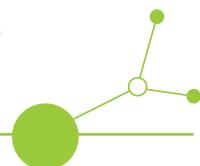


RE-PUBLIC SPACES

REVITALISATION OF PUBLIC SPACES IN HISTORIC CITIES -
adaptation of cities courtyards to climate change
in Central Europe



Version 1

November 2024

D1.1 Joint methodology on climate change
adaptation of courtyards in historic cities - M1





Table of contents

A. INTRODUCTION.....	4
1. Introduction	5
2. The structure of the study	6
3. Authors of the study	6
B. PART I - AUDIT OF HISTORICAL COURTYARDS MODERNIZATION AND ADAPTATION OF HISTORICAL COURTYARDS TO CLIMATE CHANGE - A MULTI-CRITERIA METHODOLOGY FOR ANALYSIS	7
1. Historical Courtyard - Subject of Analysis/Modernization	8
2. Audit of Historical Courtyards	8
3. Stages of the Audit of Historical Courtyards	9
4. Consultations with Stakeholders	9
5. Protection of Historical Elements and Values.....	10
6. Accessibility and Inclusivity	11
7. Technical Condition.....	11
8. Functional Condition	12
9. Climate Aspects.....	12
C. PART II - FUNCTIONAL, TECHNICAL, HERITAGE, ACCESSIBILITY AND ECOLOGICAL ASPECTS - STUDY	14
1. Stakeholder Consultations	15
1.1. Introduction	15
1.2. Climatic needs as a factor forcing and determining the need for modernization of courtyards .	16
1.3. The need for participation as an important factor for the proper process of modernization of courtyards	16
1.4. Presentation of the assumptions for the participation process - three stages and a description of the process itself	17
2. Protection of historic elements and values of historic backyards - rules and guidelines.....	23
2.1. Identification of historic elements	23
2.2. Indication of historic elements for protection	24



2.3. Conservation rules	25
2.4. Operating procedure (in the project)	26
3. Accessibility and inclusivity	27
3.1. Introduction	27
3.2. 7 Principles of universal access	27
3.3. Identifying vulnerable user groups and adapting the space accordingly.....	29
4. Water Management - sustainable urban drainage	30
4.1. Introduction	30
4.2. Urban water challenges - key issues:.....	30
4.3. Benefits of reversing environmental degradation:.....	31
4.4. Sustainable urban drainage in courtyards	31
4.5. Key steps for revitalizing courtyards in connection with sustainable water management.	36
5. Mitigating urban heat island with green infrastructure	38
5.1. Identifying the problem	38
5.2. Green infrastructure and its effects on UHI.....	39
5.3. Methodology for GI in courtyards in historic centres	40
5.3.1 General recommendations for revitalization of courtyards	42
6. Green infrastructure in historical courtyards introduction	48
6.1. What is Green Infrastructure?	48
6.2. The Importance of Planting in Green Infrastructure	48
6.2.1 Mitigating Climate Change	48
6.2.2 Reducing Urban Heat Islands	49
6.2.3 Stormwater Management	49
6.2.4 Enhancing Air Quality.....	49
6.2.5 Promoting Biodiversity	49
6.2.6 Improving Mental and Physical Well-being	49
6.3. Green Infrastructure in historic courtyards	49



6.3.1 Conditions for Vegetation Placement.....	50
6.3.2 Choosing the Right Vegetation	51
6.3.3 Placement Strategies	58
6.3.4 Modern Adaptations for Historic Spaces	59
6.4. Challenges and Considerations.....	60
6.5. Conclusion	60
7. Heat Island - Temperature Coefficient - Material Heating, Urban Heat Island Impact, Outdoor Thermal Comfort, Wind Flow	61
7.1. Introduction	61
7.2. Historical Data and Trends in Urban Heat Islands	62
7.3. Heat stress and impacts on health	63
7.4. Possible solutions.....	63
7.5. Case studies	64
7.6. Methodology	65
7.6.1 Introduction and context	65
7.6.2 Software tools.....	66
7.6.3 Application case study.....	67
7.7. Solutions	72
7.8. Conclusions	75
D. PART III - BEST PRACTICES, LEGISLATION REVIEW, SCIENTIFIC LITERATURE	77
1. Best practices of Nature-Based-Solutions.....	77
2. Legislation review	93
3. Scientific literature	108
4. Sitography:	116
5. List of Figures:	117
E. APPENDIX	118



RE-PUBLIC SPACES

A. INTRODUCTION



1. Introduction

Under Activity 1.1, the scientific and implementing partners of **RE-PUBLIC SPACES PROJECT** collaboratively developed a multi-criteria transnational methodology for adapting historic courtyard spaces to climate change, focusing on four historic cities.

This process primarily involved universities and was based on a comprehensive analysis of literature, European implementations, and study visits to gather practical insights. The methodology was designed to be applicable even beyond the project's scope, allowing for the continued development of climate change adaptation strategies for historic courtyard spaces.

A key tool in this process was the audit questionnaire, which served as both an analytical and design instrument. The historic courtyard audit - questionnaire consisted of three key elements: inventory, analysis-diagnosis, and modernization concept, guiding the partners through a systematic approach to gathering and utilizing information. The historic courtyard audit - questionnaire is annexed to this paper.

As part of the activity, the partners jointly carried out several critical tasks:

- Selection of relevant literature, including European case studies.
- Analysis and documentation of best practices from the selected urban centers.
- Selection of current standards based on European Union rules and regulations, along with the identification of major trends and objectives.

The next phase involved identifying the main criteria for the methodology, which included:

- Solar radiation - analyzing sunshine exposure, shading, and related aspects.
- Temperature factors - evaluating the heating of materials, the urban heat island effect, outdoor thermal comfort, and wind flow patterns.
- Nature-based solutions (NBS) at the neighborhood scale - such as urban drainage: retention basins, rainwater retention ponds, green water squares, small-scale rainwater catchment systems, and green infrastructure (GI) in the scale of the city and in the courtyard.
- Inclusivity and Accessibility.
- Conservation.

These factors, including climatograms, formed the basis for a common international methodology that addressed regional climatic challenges and the adaptation of courtyards to new climate requirements.

This methodology laid the groundwork for the joint development of assumptions for future adaptation strategies, ensuring the transfer of knowledge, experience, and mutual learning through transnational cooperation.



2. The structure of the study

The study is divided into three sections, each enriched with standalone appendices.

The first section presents the methodology for analyzing historic courtyards, referred to as the Historic Courtyard Audit. Its aim is to assess and modernize courtyards in the context of climate change, while simultaneously preserving their historical value. This process consists of three stages: inventory of elements, data analysis, and the formulation of recommendations for modernization projects. Key aspects include the technical condition, functionality, accessibility, inclusivity, and climate adaptation of the courtyards. The audit incorporates stakeholder consultations and heritage preservation, with the results documented in a specialized form attached to the study.

The second section presents a detailed exploration of climate-related issues, including green infrastructure at both the city and historic courtyard scales, urban stormwater management, and an extensive discussion on the urban heat island effect and mitigation efforts. Additionally, key topics related to the revitalization of public spaces are described, such as public consultations, enhancing accessibility and inclusivity of communal spaces, and respecting heritage values.

The third section of the study presents a compilation of best practice examples, legal acts, and scientific literature related to the subject of the report.

An essential element of the study is the audit questionnaire, included as an appendix both in the form of a blank template and a version completed by the city of Łódź. Additionally, documents detailing the Łódź case study are provided, including the participation process and the identification of historical elements. The appendix also includes a document outlining the fundamentals of urban water management and the development of accessibility.

3. Authors of the study

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B. PART I - AUDIT OF HISTORICAL COURTYARDS MODERNIZATION AND ADAPTATION OF HISTORICAL COURTYARDS TO CLIMATE CHANGE - A MULTI-CRITERIA METHODOLOGY FOR ANALYSIS



1. Historical Courtyard - Subject of Analysis/Modernization

A courtyard is a material space (comprising all the contributing elements) defined by the surrounding architecture (and other barriers). A courtyard does not necessarily have to be enclosed by buildings on all sides, but its boundaries should be clearly defined—they can be indicated by usage (private or semi-public space).

A historical courtyard refers to a space defined by historical buildings.

The analysis and modernization of courtyards should consider the space along with the following elements:

- Pathways leading to courtyards (gates, passages).
- Entrances to buildings and rooms adjacent to the courtyards.
- Facades.
- Interiors directly associated with the operation of courtyards (shelters, trash bins).

The analysis and modernization should also encompass courtyard furnishings, technical installations, and equipment—on the surface and below the surface of the courtyard, as well as on the facades of surrounding buildings (e.g., downspouts).

Courtyards, along with the listed elements, form functional and visual wholes. Courtyards, as described wholes, should be perceived from several interconnected aspects: functional, technical, heritage, accessibility, and ecological.

The analysis, documentation, and projects for the modernization and adaptation of courtyards should cover all of these aspects.

2. Audit of Historical Courtyards

The process of modernization and adaptation of historical courtyards to climate change should be prepared, planned, and executed according to a predefined scheme. Organizing this process ensures the inclusion of all necessary elements and factors that should be taken into account during the modernization and adaptation process. The entire set of analytical and design activities involved in preparing for the practical phase of modernization has been referred to as the Audit of Historical Courtyards.

The Audit of Historical Courtyards is a form of implementing a multi-criteria methodology for analyzing historical courtyards, aimed at gathering information and guidelines for designing adaptations to changing climatic factors.

The information, assessments, and conclusions derived from the Audit of Historical Courtyards are collected and presented in the form of an Audit Form.



The Audit Form for historical courtyards is provided in the annex.

3. Stages of the Audit of Historical Courtyards

The Audit of Historical Courtyards includes a series of actions organized into three stages.

The first stage of the audit involves gathering information about all the elements that contribute to the courtyards, including their heritage value, technical condition, accessibility, and functionality. The second group of information consists of data relevant to climatic changes—rainwater, temperature distribution, roofing, and greenery installations. The gathered information should be presented in an organized manner, as specified by the structure of the Audit Form for Historical Courtyards. The information is presented both as text and photographs.

The form serves as an inventory of all the elements contributing to the courtyards and their documentation. The form should contain key information for the courtyard modernization design process. At the same time, the form, along with its information and illustrations, serves as documentation of the courtyard's existing state (including historical elements and values), which is regarded as a means of protecting the heritage components.

The second stage of the audit is the analysis of the information contained in the form. Based on this, assessments are made regarding various aspects of the courtyard's current state—these assessments are also presented in the form. The assessments focus on technical condition, functionality, heritage value, accessibility, and climatic aspects (rainwater, temperature distribution, roofing, and greenery). Some assessments may be made directly from the information in the form. However, climatic factors may require broader analyses—such analyses will be annexed, with the results presented in the form. Due to the specialized nature of the information and assessments concerning the various factors characterizing courtyards, this stage of the audit may require input from specialists from different fields—particularly regarding climatic aspects, technical condition, heritage value, and accessibility.

The third stage of the audit involves developing conclusions that specify solutions for the project of modernization and adaptation of historical courtyards to climate change. The conclusions are provided in textual form. Their goal is to guide design solutions. The conclusions should not impose specific solutions but should indicate the objectives and the scope of their implementation. The conclusions should also reflect the opinions of stakeholders expressed during the first stage of consultations. This stage may also require involvement from sectoral specialists. The conclusions are also presented in the form.

4. Consultations with Stakeholders

A crucial element of the Audit of Historical Courtyards is consultations with stakeholders. Throughout the process of modernization and adaptation of historical courtyards to climate change, it is essential to conduct three stages of consultations with stakeholders.



The first stage of consultations is conducted during the gathering of information about the courtyard's condition. This stage should be completed before formulating the conclusions for the modernization project, meaning before the Audit Form is finalized. The aim of consultations at this stage is to gather stakeholders, opinions on the current condition of the courtyard and their expectations regarding the outcomes of its modernization. During these consultations, stakeholders are also informed about the goals, possibilities, and expected effects of the modernization process.

The second stage of consultations occurs after the development of the concept for the modernization and adaptation project of the historical courtyard. The goal is to present the design concepts to stakeholders and obtain their feedback. Revisions to the design solutions may be made based on stakeholder opinions.

The third stage of consultations takes place after the completion of the project. The aim of this stage is to gather stakeholders feedback on the completed modernization work and on the use of the courtyard after the work has been carried out. The conclusions drawn from these consultations should be shared with all project implementers.

Detailed information regarding the principles and assumptions for conducting consultations with stakeholders is provided in the annex. The annex also includes the presentation of consultations carried out in Łódź (Stage I of consultations).

5. Protection of Historical Elements and Values

A significant objective of modernizing historical courtyards is the protection of their historical elements and values. This goal is fully incorporated into the Audit of Historical Courtyards.

An element of the audit is obtaining information from heritage conservation authorities regarding elements that contribute to the historical courtyard and are formally protected. Elements subject to formal protection must be preserved in the modernization process. A heritage conservator should also provide conservation guidelines for preserving the historical values and identity of the courtyard being modernized.

Historical elements and values should be documented (in text and photographs) in the Audit Form. The form includes sections for the inventory and documentation of historical elements and values. The value of heritage elements documented in the form should be assessed by the conservator. Based on this assessment, the elements and values that must be preserved are identified. Protection may also apply to elements not formally protected—experience from the first phase of the project indicates that most heritage elements of courtyard furnishings are not subject to formal protection. Therefore, a thorough inventory and assessment of these elements in the Audit Form is crucial.

The annex presents an example of conservation guidelines developed for the modernization of a historical courtyard in Łódź.



6. Accessibility and Inclusivity

Another important goal of modernizing historical courtyards is ensuring their accessibility and inclusivity. This issue is addressed in the Audit of Historical Courtyards.

The main barriers to the use of historical courtyards stem from limited accessibility for people with mobility disabilities. Accessibility issues generally arise in two zones. The first zone is the courtyard area itself, primarily concerning surface conditions and level differences. The second zone involves exits from the courtyards to buildings, both underground and aboveground levels.

The Audit Form should identify all barriers that limit courtyard accessibility. It should also indicate which barriers need to be removed, though not all barriers need to be eliminated. The decision on which barriers to remove should consider the opinions of stakeholders expressed during consultations.

The Audit of Historical Courtyards should also address the issue of inclusivity. The broad concept of inclusivity includes various functional aspects related to courtyard use. These aspects have both material (requiring appropriate physical equipment) and non-material (organizational actions) dimensions. Inclusivity covers issues such as signage, safety (lighting, access control), usage regulations (entrance closures, noise, excessive lighting, usage forms, smoking). Inclusivity-related issues should also be included in the Audit Form.

7. Technical Condition

A crucial objective of modernizing and adapting historic courtyards is to bring them to an appropriate technical condition. All elements that constitute the physical infrastructure and equipment of the courtyard should meet technical requirements. Therefore, the Audit Questionnaire includes an assessment of the technical condition of individual elements and conclusions regarding improvements.

The technical condition of courtyards should be considered from two perspectives.

First, the technical condition of the elements comprising the existing infrastructure and equipment of the courtyards is evaluated. This assessment is one of the key factors in deciding how to handle each element in the process of preparing documentation for the courtyard's modernization. Generally, elements in good technical condition can be retained. This includes completeness, lack of damage that would limit usability, and absence of excessive wear. The assessments and conclusions presented in the Audit Questionnaire should indicate whether the assessed elements can be preserved for further use after modernization and what repairs are necessary.

In the case of elements of historical value, technical condition should not necessarily be the determining factor for their preservation. For these elements, even costly and complex repairs may be warranted—this depends on the historical value assessment. In certain cases, where historical elements are severely damaged but hold significant historical value, their reconstruction may be justified.



Second, the evaluation of technical condition can also be understood as a recommendation that the elements introduced during modernization be of appropriate quality. This ensures their long-term usability in a good technical state.

8. Functional Condition

A historic courtyard is a space that should support a variety of functional uses. Depending on the specifics of the courtyard (numerous individual circumstances), these functions may vary. The possibilities for shaping the function of the courtyard depend on factors such as location, size, ownership, accessibility, connections, the size of surrounding buildings, the number of users, and more. The functional uses of the courtyard may change over time and can also be shaped to some extent during modernization. Thus, they should be evaluated as part of the audit.

Generally, the functional uses of courtyards can be seen as subordinate, shaped primarily by the users of the surrounding buildings. To a large extent, these uses derive from how the surrounding buildings are utilized. The courtyard serves as a service area, subordinate to the buildings it serves. In historic buildings, where the courtyard often includes rear wings in addition to the main building, the primary function is to provide access to these wings. In this case, it is also important to ensure access for vehicles—moving furniture, goods, and renovation materials, etc. Courtyards are also typically the location for placing waste containers.

In many cases, courtyards are also spaces where residents meet, relax, or children play. Each of these functions requires certain equipment, which may be introduced during the modernization process. The introduction of greenery may be particularly important in these aspects.

The modernization process should also be an opportunity to eliminate certain functions from courtyards. As a rule, parking should be removed from historic courtyards, as retaining this function often significantly limits the possibility of introducing other functional uses.

The assessment of the functional uses of courtyards should also be included in the Audit Questionnaire. The evaluation and conclusions regarding modifications to the functional uses should be subject to public consultations with stakeholders.

9. Climate Aspects

Historic courtyards should be adapted to climate changes. The process of modernization and adaptation must pay particular attention to these aspects. Historic courtyards should meet contemporary ecological standards, including rainwater management, shading from excessive sunlight, reducing heat islands, and introducing greenery.

Modernization of courtyards in this respect requires specialized action. Therefore, it should be the subject of separate studies, which should be attached as annexes to the Audit Questionnaire. However, the Audit



Questionnaire itself can provide information about elements of the courtyard infrastructure that impact climate aspects.

The attached document presents a detailed analysis of the climate aspects that should be considered as part of the Historic Courtyard Audit.



C. PART II - FUNCTIONAL, TECHNICAL, HERITAGE, ACCESSIBILITY AND ECOLOGICAL ASPECTS - STUDY



1. Stakeholder Consultations

1.1. Introduction

Central Europe is home to one third of the European Union's population. Around 33% of its inhabitants live in large cities, 37% in intermediate regions and 30% in rural areas (Grübler and all, 2020).

Analyzing scenarios, models and current climate projections up to 2100 and the so-called "Common Socio-Economic Pathways" (SSP) goal of limiting the increase in global temperature to +2 degrees Celsius compared to pre-industrial levels, the so-called SSP1 is achievable, conditioned by the reduction of gas emissions (Climate Change 2021: The Physical Science Basis, the Working Group I contribution to the Sixth Assessment Report on 6 August 2021). Europe must therefore follow the path of "ecological and sustainable development, based on regional value chains around the world, increased environmental awareness and lower energy consumption" (Territorial Agenda 2030).

Thus, cities, as complex systems encompassing urban infrastructure, buildings and their surroundings, are forced to take systemic actions to mitigate climate change and build their resilience (<https://unhabitat.org/cities-and-climate-change>).

The spatial structure of Central European cities is defined by the layout and mutual relations of public spaces. Streets, squares, and inner courtyards of tenement houses define the spaces in which city life takes place. Generally, it can be estimated that in historical areas public spaces cover an average of 30-70% of their surface.

Traditionally, spaces were divided into 3 groups - public, semi-public, and private. However, in historical urban complexes - due to ownership, nature and intensity of use, multiplicity of functions, etc., practically all spaces become public. A process called "publicizing" space is taking place.

The interiors of historic quarters constitute a huge potential and challenge for the proper functioning and shaping of the historic urban landscape. These areas constitute a large resource of space, which, despite its fragmented structure, as a whole constitutes a significant area in the scale of the entire historical system of the city; what is more, these spaces often remain abandoned and neglected. The courtyard spaces in historic cities are chaotically organized, they lack modern solutions for adaptation to climate change, they are often completely covered with a sealed surface, divided and used as parking lots.

To this day, there are no standards or models that would comprehensively address the subject of such spaces and their methods of adaptation. Courtyard spaces are treated selectively, and the revitalizations that are being developed do not represent a broad approach to planning and modernizing courtyards. The factor that perpetuated this state of affairs was conservation in the spaces of historic cities and the main maxim that the fewer interventions, the better.



1.2. Climatic needs as a factor forcing and determining the need for modernization of courtyards

In recent decades - and even years, a combination of many factors has emerged, creating enormous pressure to transform and modernize public spaces. One of them is climate needs and attempts to mitigate climate change and its negative impact on the lives of city center residents.

In 2017-2019, every city in Poland with more than 100,000 inhabitants had to develop a climate change adaptation plan at the request of the Ministry of the Environment. As a result of the project, 44 strategies were created for the largest cities in Poland assessing their sensitivity to climate change, along with planning adaptation measures based on specific threats. However, the assumptions adopted in the adaptation plans are general. A similar situation exists in Italy, Croatia and Slovenia.

There is a lack of a systemic approach and procedures for dealing with individual types of public spaces. This issue particularly concerns spaces within the quarters of historic buildings. The need for common solutions for the whole of central Europe should be a priority.

Currently, specific solutions are being sought for selected Old Town areas, including actions to lower temperatures and reduce the urban heat island, retain rainwater and introduce greenery while preserving the historic values that build the identity of the place.

Currently, we are observing an evolution of paradigms in the field of monument conservation. Traditional conservation doctrine did not envisage introducing vegetation in old town areas if there was no historical greenery there before. However, the contemporary approach to the protection of cultural heritage indicates the impossibility of blocking this process. Examples of such actions can be observed in the old town spaces of Poznań, Kraków, Warsaw, Florence, Zagreb, Rome and Lubljana where the introduction of greenery is starting to play an increasingly important role in creating the aesthetics and function of these areas.

1.3. The need for participation as an important factor for the proper process of modernization of courtyards

The inalienable right of civil society is its participation in the management of space. Properly conducted social participation results in counteracting conflicts, and appropriate early consultation is an effective element of diagnosing the space that is to be covered by the revitalization process (Pawlowska and all, 2012).

The aim of consultation/participation is, on the one hand, for people to gain influence on decisions shaping their living space, and for the initiators (authorities) of the actions taken to recognise the mood and opinions of the local community (Pawlowska, 2010).



Backyard spaces are a community space. A necessary element of their modernization and revitalization is consultation with stakeholders - who use this space on a daily basis. The success of this type of consultation is associated with the use of appropriate tools (questionnaires, surveys, information leaflets, posters, invitations to presentations, joint local vision) and animation activities in the form of workshops dedicated to the local community (Maury, Wodylak, 2019).

The aim of this type of activity is to carry out a diagnosis of the space covered by revitalization, identify the problems and needs of the local community, obtain opinions and attempt to restore neighbourly relations as well as establish a sense of responsibility for the common space.

1.4. Presentation of the assumptions for the participation process - three stages and a description of the process itself

As part of the RE-PUBLIC SPACES project, public consultations will be conducted at the stage of diagnosis, agreement on the conceptual design and implementation of the pilot investment of the courtyard. The aim is to continuously inform, evaluate from the moment of diagnosis by seeking opinions and receiving feedback on the validity of undertaking the project, the design concept and the implemented investment.

The addressees of the consultation activities will be the residents of tenement houses in Pinerolo, Osiejek, Łódź and Velenje belonging to the courtyards - both seniors and young people, people running a business activity within its area and also, as initiators of the meeting, representatives of the city, among others from the Office of the City Architect, the Board of Municipal Premises, experts related to the subject of the revitalization activities undertaken.

An important element of the consultation process will be reaching the widest possible group of recipients, therefore it will be necessary to have appropriate visual identification informing about the consultations taking place both in the traditional form - posters and QR codes placed on them redirecting to the event - an invitation placed on the official website of the City Hall. Each resident will also receive an invitation to the meeting in the form of a letter with a leaflet promoting the project.

For the consultation purposes, a poster and leaflets informing about participatory activities will be developed. Information about the public consultations will be shared through both traditional and electronic channels. This will include sending written invitations and emails, placing posters¹, and distributing leaflets in nearby institutions and small service venues. Details about the consultations will also be posted on the social media pages of cultural institutions and the city. A crucial part of the public consultations is providing feedback to

¹ The poster should be legible, with a clearly formulated message and a prominent title. The graphics accompanying the poster should not be decorative but should be part of the message. Importantly, the poster should clearly indicate that the city is the sender of the message, therefore it is recommended to use appropriate logos placed in visible places ¹. Social Council for Social Consultations, Department of Social Communication and Information of the City of Toruń, Good Practices in Conducting Social Consultations, Toruń, 2014, p. 10



residents, along with a thank you for their participation. This feedback will be published on the city office website after the meeting.



Figure 1 Consultation poster in Łódź (source: City Architect's Office of Łódź)

The following tools will be utilized during the consultations: presentations outlining the current state and showcasing examples of best practices, a joint walk-through site visit, pre-prepared surveys, and interactive workshops, such as animation sessions aimed at engaging stakeholders through collaborative activities, specifically “co-designing the backyard space”.

Proposal for stakeholder consultations at the diagnostic/pre-design stage

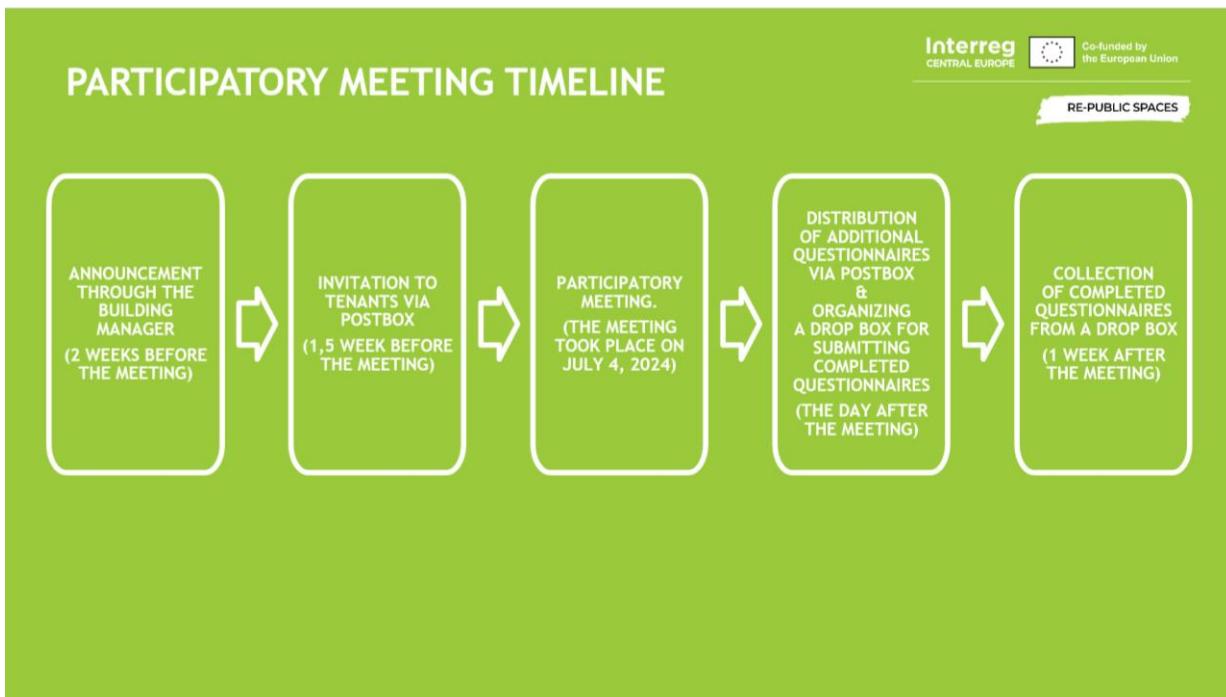


Figure 2 Participatory meeting timeline (source: City Architect's Office of Łódź)

- Objective: diagnosis, analysis of needs, seeking opinions, receiving feedback, formulating conclusions for the conceptual design of the revitalized space.
- Tools: Presentation, survey, site visit, discussion, workshop activities.

The presentation should include basic information about the project and demonstrate its alignment with the city's strategic goals to underscore the importance of the task at hand. It should also present the existing condition, emphasizing the functional aspect, and distinguish between pre-design activities and those planned as part of the project. Additionally, the presentation should address the environmental and conservation aspects, highlighting historical elements of the yard's equipment that contribute to the place's identity, supported by archival documentation and examples of best practices.

A key element of the consultation process is engaging the community in the collaborative shaping of the space. To facilitate this, a survey and workshop sessions should be prepared.

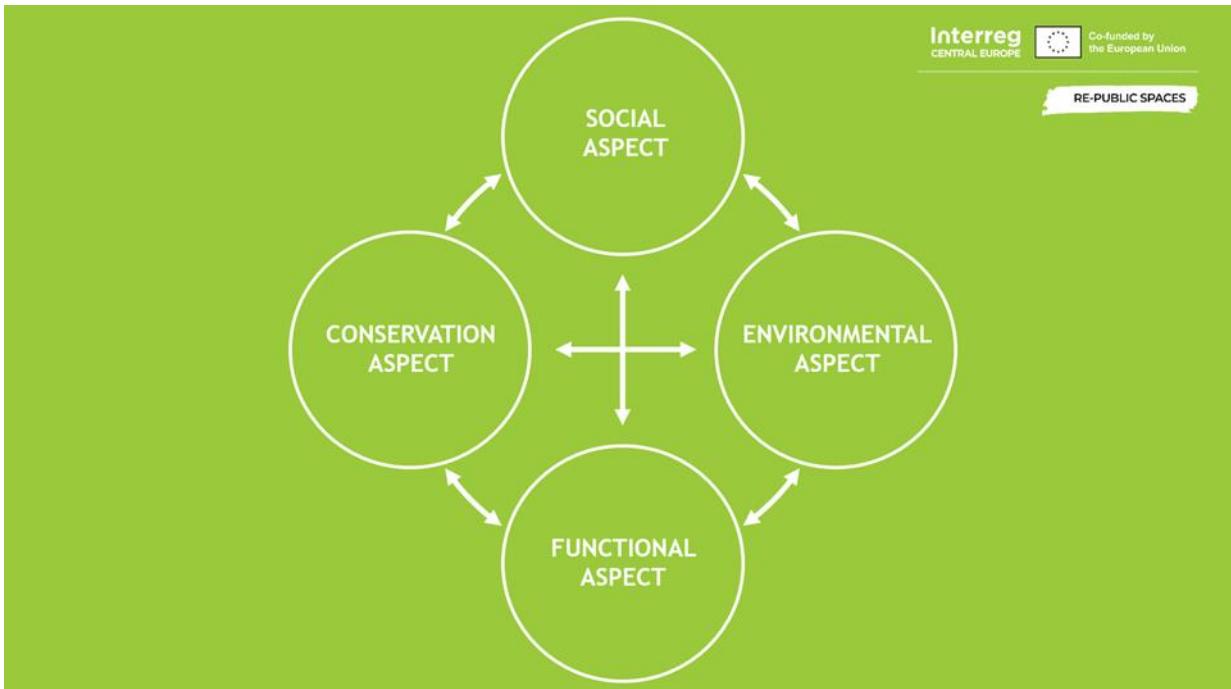


Figure 3 Consultation aspects in Łódź (source: City Architect's Office of Łódź)

The survey should include a personal data section and substantive questions. The personal data section should gather information on gender, age, education, professional activity, and the duration of residence in the given area. Substantive questions related to the conceptual design should be presented as multiple-choice questions with a range of possible answers. The survey should conclude with an open-ended section for comments and observations.

