

Article

Public City as Network of Networks: A Toolkit for Healthy Neighbourhoods

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Abstract: The distinction between the current urban crisis and that which emerged in the latter half of the last century lies in the rise of environmental concerns linked to the climate crisis, which compound the existing socioeconomic issues. The “new urban question”, in its intersectional sense, necessitates high levels of integration, interdisciplinarity, interscalarity, and iterativity to recompose the physical and socioeconomic components of change. In this regard, the proposed contribution aims to develop a transferable methodology to guide urban regeneration actions that are sustainable from a socio-economic and environmental perspective, capable of leading to the creation of “Healthy Neighbourhoods”. This objective is pursued by the authors through the definition of a toolkit of design parameters to assess the improvement of an urban area before and after the regeneration intervention. Indeed, each proposed parameter affects one or more of the ten indicators used to evaluate the health of a neighbourhood. The proposed methodology will later be tested, in subsequent phases of the research, on the case study of Pietralata (Rome, Italy).

Keywords: ClimaEquitable planning; urban welfare; intersectional climate justice; healthy cities; public city

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1. Introduction: Addressing the New Urban Question

The discussion on the “new urban question” has roots in the 1970s, when Manuel Castells introduced the concept of the “welfare city” as the core of urban issues, highlighting the intricate causes linked to economy, politics, and social welfare [1]. This concept has since been revisited by numerous scholars up to the present day, who investigate the connections between socioeconomic problems and urban development [2–5]. This is the case of David Harvey, a Marxist geographer who has profoundly influenced urban studies by analysing the relationships between capitalism, inequality, and urban transformation [6], Saskia Sassen, a sociologist known for her studies on global cities and the social consequences of globalisation, particularly regarding inequalities and social polarisation in cities [7,8], and Loretta Lees, a geographer who has significantly contributed to the understanding of gentrification processes and their social implications [9].

It is necessary to specify how the distinction between the current urban crisis and the one that emerged in the latter half of the last century lies in the rise of environmental concerns associated with the climate crisis, which add to the socioeconomic issues [10,11]. Indeed, we are not witnessing two separate crises, social and environmental, but a single, complex, and intersectional socio-environmental crisis, necessitating an integrated approach to urban complexity.

International organisations emphasise how processes of metropolisation have significantly influenced the form and structure of contemporary cities, with well-known consequences in terms of pollution, land consumption, lack of infrastructure, and a general sense of insecurity [12]. In this regard, Khan, Hildingson, and Garting (2020) [13]

underscore that there is an increasingly tangible risk that efforts to address ecological challenges may negatively impact equality and social welfare.

A recent example of this trend is the renewed commitment at COP 28 (held in Dubai in December 2023) to create a specific fund to compensate for the impacts of climate change in the territories of the most vulnerable countries. In this context, the sixth report of the Intergovernmental Panel on Climate Change (AR6) [14] specifies that the consequences of storms, floods, and droughts will be fifteen times more likely in Southeast Asia, Central America, and Sub-Saharan Africa due to climate change. This will lead urban agglomerations in the near future to grapple with phenomena such as climate gentrification and climate migrations.

To underscore the intersectionality between the impacts of climate change on territories and socioeconomic consequences, the AR6 (2021) [14] introduces for the first time the “Shared Socioeconomic Pathways” (SSPs), a collection of climate scenarios that integrate the Representative Concentration Pathways (RCPs) used in AR5 (2013) [15] with socioeconomic indicators. This aims to record socioeconomic progress downstream of mitigation and adaptation activities and understand how various socioeconomic factors influence climate change [16].

1.1. A New Urban Welfare to Guarantee Intersectional Climate Justice

The “new urban question”, in its intersectional interpretation, thus refers to what Henri Lefebvre calls the “right to the city”, understood as the right to participation and the right to appropriation.

In this sense, the author does not refer merely to the claim of essential needs but rather to full access to all urban resources. He wrote that the “right to the city” represents a superior form of rights, such as the right to freedom, to individualisation in socialisation, to habitat, and to inhabit [17].

These themes remain central to contemporary disciplinary debates on the construction and governance of the “public city”, that is, the collection of places and urban spaces freely accessible to all citizens, without distinction, and which serve to meet collective needs [18]. These spaces can include parks, squares, libraries, museums, as well as services such as public transport, schools, and hospitals; in other words, all the public components of the city that contribute to making the urban environment liveable and inclusive [19]. In this regard, the city becomes the ideal projection of a new urban welfare system for settled communities, aimed at combining quality of life with the quality of the urban environment [20].

The concept of intersectional climate justice, on the other hand, recognises that the impacts of climate change are not distributed equitably but disproportionately affect marginalised communities, such as ethnic minorities, women, people with disabilities, and low-income individuals [21]. These communities are often the first to experience the negative effects of extreme events and environmental changes and have fewer resources to cope with them [22–24].

Therefore, the connection between urban welfare and intersectional climate justice lies precisely in the need to ensure that all communities have access to urban services, while at the same time guaranteeing high standards of design and maintenance for the public components of the city, with a climate-proof perspective [25].

For these reasons, defining a new urban welfare system requires high levels of integration, interdisciplinarity, interscalarity, and iterativity to recompose the physical and socioeconomic components of change [26]. This can be achieved through the definition of new indicators and parameters of socio-economic and environmental sustainability [27] to ensure the creation of “Healthy Neighbourhoods”.

1.2. Programmatic Policies Supporting Climate-Equitable Planning

To understand the socio-economic and environmental implications of urban regeneration strategies and interventions on the improvement of the quality of life for resident communities [28], it suffices to examine the references to these in the most recent international programmatic policies aimed also at developing a new model of urban welfare, attentive to the issue of intersectional climate justice and its translation into the urban environment.

Indeed, the importance of integrating socioeconomic and environmental needs in sustainable urban development is highlighted by the United Nations in the document Strategy for Sustainability Management in the United Nations System, 2020–2030 Phase II: Towards Leadership in Environmental and Social Sustainability [29], based on two previous reports [30,31]. The European Union has long been implementing policies aimed at creating sustainable and inclusive urban communities, aligning with the priorities of the *European Urban Agenda* [32]. Indeed, the *European Green Deal* aims to make the EU a zero-emission society by 2050, balancing environmental and social dimensions [33]. Furthermore, the COVID-19 pandemic has emphasised the importance of “space” for quality of life, prompting the launch of the *New European Bauhaus* initiative aimed at making European cities beautiful, sustainable, and inclusive [34].

It should be emphasised that, in this context, the authors focus primarily on the European territorial context, as it is the reference framework for the research within which the proposed contribution is situated. However, reference will also be made to some best practices of urban regeneration strategies and projects outside Europe.

In this regard, at the national level, Italy has developed its own *Urban Agenda for Sustainable Development* [35] and the *National Recovery and Resilience Plan* (PNRR) (2021), which is contextualised within the European initiative *Next Generation EU* [36,37], a political and programme measure implemented by the EU to address the health crisis resulting from the COVID-19 pandemic.

In this regard, the contribution, which is funded under the Italian Government’s *National Recovery and Resilience Plan* (PNRR), is designed as a methodological study, aligned with the authors’ research activities and the project needs within which the contribution is situated. Its aim is to develop a transferable methodology to guide ClimaEquitable [38] urban regeneration actions that have lasting effects over time and are capable of leading to the creation of “Healthy Neighbourhoods”. This objective is pursued by the authors through the definition of a toolkit of design parameters to guide urban regeneration interventions. Each of these parameters will be measurable and will impact ten indicators of socio-economic and environmental sustainability. This will allow for a comparison of the area before and after the urban regeneration project to assess the improvement of the area in terms of urban quality.

For clarity, Figure 1 provides a flow chart that summarises the methodological process.

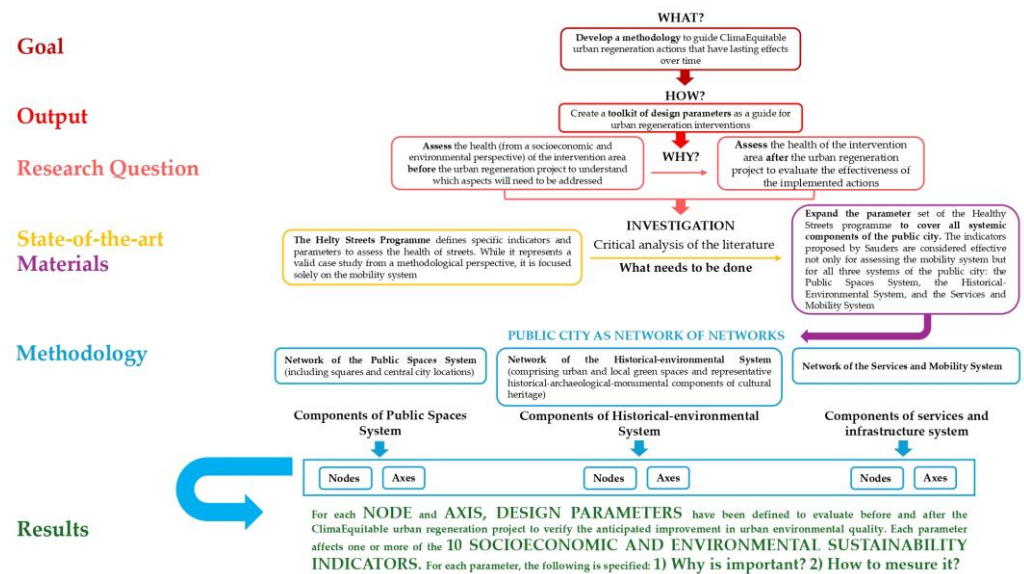


Figure 1. Flowchart of the theoretical-methodological process for defining the design parameters.

