million and expected launch in 2029; T3); the development of a new bus line (B4);
3. Quadrupling of tracks on the main line and activation of high-speed services connecting with Veneto region (by 2029);
4. development and relaunching of the freight yard and intermodal terminal "*La Piccola Velocità*" (full capacity 190.000 CTU/year) in order to support the railway reconversion of freight transport over longer distances (start of works in 2024, launch in 2027)
5. Implementation of public electric car charging service (up to 300 charging points by 2023);
6. development of a "mobility credit" system, conveyed through the pricing lever of services, rewarding environmentally virtuous behaviour. This system will promote collective awareness and orientate towards more conscious and sustainable behavioural choices;
7. electrification of the bus fleet (at least 50 new 100% electric buses are planned to be acquired by 2030);
8. completion of the cycling infrastructure in all city streets and promotion of a "bike-friendly culture";
9. development of Zone 30 km in all neighborhoods and residential areas.

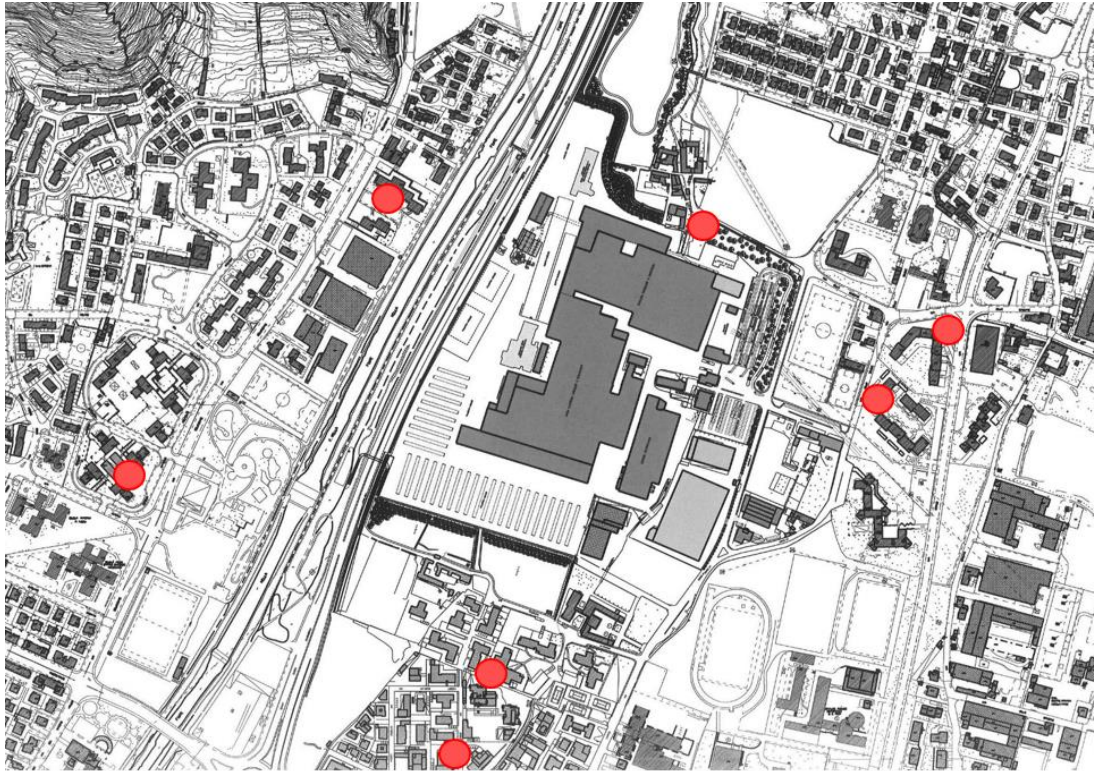
## **Stakeholder engagement: the 'Watchmen' initiative**

The activities of the Alfa Acciai and Ori Martin Observatories are crucial to foster the citizens' involvement in reducing the noise impact of the two steel mills.

- **Observatories: the 'Watchmen' initiative**

Within the Observatory, a network of citizens (the so-called *watchmen*) offered to systematically report situations of acoustic annoyance and odour nuisance in order to allow the technicians in the industrial plants to identify possible causes and remedial actions. This activity will carry on, given the remarkable results achieved.

The following figures show the positions of the Watchmen in relation to the Ori Martin and Alfa Acciai plants.