Workshop activities should be documented by photographing the residents' projects, which will serve as an appendix to the collected documentation for further evaluation.

Proposed course of the meeting:

- Welcoming those gathered, discussing the topic and course of the meeting, introducing the participants.
- Presentation - a discussion of the program assumptions by a city representative, an explanation of why this particular courtyard was chosen for the project, a presentation of examples of renovations of courtyards.
- A conversation with the residents, they explain the history of the tenement house and the yard, and talk about the realities of everyday life.
- Presentation and discussion of the survey. Request for residents to complete it. Declaration by the property administrator that the surveys will be collected by her from residents and delivered to the City Architect's Office.



- A question for the residents - do they want changes in their yard?
- Workshop part. Encouraging residents to design their yard.
- Conclusion and thanks to residents for their active participation in the meeting.

The collected surveys and photographs from the joint workshops should be analyzed, and on their basis conclusions for the conceptual design should be formulated.

RE-PUBLIC SPACES

ANKIETA DLA MIESZKAŃCÓW DOTYCZĄCA REWITALIZACJI PODWÓRKA PRZY UL. TRAUGUTTA 8

METRYCZKA

1. Płeć
 Kobieta
 Mężczyzna
 Osoba niebierarna
 Inna

2. Wiek
 Poniżej 18 lat
 18-24 lata
 25-44 lata
 45-64 lata
 65 i więcej lat

3. Wykształcenie
 Podstawowe
 Zasadnicze zawodowe
 Średnie
 Wyższe
 Inne:

4. Aktywność zawodowa
 Uczestnik/student
 Osoba pracująca
 Osoba bezrobotna
 Przedsiębiorca
 Emeryt/rentista

5. Jak dugo Państwo mieszkały przy ul. Traugutta 8
 Poniżej roku
 1-5 lat
 6-10 lat
 Powyżej 10 lat
 Jestem z rodziną, która mieszka w kamienicy kilka pokoleń
 Nie mieszkał w kamienicy, ale tu pracuję
 Inne:

6. Jakie są Państwa relacje z sąsiadami?
 Bardzo dobre, uczestniczą w życiu rodzinnych sąsiadów
 Dobre, utrzymujemy poprawne relacje sąsiadów
 Nie znam sąsiadów
 Chcę poznac sąsiadów

7. Jak oceniają Państwo podwórze obecne przy ul. Traugutta 8?
 Bardzo dobrze
 Dobrze
 Średnio
 Złe
 Bardzo złe

8. Proszę ocenić wymienione elementy związane z jakością życia w obrębie podwórka kamienicy przy ul. Traugutta 8 (od 1 - zły/niski, do 5 - dobry/wysoki)

1	2	3	4	5
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ogólny wpływ na samopoczucie				
Estetyka otoczenia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Czystość	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poczucie bezpieczeństwa	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Współpraca między mieszkańcówami a władzami publicznymi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. W jaki sposób obecnie korzystają Państwo z przestrzeni podwórka?
 Nie korzystam
 Zatrzymuję się rozmawiając z sąsiadami
 Wyprowadzam psa
 Inny (prosimy wymienić jakie): _____

10. Które z poniższych elementów wyposażenia podwórza chcieliby Państwo posiadać na podwórku przy ul. Traugutta 8 (prosimy o wybór maksymalnie 3 elementów)?
 Ławki
 Wiatra śmieleniowe
 Śnielinki schowane w pomieszczeniu gospodarczym
 Zielony urządzone
 Pergola
 Oczko wodne
 Karmniki dla ptaków/domek dla owadów
 Inne (prosimy wymienić jakie): _____

11. Które z poniższych elementów wyposażenia historycznego podwórza przy ul. Traugutta 8 są najcenniejsze wg Państwa?
 Kolor elewacji
 Zielone balustrady
 Odbyte bramne
 Drewniane elementy nad ościeżnicą drzwi wejściowych do oficyn
 Inne (prosimy wymienić jakie): _____

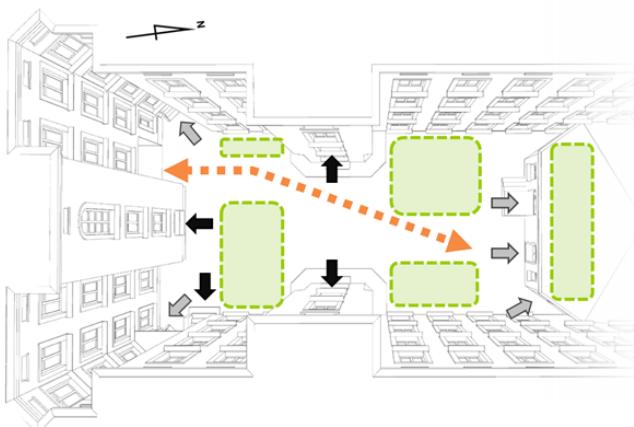
12. Jaki ekologiczne działania byłyby najlepsze do zastosowania na Państwa podwórku?
 Od betonowanie
 Wprowadzenie trawnika
 Wprowadzenie kwiatów / krzewów
 Sadzenie drzew
 Zielony dach
 Zielony w dachach / stworzenie ogrodów społecznych
 Zielony dach
 Gromadzenie wody deszczowej do jej ponownego wykorzystania
 Inne (prosimy wymienić jakie): _____

13. Czy jako mieszkańców kamienicy będą pomagać Państwu w utrzymaniu urządzenia wspólnego podwórka?
 Tak
 Nie

14. Uwagi i dodatkowe spostrzeżenia:

Figure 4 Questionnaire used during the consultation in Łódź (source: City Architect's Office of Łódź)

FUNCTIONAL REQUIREMENTS



1. Accessibility of all the existing entrances.
2. MSW room and the route for containers removal.
3. Benches.
4. Climbing greenery on outhouse.
5. Lawns.
6. Flowers and shrubs.
7. Bike racks.



Figure 5 Functional requirements (source: City Architect's Office of Łódź)



Stakeholder consultations at the conceptual design stage:

- Objective: To familiarize stakeholders with the prepared project, formulate necessary amendments to the conceptual design based on the votes of residents.
- Tools: Presentation, site visit, discussion.

The presentation should begin with basic information about the project and an overview of guidelines developed during consultations at the site diagnosis stage. It is essential to highlight the existing condition, focusing on the functional, environmental, and conservation aspects, with particular emphasis on historical elements of the yard's equipment that contribute to the identity of the place. This should be supported by archival documentation. Additionally, the presentation should cover the design assumptions and actions taken.

It is important to include visualizations juxtaposed with the current condition, allowing stakeholders to clearly see the improvements and transformation of the space.

Following the presentation, there will be a discussion with stakeholders, accompanied by a joint site visit. Based on this, comments and potential adjustments to the conceptual design should be formulated.

Consultations with stakeholders after the completed investment:

- Objective: To present the completed investment based on guidelines formulated based on stakeholder votes.
- Tools: Presentation, site visit, discussion.

The presentation should provide an overview of the project, including key information and guidelines developed during the consultation process at the project approval stage. It should also illustrate the previous condition of the area and the current state following revitalization efforts.

After the presentation, there will be a discussion followed by a joint site visit. Based on these activities, conclusions will be drawn.

The detailed course of the consultation activities conducted in Łódź is outlined in the attached document.

Elaborated by Lublin University of Technology, City of Łódź and City of Pinerolo.



2. Protection of historic elements and values of historic backyards - rules and guidelines

A historical backyard is a space marked by historical buildings. In the arrangement of historical backyards, historic elements and values can be preserved. Historic elements and values should be identified, documented, assessed from the point of view of technical condition and historic value, subjected to conservation and preserved. The program of modernization and adaptation of historical backyards should ensure the protection of the largest number of historical elements and values.

From a conservation perspective, the historical backyard should be treated as a whole, representing historic elements and values. The analysis and modernization of the yards should take into account its space along with the following elements:

- Spaces leading to courtyards (gates, passages),
- Entrances to buildings and rooms adjacent to courtyards,
- Facades,
- Interiors directly related to the service of yards (sheds, garbage cans, etc.).

2.1. Identification of historic elements

A monuments are the elements (material) and qualities (intangible) that represent historic values. The identification of historic elements should take place on the basis of the possibility of assigning them at least one of the values that justify granting the objects the status of monuments - artistic, historical, scientific values.

Artistic value - the value of the element as a work of art.

Historic value - the value of an object/place through its connection with important historical events, people, processes.

Scientific value - The value of the element as an object of scientific research and cognition (documentary value).

In the arrangement of historical courtyards, various groups of elements and historic values can be identified. The following examples can be indicated.

Historic elements (examples):

- technical components (e.g. pumps, wells, taps), lamps, drainage systems
- surfaces (authentic)
- entrance joinery (for entrance gates, for staircases)



- gate décor (floors, lamps, polychromes, stucco)
- corner stones
- balustrades, safety gratings
- small architecture (gazebos, benches, fences)

Historic values (examples):

- colours (surfaces, walls, furnishings)
- materials (surfaces, walls, equipment)
- functional divisions.

In conservation theory, all historic values - and thus the elements representing these values - are considered to be equally valuable. Therefore, the analysis of historical courtyards should reveal and include all historic elements and values. In an acceptable simplification, however, it can be assumed that the most valuable elements are those from the period of the construction of historical buildings and the elements that form a compositional/functional whole.

The identified historic elements and values should be presented in the Audit Questionnaire along with a synthetic definition of the historic values they represent. This process should be supported by guidelines drawn up by conservation services.

2.2. Indication of historic elements for protection

A key stage in the protection of historic elements and historical values of courtyards is their identification. The elements to be protected should represent historic values. In general, there are two possible forms of identification of historic elements.

The first form consists in establishing elements and values that have already been identified and formally protected. The most valuable historical elements constituting elements of courtyard furnishings may be covered by separate entries in the registers of monuments. Such elements are subject to absolute protection. Any work on these elements must be agreed with the conservation authorities.

Historical courtyards can also be formally protected as spatial units or complexes of buildings. In such cases, specific elements of the yard equipment are not indicated to be protected. However, plans for the modernization of these areas must be agreed with the conservation services. In such a situation, conservation services formulate conservation guidelines that define the elements, values, and principles that are to be implemented in the process of modernization of courtyards. These recommendations are formal and must be taken into account in the modernisation process.

The second form of identification of historical elements and values is their indication by broadly understood stakeholders. If the yard is not formally covered, all stakeholders can identify and indicate historic elements.



The most important role in this process should be played by conservation services. Conservators are most competent to indicate historic elements, regardless of their formal status. Therefore, they should always be asked to formulate guidelines on the elements, values and principles of protection of historic courtyards.

Historic elements and values can also be indicated by other stakeholders in the process of modernization of courtyards - for example, residents, managers, social organizations. From this perspective, public consultations are very important, as they are a good opportunity to identify historical elements that are important for their direct users and audiences. Stakeholder proposals should be agreed with conservation services.

Identified historical elements and values should be documented (text and photographs) in the Audit Form - appropriate fields are used to inventory and document historical elements and values. This documentation should be assessed by the conservator and on this basis the elements and values to be protected should be indicated.

In each case, the subject and scope of activities aimed at protecting historic elements and the value of historical courtyards should be specified in the guidelines formulated by conservation services (state or local government).

2.3. Conservation rules

Identified elements and historic values should be preserved. The realization of this purpose is possible if the conservation rules applicable to the management of historic buildings are observed during the modernization and adaptation of historic courtyards.

Conservation rules applicable to works in historical courtyards (selection).

Principle 1 Minimise interference

This is the basic principle resulting from the assumption that all contemporary interferences destroy the authentic form and substance of the monument or distort its perception; The principle is based on the idealistic assumption that an authentic and integral monument is of greater value than contemporary interference; Minimization applies to all aspects of interference - material, size, form, colour, location, etc.

Principle 2 Reversibility of interference

Contemporary interferences, by violating the substance and form of the monument, violate its value - primarily documentary; therefore, when the causes that justified the interference in question cease to exist, it should be possible to remove it as tracelessly as possible. Removal of interference means the restoration of the authentic form of the monument, recognized as valuable.

Principle 3 Distinguishability of Contemporary Interference from Authentic Monument

This is a principle resulting from the assumption that an authentic monument has a different value than contemporary interference and therefore should be distinguishable from them; the principle applies to both



the level of research (so as not to mislead the researchers of the monument) and the reception (so as not to mislead the recipients of the monument). The principle applies to the form, substance, décor, and equipment of the monument.

Principle 4: Harmonization of interference (with the historical environment)

In the perception of a monument, its authentic and integral form (all its components) is crucial; therefore, contemporary interference should not disturb this perception, disturb the historical cohesion, create excessive contrast - neither in a positive nor a negative sense. This postulate is not contrary to ensuring the quality of contemporary interference.

2.4. Operating procedure (in the project)

The preservation of historic elements and values in the process of modernization and adaptation of historical courtyards requires an orderly procedure of action. It is possible to indicate the stages within which the process of protecting historic elements and values should be carried out.

1. Identification and documentation of historic elements and values/in consultation with the conservator and residents.
2. Development of a concept for the protection of historic elements and values.
3. Agreeing the concept with the conservation services (permits).
4. Agreeing and introducing the concept of protection of historic elements and values to the project of modernization of courtyards.
5. Implementation of the project of preservation of historic elements and values (as part of the modernization project).

Elaborated: Team Lublin University of Technology.



3. Accessibility and inclusivity

3.1. Introduction

Public space is a common good, and every citizen should have the right to freely use and access it. Social inclusion and improved access for individuals with fewer opportunities, including those with disabilities and people from war-affected and migrant backgrounds, are becoming priorities for the European Union. Everyone, regardless of disabilities, gender, race, culture, language, ethnicity, religion, belief, age, or sexual orientation, has the right to equal access to public space. The RE-PUBLIC SPACES project focuses on promoting inclusive modernization of historical courtyards, ensuring the needs of all users are met based on the principles of universal design (Stanford, 1997).

An important goal of modernizing historical courtyards is to ensure their accessibility and inclusivity. The main challenges in using historical courtyards are related to limited accessibility for people with mobility impairments. These issues typically occur in two areas. The first area is the courtyard space itself, particularly concerning surface conditions and level differences. The second area involves exits from the courtyards to buildings, both to underground and aboveground levels.

Access to built and virtual environments, information and communication technologies (ICT), goods and services, including transport and infrastructure, is an enabler of rights and a prerequisite for the full participation of persons with disabilities on an equal basis with others. (European Commission, Directorate-General for Employment, Social Affairs and Inclusion, 2021).

3.2. 7 Principles of universal access

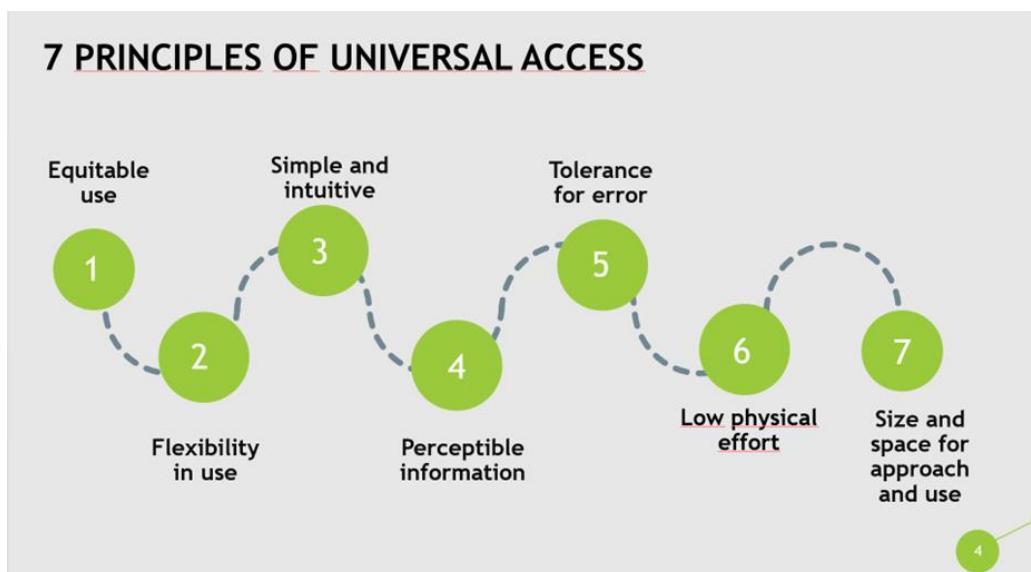


Figure 6 7 Principles of universal access, (source: University of Lubljana)



- Do not single out or segregate particular groups of users, where possible ensure that everyone uses the space (object, service) in the same way, ensure equal security and privacy for all users (If possible, ensure that everyone uses the space in the same way, ensure equal security and privacy for all users).
- Ensure that people can use the space (object, service) in different ways at their own pace (Ensure that people can use the space in different ways, ensure that each person can use the space at their own pace).
- Avoid unnecessary complexity, design spaces (objects, services) consistently and according to user expectations and intuition, cater for a wide range of users with different language and reading abilities, arrange information according to its relevance (avoid unnecessary complexity, design spaces consistently and according to the user's expectations and intuition).
- Present important information in ways that use different senses, ensure sufficient visual contrast and good legibility (- Important information is presented in ways that use different senses, ensure that the signs are easy to read).
- Elements should be arranged to minimise the potential for error, design should ensure that, despite possible misuse, no danger or damage occurs (elements should be arranged in such a way as to reduce the possibility of errors, the design should ensure that, despite possible misuse, no danger or damage will occur).
- Allowing the user to maintain his/her natural posture, reducing the strength required for use (allowing the user to maintain their natural posture, reduce the force needed to use).
- Ensure an unobstructed view of important elements, whether the user is standing or seated, ensure access and management for all users (ensure an unobstructed view of important elements, whether the user is seated or standing, ensure that all users have access and control).

Through three parameters that allow for the appropriate treatment of each space:

- Embeddedness in the wider context (access from the city).
- Define the ownership (public, semi-public, private).
- Dominant use of courtyard.



3.3. Identifying vulnerable user groups and adapting the space accordingly

- Who are the potential users of courtyard?
- Which potential users, if any, could be excluded due to space barriers?
- What are all the uses that take place in the courtyard?
- What are the expectations / user experiences of the courtyard? (owners)
- How could courtyard avoid limits to physical, psychological approachability for diverse users in diverse contexts of use?
- How can we ensure that different users in different environments can perceive the information presented in space-use related systems?
- How could a space that relates courtyard assist in preventing errors or minimize them?
- Are there elements of the courtyard that some users may not be able to interact with, use in the same way or in an equivalent way (perhaps due to difficulty of access to the area itself)?

The detailed guidelines have been included in the appendix.

Accessibility aspects of areas intended for public access shall include:	TABLE 2: REQUIREMENTS for Universal design of Courtyards (SIST ISO 21542)
European accessibility act/Directive (EU) 2019/982	
1. Use of related outdoor areas and facilities	Connecting with the wider environment. Adequate links with appropriate signage to the urban mobility network are important.
2. Use of entrances	The minimum external width of the gangway shall be 90 cm
3. Use of paths in horizontal circulation	The minimum height of the external gangways shall be 230 mm. The maximum height of the threshold that is useful for all those who require wheeled mobility aids is 15 mm. If possible, the gangway should be free of thresholds. Path slopes The cross slope shall not be greater than 1:50, unless there is a drop due to a dropped kerb in the pavement area. If the longitudinal slope of the path is greater than 1:20 it shall be designed as a ramp. Non-slip, tactile surface, the approach to the ramp should be highlighted using colour contrast, tone and texture change. Manoeuvring space (a person in a wheelchair can turn 180 degrees). The space must be large enough to accommodate a circle 150 cm in diameter. Grilles Wheelchair users and white cane users are often obstructed by grilles covering light or other shafts. The gap between the grilles should be less than 15 mm so that it does not obstruct wheeled mobility aids, and the white cane does not get stuck in it.
4. Use of paths in vertical circulation	Height differences: in the case of a space height difference, access must be provided by means of a ramp and steps. The entrance is designed in this way to allow access to the building for people with wheeled mobility aids as well as for those who can walk more easily with stairs and therefore need shorter routes. Smart technologies (lifts, elevators) are very useful, but they can also help the disabled. The technology should be selected based on a unifying design so that it can be used by all.
5. Use of equipment and facilities used in the provision of the service	Control elements (lift switches, blinds, lighting, sound information, etc.) must be positioned at a height of between 80 and 110 cm and at least 60 cm from all internal corners. Appropriate accessibility for the blind and visually impaired, such as visual contrast, tactile elements, brief font, etc., must be considered.6.
6. Use of exits, evacuation routes and concepts for emergency planning	Obstacles that are necessary (rubbish bins, benches, bollards, etc.) must be designed and placed in such a way that they can be detected in time by the blind and partially sighted. Paths, passageways, stairways, ramps should be kept as clear and free of obstacles as possible.
7. Communication and orientation via more than one sensory channel	Contrast for orientation should be appropriately coloured (e.g., edges of stairs appropriately marked). The lighting shall not cause glare, reflection or strong shadows. Preparation for the installation of equipment for the deaf and hard of hearing is primarily defined by the interior spaces, but adequate lighting and hearing loops at doorbells with intercom are important.
8. Use of facilities and buildings for their foreseeable purpose	Bench, seating: position of seats should be min. 60 cm from the line of movement, seats: 45 - 48 cm (high), back and arm rests min. 45.5 cm (high), space between seats 90 cm width, 140 cm depth; Resting areas should be adjacent to accessible routes with access.
9. Appropriate choice of materials	Parking spaces for disabled persons should be of an appropriate size and located as close as possible to the entrance with adequate access. Floors should be slip-resistant in dry and wet conditions, firm and level to allow easy passage by wheeled mobility aids or other mobility-impaired persons. On large, paved areas, homogeneous materials are recommended, and joints should be no deeper than 2 mm. Floor and wall coverings should be chosen in such a way that they do not impair visual perception. In particular, shiny and highly reflective materials should be avoided, as well as excessive use of mirrors (on several walls in the same room), brilliant white paint and strong contrasting patterns (for example, a chessboard and patterns giving the impression of a three-dimensional image). Glare severely impairs the visual perception of most people with visual impairments. Mirrors and highly reflective materials distort the image of a room and have a bad effect on orientation in the room, and high contrast patterns make some users feel dizzy.

Figure 7 Requirements for Universal design of Courtyards, (source: University of Lubljana)

Elaborated by Lublin University of Technology and University of Lubljana.



4. Water Management - sustainable urban drainage

4.1. Introduction

Water plays a critical role in both environmental quality and socio-economic development. This significance is highlighted in international frameworks, such as the UN Millennium Development Goals and the "The Future We Want" declaration, adopted during the Rio+20 conference in 2012.

Additionally, water is a key focus of Phase VIII of the UNESCO International Hydrological Programme (2014-2021), the largest intergovernmental hydrological programme globally. The theme "Water and Human Settlements of the Future" directly addresses urban areas, focusing on the challenges and solutions related to water management in cities (Zalewski, 2013).

Another key theme is ecohydrology and ecological engineering for a sustainable world, which specifically includes urban ecohydrology. Ecohydrology explores the interactions between green and blue infrastructure in cities, aiming to enhance the functionality of the urban environment and provide essential ecosystem services to urban dwellers.

In line with the global water targets set by the UN in the post-2015 Sustainable Development Goals, significant objectives include:

- Reducing water pollution from primary sources by 30% by 2030.
- Increasing urban wastewater treatment to at least 80%.
- Achieving at least 95% treatment of industrial wastewater.
- Reducing pollution from diffuse sources by 30%.

The focus on urban water issues arises from the fact that over half of the global population now lives in urban areas, and the rate of urbanization is higher than ever. Cities are the main sources of water pollution, yet water and green spaces significantly influence the quality of life for city residents. Therefore, ecohydrological water management, which improves the natural environment and ensures ecological safety, is a crucial element of urban water management (Zalewski, 2013).

4.2. Urban water challenges - key issues:

- Degradation of landscape and biosphere.
- Conflicting interests of stakeholder groups.
- Accelerate water drainage.



- Reduced water retention and droughts.
- Regulation of riverbeds.
- Water pollution.
- Negative impact on biodiversity.
- The local dimension of sustainable development (Zalewski, 2013).

4.3. Benefits of reversing environmental degradation:

Restoring natural ecosystem processes can bring benefits such as preventing floods and droughts, regulating air and water quality, improving the health of residents, improving the quality of public spaces, and reducing the costs of operating a city. Every community must develop a sustainable way of using natural resources and coexisting with ecosystems, which is crucial for the long-term development of cities (Zalewski, 2013).

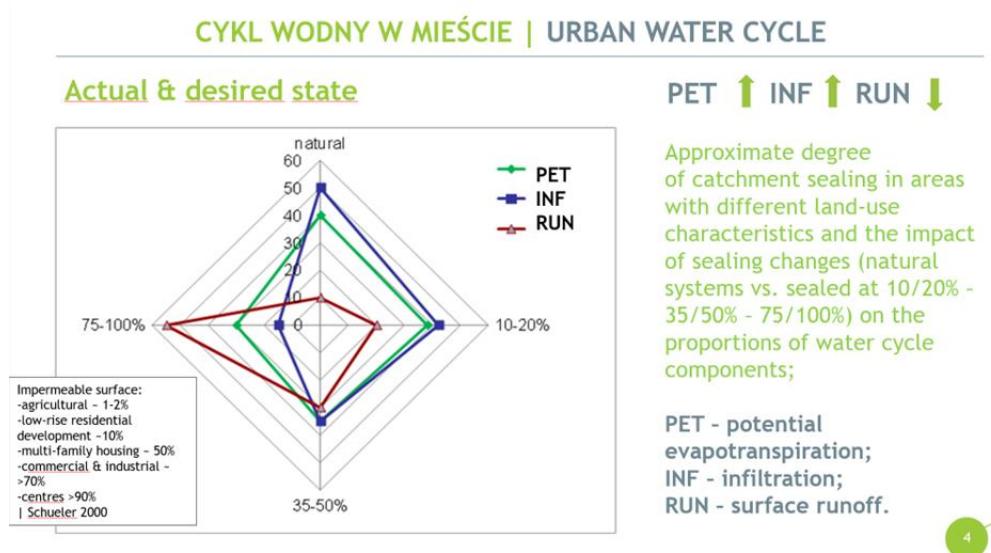


Figure 8 Urban water cycle (source: City Architect's Office of Łódź), elaborated by K. Krauze

4.4. Sustainable urban drainage in courtyards

In the context of courtyards that build the urban fabric of the historic city, the problem of sustainable water management is a key issue. In most cases, these are spaces completely covered with impermeable surfaces. When taking action to consciously manage rainwater in these spaces, the topography and hydrology of the area should be assessed first.



Understand Terrain

Analyze the site's slopes, depressions, and overall topography to identify natural drainage pathways and potential infiltration zones.

Map Drainage Patterns

Trace the flow of surface water during rainfall events to understand existing drainage patterns and potential problem areas.

1

2

3

Identify Soil Conditions

Evaluate soil types, permeability, and infiltration rates to determine the suitability for different nature-based solutions.

The key element is to recognize the type of soil, including the following parameters:

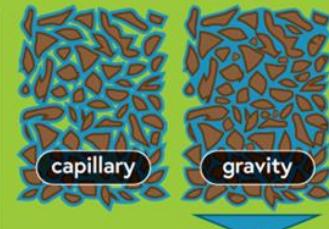
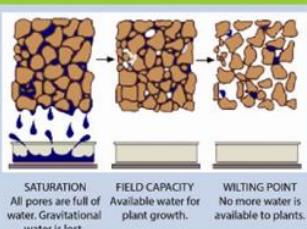
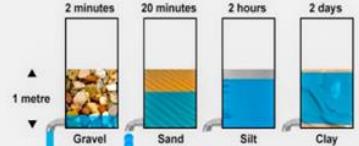
Important features:

- Profile
- Permeability
- Erosivity
- Field capacity
- Ability to transfer water
- Topography

ZASADY: GLEBA | RULES: SOILS

PROFILE	PERMEABILITY	EROSIVITY	FIELD CAPACITY	ABILITY TO TRANSFER WATER	TOPOGRAPHY	OTHER FEATURES
To identify potential obstacles to water flow, growing plants NBS construction, usable soil depth	To decide between NBS for infiltration and / or retention; to learn the infiltration rate, bulk density,	To understand risk to soils related with run off, & proper selection of solutions	To assess soil water retention options beneficial for soil formation, biodiversity, water cycle & microclimate	To understand availability of water to plants if they are planted in original soils.	To observe run off generation, transfer & accumulation zones, to properly locate NBS, lower the investment & maintenance costs	i.e. land use affecting the structure and characteristics of soils, e.g. compaction, contamination; to locate run off infiltration or storage areas

Permeability



<https://civilhex.com>, <http://www.h2grow.nz>

7

Figure 9 Rules soli (source: City Architect's Office of Łódź)



It is also crucial to use appropriate vegetation according to the following key:

<p>Important land features: existing vegetation, light, temperature, space, water availability, predominant use of the space</p>	<p>To preserve existing vegetation & plan space accordingly, to be able to properly chose plant species and locate them within the available space; to plan for optimal biodiversity</p>
<p>Important rules: look at natural species around; chose from native species, even from the local ones, keep number of species high, pay attention to ecological functions (fruit production, flowering, dust binding...), plants are social beings, they require other plants company</p>	<p>To better adjust species to local abiotic & biotic conditions, to create diverse, resistant plant community, to secure delivery of multiple services (with emphasis on services to nature), to lower the maintenance costs & make nature persistent</p>

When considering the modernization of courtyards, two water-related processes must be balanced - retention and infiltration:

- **Retention** - Resources available for immediate use, but not necessarily supporting groundwater Recharge and nature.
- **Infiltration** - A long-term investment, water is used by organisms and supports the renewal of groundwater and aquifer resources.

It is necessary to analyze rainfall, including estimated heavy rainfall, together with determining the risk of flooding.