2. State-of-the-Art

For the purposes of this study, it has been very useful to investigate the international best practices addressing intersectional climate justice, urban welfare, and the adaptation of cities to the effects of climate change.

Among these, the European Union initiative Urban Innovative Actions (UIA) [39], which provides urban areas across Europe with resources to test novel and unproven solutions to urban challenges, is of particular interest. Within this initiative, the “Ignition” project [40], launched in November 2018, proposes innovative methodologies for sustainable urban regeneration strategies aimed at improving quality of life in Greater Manchester (United Kingdom). The goal is to increase green infrastructure by 10% by 2038 through nature-based solutions (NBS) that address challenges such as flooding and urban overheating. NBS not only mitigates the impact of extreme weather events but also enhances air quality, biodiversity, and citizen well-being. In this regard, the project promotes an integrated approach that combines sustainable urban planning and environmental resilience, ensuring sustainable urban development.

Another project within the UIA network is “5Bridges” [41], based in Nantes (France)—initiated in 2021—which proposes an innovative urban regeneration model to address poverty and social exclusion. By creating a multifunctional hub that integrates work, housing, healthcare, and social services, the project aims to meet the needs of socially marginalised individuals, reducing spatial and social fragmentation. At the core of the strategy is a participatory approach, actively involving users in defining services. A key priority of the project is to foster integration with the neighbourhood and community. Before implementation, small-scale workshops were conducted to optimise solutions, applying a pioneering method in Europe.

On an international level, the “100 Resilient Cities” network, an initiative founded by the Rockefeller Foundation in 2013, is certainly worth mentioning. Its goal is to assist cities in developing resilience to the physical, social, and economic challenges of the 21st century [42].

In this context, the research initiative *Urban Pulse: Climate, Health, and Equity in Action*—a collaboration between the Resilient Cities Network and Yale University (U.S.A) [43], with support from the Rockefeller Foundation—aims to highlight the connections between the impacts of climate change and urban public health, developing replicable tools and solutions with a particular focus on low- and middle-income cities. Urban Pulse identifies and promotes innovative solutions to address climate-related health challenges, such as heatwaves and infectious diseases. The initiative supports the creation of resilient

infrastructure and fosters collaboration between local governments and stakeholders to implement evidence-based solutions, thereby improving sustainability and public health.

In the authors' view, although the aforementioned initiatives offer interesting points for reflection, they are not exhaustive in providing methodological support for the definition of a toolkit of socio-economic and environmental sustainability indicators and parameters aimed at guiding ClimaEquitable urban regeneration strategies and actions [38].

In this context, the "Healthy Streets" methodology developed by Lucy Saunders is particularly noteworthy [44]. It has been incorporated into the current Local Urban Plan of London (the London Plan, 2021) [45], with the objective of providing clear guidelines for the sustainable redevelopment of the city's main streets.

The programme indeed includes the definition of specific indicators and parameters to be applied before and after the urban regeneration project for streets. This is aimed at initially assessing the challenges that the future project will need to address and subsequently evaluating the effectiveness of the proposed solutions following the design phase.

In contrast to the previously mentioned initiatives, the programme's transferability is evidenced by its adoption in numerous cities across Australia, Europe, and New Zealand [44].

However, it should be noted that Saunders' programme specifically addresses only the issue of urban mobility. In this regard, the authors' intention is to update and expand the methodology so that it can be applied not only to the Mobility System but also to all other urban systems that make up the public city: public spaces System, historical-environmental System, and services and mobility System (as more precisely defined in Section 4, "Methodology").

The following section provides a detailed analysis of the Healthy Streets programme, which will serve to structure the toolkit of design parameters useful for guiding climate-equitable urban regeneration actions and achieving the creation of "Healthy Neighbourhoods". Indeed, as will be seen later, some elements of Saunders' programme, specifically the 10 indicators, are adopted by the authors.

3. Materials

The current Local Urban Plan in London is the London Plan 2021 [45], structured into twelve chapters, each of which includes detailed sector-specific provisions and regulations referred to as "policies".

The implementation of the High Street regeneration initiative at the local scale is addressed in Chapter 10 "Transport", under the "Policy T2 Healthy Streets".

The strategy description explains how the London Plan 2021 supports the "Healthy Streets" methodology conceptualised by Lucy Saunders [46–50] to significantly increase walking, cycling, and public transport usage throughout London. This aim is to make the city more accessible, inclusive, safe, and welcoming for all while also mitigating CO₂ emissions.

The approach theorised by Saunders and endorsed by the Plan identifies 10 indicators to determine "Healthy Streets" (assunti anche dalle autici) (Figure 2):

1. Everyone feels welcome;
2. Easy to cross;
3. Shade and shelter;
4. Places to stop and rest;
5. Not too noisy;
6. People choose to walk and cycle;
7. People feel safe;
8. Things to see and do;
9. People feel relaxed;
10. Clean air.

Regarding the mentioned need to consider the intertwining of socioeconomic and environmental issues from a “ClimaEquitable” perspective [38], it is worth noting that the ten indicators proposed by Lucy Saunders’ program (2024) affect both socioeconomic and environmental aspects from the perspective of intersectional climate justice, as shown in the critical reading of the ten indicators presented in Table 1.

Table 1. Critical rereading of the ten indicators envisaged by the Healthy Street program (2024), aimed at highlighting the socio-economic and environmental impact for each of them.

Indicators Foreseen by the “Healthy Streets” Program [44]	Critical Rereading by the Authors Regarding the Socioeconomic Impacts of the “Healthy Streets” Indicators [44]	Critical Rereading by the Authors Regarding the Environmental Impacts of the “Healthy Streets” Indicators [44]
Shade and shelter	The presence of shade and shelter enhances the comfort and attractiveness of urban spaces for both residents and visitors. This improvement in quality of life encourages the use of public spaces and commercial areas, thereby promoting social interaction and community cohesion	Trees and green structures provide shade, mitigate the urban heat island effect, and improve air quality by absorbing CO ₂ and releasing oxygen
People choose to walk and cycle	Encouraging walking and cycling promotes physical health and reduces healthcare costs. It also enhances the economic and social accessibility of urban areas	Reducing the use of motor vehicles decreases greenhouse gas emissions and air pollution, contributing to a cleaner and more sustainable environment
Clean air	Clean air improves public health by reducing respiratory diseases and associated healthcare costs. It also enhances the city’s attractiveness for residents and businesses	Reducing air pollution protects urban ecosystems and contributes to biodiversity conservation and climate change mitigation
Everyone feels welcome	An inclusive environment promotes social cohesion and equality, reduces social tensions, and fosters active participation in urban life. Additionally, it makes the city more attractive to new residents and visitors	An environment that welcomes everyone often includes green spaces and sustainable infrastructure, which enhance quality of life and promote environmentally responsible behaviours
People feel safe	Safety is fundamental to urban quality of life. When people feel safe, they are more inclined to engage in social and economic activities, contributing to the city’s prosperity	A well-planned environment with adequate lighting and well-maintained public spaces can reduce crime and improve overall well-being.
Things to see and do	The presence of cultural and recreational attractions stimulates the local economy by attracting tourists and residents and creating job opportunities	Cultural and recreational spaces often include natural elements such as parks and gardens, which improve environmental quality and promote sustainable behaviours
People feel relaxed	An urban environment that promotes relaxation improves the mental and physical well-being of residents, thereby increasing productivity and quality of life	Green and quiet spaces contribute to reducing stress and noise pollution, thus improving the overall health of the urban ecosystem
Easy to cross	Easily navigable streets improve accessibility and inclusivity by facilitating mobility for all citizens and supporting local commerce	Promoting pedestrian mobility reduces car usage, thereby decreasing greenhouse gas emissions and improving air quality
Places to stop and rest	Rest areas enhance urban comfort, encourage social interactions, and support local commerce	These spaces often include green areas that contribute to biodiversity and improve air and soil quality
Not too noisy	A low level of noise improves quality of life, reduces stress, and enhances the attractiveness of the city for residents and businesses	Noise reduction contributes to a healthier environment for both people and urban wildlife, improving the overall quality of urban ecosystems

The methodology also entails defining 19 parameters that have a specific impact on one or more of the aforementioned indicators (Figure 3):

1. Motorised vehicle speed;
2. Volume of motorised traffic;

3. Mix of vehicles;
4. Cycle safety at junctions;
5. Ease of crossing side roads;
6. Ease of crossing between junctions;
7. Priority of crossing at junctions;
8. Navigation of crossings for people with visual impairments;
9. Quality of the footway surface;
10. Space for walking;
11. Quality of the carriageway surface;
12. Space for cycling;
13. Public seating;
14. Cycle parking;
15. Trees;
16. Green infrastructure;
17. Lighting;
18. Reducing the convenience of driving short journeys;
19. Bus stops.

