Integrated NBS-based Urban Planning Methodology
for Enhancing the Health and Well-being of Citizens

D11.4

Societal impact report (version 1)

WP11 - Project Coordination and Management

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Executive summary

This document presents Deliverable 11.4 "Societal impact report" corresponding to Task 11.3 (Quality and ethics assurance) of the euPOLIS project.

In chapter 1, we explain the purpose of this report. This deliverable is the first version of the euPOLIS societal impact report. It lays out the theoretical framework for the more detailed analysis that will follow in the second version.

Chapters 2 to 5 discuss the theoretical background based on which we describe in detail the whole methodological framework. The concept includes the methods and tools for measuring the euPOLIS societal impact and their practical application. In these chapters we describe the metalevel societal impact analysis, taking into consideration the impact of the project as a whole and its short- and long-term influence.

First, in chapters 2 and 3, we analyse the theoretical background. There are described modern social scientific concepts and effects of social surveys in an approach to planning and building a city friendly to residents, in the neighbourhood, which responds to their needs. First, we describe the approach of the Civil City Framework and the right to a healthy city. Next, we discuss concepts connected with neighbourhood sustainability assessment of societal impact. EuPOLIS's mission and holistic vision of implementation of NBS in demo sites are based on that approach.

In chapter 4, we propose the euPOLIS holistic approach for impact assessment. It is built on three layers: indicators framework (that was presented in D4.1 and D4.2), livability model (described in detail in D4.2), and 3) Social Sustainability. Herein, we focus mostly on the second and third layers and describe how the Livability model together with the Social Sustainability index might serve as the societal impact assessment tools.

In the following chapter 5, we analyse the potential societal impact of euPOLIS aggregated by Sustainable Development Goals (SDG). The aim is to additionally complement the project methodology and predict the societal impact from a long-term perspective. We present Table 2, in which we show the connection between SDG and the method of impact assessment in the euPOLIS project. Moreover, we describe in detail the potential societal impact of euPOLIS under selected SDGs.

In chapter 6, we focus on the ethical aspects of using ICT tools. We discuss the importance of the introduction of common data security measures and the data management system as well as we draw attention to ethical concerns related with the usage of ICT tools. Moreover, we highlight that a right to a healthy city is immanent for every citizen or urban space user of their technological competencies, socio-economic background, education level, gender, age, ethnicity, or religion.

Finally, in chapter 7, we discuss the risks of the project and possible compensation measures. We start with the subchapter describing potential conflict resolution measures. Then, we follow with a brief discussion of the risks of gentrification processes and digital exclusion. Next, we focus on the gender stereotypization and how the euPOLIS must avoid it. Finally, we discuss the topic of lack of trust which is one of the biggest challenges in planning public participation.

To summarize, in this deliverable we present a holistic approach to the assessment of the societal impacts of Nature-Based Solutions. It serves to monitor the effects of NBS implementation on the local community and beyond. While this is the first version of D11.4 that lays out the groundwork for the future assessment of societal impact, the second version will deliver the results of the assessment at the end of the project.

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List of Acronyms

Abbreviation	Explanations
BGS	Blue Green Solutions
GHG	Greenhouse Gases
GDPM	Goal Driven Planning Matrix
ICT	Information and Communication Technologies
KPI	Key Performance Indicator
NBS	Nature-based solutions
PH	Public Heath
SUDS	Sustainable Urban Drainage Systems
UGS	Urban Green Space
UHI	Urban Heat Island
UTCI	Universal Thermal Climate Index
UWOT	Urban Water Optioneering Tool
WB	Well-being
WHO	World Health Organization
WTC	Wastewater Treatment Coverage

Relationships with the other euPOLIS work packages

This deliverable summarizes the outcomes of Tasks: WP1, T2.1, T2.2, T3.1-T.3.3, T4.1-T4.5, T.8.1, T11.3. However, the main part of this document was created based on WP4 and WP11 results.

WP1 "Ethics Requirements" is a base for the work in every Task in the euPOLIS project. It is the main document that provides guidelines and information on a legal basis. On the other hand T11.3 "Quality and ethics assurance" give us quality procedures and other horizontal strategies on the quality of work, preparing deliverables, etc.

Task 2.1 "Stakeholders mapping, analysis and guidelines for their systematic involvement", and Task 2.2 "Stakeholders and wide public participatory planning education" are the main sources of knowledge on the participatory process plan and stakeholders' engagement in the euPOLIS project. Under these tasks, D2.1 "Stakeholders engagement plan and guidelines" and D2.2-D2.4 "Reports on the local site analysis and list of relevant issues/problems and resources" were created.

Additionally, WP8, especially T8.1 helped with the identification of potential risks and corrective measures throughout the euPOLIS project.

Results of work in WP4 "Public Health and Well-being with related Social and Behavioral aspect", with all tasks (T4.1-T4.5) were crucial for the creation of D11.4. Especially D4.1 "Report on the multidimensional set of the indicators for the NBS impact and PH and WB" and D4.2 "Report on cultural, social, economic and environmental impacts of NBS". They are the core of D11.4.

D11.4 will be delivered to the European Commission in two versions including all the societal, gender and ethical issues of the project (after M24 and M48).

Partners' contribution in D11.4

ISS – Leader of D11.4, leads Task 4.2. Responsibility: social and cultural methods and tools for measuring the impact of NBS; Livability Model; social-cultural impact indicators; preparation of the final document.

FCEBG – as WP4 Leader supported the whole process and work.

MIKSER – supported ISS and author graphics.

1   Introduction

The purpose of this report is to present the framework for analysing the euPOLIS societal impact. EuPOLIS impact assessment methodology involves the systematic effort to identify and analyse the social, economic and environmental impacts of each intervention in the pilot site on the individual and community level. This approach is presented in detail in D4.1 and D4.2. The current report represents the metalevel societal impact analysis, taking into consideration the impact of the project as a whole and its short- and long-term influence. This effort will take the form of two versions of deliverable D11.4. While the first version lays out the groundwork for the future assessment of societal impact, the second version will deliver the results of the assessment at the end of the project.

In the traditional sense societal impact of urban plans usually refer to various factors such as quality of housing, local services and living environment, gentrification and segregation, conditions of transportation, etc. In the case of NBS interventions, some additional dimensions can be identified, while others are less relevant.

The first objective of societal impact assessment procedures and participatory planning practices is to provide decision-makers with an indication of the potential consequences of their actions (Wathern 1988) and provide tools to mitigate risks. However, we believe that the second objective is not less important, namely empowering local community members to voice their concerns, preferences and needs and to enable them to monitor changes from a grassroots perspective.

While the societal impact has no universally accepted definition, we start with the one offered by the International Association for Impact Assessment (Vanclay 2003, p. 5):

> "Social impact assessment includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions and any social change processes invoked by those interventions".

In other words, the societal impacts of NBS interventions refer to the whole plethora of effects. For example, on livability, public health and well-being, accessibility of urban green areas, and processes of gentrification. We believe that our livability model proposed in Deliverable 4.2 offers a comprehensive approach to measuring the societal impact. However, it must be combined with the measurement of social sustainability (Missimer et al. 2017; Domaradzka and Roszczyńska-Kurasińska, forthcoming), which reflects the long-term prospects for maintaining the positive results of the euPOLIS interventions.

It is important to underline that there is no general social theory through which we can identify and find causal explanations for specific impacts (Burdge 1998). This is because social impacts often have contextual features and represent complex social dynamics. As a result, we must recognize that the nature of societal change will vary with the type and size of an intervention, as well as with the nature of the city and community in which the project is located. Therefore, under euPOLIS, we adapt a method of **dynamic assessment to societal impact prediction and evaluation.**

The methodology of social impact assessment favours a mixed method approach, employing both quantitative and qualitative analysis, as well as including the perspective of various population groups (socio-economic, gender, age, ethnic etc.). In particular, interviews, surveys, observations and workshops can be used to study the effects on local social structures. Moreover, under the euPOLIS project, we will collect data on the individual health of participants through wearables and local environmental conditions from smart sensors implemented in the demo locations together with Nature-Based Solutions. Such an approach to the assessment of societal impact allows for concluding

on both objective and subjective effects of the interventions. This is very much in line with the Civil City Framework proposed by Domaradzka et al. (2022), which aims to expand the current debate concerning the implementation of health-related innovations by employing the rights-based approach. **Specifically, we address the societal impacts and challenges related to the implementation of Nature-Based Solutions (NBS) from the right to the city perspective.**

2   Civil City Framework and the right to a healthy city

We argue that applying the rights-based paradigm in the conceptualization of the city's future is crucial in building an innovative human-based planning approach (Domaradzka et al. 2022). We build our concept of a healthy city on the vision of caring cities (Valdivia 2017), which proposes a new model of urban environments with people at the heart of decision-making, reflecting the diversity of users' preferences and experiences, to ensure that spaces are adapted to meet people's different needs, instead of making people adapt to the urban conditions. In this new paradigm, cities are seen as places that look after us, so groups and communities can take care of each other.

There are several dimensions that signify that the city is healthy and caring: its public spaces convey a sense of safety; its air, water, and earth are not polluted, and urban planning is focused on ensuring that we live close to nature and are protected from the negative impact of weather-related conditions. Therefore, rethinking the city from a health and care perspective means designing environments that place a greater emphasis on the people who use them instead of creating spaces based on the strict economic rationale that very often comes down to focusing only on the engineering aspect.

We believe that the right to the city approach embeds two important dimensions into the planning process. One is that the residents and city users should be treated as autonomous subjects, and the second is that all planning efforts should revolve around responding to their needs as well as respecting their rights as citizens. It means that health-related interventions should develop true opportunities for participation and empowerment, building communities' resilience (Ross and Berkes 2014, Nelson 2014) and social sustainability (Missimer et al. 2017, Roszczyńska-Kurasińska et al. 2019) instead of focusing on the market- or power-driven interests. Last but not least, the residents and city users should be treated as a collective of diverse groups that use the urban space differently, have different needs and lifestyles.

As Figueiredo et al. (2017) point out, the right to health intertwines with the right to the city because guaranteed access to healthy urban spaces reduces inequities among the population. As a result, also disadvantaged groups can enjoy positive urbanization effects. In this sense, the interconnection between the right to the city and the right to health promotes equity in urban planning.

3 Neighborhood social sustainability in societal impact assessment

As showcased by both Paris' 15-minute city agenda and Melbourne's 20-minute neighbourhoods program, the neighbourhood scale is perfect for instigating change and achieving societal impact. While at a city-level, policy-makers often struggle to connect with local issues and residents, the neighbourhood offers a scale that is small enough to manage participation and implementation, yet large enough to evidence societal impact or behavioural change (Siggaard Andersen 2021).