Rainfall Analysis	Runoff Estimation	Flood Risk Assessment
<p>Collect and analyze historical rainfall data to determine the frequency, intensity, and duration of precipitation events.</p>	<p>Use hydrological models to estimate the volume of runoff generated by rainfall, accounting for impervious surfaces and soil conditions.</p>	<p>Identify areas prone to flooding and assess the potential impacts of extreme rainfall events on the urban environment.</p>
<p>Important aspects: amount of water (source: rainfall, run off, groundwater), quality of water, availability</p>	<p>Water at the site originates from rainfall - direct fall, run off - water transferred from other places either as surface flow or with infrastructure, groundwater - when the groundwater table is shallow soil easily gets saturated; Quality of water may create risk to people and animals, influence the quality of created habitats, but may be a subject of NBS implementation; Availability: number of sources, catchment delivering water, seasonality / frequency / intensity of precipitation;</p>	



As a result of the data and measurements obtained, appropriate infrastructure should be used:

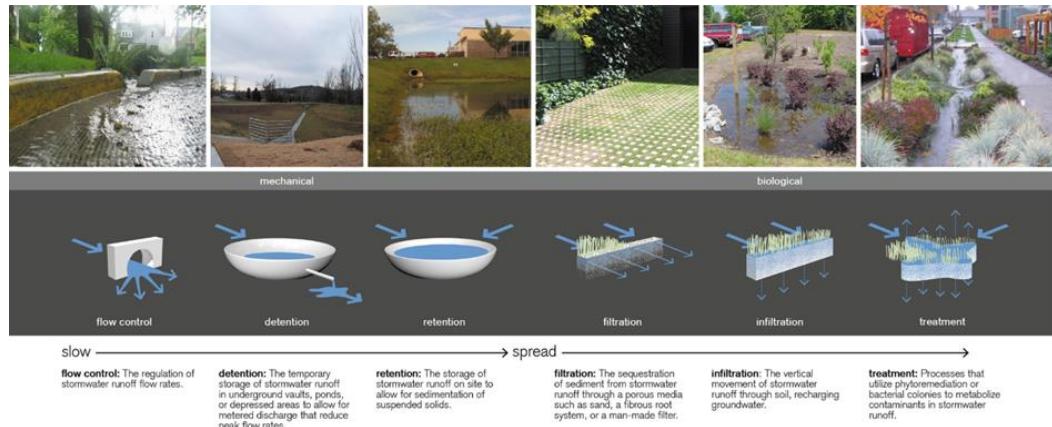
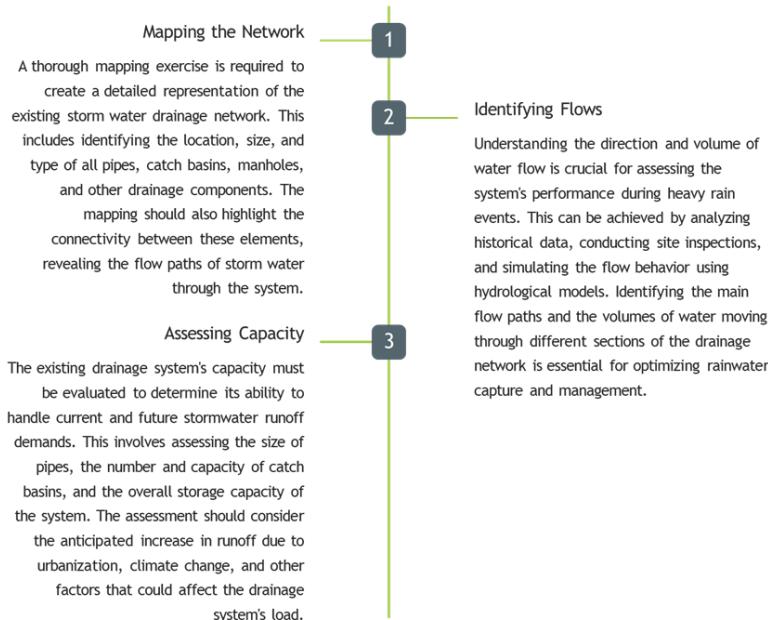


Figure 10 Solutions (source: City Architect's Office of Łódź)

Before implementing any rain water nature-based solutions or rain water tanks, it's essential to thoroughly investigate the existing gray infrastructure in the area. Understanding the current drainage system, mapping storm water infrastructure, and evaluating its capacity & conditions are crucial first steps.

Second, investigate the technical conditions of the buildings within the area: structure of the foundations, their protection against moisture. If any infiltration is planned NBS must be located not closer than 5 m from the walls.

Understanding the Current Drainage System





It is necessary to integrate nature-based-solutions (NBS) into the existing ecosystem.

- 1 Identify Opportunities
Analyze the existing infrastructure to pinpoint areas where nature-based solutions can be seamlessly integrated.
- 2 Design Integration
Develop a plan to connect the nature-based features with the existing storm water drainage system.
- 3 Ensure Compatibility
Verify that the nature-based solutions and grey infrastructure work together to enhance overall storm water management.

If rain water flows over the ground it may carry sand or even petrochemicals. Then it is necessary to install sedimentation tanks or separators on its way to NBS to allow undesirable substances to be captured & stored. Separators must be adjusted to flow intensity & amount of pollution, & regularly cleaned.

In case of less polluted waters also biofilters can be applied.

Examples of solutions:

“Dry” rain garden in “Nasze Podwórko” at the intersection of Żeromskiego and Sienkiewicza streets, Olsztyn, Poland.

20 cm	TOPSOIL	15 cm	TOPSOIL	5 cm	LOWERING OF THE GROUND
	HORTICULTURAL SCREEN	35 cm	DOLOMITE AGGREGATE, FRACTION 2-8 mm	30 cm	TOPSOIL
70 cm	DOLOMITE AGGREGATE, FRACTION 8-32 mm	40 cm	DOLOMITE AGGREGATE, FRACTION 8-32 mm		NAITIVE SOIL
	NAITIVE SOIL		NAITIVE SOIL		NAITIVE SOIL
20 cm	FERTILE SOIL	40 cm		30 cm	
40 cm	EXCAVATED SOIL				
	NAITIVE SOIL				

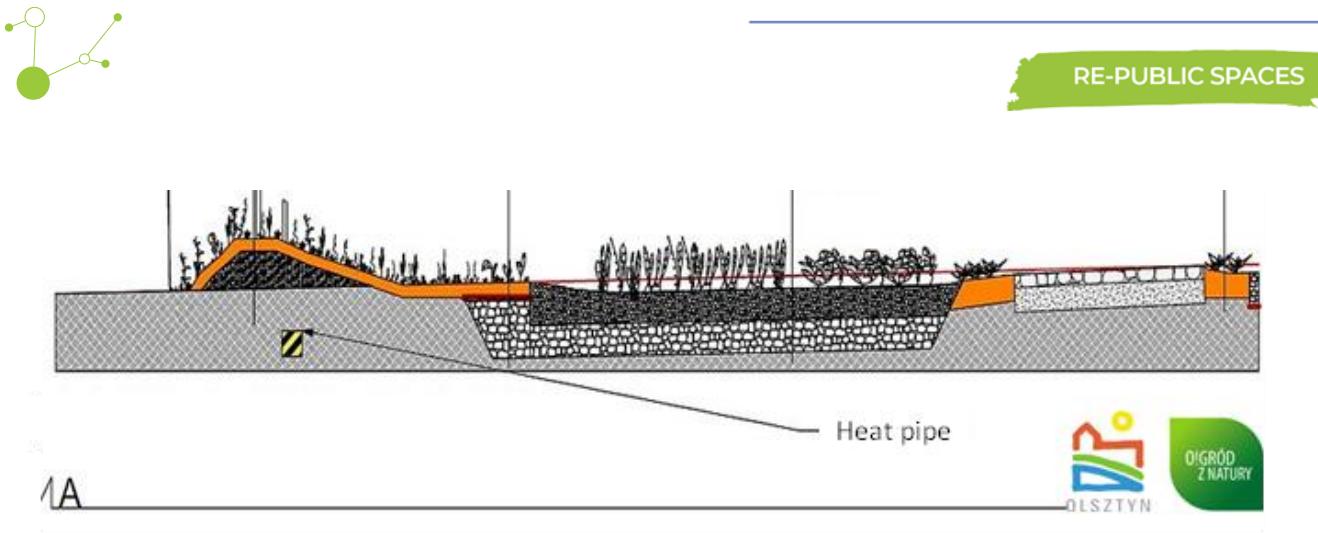


Figure 11 Dry garden in Nasze Podwórko, Olsztyn Fig.5 (source: City Architect's Office of Łódź)

Rain garden in foil in the 'Optimist's Corner' at the junction of Pushkina and Żeromskiego Streets, Olsztyn.

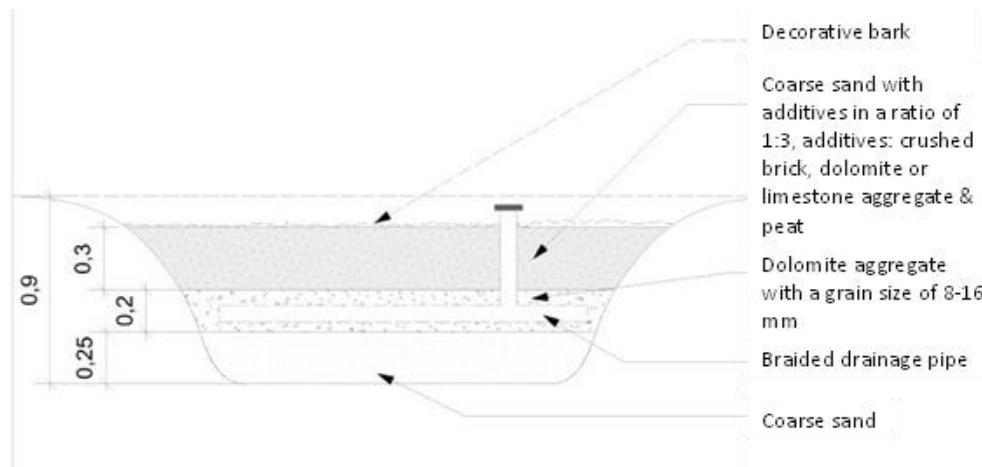


Figure 12 Dry garden - section, (source: City Architect's Office of Łódź)

4.5. Key steps for revitalizing courtyards in connection with sustainable water management.

1. Conduct a courtyard inspection and on-site assessment.
2. Collect archive and inventory documentation related to the pilot investment area.
3. Gather technical infrastructure plans to identify available installations and their potential use for the project.
4. Hold public consultations to understand tenants' expectations.



5. Analyze the courtyard's performance under extreme conditions, such as torrential rain.
6. Prepare a model showing the annual rainfall amounts.
7. Conduct geological studies of the yard substrate.
8. Determine boundary conditions for potential water usage.
9. Develop a design concept by selecting appropriate solutions.

Detailed information and solutions are included in the attachment.

Elaborated by Lublin University of Technology and City of Łódź.



5. Mitigating urban heat island with green infrastructure

5.1. Identifying the problem

According to the latest European state of the climate Report for 2023, 2023 year was globally the warmest year on the record. Heatwaves and their local manifestations are some of the most severe consequences of climate change and the increase in frequency and intensity of record-breaking temperatures is projected to continue (Taha, 1997). The impacts of climate change are more intensely felt in urban areas due to dense infrastructure, urban morphology and dense population (Chafer and all, 2020).

In urban areas, manmade structures have replaced natural land cover, thus altering the (energy) temperature and water balance with large impermeable surfaces, changes in air circulation (change in the direction and wind speed), low surface albedo and less natural cooling (lack of shade). This results in the phenomena called the urban heat islands (further UHI). UHI is characterised by higher surface and air temperatures in urban areas, compared to the surrounding natural/rural areas. In densely built cities, peak temperatures may be up to 10°C higher than in surrounding rural areas with an average between 4 and 6°C (Feng, 2022). UHI is especially problematic in the summer season, when the consequences of heat waves are often amplified. The intensity of UHI phenomena in urban environments depends on building density (diminished ventilation and heat evaporation and increase in the surface area exposed to solar radiation as well as high thermal conductivity of building materials which absorb incoming solar radiation), green space, and average building height (Tehrani and all, 2024). In addition, important factors are also anthropogenic heat sources (human activities that add heat such as transport, industry etc.), properties of building materials, removal of vegetation, meteorological conditions, climate, geography, local topography etc. UHI, increased levels of pollution (air, noise) pose significant challenges for cities, adversely affecting both quality of life and urban sustainability (Olivieri, 2024).

Due to the complexity of the phenomena, UHI results in challenges across different domains, such as energy sector (increase in energy consumption needed for cooling (AC), health sector (increase in heart related conditions, and mortalities due to heat stress (Gomez, 2023), respiratory problems, heat exhaustion etc.), environment (effect on the air quality, water systems, ecosystems, public greenery, alteration of production cycles etc.), economy (interruptions in daily services, power outages etc. (Nicolini, 2024, Nouri and all, 2018) as well as negative effects on the quality of life of residents.

In historic cities due to the historic urban planning and current climatic conditions as well as dense urbanization and limited green space, UHI is even more prominent (European Environmental Agency, 2024). Limited number of studies highlight that historical urban centres, due to being highly stratified and dense, are the most vulnerable places to ongoing climate change (Nicolini, 2024). As establishing resilient and health-conscious urban landscapes is becoming an imperative to shield communities from escalating health risks



exacerbated by the UHI effect (Tehrani and all, 2024) historic cities are increasingly recognizing the significance of adopting adaptation strategies to maintain liveable conditions.

In terms of effective strategies to reduce the impact and magnitude of UHI, integration of green infrastructure and its related cooling effects have been recognized as one of the most important (Chafer and all, 2020, Tehrani and all, 2024).

5.2. Green infrastructure and its effects on UHI

Green infrastructure (GI) is defined by the European Commission as a strategically planned network of natural and seminatural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. In terms of mitigation strategies, GI has been recognized as one of the most important strategies to mitigate effects of UHI and to promote a resilient environment in cities (Saaroni, 2018) while simultaneously restoring urban biodiversity. Furthermore, Climate-ADAPT defines urban green infrastructure (UGI) as a strategic approach which involves developing interconnected and multifunctional networks of blue and green spaces to offer a diverse array of advantages across environmental, social, and economic domains (Chafer, 2020).

Urban green spaces provide cooling effect, with vegetation functioning both as an adaptation and mitigation measure by carbon sequestration and reduction in energy demands. UGI helps reduce air and noise pollution, mitigates water run-off (urban stormwater), positively affects water conservation as well as human health, including mental well-being and supports biodiversity of cities (habitats for flora and fauna). Thus, research highlights UGI's potential to enhance liveability while bolstering climate resilience of cities.

Even though historical urban centres are identified as critical ground to build resilience to climate change, as any event could affect the recognizability of the settlement structure (Nicolini, 2024), UGI strategies often exclude historic centres due to density, preservation constraints and morphological complexities (Tzortzi, 2022). It is worth noting that vulnerability of historical urban centres is further emphasized by social factors, such as aging population. Today, historical centres are the urban areas most structurally lacking in green spaces and where it is most complex reintegration of natural components due to the compact structure of the historic city and the numerous heritage conservation (Tzortzi, 2022).

Research indicates that courtyards in historic cities are significantly affected by climate change, primarily due to the excessive heat accumulation, insufficient vegetation coverage, and limited water retention capacity. As reviewed case studies indicate, courtyards in historic centres are often used as parking lots, or simple transition or storage areas, without social function of proper maintenance (Mahora, 2019, Tzortzi, 2022, Dinić, 2022).

According to the European Landscape Convention, in a consolidated historical urban fabric the primary objective is to enhance landscape quality (Convenzione Europea del Paesaggio), followed by preserving the defining characteristics of the landscape's identity and maintaining the integrity of the historical urban layout (Nicolini, 2024). Addressing these challenges demands a highly 'site-specific' approach, which is resource-



intensive in terms of time, cost, and planning (Tzortzi, 2022). To streamline these efforts and effectively adapt historic cities to climate challenges, a complementary approach is needed for integrating green infrastructure into historic urban landscapes.

5.3. Methodology for GI in courtyards in historic centres

To propose the most appropriate strategies, i.e. concrete actions, for courtyard revitalisation in historic cities with GI, methodological framework is conceptualized in couple of phases.

Keeping in mind the need for site specific approach to identify most appropriate solutions for each courtyard, the principle of the methodology is the same. Smart graph visualization is given in Figure 1.

1. Analysis of the existing green infrastructure on the urban scale (city) and green infrastructure corridors.

Here it must be emphasized that GI integrated in pilot areas should be connected and integrated into existing GI network of the city, as it is known that the presence and arrangement of green areas significantly influence the intensity of the UHI effect (Teherani, 2024) and that scattered small patches of greenery do not mitigate as nearly as contiguous and densely vegetated green areas (Dugord and all, 2014). It is emphasized that strategic integration and networking of the GI elements in the cityscape is necessary to mitigate UHI (Marsoner and all, 2020). The ecological benefits and resilience of urban areas rely on the effective integration of small-scale GI within a broader GI network.

In our case, while the pilot courtyards have already been selected, broader-scale analysis of GI at a city level is essential. This includes the analysis of distribution of current GI and GI corridors to identify the critical areas for revitalization and to address the gaps in connectivity (corridors). Such analysis could be done through spatial mapping in Geographical Information System (GIS). Many cities in Europe already have spatial registers of GI, which can serve as valuable resource for this purpose. For this project, these existing registers will be reviewed, to assess whether additional small green spaces (i.e. stepping stones) are required to ensure the functionality and interconnectivity of GI network. In addition, such spatial analysis could be used to analyse the current natural cooling capacity of the wider area, thus also contributing to defining the most critical areas within the urban area, for interventions (Mansoldo, 2024).

2. Legislation analysis of urban planning documents and restrictions concerning both GI and historical aspect.

When determining the most appropriate solutions, it is important to consider conditional, total and technical constraints. Conditional constraints refer to the need of obtaining additional, specific approvals from relevant public institutions or authorities. In many cases, heritage preservation or city planning documents may restrict



the implementation of certain solutions, such as bioretention areas or other nature-based solutions (NBS²), therefore evaluation of constraints is essential to ensure feasibility and compliance.

3. Literature review - conclusions from selected case studies showing good practice and limitations.

As more cities are implementing revitalization projects to introduce GI into inner-city courtyards (Dinić, 2022), a couple of best practice examples were selected. Those included findings from Milan (Tzortzi, 2022), Timisoara (Mahora, 2019), Madrid (Olivieri, and all 2024), Praha (Krivohlavek and all, 2021), Niš (Dinić, 2022), Krakow (Zachariasz, 2023), Graz (Schrenk and all) and Malta (Mansoldo and all, 2024). Those case studies provided valuable insights in terms of feasibility.

4. On site assessments of pilot courtyards.

This is done to assess the current state of each courtyard, identify the problems as well as potential for revitalization. A checklist for this part, with crucial elements, is given in the next chapter. Here it is very important to include residents/public through public participation process, including surveys and interviews.

5. Microclimate analysis of pilot courtyards.

This is done to determine thermal stress (UHI) and cooling capacities of courtyards. Analysis of the current microclimate of courtyards could be done experimentally by recording air temperature and humidity with sensors. This provides realistic data for modelling of cooling capacities as has been done for historic areas in Madrid (Olivieri, 2024) and on Malta (Mansoldo, 2024). UHI analysis for our courtyards are done by other partners, thus it shall not be further described here.

6. Mitigation strategies / designs for revitalization of courtyards.

The most suitable revitalization solutions for courtyards, that are aligned with their historic elements, will be identified (proposed). It is essential to ensure that these solutions are feasible, reserve the site's identity and historical character, and adequately address residential needs. Feasibility of the solutions should be determined based on the evaluation of the existing pilot areas, requirements and benefits (Tzortzi, 2022). Gathering feedback on the proposed solutions, and including the local community is necessary. Additionally, a thorough review should be conducted to verify that the solutions comply with relevant regulations and constraints and are designed for long-term functionality. A detailed checklist of key considerations for this process is provided in the next chapter. Checklist is in line with the checklist for solutions from the European Commission (Report of the OMC group of EU Member State experts, 2021).

7. Guideline creation and upscaling.

General recommendations for revitalizing courtyards with GI are informed by both selected best practices and literature. The final guidelines developed during the project will incorporate practical knowledge and observations gained from public participation, as well as insights from the team's interdisciplinary approach

² NBS are defined as “solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience” (EEA, 2015). In literature NBS acts as an umbrella for green and green - blue infrastructure [23]



and a critical evaluation of each proposed design. Integration of GI in historic cities should be done in a way that is not invasive on the historical legacy and place's identity. As such, creating guidelines that will promote integration of such solutions into urban planning and legislative is key to achieving recognized potential of GI in mitigation of UHI in historic cities, thus contributing to more liveable and citizen-oriented spaces.

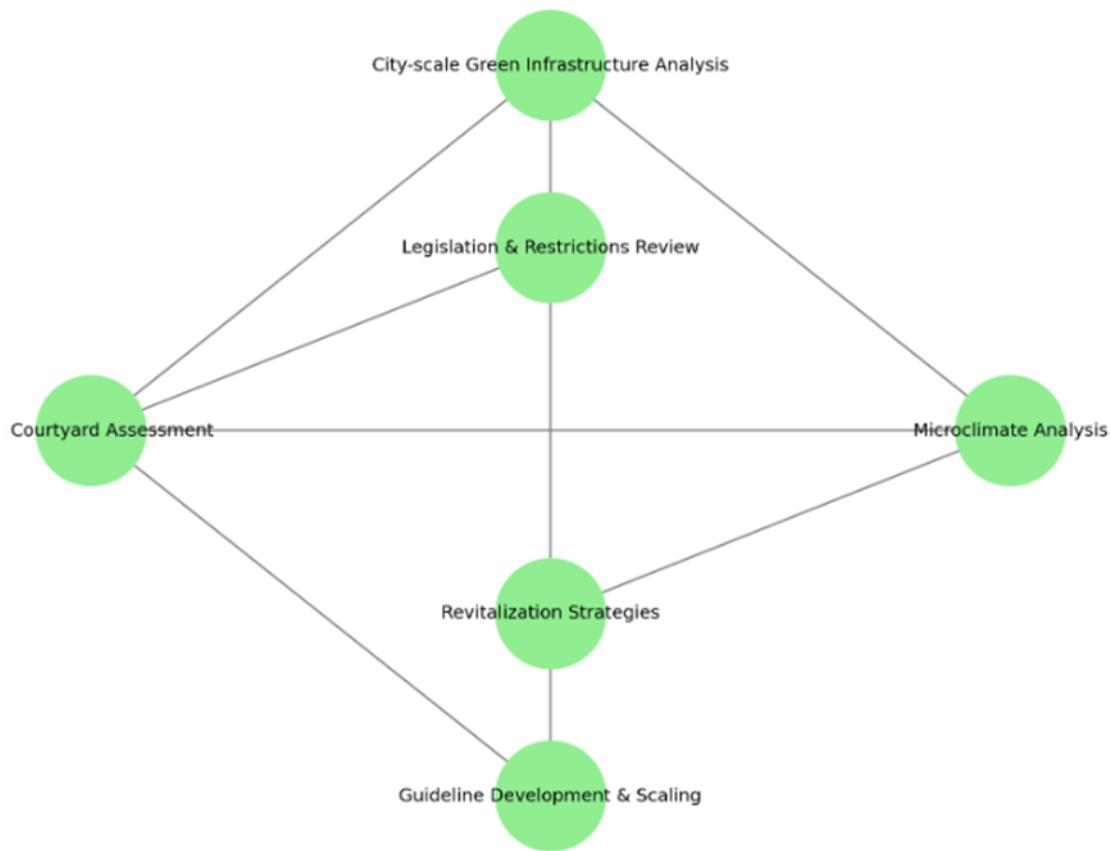


Figure 13 Vizualization of the interconnected steps in courtyard revitalization with GI

5.3.1 General recommendations for revitalization of courtyards

Literature suggests that green areas smaller than two hectares contribute to urban cooling mainly through shading (Iodice and all, 2024). Given the size of the pilot courtyards, focus should be given on improving the cooling capacities of courtyards through shading.

Given the historical context, tall-stemmed vegetation often is not appropriate due to problems related to the proximity of buildings and the development of the root system (Tzortzi, 2022). Integrating vertical greenery with horizontal greenery is regarded as a crucial factor in enhancing cooling effects of the courtyards. Vertical greenery was considered most appropriate for case studies, i.e. historic centres of Milan (Tzortzi, 2022), Timisoara (Mahora, 2019) and Malta (Mansaldo, 2024). Vertical and horizontal greenery can be combined with



other features such as shading structures. When incorporating artificial elements for vertical greenery, preference should be given to natural material like ropes, locally produced wood or recycled materials (e.g. metal gates etc.) that have historic connection with the area. Plastic material and urban equipment made of plastic should be avoided. Additionally when considering equipment, preference should be given to locally produced materials to minimize the carbon footprint.

For including vertical and horizontal greenery in historic courtyards several options could be considered such as vegetated pergolas (Chafer, 2020, Olivieri, 2024, Peeters, 2020), green facades, elevated plant support structures³ (Mansaldo, 2019, Chafer, 2020), living walls (Mahora, 2019), flowing vegetation etc. Preferable solutions for our pilot courtyards should be combination of climbing vegetation and living walls, depending on the specifics of each site. If implementation of living walls and other vertical structures on facades is not compatible with architectural heritage of specific courtyards, these elements could be included on less significant partition walls, fences or by adding new climbing elements for plants (e.g. wooden posts etc.).

When it is possible, tall vegetation should be preserved and if new tall vegetation is planted it should include local climate (heat) - tolerant species. Bearing in mind that tree canopy achieves different levels of shading depending on the density of the foliage cover, preference should be given to deciduous trees with large canopies as they can provide shade in the summer months and allow more sunlight to penetrate in the winter (Gomez, 2018). Preference should be given to group of trees, but it is known that even a single tree on a micro-level, such as courtyard, has significant effect on the air temperature during hot days (Khalaim, 2021). By combining different types of vegetation such as trees, shrubs, perennials, annual vegetation etc., shading effect could be increased. Keeping in mind the functionality and thermal comfort of people urban (sitting) equipment in courtyards should be placed beneath a natural covered area, i.e. under tree canopy, vegetated pergolas etc. When deciding on urban equipment preference should be given to natural elements with lower thermal conductivity (e.g. wood) and to equipment that is durable and reusable.

When selecting new vegetation, as already mentioned, preference should be given to climate - tolerant plant species, native to the area. Selected vegetation should also be adapted to the urban environment. When selecting species, it is necessary to check its invasive potential (national and EU list of invasive species⁴). Some of the species that are considered appropriate for urban habitats are elms (Urban Resista cultivars such as Ulmus New Horizon, Ulmus Rebona, Ulmus Rebella), maples (Acer campestre cvs., Acer monspessulanum, Acer rubrum), oaks (Quercus frainetto) etc. For planting pits low - growing tree cultivars that can survive limited soil volume should be selected. For living walls vegetation such as vines that are native to Central Europe could be used. Since the selection of appropriate plant species depends on the specific location, a multidisciplinary approach should be adopted, involving experts in urban forestry, arboriculture, and landscape architecture. It should be noted that beside the right selection of species, problems are in quality of supplied planting material. Inappropriately grown planting material results in high mortality rates and

³ Similar concept to the pergola, but the horizontal surface is made of wire or rope and is anchored directly to the walls on each side of the street, without requiring wooden posts. Climbing plants are placed on balconies or in wall pots and allowed to grow across the structure to form a canopy

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R1203>



significantly prolonged adaptation periods of young trees to the new habitat. In terms of maintenance it has been recognized that traditional ways of maintenance such as tree topping (i.e. removing all thinner branches with foliage), intensive grass cutting etc. are not appropriate in promoting urban biodiversity. Alternative, more nature friendly practices in courtyards should be implemented to promote urban biodiversity. Such practices include structural pruning, unmown patches (mowed only once or twice a year to create wildflower meadows etc.), non-frequent mowing (to allow plants to flower and produce seeds, not cutting grass below 10-15 cm), non-frequent hedge management etc.

Due to the extensive soil sealing present in urban areas and especially historic centres, as well as courtyards often used as parking lots, the most effective are structural solutions that include the reshaping of the present cover (Tzortzi, 2022), i.e. replacement of impermeable surfaces with permeable ones. This also makes an important contribution to stormwater management. Total replacement of impermeable surfaces is preferred, but if such solution is not feasible, partial solutions such as small rain gardens or creating patches of grass or infiltration strips should be considered. Alternatives for replacing part of impervious such as sedum turf, grass pavers, gravel and sand surfaces or porous concrete/asphalt should also be considered. If removing portions of impermeable surfaces is not an option, planting pits (planter boxes) with vegetation and similar solutions should be incorporated as an alternative. Additionally cooling effect of impervious surfaces could be achieved with increasement of albedo. Light coloured materials such as gravel and reflective materials could be implemented.

Important part of revitalization of historic courtyards is rainwater harvesting and restoring historic water elements. For this purpose, rainwater - harvesting tanks should be implemented in each courtyard. Utilizing harvested rainwater is a preferred solution for irrigating courtyard vegetation, as it reduces reliance on municipal water supplies, minimizes maintenance costs, and ensures an uninterrupted water source even during summer restrictions. Old water elements such as drinking fountains are quite often present in historic courtyards in Europe, as it is the case with pilot courtyards in Osijek and Pinerolo. Such elements should be restored as they help with cooling and enhance thermal comfort of courtyards. Additionally, these features reconnect the community with their cultural heritage, serving as functional and aesthetic elements that enrich the urban landscape.

Green rooftops are generally not considered appropriate in historic centres due to the scarce presence of flat roofs in historical areas and by the structural inadequacy of the existing ones (Tzortzi, 2022). Moreover, they can alter or hide the architectural and historic characteristics of the buildings (Olivieri, 2005). However, green roofs could be effectively implemented on auxiliary structures such as garbage/storage sheds or other accessory buildings such as the surrounding former factory in selected courtyard in Pinerolo. By integrating green solutions such as overgrown green trellises, current waste disposal solutions could be improved.

Urban courtyards should ideally function as public spaces, as suggested by the literature, emphasizing their role in enhancing urban greenery and providing accessible, pleasant communal areas. Improving the accessibility and connectivity of these courtyards is essential for maximizing their benefits and role in climate change adaptation. Selected pilot courtyards are owned by the cities, however, many remain inaccessible



due to locked gates. To fully integrate revitalized courtyards into the urban green network, it is vital to ensure they are open to the public. In cases where courtyards are surrounded by residential buildings, as seen in Łódź, a semi-public approach is recommended. This involves keeping courtyards open to the public during the day and closing them at night to maintain residents' privacy and peace. This approach could be used to balance the functionality of the courtyards as shared spaces and needs of local residents. Additional, integration of courtyards with other elements of urban green infrastructure is crucial for creating a cohesive and functional urban green network. Courtyards should be used as links to the broader system thus connecting larger patches of greenery such as parks, tree-lined streets, and other green spaces to enhance ecological benefits and urban resilience.

Literature has shown that community involvement can impede small scale GI, i.e. NBS (Wamsler, 2020), thus having a participatory approach to planning is vital (Mansaldo, 2024). An effective participatory planning approach blends a bottom-up process, addressing visions, needs, knowledge and recognized issues by real users of courtyards. It serves to produce solutions (designs) that include knowledge-based decisions and designs that are applicable and realistic. To foster meaningful community engagement, it is essential to maintain active dialogue with local residents throughout the planning stage, encouraging them to express their thoughts and allowing them to have a direct influence on decision-making (Diep, 2023, Mansaldo, 2024). When creating design for the courtyards, functionality and use of space should be kept in mind. Engaging residents in the decision-making process is essential, as their inputs helps identify specific needs and encourage creative, multifunctional uses for these spaces. Enhancing community involvement has been identified as a key factor in preserving the inner courtyards as green urban oasis, as demonstrated in a project that revitalized inner courtyards in city centre of Graz (Climate ADAPT, 2023). This approach not only helps define the future use of courtyards but also supports their ongoing maintenance, ensuring the long-term sustainability of revitalized spaces beyond the project's duration. Pilot actions could also be used for educational purposes, drawing the attention of residents to the UHI problem and explaining to them the benefits of green infrastructure in terms of climate change adaptation.