10 Healthy Streets Indicators

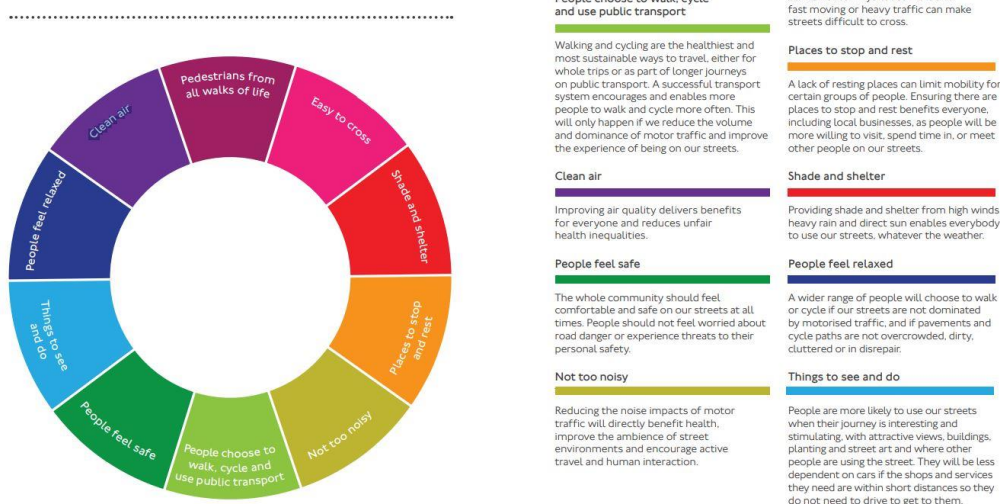


Figure 2. The 10 indicators outlined by the “Healthy Streets” program conceptualised by Lucy Saunders (2024) and reintroduced in the London Plan 2021 [45].

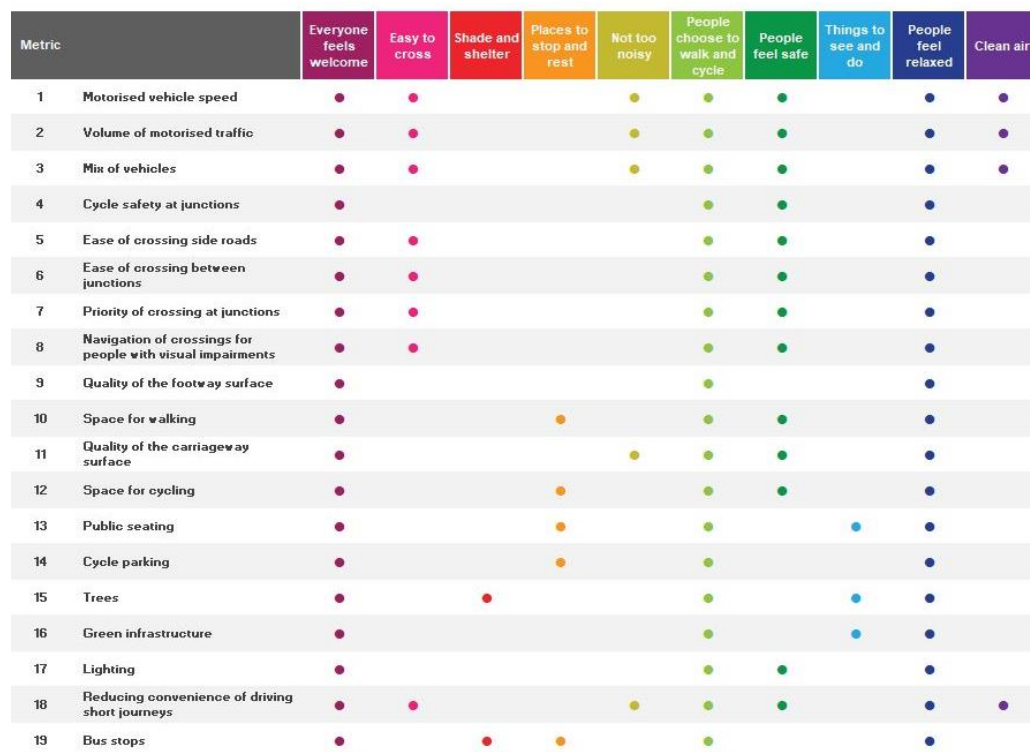


Figure 3. The 19 parameters identified by the “Healthy Streets” program conceptualised by Lucy Saunders (2024) and reintroduced in the London Plan 2021 [45].

To make these indicators a tangible tool for urban regeneration, the methodology structures an interactive checklist, namely an editable Excel document, applicable and exportable to all urban contexts, defined as “Healthy Streets Check for Designers”. This enables the comparison between the current situation of a street (referred to as “Existing Layout”) and the outcome that would be achievable following the implementation of the proposed design (referred to as “Proposed Layout”). Indeed, for each of the 19 parameters, a rating ranging from a minimum of 0 to a maximum of 3 is assigned, along with precise instructions on the need to assess each parameter and the evaluation methods. Assessment is conducted first for the “Existing Layout” and subsequently for the “Proposed Layout”.

As an illustrative example, Table 2 outlines the guidelines for evaluating the first parameter, “Motorised vehicle speed”.

Table 2. Healthy Streets Design Check (Saunders, 2021).

Parameter	Assessment
Motorised Vehicle Speed	<p>Why This Is Important</p> <p>This metric is measuring the greatest harm to people caused by motorised vehicles travelling at the highest speed they can. Vehicles travelling at higher speeds pose a danger to safety, especially for people walking, cycling, and spending time on the street. They also contribute to the street feeling unsafe, unwelcoming, and noisy.</p> <p>How to Measure It</p> <p>For existing streets, if you have speed data for the street you are assessing, then take the 85th percentile for the period when vehicles are travelling at their fastest. This is often late at night or in the early hours of the morning. Where speed data is not available, for existing streets and proposed designs, make an estimate of how fast motorised vehicles could travel in the period when they can travel fastest. To make</p>

your estimate, consider aspects of your street design that enable or inhibit vehicle speed, such as lighting, lane widths, signage and road markings, corner radii, and vertical and horizontal deflections.

Therefore, Lucy Saunders’ methodology not only allows for the examination of the “health” of a street (based on 19 measurable parameters affecting the 10 indicators), but also enables the pre-evaluation of whether a proposed design can bring about a significant improvement compared to the current state, as well as monitoring the project over time. Indeed, at the end of the comparison between the current layout and the proposed layout, it is possible to assess which of the ten indicators have shown improvement and which have not (Figure 4).

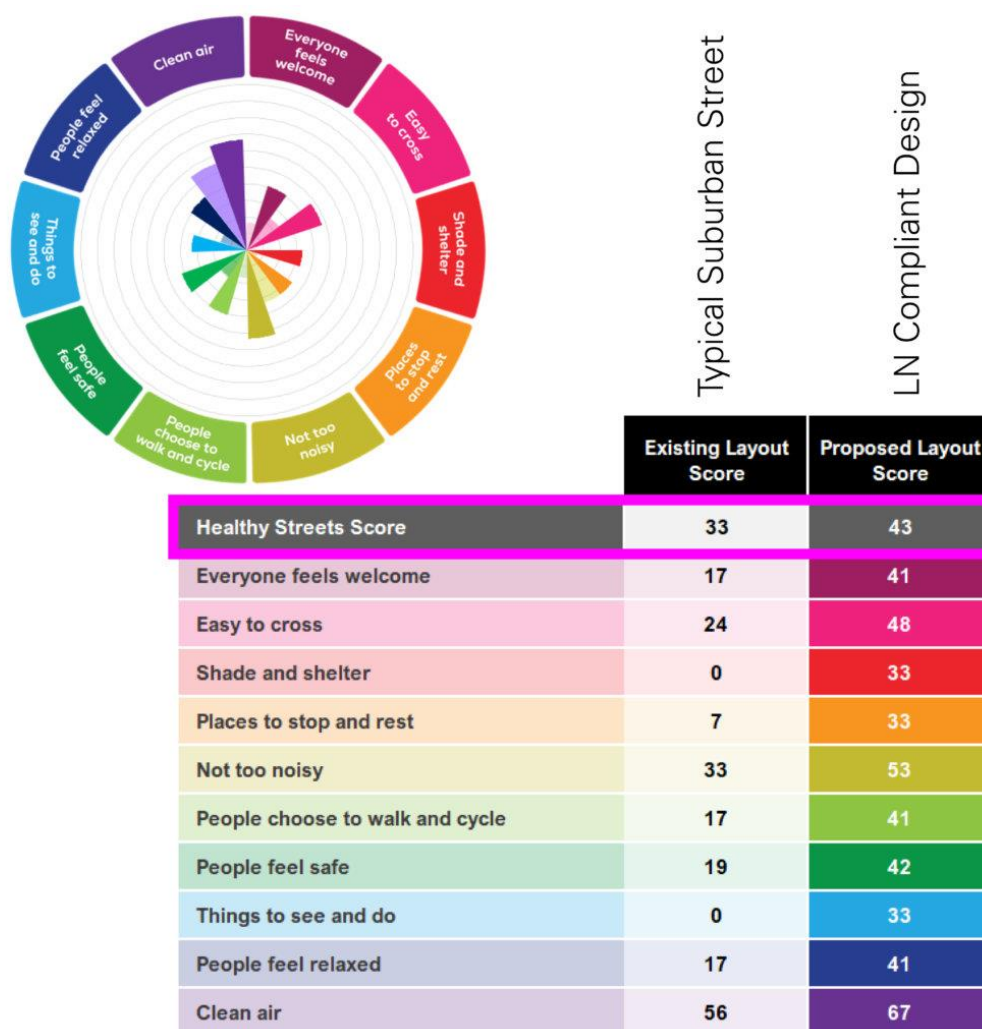


Figure 4. Example of comparison between the score obtained from the “Existing Layout” and the “Proposed Layout” of a street, using the approach and methodology of “Healthy Streets” theorised by Lucy Saunders (2024) and reintroduced in the London Plan 2021 [45].