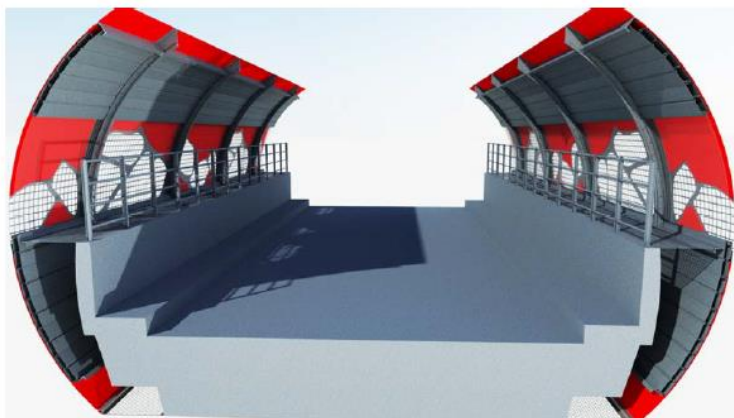
*Figure 9: Ori Martin Watchmen position*

### **Specific measures**

- **Project: San Polino station of the Brescia Subway**

The project envisages the development of a sound-absorbing metal structure for the San Polino station capable of reducing the decibels (generated by the passage of metro trains) by ten. Also, this measure will contribute to the architectural renewal of the subway infrastructure representing a qualifying element for the entire landscape.

This project will cost around €2 million 350 thousand euros and is expected to be completed in 2024.



*Figure 10: Brescia Subway, San Polino Station's restoration of the desired acoustic condition*



- **Quiet areas**

The identification of quiet areas will remain a priority for the Municipality of Brescia in consideration of the great number of green zones within the municipal territory.



**Figure 11:** Noise zoning of green areas

## 5.D References

List supporting documentation, adding links where possible. Further detail may be requested during the pre-selection phase. Documentation should not be forwarded at this stage.

(max. 400 words)

[1] Municipality of Brescia: *Strategic Noise Map of the Brescia agglomeration*, in cooperation with ICOSTECH SRL Turin

<https://www.comune.brescia.it/sites/default/files/imported/servizi/ambienteeverde/Ambiente/Documents/Sostenibilit%C3%A0%20Ambientale/Relazione%20Mappatura%20Acustica%20Strategica%20Anno%202022.pdf>

[2] Municipality of Brescia: Action Plan of the Brescia agglomeration 2018

<https://www.comune.brescia.it/aree-tematiche/ambiente/inquinamento-acustico/piano-dazione-dellagglomerato-di-brescia-2018>

[3] Municipality of Brescia: Strategic Noise Map of the Brescia agglomeration (June 2022)

<https://www.comune.brescia.it/servizi/ambienteeverde/Ambiente/Pagine/rumore.aspx>

[4] Municipality of Brescia: Strategic Noise Map of the Brescia agglomeration (June 2017)

<https://www.comune.brescia.it/servizi/ambienteeverde/Ambiente/Pagine/rumore.aspx>

[5] Brescia's Sustainable Urban Mobility Plan

<https://www.comune.brescia.it/aree-tematiche/mobilita-e-trasporti/documenti-di-pianificazione/piano-urbano-mobilita-sostenibile>

[6] Municipality of Brescia: Quiet areas identification and management

<https://www.comune.brescia.it/sites/default/files/2023-04/Individuazione%20%20aree%20silenziose%20Comune%20di%20Brescia.pdf>

[7] Brescia's report on the State of the Environment

<https://www.comune.brescia.it/aree-tematiche/ambiente/relazione-sullo-stato-dellambiente>

[8] Municipality of Brescia: web site noise pollution

<https://www.comune.brescia.it/aree-tematiche/ambiente/inquinamento-acustico>

[9] Municipality of Brescia Urban Police Regulations

<https://www.comune.brescia.it/sites/default/files/imported/comune/statutoregolamenti/RegPolizia/Documents/42-REG-POLIZIA%20URBANA.pdf>

[10] Municipality of Brescia: Noise zoning in the municipal territory

<https://www.comune.brescia.it/aree-tematiche/ambiente/inquinamento-acustico/zonizzazione-acustica-del-territorio>

[11] Municipality of Brescia: Resolution of the City Council No. 197 of 23/02/09: Noise from shows and events

[https://www.comune.brescia.it/sites/default/files/2023-04/Indirizzi%20per%20la%20realizzazione%20di%20spettacoli%20e%20manifestazioni%20sul%20territorio%20comunale\\_0.pdf](https://www.comune.brescia.it/sites/default/files/2023-04/Indirizzi%20per%20la%20realizzazione%20di%20spettacoli%20e%20manifestazioni%20sul%20territorio%20comunale_0.pdf)

**[12]** Brescia's Building regulations

<https://www.comune.brescia.it/sites/default/files/imported/servizi/casa/SUE/Documents/Regolamento%20edilizio.pdf>

**[13]** Municipality of Brescia: Alfa Acciai Observatory

<https://www.comune.brescia.it/aree-tematiche/ambiente/osservatori/osservatorio-alfa-acciai>

**[14]** Comune di Brescia. Ori Martin Observatory (active since 2013)

<https://www.comune.brescia.it/aree-tematiche/ambiente/osservatori/osservatorio-ori-martin>

## Word Count Check

*Please complete the below word count check.*

<b>Section</b>	<b>Number of words in graphics/images/tables</b>	<b>Number of words in body of text</b>	<b>Total number of words in graphics/ images/ tables and body of text</b>	<b>Max. words</b>
5A	0	992	992	1000
5B	0	528	528	600
5C	0	534	534	600