Including local policy makers to create incentives is necessary to ensure the upscaling and to motive private residents to participate in greening the urban area. Successful examples are Budapest city council tender for greener, flowery courtyards and green facades (2023), project "*Plac na glanc*", an annual event concerned with the revitalisation of Katowice's rundown urban backyards, which has been taking place since 2013, „*The living courtyards*“ in city of Praha etc. Positive examples of engaging local communities is supported through the New European Bauhaus with in co-creation workshops of public spaces and public design competitions.

Further in the text, simple checklists are created for the on-site assessment as well as for the design proposals. Further in the text, simple checklists are created for the on-site assessment as well as for the design proposals.

Checklist for courtyard analysis (on site assessment):

- Accessibility (public, semi-public, semi-private, private)



- Size (area)
- Ownership (public/private)
- Greenery - type (horizontal/vertical, tall greenery - trees, classification in evergreen, deciduous, scrubs, grass etc.), amount, catalogue of species
- Impervious/pervious surface (ratio) + type of the surface and colour of the surface
- Limitations - fences, walls etc.
- Current usage (local residents), equipment and artificial structures (sheds, parking lots etc.)
- Rainwater collection systems
- Water elements
- Water runoff
- Determine sunlight and ventilation characteristics
- Proximity of other green areas
- Connection to sustainable mobility

Design proposal checklist:

1. Purpose and residents needs

- Fit to purpose
- Aligned with residents need

2. Compliance with norms

- Compliant with historic, architectural, planning and engineering standards
- Used elements are in harmony with the surrounding

3. Shading and greenery

- Shading
- Permeable surfaces
- Horizontal greenery
- Vertical greenery
- Climate tolerant native species
- Part of green corridors



4. Water management

- Rainwater harvesting
- Water elements - original features restored

5. Increased accessibility

- Accessible pathways and entry points

6. Promotes sustainable living conditions

7. Multifunctionality, flexibility and long-term use multifunctional use of space

- Equipment is made of natural, durable materials locally made
- Adaptable to future needs
- Community is actively included (events, gardening etc.)

8. Promotes social inclusion

- Healthy, inviting space

9. Maintenance plans

10. Post occupancy evaluation (community satisfaction)

Elaborated by EIHP.



6. Green infrastructure in historical courtyards introduction

In the face of urbanization and climate change, the importance of sustainable, resilient urban landscapes has never been clearer. One area where this intersection of history and environmental stewardship becomes particularly significant is in the preservation and transformation of historical courtyards. These architectural gems, often tucked away in the heart of cities, hold cultural, historical, and aesthetic value, yet they also offer a unique opportunity to integrate green infrastructure solutions. Green infrastructure—such as green roofs, permeable pavements, rain gardens, and urban trees—can enhance the ecological function of these spaces, improving stormwater management, air quality, and biodiversity while preserving the rich heritage of the courtyards. This article explores how the application of green infrastructure in historical courtyards can balance the demands of modern environmental challenges with the need to protect and honor the architectural and cultural legacy embedded in these spaces.

6.1. What is Green Infrastructure?

Green infrastructure has emerged as a cornerstone of sustainable urban planning, offering innovative solutions to challenges such as climate change, urban heat, and stormwater management. Central to green infrastructure is the strategic use of vegetation, which enhances ecological balance and improves the quality of life in urban environments. Green infrastructure refers to the network of natural and semi-natural systems that provide ecological, economic, and social benefits. Unlike traditional infrastructure, which often relies on concrete and steel, green infrastructure integrates nature into urban planning. Examples include urban forests, green roofs, rain gardens, wetlands, and permeable pavements. Planting is at the heart of green infrastructure, acting as a catalyst for ecosystem services such as air purification, carbon sequestration, and biodiversity enhancement.

6.2. The Importance of Planting in Green Infrastructure

6.2.1 Mitigating Climate Change

Plants are natural carbon sinks. Trees and shrubs absorb carbon dioxide during photosynthesis, helping to reduce greenhouse gases in the atmosphere. In urban areas, planting trees and vegetation can offset the carbon emissions generated by transport and industries.



6.2.2 Reducing Urban Heat Islands

Cities often experience higher temperatures than surrounding rural areas due to the heat-absorbing properties of asphalt and concrete. Green infrastructure, particularly tree canopies and green walls, mitigates this effect by providing shade and releasing moisture through transpiration.

6.2.3 Stormwater Management

Vegetation plays a critical role in managing urban water systems. Trees and plants absorb rainwater, reducing runoff and the risk of flooding. Rain gardens and bioswales, designed with native plants, filter and slow down water, allowing it to recharge groundwater supplies.

6.2.4 Enhancing Air Quality

Urban vegetation filters pollutants such as nitrogen dioxide, ozone, and particulate matter. By planting trees in strategic locations, cities can improve air quality, benefiting public health and reducing respiratory illnesses.

6.2.5 Promoting Biodiversity

Planting native and diverse species creates habitats for birds, insects, and other wildlife. Urban green spaces serve as ecological corridors, connecting fragmented habitats and supporting local ecosystems.

6.2.6 Improving Mental and Physical Well-being

Access to green spaces has been linked to lower stress levels, improved mood, and increased physical activity. Trees and plants enhance urban aesthetics, creating spaces that encourage social interaction and community cohesion.

6.3. Green Infrastructure in historic courtyards

Historic courtyards are unique spaces that combine architecture, history, and nature. These enclosed or semi-enclosed spaces often served as retreats, gathering places, or sources of sustenance. The placement of vegetation in such courtyards requires careful planning to respect their historical character while enhancing their functionality and aesthetic appeal. Modern landscaping techniques introduce a mix of native plants, decorative trees, and sustainable garden designs, providing areas for relaxation, socializing, or even urban farming. The following are the conditions for placing vegetation in the area of historical courtyards



6.3.1 Conditions for Vegetation Placement

When incorporating plants into historic courtyards, several factors must be considered to ensure the space's integrity and functionality.

Microclimate Analysis

Historic courtyards often have unique microclimates shaped by their architecture. Factors such as sunlight exposure, wind patterns, humidity, and temperature fluctuations must be assessed to determine suitable plant species. For instance, shaded courtyards may require shade-loving plants, while sunny areas can support drought-tolerant species.

Historical Accuracy

If the goal is restoration or conservation, research should guide the choice of vegetation. What plants were traditionally used in similar courtyards during the same era or region? Incorporating historically accurate species preserves the courtyard's authenticity.

Spatial Considerations

Space is often limited in courtyards, so plants must be placed carefully to avoid overcrowding or blocking pathways. There is often a lack of soil, which can be compensated for by raised beds or vertical gardening techniques, such as trellises or climbing plants. In historical courtyards, the use of high-quality soil or substrates is essential. This ensures the proper growth of plants, helps maintain the aesthetic and ecological balance, and supports the longevity of the landscape. Quality soil contributes to the health of the plants providing the necessary nutrients and proper drainage, which is especially important in preserving the historical integrity and beauty of these spaces.

Water Management

Drainage systems in historic courtyards may be outdated or delicate. Selecting plants with low water requirements or installing modern irrigation systems that don't disrupt the original layout can mitigate water-related issues. It is advisable to retain rainwater in the yard by installing water tanks, including retention tanks, for activities such as maintaining greenery, increasing biodiversity, and supporting insects and birds.

Cultural and Symbolic Significance

Many historic courtyards, especially in regions like the Middle East, Asia, and Mediterranean Europe, featured plants with symbolic meanings. For example, citrus trees in Moorish courtyards represented abundance and paradise, while lotus ponds in Chinese courtyards symbolized purity.



6.3.2 Choosing the Right Vegetation

The choice of vegetation depends on the courtyard's size, climate, historical landscaping traditions and aesthetic preferences of each region. Native plants are well-suited to local climates, requiring less water and maintenance while supporting local wildlife. When selecting plants for historical courtyards in cities like Velenje, Pinerolo, Łódź and Osijek, it's important to consider the local climate, historical gardening traditions, and the cultural significance of plants. Each of these cities has a distinct history and climate zone, so the plant choices should reflect both the environment and the architectural styles of the courtyards. Below, is a list of some plants that would be suitable for each location, based on its climate and history. The selected plants are just some of the viable options, but there is actually a broader variety available!

Velenje, Slovenia:

Velenje has a temperate continental climate with mild winters and warm summers, influenced by the nearby Alps and Pannonian Plain. The landscaping of historical courtyards in Slovenia tends to favor native and hardy species. For example:

Trees:

- European Hornbeam (*Carpinus betulus*): A native tree often found in courtyards for its dense, formal shape and ability to withstand a variety of soil types.
- Silver Birch (*Betula pendula*): A graceful, deciduous tree with striking white bark and yellow leaves in autumn.
- Norway Maple (*Acer platanoides*): Known for its broad canopy and vibrant autumn color, commonly seen in urban settings.
- Common Oak (*Quercus robur*): A majestic, native tree that represents Slovenian heritage, often used in public spaces and courtyards.

Shrubs:

- Lilac (*Syringa vulgaris*): Popular for its fragrant blooms in late spring, adding a soft and aromatic touch.
- Spirea (*Spiraea spp.*): A hardy shrub with showy flowers, often used in historical gardens for its.
- Elegance and low maintenance Forsythia (*Forsythia spp.*): A spring-blooming shrub with bright yellow flowers, it adds a burst of colour early in the season.
- Hydrangea (*Hydrangea spp.*): Known for its large, colourful flowers that can tolerate the colder climate.
- Viburnum (*Viburnum spp.*): With fragrant blooms and attractive berries, it is a versatile and hardy shrub ideal for historical courtyards.



Climbers and vines:

- Clematis (Clematis spp.) - This vine is known for its beautiful, large flowers and can add a touch of elegance to courtyards. It's often used in historic gardens for its vertical growth and dramatic blooms.
- Common Wisteria (Wisteria sinensis) - With its stunning hanging purple flowers in spring, wisteria can be used to frame windows and doorways. It grows well in temperate climates and has a classic, timeless appeal in historical settings.
- English Ivy (Hedera helix) - A hardy evergreen vine, English ivy is a great option for creating a lush, green backdrop. It's traditional and often seen covering old walls in European courtyards.
- Grape Vines (Vitis vinifera) - Grape vines can add a rustic touch to the courtyard. Historically, vineyards were common in many parts of Slovenia, and grapevines are ideal for creating shaded areas or growing over trellises.

Herbs and Edibles:

Slovenia has a long tradition of growing herbs and edibles, with a focus on vegetables, fruits, and medicinal herbs.

- Herbs: Thyme, sage, rosemary, mint, oregano, and parsley were commonly grown for culinary and medicinal purposes.
- Edibles:
 - ✓ Vegetables: Cabbage, potatoes, carrots, onions, and leeks.
 - ✓ Fruits: Apples, pears, plums, and cherries.
 - ✓ Flowers: Edible flowers like nasturtiums and pansies were often grown in courtyards for both beauty and culinary use.

Ornamental Plants (annuals and perennials):

Annuals:

- Petunias (Petunia spp.): Often found in Mediterranean-style gardens, petunias can add vibrant color and variety to courtyards.
- Marigolds (Tagetes spp.): These bright, cheerful flowers were historically used in European gardens for their vivid color and easy cultivation.
- Begonias (Begonia spp.): Perfect for shaded areas in courtyards, begonias were commonly grown in European gardens for their ornamental value.

Perennials:

- Lavender (Lavandula angustifolia): A symbol of the Mediterranean region, lavender's fragrance and purple flowers can enhance the historical character of the courtyards.



- Hostas (*Hosta* spp.): With their large, lush foliage, hostas are excellent for shaded areas and have been widely used in historical gardens across Europe.
- Geraniums (*Geranium* spp.): Often used in older European gardens, they provide a long-lasting bloom and are hardy in temperate climates.
- Daylilies (*Hemerocallis* spp.): Known for their hardiness and wide variety of colors, daylilies are often found in Eastern European gardens, where they can survive the colder winters.
- Peonies (*Paeonia* spp.): These fragrant, showy flowers are iconic in many historical gardens, including those of Central and Eastern Europe. Astilbes (*Astilbe* spp.): Perfect for shaded or partially shaded courtyards, astilbes add a delicate texture with their feathery blooms and are suited for the climate.

Pinerolo, Italy:

Pinerolo, located in the Piedmont region of Italy, has a Mediterranean climate with hot, dry summers and mild winters. The landscape is influenced by the Alps, and historical courtyards often feature classical Mediterranean elements.

Trees:

- Mediterranean Pine (*Pinus pinea*): A symbol of the Mediterranean region, known for its umbrella-like canopy, perfect for a sunny courtyard.
- Cypress (*Cupressus sempervirens*): Tall and slender, often seen in formal, historical Italian gardens and courtyards.
- Olive Tree (*Olea europaea*): An iconic Mediterranean tree with silvery leaves, known for its resilience and long lifespan.
- Common Fig (*Ficus carica*): A deciduous tree with broad leaves and edible fruit, historically associated with Southern Europe.

Shrubs:

- Lavender (*Lavandula* spp.): A fragrant, hardy shrub that thrives in Mediterranean climates, often planted in courtyards for its aromatic flowers.
- Rosemary (*Rosmarinus officinalis*): Another aromatic herb frequently used in courtyards for both culinary and ornamental purposes.
- Oleander (*Nerium oleander*): Known for its striking flowers and tolerance to dry conditions, often used for adding color to Mediterranean gardens.



Climbers and vines:

- Wisteria (Wisteria sinensis or Wisteria floribunda) - Common in Mediterranean courtyards, wisteria's cascading flowers are iconic in Italian architecture. Its purple flowers are particularly striking in historical settings.
- Bougainvillea (Bougainvillea spp.) - Known for its vibrant colors, bougainvillea works wonderfully in Mediterranean climates. Its cascading blossoms in shades of pink, purple, and red can bring life to the courtyard's walls and arches.
- Virginia Creeper (Parthenocissus quinquefolia) - This deciduous climber provides stunning autumn color with red and purple hues. It thrives in the Italian climate and can cover large areas, creating a rich, historical look.
- Rose Vine (Rosa spp.) - Roses are a classic option for Italian courtyards. Climbing roses add romantic beauty and a sweet fragrance, ideal for transforming walls or trellises into colorful floral displays.

Herbs and Edibles:

Italy, especially in the Piedmont region, has a rich tradition of growing Mediterranean herbs and vegetables. The area's historical courtyards often featured plants used in local cuisine.

- Herbs: Basil, rosemary, thyme, oregano, marjoram, and sage. These are commonly used in Italian cuisine.
- Edibles:
 - ✓ Vegetables: Tomatoes, peppers, eggplant, zucchini, and beans.
 - ✓ Fruits: Grapes, figs, peaches, and olives were historically significant, especially for making olive oil and wine.
 - ✓ Flowers: Edible flowers such as pansies and marigolds were often used in salads or as garnishes.

Ornamental Plants (annuals and perennials):

Its historical gardens often reflect Italian Renaissance or Baroque influences, with symmetrical and formal planting schemes.

Annuals:

- Geraniums (Pelargonium spp.): A popular annual in Italian courtyards, geraniums add bold color and are suited to both sun and partial shade.
- Petunias (Petunia spp.): A staple of Italian gardens for their resilience and vibrant colors.
- Impatiens (Impatiens walleriana): Frequently planted in shaded areas, impatiens are perfect for adding color to the cooler corners of a courtyard.



Perennials:

- Rosemary (*Rosmarinus officinalis*): A fragrant herb that is both ornamental and useful, rosemary thrives in the Mediterranean climate and was a staple in Renaissance gardens.
- Lavender (*Lavandula angustifolia*): Essential in Mediterranean-style gardens, its fragrance and purple flowers create a quintessential Italian atmosphere.

Łódź, Poland:

Łódź has a continental climate with cold winters and warm summers. The historical gardens here reflect a mix of European gardening traditions, with an emphasis on ornamental plants that can withstand the cold.

Trees:

- European Beech (*Fagus sylvatica*): A strong, deciduous tree commonly found in historical courtyards for its dense foliage and elegant shape.
- *Tilia* (Linden Tree, *Tilia spp.*): A symbol of European parks, the linden tree offers shade and is often associated with classical European gardens.
- Horse Chestnut (*Aesculus hippocastanum*): A large, stately tree with beautiful white or pink flowers in spring.
- Rowan (*Sorbus aucuparia*): A small to medium-sized tree with clusters of white flowers and bright red berries in autumn.

Shrubs:

- Forsythia (*Forsythia spp.*): A spring-blooming shrub with bright yellow flowers, it adds a burst of color early in the season.
- Hydrangea (*Hydrangea spp.*): Known for its large, colorful flowers that can tolerate the colder climate.
- Viburnum (*Viburnum spp.*): With fragrant blooms and attractive berries, it is a versatile and hardy shrub ideal for historical courtyards.

Climbers and vines:

- Climbing Roses (*Rosa spp.*) - Roses are a traditional choice for courtyards in Poland. Their fragrant, colorful blooms can add elegance to any space, creating a refined atmosphere in historical buildings.
- Common Ivy (*Hedera helix*) - Ivy is commonly found growing on historical buildings in Poland. It's well-suited to cold winters and will keep the courtyard green throughout the year.
- Clematis (*Clematis spp.*) - Clematis is a versatile vine that comes in a variety of colors and sizes. It blooms in late spring to early summer, adding charm and color to courtyards.
- Knotweed (*Fallopia spp.*) - A fast-growing plant often seen in colder climates, knotweed provides quick coverage for courtyards and can add a historic feel to stone walls or fences.



Herbs and Edibles:

Poland's history includes a variety of fruit orchards and vegetable gardens, with a strong tradition of herbal medicine. Courtyards would often feature plants for both culinary and medicinal uses.

- Herbs: Dill, parsley, thyme, chives, and lovage were commonly grown.
- Edibles:
 - ✓ Vegetables: Cabbage, potatoes, carrots, onions, and beans were staples in Polish gardens.
 - ✓ Fruits: Apples, strawberries, raspberries, and blackberries were grown in gardens and courtyards.
 - ✓ Flowers: Nasturtiums and marigolds, used for their beauty and as flavorings in cooking.

Ornamental Plants (annuals and perennials):

Historical courtyards in Lodz may reflect Eastern European and German influences, with a mix of formal and cottage-style gardens.

Annuals:

- Sunflowers (*Helianthus annuus*): A cheerful, tall flower, sunflowers were often seen in traditional European gardens and would be great for adding height and brightness to courtyards.
- Zinnias (*Zinnia elegans*): These hardy flowers add bright colors and can tolerate the summer heat, making them perfect for sunny areas of the courtyard.
- Snapdragons (*Antirrhinum majus*): With their tall, colorful blooms, snapdragons are a classic choice for adding vertical interest in historical courtyards.

Perennials:

- Daylilies (*Hemerocallis spp.*): Known for their hardiness and wide variety of colors, daylilies are often found in Eastern European gardens, where they can survive the colder winters.
- Peonies (*Paeonia spp.*): These fragrant, showy flowers are iconic in many historical gardens, including those of Central and Eastern Europe.
- Astilbes (*Astilbe spp.*): Perfect for shaded or partially shaded courtyards, astilbes add a delicate texture with their feathery blooms and are suited for the climate.

Osijek, Croatia:

Osijek has a continental climate with hot summers and cold winters, typical of the Pannonian Plain. The landscaping of courtyards here often features a mix of local species and classical European plants.



Trees:

- Black Walnut (*Juglans nigra*): A large tree with a strong presence, commonly found in central European courtyards.
- Hornbeam (*Carpinus betulus*): Tolerates a variety of conditions and offers a clean, formal look often used in historical landscapes.
- American Sweetgum (*Liquidambar styraciflua*): Known for its striking autumn color and bold, star-shaped leaves, ideal for adding a dramatic effect.
- Poplar (*Populus spp.*): A tall, fast-growing tree commonly found in this region, often used in large courtyards for shade.

Shrubs:

- Barberry (*Berberis vulgaris*): A hardy, spiny shrub with beautiful autumn color and small, red berries.
- Euonymus (*Euonymus spp.*): Often used for its colorful foliage and compact form, suitable for borders and hedges.
- Rhododendron (*Rhododendron spp.*): Popular for its large, showy flowers, particularly in cooler areas like Osijek's courtyards.

Climbers and vines:

- Clematis (*Clematis spp.*) - With a wide variety of species, clematis is a versatile vine that provides vibrant blooms throughout the spring and summer, ideal for historical courtyards.
- Hops (*Humulus lupulus*) - Historically grown in many parts of Europe for brewing, hops are also an attractive climber. Their fast growth and lush foliage provide shade and aesthetic appeal.
- Violet Trumpet Vine (*Clytostoma callistegioides*) - Known for its striking, purple trumpet-shaped flowers, this vine adds a Mediterranean touch and blooms profusely during the warmer months.
- Grape Vines (*Vitis vinifera*) - In Osijek's climate, grapevines are ideal for creating shaded, rustic spaces. Grapevines would also tie into the region's agricultural heritage.

Herbs and Edibles:

Historically, Osijek's gardens and courtyards would have been influenced by both Mediterranean and Central European culinary traditions. The region has a long tradition of growing herbs and vegetables for both practical and ornamental purposes.

- Herbs: Lavender, basil, mint, sage, thyme, and rosemary were used both in cooking and for medicinal purposes.
- Edibles:
 - ✓ Vegetables: Tomatoes, cucumbers, peppers, beans, and cabbage were often grown in courtyards.



- ✓ Fruits: Apples, pears, figs, and grapes were common in the region.
- ✓ Flowers: Marigolds and lavender were often planted for their aromatic properties and beauty.

Ornamental Plants (annuals and perennials):

Its historical courtyards are influenced by both Central European and Mediterranean traditions, with an emphasis on ornamental plants that can withstand variable temperatures.

Annuals:

- Petunias (Petunia spp.): A versatile flower that thrives in warm, sunny courtyards, petunias add long-lasting color through the summer months.
- Verbena (Verbena spp.): Known for its resilience and long flowering period, verbena is often found in Croatian gardens and can add a cascade of color.
- Nasturtiums (Tropaeolum majus): These trailing flowers are not only beautiful but also edible, and they thrive in warm climates, making them perfect for Osijek's courtyards.

Perennials:

- Lavender (Lavandula angustifolia): Lavender is well-suited to the hot, dry summers of Osijek and is a staple of Mediterranean-style courtyards.
- Sedum (Sedum spp.): Known for its drought tolerance, sedum adds texture and color to courtyards with its fleshy leaves and clusters of star-shaped flowers.
- Russian Sage (Perovskia atriplicifolia): This plant's silvery foliage and purple flowers are a common sight in historical Mediterranean-inspired gardens, and it performs well in dry conditions.

6.3.3 Placement Strategies

Placement strategies

In historical courtyards refer to the design and arrangement of various architectural elements and spaces within the courtyard, ensuring they complement the historical, cultural, and functional aspects of the environment.

These strategies typically aim to:

- Preserve Historical Integrity: Respecting the original design while integrating modern additions or functions.
- Enhance Aesthetic Value: Positioning features like fountains, sculptures, or greenery to maintain or enhance the visual appeal of the space.
- Improve Functionality: Organizing the layout to serve both practical purposes and social needs, like seating, accessibility, and circulation.



- Maximize Natural Light and Ventilation: Ensuring that the courtyard remains well-lit and ventilated, enhancing comfort while maintaining traditional elements.
- Respond to Cultural and Social Contexts: Considering the historical and cultural significance of the courtyard's design to create spaces that are meaningful to the community.

Placement strategies

In historical courtyards refer to the careful arrangement of plants within the design of a courtyard that is historically significant. These strategies take into account the preservation of the courtyard's cultural, architectural, and historical elements, while integrating plantings in a way that enhances the space without disrupting its integrity. Key considerations in placement include:

- Respecting Historical Features: Ensuring plants are placed around or complementing architectural features such as fountains, walls, or statues.
- Seasonal and Aesthetic Appeal: Choosing plants that bloom at different times of the year, offering visual interest throughout the seasons.
- Ecological and Climate Considerations: Selecting plant species that are historically appropriate or that thrive in the specific climate of the courtyard.
- Functional Use of Space: Using plants to create privacy, shade, or pathways, while maintaining access and view corridors to important architectural features.
- Layering and Height Variations: Combining plants of different heights creates depth and visual interest. For instance, taller trees or climbers can form the backdrop, with medium shrubs and low ground covers filling in the foreground.
- Perimeter Planting: Planting along walls maximizes usable space and softens hard architectural lines. Vines, tall grasses, or espaliered trees are ideal choices.
- Movable Pots and Planters: In historic courtyards with fragile surfaces or evolving uses, potted plants allow flexibility. Terracotta pots, often historically accurate, are both functional and decorative.

6.3.4 Modern Adaptations for Historic Spaces

While preserving the historical essence of courtyards is essential, modern techniques can enhance their sustainability and usability.

Eco-Friendly Irrigation

Drip irrigation systems minimize water waste while maintaining historical plantings. The irrigation system can be powered by a rainwater harvesting tank.



Native Species

The use of native plants reduces the need for maintenance, as they are more resilient, better suited to the environment, and provide stronger support for local ecosystems. 3.4.3 Minimalist Lighting Subtle, strategically placed lighting highlights plants and architectural features without detracting from their historic character.

6.4. Challenges and Considerations

While the benefits of planting in green infrastructure are well-documented, successful implementation requires careful planning and community involvement. Challenges include limited urban space, high initial costs, and maintenance requirements. Additionally, ensuring plant diversity and resilience to pests and diseases is essential to creating sustainable systems.

6.5. Conclusion

In conclusion, green infrastructure plays a crucial role in enhancing urban sustainability, particularly when integrated into historical courtyards. These spaces, often characterized by their unique architectural and cultural heritage, benefit significantly from the introduction of greenery, which not only improves air quality and biodiversity but also fosters a deeper connection between urban residents and nature. However, the success of such initiatives hinges on the careful selection of appropriate vegetation. Choosing plants that complement the historical context, thrive in the local climate, and respect the cultural significance of the site is essential. A thoughtful approach to plant selection ensures that green infrastructure not only preserves but also enriches the aesthetic and ecological value of these cherished spaces.

Elaborated by City of Velenje.



7. Heat Island - Temperature Coefficient - Material Heating, Urban Heat Island Impact, Outdoor Thermal Comfort, Wind Flow

7.1. Introduction

Urban heat islands (UHIs) are a phenomenon where cities experience significantly higher temperatures than surrounding rural areas due to human activities, dense infrastructure, and reduced vegetation. This temperature difference is mainly caused by heat-absorbing materials such as asphalt and concrete, as well as waste heat from vehicles, industries, and buildings (Santamouris et al., 2015).

UHIs can exacerbate the effects of climate change, leading to increased energy consumption, higher pollution levels, and greater health risks for city dwellers. Climate change plays a crucial role in the growing frequency and severity of heatwaves. The accumulation of greenhouse gases in the atmosphere drives global temperatures higher, increasing the likelihood of extreme heat events. With warmer baseline temperatures, heatwaves begin at elevated levels, intensifying their impact. Moreover, climate change can disrupt atmospheric circulation patterns, potentially fostering more persistent high-pressure systems that favor prolonged heatwaves.

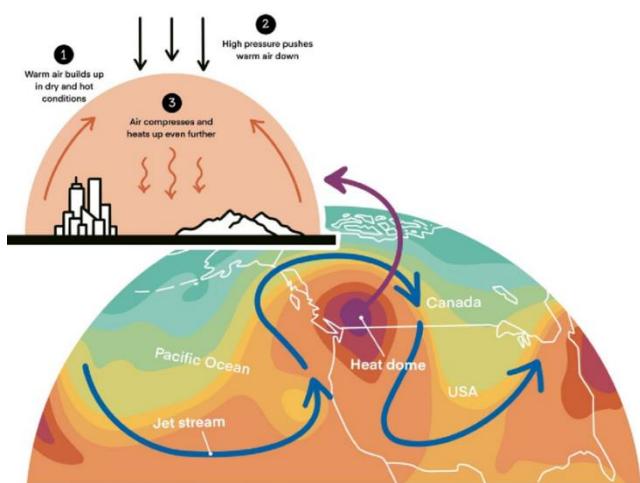


Figure 14 How a heat dome forms, adapted from AFP, 2021 and Hills and others, 2021

Heatwaves are mainly driven by high-pressure systems, or anticyclones, that trap warm air in a specific region, preventing it from escaping. These systems create a heat dome by causing air to sink and compress, raising surface temperatures. The absence of cloud cover beneath these high-pressure systems allows for more solar



radiation, intensifying the heating of the ground and the air above it. Together, these factors can lead to extended periods of extreme heat, often lasting from several days to weeks (Eberle et al., 2022).

7.2. Historical Data and Trends in Urban Heat Islands

Since the 20th century, UHIs have intensified as urbanization increased globally. Historical temperature records show that urban areas have warmed more rapidly than rural areas. For example, between 1960 and 2020, cities worldwide experienced a temperature increase of 1.8°F (1°C) to 4.5°F (2.5°C) above their surrounding areas, depending on size and location. This trend is influenced by factors like population growth, infrastructure expansion, and reduced green spaces.

- Seasonal variation: UHIs tend to be more pronounced at night and during the summer when the heat retained by urban materials is most noticeable.
- Global patterns: Cities in arid or semi-arid regions experience stronger UHI effects due to the limited presence of moisture and vegetation.

The summer of 2022 was the hottest season on record in Europe, there were 61,672 heat-related deaths across 35 countries, with Italy, Spain, and Germany having the highest mortality figures. The findings highlight a significant gender disparity, with women experiencing 56% more heat-related deaths than men. These results emphasize the urgent need to strengthen heat monitoring systems, improve prevention measures, and develop long-term adaptation strategies to address the health impacts of extreme heat, particularly in urban areas affected by the Urban Heat Island (UHI) effect (Ballester et al., 2023).

Several European cities have implemented innovative solutions to mitigate urban heat islands. For example, Paris has expanded its network of green roofs and walls, which help cool buildings and absorb rainfall. In Copenhagen, extensive green spaces and "cooling islands" offer respite from the heat, while the city has also improved water management to reduce heat stress. Barcelona has adopted urban reforestation and the creation of more shaded areas, while Vienna has focused on "cool streets" by redesigning urban spaces to include more vegetation and permeable surfaces that reduce heat retention. Valencia, European Green Capital 2024, has been focusing his efforts in building a network of governance for "Valencia 2030 Climate Mission", a local initiative aimed at addressing climate challenges.

These efforts demonstrate Europe's proactive approach to creating cooler, more sustainable urban environments.