4. Methodology: A Network of Networks for the Urban Regeneration

As mentioned in Section 1.2, the aim of this contribution is to develop a transferable methodology to guide ClimaEquitable urban regeneration actions with lasting effects over

time [38]. This objective is pursued by the authors through the definition of a toolkit of design parameters to guide urban regeneration interventions.

Similar to Saunders' programme, each of these parameters will be measurable and will impact the ten indicators of socio-economic and environmental sustainability. This will enable a comparison of the area before and after the urban regeneration project to assess improvements in urban quality.

As previously stated, the authors adopt the ten indicators (Everyone feels welcome; Easy to cross; Shade and shelter; Places to stop and rest; Not too noisy; People choose to walk and cycle; People feel safe; Things to see and do; People feel relaxed; Clean air), but they expand the parameters, as Saunders' focus is solely on the Mobility System. The parameters proposed by the authors will cover the three systems that make up the public city:

1. Public spaces System (including squares and central city locations);
2. Historical-environmental System (comprising urban and local green spaces and representative historical-archaeological-monumental components of cultural heritage);
3. Services and mobility System.

Indeed, the authors consider the public city as a "Network of networks" of tangible and intangible elements:

- Networks of areas, spaces, and public facilities for health, education, and culture;
- Infrastructural networks for sustainable public mobility and social inclusion;
- Technological networks, networks for waste collection and disposal;
- Connective networks of greenery and water for ecological functioning, and for environmental regeneration of fundamental resources;
- Networks of natural and anthropic components structuring, characterising, and detailing landscape arrangements;
- Morphological networks for reconfiguring open spaces, residual spaces, disused areas, fabrics, and artefacts;
- Networks for enhancing historical-documentary-architectural emergencies, architectural landmarks, routes, and historical paths; Networks of functions, integrated and complementary, compatible, permanent, and temporary;
- Community networks, networks of active subjects in the territories, of shared management, of common goods for the care and maintenance of the urban environment, public-private partnership networks;
- Networks for socio-economic and cultural development and revitalisation, local and urban, of new urban economies;
- Networks for housing, social inclusion, conflict reduction;
- Networks for energy conversion and replacement of the building stock [51].

As depicted in Table 3 and shown in Figure 5, each network (or system) is further defined by "nodes" (represented by the specific components of the above-mentioned systems) and "axes" (linear components of the aforementioned systems that connect the nodes and project the design into its urban dimension, integrating it into the context).

The individual parameters for each "Node" and "Axis" are presented in Section 5, "Results" In Section 6, "Discussion", the contribution of each parameter to the ten indicators used for the construction of "Healthy Neighbourhoods" is highlighted.

Table 3. Schematisation of the “network of networks” of the public city.

Public City as “Network of Networks”		
Networks	Elements Which Constitute the Network	
	Nodes	Axes
Public space System network	Squares, open spaces	Roads, in their capacity as public spaces (e.g., sidewalks, parklets)
Historical-environmental System network	Urban and local-level parks, punctual elements with a historical-archaeological-monumental value	Ecological corridors, ancient roadways, linear elements with historical-archaeological-monumental value
Network of services and mobility System	Public services at urban and local level	Roadways, railways, and public transport lines

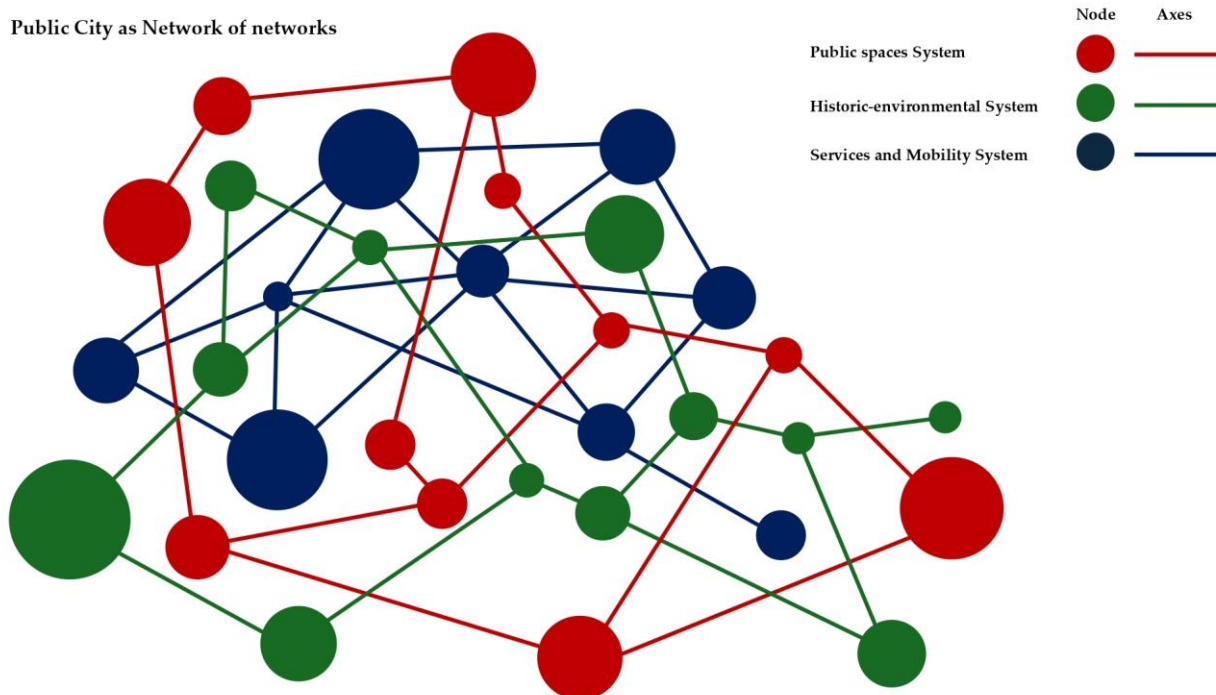


Figure 5. Public City as “Network of networks”. Scheme developed by Marsia Marino (2024).

The flow chart shown in Figure 6 clearly illustrates how the authors have utilised Saunders’ methodology [44], detailing what aspects have been retained and what changes or expansions have been made.

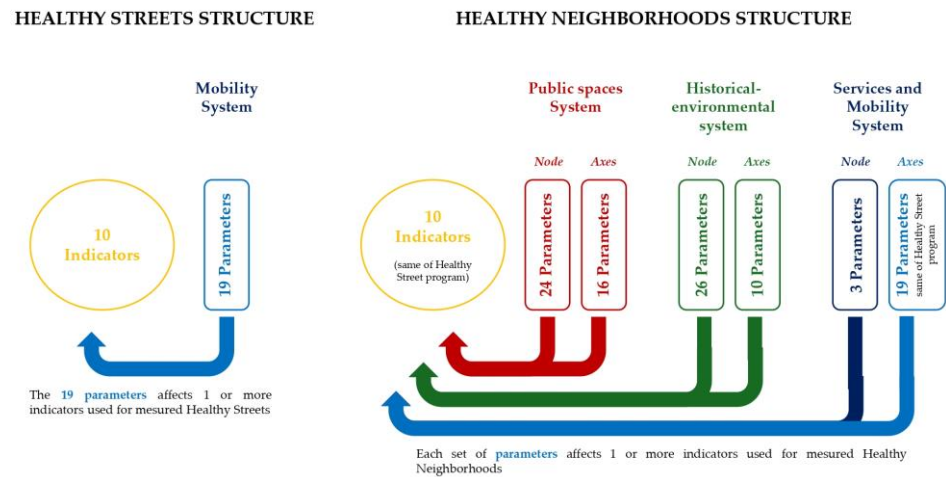


Figure 6. The Flow Chart show the comparison between Healthy Street structure and Healthy Neighborhoods structure. Developed by Marsia Marino (2024).

5. Results

5.1. Setting Parameters for Healthy Neighborhoods

Starting from the methodological framework of the “Network of networks”, the authors propose a critical reinterpretation of the methodological architecture of the Healthy Streets program [44], outlined in Section 3 in order to structure an exportable toolkit of parameters.