As we know from the growing body of research (Turnbull 2021, Pfeiffer & Cloutier 2016, Leyden et al. 2011, Sirgy & Cornwell 2002), the shape of the built environment has a direct impact on people's ability to live happy, healthy lives. Therefore, each shaping of space becomes a responsibility to local residents as well as other potential users of space. This includes ingraining the values of gender equality and inclusion in our work. Traditionally, urban planning decisions tend to ignore groups who are carers in favour of workers, as well as favour male needs over female preferences and perception of space (Siggaard Andersen 2021). We believe that the only way forward is to acknowledge different people's perspectives, needs, and experiences in designing for a more inclusive equitable and sustainable urban future.

While maintaining its sustainable and productive qualities, we can increase the potential of public space to have a wider societal impact, by enabling access and layering its functions. For example, a pocket park can be a place of transit, social activities, or a tool for dealing with the heat island effect or mitigating the results of flash floods.

Baldwin and King (2018) report evidence from 12 countries on how built environments help to foster behaviours, thoughts and feelings that benefit communities. These include feeling connected and emotionally attached to a certain place, neighbourhood, and community. It also explores the effects of such behaviours on community resilience. Increased community resilience is key in creating a fast response to an emergency like flooding, drought, heatwave or hurricane, based on a collective ability for people to get together and help each other out on the practical as well as emotional levels.

The ability to cope depends on community social cohesion and the resilience of local networks. For example, in neighbourhoods with a lot of diversity (and where it is cherished), the variety of complementary skills and competencies are considered a community strength. Moreover, social cohesion nudges the community into a more successful response to a crisis, compared to places overcome with tension and conflict.

> "Social sustainability is about people's quality of life, now and in the future. It describes the extent to which a neighbourhood supports individual and collective well-being. Social sustainability combines design of the physical environment with a focus on how the people who live in and use a space relate to each other and function as a community. It is enhanced by development which provides the right infrastructure to support a strong social and cultural life, opportunities for people to get involved, and scope for the place and the community to evolve." Bacon, et al. (2012: 9); Woodcraft (2012: 35)

4   EuPOLIS methodologies for ensuring positive societal impact

EuPOLIS NBS-based Urban Planning methodology enriched with cultural and societal aspects offers the synergy of a people-centered approach with significant environmental and economic benefits of Blue Green Solutions. EuPOLIS approach to urban planning and revitalisation is based mostly on PH and WB criteria, but with additional emphasis on cultural, economic, and societal aspects. The needs of local communities are recognized in both co-design and co-creation processes, to ensure a better fit and long-term sustainability of the implementation. On a wider scale, euPOLIS addresses major social and environmental challenges resulting from the climate crisis and possible risks of smart development.

In terms of societal impact, euPOLIS main outcomes are expected to result from placemaking processes. Placemaking is both an idea and a hands-on approach to improving neighbourhoods, which invites people to collectively reinvent public spaces. The process itself allows for strengthening the connection between people and places. Placemaking refers to a collaborative process by which people can shape the public realm to increase its collective value. While promoting better urban design, placemaking facilitates new patterns of use, paying particular attention to the physical, cultural, and social identities that define a place (Project for Public Spaces, 2007).

> "With community-based participation at its center, an effective placemaking process capitalizes on a local community's assets, inspiration, and potential, and it results in the creation of quality public spaces that contribute to people's health, happiness, and well being."

Placemaking helps to re-imagine everyday spaces, and to discover the potential of parks, waterfronts, neighbourhoods, and spaces between the buildings.
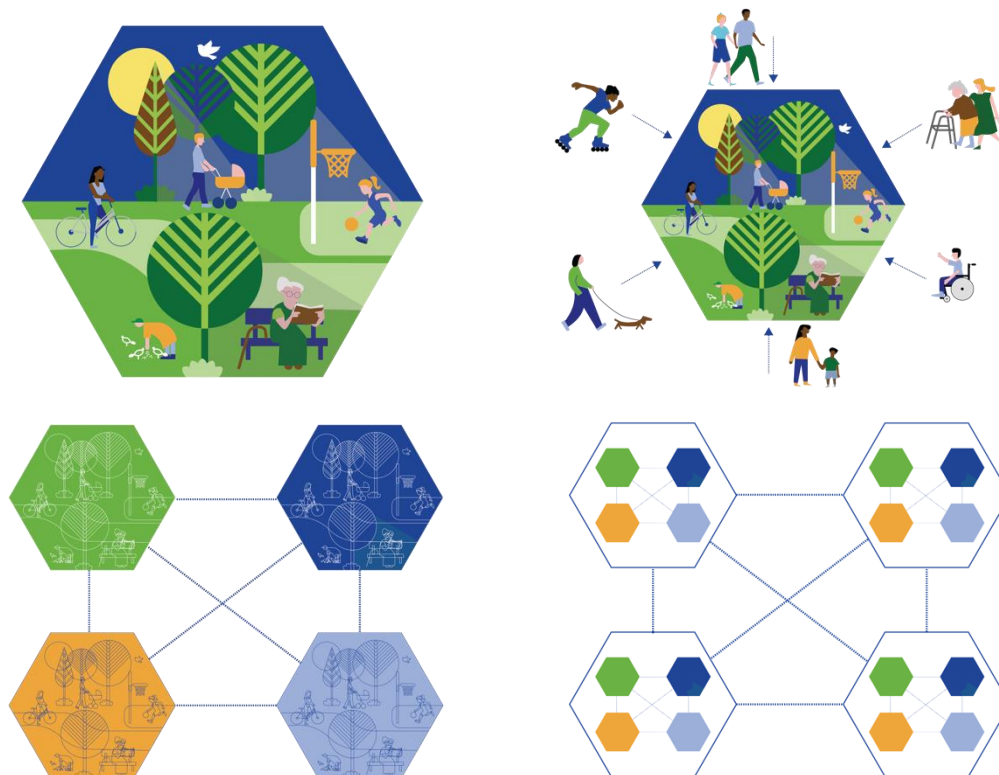
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Figure 1. Levels of euPOLIS societal impacts. Top left – intervention level; Top right – community level; Bottom left – city level; bottom right – city-network level

Therefore, euPOLIS societal impact should be considered on several levels:

1) **intervention level**, where new NBS create place-based impact for the space users
2) **community level**, at which NBS becomes a new opportunity to socialize, foster place attachment and increases engagement through participatory processes
3) **city level**, where municipalities have a chance to pilot NBS approach and learn of its benefits
4) **city-network level**, where opportunities for learning and transferring knowledge and good practices emerge from local implementation.

By systematically implementing the NBS-based urban planning methodology, enriched with cultural, economic, and societal aspects, euPOLIS strives to design spatial and functional solutions that will not only enhance the PH and WB of citizens, but also upgrade urban metabolism, increase social cohesion and strengthen the resilience of cities.

However, every change and new development within the neighbourhood can potentially disrupt the life of the local community. This can in turn create different negative societal impacts and hinder the positive influence of NBS. This is why EuPOLIS proposes an approach that should help NBS interventions systematically blend into the neighbourhood. This means that they should positively contribute to the neighbourhood quality of life, avoiding negative impacts like the disruption of existing neighbourhood bonds or local social capital. In the case of the communities that have a low level of social capital and cohesion at the beginning of the project, we hope to generate conditions to facilitate new bonds, self-organization as well as increase place attachment.

However, we recognize several constraints in the field of societal impacts. First, it is often not possible to reconcile the needs of different space users and community members. Still, we hope that even local

conflicts can create an opportunity for better voicing of needs and preferences and can be a starting point for addressing them. When in doubt we will focus on our main goal which is to increase public health through NBS implementation. While our ambition is to create a wider societal impact, we know that it is a long-term process that goes way beyond the timeframe of our project. Also, recent global challenges related to Covid-19 and the Russian invasion of Ukraine, create unfavourable conditions that are beyond our project's control.

As described in the grant agreement euPOLIS will also implement two additional standards addressing the field of neighbourhood impact (Blend in criteria) and gender equality (Gender-related planning criteria). Those two also belong to the wide category of societal impacts and will be considered jointly as part of D11.4 report 2.0.

In this preliminary version of D11.4 Societal impact report, we focus on the ongoing efforts including the creation of participatory guidelines and evaluation framework as well as the ongoing activities around co-planning, co-creating and co-building. At this stage of the project, we can only provide information about the expected societal impact and plan ahead to minimise the risks in terms of any form of discrimination or societal disruption. In our effort to address the existing societal challenges, we not only want to help avoid those negative processes but introduce good practices in planning and implementation as part of euPOLIS legacy.

As each of our pilot sites is different, we have to address their specific context and residents' needs and preferences. Local cultural diversity and social composition have been the object of our scrutiny from the very early stages of the project. However, during the first two years, we encountered unique new societal challenges, namely the Covid-19 pandemic, and humanitarian and economic crises after Russian aggression in Ukraine. The pandemic had a huge – and mostly negative – societal impact on all studied communities, resulting in increased care burden on families (especially mothers and grandmothers) and severe physical and mental health risks resulting from periods of lockdowns and social isolation. Till this moment, we observe negative long-term effects like higher levels of stress and frustration, a certain reluctance to socialise, and participate in group events, especially among senior citizens.

Similarly, Russia's attack on Ukraine has a widespread influence on European societies and individuals' well-being. The humanitarian crisis and the influx of refugees created additional inequalities and social conflicts. In our pilot cities we can already observe a surge of rent prices or increased competition over public resources as a result of Ukrainian refugees influx and relocation of businesses and residents of Russia and Belarus. The consequences of military aggression go deeper, reviving existential fear of nuclear war, shortages of fuels and gas or even food in developed European countries. Several sectors of the European economy are under pressure due to workforce shortages in services, construction and food production.

We decided to analyse the different aspects of the potential societal impact by SDGs, to make sure we cover a wide area of potential influence, as already in this global framework. We also define how we will evaluate those societal impacts at the end of the project, referring to deliverables from WP4, WP5, WP8, and potentially also from WP6, WP7.

The guiding value of euPOLIS is to design NBS while protecting vulnerable individuals or groups. The respect for the safety and rights of people at risk of marginalisation (e.g., refugees, unemployed, parents of small children, people with disabilities, ethnic and religious minorities, LGBTQ+ community) will be guaranteed by assessing their needs and seeking their voices at all stages of project implementation. The euPOLIS consortium acknowledges the possibility of differential effects our activities may have on different groups within society, such as unjustly favouring or penalising one or the other. EuPOLIS will mitigate these effects through constant monitoring in WP11.

The consortium is also committed to monitoring the application of gender equality and non-discrimination policies, both in the project methodology and results, ensuring they are compliant with European and internationally recognised standards.

Below, we present a detailed description of the tools and methods that in our opinion best fit the purpose of the euPOLIS impact assessment. They are organized into three categories that match the social, economic, and environmental aspects of NBSs impacts.

4.1   Livability model as societal impact assessment tool

The euPOLIS livability model is described in detail in D4.2, so we only summarize it here, to show its use for the societal impact assessment.

As Okulicz-Kozaryn and Valente (2019) point out, livability usually refers to the standard of living, or general well-being of a population in a specific region, area, or city. It is often presented as a sum of factors that add up to a community's quality of life (like economic prosperity, social equity and stability, educational opportunities, recreation, cultural possibilities, etc.).