7.3. Heat stress and impacts on health

Cities experience significantly higher temperatures than surrounding rural areas, caused by the excess heat emitted and solar gain trapped by the urbanized environment, such as impervious surfaces and waste heat produced by air conditioning units, vehicular traffic, and industrial processes.

A study demonstrated how the heat-health risk assessment evaluates the interplay between urban heat hazards, population exposure, and vulnerabilities. This approach integrates data on heat intensity, demographic factors like age and social isolation, and the adaptive capacity of urban environments. Using a microscale framework, the methodology quantifies risks at neighborhood levels, helping identify high-risk areas. These insights inform climate adaptation strategies, prioritizing interventions for vulnerable populations, such as the elderly, and promoting urban resilience through improved planning and infrastructure adjustments (Ellena et al., 2023).

7.4. Possible solutions

Here are some possible solutions to mitigate urban heat islands:

1. Green Roofs and Walls

Installing green roofs and vertical gardens helps absorb heat, reduce building temperatures, and increase green spaces in cities.

2. Urban Greening

Planting more trees, creating parks, and increasing vegetation provide shade and reduce surface temperatures through evapotranspiration.

3. Cool Pavements

Using reflective or permeable materials for streets and sidewalks can decrease heat absorption and allow for better water drainage.

4. Energy-Efficient Buildings

Promoting energy-efficient building designs, such as using reflective materials for roofs and walls, can reduce the heat emitted by structures.

5. Water Features

Adding fountains, ponds, or misting systems in public spaces can help cool the air and create comfortable urban environments.



6. Shading Structures

Installing shading elements, such as pergolas or awnings, over pedestrian areas can reduce direct sunlight and lower surface temperatures.

7. Reducing Heat-Generating Activities

Limiting vehicle use, promoting public transportation, and encouraging the use of electric vehicles can reduce waste heat from transportation.

These strategies aim to create cooler, more liveable urban environments.

7.5. Case studies

Here are some case studies from Europe that highlight successful strategies to mitigate urban heat islands:

1. Paris, France

Paris launched the "Paris Resilience Strategy" to address urban heat islands. One key initiative is the creation of "oasis schools," where schoolyards have been transformed into green spaces with permeable surfaces and shaded areas, significantly reducing local temperatures. The city also encourages the use of green roofs and vertical gardens on public and private buildings, which help to mitigate heat and improve stormwater management.

2. Copenhagen, Denmark

Copenhagen has been a leader in integrating water management with green urban planning to combat heat. The city has developed "cloudburst streets" that are designed to absorb excess rainwater and reduce the urban heat island effect. Additionally, Copenhagen has invested in creating cooling zones with green spaces, parks, and urban forests that help lower temperatures in residential areas.

3. Barcelona, Spain

Barcelona has implemented the "Green Infrastructure and Biodiversity Plan", which focuses on urban reforestation and creating shaded pedestrian areas. The city has increased tree planting and expanded parks, while also installing permeable pavements to reduce heat absorption and improve water drainage. This approach helps to cool down densely populated areas during the summer.

4. Vienna, Austria

Vienna's "Cool Streets" program is another example of successful urban heat island mitigation. The city redesigns streets with more vegetation, water features, and reflective materials to lower surface temperatures. Vienna also utilizes urban cooling projects like installing misting stations and promoting the use of reflective roofs to minimize heat retention in urban areas.

5. Valencia, Spain



In Valencia, a multilevel 'collaborative space' is being developed to enhance coordination between the city and regional government, as well as promote collaboration among various stakeholders. While still evolving, this governance framework aims to help local actors pool resources and efforts to address pressing climate challenges, including those highlighted by the EU's climate missions.

These case studies demonstrate how European cities are adopting diverse strategies to reduce the impact of urban heat islands and create more climate-resilient environments.

7.6. Methodology

Methodological proposal for the execution of predictive analyses on the mitigating effect of heat in the local microclimate, produced by architectural and engineering solutions.

7.6.1 Introduction and context

Current research in the international field provides indications on advanced methods to build sustainable urban environments that are adaptive to the challenges induced by changing climate conditions. Landscape and urban architecture have surpassed empirical design techniques, now requiring accurate methods to quantify microclimate, with the aim of improving climate conditions in cities. In this regard, Computational Fluid Dynamics (CFD) has gained interest, thanks to the continuous improvements in computational resources. Numerous studies indicate that CFD models are useful for bioclimatic design applications, for example to mitigate the urban heat island (UHI) effect and improve thermal comfort in urban areas (MDPI, 2024). These models are used to evaluate the spatial distribution of various microclimatic parameters and improve sustainable design at the urban level (Scientific Journal Riga Technical University, 2013).

CFD is a numerical method used to simulate and study the hydrodynamics of fluid flows by solving the *Navier-Stokes equations*⁵ that govern these phenomena (Versteeg and Malalasekera, 2007). Recent CFD-based studies include wind speed assessments (Zhang et al., 2021), heat flux analysis (Allegrini et al., 2015), characterisation of microclimatic extremes (Javanroodi et al., 2022) or, on a more detailed scale, simulations of the effects of air turbulence due to urban tree canopies (Zeng et al., 2020) and the thermal behaviour of different soil surfaces (Yang et al., 2013).

There are several models and tools, such as RayMan, SOLWEIG, ENVI-met and Ladybug-Grasshopper (Matzarakis et al., 2010; Lindberg et al., 2008; Bruse and Fleer, 1998; Evola et al., 2020), which are used to simulate urban heat and thermal stress, as well as to analyse the effects of specific parameters on urban climate conditions. To take into account the main variables that influence the urban climate (e.g., surface roughness, wind speed, air temperature variations), these tools leverage the capabilities of Geographic Information Systems (GIS) or Computational Fluid Dynamics (CFD) to perform simulations. These two

⁵ A system of nonlinear partial differential equations that describes the flow pattern for an incompressible viscous liquid. These equations link together the velocity field, the pressure, the external force acting on the unit of mass, the density of the fluid and its dynamic viscosity (equal to the ratio between viscosity coefficient and density).



approaches differ in their strengths and limitations, for example, in the inclusion and representation of those variables (Aghamolaei et al. 2021).

7.6.2 Software tools

From an in-depth research of simulation methods and models in the bioclimatic field, it emerges that the tool that best lends itself to the context of pilot analysis is the Envi-MET software. The evaluations in the choice of the instrument systematize considerations regarding various factors, including the technical reliability of the elaborations and the scientific robustness of the theoretical assumptions used by the calculation modules, the modest intuitiveness of the interface of interaction with the software, the availability of extensive literature and use cases that denote wide diffusion and reliability on the international scene. Finally, the availability, given the wide use, of a large amount of material from which to draw as a reference source and example of replication.

In a nutshell, Envi-MET is a software that exploits modeling through "Computational Fluid Dynamics" (CFD) in a three-dimensional computing environment, which allows to model the physical and microclimatic behavior of buildings, gardens and the urban landscape as a whole. The reading of the elaborations and the use of these analyses go in the direction, depending on the scale of in-depth study, of a conscious urban planning and/or architectural design addressed to the issues of climate adaptation, also with attention to thermal comfort and human health. The approach adopted is holistic and considers the environment as a single organism. The results of the simulations can show how the effects of architectural solutions, sustainable technologies, the use of greenery and water, make it possible to improve microclimatic conditions in the outdoor environment. Specifically, the solid basis of calculation is based on scientific-mathematical assumptions validated and included in the most illustrious reference literature, defining fluid dynamic models, turbulence, radiation, evapotranspiration exchanges and sky-factor modeling. In addition, it returns thermal comfort values for the population, such as the Physiological Equivalent Temperature ⁶(PET) and Universal Thermal Climate Index⁷(UTCI).

Essentially to process the data necessary to reconstruct the environment of each pilot, Envi-MET will be used as advanced microclimate simulation software. The tool models the built environment in three dimensions and generates, in the computational field, the characteristics of local atmospheric agents and the detailed composition of the different anthropogenic and natural elements. By doing so, an initial estimate is made of each bioclimatic parameter that is intended to be monitored. Subsequently, by manipulating the initial landscape scenario with the planned design solutions, we will quantify what is the actual benefit expected from the changes made, compared to the current state of affairs.

⁶ PET is defined as the air temperature at which, in a typical indoor setting (without wind and solar radiation), the heat budget of the human body is balanced with the same core and skin temperature as under the complex outdoor conditions to be assessed.

⁷ UTCI is an equivalent temperature (°C), as well as the index that measures human physiological response to the thermal environment. It describes the synergistic heat exchanges between the thermal environment and the human body, i.e. energy balance, physiology and clothing. There are four variables required to calculate UTCI: Air temperature of 2 m, dew point temperature of 2 m (or relative humidity), wind speed at 10 m above ground level, and average radiant temperature (MRT)



7.6.3 Application case study

By way of example, an application study is proposed that is very similar to the context of the pilots on which we will operate the same methodology.

For summary purposes, the workflow developed is reported in the form of small paragraphs in order to better explain the conceptual path of the work to be done.

Step 1: Urban framing

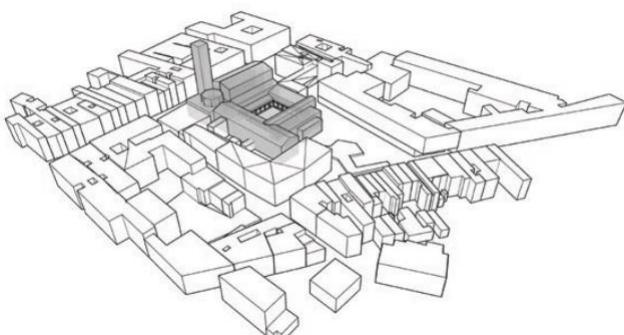
The courtyard in question is a cloister of an ancient monastery near Parma.



Figure 15 Courtyard near Parma

The urban context in which it is inserted presents Renaissance architecture, whose forms have been modeled for the purpose of study in order to reconstruct their construction morphology.

Image containing sketch, drawing, diagram, Line art Auto-generated description. The cloister dates back to 1493-95. Renaissance architecture has a single-storey square plan, with no loggia on the upper floor. It has three porticoed sides and the north side was filled in in the nineteenth century. Each side has six round arches made of sandstone, which overlook the green space, where several trees such as figs and pomegranates are located. Today a small hedge and a well remain.



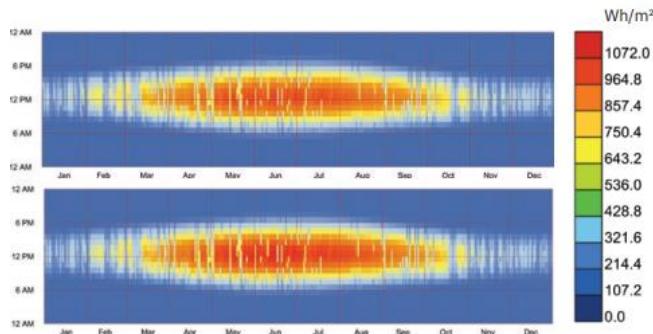


Step 2: Reconnaissance of the climate scenario

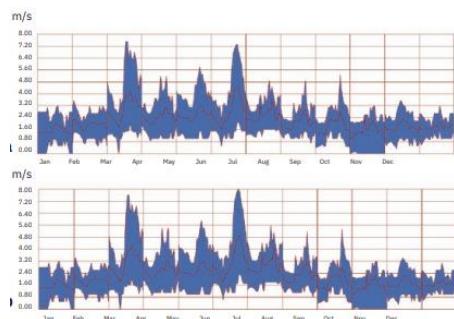
Defining the reference climate horizon is essential in order to then be able to compare all the climate indicators taken into consideration for the scenario analysis. In this study, the initial scenario has been set to 2022, while the future scenario to 2080, using all the estimates deriving from the IPCC scenario SSP5 - 8.5.⁸

The climatic parameters taken as a reference were:

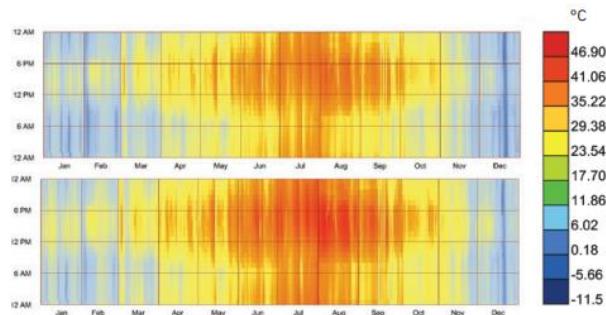
- Horizontal global radiation



- Wind speed



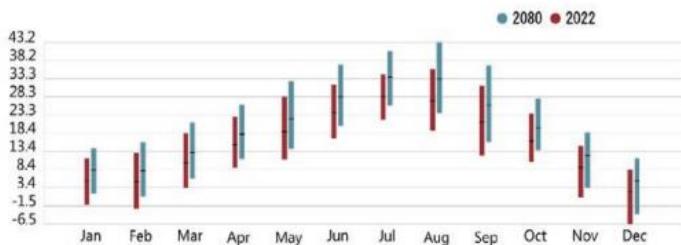
- Air temperature



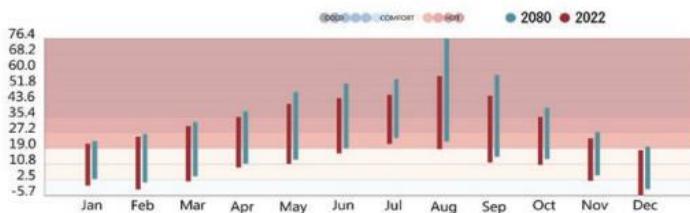
⁸ IPCC Assessment Report on Climate Change in AR6 published on 9 August 2021. The scientists examined five "possible climate futures", exploring as many scenarios with different levels of greenhouse gas emissions, ranging from "very low" SSP1-1.9, "low" SSP1-2.6 and "intermediate" SSP2-4.5, up to "high" SSP3-7.0 and "very high" SSP5-8.5.



- Dry bulb temperature⁹



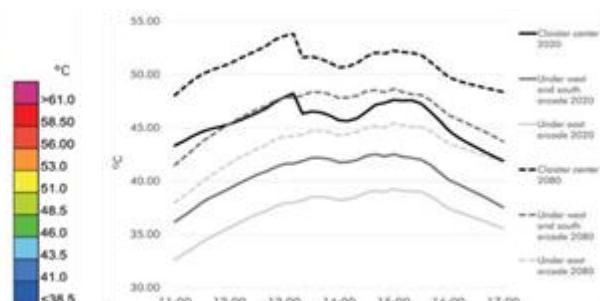
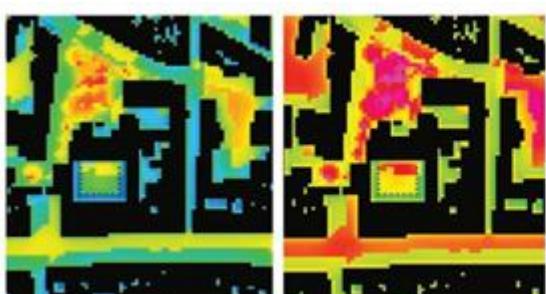
- Universal Thermal Climate Index



Step 3: Building the local microclimate

The comparative analysis of the microclimate of the courtyard and surrounding areas between 2020 and 2080 reveals three climate-related criticalities:

- The high average radiant temperature of around 54 °C in the center of the courtyard in the scenario to 2080.

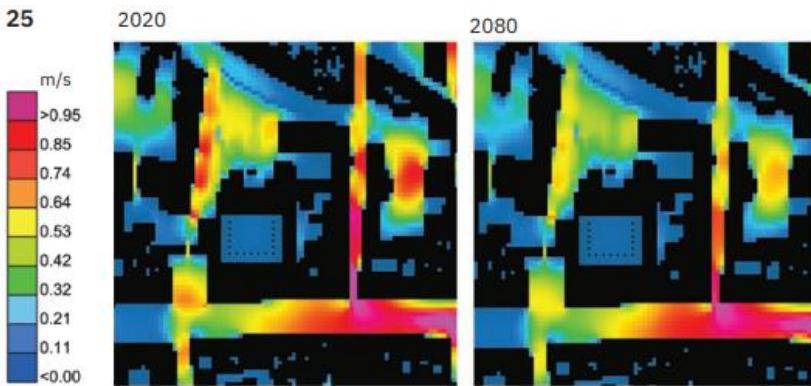


- The low wind speed, which means that there is almost no air passage and therefore no turbulence, which can mitigate warming during the peak hours of solar radiation.

⁹ DBT (dry bulb temperature) is the actual air temperature that does not include humidity at constant air pressure, measured with a regular thermometer.

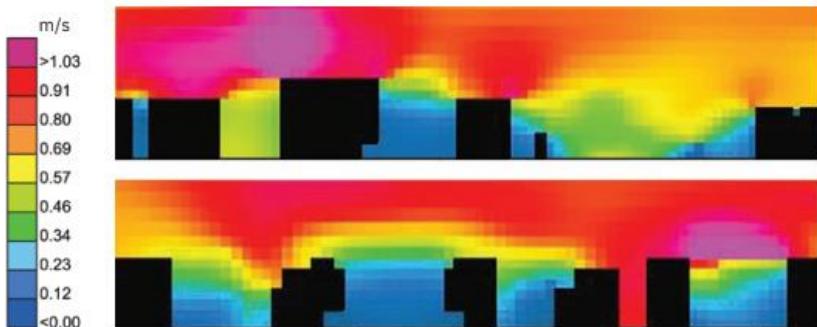


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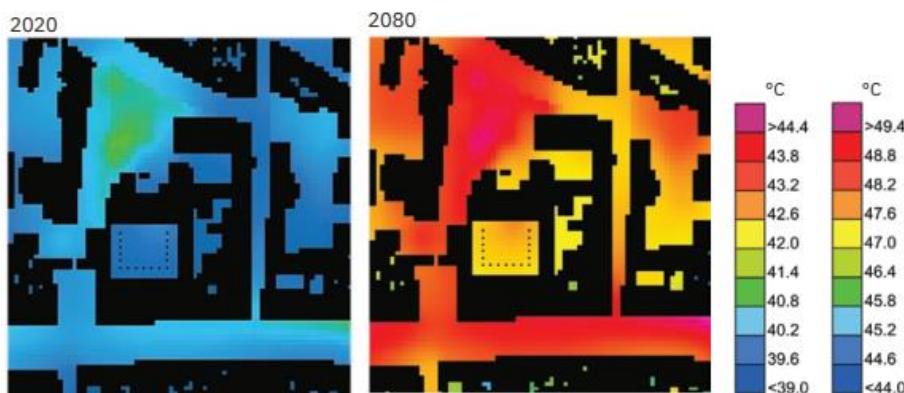
Wind speed in 1.15 m height from the ground in 2020 and 2080 for the hottest time of the year (5th of August-15:00).

26



Wind speed sections in 2080 for the hottest time of the year (5th of August-15:00).

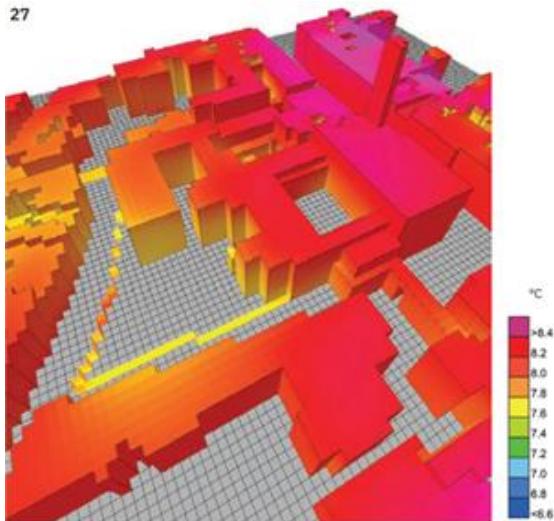
- The increase in temperatures on higher floors, in fact inside the cloister (in the center), the potential air temperature during the hottest period of the year will change from 40 °C in 2020 to 47.6 °C in 2080. The three covered sides offer better conditions than the surrounding environment, but the situation is still critical.



Potential air temperature at 1.15 m from the ground in 2020 and 2080 during the hottest time of the year (5th of August-15:00).



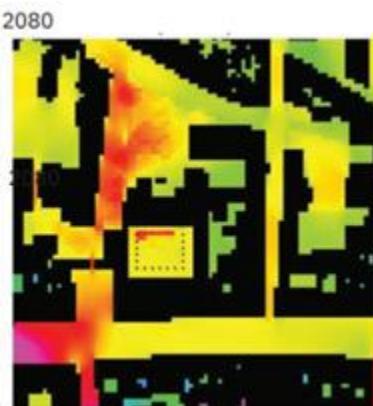
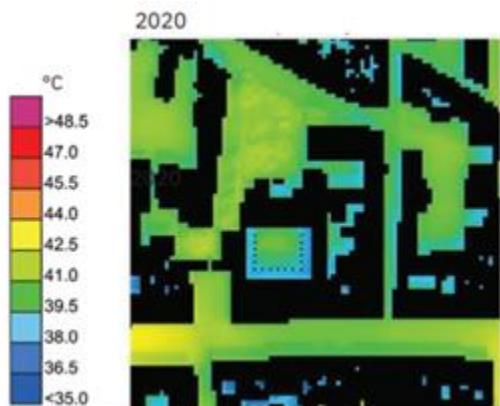
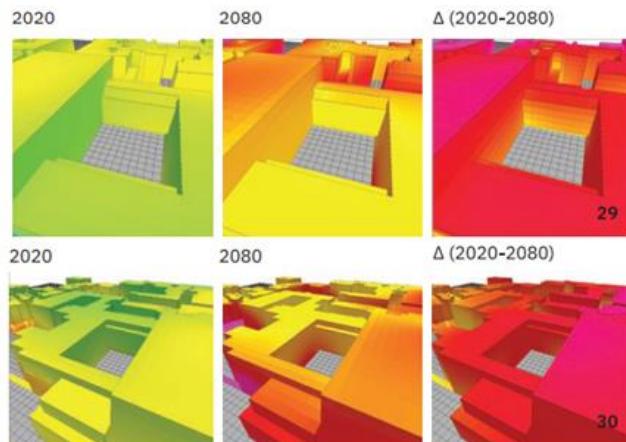
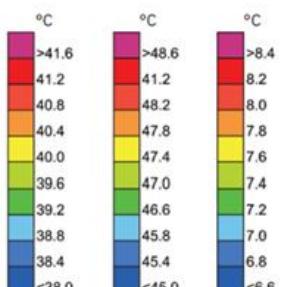
27



Change in air temperature
in front of facades between
the years 2020 and 2080
during the hottest time
of the year (5th of Au-
gust-15:00).

To summarize all these parameters, UTCI is therefore used, which quantification shows that comfort is already compromised, and will be further compromised, by the increase in direct solar radiation, the lack of ventilation and the higher air temperature.

Air temperature in front of facades
inside the cloister for 2020, 2080
and as a difference.



UTCI at 1.15 m height from
the ground in 2020 and 2080
during the hottest time of the
year (5th of August-15:00).

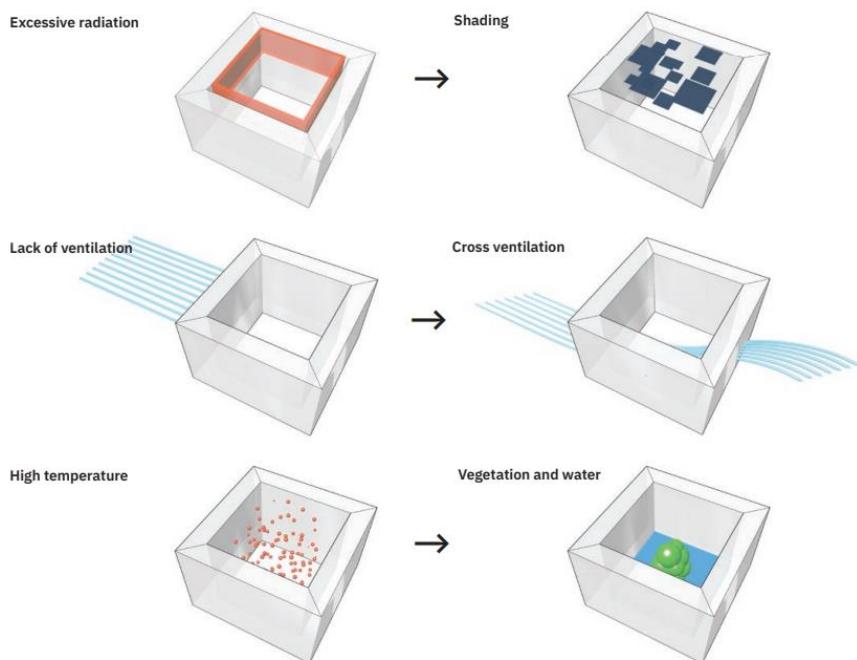
31



Step 4: Intervention proposals and mitigation results

The ENVI-met analysis highlighted some critical issues. Thermal discomfort occurs due to three causes:

1. Excessive radiation
2. Lack of cross-ventilation
3. High temperature



The focus is on simple solutions, addressing one cause at a time. The solutions lead to partial improvements in comfort, showing their relative potential:

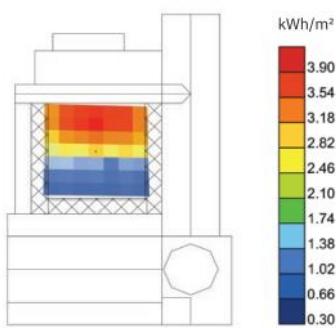
- Mitigating excessive radiation affecting the top of facades and the courtyard floor is a shading system.
- Lack of ventilation can be addressed with cross-ventilation.
- The high temperature can be mitigated by the use of water and vegetation.

7.7. Solutions

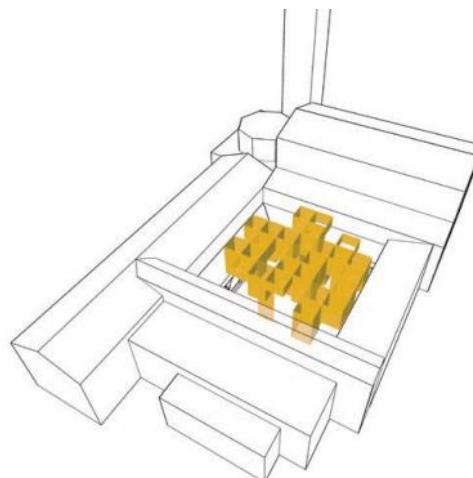
The shading of the top of the solar radiation addresses. The analysis shows that the interior facades of the cloister are very exposed to sunlight in summer, especially in the upper parts.



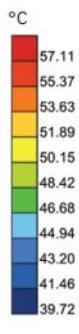
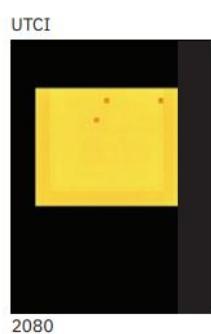
Figure 16 Analysis of the shading in the space of courtyard



37 Radiation Analisys ante operam

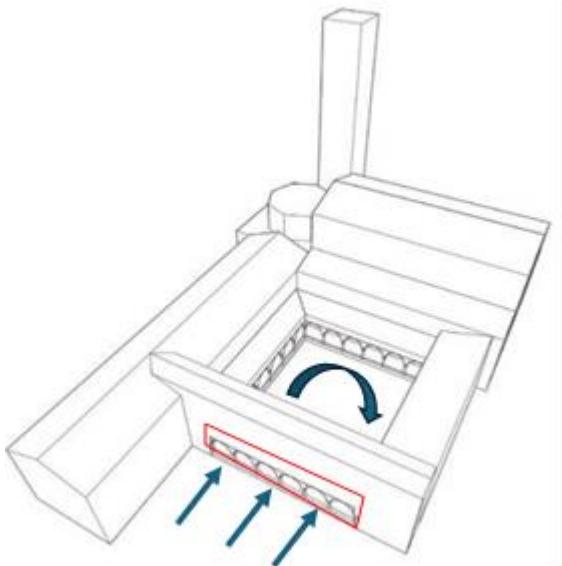


38 Shading project

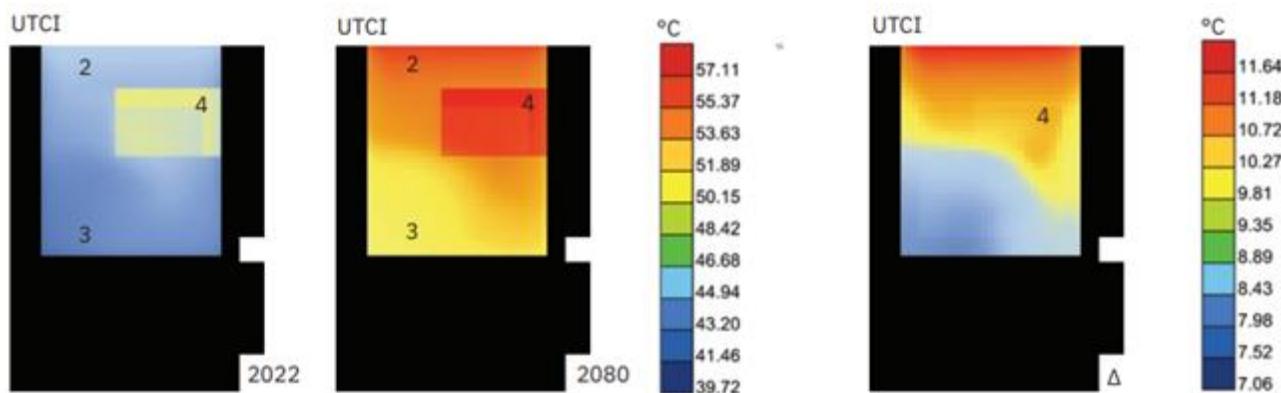




Cross ventilation



The closed design prevents ventilation. The cloister is protected from winter winds, but, in the summer, this lack of ventilation causes thermal discomfort. The second design proposal works by subtracting volumes and creating an opening in one of the walls surrounding the cloister. The proposal mimics some tropical leaves that have holes in their large surface.