Therefore, once the portability of the ten indicators of the Healthy Streets Program to all the systems identified by the authors has been established and verified, along with the dual impact on socioeconomic and environmental aspects for each of them (Table 1), some parameters are proposed in Sections 5.2–5.4 to evaluate the “nodes” and “axes” of the three systems, specifying, for each parameter, “Why this is important” and “How to measure it” (following the methodology proposed by Lucy Saunders (2024) and outlined in Table 2).

5.2. Assessment of “Nodes” and “Axes” for the Public Space System

The “Public space System” is understood as the connective tissue of the built environment, within which collective spatiality is concretised. It refers to the ensemble of city areas accessible to the public (mostly paved): squares, pedestrian streets, plazas, and any other urban space offering opportunities for socialisation, leisure, culture, and community activities. In addition to being essential for urban quality of life, these spaces also play a crucial role in the social, economic, and environmental structure of a city.

As highlighted in Section 4, the authors break down the system of public spaces into “nodes” and “axes”. Nodes are represented by focal points, where social and collective activities converge, those characterised as “gathering places” (squares, open spaces...).

Axes are the linear connections that join the nodes and thus, the components of linear public space along the thoroughfares (such as sidewalks), pedestrian axes, etc...

The “axes” of this system facilitate movement and connection between different “nodes” in favour of an integrated vision of the public city.

The system of public spaces materialises in the dynamic interaction between “nodes” and “axes”, creating a functional and lively network that supports the socioeconomic and environmental health of cities, promoting an inclusive, accessible, and sustainable urban environment.

Below is a first hypothesis of parameters (which can however be integrated during more advanced research phases) to evaluate the nodes (Table 4) and axes (Table 5) of the “Public space System”, indicating the importance of each parameter and how to measure it.

Table 4. Parameters to consider in the assessment of the “Existing layout” and the “Proposed Layout” for the “nodes” of the Public space System.

“Nodes” of the Public Space System		
Parameters	Assessment	
	Why This Is Important	How to Measure It
Presence of cultural heritage elements	The presence of historical-cultural heritage elements in the square, such as historical monuments, archaeological sites, or buildings of historical-artistic interest, enriches the identity and character of the square, providing residents and visitors with evidence of the place’s history and culture	Assess the presence and conservation of cultural heritage elements in the square, as well as their historical-artistic significance and their impact on the surrounding urban environment
Presence of Land art, urban art (murals/graffiti), or interactive installations	The presence of Land art, urban art, or interactive installations adds aesthetic and cultural value to the square, creating visually interesting focal points that can stimulate community interest and engagement	Quantitatively evaluate the number of art works or historical-architectural testimonies present in the square. Also, consider the variety and quality of the works, as well as the accessibility for the population and the degree of community involvement in their creation, maintenance, and enhancement.
Organisation of cultural activities or public identity events	Organizing cultural activities and public identity events helps create a sense of community and belonging in the square, increasing the vitality and attractiveness of the place	Monitor the frequency and variety of cultural events organised in the square, such as concerts, art exhibitions, thematic festivals, or fairs. Also, assess community involvement in the organisation and participation in the events
Organisation of artistic-cultural events	Organizing artistic-cultural events promotes creativity, innovation, and cultural exchange in the square, contributing to enhancing local cultural heritage and stimulating community interest and participation	Evaluate the variety and frequency of artistic-cultural events organised in the square, as well as community involvement in the organisation and participation in the events
Presence of spaces for cultural or artistic events	The presence of dedicated spaces for cultural or artistic events supports the programming of public activities that enrich the cultural life of the community and promote social interaction and citizen participation	Assess the availability of flexible and multifunctional spaces in the square that can host various cultural or artistic events, as well as the frequency and variety of events organised in the square
Presence of open spaces suitable for meetings and/or informal gatherings for residents or neighbourhood associations	The presence of open spaces for meetings and informal gatherings promote social interaction and community participation, fostering social cohesion and creating bonds among neighbourhood residents	Evaluate the availability of well-equipped open areas with seating, green spaces, and meeting spaces, as well as the frequency and diversity of activities organised in these spaces
Accessibility for disabled people and presence of support structures for people with reduced mobility	Ensuring accessibility for people with disabilities is essential to promoting inclusion and equity in the use of public space. The presence of adequate support structures is essential to enabling full participation of all community members	Evaluate the presence of ramps, elevators, tactile paths, reserved parking, and other support structures for people with disabilities, as well as compliance with international accessibility standards

Presence of well-marked pedestrian crossings	Safe road crossing to reach a central place, an open space, or a square is essential to ensure user safety, especially for the elderly and children. Well-marked pedestrian crossings reduce the risk of traffic accidents and promote the perception of a safe and welcoming urban environment	Evaluate the presence of clearly marked pedestrian crossings with horizontal and vertical signage, including light signals and pedestrian stripes
Clear and visible signage/billboards and any info points	Clear and visible signage is essential for orientation and accessing useful information about the square and its attractions. Info points provide an additional service for visitors, improving the overall experience in the urban environment	Assess the presence and quality of signage and informational signs throughout the square, including their contents, location, and visibility
Presence of trees or shade structures such as pergolas or awnings	The presence of trees and other shade structures is essential to provide thermal comfort and protection from sunlight during hot periods, encouraging people to spend more time outdoors and enjoy the square comfortably	Assess the tree density, presence of mature trees, and availability of structures such as pergolas, awnings, or umbrellas that provide shading for users of the square
Presence of shaded areas in resting spots	The presence of shaded areas in resting spots ensures comfort for visitors during hot periods, improving the usability of rest areas and promoting permanence and social activity in the square	Evaluate the presence, quality, and accessibility of shading structures in resting spots, such as gazebos, pergolas, awnings, or tall trees
Presence of shelters from adverse weather	Weather shelters provide protection from adverse weather phenomena such as rain and wind, allowing people to continue using the square even in unfavourable weather conditions	Assess the presence and quality of shelters such as gazebos, kiosks, arcades, or covered sidewalks, and their suitability for providing adequate protection in case of bad weather
Presence of measures to adapt to the effects of climate change	Measures to adapt to the effects of climate change are crucial to ensure the resilience of the square and protect its infrastructure and users from the negative impacts of climate variations, such as heatwaves, heavy rains, and sea-level rise	Assess the presence, effectiveness, and integration of adaptation measures possibly implemented in the square, such as drainage systems and rainwater management, the presence of green areas for water absorption, sustainable irrigation systems, and strategies for managing extreme temperatures. Additionally, consider compliance with urban planning and climate change adaptation guidelines
Presence of benches or public seating	Benches and public seating provide users of the square with a place to rest, socialise, and observe the surrounding environment, contributing to the comfort and liveability of the public space	Assess the quantity and distribution of benches or public seating in the square, as well as their quality, comfort, and accessibility for various user groups
Presence of picnic areas or relaxation areas	Picnic or relaxation areas provide residents and visitors of the square with a dedicated place for outdoor relaxation and enjoyment, promoting social interaction and psychological well-being	Assess the presence of designated picnic or relaxation areas in the square, equipped with facilities such as tables, benches, shading, and green areas, and their suitability to meet user needs
Presence of outdoor bars or cafes with chairs and tables	The presence of outdoor bars or cafes enhances the service offer of the square, providing users with a place to socialise, consume	Assess the quantity and quality of the offer, as well as the availability of chairs,

	food and drinks, and enjoy the urban atmosphere	tables, and other equipment for customer comfort, also provided for public use
Presence of traffic restrictions	Limiting vehicular traffic in the square contributes to creating a safer, more welcoming, and healthier environment for pedestrians and cyclists, reducing the risk of traffic accidents and air and noise pollution	Evaluate the measures adopted to limit or reduce vehicular traffic in the square, such as pedestrian zones, limited traffic areas, and parking restrictions, and their impact on the liveability and safety of the public space
Presence of noise barriers or trees to attenuate noise	Reducing environmental noise through noise barriers or trees contributes to improving the quality of life for residents and visitors of the square, creating a more pleasant and quiet environment	Evaluate the presence of noise barriers installed along the square or the presence of trees strategically placed to reduce noise from surrounding streets or other sources of acoustic disturbance
Presence of bicycle paths	The presence of bicycle paths in the square promotes sustainable and active mobility, allowing cyclists to easily access the square and move safely and comfortably within the urban environment	Evaluate the presence and quality of bicycle paths in the square, as well as their connectivity to the urban bike network and their suitability to meet cyclists' needs
Spaces for bicycle rental or bike-sharing stations	The availability of spaces for bicycle rental or bike-sharing stations facilitates access to bicycles and promotes their use as a sustainable means of transport in the square and the city	Evaluate the presence and quantity of bike-sharing stations or designated areas for bicycle parking and rental, as well as their accessibility
Adequate lighting during the night	Adequate lighting during the night ensures safety and visibility in the square, allowing people to continue using the public space even after dark and reducing the risk of accidents and crime	Evaluate the intensity and distribution of night lighting in the square, as well as the quality and energy efficiency of the installed lighting systems
Presence of local markets	Local markets contribute to promoting the local economy, cultural diversity, and socialisation in the square, offering residents and visitors the opportunity to purchase essential products and contributing to the creation and strengthening of cultural identity	Evaluate the frequency and size of local markets organised in the square, as well as the variety and quality of the products offered and the involvement of local producers and residents
Presence of green areas	The presence of green areas in the square promotes contact with nature, improves air quality and the microclimate, and contributes to the psychological well-being of residents and visitors	Evaluate the quantity, quality, and distribution of green areas in the square, as well as the variety of plant species present and their maintenance

Table 5. Parameters to consider in the assessment of the “Existing layout” and the “Proposed Layout” for the “axes” of the Public space System.