In euPOLIS we need a more site-specific approach, directly related to the potential impacts that the NBS can have on the well-being and health of the local population. Therefore, we start from the discussion of the diverse approaches to livability to arrive at the euPOLIS Livability model, tailored for the impact assessment of NBS implementation.

Livability is defined as 'suitability for human living' (Webster Dictionary), as (objective) quality of life, welfare, 'level of living,' or habitability (Veenhoven, 2000). However, Okulicz-Kozaryn and Valente (2019) rightly noted, that such livability measurement fails to include the intangible qualities of a place such as its historical or cultural value, vibrancy, authenticity, or distinctiveness. A more comprehensive approach to place evaluation focuses on the relation between space quality and accessibility of services on the well-being of the local population. The expected relationship between livability and well-being is positive: if livability is high, human needs are satisfied and happiness follows (Diener et al., 1993; Veenhoven, 1991; Veenhoven and Ehrhardt, 1995).

In euPOLIS, we strive to ensure better WB and PH by means of place-changing, the introduction of NBSs and higher involvement of communities in their planning. We expect that the implementation of NBSs will result in higher livability for the surrounding community thus bringing wider societal impacts. We propose to monitor livability through a multidimensional set of social and urban development indicators to assess the euPOLIS intervention impact. Developing a livability model allows us to be more space-specific and consider different local needs, expectations, and general challenges today's cities face.

According to Kovacs-Gyori et al. (2019), livability reflects the quality of the person-environment relationship, and how well the built environment and the available services fulfil the needs and expectations of residents. As such the livability assessment is important for the implementation of the Green Deal and New Urban Agenda goals (European Commission, 2019) by providing a feasible framework to assess the quality of the urban environment. However, the key elements of livability have to be defined to represent the person-environment relationship. This way livability becomes more than a statistical index and can serve to improve the quality of urban life. The euPOLIS Livability Model is guided by three New European Bauhaus (European Commission, 2021a) values: 1) sustainability – to ensure biodiversity, circularity, and addressing the climate goals; 2) aesthetics – going beyond functionality, relating to the quality of experience in places; and 3) inclusion – to secure accessibility and affordability for all, through valorising diversity.

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EuPOLIS sites are expected to contribute to local livability in terms of increasing the amount and quality of green and blue areas, ensuring safety and accessibility to diverse groups of users, introducing new attractive functions, and encouraging more intensive use of the space resulting in a higher number of interactions. Improved livability should also result in both healthier lifestyles (enabled by NBS), as well as positive emotional attachment to the site and an increased sense of responsibility or being part of the local community. Reaching this effect requires a place-based urban planning and design approach, with innovative livability-related planning criteria, that build upon local characteristics.

To enhance the impact measurement of the euPOLIS implementation as well as the process of participation in planning, we propose the theory-driven, yet practice-oriented livability model, developed in line with the New European Bauhaus (European Commission, 2021a) philosophy. Based on the common set of livability principles available in the literature, we decided to focus on those aspects that directly relate to PH and WB through green space design, accessibility, available infrastructure, and services or functions. Those aspects are grouped into seven categories that directly relate to the New European Bauhaus priorities (see Fig. X): 1) sense of safety, 2) multifunctionality, 3) contact with nature, 4) comfort of use, 5) walkability, 6) friendliness, 7) sense of place.

Our euPOLIS Livability Model, built on those seven major categories, is related to the direct and indirect impacts of the Blue-Green spaces designed within the framework of the project. While we perceive PH and WB as central areas of impact, we also point out the desired societal impacts including local civic engagement (stimulated through the use and possibilities offered by NBS as well as indirectly resulting from better health), positive place attachment (which relates to mental well-being as well as the willingness to engage on the local level) and local economic growth (resulting from higher attractiveness of the area to people and businesses).

Figure 2. EuPOLIS Livability model.

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4.2 Social sustainability index as societal impact assessment tool

The social sustainability index is described in detail in D4.2, here we present a short summary to show its use for the societal impact assessment.

Sustainability is commonly defined as meeting the needs of present generations without compromising the ability of future generations to meet their own needs. As Ricee (2021) explains, social sustainability cannot be created simply through the physical design of the community, however, neither can environmental sustainability be created by physical design alone. It is important to realize that while physical design cannot ensure that individuals, families, and communities will lead environmentally sustainable lifestyles, it can help to make such environmentally sustainable everyday choices easier. Equally, the physical design of the neighbourhood can make it either easier or more difficult for communities to be socially sustainable. As one of the active social enterprises defines it:

> "social sustainability is a process for creating sustainable successful places that promote well-being, by understanding what people need from the places they live and work. Social sustainability combines the design of the physical realm with the design of the social world – infrastructure to support social and cultural life, social amenities, systems for citizen engagement, and space for people and places to evolve." (Social Life, 2012).

As advocates of sustainability, we cannot assume the facts about environmental issues will 'speak for themselves' and we must consider why people resist change, even when there are very good arguments for introducing certain solutions. The adverse impacts some eco-implementations may have on already disadvantaged groups have to be recognized and combined with a deeper understanding of the ways in which technical aspects of Blue-Green Solutions influence everyday life. These are central to ensuring a smoother and more equitable transition to a more sustainable future, in which the importance of social development is recognized as a central goal.

To implement the various innovations that will transform societies in the direction of environmental sustainability, it is necessary to have well-functioning societies — from a social, political, and economic standpoint — that can meet the new challenges successfully (Rogers et al., 2012). Healthy and happy individuals with a strong sense of place, identity, and relations based on trust are more likely to prioritize the protection of their environment (Geller, 1995). Therefore, the empowerment of local communities and increased social sustainability are essential conditions for long-term grassroots, legal and political protection of the natural environment (Heiman, 1997).

While environmental sustainability examines living within the limits of the natural world, likewise, social sustainability emphasizes living in ways that can be sustained because they are healthy and satisfying for people and communities. This requires providing for material, social, cultural and emotional needs, avoiding behaviours that result in poor health, emotional distress and conflict, and ensuring that we do not destroy the social structures (such as families and communities), cultural values, knowledge systems and human diversity that contribute to a vibrant and thriving human community. In other words, social sustainability means meeting the needs for human well-being.

In the case of euPOLIS interventions, we propose a complex approach to assessing social sustainability which focuses on characteristics of the site and local community that are relevant to NBSs. We suggest following the social sustainability model developed and tested within the framework of the CLIC project (Roszczyńska-Kurasińska et al., 2019). The proposed dimensions of social sustainability are presented on the graph and include a more detailed approach to the original 5 categories described by Missimer et al. (2017). Those ten characteristics of the studied communities that are decisive for the social sustainability of planned interventions include: 1) diversity, 2) connectivity, 3) openness, 4) trust in neighbours, 5) trust in authorities, 6) trust in local business owners, 7) shared values, 8)

compatibility with NBS, 9) capacity for learning and 10) capacity for self-organization. For each of the aspects of social sustainability, a specific set of survey questions can be asked. However, in the case of euPOLIS, we will employ already collected social and cultural indicators to build a site-specific model describing the strengths and weaknesses of a given social context in terms of ensuring the social sustainability of NBS.
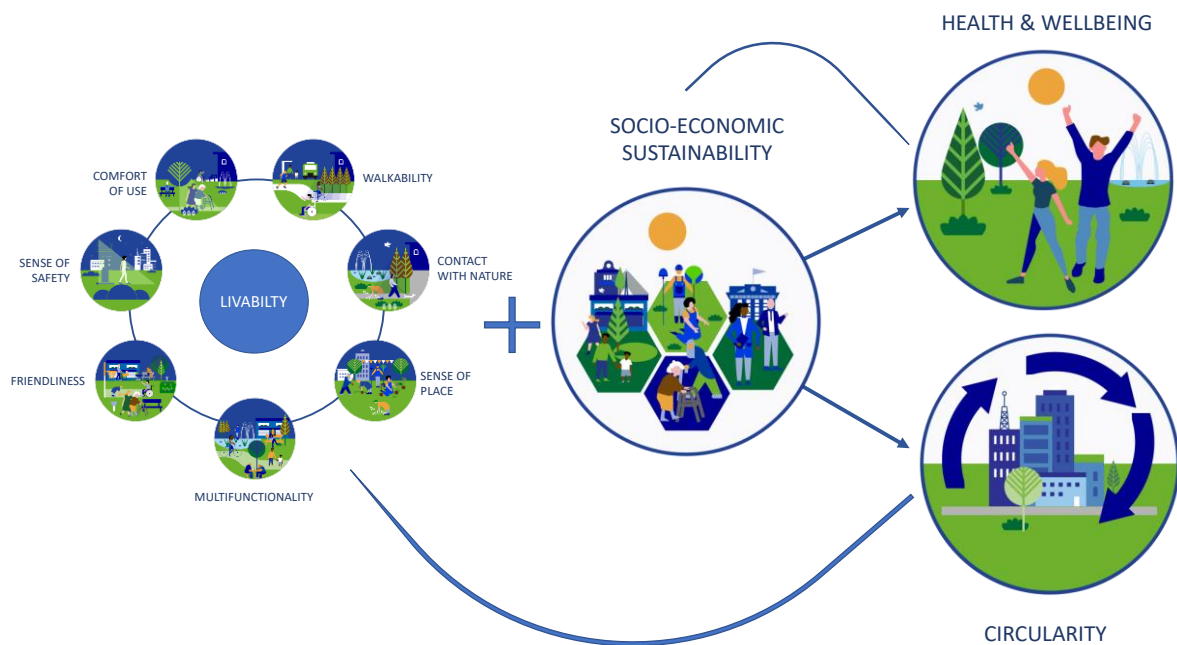

Figure 3. EuPOLIS holistic approach to urban planning and impact assessment.

5 EuPOLIS societal impact according to SDGs

To predict the potential societal impact of euPOLIS we reviewed the Sustainable Development Goals to look for those areas in which it may be visible. In Table 1 we present the results of this review, indicating the expected impact in a given SDG area as well as possible the timeframe. In most cases we predict the initial societal impact to be visible and measurable at the end of the project. However, we also predict that some of the societal impact will become more visible in the longer term – several months after the project implementation. This is because the nature of some societal processes – like community building, gender empowerment or social sustainability is emergent and takes time and continuous effort to ensure.