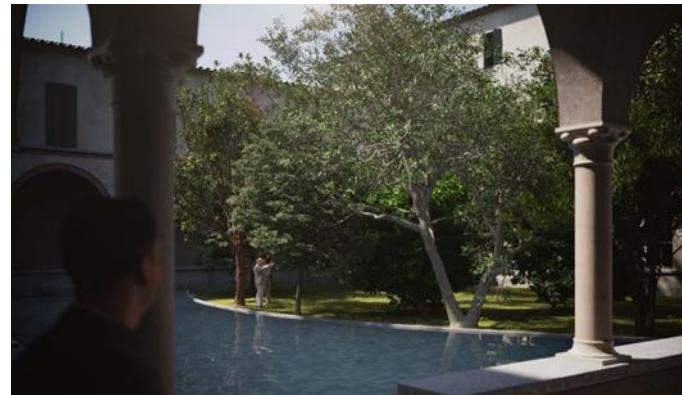
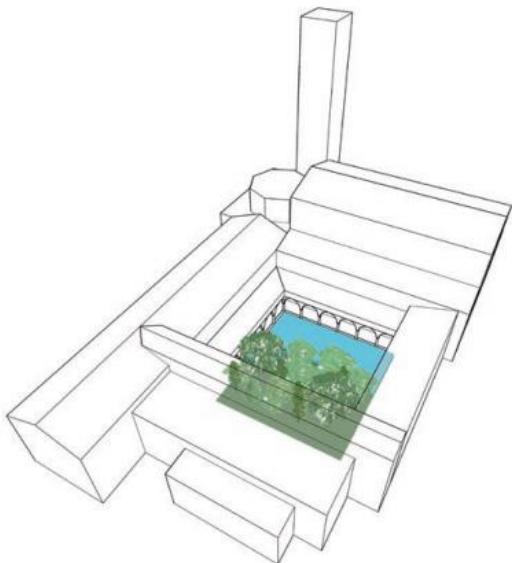
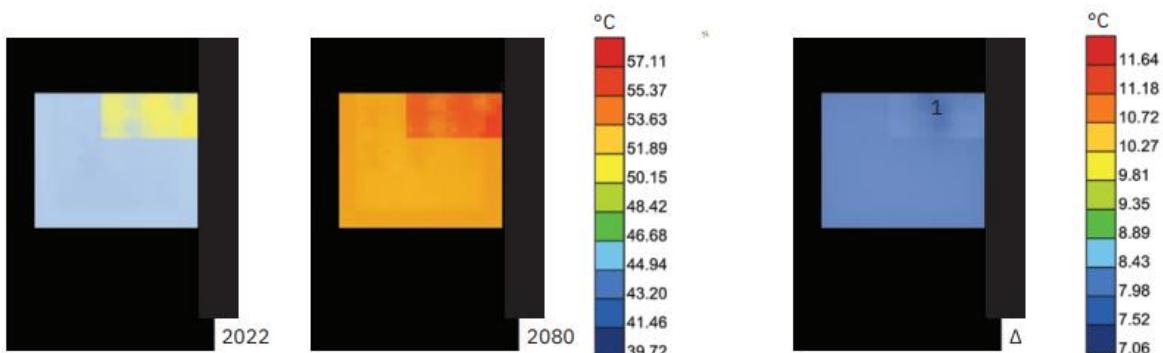


Figure 17 Greenery and water pond in the space of courtyard

Water and vegetation

The third project works to add a large pool of water and dense vegetation. The presence of water and vegetation creates evapotranspiration, mitigating the temperature and increasing thermal comfort.



7.8. Conclusions

The results demonstrate that lightweight interventions can effectively address local climate change challenges. These solutions are designed to maintain a comfortable microclimate despite the impacts of urban heat islands and global warming. Inspired by the shading properties of cactus plants and the ventilation patterns of Monstera leaves, the project integrates innovative strategies.

The porous system is tailored to meet ecological needs, support decarbonisation, and enhance health outcomes, with a forward-looking perspective extending to 2080. By modulating solar radiation and temperature while facilitating airflow, it fosters the creation of comfortable environments.



The study highlights that climate change is likely to disproportionately affect the upper floors of buildings. By offering targeted protection to structures at higher elevations, the system reduces cooling demands without obstructing views or natural light. In terms of human health, it improves pedestrian comfort and mitigates adverse effects associated with thermal stress.

In conclusion, the application of the proposed methodology to the pilot sites will adhere to the same approach, as it is fully adaptable to any context. While the specific design alternatives may vary based on the preferences and decisions of each city, the conceptual, technical, and analytical framework will remain consistent. This robust framework will ensure a thorough assessment of the bioclimatic performance of the proposed solutions slated for implementation.

Elaborated by LINKS Foundation.



D. PART III - BEST PRACTICES, LEGISLATION REVIEW, SCIENTIFIC LITERATURE

1. Best practices of Nature-Based-Solutions

PROJECT	CITY	DESCRIPTION	REFERENCE
Prato Urban Jungle	Prato	<p>In early 2018, the Municipality of Prato adopted a new strategy for urban forestation, aimed at countering land consumption and incentivizing strategies for the recovery and reuse of existing areas and buildings. As part of this strategy, the Prato Urban Jungle (PUJ) project aims to promote creative urban design to re-naturalize Prato's neighborhoods in a sustainable and socially inclusive way. To this end, urban jungles are developed in four specific areas of the city as an innovative solution to address sustainable land use issues within the city. The 4 identified areas are characterized by pollution, high traffic density, economic and/or social fragility, abandoned sites or disused industrial areas. "Urban jungles" are densely populated areas of greenery embedded in urban fabric that augment the natural pollutant-busting capacity of plants while restoring unused soil and space for community enjoyment, transforming marginal and decaying areas into active green hubs.</p>	https://www.pratourbanjungle.it/en/pagina1943.html
Start Park	Prato	<p>"Start Park" is a project born from the 2017 Florence Climathon, aimed at raising climate change awareness and fostering resilient actions through community-driven urban green spaces. The project it started with multidisciplinary collaboration and evolved into a co-design initiative for creating</p>	https://www.startpark.org/en/



		<p>modular, digital urban parks. The first pilot took place in 2019 in Prato's Soccorso district, co-designed by locals and regional participants, introducing new green and blue infrastructures for social interaction. Currently, the project has expanded to Lucca's Valgimigli park, in partnership with Lucca Creative Hub and local authorities, supported by the Designscapes III Call for scalability.</p>	
Efficient rooftop gardens	Bologna	<p>The study group set up experiments in the community rooftop garden of a public housing building in Bologna between 2012 and 2014. They grew lettuce using three techniques: nutrient film, floating hydroponic and soil cultivation. Data was analysed by life cycle assessment for environmental and economic performance. Results reveal that the best techniques of lettuce cultivation to address global warming were floating in the summer, with 65-85 % less environmental impact per kilogram than nutrient film; and soil production in the winter, with 85-95 % less environmental impact. Furthermore, floating production was 25 % cheaper in summer, and soil was 65 % cheaper in winter, compared to the nutrient film technique.</p>	<p>Esther Sanyé-Mengual, Francesco Orsini, Jordi Oliver-Solà, Joan Rieradevall, Juan Ignacio Montero, et al.. Techniques and crops for efficient rooftop gardens in Bologna, Italy. Agronomy for Sustainable Development, 2015, 35 (4), pp.0. 10.1007/s13593-015-0331-0. hal-01532265</p>
Sensational Park by Nabito	Frosinone	<p>The park opened in 2011 and was designed by Nabito Architects and Partners. The main goal of the design is to invite users to a path in which constantly changing the scene. The user will have the feeling of discovering a new space but with the similar of characteristic. The five human senses are the main theme of the space; the materials that used and vegetation relates to a variety of senses. The design of the park is not a complete view but develops through a series of different senses. The variation of</p>	<p>https://www.architonic.com/it/project/nabito-architects-sl-sensational-park/5100276</p>



		height, inclination, and dimensional games is part of the ludic peculiarity of the park.	
Park for water purification, flood mitigation & recreation	Milan	A three-hectare park near Milan which aims to contribute to flood protection, water quality, biodiversity enhancement and provide a place for recreation. When sewers overflow during heavy rains, the water first flows into reed beds in the park which remove some of the pollutants, it then flows into a constructed wetland (acting as an extended retention basin) where it accumulates and is slowly released into the river. It is estimated that this system can decrease peak flow by 86% for once-in-a-decade rainfall events, whilst removing 11.7 tonnes per year of dissolved organic carbon, and 0.4 tonnes per year of nitrogen. This green infrastructure functions as well as analogous engineered grey infrastructure for water purification, at a similar cost, whilst providing additional benefits for wildlife and recreation. Other parts of the park are dedicated to social activities, including educational events, cycling and picnicking, with information panels about local fauna and flora.	
Urban regeneration of Rossani park	Bari	In 2017 the City of Bari provided funds to citizens and non-profit associations to promote the regeneration of an abandoned area. Eventually an area of 4500 sqm was rehabilitated and the authorities plan to extend the area until the green space reaches 10,000 sqm. Among the planned interventions are the maintenance of greenery and trees, as well as the redevelopment of the side wall that borders the buildings. For the 4500 sqm intervention which was designed by the local community and migrant volunteers, the first multifunctional furniture was built at Bari. It was made with recycled wood, stones, fabrics and lots of goodwill during the natural architecture laboratory. The NBS allowed to have a green area where	https://una.city/nbs/bari/urban-regeneration-rossani-park



		<p>different activities were implemented such as green and educational laboratories. Also, a shared gardening project (in order to promote the importance and the culture of preserving green areas) and social labs were organized (promoting school and sport activities outdoors).</p>	
Agro-didactical park Salvatore Buglione	Naples	<p>The didactic park Salvatore Buglione links its agricultural tradition and presence of plants and trees with social and cultural innovation (namely a playground for kids, a didactical botanical garden and an organized reading lab). A specialized lab aims at promoting civic and eco-functions, in line with the overall project of the city of Naples to allocate 2 million euros to regenerate the green areas of the city. The project "Orti Sociali" of the park represents an attempt to reach social inclusion and environmental awareness, underlying the crucial function of public parks in terms of environmental and social services</p>	https://una.city/nbs/napoli/agro-didactical-park-salvatore-buglione
Bio-Habitat	Bologna	<p>The project opts for switching to more sustainable and organic ways of handling natural parks in the urban areas of the city of Bologna. The project was launched in 2008 and focused on 100 hectares, meaning 10 parks (out of the 1.100 total in the city). The goal is to develop maintenance techniques with low impact on local flora and fauna, stimulating biodiversity and an equilibrium with the surrounding urban environment, as well as the reduction of toxicity impacts for vulnerable residents (i.e. children and elderly people) (1 and 2). This NBS solution focuses on changing maintenance of Bologna public urban parks from conventional techniques to biological ones</p>	https://una.city/nbs/bologna/bio-habitat
Botanical square Montessori	Catania	<p>The intervention to regenerate 5 squares in the city of Catania is a result of an announcement published by the EU, where European cities had the chance to present projects to get funds. Catania municipality</p>	https://una.city/nbs/catania/botanical-square-montessori



		<p>was chosen for the importance of the areas from a historical and cultural perspective, and for the aim to insert green areas and vegetation both inside and outside the historical buildings. The square will see a new green area, in a process of linkage of nature and architecture. The whole area will be filled with some Mediterranean plants and trees</p>	
Community Garden of Via Gandusio	Bologna	<p>Via Gandusio is a social housing complex in the North of Bologna that was originally built for hosting workers that migrate from South Italy in the 60s. Nowadays, it hosts two different communities: elderly people and international immigrants. The differences create some conflicts and limits relationships among the community. In 2010 a group of researchers tried to implement a community garden that was designed with the aim of setting a meeting point for the community where food production is the link between neighbours to exchange knowledge, culture and experiences. The 250 m² roof garden started in 2011 becoming the first of the city of Bologna and of Italy. Over the years the project has undergone changes and variations, has seen the end of funding and known voluntary management (2013). Since 2013 there is an urban vegetable garden cared for by some residents with the support of the Biodiversity association.</p>	https://una.city/nbs/bologna/community-garden-gandusio
Community Gardens in the urban city of Genova	Genova	<p>The OrtoCollettivo project focuses on the creation of common spaces to grow local sustainable food while raising awareness about environmental challenges in cities. The project is based on teamwork: if there is work planned for today and someone cannot come to do that job, someone else will do it, with the ultimate benefit of everyone. It, therefore, stimulates common values about well-being, sustainable food production, and sharing time</p>	https://una.city/nbs/genova/community-gardens-urban-city-genova



		and activities collectively as a group. The initiative is ongoing and expanding.	
The garden of senses	Bari	The initiative promoted by the event “Primavera Mediterranea” (Mediterranean spring) transforms the central pedestrian area of via Argiro into an urban park. The project is aimed at rethinking the urban spaces in a green way, as urban gardens are built within the whole central area. The main benefit of the initiative is to give a green view of the city centre, a new dimension of the lived urban space. In addition, workshops and manifestations are organized within the area, to promote also the social and cultural value of the zone. The intervention is an initiative taking place every year since 2011, which lasts for days. Private shops, associations and consultancies work together to realise the urban gardens in the main street in Bari.	https://una.city/nbs/bari/garden-senses
GAIA - Green Area Inner-city tree planting agreement	Bologna	The project aimed to tackle two environmental problems through an integrated policy: climate change (both the mitigation and adaptation effects of urban forestation) and air quality. The project foresaw the dissemination of public-private partnership tools, developed within the framework of corporate social responsibility experiences, and the distribution of specific guidelines. Specifically, the project planned to develop a public-private partnership model for urban forestation through the adoption of the ‘green areas inner-city agreement’ (GAIA). This was expected to include three specific protocols for green urban areas covering management, monitoring and mapping resulting in 3000 trees planted across Bologna.	https://una.city/nbs/bologna/green-area-inner-city-tree-planting-agreement
Green Façade in Genova	Genova	The green wall was built as a pilot project in cooperation between the national government, the University of Genova and the Ecosystemic Research Group with the aim to assess urban air pollution. The wall is being monitored to understand which	https://una.city/nbs/genova/green-facade-genova



		<p>plant species are the most ideal for carbon sequestration in cities. The wall is part of a building which hosts a public body (INPS).</p>	
Green Roofs for Sustainable Water Management	Bologna	<p>This project was the first green roof in the city of Bologna, on top of the building which hosts the University, and it has been carried out by the University of Bologna in collaboration with the Columbia University of New York with the aim to prove more evidence on green roof stormwater performance. For the Engineering School of Bologna University, the existing roofs had a load capacity that was able to host only an extensive roof, without the costly need of being reinforced. In the extensive roof type the vegetation is usually very drought resistant and plants can adapt to difficult environmental conditions, therefore sedum was chosen.</p>	https://una.city/nbs/bologna/green-roofs-sustainable-water-management
Giardino Verticale	Milano	<p>This vertical garden was created with the aim to integrate the shopping mall in the surrounding green. A total of 44.000 plants of 200 different species were used on a surface of 1.262 square meters, making it the largest living wall in the world (now in Italy) at the time it was created. The green wall has met large positive response both by the owners of the shopping mall, who noticed a decrease in their energy expenses, and by local residents, who can appreciate the aesthetic beauty of the wall and breathe fresher and cleaner air.</p>	
Japigia Park	Bari	<p>The city district Japigia in 2013 has proposed a project of a new park that links the necessity of housing, open spaces, urban sustainability. The park is centre of green spaces with a high level of accessibility, in a part of the city which was previously abandoned. The presence of hedges and trees guarantees the liveability of the area, while at the same time providing important ecosystem services such as mitigation of urban pollution and</p>	https://una.city/nbs/bari/japigia-park



		mediation of visual impact. The same can be said for the vertical gardens which will characterise the entrance of the park.	
Library of Trees	Milano	The park will have a surface of 100.000 sqm. It is designed to create a system of connections between the different urban realities surrounding the area: residences, offices and services. The paths generate a mosaic of irregular plots, each with specific groups of plant species, grasses or lawn, which contribute to enhance the botanical characterisation of the park. The vegetal patches alternate with water and hard materials, thus creating a series of public spaces that house cultural and recreational program. The "Tree Library" suggests a modern interpretation of the botanical garden, emphasising the cultural aspect linked to mythological history and poetic expression.	https://una.city/nbs/milano/library-trees
NapLEST - Urban regeneration of Napoli East	Napoli	This NBS is part of a strategy of urban development including social, economic and urban dimensions, aiming at implementing green streams within and between neighbourhoods to enhance the liveability of the area. The main project is the "Green Stream", which embeds a new vision of urban infrastructures meant as urban and environmental regeneration, by creating public green spaces. The East area of the city hosts a green flux of green corridors, parks, as well as cultural spots, sports facilities and recreation. It is highlighted the social value of this project in terms of creation of public sustainable spaces	https://una.city/nbs/napoli/naplest-urban-regeneration-napoli-east
Mi Coltivo: Community Gardens in Schools	Milano	"MiColtivo, Orto a Scuola", regards the involvement of children with horticulture to educate them on the importance of a correct diet and environmental issues. The aim is to re-qualify courtyards and gardens of public schools in the city, through the installation of educational gardens, in order to enhance and make them available to the child. The	https://una.city/nbs/milano/mi-coltivo-community-gardens-schools



		<p>projects also wants to ensure children's right to healthy and safe nutrition by promoting child nutrition education, and to involve the area around the schools (families, grandparents, associations, etc.) in the design and subsequent management of gardens (maintenance, food education, food consumption etc.) also encouraging multicultural integration between children and families through the knowledge and sharing of different food traditions. The first pilot project was launched in local schools in 2012. The project was developed in the concept of the imminent EXPO 2015, as the main topics were nutrition and the environment.</p>	
P.A.R.C. - Petromyzon And River Continuity	La Spezia	<p>In light of the LIFE P.A.R.C. project, the NBS here presented consisted in the restoration of the fluvial and ecological continuity of the Magra and Vara rivers in the Montemarcello-Magra Regional Natural Park. The intervention implemented the removal of artificial barriers blocking the water continuity currently affecting biodiversity conservation. In the meantime, several activities implemented focused on restoring the area along the stream with the creation of walking paths and the use of signs to spread environmental awareness about the key habitat provision services of the area</p>	https://webgate.ec.europa.eu/life/publicWebsite/project/LIFE07-NAT-IT-000413/petromyzon-and-river-continuity
Palermo green: clean and inclusive city	Palermo	<p>The project has the goal to promote volunteering related to environmental protection. The community-based initiative involves disabled people to implement the intervention - with the supervision of specific tutors - to prove that they can be an active part of the population. Activities included taking care of several green areas and implementation of social horticulture gardens.</p>	https://www.esperienzeconilsud.it/palermogreen/2020/12/03/il-volontariato-inclusivo-che-fa-bene-alla-comunita/
Recovery of the Royal Gardens	Venezia	<p>The Royal Gardens, situated between Piazza San Marco and the Bacino di San Marco, were created during the Napoleonic occupation of the city and used to be a space for recreational activities for</p>	https://www.veniciegardensfoundation.org/en/restoration-care-and



		<p>locals for many years after the monarchy was over. During past decades, the gardens have progressively deteriorated, with their original design barely legible -in terms both of geometrical patterns and the placement of trees and shrubs-, thus rapidly becoming a derelict area. The recovery intervention consists of the restoring of the original vegetation by recovering still-living plants and introducing new ones. Between 2015 and 2019 the Gardens underwent complex restoration, planned by the gardener and landscape architect Paolo Pejrone, while architectural renovation and the rebuilding of the greenhouse was planned by architect Alberto Torsello. Reopened in December 2019, the Royal Gardens, rich in unexpected perspectives and luxuriant growth, have reacquired their formal excellence and botanical complexity, in coherence with their historic nineteenth-century design.</p>	conservation-royal-gardens-venice https://www.europeanheritageaward.s.eu/winners/royal-gardens-of-venice/
Regeneration of Falcone park	Catania	<p>The park, dedicated to the Sicilian judge assassinated by the mafia in the early 90s, was the object of a regeneration project by two associations (with the approval of the municipality). The initiative was practically implemented by kids of several schools in Catania, which were invited to the park with the intention of cleaning the area to make the spot available to new plants and trees. This is not just a natural intervention, it is of great cultural and social value for the importance of the character for the city and region.</p>	Leonardi, M. Nature-Based Solutions to Regenerate Mediterranean Cities: A Case Study in Catania, Sicily. Sustainability 2023, 15, 12112. https://doi.org/10.3390/su151612112
Regeneration of Maria Maugeri Park (ex-Gasometro)	Bari	<p>The municipality adopted an integrated approach to regenerating peripheral neighborhoods, involving associations and citizens in a comprehensive program to revitalize public spaces, strengthen social and cultural services, and promote employment and innovative businesses. The main focus area is the Libertà district, a former industrial</p>	https://www.researchgate.net/publication/344487435_Regenerazione_Liberta_un_WebGIS_per_l%27analisi_e_il_dibattito_su_un_qua



		<p>area with high unemployment, low education levels, and demographic challenges. With funding from European and national sources, the municipality is investing in new parks, childcare services, cultural centers, coworking spaces, and family services. Civil society plays a central role, co-producing and co-managing interventions to create essential community resources. The project also explores the role of researchers in bridging divides, using participatory planning to facilitate dialogue between public administration and citizens. This involved gathering diverse perspectives, triangulating quantitative and qualitative data, and aligning goals and actions for sustainable urban development.</p>	rtiere_in_trasformazione
Regeneration of the Casale Posillipo garden	Napoli	<p>It is a project of regeneration of an abandoned small garden in the centre of Napoli, with the plantation of plants typical of the Mediterranean area. The new 400 sqm garden was developed by the Servizio Arredo Urbano of the city of Napoli. The regeneration process was persistently asked by the citizens of the surrounding area which were looking for an improvement of the area. In addition, the garden hosts a new playground for kids, and by consequence, it is considered a new spot for recreational activities.</p>	https://una.city/nbs/napoli/regeneration-casale-posillipo-garden
Roof garden Royal Palace	Napoli	<p>The Royal Palace of Naples (Palazzo Reale di Napoli) is a palace, museum, and historical tourist destination located in central Naples, southern Italy. In 2016, the rooftop gardens of the Palace were part of the project to renew the historical royal palace to reopen the green space on the top of the Palazzo. The external walls of the internal part have been covered by flowers and plants. In addition, new services have been provided, such as bar, restaurants, recreation areas, providing at the same time economic opportunities and new jobs.</p>	https://una.city/nbs/napoli/roof-garden-royal-palace



Urban gardens Librino	Catania	<p>An example of community garden is located in the suburbs of the city of Catania, Librino, which hosts the largest social housing scheme built in the late 1970s with 36.000 inhabitants. This community gardening effort primarily aims to respond to current social aspects. Recently, in Librino, the municipality of Catania initiated a pilot project. It aims to create new social public green spaces (more than 3.5 ha) that are assigned to associations or private persons to cultivate small land pieces. Part of these areas will be available for urban agriculture that contributes to the production of food at local level, and at the same time reduces maintenance costs for the municipality. Each garden has free water for irrigation and assignees will be able to buy seedlings at subsidized prices, bulbs, seeds, saplings, fertilizers and natural pesticides. The social community in their activities are followed by the Office for Ecology with the cooperation of agriculture associations. For each garden - assignment lasts four years with renewal - must be paid an annual fee established by the municipality. The lots for community gardens, reserved for retirees and people in socially disadvantaged conditions, as well as those for the families do not exceed 200 square meters. For educational-training gardens and associations, which will take place theoretical activities and practices, can be assigned to neighbouring lots, up to a maximum of 2,000 square meters. The trade is only allowed to cover the costs of training-work projects. The gardens will be cultivated directly by beneficiaries or their family, without paid work</p>	Privitera D. Urban Gardens and Communities: An Open Debate. Ann Agric Crop Sci. 2016; 1(1): 1003. Ann Agric Crop Sci - Volume 1 Issue 1 - 2016 ISSN: 2573-3583 www.austinpublishinggroup.com https://cityfarmer.info/sicily-a-community-garden-in-librino-catania/
Bosco verticale	Milano	<p>This NBS is part of the new Porta Nuova area, an extended urban transformation of a neglected area of Milan. It consists of two residential towers of 110 and 76 m height hosting 800 trees and over 20,000 plants from a wide range of shrubs and floral plants</p>	https://www.stefanoboeriarchitetti.net/en/project/vertical-forest/



		<p>distributed according to the sun exposure of the facade. On flat land, each Vertical Forest equals, in number of trees, an area of 20,000 square meters of forest. In terms of urban densification, it is the equivalent of an area of a single family dwelling of nearly 75,000 sq.m. The vegetal system of the Vertical Forest contributes to the construction of a microclimate, produces humidity, absorbs CO2 and dust particles and produces oxygen. The Vertical Forest increases biodiversity. It promotes the formation of an urban ecosystem where various plant types create a separate vertical environment, but which works within the existing network, able to be inhabited by birds and insects (with an initial estimate of 1,600 specimens of birds and butterflies). In this way, it constitutes a spontaneous factor for repopulating the city's flora and fauna.</p>	
NBS in GrowGreen city of Modena	Modena	<p>Modena has an extensive canal network and two rivers surround the city - the Secchia and the Panaro - making it vulnerable to flooding. The city also suffers increasingly high temperatures in the summer. The dense historical centre has little green space and its UNESCO World Heritage Status makes it difficult to change its layout and infrastructure. However, in newer development outside the city there is scope to introduce new nature-based solutions to manage the risk of flooding and reduce stress during the hot summer months. In the framework of the European project "GrowGreen", Modena has tested nature-based solutions to reduce flood peaks and improve the quality of the canal waters from the urbanised eastern part of the city. The grassy canal and swales will help to remove pollutants and increase water infiltration. On the basis of extensive hydrological modelling and assessments of climate change, as well as experiences from the pilot project, a new strategic</p>	<p>https://growgreenproject.eu/city-actions/modena/ GrowGreen Project, Deliverable D3.3 Nature-based Solutions Strategies in GrowGreen Cities and Fellow City Pilot Projects</p>



		<p>approach for NBS in Modena's context has been developed. Objectives: To better understand the rivers and canal network and assess the city's vulnerability to flooding, in order to inform suggestions for nature-based solutions to tackle it. To develop and assess a pilot project to reduce flooding and pollution of the canal. To develop an effective strategy for nature-based solutions. To increase stakeholder engagement in nature-based solutions.</p>	
Unalab: Gavoglio area	Genova	<p>NBS addressing key climate- and water-related challenges have been implemented in Genova's Lagaccio district, which is a central and densely populated district characterised by disorganised post-war urbanisation mainly formed by residential multi-story buildings and derelict sites. The Municipality of Genova has transformed the Gavoglio area in the Lagaccio district into a 10,000 sqm urban park. The former military barracks in the area have been demolished and the area has developed into a public, inclusive and sustainable urban park built by almost entirely nature-based solutions. All functions of the park have been designed to be compatible with nature and the project involved the implementation of 12 different NBS. The city has also improved water management and quality on site through innovative collection, depuration and reuse of stormwater runoff to irrigate new trees and other vegetation in the Gavoglio area.</p> <p>These interventions have been implemented in the framework of the Horizon Project UNaLab - Urban Nature Labs.</p>	
Development of public green areas	Milano	<p>By working together with citizens and experimenting with new forms of co-creation, the team is planning to create a new public park within the Giambellino neighbourhood of Milan. Plans are to include nature-based solutions such as a green buffer area near the</p>	<p>https://clevercities.eu/milan/ I. Mahmoud, E. Morello, Four years of Co -creation</p>



	<p>railway, a water management and monitoring system and user-friendly sensors that encourage use by citizens. The aim is to encourage shared management and use of spaces, by introducing equipment and vegetation that encourage community involvement. This project has been implemented in the framework of the Horizon Project CLEVER Cities</p>	<p>with stakeholders: What did we learn about its added value in Urban Planning? Insights from CLEVER Cities Milan three Urban Living Labs, in M. Cerrtea, M. Russo (edited by), Planning-Evaluation. Le valutazioni nel processo di pianificazione e Progettazione, Atti della XXIV conferenza nazionale SIU - Società Italiana degli Urbanisti - Dare valore ai valori in urbanistica - Brescia, 23-24 giugno 2022</p>
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Some useful sources and examples of good practices related to vegetation placement in historic courtyards. These practices highlight the importance of selecting vegetation that aligns with historical and climatic conditions, preserving original plants where possible, and balancing modern needs with historical integrity. For more detailed exploration, you can refer to the guidelines and case studies provided by the National Park Service, Land8 (<https://land8.com/>) and research on urban historic spaces.

1. Case Study: Beijing's Dashilar Community:

(<https://ifdesign.com/en/brands-creatives/company/beijing-design-week/557/portfolio/dashilar-design-community/124>)



Highlights resident-led initiatives for revitalizing courtyards using locally adapted greenery and sustainable practices, balancing vegetation with limited space.

2. Leyteire Courtyard, Bordeaux (Historic Courtyard Transformation):

(<https://architizer.com/projects/leyteire-courtyard/>)

Demonstrates the integration of modern landscape architecture with historic structures by incorporating plants like European palms and ornamental shrubs to create a green oasis while addressing urban heat island effects. Blends evergreen shrubs (e.g., *Choisya grandiflora*) and decorative trees (e.g., *Cercis siliquastrum*) with paving and water features to reflect the historic ambiance while providing modern functionality. A list of notable renovated historical courtyards featuring green infrastructure, blending heritage preservation with environmental and community-oriented upgrades. These examples highlight a range of adaptive reuse projects where historical and environmental considerations were harmoniously blended.

3. Tai Kwun Centre for Heritage and Art, Hong Kong

(<https://www.taikwun.hk/en/>)

Originally a 19th-century prison complex, this site was transformed by Herzog & de Meuron into a cultural space featuring two large green courtyards. The design incorporates historical elements with new structures, providing both cultural value and modern environmental design features like green open spaces to enhance visitor experience.

4. Ferencváros Courtyards, Budapest, Hungary

(<https://maril.hu/en/ferencvaros-the-reborn-district/>)

This requalification project revamped historic courtyards in Budapest, focusing on unifying fragmented spaces into connected green areas. These courtyards were redesigned to include public or semi-public pedestrian pathways and greenery, significantly improving urban resilience and social interaction.

5. Troy Block, Seattle, USA

(<https://perkinswill.com/project/troy-block/>)

The renovation of the Troy Laundry Building included the addition of a modern courtyard with green infrastructure. The courtyard features shade trees planted using Silva Cell technology to ensure soil quality and tree health in urban hardscape areas. This design combines historic preservation with environmental benefits.

6. Supply Laundry Building, Seattle, USA

(<https://runberg.com/work/supply-laundry-building-2/>)

Part of the broader Stack House development, this historic building's renovation incorporated green courtyards as part of its urban mixed-use plan. These courtyards include sustainable landscaping and serve as community gathering spaces, enhancing both livability and environmental performance.



2. Legislation review

For a legislation review focused on climate adaptation and resilience for courtyard spaces in historic Italian cities, we consider Italian and EU policies that guide climate adaptation, urban transformation, and heritage preservation.

European Union Standards and Directives

These are the EU policies that Italy implements, which are relevant to climate adaptation and urban spaces in historic areas:

- European Climate Law (EU Regulation 2021/1119). It sets targets for climate neutrality by 2050 and the 2030 emissions reduction goal, promoting urban resilience.
- EU Strategy on Adaptation to Climate Change (2021). It encourages member states to adopt national and local adaptation strategies, including urban planning adaptations.
- Energy Performance of Buildings Directive (EPBD, 2018/844). It targets energy efficiency and also incentivizes the sustainable renovation of buildings.
- Urban Agenda for the EU. It focuses on sustainable urban development, including adaptation to climate change and resilience in public spaces.