“Axes” of the Public Space System		
Parameters	Assessment	
	Why This Is Important	How to Measure It
Width of sidewalks	Wide sidewalks ensure the comfort and safety of pedestrians, preventing overcrowding and facilitating the passage of strollers and wheelchairs	Measure the width of the sidewalks along the entire axis, verifying compliance with standards
Pavement quality	High-quality pavement reduces the risk of tripping and falling, improving the pedestrian experience	Evaluate the maintenance condition, surface regularity, and absence of holes or obstacles

Night lighting	Adequate night lighting improves safety and usability of spaces during dark hours	Verify the presence and functionality of streetlights, and measure the distribution and intensity of lighting Count the number of pedestrian crossings, and evaluate their visibility, signage, and presence of pedestrian traffic lights
Safe pedestrian crossings	Well-designed pedestrian crossings reduce the risk of road accidents	Measure the width of bicycle paths, verify their separation from vehicular traffic, and ensure the continuity of the route
Presence of bicycle paths	Bicycle paths promote sustainable and safe mobility for cyclists	Verify the presence of ramps, tactile paths, and other adaptations for people with disabilities along the axis
Accessibility for disabled people	Accessibility ensures fair use of public space for everyone	Count the number of drinking fountains and evaluate their distribution and functionality
Presence of drinking fountains	Drinking fountains offer a useful service and improve user comfort	Evaluate the quantity and distribution of trees, presence of flower beds, and small parks along the axis
Presence of trees and green areas	Urban greenery improves air quality and psychological well-being	Count the number and evaluate the quality and distribution of benches, waste bins, and other urban furniture elements
Presence of urban furniture (benches, bins, etc.)	Urban furniture improves the usability and cleanliness of spaces	Verify the presence, clarity, and readability of signage along the axis
Informative signage	Good signage helps with orientation and provides useful information	Count and evaluate bicycle crossings, their signage, and safety
Presence of bicycle crossings	Safe bicycle crossings improve the continuity of bicycle paths and cyclist safety	Evaluate the presence and effectiveness of drainage systems along the axis, such as grates and channels
Drainage and water management measures	A good drainage system prevents flooding and infrastructure damage	Verify the presence of noise barriers and their effectiveness in reducing noise along the axis
Presence of noise barriers	Noise barriers reduce noise pollution and improve the quality of life	Count the number of bars, cafes, restaurants, and public services along the axis and evaluate their quality and accessibility
Refreshment points and services	The presence of refreshment points and services along the axis increases user convenience	Verify the presence of ZTLs along the axis and evaluate their effectiveness and compliance with the rules
Limited traffic zones	Limited traffic zones reduce vehicular traffic and improve safety and air quality	Verify the proximity and frequency of bus, tram, or metro stops along the axis
Public transport coverage	Good public transport coverage increases mobility and accessibility of public spaces	Count the number of bike racks and their distribution along the axis
Presence of bicycle parking areas	Bicycle parking areas encourage the use of this mode of transportation	

5.3. Assessment of “Nodes” and “Axes” for the Historic Environmental System

The “historical-environmental system” is understood as the ensemble of public green areas and places or elements that testify to the historical and cultural heritage of a city,

integrated with the natural and landscape context. This system includes monuments, historic buildings, archaeological sites, historic parks, or green areas with the significance of a public park. In addition to being fundamental for the preservation of historical memory and cultural identity, these places play a crucial role in the social, economic, and environmental structure of a city.

As highlighted in Section 4, the authors break down the historical-environmental system into “nodes” and “axes”. Nodes are represented by focal points of historical and natural heritage, where the main cultural and landscape attractions converge (monuments, archaeological sites, public parks, historic parks...).

Axes are the connections that unite these nodes, integrating historical paths, ecological corridors, tree-lined avenues... The “axes” of this system facilitate movement and connection between different “nodes” in favour of an integrated vision of the historical, landscape, and natural components of the city.

The historical-environmental system materialises in the dynamic interaction between “nodes” and “axes”, creating a network that supports the socioeconomic and environmental health of cities, promotes an inclusive, accessible, and sustainable urban environment, and enhances historical memory and natural heritage.

Below is a first hypothesis of parameters (which can however be integrated during more advanced research phases) to evaluate the nodes (Table 6) and axes (Table 7) of the “historical-environmental system”, indicating the importance of each parameter and how to measure it.

Table 6. Parameters to consider in the assessment of the “Existing layout” and the “Proposed Layout” for the “nodes” of the historical-environmental system.

“Nodes” of Historical-Environmental System		
Parameters	Assessment	
	Why This Is Important	How to Measure It
Presence of cultural heritage elements	The presence of cultural heritage elements, such as historic monuments, archaeological sites, or buildings of historical-artistic interest, enriches the identity and character of the area, offering residents and visitors a testimony of the place’s history and culture	Evaluate the presence and preservation of cultural heritage elements, their historical-artistic significance, and their impact on the surrounding urban environment
Presence of Land art, urban art (murals/graffiti), or interactive installations	The presence of Land art, urban art, or interactive installations adds aesthetic and cultural value, creating visually interesting focal points that can stimulate community interest and engagement	Quantitatively assess the number of artworks or historical-documentary-architectural testimony in the area of interest. Also, consider the variety and quality of the works, their accessibility to the population, and the community’s involvement in their creation, maintenance, and enhancement
Organisation of cultural activities or identity public events	The organisation of cultural activities and identity public events helps create a sense of community and belonging, increasing the vitality and attractiveness of the place	Monitor the frequency and variety of cultural events organised in the area of interest, such as concerts, art exhibitions, festivals, or themed fairs. Also, assess community involvement in organising and participating in events
Organisation of artistic-cultural events	The organisation of artistic-cultural events promotes creativity, innovation, and cultural exchange, contributing to the enhancement of local cultural	Evaluate the variety and frequency of artistic-cultural events, as well as the community’s involvement in organising and participating in events

Presence of spaces for cultural or artistic events	<p>heritage and stimulating community interest and participation</p> <p>The presence of dedicated spaces for cultural or artistic events supports the programming of public activities that enrich the community's cultural life and promote social interaction and citizen participation</p>	Assess the availability of flexible and multifunctional spaces that can host various cultural or artistic events, as well as the frequency and variety of events organised in the area
Presence of open spaces suitable for meetings and/or informal gatherings for citizens or neighborhood associations	<p>The presence of open spaces for meetings and informal gatherings fosters social interaction and community participation, promoting social cohesion and the creation of bonds among neighbourhood residents</p>	Evaluate the availability of well-equipped open areas with seating, green spaces, and meeting areas, as well as the frequency and diversity of activities organised in these spaces
Access for disabled people and presence of support structures for people with reduced mobility	<p>Ensuring accessibility for disabled people is essential to promoting inclusion and equity in the use of public space. Adequate support structures are essential for enabling full participation of all community members</p>	Evaluate the presence of ramps, elevators, tactile paths, reserved parking, and other support structures for disabled people, as well as compliance with international accessibility standards
Presence of well-signposted pedestrian crossings	<p>Safely crossing the street to reach a central location, square, or public park is crucial for ensuring user safety, especially for the elderly and children. Well-signposted pedestrian crossings reduce the risk of road accidents and promote the perception of a safe and welcoming urban environment</p>	Evaluate the presence of clearly signposted pedestrian crossings with horizontal and vertical signage, including luminous signals and pedestrian stripes
Visible and clear signage/information points	<p>Clear and visible signage is essential for orienting oneself and accessing useful information about a central location, square, or public park. Information points provide an additional service for visitors, enhancing the overall experience in the urban environment</p>	Evaluate the presence and quality of signage and information boards in the area of interest, including their content, location, and visibility
Presence of shaded areas in rest areas	<p>The presence of shaded areas in rest areas ensures comfort for visitors during hot periods, improving the usability of rest areas and promoting social interaction and activity</p>	Evaluate the presence, quality, and accessibility of shading structures in rest areas, such as gazebos, pergolas, tents, or tall trees
Presence of shelters for inclement weather	<p>Shelters from inclement weather provide protection from adverse weather conditions such as rain and wind, allowing people to continue using the area even in unfavourable climatic conditions</p>	Evaluate the presence and quality of shelters such as gazebos, kiosks, porticoes, or covered sidewalks, and their suitability to provide adequate protection in case of bad weather
Presence of climate change adaptation measures	<p>Climate change adaptation measures are essential to ensure the resilience of a central location, square, or public park and to protect its infrastructure</p>	Evaluate the presence, effectiveness, and integration of adaptation measures implemented in the area of interest, such as drainage and stormwater