Table 1. Expected societal impacts and their method of measurement by SGDs

Sustainable Development Goal	Type of expected impact	Timeframe	Method of impact measurement
SDG 3. Ensure healthy lives and promote well-being for all at all ages	NBS implementation should bring positive results among space users: • Lower blood pressure • Lower stress levels • Increased wellbeing • More opportunities for recreation and health-improving activities • Environmental quality improvements	Expected by the end of the project and in the long term	Data from wristbands and smartphone apps Surveys and sensors data–
SDG 5. Achieve gender equality and empower all women and girls	Gender planning matrix to ensure equality and empowerment of female users and community members: • Inclusive spaces for women and girls • Increased feeling of security • Engagement of women in participatory processes	Expected by the end of the project and in the long term	Data from observation and surveys
SDG 6. Ensure availability and sustainable management of water and sanitation for all	NBS and integrated sensors will allow: • Better management of wastewater • Flood mitigation	Expected by the end of the project and in the long term	Data from sensors

SDG 7. Ensure access to affordable, reliable, sustainable and modern energy for all	NBS equipped with solar panels and other renewable energy sources: • Employed to power lightning or mobile devices charging stations • Eco-edu hub as a place of education and implementation of sustainable energy solutions	Expected in the long term	Data from sensors and observations
SGD 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	NBS, specially designed to bear climate extremes, should bring positive results: • Decreasing pressure on the surrounding drainage infrastructure • Showcase innovations (sensors, biotechnologies) – bring new business	Expected in the long term	Data from sensors and modelling results
SDG 11. Make cities and human settlements inclusive, safe, resilient and sustainable	NBS implementation should bring positive change in the neighbourhood: • Increased feeling of safety • Increased friendliness and accessibility of place • Increased livability of the neighbourhood • Long-term social sustainability of NBS • Increased citizens' awareness and level of readiness for participation	Expected by the end of the project and in the long term	Data from surveys and observations
SDG 12. Ensure sustainable consumption and production patterns	NBS implementation should bring positive change in the neighbourhood	Small scale impact expected in the long term	Data from sensors and observations

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	• Better management of natural resources like water, urban flora and fauna. • New opportunities to prevent waste by recycling grey water and reducing the drying out of plants and water reservoirs • Eco-edu (urban metabolic) hub as a place of dissemination and demonstration of water-based urban circularity resulting in intermediary products from wastewater and organic waste that can be further processed to valuable end products (reuse water, food and feed, biopolymers, etc.)		
SDG 13. Take urgent action to combat climate change and its impacts	NBS implementation should bring positive results in terms of: • Mitigating the effects of the heat island effect by introducing greenery, waterbodies and shade • Rainwater treatment and management • Evaporation systems to prevent flooding • Increasing biodiversity	Expected in the long term	Data from sensors

Below, we present in more detail the expected societal impacts in areas defined by these eight SDGs. We present them in descending order of how strongly related they are to the euPOLIS mail goals. We see our main impact areas to be directly related to SDG3 (Healthy lives), SDG11 (Sustainable cities) and SDG13 (Climate resilience). SDG5 (Gender equality) is our guiding goal, implemented horizontally in project activities – both through Gender planning matrix, participatory processes (see D4.3) and specific design of NBS, but also in the impact assessment framework (see D4.1, D4.2). We also expect a smaller societal impact in the areas of SDG6 (Water management), SDG7 (Accessible energy), SDG9 (Resilient infrastructure), and SDG12 (Sustainable consumption).

SDG 3. Ensure healthy lives and promote well-being for all at all ages

EuPOLIS societal impact concerns mainly the goals described in SDG 3 "Ensure healthy lives and promote well-being for all at all ages". We are especially focused on addressing challenges defined in:

- Goal 3.4 "By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being" and
- Goal 3.9 "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

Public Health impacts envisioned and monitored within the project directly concern the non-communicable diseases like depression, anxiety, cardiovascular or pulmonary conditions, on which nature (blue and green areas) have proven positive impact. Allergies are a specific case – euPOLIS approach to introducing new plants is to make sure they do not create a risk of asthma or hay fever. Therefore, by redesigning the green and blue areas we expect a positive societal impact in terms of increased physical and psychological comfort. By creating inviting recreational spaces we also expect higher engagement in physical activity, including sports, walking, biking and running, which is part of the prophylactics against non-communicable diseases. The important advantage of upgrading public spaces with NBS is that they are accessible to people of all ages and can therefore create benefits throughout generations.

In relation to Goal 3.9 we expect a certain positive societal impact as well, due to the installation of sensors that allow for monitoring of humidity, temperature and air or water quality. Also, some of the potential NBS involve creating water reservoirs, with biofilters for water-cleaning processes.

SDG 11. Make cities and human settlements inclusive, safe, resilient and sustainable

On the more general level euPOLIS societal impact also concerns the goals described in SDG 11 "Make cities and human settlements inclusive, safe, resilient and sustainable". In our implementation process we will be following several aspects of building urban resilience enlisted as SGD 11 subgoals:

- Goal 11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
- Goal 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
- Goal 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

EuPOLIS planning methodology is designed specifically to address challenges relating to urban inclusiveness and sustainability. Diverse participation processes are put in place to ensure co-planning, co-creating and co-building with members of local communities and other stakeholders.

In the longer term, we hope that scaling up similar NBS initiatives will also enable cities to reduce their negative environmental impact, especially the heat island effect or water and air pollution. While our pilot sites are too small to change the whole city ecosystem, they are a good start to a long-term process of building urban resilience. Even in the short period of our project, however, we expect a positive societal impact stemming from increased community resilience developed around upgraded green spaces. By ensuring access to our sites for all people, including older persons, people with disabilities, women and children, we also directly address Goal 11.7.

Goal 13. Take urgent action to combat climate change and its impacts

EuPOLIS also plans to support the achievement of SDG 13 "Take urgent action to combat climate change and its impacts". Nature-Based Solutions to be implemented in all our pilot sites directly addresses negative consequences of the climate emergency like urban heat island effect, flooding, or water scarcity. By creating nature-supported water systems and increased water absorption opportunities we address several subgoals:

- Goal 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- Goal 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

While NBS implementation should have a direct (even if small scale) impact of strengthened resilience to climate-related hazards, euPOLIS workshops and dissemination activities should also allow for improving awareness about community capacity to adapt to climate change and reduce its negative impacts.

SDG 5. Achieve gender equality and empower all women and girls

The third important area concerning euPOLIS societal impact relates to the goal described in SDG 5 "Achieve gender equality and empower all women and girls". In our design and participatory practices we are focused on addressing several points:

- Goal 5.1 End all forms of discrimination against all women and girls everywhere
- Goal 5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation
- Goal 5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life
- Goal 5.6 Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women

While in the scope of the project it is not possible to end all forms of discrimination, we take responsibility for avoiding all forms of discrimination in our work with local communities. Similar care should also concern all members of the consortium and other involved stakeholders. This is done by implementing the Gender planning matrix and appointing a gender equality officer within our project. In all our data collection activities and participation processes we will ensure participation of both women and men, to make sure their voices are heard and respected in the planning process. In the case of group processes, we will make sure to ensure equal opportunities for participation and access to decision-making during project-related local activities.

Our project will also address the issue of safety of women and girls in the public sphere, by designing with consideration of increasing feeling of safety and addressing concrete safety challenges identified through assessment of women and girls' safety in public spaces using Women Safety Audit Tool[1] (WSAT) developed by euPOLIS gender-sensitive urban planning experts. Some of the measures include increasing space quality, "eyes on the street" approach, proper lighting, introducing new functions that ensure the greater presence of other space users, etc. By upgrading some of the low-quality spaces we hope to make it more inviting and safer for all, women and girls included.

Last, but not least, we believe euPOLIS can contribute to enhancing the use of enabling technology, by supplying space users with wearable sensors and smartphone apps, which will allow them to participate in data collection as well as monitoring both their individual results and project results. This is in line with the citizen science philosophy, which invites citizens to take an active part in research and empowers them as data co-creators.

6 CLEAN WATER AND SANITATION

Goal 6. Ensure availability and sustainable management of water and sanitation for all

Another area of societal impact that euPOLIS addresses relates to SDG 6 "Ensure availability and sustainable management of water and sanitation for all". By default, investing in Blue-Green Solutions ensures a positive impact on the urban water system. Our Nature-Based Solutions will allow for addressing the issues related to:

- Goal 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- Goal 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- Goal 6.b Support and strengthen the participation of local communities in improving water and sanitation management

Introducing nature-driven smart innovation in our pilot sites' ecosystems will help treat wastewater and increase its recycling. We will especially focus on solutions that allow for flood prevention and natural filtering of the rainwater, which should result in greater water-efficiency. EuPOLIS participatory

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[1] It has been developed under the UN Women program and its preliminary version is available (as of 27.10.2022) at https://www.dropbox.com/s/ewbpuoj7ohxj2py/Women%20Safety%20Audit%20Tool%20%28WSAT%29_ENG.pdf?dl=0

processes and eco-edu hub should also allow for promoting and building knowledge as well as strengthening awareness concerning the importance of sustainable water management.

7 AFFORDABLE AND CLEAN ENERGY

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

Less pronounced in euPOLIS, but with the potential to create a societal impact are activities concerning the implementation of renewable energy sources. Some of the NBSs can include solar panels or wind turbines to produce energy-sustaining lighting or charging of mobile devices in public spaces. While the scope of such interventions is hard to predict, we ingrained such technologies in our euPOLIS methodology and will strive to educate communities on such opportunities as well as implement them where possible. We also believe that our Followers cities will take an opportunity to use our example to invest in local energy services and enable greater use of renewable sources.

This will allow us to address several subgoals related to SDG 7:

- Goal 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
- Goal 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- Goal 7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

The euPOLIS activities dedicated to implementing resilient and innovative NBS interventions have also a long term potential for creating societal impact in the field of innovation, resilience, and inclusive industrialization. This concerns mainly how NBSs are supported by an integrated monitoring network of environmental sensors, remote-sensing, smart wearable devices and apps. Those innovations have the potential to act as mitigators of the climate and environmental pressures on the communities, but also foster inclusive social interactions and inspire new business activation.

Therefore, although in the long term, we expect positive societal impacts related to several SDG 9 subgoals:

- Goal 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
- Goal 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

- Goal 9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

Goal 12. Ensure sustainable consumption and production patterns

Last, but not least, euPOLIS wider societal impact should touch upon SDG 12 "Ensure sustainable consumption and production patterns". This is because, the introduction of NBS should result in better management of natural resources like water, as well as urban flora and fauna. They also offer opportunities to prevent waste by recycling grey water and reducing the drying out of plants and water reservoirs. Therefore, although on the small scale, we expect positive societal impacts related to several SDG 12 subgoals:

- Goal 12.2 By 2030, achieve the sustainable management and efficient use of natural resources
- Goal 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
- Goal 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature

We believe that the education campaign (through for example eco-edu hub in Belgrade), together with co-design workshops, will also increase community awareness concerning sustainable urban development and promote healthier lifestyles in harmony with nature. By designing blue-green spaces for local communities, we will showcase their benefits in terms of new recreational and health-related functions. As a result, we hope local community members to embrace values related to sustainable urban development as well as new opportunities for healthier living.

6   Ethical concerns

Using ICT tools in participation processes brings to the table a very important notion of the data security policy and the ethical concerns of its usage. The former is a complex issue because among the euPOLIS partners we have stakeholders from outside of the EU, where the GDPR regulates data management. Under Deliverables 10.1 and 1.1, we described a common data management system and data protection norms that are being enforced among partners to secure the highest standards while the detailed procedures of data management are subject to local and national regulations.