Italian National Legislation related to energy and environment

The package of rules that, in the Italian legislative system, refer in general to environmental issues and those related to climate change (for simplicity called “Italian Climate Law”), represents the country’s commitment to align with EU’s broader climate objectives and climate goals and pursue their ambitious targets for emissions reduction, environmental sustainability and adaptation to climate change, including the European Green Deal and the “Fit for 55” package, aiming to cut emissions by at least 55% by 2030 (compared to 1990 levels) and reach carbon neutrality by 2050. It sets out a legal framework and specific measures to achieve net-zero emissions by mid-century, with a focus on urban adaptation, sustainable renovations, and the integration of green and blue infrastructure, especially within historic areas.

The laws place significant emphasis on urban resilience, mandating the creation of city-level climate adaptation plans. Cities are encouraged to adopt strategies to manage heat waves, floods, and other climate risks, using nature-based solutions where possible.

The pack of norms that, Italian Climate Law promotes the integration of green (vegetation) and blue (water) infrastructure in urban planning, particularly within historic and densely populated areas. This includes projects like urban green roofs, rain gardens, and restored waterways that reduce urban heat, manage stormwater, and enhance biodiversity. For historic areas, these infrastructures are designed to be minimally



invasive and adaptable to the architectural heritage, helping to mitigate climate impacts without compromising cultural value.

Local governments receive support for implementing climate-friendly projects, with particular emphasis on public transportation, waste management, and renewable energy installations. Historic cities are encouraged to integrate adaptation strategies that consider their unique spatial and structural characteristics, making adaptation compatible with preservation.

To sum up, the Italian Climate legislation represents a broad, multifaceted approach that combines emissions reduction with resilience-building measures, emphasizing the unique challenges of adapting Italy's historic urban landscapes to a changing climate.

National Adaptation Strategy (2015)

The Climate Adaptation Strategy establishes specific objectives to be reached by end of December 2016 and it is updated every 5 years. The National Adaptation Strategy provides an extensive knowledge on past, present and future climate change and on impacts/vulnerabilities to climate change of different sectors, including: water resources; desertification, soil degradation and drought; hydrogeological risks; biodiversity and ecosystems; health; forestry; agriculture, aquaculture, marine fishery; energy; coastal zones; tourism; urban settlements; and critical infrastructures. The Strategy also provides a national vision on how to address future impacts of climate change in various socio-economic sectors and natural systems and it in particular aims to:

- improve current knowledge on climate change and its impacts;
- identify vulnerabilities and adaptation options for relevant natural and socio-economic systems, and describe opportunities that may be associated to climate change;
- promote participation of stakeholders in defining strategies and sectoral adaptation plans to make later implementation more effective;
- increase awareness about climate change risks and adaptation through a range of communication activities;
- specify methods to be used to identify the best options for adaptation actions, also highlighting the co-benefits.

National Integrated Energy and Climate Plan (PNIEC)

The National Energy and Climate Plan (NECP) is a ten-year integrated document mandated by the European Union to each of its member states in order for the EU to meet its overall greenhouse gases emissions targets. The plan is intended to contribute to a wide-ranging transformation of the economy. In this, the combination of decarbonisation, the circular economy, efficiency and the rational and fair use of natural resources represent objectives and instruments for an economy that is more respectful of people and the environment.



The framework is one of integration of the national energy markets in the Single Market and due consideration for affordable pricing and security of supply. The general objectives of the plan are:

- A. Accelerate the decarbonisation process by setting 2030 as an interim milestone for achieving full decarbonisation of the energy sector by 2050 and integrating environmental factors in other public policies.
- B. Place a central emphasis on citizens and businesses (in particular SMEs), in such a way that they become key players and beneficiaries of the energy transition and not just the financiers of active policies. This requires the promotion of self-consumption and renewable energy communities, but also the greatest possible degree of regulation and transparency of the sales segment, so that consumers may reap the benefits of a competitive market.
- C. Foster the evolution of the energy system, particularly in the electricity sector, from a centralised structure to a distribution predominantly reliant on renewable sources.
- D. Adopt measures to improve the capacity of renewables to contribute to security while at the same time promoting frameworks, infrastructure and market rules which, in turn, contribute to the integration of renewables.
- E. Continue to ensure adequate supplies from conventional sources, by pursuing security and continuity of supply, with the understanding that the demand for these conventional sources is in progressive decline as a result of both the increase in renewables and energy efficiency.
- F. Promote energy efficiency across all sectors as an instrument for protecting the environment, improving energy security and reducing energy costs for families and businesses.
- G. Promote electrification of consumption, in particular in the civil and transport sectors, as an instrument for additionally improving air and environmental quality.
- H. Guide the evolution of the energy system through research and innovation activities to develop, in line with European guidelines and the requirements for full decarbonisation, solutions able to achieve sustainability, security, continuity and cost effectiveness of supply based increasingly on renewable energy in all usage sectors. Another goal to encourage the reorientation of the production system towards processes and products with a small carbon footprint, which may also be of benefit to the demand arising from other support measures.
- I. Adopt, taking into account the conclusions of the strategic environmental assessment (sea) and related environmental monitoring, measures and expedients to reduce the potential negative impacts of energy transition on other equally relevant objectives, such as the quality of air and bodies of water, the limitation of soil consumption and landscape protection.
- J. Continue the process for integrating the national energy system with the energy union.



Italian Climate Adaptation Plan (PNACC)

The National Climate Change Adaptation Plan has been approved by the Ministry of the Environment on 21 December 2023. It is a comprehensive national strategy that identifies the potential impacts of climate change across Italy and guides institutions at national, regional, and local levels in implementing effective, context-specific adaptation measures. Its goal is to minimize climate impacts and strengthen the resilience of natural, social, and economic systems. Its key objectives include reducing climate risks and improving the adaptive capacity of socio-economic and natural systems, offering frameworks for urban resilience and emphasizing adaptation in urban spaces. It provides guidelines on cooling measures, water management, and biodiversity to enhance resilience in cities, which will be key for courtyard transformations.

The PNACC is organized into five core sections:

1. Legal Framework;
2. National Climate Framework;
3. Climate Change Impacts in Italy;
4. Adaptation Measures and Actions;
5. Adaptation Governance.

The climate analysis within PNACC examines historical climate data (1981-2010) and projects mid-century changes (2036-2065) under three IPCC scenarios: a strong mitigation scenario (RCP 2.6), an intermediate scenario (RCP 4.5), and a business-as-usual scenario (RCP 8.5). In the framework of these scenarios, the plan prioritizes adaptation measures in land, marine, and coastal environments, assessing climate change's effects on vulnerable environmental and socio-economic sectors (such as transport, energy, agriculture, health, cultural heritage, tourism etc.), emphasizing the interconnectedness of climate impacts. The PNACC outlines three adaptation levels:

1. Soft measures: include policy, legal, social, management, and financial actions aimed at raising awareness and adapting behaviors. Examples include changes in lifestyle, governance improvements, and legislative strengthening.
2. Green measures: nature-based solutions leverage ecosystem services to build resilience, such as restoring wetlands to reduce flood risk.
3. Grey measures: infrastructural and technological measures, such as building water retention basins and coastal defences.

With a database of 361 adaptation actions (i.e. measures to be taken at national or regional level, covering a variety of environmental issues: desertification, coastal zones, urban settlements, water), each is evaluated by criteria like cost-effectiveness, overall effectiveness, job creation potential, adaptability to uncertain contexts, and urgency. Notably, 76% of actions are soft, 13% are green, and 11% are grey, with agriculture, urban settlements, forests, and water resources being the focal sectors for maximum cross-sector impact.



Historic Preservation and Cultural Heritage

Italy is renowned worldwide for its extraordinary cultural heritage, which encompasses historic monuments, archaeological sites, landscapes and intangible cultural practices, and forms the backbone of the nation's identity and a cornerstone of its economy. Recognizing the unique value and fragility of this patrimony, Italy has established a comprehensive legal framework to ensure its protection, conservation, and enhancement.

The Italian approach to cultural heritage legislation is deeply rooted in the nation's Constitution. Article 9 of the Italian Constitution explicitly states that the Republic promotes the development of culture and scientific research while safeguarding the historical and artistic heritage of the nation. This constitutional foundation emphasizes the dual role of cultural heritage: as an asset to be preserved for future generations and as a dynamic resource for fostering education, identity, and sustainable development.

Building on this constitutional mandate, the Codice dei Beni Culturali e del Paesaggio is the cornerstone of Italian legislation in this field, providing a unified and coherent system to manage the complex interactions between cultural assets, landscapes, and contemporary society.

The Italian legal framework also reflects its commitment to international standards and agreements, particularly those established by UNESCO and the European Union. Italy's adherence to these frameworks underscores its global leadership in heritage preservation and its dedication to fostering international cooperation.

However, the implementation of cultural heritage laws in Italy also reveals the complexity of balancing preservation with modernization. The tension between maintaining authenticity and adapting historic structures to contemporary uses is a recurring theme in Italian legislation. The laws provide clear guidance on interventions, promoting solutions that respect the historical integrity of assets while accommodating the functional needs of society.

In addition to national legislation, regional and local authorities play a significant role in the application of cultural heritage laws, particularly through instruments such as Regional Landscape Plans (Piani Paesaggistici Regionali). These plans reflect regional specificities and ensure that cultural and natural heritage is managed in harmony with local development goals.

This legislative framework not only protects Italy's cultural heritage but also enhances their potential as drivers of education, tourism and innovation. By ensuring that heritage is both preserved and accessible, Italian legislation positions cultural assets as a bridge between the past and the future, contributing to national identity and global cultural dialogue.

The following sections report a synthesis of the main components of Italian cultural heritage legislation, examining the main rules and principles governing the protection and enhancement the patrimony.

Code of Cultural Heritage and Landscape (Codice dei Beni Culturali e del Paesaggio) - D.Lgs. 42/2004



The Italian “Code of Cultural Heritage and Landscape” (Legislative Decree 42/2004, abbreviated as D.Lgs. 42/2004) is the main legal framework for the preservation and management of Italian cultural and landscape heritage. The code aims to safeguard Italy’s historical and artistic assets, which include monuments, artefacts, historic buildings and significant landscapes, by establishing a set of rules to guide interventions, restorations, and modifications on such properties.

This is the primary legal framework for the protection and management of cultural heritage in Italy. It addresses both movable and immovable heritage and establishes how interventions on protected sites, including historical courtyards, must be handled. This law regulates modifications to historic buildings and areas.

The code defines cultural heritage broadly, including not only tangible assets like monuments, archaeological sites, and historic buildings, but also intangible assets, such as archives and historical documents. It also includes landscapes of recognized historical, cultural, or environmental value. The code emphasizes the preservation of the authenticity, historical integrity, and aesthetic values of heritage assets, discouraging modifications that could alter their historical significance or structural integrity. Interventions must aim to conserve and restore rather than radically transform or modernize.

The Code is divided into five parts, each addressing specific aspects of cultural and landscape management. Below is an overview of the structure and key contents of each part:

- **Part I: General Provisions.** This introductory section outlines the fundamental principles and objectives of the Code. It establishes that cultural heritage and landscapes are public goods of paramount importance for the identity, memory, and development of the Italian nation. The first part defines essential terms such as cultural property (movable and immovable items of historical, artistic, archaeological, or ethnographic value) and landscape property (areas with significant natural, aesthetic, or cultural features). It also specifies the roles and responsibilities of various stakeholders, including the State, regions, and local authorities, in safeguarding and promoting heritage.
- **Part II: Cultural Heritage.** This part focuses on cultural heritage, detailing the rules for its identification, protection, and enhancement. It defines the procedures for recognizing cultural assets, including the declaration of public interest and their registration in official inventories. The section emphasizes the importance of conservation, stipulating guidelines for interventions on movable and immovable cultural property. Key principles include preserving authenticity, using reversible techniques, and prioritizing restoration over replacement. It also regulates the export and import of cultural assets, aiming to prevent the illegal trafficking of heritage items. Additionally, it introduces provisions for public accessibility to cultural goods, ensuring that they are available for educational and cultural purposes.
- **Part III: Landscape.** The third part is dedicated to landscape protection and enhancement. It underscores the intrinsic value of Italy’s diverse landscapes, from urban centers and rural settings to natural areas and coastal regions. This section mandates the development of *Piani Paesaggistici Regionali* (Regional Landscape Plans) to guide land use and development in harmony with conservation



objectives. It specifies the procedures for identifying and protecting landscapes of particular cultural or natural significance, including the listing of protected areas. The part also addresses the authorization process for activities or developments that may impact landscapes, ensuring that such interventions align with the principles of sustainability and respect for heritage. Art. 29 specifies that interventions should be aimed at conservation and compatible use, without compromising the historical and architectural value. For climate adaptation projects, this could mean prioritizing reversible and non-invasive solutions (e.g., green roofs or water retention systems that don't permanently alter the structure). For historic buildings located in protected landscapes, interventions must also comply with landscape protection rules to ensure harmony with the surrounding environment.

- **Part IV: Sanctions.** This part establishes administrative and criminal penalties for violations of the Code. It outlines specific offenses, such as unauthorized alterations or demolitions of protected cultural or landscape assets, illegal excavation or export of cultural property, and failure to comply with conservation obligations. The section aims to deter and address actions that threaten Italy's cultural and natural heritage by imposing fines, administrative sanctions, and, in severe cases, criminal prosecution.
- **Part V: Final and Transitional Provisions.** The final section includes transitional measures and other provisions necessary to ensure the effective implementation of the Code. It also addresses potential conflicts of jurisdiction and specifies the roles of supervisory bodies like the Ministry of Culture and regional authorities in monitoring compliance and enforcing regulations.

Under the code, modifications to historical artefacts and relevant landscapes in Italy must prioritize preservation and enhancement of the artefact's historical and aesthetic qualities. Alterations are carefully scrutinized and generally limited to prevent any loss of historical integrity. Modern interventions, such as adaptations for climate resilience, are permitted but must align with strict preservation guidelines, often involving methods that are reversible or minimally invasive. The Code emphasizes that protection and conservation must coexist with initiatives to enhance heritage value, ensuring its cultural and economic potential benefits society; it recognizes the roles of public institutions, private stakeholders, and local communities in managing and safeguarding heritage. Finally, it promotes sustainable practices in land use, urban planning, and tourism to ensure the long-term preservation of cultural and natural resources.

Legge 1089/1939 (Law 1089/1939) - Protection of Cultural Assets

While largely superseded by D.Lgs. 42/2004 (Code of Cultural Heritage and Landscape), this foundational law originally set the tone for Italy's strict approach to heritage conservation, emphasizing that all interventions must prioritize historical integrity. It also established the need for permission from the Soprintendenza, a regional body for heritage supervision under the Ministry of Culture. In practice, this translates to strict oversight and limits on climate adaptation interventions in historic courtyards (and, in general, in all places and artifacts with historical and cultural relevance).



The Law 1089 of 1939 is known as one of the first comprehensive laws in Italy dedicated to safeguarding cultural assets; it established the framework for state intervention in protecting and preserving art, historic buildings and archaeological sites. Law 1089/1939 classified various types of assets as cultural heritage, including works of art, monuments, archaeological finds, manuscripts and items of historical or artistic value. This definition was broad and aimed to cover a wide range of objects that contribute to the country's cultural identity.

The law allowed the Italian government to exercise control over privately owned cultural assets, requiring owners to notify the state before any sale, transfer, or export of such items. The state was granted pre-emptive rights to purchase cultural assets under private ownership if deemed significant to national heritage, preventing their potential loss to foreign buyers.

The Law 1089 imposed strict regulations on any modification or restoration work on cultural heritage sites and objects; for example, any planned changes required state approval to ensure that they did not compromise the historical integrity of the asset. This principle has remained a core aspect of Italian cultural preservation efforts.

Law 1089/1939 laid the groundwork for modern cultural heritage laws in Italy and influenced future legislative developments, including the “Codice dei Beni Culturali e del Paesaggio” (Cultural Heritage and Landscape Code) of 2004, which consolidated and updated many provisions originally established by Law 1089/1939. The 1939 law is seen as a landmark in the shift towards proactive state intervention in cultural heritage protection, emphasizing that cultural assets are not merely private property but part of the public good.

This law has had a lasting impact on Italy's approach to cultural preservation and continues to serve as a reference in protecting Italian heritage against unauthorized alterations and international trade pressures. This legal framework underscores Italy's commitment to protecting its cultural heritage, making it challenging to implement substantial changes without adherence to these regulations.

Decree on Minimum Environmental Criteria (CAM) for Public Works

In recent years, Italy has taken significant steps to integrate environmental sustainability into its policies and practices, particularly in the realm of public works and procurement. One of the key instruments driving this transition is the Decree on Minimum Environmental Criteria (Criteri Ambientali Minimi, or CAM), a regulatory framework designed to ensure that public construction projects align with ecological and sustainability goals. It was introduced through Ministerial Decree of 11 October 2017, issued by the Italian Ministry for the Environment, Land, and Sea (Ministero dell'Ambiente e della Tutela del Territorio e del Mare, now called Ministry of the Environment and Energy Security). The CAM represents a pivotal shift in how public infrastructure is planned, constructed, and maintained, embedding environmental considerations into every stage of the process.

The CAM, established under the broader framework of Italy's Green Public Procurement policies, serves as a mandatory benchmark for public authorities when commissioning works, services, and supplies. Rooted in the principles of the circular economy, this decree emphasizes the reduction of environmental impacts across the



entire life cycle of a project. From the selection of raw materials to energy efficiency and waste management, the CAM promotes practices that conserve resources, reduce emissions, and foster long-term sustainability.

The significance of the CAM lies in its dual objectives. First, it ensures that public funds are used to create infrastructure that is not only functional but also environmentally responsible. Second, it drives innovation and sustainability across industries by setting clear and ambitious criteria for construction and procurement. Companies bidding for public contracts are incentivized to adopt greener technologies, use sustainable materials, and implement energy-efficient solutions, fostering a culture of environmental accountability.

A hallmark of the CAM is its holistic approach to environmental criteria. For instance, in public construction projects, the decree requires the use of certified, low-impact materials, prioritizing recycled or locally sourced options. It also mandates energy efficiency standards in building design and operational performance, encouraging the integration of renewable energy systems. Furthermore, the CAM addresses critical issues such as water conservation, soil protection, and the sustainable management of construction waste, ensuring that projects contribute positively to their surrounding environment.

The CAM's implementation is not merely about compliance but also about fostering a mindset of sustainability among stakeholders. It encourages architects, engineers, and contractors to innovate, incorporating cutting-edge technologies and green practices into their projects. This transformative effect is particularly evident in public building renovations, where the CAM criteria align closely with Italy's broader goals for energy efficiency and climate adaptation, as outlined in national and European policies.

Despite its ambition, the CAM also recognizes the challenges of applying uniform criteria across diverse projects and regions. The framework is designed to be flexible, allowing adjustments to accommodate specific local conditions while maintaining its core environmental objectives. Moreover, the decree integrates monitoring mechanisms to assess compliance and effectiveness, ensuring that public works genuinely contribute to sustainability goals.

Though primarily an environmental policy, CAM intersects with heritage projects by mandating that construction and renovation in protected zones must adhere to eco-friendly criteria. This includes, for instance, use of sustainable materials (indicating that, when retrofitting or adapting buildings, materials should be sustainable and, ideally, locally sourced) and Energy Efficiency (emphasizing the importance of energy-saving interventions, which, in historic buildings, must be done with minimal impact, e.g., adding internal insulation instead of altering facades).

Regional Landscape Plans (Piani Paesaggistici Regionali - PPR)

These plans regulate the way cultural landscapes and historical sites are managed and preserved at Regional level, as each region must adapt national guidelines to local contexts. Regional Landscape Plans are crucial planning tools established by the "Codice dei Beni Culturali e del Paesaggio" (Cultural Heritage and Landscape Code, see above) to ensure the sustainable management, protection and enhancement of Italy's landscapes. These plans are designed to integrate cultural, environmental, and urban planning policies, reflecting both national priorities and regional specificities.



The primary purpose of PPRs is to safeguard landscapes of cultural, historical, and environmental significance. These include areas of natural beauty, historic sites and places considered prior to Italy's national identity. By protecting these landscapes, PPRs aim to harmonize conservation with economic and social development, promoting sustainable land use, agriculture, tourism and infrastructure projects that respect their surroundings. They also play a vital role in aligning regional development policies with broader national and European frameworks for landscape and environmental protection.

Each PPR involves detailed mapping and classification of landscapes of the Region. Through this process, landscapes are identified and categorized based on their cultural, historical, aesthetic or ecological value. This classification determines the types and extent of interventions permitted in different areas. The plans establish specific rules for land use, defining which areas are subject to strict conservation measures and which allow for controlled development. In addition, they address both cultural assets, such as historic buildings and archaeological sites, and natural elements like rivers, mountains, and forests. A unified approach ensures that these elements are managed cohesively.

The development of PPRs emphasizes public participation. Local communities, stakeholders, and experts are consulted during the preparation and adoption phases, ensuring the plans reflect local needs and values. Once approved, these plans become legally binding, requiring all regional and local authorities to adhere to their provisions. Urban and territorial planning at all levels must comply with the PPR, ensuring that conservation and development goals are met consistently.

A key feature of PPRs is their focus on guiding interventions to ensure compatibility with the surrounding landscape. They encourage modernization projects, such as renewable energy installations and infrastructure upgrades, as long as they respect the historical, cultural and environmental context. To preserve scenic integrity, the plans often impose restrictions on construction height, materials, and design, particularly in areas of high cultural or visual significance. Additionally, PPRs actively promote the development of green and blue infrastructure, such as green spaces and water management systems, to enhance biodiversity and improve urban resilience to climate change.

Adaptive reuse of historic buildings is another significant aspect of these plans. PPRs support initiatives that enable the modernization of such structures while safeguarding their heritage value. For example, projects transforming historic sites into community spaces or eco-friendly facilities are encouraged if they maintain the integrity of the original design.

As already mentioned, the legal framework for PPRs is provided by the Codice dei Beni Culturali e del Paesaggio; indeed, although the Code establishes the requirement for these plans, each region is responsible for their content and implementation. Regions often collaborate with the Ministry of Culture and local authorities to ensure compliance with national objectives while addressing regional needs.

Finally, Regional Landscape Plans ensure that modernization and development can coexist with the protection of Italy's diverse and historically rich landscapes, enabling them to meet contemporary needs without compromising their unique value.



National Guidelines on Energy Efficiency in Historic Buildings (Linee Guida Nazionali per l'Efficienza Energetica degli Edifici Storici).

Italy's National Guidelines on Energy Efficiency in Historic Buildings (Linee Guida Nazionali per l'Efficienza Energetica degli Edifici Storici) were issued on April 30, 2015, by the Italian Ministry of Cultural Heritage and Activities and Tourism (Ministero dei Beni e delle Attività Culturali e del Turismo, or MiBACT, now called Ministry of Culture) in collaboration with the Ministry of Economic Development (Ministero dello Sviluppo Economico, or MISE). They represent a crucial step toward harmonizing energy efficiency goals with the preservation of Italy's architectural heritage. These guidelines provide a comprehensive framework for balancing modern energy demands with the unique constraints and opportunities of historic structures.

The central challenge in improving energy efficiency in historic buildings lies in their distinctive architectural, artistic, and cultural features. Such buildings often predate modern construction techniques and energy standards, making traditional approaches to retrofitting incompatible with their preservation. Recognizing this, the guidelines advocate for an approach that respects the authenticity, integrity, and historical value of these buildings while reducing energy consumption and improving comfort for their users.

A cornerstone of the guidelines is their emphasis on case-by-case analysis. Every historic building is unique, with its own materials, construction methods, and historical context. The guidelines stress the importance of conducting thorough assessments before undertaking any intervention. This includes analysing the building's current energy performance, studying its historical and architectural characteristics, and understanding its relationship with the surrounding environment.

Energy efficiency measures are to be implemented in a way that minimizes physical and visual impacts. For instance, the guidelines recommend prioritizing interventions that are reversible and do not alter the original materials or design. Solutions such as improving the thermal performance of existing windows through secondary glazing, using low-impact insulation materials, and installing advanced heating and cooling systems that blend seamlessly into historic interiors are promoted.

The guidelines also address renewable energy systems, which can be particularly challenging in historic contexts. While the installation of solar panels or other renewable technologies is encouraged, the guidelines stress the need to integrate these systems discreetly, avoiding visual intrusions that might detract from the building's aesthetic or cultural significance. The guidelines outline that adaptations must be "non-invasive" and "reversible," such as using external shading instead of altering window structures. These guidelines are valuable for courtyards where shading or greenery could be added without permanent structural changes. Moreover, they focus on Passive Adaptations: passive energy strategies, like improved ventilation, use of natural light, and reflective materials, are encouraged over mechanical systems that would alter the building's historic character.

A vital aspect of the guidelines is their focus on multidisciplinary collaboration. Architects, engineers, conservators, and historians are urged to work together throughout the planning and execution phases of



energy efficiency projects. This collaborative approach ensures that all interventions are both technically effective and historically appropriate.

In addition to technical recommendations, the guidelines highlight the role of education and awareness. Property owners, managers, and local authorities are provided with information and tools to better understand the value of energy-efficient retrofitting in preserving the usability and sustainability of historic buildings.

The guidelines align with European and national objectives for energy efficiency and sustainability, particularly those outlined in the European Green Deal and Italy's National Energy and Climate Plan (NECP). By addressing the specific challenges of historic buildings, they contribute to broader goals of reducing greenhouse gas emissions, conserving resources, and promoting sustainable urban development.

Ultimately, the National Guidelines on Energy Efficiency in Historic Buildings serve as a bridge between Italy's past and future. They demonstrate that the pursuit of sustainability can coexist with the preservation of cultural heritage, ensuring that historic buildings remain vibrant and functional spaces for generations to come while playing their part in addressing the challenges of climate change.

Sustainable Mobility and Access Regulations

In Italy, sustainable mobility and access regulations are part of a broader effort to reduce environmental impacts, improve air quality, and enhance the liveability of urban and rural areas. These policies are closely tied to the principles of sustainability, promoting transportation systems that prioritize ecological responsibility, energy efficiency, and social inclusivity. They aim to balance the mobility needs of citizens and businesses with the overarching goal of reducing greenhouse gas emissions and preserving public spaces.

The foundation of sustainable mobility in Italy lies in the integration of public transportation, non-motorized transport, and policies restricting the use of private vehicles in certain areas. Many Italian cities have adopted "Piani Urbani della Mobilità Sostenibile" (Urban Sustainable Mobility Plans, or PUMS), which outline long-term strategies to create efficient, eco-friendly, and accessible transport systems. These plans often involve measures to enhance the appeal and reliability of public transport, expand cycling and pedestrian infrastructure, and introduce innovations like electric mobility and car-sharing services.

Access regulations play a critical role in promoting sustainable mobility. A key example is the widespread implementation of Low Emission Zones (in Italy called "Zone a Traffico Limitato", ZTL). These zones restrict the access of polluting vehicles to certain urban areas, particularly historic city centers, which are often characterized by narrow streets and high pedestrian activity. Entry is typically reserved for residents, electric vehicles, and public transportation, while other vehicles may need special permits or must pay access fees. This approach helps reduce traffic congestion, air pollution, and noise, creating safer and more enjoyable environments for pedestrians and cyclists.

The shift toward electric mobility is another significant focus of Italian regulations. Incentives for electric vehicles, such as tax reductions and exemptions from ZTL restrictions, are complemented by the expansion



of charging infrastructure. Urban centers, highways and even smaller towns are seeing the installation of charging stations, making it increasingly convenient for drivers to adopt zero-emission vehicles.

Public transportation systems are also being modernized to align with sustainability goals. Many Italian cities are transitioning to electric or hybrid buses, investing in tram networks, and integrating ticketing systems to make public transport more efficient and user-friendly. Additionally, initiatives like bike-sharing and scooter-sharing programs are gaining popularity, offering flexible, low-impact options for short-distance travel.

Pedestrianization is another cornerstone of sustainable mobility. Cities like Milan, Bologna, and Florence have expanded car-free zones, turning streets and squares into vibrant spaces for social and commercial activities. These pedestrian areas not only reduce emissions but also enhance the quality of urban life by fostering community interactions and supporting local businesses.

Italy's focus on sustainable mobility is deeply intertwined with EU policies, particularly those targeting climate neutrality and urban resilience. By adopting measures to decarbonize transport, improve accessibility, and promote alternative mobility options, Italy is working toward a future where movement within and between cities is not only efficient but also environmentally and socially responsible.

The challenge, however, lies in ensuring equitable access to sustainable mobility options across all regions, including less densely populated rural areas. While urban centers often lead the way in implementing innovative solutions, the Italian government is increasingly directing resources and policies to ensure that sustainable mobility is accessible and beneficial to all citizens, regardless of location. This narrative reflects an ongoing transformation aimed at rethinking how Italians move while safeguarding the nation's cultural and natural heritage for future generations.