	and users from the negative impacts of climate variations, such as heat waves, intense rainfall, and sea level rise	management systems, the presence of green areas for water absorption, sustainable irrigation systems, and strategies for managing extreme temperatures. Also, consider compliance with urban planning and climate change adaptation guidelines
Presence of benches or public seating	Benches and public seating offer users of a central location, square, or public park a place to rest, socialise, and observe the surrounding environment, contributing to the comfort and liveability of the public space	Evaluate the quantity and distribution of benches or public seating, as well as their quality, comfort, and accessibility for different user group
Presence of picnic or relaxation areas	Picnic or relaxation areas provide residents and visitors with a dedicated place for outdoor relaxation and enjoyment, promoting social interaction and psychological wellbeing	Evaluate the presence of designated picnic or relaxation areas with equipment such as tables, benches, shading, and green areas, and their suitability to meet user needs
Presence of outdoor bars or cafes with chairs and tables	The presence of outdoor bars or cafes enriches the service offering, providing users with a place to socialise, consume food and drinks, and enjoy the urban atmosphere	Evaluate the quantity and quality of the offering, as well as the availability of chairs, tables, and other equipment for customer comfort, including public use
Presence of bicycle paths	The presence of bicycle paths promotes sustainable and active mobility, allowing cyclists to easily access the area and move safely and comfortably within the urban environment	Evaluate the presence and quality of bicycle paths, their connectivity to the urban bicycle network, and their suitability to meet cyclists' needs
Spaces for bicycle rental or bike-sharing stations	The availability of spaces for bicycle rental or bike-sharing stations facilitates access to bicycles and promotes the use of bicycles as a sustainable mode of transportation in the area and city	Evaluate the presence and quantity of bike-sharing stations or designated areas for bicycle parking and rental, as well as their accessibility
Adequate night lighting (if night opening of the green area is planned)	Adequate night lighting ensures safety and visibility in a central location, square, or public park, allowing people to continue using the public space even after dark and reducing the risk of accidents and crime	Evaluate the intensity and distribution of night lighting, as well as the quality and energy efficiency of the installed lighting systems
Quality of green areas	The quality of green areas affects user experience and environmental sustainability	Evaluate the variety of plant species, maintenance, and the presence of elements such as flower beds, lawns, and mature trees
Presence of wildlife habitats	Wildlife habitats contribute to biodiversity and ecological sustainability	Evaluate the presence and quality of habitats, the variety of species present, and protective measures
Presence of public toilets	Public toilets are essential for the comfort and usability of the node	Count the number of public toilets and evaluate their cleanliness, accessibility, and maintenance

Presence of equipment for physical activity	Spaces dedicated to physical activity promote health and well-being	Count the number of spaces and evaluate their equipment, accessibility, and usage
Presence of relaxation areas	Relaxation areas increase the comfort and usability of the node	Count the number of relaxation areas and evaluate the presence of benches, shading, and green areas
Presence of recycling collection facilities	Recycling collection facilities promote environmental sustainability	Count the number and distribution of collection points and evaluate their accessibility and maintenance
Presence of charging stations for electronic devices	Charging stations improve the comfort and attractiveness of the node	Count the number of charging stations and evaluate their distribution and functionality
Presence of children’s play area	Play areas promote the family-friendly and inclusive use of the node	Count the number of play areas and evaluate their safety, maintenance, and attractiveness

Table 7. Parameters to consider in the assessment of the “Existing layout” and the “Proposed Layout” for the “axes” of the historical-environmental System.

“Axes” of Historical-Environmental System		
Parameters	Assessment	
	Why This Is Important	How to Measure It
Presence of cultural heritage elements	The presence of cultural heritage elements, such as historic monuments, archaeological sites, or buildings of historical-artistic interest, enriches the identity and character of the axis, offering residents and visitors a testimony of the place’s history and culture	Evaluate the presence and preservation of cultural heritage elements, their historical-artistic significance, and their impact on the surrounding urban environment
Presence of natural habitats	Natural habitats provide sustenance and shelter for local wildlife, essential for biodiversity conservation	Identify the presence of natural habitats along the axis
Ecological connection corridors	Ecological connection corridors allow the movement of wildlife between habitats, reducing the risk of ecosystem fragmentation	Map and evaluate the presence of ecological corridors, such as coppiced woods, hedgerows, tree lines, etc
Presence of reproductive habitats	Reproductive habitats are crucial for species survival, offering nesting and breeding sites	Identify and evaluate the presence of reproductive habitats, such as wetlands for egg-laying, cover zones for nesting, etc.
Vegetative continuity	Vegetative continuity along the axis provides cover and protection for moving wildlife	Analyse satellite images or orthophotos to assess vegetative continuity along the axis
Presence of tree lines	Tree lines provide linear ecological corridors, offering shelter and nourishment for wildlife and contributing to biodiversity. Additionally, they act as green corridors that promote habitat connection, facilitating species migration and plant dispersal, thus contributing to ecosystem resilience in the face of climate change	Identify and evaluate the presence and health of tree lines along the axis, considering not only the density, variety, and conservation status of the trees but also their role in ecological connection and ecosystem resilience against climate change

Compatibility of tree species	The choice of tree species affects habitat quality and stability, as well as the ability to attract and support wildlife. Additionally, it determines the trees' resilience to future climatic conditions, such as higher temperatures	Evaluate the tree species present and their compatibility with the local ecosystem, analysing species diversity, their ability to support local wildlife, and their resilience to climate change
Density of tree cover	Dense tree cover contributes to biodiversity protection	Conduct forest surveys to assess the density of tree cover along the axis
Presence of natural watercourses	Natural watercourses provide essential habitats for aquatic and riparian fauna	Map and evaluate the presence of natural watercourses along the axis, identifying potential critical points
Presence of wetlands	Wetlands provide vital habitats for a wide range of species, contributing to biodiversity	Map and evaluate the presence and health of wetlands along the axis
Presence of climate change mitigation and adaptation measures	Mitigation and adaptation measures are crucial for protecting the axes from the increasing impacts of climate change (surface runoff, heat islands...), including extreme events, vegetation changes, and variations in water availability	Evaluate the presence and effectiveness of mitigation and adaptation measures along the axes, including drainage infrastructures, planting of heat- and drought-resistant species, reforestation zones for biodiversity conservation, and soil management policies to prevent erosion and environmental degradation

5.4. Assessment of "Nodes" and "Axes" for the Services and Mobility System

The "Services and Mobility System" encompasses urban and local public services (such as schools, universities, hospitals, cultural centers, elderly centers) and mobility infrastructures (subway stations, railway stations, public transportation lines, etc.).

This system ensures the right of settled communities to access public services and the possibility to reach them easily. In addition to being essential for ensuring the quality of urban life, the elements constituting the system also play a crucial role in preventing socioeconomic relegation dynamics as well as in guaranteeing economic development.

Moreover, appropriately designed mobility infrastructures can significantly contribute to mitigating the effects of climate change.

As highlighted in Section 4, the authors decompose the system of services and mobility into "nodes" and "axes". Nodes are represented by urban and local public services (schools, universities, hospitals, cultural centers, elderly centers, subway stations, railway stations).

Axes are represented by road or rail traffic lanes and public transportation lines that connect the nodes.

The "Services and Mobility System" materialises through the dynamic interaction between nodes and axes, creating a network of services for citizens that substantiates the very definition of a "public city".

Below is a first hypothesis of parameters (which can however be integrated during more advanced research phases) to evaluate the nodes (Table 8) of the "Services and Mobility System", indicating the importance of each parameter and how to measure it.

For the axes of this system, the parameters theorised by Saunders in the Healthy Streets methodology (see Section 3) are assumed.

Table 8. Parameters to consider in the assessment of the “Existing layout” and the “Proposed Layout” for the “nodes” of the services and mobility System.

“Nodes” of Services and Mobility System		
Parameters	Assessment	
	Why This Is Important	How to Measure It
Equality in access to services	Ensuring that all citizens, regardless of their geographical location within the urban area, have equitable access to essential public services such as transportation, healthcare, education, and security, thus ensuring social cohesion and spatial justice	Evaluate the spatial distribution of public services and accessibility for different population segments, analysing the presence and quality of services in relation to population density and demographic distribution within the urban area
Impartiality in service delivery	Ensuring that the delivery of public services is impartial and non-discriminatory, respecting the principles of equity and social justice, and promoting fair distribution of resources and opportunities within the urban area	Monitor the distribution of resources and funding for public services, evaluating the alignment between population needs and resource allocation, as well as equity in access to and use of services by different social groups
Continuity and resilience of the system	Ensuring the continuity and resilience of the public services system, minimizing disruptions and impacts caused by external events such as natural disasters or emergencies, thus	Evaluate the ability of the public services system to withstand external shocks and environmental changes, analysing the robustness of infrastructure and construction technologies in relation to climate change impacts. Also, assess the effectiveness of prevention, preparedness, and response strategies to emergency and crisis events

6. Discussion

In light of the content presented in Section 5 “Results”, in this paragraph, precisely in Tables 9 (related to the Public space System), 10 (related to the Historical-environmental system), and 11 (related to the Services and Mobility, exclusively referring to the “nodes”), the authors highlight the contribution of each parameter to the ten indicators used for the construction of Healthy Neighbourhoods.