In regards to ethical concerns about the sole usage of ICT tools for either enhancing participatory processes or monitoring the impacts of NBS interventions, we follow Domaradzka et al. (2022) recommendations. Under Civil City Framework, they emphasize that such solutions must empower diverse participation and override social division. Therefore, they should not serve as entry barriers, but rather as one of many tools that might allow for reaching out to a specific group of citizens or space users that will benefit from it. The access to Internet or devices should not be an entry barrier for any citizen, and cities should make as much effort as possible to ensure that no one is left behind. Moreover, the usage of ICT tools should not be an excluding factor. That is because raising awareness of the downsides of monitoring technologies should not be penalized. A right to a healthy city is immanent for every citizen and urban-space user, regardless of their technological competencies, socio-economic background, education level, gender, age, ethnicity, or religion. Therefore, while wearables that are going to be used under the euPOLIS project for monitoring the health and well-being of volunteers might deliver valuable insight into the scientific knowledge about the impacts of the NBS interventions at the same time, other methods and tools (e.g., questionnaires, focus groups, individual interviews) should be developed and designed for people who for various reasons can not or do not want to use ICT tools.

Under Deliverable 4.3, we described the guidelines for the participatory processes tailored to the local needs and context. We highlight the importance of using a variety of tools and methods for engaging with different groups of citizens and space users. That is because, in the euPOLIS project, we see public participation (and participation processes in particular) as an opportunity for building not only Nature-Based Solutions that match the diverse needs of local communities but also for building social capital and consequently increasing social cohesion. However, to reach both goals, it is necessary to plan and execute public participation that is inclusive for diverse groups of citizens, easy and accessible for all stakeholders, based on two-way communication, and gives decision-making power to the citizens, and foremost is part of the long-term strategy that promotes citizens' participation (DeVento et al., 2016).

Taken together, we see the interventions planned under the euPOLIS project as having the potential for positive societal impact. However, we also note the potential risks that might make the NBSs implementations and their assessment limited to benefits towards the tech-savvy middle class. Therefore, the standards and tools for public participation and assessment of the effects that are being developed under the euPOLIS methodology must try to mitigate the effects of unavoidable gentrification processes and make sure that the needs of diverse groups of stakeholders are recognized and covered even if they are not voiced with much political power.

7 Risks and compensating measures

By definition, the implementation of Nature-Based Solutions should have a positive impact on the local community. Although the vast body of scientific literature focuses on the benefits of greening and renovating existing (blue-) green spaces it also raises concerns about possible negative consequences. During the implementation phase, we enter four different urban communities and introduce visible changes in the physical environment as well as induce new social processes through our participatory processes. Therefore, euPOLIS intervention may impact pilot sites communities in several ways:

- spatial change (new NBS, replacement or displacement of old structures and features)
- social change (social revitalisation, gentrification risk, forging new community ties)
- long term environmental and economic change (mitigation of climate risks like flooding or heat island effect, new business opportunities)

Here, we want to mention potential risks and compensating measures related to those three types of societal impact.

7.1 Conflicts

A conflict may arise in the public participation process when perspectives from two or more parties are incompatible. Conflicts may be due to a difference of beliefs, values, understanding, or interests. Conflict may be based on resistance to changes, or inability to reach consensual decisions due to different preferences and needs, but also interpersonal tension, or. disagreements about facts.

Each community intervention may uncover either existing or hidden conflicts between different groups of residents or even individuals, as well as other stakeholders. However, if public participation and transparency are emphasized from the very beginning of the intervention, the latter can be a method to reduce or avoid major conflict. When conflict does arise, it is necessary to introduce prevention and resolution techniques.

Conflict prevention and resolution refer to a broad set of practices and techniques aimed at reducing the likelihood of conflict and, if conflict emerges, developing effective solutions to deescalate it (Harter et al. 2009, EPA 2022). Often the help of impartial third parties such as an independent mediator or facilitator is the most effective solution.

The common conflict prevention and resolution techniques and tools include the following convening, consensus building, facilitation, and mediation (EPA 2022):

Convening: involves the use of an impartial third party to help assess the causes of the conflict, identify the persons or entities that would be affected by the outcome of the conflict, and help these parties consider the best way for them to deal with the conflict. Examples include mediation and consensus building.

Consensus Building: a process in which people agree to work together to resolve common problems in a relatively informal, cooperative manner. It is a technique that can be used to bring together representatives from different stakeholder groups early in the decision-making process. Often the introduction of the third party helps the stakeholders to design and implement their own strategy for developing group solutions to the problems.

Facilitation: a process used to help a group of stakeholders or parties hold constructive discussions about complex or potentially controversial issues. The facilitator provides assistance by helping the

parties set ground rules or establish communication agreements for these discussions, promoting effective communication, eliciting creative options, and keeping the group focused.

Mediation: is a process in which an impartial third party assists disputants in reaching a mutually satisfying settlement of their differences. Mediation is voluntary and confidential, and the parties can withdraw at any time. The mediator helps the disputants to communicate clearly, listen carefully, and consider creative ways for reaching a resolution.

Dealing constructively with conflicts allows for faster resolution of issues and reduces transaction costs, but also results in more satisfying and enduring solutions and broader stakeholder support.

7.2 Gentrification

The municipalities' efforts to green the degraded urban environments by either creating new green areas or renovating already existing ones tend to be leading to the so-called "green-space paradox". That is, deploying green infrastructure in the area improves its attractiveness and therefore might result in increased property values and skyrocketed housing prices. Consequently, greening the degraded urban environments might be a gentrification force that leads to physical, political, or cultural displacement of long-term residents of low-family income (Anguelovski et al. 2022).

In the resubmitted Deliverable 3.2, we analyzed the risks of green gentrification in all demo locations and how the planned interventions throughout the influx of new residents and businesses might contribute to the displacement of long-term residents. In most of the demo sites, the risks of green gentrification (or gentrification in general) are moderate to high. Moreover, because of the scope of the modernization (Belgrade) or attractive location (Łódź) the process in many cases has already started. The problem with green gentrification (and gentrification in general) is that it depends on the macroeconomic processes on the city level and is therefore a complex issue to tackle.

Although prevention of residents' physical displacement lies beyond the euPOLIS project's reach, the consortium is devoted to trying to prevent the cultural and political displacement of long-term residents that often accompany the gentrification processes. Martin (2007) defines the latter as the process in which new residents of higher income outvote or outnumber the long-standing community and consequently have a bigger impact on the decision-making process shaping the local environment. This in turn might lead to withdrawal from public participation (Knotts & Haspel 2006), decreased civic engagement, and make it more difficult to form bridging relationships with newcomers (Chaskin & Joseph 2011). To prevent such processes that often end with long-term residents being dissatisfied with the amenities (or services that do not match their needs) and norms introduced by the newcomers (Curley, 2010), we, as the euPOLIS consortium must make sure that the participation processes are equally welcoming for a diverse group of residents and at the same time inclusive for citizens who might not be familiar with or do not want to use digital or smart solutions.

7.3 Exclusion – social / digital

Digital technologies are very much at the heart of how public and social life functions nowadays with their use additionally boosted by the global pandemic. While they have become integral to many aspects of life, the spread of access and use of the Internet is uneven and many people still remain digitally excluded (Selwyn 2004). As a result, those who are excluded can be limited or unable to participate fully in any local decision-making and their voice may not be heard in planned participation processes.

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The risk is that the digital divide (between those with digital skills, and those who struggle to overcome barriers to access and use the internet tools), and the related social and economic gaps will have a negative impact on the participatory processes and abilities to voice interests or concerns in euPOLIS as well. This is because the socially isolated or/and economically disadvantaged members of the local community tend to have more limited access to, and use of, the Internet, devices and online services, which euPOLIS employs throughout the implementation (Helsper 2008).

Overall, studies show that non-users are increasingly older, less educated, and more likely to be unemployed, with a disability, and socially isolated (Helsper & Reisdorf 2017). Older people have consistently made up the largest proportion of internet non-users, and the pattern of internet use by age is replicated when looking at digital skills. This includes the rare use of the Internet and difficulties with using computers and smart devices. However, younger people can be a subject of digital exclusion as well. A substantial group of people aged between 11 and 18 years reports having no internet access at home from a computer or tablet (e.g. in Scotland it was 12% in 2019).

Moreover, Jaegar (2012) describes the internet as 'inherently unfriendly' to people with disabilities, with barriers varying by the type and extent of disability. People with disabilities are less likely to use the internet or have access at home than people without (Helsper & Reisdorf 2013, Hollier 2007, Dobransky & Hargittai 2006).

What seems to run through most of those affected by digital exclusion is poverty. Respondents from the most deprived areas are less often able to use a computer or/and the Internet, than those living in the least deprived areas. This is relevant to euPOLIS sites located in less affluent neighbourhoods. Therefore, as the consortium, we have to take additional measures to include those groups in face-to-face activities and traditional data collection. These concerns mainly consider older residents, teenagers, and people with disabilities who are at the biggest risk of digital exclusion. Moreover, in all these cases, we must also take into account the gender equality aspect.

However, very often it is very difficult to ensure the participation of the representatives of these groups in public participation. This might be caused by many factors, like lack of trust, reluctance for direct participation, or physical barriers that limit the accessibility of the process. Therefore, as the bare minimum, we have to ensure the participation of the organizations that understand and can represent the voices of certain citizens groups (associations of people with disabilities, senior clubs, teenage city council etc.) in the participatory processes.

7.4 Gender stereotypization

One of the important horizontal goals of euPOLIS is to ensure gender equality is well embedded into our work in the pilot sites. However, most cities in the world were planned and designed by and for men. According to the World Bank's Handbook for Gender-Inclusive Urban Planning and Design (Terraza et al. 2020), worldwide, women occupy just 10% of the highest-ranking jobs at leading architecture firms and urban planning offices. For this reason, the design of public spaces seldom considers the daily lives of women and minorities. Moreover, women, girls and sexual and gender minorities are rarely asked to participate in community planning and design processes.

As a result, urban areas, are by design more suitable for heterosexual, cisgender men. Existing urban space reflects and reproduces the gender stereotypes that should long have belonged to the past. Urban inequality is visible in parks without lighting, lack of public restrooms for women and the LGBTQ+ population (or their size if they exist), in roads that are difficult to maneuver with a baby

stroller or a wheelchair, and finally with the shape and functions of the playgrounds that are typically designed for stereotypical boys' activities.

We often build cities thinking about the "neutral masculine" use and budgets in which the women's role is related more to the private space of the home, than the public realm. That is why it is crucial to include the perspective of women and gender minorities in the design of our pilot sites and processes within the communities. However, this has to be done in a reflective fashion, which takes into account the changing roles of women and men. Therefore, access to stroller-friendly paths, childcare facilities or clean toilets should be granted to both men and women, as well as include LGBTQ+ minorities. Similarly, other NBSs facilities should be designed in a gender-neutral way, allowing for flexible use of spaces depending on the activity – quiet corners should be available for both girls and boys, while playgrounds should be attractive to both, without stereotypical zoning.

To address these risks we will implement the Gender planning matrix (and a Guide to Gender-sensitive Public Spaces[2], Rikanovic et al. 2020) and relate to the Handbook design guidelines on how to implement a participatory, inclusive design process that explores the experiences and uses of the city from the perspective of all citizens: women, men, and sexual and gender and other minorities.

7.5   Lack of trust

One of the important challenges is to create an atmosphere of mutual trust and respect between different project stakeholders. In the case of our pilot sites, different "trust cultures" built on previous experience with similar initiatives can be observed, and therefore a certain level of distrust towards the project on the community level can be expected. The problem is that local politics is characterized by a general lack of trust and a feeling of the temporariness of the strategies which leads to a specific 'crisis of trust' in planning (Swain & Tait 2007).

Contemporary planning is mistrusted for its bureaucratic nature, and its incapacity to understand and work for residents' needs, as well as its bias towards business interests (Tait & Hansen 2007). Moreover, in extreme cases, the reason lies in the wider political circumstances and pressures, i.e. corruption of the urban/construction procedures, nepotism in public institutions issuing building permits, and lack of media freedom. In the pursuit of trust, new forms of participation are being developed within planning processes. This includes democratic innovations (Smith 2009), co-production of services (Alford 2009), and participatory planning (Innes & Booher 2004) focused on promoting direct citizen participation in design or policy-making. With help of ICT tools, the use of those approaches has increased significantly. As Åström (2020) points out, taking into account the recent developments in those innovative tools, the main barriers to effective e-participation can hardly be blamed on the lack of advanced technology (Falco & Kleinhans 2018, Royo et al. 2020). What plays the most important role in the success or failure of urban planning e-participation initiatives is therefore a complex combination of institutional and individual factors (Åström 2020) varying from place to place. To prepare both traditional participation an e-participation activities, those factors should be thoroughly diagnosed during the stakeholders' mapping.

At all stages, transparency can enhance trust in local authorities' activities, facilitating urban planning and enhancing accountability by ensuring that urban policies are implemented with the best interests of all population groups in mind. Accountability ensures that urban planners are taking into

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[2] Although it is only available in Serbian we will try to use it also in other demo sites. It might be accessed at https://www.zad.rs/wp-content/uploads/2021/10/Vodic-ka-rodno-osetljivim-javnim-prostorima.pdf

consideration inclusive policies in the decision-making process, working to increase public health and wellbeing, provide clean water and air, and generally improve local sustainability.

However, social and political trust are the foundation for legitimacy, sustainability and participation in cities. Trusted interactions between residents and local government would also enable urban designers to address the need of diverse population groups and make it more likely to deliver the desired societal outcomes. By ensuring transparency and good information flow during euPOLIS planning activities, we want to provide new NBS infrastructure effectively and with local collaboration. To this end, local teams are engaging in building trust relation with local communities as well as build on the existing cooperation with different stakeholders.

Transparency and trust provide the foundation to achieve euPOLIS goals. Up to date, topics related to data ethics stemming from data collection and ownership have already created mistrust in new technologies among citizens. Therefore, transparency is also essential for building digital trust and facilitating NBS with digital solutions.

8 Conclusions

A change in urban environment can be analysed in a variety of ways, focusing on dimensions of visual, perceptual, socio-economic or environmental. For example, Krier's (1979) idea of an urban environment is strongly influenced by its physical construction, and the urban space is "all sorts of space between buildings". On the other hand, for Lynch (1960), the perceptual structure (how people perceive their city) of an urban area is no less important for city's legibility than its physical form. Here, our main interest is the social dimension that focuses on needs, rights, and meanings, and therefore links the physical and perceptual. In other words, to establish the societal impact of euPOLIS interventions we need to observe and understand how people and our pilot sites interact and how it impacts the functions of the introduced urban innovations – the NBSs.

While urban planning and design processes involves creating new spaces, buildings and landscapes, it should also establish frameworks and processes that will ensure their sustainability and positive outcomes for future generations. Therefore, in euPOLIS, we enrich our technical work with impact assessment and participatory practices to ensure highest "societal return" on the investment. We also introduce Livability Model for more complex assessment of social change related to urban design.

While urban planning is in essence about composing the physical setting for better living, it is best done by bringing together multiple elements from a wide range of disciplines. Therefore our interdisciplinary team is putting together the **Goal Driven Planning Matrix** and **Gender planning matrix** to ensure it aligns with both best practices in design as well as horizontal policies of the EU.

This approach is strengthened by the development of **Civil City Framework** (Domaradzka et al. 2022), which underlines the importance of grassroots engagement in planning processes and proposes the pentahelix approach to integrate five key stakeholders' groups in the planning processes. Those include public authorities, industry and business sector, academia, civil society organizations, and individual citizens. The Civil City Framework also expands the debate concerning health-related planning interventions with a rights-based approach and reconceiving the city as commons – a shared resource managed through collective action and cooperation between different local stakeholders.

We argue that applying the rights-based paradigm is crucial for building an innovative human-centred planning approach, founded on consensus seeking and conflict resolution. This also allows for defining societal risks related to our interventions and define the compensating measures.

Focusing on societal impact helps to understand how different factors of NBS design and implementation can affect the vitality and livability of public places in an urban context. This is crucial for ensuring long term social sustainability of our interventions. It also highlights the responsibility of local governments, urban designers, engineers and researchers involved in the process for ensuring respect towards communities, citizens empowerment, higher livability and social sustainability of our interventions.

In the second version of the report, delivered at the end of the project, we will analyse the societal impact in more detail and illustrate it with data collected in all pilot sides.

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10 Annex 1 Summaries of selected deliverables.

No.	Name	Reference to societal impacts
D1.1	POPD-Requirement No. 2 (Lead: NTUA)	This deliverable is focused on the ethical regulations that are relevant to the euPOLIS project.
D2.1	Stakeholders engagement plan and guidelines (Lead: RG)	In general, this deliverable includes references to the gender mainstreaming EU policy and the Diversity and Inclusion Charter (p. 12, 16, 39). Its central part is the description of the Stakeholders' engagement framework and reports from the initial activities in the demo sites that aimed at stakeholders' engagement. The proposed framework emphasizes the importance of the codesign, cocreation, and inclusion of a diverse group of stakeholders in the decision-making process. It stresses that engagement tools should be used accordingly to the preferences of the identified stakeholder group. Therefore, cities when organizing events must consider the needs and preferences of the following groups that have been identified as vulnerable to being excluded otherwise: people with disabilities, representatives of minorities, seniors, women, and people with no access to ICT tools. Moreover, during organized under this framework workshops with cities, partners emphasized that the needs of stakeholders from minority groups and often marginalized voices of women must be included. In Chapter 4 "Stakeholder identification, selection and analysis" (p. 18-21) gender and age are mentioned in 3 of the identified stakeholders groups, but only in the "Any other stakeholders not included above" group, they are referred to as the selection criteria ("gender equality" and inclusion of "young movements/parties"). In Chapter 5 "Stakeholder engagement plan and guidelines" the main focus is put on the importance of the codesign and cocreation processes as well as the creation of local partnerships that will activate and engage local communities. Moreover, detailed action plans for each demo site are provided and some of the already accomplished activities are reported. In terms of Belgrade demo sites, two stakeholder engagement workshops are reported. The first one was organized for the city supporting project partners and the second one was for the project partners and urban planners. The call for both events emphasized their inclusiveness and used various methods to invite a diverse group of participants. i.e., women, the elderly, and sensitive groups in general. The tools used for reaching out to the participants included social media and more traditional ICT tools such as email and phone calls. As a result of the reported activities, relevant stakeholders were identified and mapped accordingly to the proposed framework. Moreover, a

No.	Name	Reference to societal impacts
		document that summarized the existing good practices among stakeholders and defined the roles of each stakeholder in the project was created. Under "Any other stakeholders not included above" group two organizations (ŽAD – Women Architectural Association and UN Women Serbia) are mentioned as safeguards of gender equality. In the case of Gladsaxe, one stakeholder's engagement workshop is reported while the date of the second one was scheduled for January 2021. Moreover, the Gladsaxe involvement framework is described in detail which highlights two challenges the municipality confronts: residents only interacting within small groups defined by ethnicity, employment status, age, etc., and temporality of the stay of the majority of the residents in the neighborhood. Both issues are identified as the main causes of the low engagement. The proposed action planned by the city involves hiring a social innovator who would first try to meet most of the residents by visiting them at their apartments and later animate different activities that will meet their interests. Moreover, a big opening of stakeholders engagement activities was planned for the summer of 2021 with a series of different workshops for citizens, like a cooking workshop that in the past was successful. As a result of the reported activities, relevant stakeholders were identified and mapped accordingly to the proposed framework. Łódź reports the list of the nourished good practices that include different ICT tools for communication with the citizens and examples of public participation activities built on previous projects, like guided tours with the mayor. The tools used for reaching out to the citizens mainly involve an internet-based public participation platform and communication with citizens through social media. Moreover, the municipality of Łódź reports a document in which relevant stakeholders were identified and mapped accordingly to the proposed framework. In terms of Piraeus, one stakeholder's engagement workshop is reported. It was organized as an online event and all stakeholders identified through the proposed Stakeholders Engagement Framework were invited, among which there were Representatives of the Parents Association of Ralleion Schools of Piraeus and residents of Mikrolimano (descendants of the refugees from Asia around 1922). Chapter 5 includes also parts about the co-creation and the extracts from the Stakeholder Engagement Guideline which is attached in the annex. Both parts emphasize the importance of public participation for the euPOLIS methodology and stress that the voices and needs of a diverse group of stakeholders that represent the interests of all citizens should be included. Moreover, the different tools and methods for the stakeholders are discussed. This part is described as a toolbox that

No.	Name	Reference to societal impacts
		proposes a variety of different methods and tools that might be tailored to local conditions and specific groups of citizens. In Chapter 6 "Conclusions", the authors again emphasize the importance of the engagement of a diverse group of stakeholders and as an example give the voices of representatives of minorities that often are marginalized in participatory processes. euPOLIS is meant to avoid such malpractice through a very detailed stakeholders identification and mapping which D2.1 lies fundaments for. As a final note of the conclusions, the authors stress that stakeholder engagement is a process, therefore, it must be nourished throughout the whole life of the project and possibly beyond it. In Annexes, there is a full Stakeholders Engagement Guideline that discusses in detail the stakeholders' engagement process as well as presents adequate tools and methods for it. Moreover, it draws attention to ethical concerns regarding the use of ICT tools and the risks of exclusion of certain groups of citizens that follow such usage. Moreover, in Annexes, there are detailed reports from the conducted workshops (from the cities in which the workshops took place in other cases the reports describe other activities), tables with a detailed description of mapped stakeholders, and the results of a questionnaire on the usage of the existing facilities at the demo site and the local community.
D3.1	Report on the local demonstration case studies analysis (Lead ICL)	This deliverable contains 3 main parts: (i) Local conditions and demo-sites technical features (Chapter 2), (ii) Characteristics of existing natural elements and environmental issues (Chapter 3), and (iii) identification of the gaps in existing NBS (Chapter 4 of this report). Although Chapter 2 focuses mainly on the technical features of each demo site it also gives a glimpse of the information on who lives in the surrounding neighborhood under what conditions. This information might be crucial for the planned intervention and the impact on the local community. In Belgrade, in the case of Linear Park, the area of the planned intervention surrounds an old railroad track. It goes for several kilometers cutting a very diverse neighborhood, from "(…) existing housing complexes, that already create defined architectural and urban areas, to the low-density decaying and slum housing that will be transformed; from business and commercial functions to storage and industrial buildings; from port and railway buildings and other transport-related functions to sports and recreation facilities; from devastated built structures to protected heritage such as the electric power plant Power and Light, Nebojša tower and other monuments." (p. 14). On the other hand the second demo site is located in the