For reader clarity, it’s specified that in Tables 9–11, numbers 1 through 10 correspond to their respective indicators:

1. Everyone feels welcome;
2. Easy to cross;
3. Shade and shelter;
4. Places to stop and rest;
5. Not too noisy;
6. People choose to walk and cycle;
7. People feel safe;
8. Things to see and do;
9. People feel relaxed;
10. Clean air

Table 9. Incidence of public space System parameters on indicators for Healthy Neighbourhoods.

Parameters of the Public Spaces System		1	2	3	4	5	6	7	8	9	10	
Nods	Presence of cultural heritage elements								✓			
	Presence of Land art, urban art (murals/graffiti), or interactive installations								✓	✓		
	Organisation of cultural activities or public identity events	✓						✓	✓	✓		
	Organisation of artistic-cultural events	✓						✓	✓	✓		
	Presence of spaces for cultural or artistic events	✓		✓	✓				✓	✓		
	Presence of open spaces suitable for meetings and/or informal gatherings for residents or neighbourhood associations	✓		✓	✓				✓	✓		
	Accessibility for disabled people and presence of support structures for people with reduced mobility	✓							✓		✓	
	Presence of well-marked pedestrian crossings	✓	✓					✓	✓		✓	
	Clear and visible signage/billboards and any info points	✓	✓						✓	✓	✓	
	Presence of trees or shade structures such as pergolas or awnings	✓		✓	✓	✓	✓	✓			✓	✓
	Presence of shaded areas in resting spots	✓		✓	✓		✓	✓			✓	✓
	Presence of shelters from adverse weather	✓		✓	✓		✓	✓			✓	
	Presence of measures to adapt to the effects of climate change	✓							✓		✓	
	Presence of benches or public seating	✓			✓		✓	✓			✓	
	Presence of picnic areas or relaxation areas	✓			✓			✓	✓	✓		
	Presence of outdoor bars or cafes with chairs and tables	✓			✓				✓	✓		
	Presence of traffic restrictions		✓				✓	✓	✓		✓	✓
	Presence of noise barriers or trees to attenuate noise	✓		✓	✓	✓					✓	
	Presence of bicycle paths						✓	✓	✓		✓	✓
	Spaces for bicycle rental or bike-sharing stations						✓	✓	✓		✓	✓
Adequate lighting during the night	✓						✓	✓		✓		
Presence of local markets									✓			
Presence of green areas			✓	✓	✓				✓	✓	✓	
Axes	Width of sidewalks	✓	✓		✓		✓	✓		✓		
	Pavement quality	✓	✓				✓	✓		✓		
	Night lighting	✓	✓				✓	✓		✓		
	Safe pedestrian crossings		✓			✓			✓			
	Presence of bicycle paths		✓			✓	✓	✓		✓	✓	
	Accessibility for disabled people	✓			✓						✓	
	Presence of drinking fountains	✓			✓						✓	
	Presence of trees and green areas	✓		✓	✓	✓			✓		✓	
	Presence of urban furniture (benches, bins, etc.)	✓			✓		✓	✓		✓		
	Informative signage	✓						✓		✓		
	Presence of bicycle crossings		✓				✓			✓	✓	
	Drainage and water management measures							✓		✓		
	Presence of noise barriers				✓	✓					✓	
	Refreshment points and services	✓			✓					✓	✓	
	Limited traffic zones		✓	✓		✓	✓	✓	✓	✓	✓	
	Public transport coverage	✓				✓	✓			✓	✓	
	Presence of bicycle parking areas					✓	✓			✓	✓	

Table 10. Incidence of historical-environmental System parameters on indicators for Healthy Neighbourhoods.

Parameters of the Historical-Environmental System		1	2	3	4	5	6	7	8	9	10
Nods	Presence of cultural heritage elements								✓		
	Presence of Land art, urban art (murals/graffiti), or interactive installations								✓	✓	
	Organisation of cultural activities or identity public events	✓						✓	✓	✓	
	Organisation of artistic-cultural events	✓						✓	✓	✓	
	Presence of spaces for cultural or artistic events	✓		✓	✓				✓	✓	
	Presence of open spaces suitable for meetings and/or informal gatherings for citizens or neighbourhood associations	✓		✓	✓				✓	✓	
	Access for disabled people and presence of support structures for people with reduced mobility	✓							✓		✓
	Presence of well-signposted pedestrian crossings	✓	✓					✓	✓		✓
	Visible and clear signage/information points	✓	✓						✓	✓	✓
	Presence of shaded areas in rest areas	✓		✓	✓	✓	✓	✓	✓		✓
	Presence of shelters for inclement weather	✓		✓	✓			✓	✓		✓
	Presence of climate change adaptation measures	✓		✓	✓			✓	✓		✓
	Presence of benches or public seating	✓							✓		✓
	Presence of picnic or relaxation areas	✓			✓			✓	✓		✓
	Presence of outdoor bars or cafes with chairs and tables	✓			✓				✓	✓	✓
	Presence of bicycle paths	✓					✓	✓		✓	✓
	Spaces for bicycle rental or bike-sharing stations							✓			✓
	Adequate night lighting (if night opening of the green area is planned)	✓						✓	✓		✓
	Quality of green areas				✓	✓			✓	✓	✓
	Presence of wildlife habitats						✓			✓	✓
	Presence of public toilets	✓			✓						✓
	Presence of equipment for physical activity				✓					✓	✓
	Presence of relaxation areas	✓			✓	✓				✓	✓
	Presence of recycling collection facilities	✓									✓
	Presence of charging stations for electronic devices								✓	✓	✓
	Presence of children's play area	✓			✓				✓	✓	✓
Axes	Presence of cultural heritage elements								✓		
	Presence of natural habitats	✓			✓	✓		✓	✓	✓	✓
	Ecological connection corridors	✓			✓	✓		✓	✓	✓	✓
	Presence of reproductive habitats	✓			✓	✓		✓	✓	✓	✓
	Vegetative continuity		✓		✓	✓		✓	✓	✓	✓
	Presence of tree lines		✓		✓	✓		✓	✓	✓	✓
	Compatibility of tree species		✓		✓	✓		✓	✓	✓	✓
	Density of tree cover		✓		✓	✓		✓	✓	✓	✓
	Presence of natural watercourses				✓	✓			✓	✓	✓
	Presence of wetlands				✓	✓			✓	✓	✓
	Presence of climate change mitigation and adaptation measures	✓							✓		✓

Table 11. Incidence of Services System parameters on indicators for Healthy Neighbourhoods.

Parameters of the Services System	1	2	3	4	5	6	7	8	9	10
Equality in access to services	✓						✓		✓	
Nods Impartiality in service delivery	✓						✓		✓	
Continuity and resilience of the system	✓		✓		✓	✓	✓		✓	✓

7. Conclusions and Future Developments

The primary objective of the authors was to develop a transferable methodology to guide climate-equitable urban regeneration actions with enduring effects and to facilitate the creation of Healthy Neighbourhoods.

Firstly, the concept of the “public city” was defined as a “Network of networks” Morphologically and functionally, the authors divided the city into three main systems (Public Spaces, historical-environmental, Services and Mobility), which are further subdivided into “Nodes” and “Axes”, as outlined in Table 3 (Section 4).

To achieve the desired outcome stated in the introduction (Section 1.2), which is a toolkit of design parameters serving as a guide for urban regeneration interventions, the authors compiled a list of parameters (Section 5, “Results”). This list draws on the methodology of the Healthy Streets programme [44], and these parameters were subsequently discussed in Section 6, “Discussion”, to assess each parameter’s impact on the ten indicators of the Healthy Streets programme (also adopted by the authors as valid indicators of socio-economic and environmental sustainability applicable to all three systems that make up the public city).

The research presented represents an Initial result of a broader research project titled “New Rules, Parameters, Indicators, Operational References of the Urban Plan for an Eco-Sustainable Approach to Urban Regeneration” (PI Laura Ricci), which is currently in its second phase, “Operationalisation” (the first phase being “Thematic Contextualisation”). The aim of this project is to develop a transferable methodology to guide climate-equitable urban regeneration actions with lasting effects and to facilitate the creation of Healthy Neighbourhoods.

In the third and final phase of the research, known as “Experimentation” the methodology conceptualised by the authors and presented in this contribution will be applied to the case study of Pietralata, a peripheral area of Rome (Italy). This area is expected to see the development of several public and private services in the coming years, including the new Technopole of Sapienza University of Rome (a public service funded under the PNRR, which constitutes a significant component of the public city) and the construction of the AS Roma football stadium (a private service expected to have notable impacts on the public city, including increased traffic and potential gentrification effects in the area).

The authors recognise the iterative nature of the process as a foundational aspect of applied research. Therefore, as the research project within which this contribution is situated is in an intermediate phase, it is evident that applying the proposed method to one or more pilot areas may lead to potential revisions of the method and/or the conceptualised parameters to ensure the model’s applicability to the chosen case study and its repeatability in other contexts.

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