No.	Name	Reference to societal impacts
		existing Usce park that will be upgraded. It is located by the river in the city center and well-connected by public transport.
		In Gladsaxe, the demo site is located in the social housing complex which was built and recently renovated (2010) by public means. As a consequence, a third of the vacant flats are at the disposal of the municipality. The authors underline that citizens of this relatively small complex (it includes four blocks of flats with 117 apartments which compared to other demo sites in euPOLIS is rather small) have expressed concern about the safety of the space "(…) What makes residents feel unsecure are young people coming to the plot in the evening hanging out at the football lane. It is neighbourhood having a lot of social problems and occasional incidents with violence. Drugs are being sold in at different outdoor locations. The residents are afraid to get these problems at the plot. They feel unsecure in areas with little lighting because such areas attract street crime." (p. 17).
		In Łódź, in "(…) the vicinity of the area under development there are mostly dense tenement buildings and more extensively developed post-industrial (former factories) areas. In the immediate proximity there are residential areas (often in poor condition), an extensively developed fire station area and a municipal kindergarten." (p. 22)
		Demo sites in Piraeus are in close proximity to one another. The planned intervention in Mikrolimano harbor aims to increase its accessibility for visitors who now can't walk by the sea because of the shops and restaurants occupying the harbor. In the second demo site in Akti Dilaveri, the planned intervention also focuses on refurbishing the harbor. The authors highlight that the neighborhood of this demo site already offers a diverse range of activities for visitors and citizens: "(…)such as theatres, stadiums, the marina and the sailing clubs and of course coffee shops, bars and seafood restaurants." (p. 27). The third demo site in Piraeus is located in the Raillon School complex. Therefore, the planned intervention will mostly affect the students and their parents.
		In the case of the Following Cities (Bogota, Fengxi New City, Limassol, Trebinje, and Palermo) the authors focus more on a general description of the cities and planned routes of the development than on the local community. Only, in Limassol, the description of the Public Garden includes more detail about people using the space "(…) it is both local and touristic territory which hosts various and wide range social groups (such as married couples for walking, singles, parents with children, teenagers, multicultural/immigrants/tourists). Inside the garden there

No.	Name	Reference to societal impacts
		are benches across the park for giving the opportunity to the visitors' rest under the trees' shading areas, chairs mainly at the kiosk area and trash bins." (p. 35)
		Chapter 3 "Characteristics of existing natural elements" discusses the greenery in each of the demo site and characterizes the existing natural elements. Therefore, there is no references to the social part of the planned interventions.
		Chapter 4 "Gaps in the use of existing NBS planning and modeling technologies" discusses the use of provisional Goal Driven Planning Matrix for creating a list of all possible NBS interventions. It aims to demonstrate what are the possible improvements of the demo site and what kind of direct impacts they might have on Public Health and Well-being and what are the indirect social, environmental and economic benefits of the planned NBS. While in the main body of the deliverable there is a summary of gaps analysis for all demo sites in the annex there are lists with specific solutions and cities responses whether they might be applied in their case. They are grouped in 41 main categories under which a specific solutions are listed. Among these categories there a few that directly address diversity, inclusiveness and gender mainstreaming policy, "Higher ethnic and gender diversity – (Introduce: Introduce missing facilities for different gender and people groups – utilize BGS "gender planning criteria) (Gender related planning matrix used)", "Strong participatory process (target>200) – (Introduce: Introduce systemic, comprehensive collaborative planning process)", and "Number of people involved in participatory processes (Count from all events)". Unfortunately, some of the proposed solutions are seem not to fit the general category or even seem to be very stereotypical, for example under the "Higher ethnic and gender diversity" there are solutions that propose "the design should address the fact that girls preferring to play in quite corners" or "To make the park more appealing to girls create what amounted to gender-segregated spaces, installing volleyball and badminton courts for the girls, and dividing open areas into more private spaces with landscaping" (p. 96)
		In the case of Belgrade, only Usce park was considered in the gaps analysis but in general, all possible solutions proposed under the above-mentioned categories were marked as possible to implement. Similarly, in Gladsaxe most of the proposed interventions were ticked as possible (only the ones that did not fit the specificity of the space were discarded, i.e., "Major park signs should be lit for night visibility"). Moreover, the comments from Gladsaxe emphasize that although some solutions might be possible they will have to be agreed upon in a participatory process as the local community must accept them. In the

No.	Name	Reference to societal impacts
		Łódź case, the city pointed to some of the proposed solutions being already criticized in the literature, i.e., "Places that include technology, play, and social interaction are an important part of Child and Youth Friendly communities, especially in meeting their social, physical, and emotional health needs. - Create technological areas for free Bluetooth connectivity, Wi-Fi, etc. that is easily accessible for children and youth" therefore they are unlikely to be implemented. Other being excluded because of the direct request of the local real estate company (sic!) "The areas of active play to be included - Introduce arrangement of special-use areas for specific groups: e.g., playgrounds for small children within visual and voice range of the apartments + water toys, water playground to attract younger generations". In Piraeus, the general comment to the category "Higher ethnic and gender diversity - (Introduce: Introduce missing facilities for different gender and people groups –utilize BGS "gender planning criteria) (Gender related planning matrix used)" was that both "Mikrolimano and Akta Dilaveri don't seem to suffer from gender inequality access". Moreover, the participatory processes in the case of Microlimano were discarded because the works are already ongoing so any changes in the design are not possible. In terms of the following cities, there is no detailed gaps analysis provided. However, there are short summaries discussing the process of implementing similar to the euPOLIS interventions. In terms of Bogota, the authors directly point out that there is a lack of any participatory processes in similar constructions. Other following cities focus mainly on the gaps related to either specific NBS or public-private cooperation. In the last chapter "Lessons learned/Conclusions", the author focus only on the environmental and technological aspects of the conducted analysis.
D3.2	Baseline status and indicators identification	This deliverable aims at the initial qualitative evaluation of the demonstration sites' baseline status, definition of Contextual Indicators (related to urban, social, environmental, economic and PH&WB categories), and development of the advanced planning and design matrix (Goal Driven Planning Matrix). The main part of the deliverable is presented in Chapters 4, 5, 6, and 7. In Chapter 4 "Process summary for the demos' baseline status, indicators identification and GDPM construction", the authors very briefly summarise the idea behind the Goal Driven Planning Matrix. Moreover, the connection between the GDPM tool and the used

No.	Name	Reference to societal impacts
		Indicators framework (in detail the framework is described in D4.1) is established and explained.
		In Chapter 5 "Overview of the euPOLIS Indicator framework", a more detailed description of the euPOLIS indicators framework is provided, and its connection with the GDPM. The main focus is put on the presentation of the Challenges and Themes and Contextual Indicators. Under each impact category (public health & well-being, social, environmental, economy/business, urban development) a list of themes is presented, and later a list of specific indicators that serve for delivering a diagnosis of each demo site. Challenges and themes under social categories include a sense of safety, friendliness, social cohesion, diversity, comfort of use, sense of place, willingness to participate, activation in a participatory process, strengthening local community ties, and environmental awareness. Moreover, chapter 5 includes also an excellent part discussing gentrification in risks in all demo sites. Authors note that while in some places the gentrification processes have already begun in others they are likely to begin. Therefore, they emphasize the importance of well-designed and executed participatory processes that capture the voices of a diverse group of stakeholders that represent the interest of all citizens and also monitoring of the gentrification indicators.
		Chapter 6 "Qualitative Baseline status assessment for FR cities" includes a description of each demo site from a different perspective: urban, social, environmental, and business.
		In terms of Łódź, the provided description mainly focuses on the functions of the site and the characteristics of its users "The site contains a small playground for kids. There is a small, poorly equipped outdoor gym on the site. There are a few benches, which are not adequate to the number of current and potential users and are not shaded in summer. The categories of visitors are limited – they are mostly people who walk their dogs in the park, use the small outdoor gym, and are accompanying children to the playground. There are people interested and practically daily involved in taking care of the demo sites nature (and are a potential resource for urban gardening, urban agriculture, etc.). There is an active group of citizens in the neighbourhood who have been jointly implementing social activities for several years. The topic of social activities include development, education, culture, neighbourhood help, building a civil society, ecology, intersectoral cooperation, etc. This group implement these topics through workshops and trainings, meetings and discussions, cultural and social events, individual and group activities. The site is not covered by info-tech facilities. The City progressed on development of

No.	Name	Reference to societal impacts
		NBS related participatory programmes, tools, promotion, some of them supporting not only communication among stakeholders but also their engagement in the city-nature stewardship. These engagement practices consist of organization of Citizens' Panel on City Greenery, co-designing workshops on streets revitalization, e.g., "Streets of Old Polesie. There is also ongoing participatory development of the City Green Deal that is to stimulate filling the NBS gaps through multi-stakeholder and multi-sectoral collaboration." (p. 42)
		Similarly, the description of the Gladsaxe demo site stresses the function of the existing demo site and its users (briefly mentioning people living in the neighborhood): "The area is characterized by a lack of socializing activities – with introvert families, and there is a lot of segregated living. There are nice green areas that do not have a small resting or socializing points / facilities. The placement of the trees does not really invite the people to use the area for leisure, besides the playground for children. The interactions between human and nature are not existing besides the aesthetics. The "social innovator" has already been introduced at the demo site There are sporadic visitors at demo site from neighbouring societies, predominantly youngsters to practice sports There is only one, not large enough, public socializing spot on the site. Generally, there are no public meeting places in the area. At the site, the residents can borrow the common space in one of the residential blocks It is not fully understood at this point what is the sense of place attachment for the residents. Residents are showing low willingness to participate in different social activities. The cultural potential of the site is limited by fact, that it is a private residential area. Historically, there is a culture of excluding the neighbourhood from the site, but children and young people from the neighbourhood are occasionally using the football lane. The municipality offers a wide range of activities through local associations. The municipality have a webpage giving an overview of possibilities: https://prod.workforce-planner.dk/Booking/#!/associationList There are no information & communication systems presently developed on the site." (p. 45)
		In the case of Belgrade only Usce park is described in detail because the authors claim that for the Linear park "(...)the baseline status for each category, could not be defined at this stage, apart from statement that it is now one devastated city zone." (p. 48) For Usce park the description also focus on the users of the space and the existing functions of the space: "The area has very versatile categories of visitors: elderly, families with children, youth, businesspeople, Roma, etc. during all times of the day and night, which seek recreation, socializing, nightlife, etc. It is expected that a vast number of these visitors might be interested in taking part in the euPOLIS project. Many park visitors do not live in the area which might be the cause why they

No.	Name	Reference to societal impacts
		do not have a sense of place attachment, and behave irresponsibly toward park amenities (destroy, litter, etc.). Park visitors who live in the near vicinity are closely interconnected, and often gather to plan community actions. This Park section is less developed in terms of park equipment but does offer some interesting kids playing and sports facilities. There is an artificial free-climbing facility, and two basketball courts. There is a river promenade that is a significant community socializing area. There are also a few river marinas next to the site, which gather a community of recreative fishermen. The river area is also a hub for kitesurfing, rowing, water sports, etc. One part of this park has already been used for massive outdoor musical concerts and cultural gatherings. One of the most significant cultural buildings, the Museum of Contemporary Arts is in the park. This building is a large potential for diverse cultural events. There is no organized information & communication technology system on the site. The interaction between the City authority and citizens is only formal at present. There is no participatory planning in place." (p. 47) In terms of Piraues, two demo sites are analyzed Akti Dilaveri and Rallion School complex in Mikrolimano. The description of the Akti Dilaveri demo site focuses mostly on its function: "Local restaurants and cafeterias are located along Akti Dilaveri and is used mainly for promenading. Most sport/athletic clubs and unions are located in Akti Dilaveri Akti Dilaveri Area, at limited existing facilities is used by residents and athletes on a regular basis, and visitors of the area, especially the weekends for leisure activities. In Akti Dilaveri Area, there are facilities and activities of hyper-local interest, such as theatres, stadiums, the marina and the sailing clubs and of course coffee shops, bars and seafood restaurants Delfinario Theatre and the Peace and Friendship Stadium are facilities of hyper-local interest The area has many archaeological sites in the mainland and underwater, that have not been excavated There are old buildings created before the 50s called "Mikrasiatika" and most of them being categorised as Cultural Heritage by the Greek Ministry of Culture. Lack of green spaces and recreation areas (e.g., parks, meeting places, etc.) There are no public information networks at the site Many unions are located and are taking actions in the demo site area. The Municipality of Piraeus, operates the Volunteer Office, aiming at the improvement of the quality of life in Piraeus, and in parallel contributing to the cultivation of solidarity among its residents. The Municipality of Piraeus, since 2012, has commenced the implementation of a number of voluntary programs, through the Volunteer Office, aiming at the improvement of the quality of life in Piraeus, and in parallel contributing to the cultivation of solidarity among its residents. The Public Benefit Municipal Enterprise of Piraeus (KODEP) implements a series of new social services to support vulnerable groups in the city, in the context of strengthening the municipal social solidarity structures of the

No.	Name	Reference to societal impacts
		Municipality of Piraeus. The President of the 3rd Municipal Community of Piraeus is willing to contribute to the co-process and the implementation of the project, engaging the members of their communities, according to its requirements. Local community may not know about NBS solutions in a technical level but when engaged they will definitely understand and accept the potential positive impact of the NBS solutions on their Health and Well-being. The stakeholder's issues and concerns had never been discussed, in a sense euPOLIS proposes, before the euPOLIS project."
		Similar, in the case of Rallion School only functions of the space are mentioned: "A seating area is located at the entrance of the Ralleion School complex used mainly by parents during pick up times. The remaining green spaces surrounding the Ralleion School complex are used for walking dogs, seating and to traverse between destinations. Parents & Teachers association of Ralleion Primary schools of Piraeus will be the representative for the Ralleion demo site. Ralleion School has an environmental union for educational purposes, where pupils / students are learning about the environment protection, plant cultivation methods, etc. The area is a school complex so there does not seem to be any major cultural development apart from school festivities There are no public information networks at the site The Culture, Sport and Youth Organisation (OPAN PIRAEUS) is charged with the responsibility of promoting sport and awareness of social and cultural issues among all citizens, and youth in particular. The President of the Ralleion educational community is willing to contribute to the co-process and the implementation of the project, engaging the members of their communities, according to its requirements. Local community may not know about NBS solutions in a technical level but when engaged they will definitely understand and accept the potential positive impact of the NBS solutions. The stakeholder's issues and concerns had never been discussed, before the euPOLIS approach."
		In Chapter 7 "The euPOLIS project Goal Driven Planning Matrix – NBS planning tool", the GDPM and its functions are described in detail. Moreover, the authors also define the main project goals and targets based on Key Performance Indicators. Under Goal 4 "Enhancement of social cohesion and cultural particularity through ensuring a sense of security and inclusion for all" (p. 64), they list the following targets and "Bases for site enhancement concept solutions/interventions (Site conditions /effects with potential impact on Targets)" (sic!): Increased use of public spaces, Higher ethnic and gender diversity, and Strong participatory process (n>200). For Goal 5 "Sense of place and place attachment among users": Emotional attachment, Feeling of responsibility and ownership, and Increased sense of pride. Finally for Goal 6 "Density and strength of local community ties": Higher trust in

No.	Name	Reference to societal impacts
		local community members, New forms of neighborly exchange - neighborhood engagement and cooperation, Emergence of local leaders and social entrepreneurs, and Increased feeling of community efficacy. Chapter 8 "Conclusions" mainly focuses on the challenges and lessons learned from the indicators definition process. Authors mention the issues with data availability regarding the social category of the contextual indicators: "In terms of social category, FR cities differ mostly in demographic diversity of demo site potential users (which is well correlated with site size): Gladsaxe, Lodz, Piraeus, Belgrade (starting with low going to high). In addition, participatory processes (citizen engagement) already implemented in the cities vary and is affected by Covid restrictions. In Lodz, Gladsaxe and Piraeus was medium, and lowest in Belgrade." (p. 74) In Annexes for all demo sites, the data from contextual indicators are provided. In general, in most cases, it is not very up to date (for example, census from 2011) or aggregated on a satisfactory level (city or even national level).
D3.3	euPOLIS Project Requirements (Lead ICL)	This deliverable aims at defining project requirements for selected demo sites in Belgrade (Serbia), Gladsaxe (Denmark), Łódź (Poland), and Piraeus (Greece); and for case studies in Bogotá (Columbia), Fengxi New City (China), Limassol (Cyprus), Palermo (Italy), and Trebinje (Bosnia and Herzegovina). The main part of the deliverable is described in Chapters 3 and 4. In Chapter 3 "Methodology for euPOLIS project requirements identification", the main assumptions for the euPOLIS project requirement identification are described. They focused on the main objective of the euPOLIS project – enhancing the health and well-being of citizens. As a theoretical background for the project requirements definition, this report is based upon the functional organization analysis (FOA) method (proposed by Halbe et al (2014)). Based on this method four main categories of requirements are defined: urban development, environmental, social, and business. Under each category, a number of subcategories are defined based on the already collected data. In terms of social category, the authors listed the following subcategories: Life expectancy, Presence of socializing activities, Citizens' concerns, Potential for improvement of public spaces for different age groups, Engagement activities for participatory planning, Potential for activating business activities, and Potential restrictions on business activities development. Each city was asked to evaluate the requirements under each subcategory whether it had a direct or indirect impact on Public

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		Health and whether it impacted the well-being of the citizens. Moreover, under the proposed methodology, each city decided whether the listed requirement was mandatory, important, or desirable.
		In Chapter 4 "euPOLIS project requirements", the authors provide a summary of the project requirements for each demo site (and for each following city) while the detailed tables with all categories and subcategories are in Annex.
		In the case of Belgrade's Usce Park, the main social requirements defined by the city are "Engage with park visitors to obtain their active participation in the park everyday life" and "Activate natural potential for improving social areas (example: already shaded route for resting and walking)". Both of them are marked as desirable for the project. In the case of Linear Park, the authors do not provide a similar table because "the second demo-site, Linear Park does not exist yet and is planned to be created by transforming a derelict railway track. The planning documents are still under development and the project requirements will be defined on later project stages and specifically WP6 (Task 6.2)."
		In the case of Gladsaxe, the main social requirements defined by the city are "Improvement of socialising activities. Introduction of socialising points/facilities in the DS", "Create better interaction between human and nature", and "Improve the sense of place attachment". While the first two are marked as important the third one is "just" desirable.
		In the case of Lódź, the main social requirements include: "Improve and protect existing playground for kids", "Improve safety of the place", "Improve existing outdoor sport equipment and create better interactions with other nearby sport facilities", "Improve the points for quality socialising for different groups of users", "Consider high unemployment and poverty level in the DS vicinity", and "Engage with existing NBS related participatory programmes". The first two requirements were marked as important by the city authorities, the next two as mandatory, and the last two as desirable.
		In the case of Piraeus, the two harbor demo sites (Mikrolimano and Akti Dilaveri) were treated jointly while the requirements for Rallion School were provided separately. Social requirements for Mikrolimano and Akti Dilaveri included: "Engagement with local sport/athletic clubs and

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		unions", "Engagement with facilities of hyper-local interest", "Enhance engagement and participatory planning improvement - introduce green areas for resting and small recreation (as PP)", "Engagement with all stakeholders' groups and develop further discussion about their issues and concerns", "Highlight the unique characteristics of the area", and "Include additional cultural/athletic/eco-educational/community activities in DS". While the first four are marked as important the last two as desirable requirements. In terms of Rallion School, the city authorities listed the following social requirements: "Engage with Parents and Teachers association and its environmental unit", "Enhance engagement with culture, sport and youth organisation and participatory planning improvement", and "Engage with all stakeholders' groups and develop further discussion about their issues and concerns". All listed requirements were marked as important.

In cases of the following cities that will not implement the interventions under the project the requirements were more general and focused more on the benefits of participation in the euPOLIS project. In the case of Bogota, the main social requirement marked as desirable was "Improve social activities and interactions through the implementation of BGS NBS to enhance PH&WB". In Fengxi New City, social requirements included "Explore ways of improvement of area infrastructure", "Share best practices in successful governance systems and management mechanisms", "Bring together what has already been achieved through the Sponge City program with new concepts such as the harvested storm water (resource recycling), grey water and possibly wastewater recycling, renewable energy and urban farming", "Enhance engagement and participatory planning improvement", and "Involve stakeholders for the global dissemination of euPOLIS work and results: interchange with municipality of Shenzen and Shanghai". All of them were marked as desirable. In Limassol, the social requirements marked as desirable were "Improve social activities and interactions through the implementation of BGS NBS to enhance PH&WB" and "Support further participatory activities". In the case of Palermo, the city authorities selected "Include knowledge from agricultural experimentation and local cultural legacy in future projects" as desirable social requirement. Finally, in Trebinje, "Explore ways of improvement of recreational activities and other socialising opportunities" was marked as important social requirement.

In Chapter 6 "Conclusions", the authors mainly discuss the differences in size and greenery coverage among the demo sites (as well as following cities). |

No.	Name	Reference to societal impacts
		In the Annex, a list of more precise requirements is provided for all demo sites (and following cities).