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5. List of Figures:

Figure 1 Consultation poster in Łódź (source: City Architect's Office of Łódź)	18
Figure 2 Participatory meeting timeline (source: City Architect's Office of Łódź)	19
Figure 3 Consultation aspects in Łódź (source: City Architect's Office of Łódź)	20
Figure 4 Questionnaire used during the consultation in Łódź (source: City Architect's Office of Łódź)	21
Figure 5 Functional requirements (source: City Architect's Office of Łódź)	21
Figure 6 7 Principles of universal access, (source: University of Lubljana)	27
Figure 7 Requirements for Universal design of Courtyards, (source: University of Lubljana).....	29
Figure 8 Urban water cycle (source: City Architect's Office of Łódź), elaborated by K. Krauze.....	31
Figure 9 Rules soli (source: City Architect's Office of Łódź)	32
Figure 10 Solutions (source: City Architect's Office of Łódź)	34
Figure 11 Dry garden in Nasze Podwórko, Olsztyn Fig.5 (source: City Architect's Office of Łódź)	36
Figure 12 Dry garden - section, (source: City Architect's Office of Łódź).....	36
Figure 13 Vizualization of the interconnected steps in courtyard revitalization with GI	42
Figure 14 How a heat dome forms, adapted from AFP, 2021 and Hills and others, 2021	61
Figure 15 Courtyard near Parma	67
Figure 16 Analysis of the shading in the space of courtyard	73
Figure 17 Greenery and water pond in the space of courtyard	75



E. APPENDIX

[Appendix 1 - Historic Courtyard Audit Questionnaire](#)

[Appendix 2 - HISTORIC COURTYARD AUDIT QUESTIONNAIRE Case Study Of Łódź City](#)

[Appendix 3 - Public consultation case study of Łódź city](#)

[Appendix 4 - CONSERVATION GUIDELINES case study of Łódź city](#)

[Appendix 5 - Urban city drainage case study of Łódź city](#)

[Appendix 6 - Accessibility of courtyards](#)

KWESTIONARIUSZ AUDYTU HISTORYCZNYCH PODWÓREK (INWENTARYZACJA, OCENA, MODERNIZACJA)

HISTORIC COURTYARD AUDIT QUESTIONNAIRE (INVENTORY, EVALUATION, MODERNISATION)



STRUKTURA KARTY

THE STRUCTURE OF THE CHARTER

- CZEŚĆ I - INWENTARYZACJA I CHARAKTERYSTYKA / PART I - INVENTORY AND CHARACTERISATION
- CZEŚĆ II - CHARAKTERYSTYKA I OCENA / PART II - CHARACTERISATION AND ASSESSMENT
- CZEŚĆ III - WNIOSKI I UDOSKONALENIE / PART III - CONCLUSIONS AND IMPROVEMENT



CHARAKTERYSTYKA PRZESTRZENI PUBLICZNEJ W STREFIE WIELKOMIEJSKIEJ/ CHARACTERISTICS OF THE PUBLIC SPACE IN THE HISTORIC URBAN CORE

NAZWA MIASTA / NAME OF THE MUNICIPALITY	
ROK ZAŁOŻENIA / DATE OF LOCATION	
TYPOLOGIA PP KRÓTKA CHARAKTERYSTYKA / PS TYPOLOGY BRIEF CHARACTERISTICS	
COOPERATION IS CENTRAL	

CHARAKTERYSTYKA PRZESTRZENI PUBLICZNEJ / CHARACTERISTICS OF THE PUBLIC SPACE

OCHRONA KONSERWATORSKA / CONSERVATION POLICY	
WŁAŚCIWY ORGAN KONSERWATORSKI / COMPETENT AUTHORITY CONSERVATION OFFICE	
REALIZOWANE PROGRAMY REWITALIZACJI PRZESTRZENI PUBLICZNEJ I INNE DOKUMENTY STRATEGICZNE / REVITALISATION PROGRAMMES FOR PUBLIC SPACES AND OTHER STRATEGIC PAPERS	
AKTY PRAWNA MIEJSKOWEGO, WYTYCZNE KONSERWATORSKIE / LOCAL PLAN, CONSERVATION GUIDELINES COOPERATION IS CENTRAL	

PART I

INWENTARYZACJA I CHARAKTERYSTYKA TECHNICZNA ELEMENTÓW PP

INVENTORY AND TECHNICAL CHARACTERISTICS OF PS ELEMENTS

AD.1 INWENTARYZACJA STAŁYCH ELEMENTÓW WYPOSAŻENIA PP

AD.1 INVENTORY OF FIXED LAND-USE ELEMENTS OF PS

AD.2. WYPOSAŻENIE PP (MEBLE MIEJSKIE)

AD.2. EQUIPMENT PP (URBAN FURNITURE)

AD.3 ZIELEŃ W PP

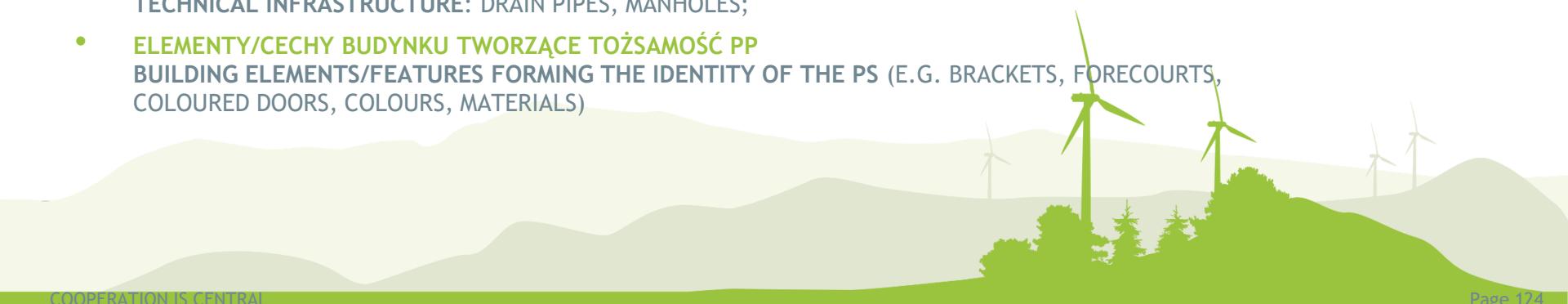
AD.3 GREENERY PS



AD.1 INWENTARYZACJA STAŁYCH ELEMENTÓW WYPOSAŻENIA PP

AD.1 INVENTORY OF FIXED LAND-USE ELEMENTS OF PS

- **PŁASZCZYZNY, RAMPY, SCHODY, MURY OPOROWE**
PLANES, RAMPS, STAIRS, RETAINING WALLS;
- **POSADZKA: MATERIAŁ I FORMA, KRAWĘŻNIKI, COKOŁY, INNE ELEMENTY WYPOSAŻENIA**
GROUND COVER MATERIALS: MATERIAL, FORM OF COVERING ELEMENTS (DIMENSIONS, SHAPE, COLOURS, JOINTS), KERBS - PAVEMENTS AND STREETS SEPARATELY; BANDS AND PLINTHS: I.E. THE EDGES FORMING THE PS, AND OTHER ITEMS;
- **INFRASTRUKTURA TECHNICZNA: RURY ODPROWADZAJĄCE, WŁAZY, INNE**
TECHNICAL INFRASTRUCTURE: DRAIN PIPES, MANHOLES;
- **ELEMENTY/CECHY BUDYNKU TWORZĄCE TOŻSAMOŚĆ PP**
BUILDING ELEMENTS/FEATURES FORMING THE IDENTITY OF THE PS (E.G. BRACKETS, FORECOURTS, COLOURED DOORS, COLOURS, MATERIALS)



INWENTARYZACJA STAŁYCH ELEMENTÓW WYPOSAŻENIA PP / INVENTORY OF FIXED LAND-USE ELEMENTS OF PS

INWENTARYZACJA STAŁYCH ELEMENTÓW WYPOSAŻENIA PP / INVENTORY OF FIXED LAND-USE ELEMENTS OF PS

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OPIS:

DESCRIPTION:

PŁASZCZYZNY, RAMPY, SCHODY, MURY OPOROWY / PLANES, RAMPS, STAIRS, RETAINING WALLS

<p>OPIS: OCENA I ZALECENIA:</p>		<p>DESCRIPTION: RECOMMENDATIONS:</p>	

POSADZKA: MATERIAŁ I FORMA, KRAWĘŻNIKI, COKOŁY / GROUND COVER MATERIALS: MATERIAL, FORM OF COVERING, KERBS, BANDS AND PLINTHS

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OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

ELEMENTY/CECHY BUDYNKU TWORZĄCE TOŻSAMOŚĆ PP / BUILDING ELEMENTS/FEATURES FORMING THE IDENTITY OF THE PS

OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

AD.2. WYPOSAŻENIE PP (MEBLE MIEJSKIE) AD.2. EQUIPMENT PP (URBAN FURNITURE)

A. ELEMENTY UŻYTKOWE / A. UTILITY COMPONENTS:

- ŁAWKI / BENCHES,
- OŚWIETLENIE / LIGHTING,
- OGRODZENIA / FENCES,
- BRAMY / GATES,
- KOSZE NA ŚMIECI / TRASH CANS,
- STUDNIE / WATER INTAKES,
- STOJAKI NA ROWERY, MIEJSCA DLA SKUTERÓW / BIKE RACKS, SPACES FOR SCOOTERS,
- ODBOJE BRAMNE / GUARD STONES,
- PERGOLE, ALTANY, ZADASZENIA / PERGOLAS, ARBORS, SHEDS,
- OBIEKTY TYMCZASOWE, PARKLETY, USŁUGI TYMCZASOWE / TEMPORARY OBJECTS, PARKLETS, TEMPORARY SERVICES,
- OZNAKOWANIE, INFORMACJA, REKLAMA / SIGNAGE, INFORMATION, ADVERTISING,

B. ELEMENTY DEKORACYJNE / B. DECORATIVE ELEMENTS:

- POMNIKI I MIEJSCA PAMIĘCI / MONUMENTS AND MEMORIALS,
- FONTANNY / FOUNTAINS,
- OBIEKTY ARTYSTYCZNE / ART. OBJECTS,
- STREET ART., MURALE, GRAFFITI / STREET ART, MURALS, GRAFFITI,
- INNE / OTHERS.



A. ELEMENTY UŻYTKOWE: ŁAWKI / A. UTILITY COMPONENTS: BENCHES

OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

A. ELEMENTY UŻYTKOWE: OŚWIETLENIE / A. UTILITY COMPONENTS: LIGHTENING

OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

A. ELEMENTY UŻYTKOWE: OGRODZENIA / A. UTILITY COMPONENTS: FENCES

OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

A. ELEMENTY UŻYTKOWE: BRAMY / A. UTILITY COMPONENTS: GATES

OPIS:
OCENA I ZALECENIA:

DESCRIPTION:
RECOMMENDATIONS:

A. ELEMENTY UŻYTKOWE: KOSZE NA ŚMIECI / A. UTILITY COMPONENTS: TRASH CANS

OPIS
OCENA I ZALECENIA:

DESCRIPTION:
RECOMMENDATIONS:

A. ELEMENTY UŻYTKOWE: STUDNIE, ZDROJE / A. UTILITY COMPONENTS: WELLS, WATER INTAKES

OPIS:
OCENA I ZALECENIA:

DESCRIPTION:
RECOMMENDATIONS:

A. ELEMENTY UŻYTKOWE: STOJAKI NA ROWERY, MIEJSCA DLA SKUTERÓW / A. UTILITY COMPONENTS: BIKE RACKS, SPACES FOR SCOOTERS

OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

A. ELEMENTY UŻYTKOWE: ODBOJE BRAMNE / A. UTILITY COMPONENTS: GUARD STONES

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OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

A. ELEMENTY UŻYTKOWE: PERGOLE, ALTANY, ZADASZENIA / A. UTILITY COMPONENTS: PERGOLAS , ARBORS , SHEDS

A. ELEMENTY UŻYTKOWE: OBIEKTY TYMCZASOWE, PARKLETY, USŁUGI TYMCZASOWE / A. UTILITY COMPONENTS: TEMPORARY OBJECTS, PARKLETS, TEMPORARY SERVICES

OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

OCENA I ZALECENIA:

COOPERATION IS CENTRAL

RECOMMENDATIONS:

Page 142

B. ELEMENTY DEKORACYJNE: FONTANNY / B. DECORATIVE ELEMENTS: FOUNTAINS

B. ELEMENTY DEKORACYJNE: STREET ART., MURALE, GRAFFITI / B. DECORATIVE ELEMENTS: STREET ART, MURALS, GRAFFITI

OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

B. ELEMENTY DEKORACYJNE: OBIEKTY ARTYSTYCZNE / B. DECORATIVE ELEMENTS: ART. OBJECTS`

OPIS: OCENA I ZALECENIA:			DESCRIPTION: RECOMMENDATIONS:
-----------------------------	--	--	----------------------------------

AD.3 ZIELEŃ W PP / AD.3 GREENERY PS

- POWIERZCHNIA TERENÓW ZIELENI / THE SIZE OF GREEN AREAS,
- TERENY ZIELENI / THE FORMS OF GREEN SPACE,
- RODZAJ ZIELENI: ZIELEŃ NISKA / TYPE OF GREENERY: LOW GREENERY,
- RODZAJ ZIELENI: DRZEWIA DOJRZAŁE / TYPE OF GREENERY: MATURE GREEN,
- RODZAJ ZIELENI: DRZEWIA MŁODE / TYPE OF GREENERY: YOUNG TREES,
- RODZAJ ZIELENI: DRZEWIA POMNIKOWE / TYPE OF GREENERY: MONUMENTAL TREE,
- RODZAJ ZIELENI: DRZEWIA PRZY ULCY / TYPE OF GREENERY: STREET TREE,
- RODZAJ ZIELENI: ZIELEŃ PNĄCA / TYPE OF GREENERY: HIGH GREEN,
- RODZAJ ZIELENI: ZIELEŃ TYMCZASOWA W DONICACH / TYPE OF GREENERY: TEMPORARY GREENERY IN POTS.



POWIERZCHNIA TERENÓW ZIELENI / THE SIZE OF GREEN AREAS

OPIS:

COOPERATION IS CENTRAL

DESCRIPTION:

RODZAJ ZIELEŃI: ZIELEŃ NISKA / TYPE OF GREENERY: LOW GREENERY

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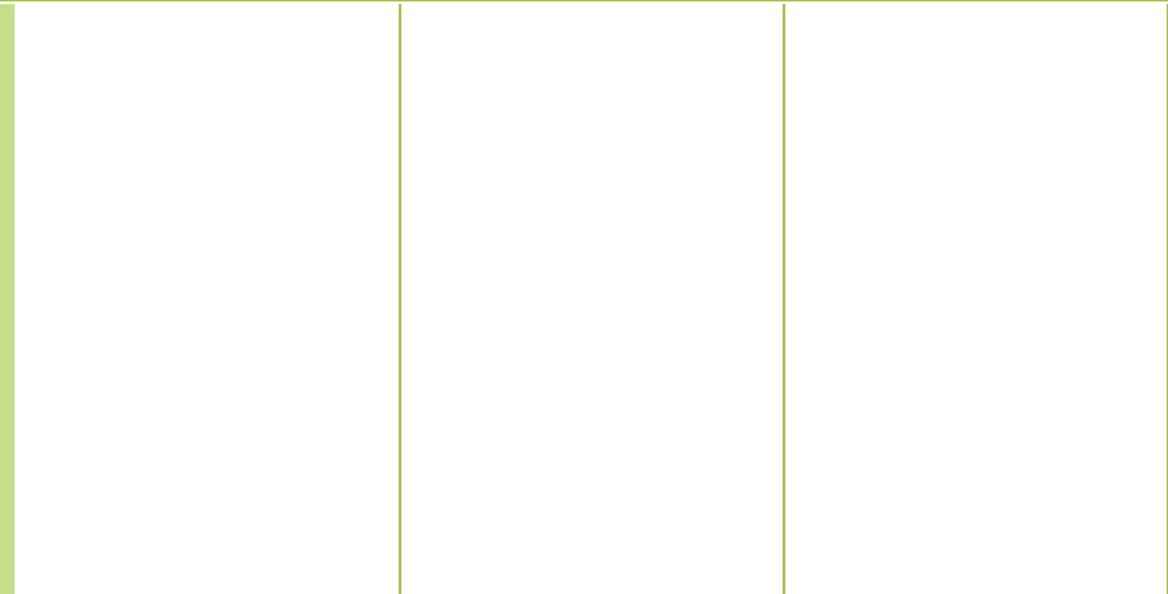
OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

RODZAJ ZIELNI: DRZEW DOJRZAŁE / TYPE OF GREENERY: MATURE GREEN



OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

RODZAJ ZIELENI: DRZEWA MŁODE / TYPE OF GREENERY: YOUNG TREES



RODZAJ ZIELENI: DRZEWA POMNIKOWE / TYPE OF GREENERY: MONUMENTAL TREE



RODZAJ ZIELENI: DRZEWA PRZY ULICY / TYPE OF GREENERY: STREET TREE



RODZAJ ZIELENI: ZIELEN PNACA / TYPE OF GREENERY: HIGH GREEN

OPIS: OCENA I ZALECENIA:	DESCRIPTION: RECOMMENDATIONS:			
COOPERATION IS CENTRAL				Page 151

RODZAJ ZIELENI: ZIELEŃ TYMCZASOWA W DONICACH / TYPE OF GREENERY: TEMPORARY GREENERY IN POTS

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OPIS:

OCENA I ZALECENIA:

DESCRIPTION:

RECOMMENDATIONS:

PART II

CHARAKTERYSTYKA I OCENA WYBRANYCH ASPEKTÓW PP CHARACTERISTICS/EVALUATION OF SELECTED ASPECTS OF PS

- AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA / AD.1 FUNCTIONING/USE
- AD.2 EKOLOGIA / AD.2 ECOLOGY
- AD.3 HISTORYCZNE ELEMENTY TWORZĄCE TOŻSAMOŚĆ / AD.3 HISTORIC ELEMENTS GIVING IDENTITY



AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA / AD.1 FUNCTIONING/USE

- ORGANIZACJA RUCHU / TRAFFIC ORGANISATION
- ZRÓWNOWAŻONE ZAGOSPODAROWANIE PRZESTRZENNE DO CELÓW FUNKCJONALNYCH / SUSTAINABLE SPATIAL DEVELOPMENT FOR FUNCTIONAL PURPOSES
- DOSTĘPNOŚĆ / ACCESSIBILITY
- BEZPIECZEŃSTWO / SAFETY
- OTWIERANIE I ŁĄCZENIE PRZESTRZENI / OPENING UP AND CONNECTING SPACES
- WPROWADZENIE USŁUG DO PRZESTRZENI PUBLICZNEJ / INTRODUCTION OF SERVICES INTO THE PUBLIC SPACES
- UŻYTKOWANIE PRZEZ OKREŚLONE GRUPY / USE BY SPECIFIC GROUPS



AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: ORGANIZACJA RUCHU

/priorytet ruchu pieszego, ograniczenie ruchu samochodowego, ścieżki rowerowe, komunikacja w terenie i do obszaru, komunikacja pionowa, organizacja parkingów/

OPIS:

OCENA I ZALECENIA:

AD.1 FUNCTIONING/USE: TRAFFIC ORGANISATION

/priority of pedestrian traffic, restriction of car traffic, bicycle lanes, communication in and to the area, vertical communication, organisation of parking lots/

DESCRIPTION:

RECOMMENDATIONS:

<p>AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: ZRÓWNOWAŻONE ZAGOSPODAROWANIE PRZESTRZENNE DO CELÓW FUNKCJONALNYCH</p> <p>/np. spowolniacze ruchu, podwyższenie przejść dla pieszych, likwidacja podziału na ulicę i chodnik - woonerf itp./</p>	<p>AD.1 FUNCTIONING/USE: SUSTAINABLE SPATIAL FOR FUNCTIONAL PURPOSES</p> <p>/e.g. traffic slowdowns, raised pedestrian crossings, elimination of the division between street and pavement - woonerf etc./</p>
<p>AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: DOSTĘPNOŚĆ</p> <p>/dostępność dla osób niepełnosprawnych (architektoniczna i inna, w tym wzory przestrzenne i oznakowanie), łatwość obsługi (np. ławki, cień, źródła wody)/</p> <p>OPIS:</p> <p>OCENA I ZALECENIA:</p>	<p>AD.1 FUNCTIONING/USE: ACCESSIBILITY</p> <p>/disability accessibility (architectural and other including spatial patterns and signage), user friendliness (e.g. benches, shade, water sources)/</p> <p>DESCRIPTION:</p> <p>RECOMMENDATIONS:</p>

AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: BEZPIECZEŃSTWO

/nawierzchnie antypoślizgowe, oświetlenie, ograniczenia ruchu, monitoring, niskie płoty - ograniczniki oddzielające chodniki od zieleni/

OPIS:

OCENA I ZALECENIA:

AD.1 FUNCTIONING/USE: SAFETY

/anti-slip surfaces, lighting, traffic restrictions, monitoring, low fences - delineators separating pavements from greenery/

DESCRIPTION:

RECOMMENDATIONS:

AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: OTWIERANIE I ŁĄCZENIE PRZESTRZENI

/ np. włączenie dziedzińców do PP/

OPIS:

OCENA I ZALECENIA:

AD.1 FUNCTIONING/USE: OPENING UP AND CONNECTING SPACES

/ e.g. incorporation of courtyards into PS /

DESCRIPTION:

RECOMMENDATIONS:

AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: WPROWADZENIE USŁUG DO PRZESTRZENI PUBLICZNEJ

/np. ogródki gastronomiczne, stoiska, markety, kioski, lodowiska)/

AD.1 FUNCTIONING/USE: INTRODUCTION OF SERVICES INTO THE PUBLIC SPACES

/e.g. catering gardens, stands, markets, kiosks, ice rinks)/

AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: UŻYTKOWANIE PRZEZ OKREŚLONE GRUPY

/np. place zabaw dla dzieci, dla dorosłych - ciche gry - szachy, boule itp., tereny sportowe - m.in. siłownie zewnętrzne, skatepark, wybiegi dla zwierząt/

OPIS:

OCENA I ZALECENIA:

AD.1 FUNCTIONING/USE: USE BY SPECIFIC GROUPS

/e.g. children's playgrounds, adults - silent games - chess, boules etc., sports areas - e.g. outdoor gyms, skate park, pet walkers/

DESCRIPTION:

RECOMMENDATIONS:

AD.2 EKOLOGIA / AD.2 ECOLOGY

- ROZWIĄZANIA OPARTE NA PRZYRODZIE / NBS VEGETATION
- UDZIAŁ NAWIERZCHNI UTWARDZONEJ I POWIERZCHNI BIOLOGICZNIE CZYNNEJ / AMOUNT OF CONCRETE PAVEMENT AND BIOLOGICALLY ACTIVE SURFACES
- EKOLOGICZNE MEBLE MIEJSKIE / SUSTAINABLE URBAN FURNITURE
- GROMADZENIE WODY DESZCZOWEJ / DRAINAGE, WATER COLLECTION
- FOTOWOLTAIKA, STACJE ŁADOWANIA SAMOCHODÓW ELEKTRYCZNYCH / PHOTOVOLTAICS , ELECTRIC CAR CHARGING STATIONS
- GOSPODAROWANIE ODPADAMI / WASTE MANAGEMENT



AD.2 EKOLOGIA: ROZWIĄZANIA OPARTE NA PRZYRODZIE

/(ilość, forma, rodzaj) (zieleń niska - np. zielone aleje, łąki kwietne, zieleń ruderalna), (zielona architektura - zieleń dachowa i pionowa/zielone ściany hydroponiczne, zielone pergole i ogrodzenia), ogrody warzywne i ziołowe - forma podniesionych grządki, las miejski itp./

OPIS:

OCENA I ZALECENIA:

AD.2 EKOLOGIA: UDZIAŁ NAWIERZCHNI UTWARDZONEJ I POWIERZCHNI BIOLOGICZNIE CZYNNEJ

/(identyfikacja wysp ciepła), powierzchnie przepuszczalne, nawierzchnie podwieszane, oddzielanie korzeni drzew od infrastruktury/

OPIS:

OCENA I ZALECENIA:

AD.2 EKOLOGIA: EKOLOGICZNE MEBLE MIEJSKIE

/tworzenie zielonych przystanków autobusowych, domków dla ptaków i owadów, uli itp./

OCENA I ZALECENIA:

AD.2 ECOLOGY: NBS VEGETATION

/(quantity, form, type) (low greenery - e.g. green lanes, flower meadows, ruderal greenery), (green architecture - rooftop and vertical greenery/ green hydroponic walls, green pergolas and fences), vegetable and herb gardens - form of raised beds, urban forest, etc./

DESCRIPTION:

RECOMMENDATIONS:

AD.2 ECOLOGY: AMOUNT OF CONCRETE PAVEMENT AND BIOLOGICALLY ACTIVE SURFACES

/(identification of heat islands), permeable surfaces, suspended pavements, separating tree roots from infrastructure/

DESCRIPTION:

RECOMMENDATIONS:

AD.2 ECOLOGY: SUSTAINABLE URBAN FURNITURE

/creating green bus stops, birdhouses, insecthouses, beehives, etc./

RECOMMENDATIONS:

AD.2 EKOLOGIA: ZBIERANIA WODY DESZCZOWEJ

/(ponds, retention basins, infiltration and bioretention ditches, rain gardens/potted rain gardens)/

OCENA I ZALECENIA:

AD.2 ECOLOGY: DRAINAGE, WATER COLLECTION

/(ponds, retention basins, infiltration and bioretention ditches, rain gardens/potted rain gardens)/

RECOMMENDATIONS:

AD.2 EKOLOGIA: FOTOWOLTAIKA, STACJE ŁADOWANIA SAMOCHODÓW ELEKTRYCZNYCH

OCENA I ZALECENIA:

AD.2 ECOLOGY: PHOTOVOLTAICS, ELECTRIC CAR CHARGING STATIONS

RECOMMENDATIONS:

AD.2 EKOLOGIA: GOSPODAROWANIE ODPADAMI

OCENA I ZALECENIA:

AD.2 ECOLOGY: WASTE MANAGEMENT

RECOMMENDATIONS:

AD. 3 ELEMENTY HISTORYCZNE I CECHY IDENTYFIKUJĄCE PP / AD.3 HISTORIC AND IDENTITY ELEMENTS OF PS

- SPIS WSZYSTKICH ELEMENTÓW HISTORYCZNYCH I CECH, TWORZĄCYCH TOŻSAMOŚĆ PP
/ ENUMERATION OF ALL ELEMENTS AND FEATURES THAT ARE HISTORIC AND FORM THE IDENTITY OF THE PS



AD. 3 ELEMENTY HISTORYCZNE I CECHY IDENTYFIKUJĄCE PP: SPIS WSZYSTKICH ELEMENTÓW HISTORYCZNYCH I CECH, TWORZĄCYCH TOŻSAMOŚĆ PP

/np. oznaczanie przebiegu linii obronnych w kondygnacjach PP, eksponowanie w przestrzeni fundamentów obiektów zabytkowych, wykopalisk itp., formy upamiętnienia/

OPIS:

OCENA I ZALECENIA:

AD.3 HISTORIC AND IDENTITY ELEMENTS OF PS: ENUMERATION OF ALL ELEMENTS AND FEATURES THAT FORM THE IDENTITY OF THE PS

/e.g. marking the course of defensive lines in PP floors, exposing in space the foundations of historic buildings, excavations etc., forms of commemoration/

DESCRIPTION:

RECOMMENDATIONS:

PART III

ULEPSZENIE I OCHRONA WYBRANYCH ASPEKTÓW PP IMPROVING/PROTECTING SELECTED ASPECTS OF PS

- AD.1 OCENA/POPRAWA JAKOŚCI ELEMENTÓW MATERIAŁOWYCH / AD.1 ASSESSING/IMPROVING THE QUALITY OF THE MATERIAL ELEMENTS
- AD.2. OCENA/POPRAWA JAKOŚCI UŻYTKOWANIA / AD. 2. EVALUATION/IMPROVEMENT OF QUALITY OF USE
- AD.3 OCENA/POPRAWA ASPEKTÓW EKOLOGICZNYCH / AD.3 ASSESSMENT/IMPROVEMENT OF ECOLOGICAL ASPECTS
- AD 4. OCENA/ POPRAWA OBSZARÓW ZIELONYCH / AD 4. EVALUATION/IMPROVEMENT OF GREEN AREAS
- AD.5 OCHRONA WARTOŚCI/TOŻSAMOŚCI I ELEMENTÓW HISTORYCZNYCH / AD.5 PROTECTION OF HISTORIC ELEMENTS AND VALUES/IDENTITY
- AD.6 OCENA/POPRAWA ESTETYKI / AD.6 EVALUATION/IMPROVEMENT OF AESTHETICS

AD.1 OCENA/POPRAWA JAKOŚCI ELEMENTÓW MATERIAŁOWYCH

/(zadanie odrębne od kryteriów jakościowych materiałów, niezależne od dalszych punktów)poprawa stanu technicznego elementów tworzących przestrzenie publiczne (konieczność oceny czy jest to konieczne - stan techniczny wszystkich elementów materialnych)modernizacja elementów PP/

AD.1 ASSESSING/IMPROVING THE QUALITY OF THE MATERIAL ELEMENTS

/ (separate task from the material quality criteria, independent of further points) improvement of the technical condition of the elements forming the public spaces (need to assess whether it is necessary - technical condition of all material elements) upgrading of PS elements/

AD.2. OCENA/POPRAWA JAKOŚCI UŻYTKOWANIA

- improving functionality; e.g. subordination of pedestrian traffic and large numbers of people, bicycle transport (is it really desirable), transport within the area and to the area, elimination of the division between streets and pavements (is it really so); provision of parking, slowing down, raised pedestrian crossings,
- signage
- improving accessibility (accessibility for the disabled as well as general access)
- safety (non-slip surfaces, lighting, traffic restrictions)
- signposting/information
- opening up and connecting spaces
- allowing services to move out into the street (gardens)

AD. 2. EVALUATION/IMPROVEMENT OF QUALITY OF USE

- improving functionality; e.g. subordination of pedestrian traffic and large numbers of people, bicycle transport (is it really desirable), transport within the area and to the area, elimination of the division between streets and pavements (is it really so); provision of parking, slowing down, raised pedestrian crossings,
- signage
- improving accessibility (accessibility for the disabled as well as general access)
- safety (non-slip surfaces, lighting, traffic restrictions)
- signposting/information
- opening up and connecting spaces
- allowing services to move out into the street (gardens)

AD.3 OCENA/POPRAWA ASPEKTÓW EKOLOGICZNYCH

/zielność traktowana jest podwójnie - jako stały element i jako element ekologiczny - w tym drugim przypadku będą zapewne inne priorytety - będzie założenie wprowadzenia zieleni/ - tutaj można przeprowadzić analizy temperaturowe (programy/analizy komputerowe)

- wprowadzenie zieleni i wody (obszary biologicznie czynne)• zacienienie (zadaszenia, w tym te o wysokim albedo, ale także poprzez wprowadzenie wysokiej zieleni)

- gospodarka wodami opadowymi

- kosze na śmieci (segregacja odpadów, ukryte kosze na śmieci)/

AD.3 ASSESSMENT/IMPROVEMENT OF ECOLOGICAL ASPECTS

/greenery is treated twice - as a permanent fixture and as an ecological element - in the latter case there will probably be other priorities - there will be an assumption of introducing greenery/ -- here temperature analyses (computer programs/analyses) can be done

- introduction of greenery and water (biologically active areas)
- shading (canopies, including those with high albedo, but also through the introduction of tall greenery)

- rainwater management

- rubbish bins (waste segregation, concealed rubbish bins)/

AD 4. OCENA/ POPRAWA OBSZARÓW ZIELONYCH

/• wielkość terenów zielonych (różne formy); • istniejące formy przestrzenne zieleni; • ocena gatunkowa zieleni/

AD 4. EVALUATION/IMPROVEMENT OF GREEN AREAS

/• size of green spaces (various forms); • existing spatial forms of greenery; • species assessment of greenery/

AD.5 OCHRONA WARTOŚCI/TOŻSAMOŚCI I ELEMENTÓW
HISTORYCZNYCH

AD.5 PROTECTION OF HISTORIC ELEMENTS AND VALUES/IDENTITY

AD.6 OCENA/POPRAWA ESTETYKI

- Działania mogą być albo wskazaniami konkretnych elementów, albo w formie Przewodników Dobrych Praktyk (ogrody gastronomiczne, parasole, ławki, znaki itp.).
- Poprawa estetyki poprzez standaryzację (np. reklamy, parasole, witryny sklepowe),
- balustrady, tynki, wieszanie prania - co można zobaczyć z przestrzeni publicznych
- murale, dekoracje przestrzenne, graffiti
- poprawa funkcjonalności (spełnianie funkcji)
- jakość użytkowania (jakość mebli).

AD.6 EVALUATION/IMPROVEMENT OF AESTHETICS

- Actions can be either indications of specific elements or in the form of Good Practice Guides (catering gardens, umbrellas, benches, signs, etc.).
- Improving aesthetics through standardisation (e.g. advertising, umbrellas, shop windows),
- railings, plasterwork, hanging laundry - what can be seen from public spaces
 - murals, spatial decorations, graffiti
 - functional improvement (fulfilment of functions)
 - quality of use (quality of furniture).

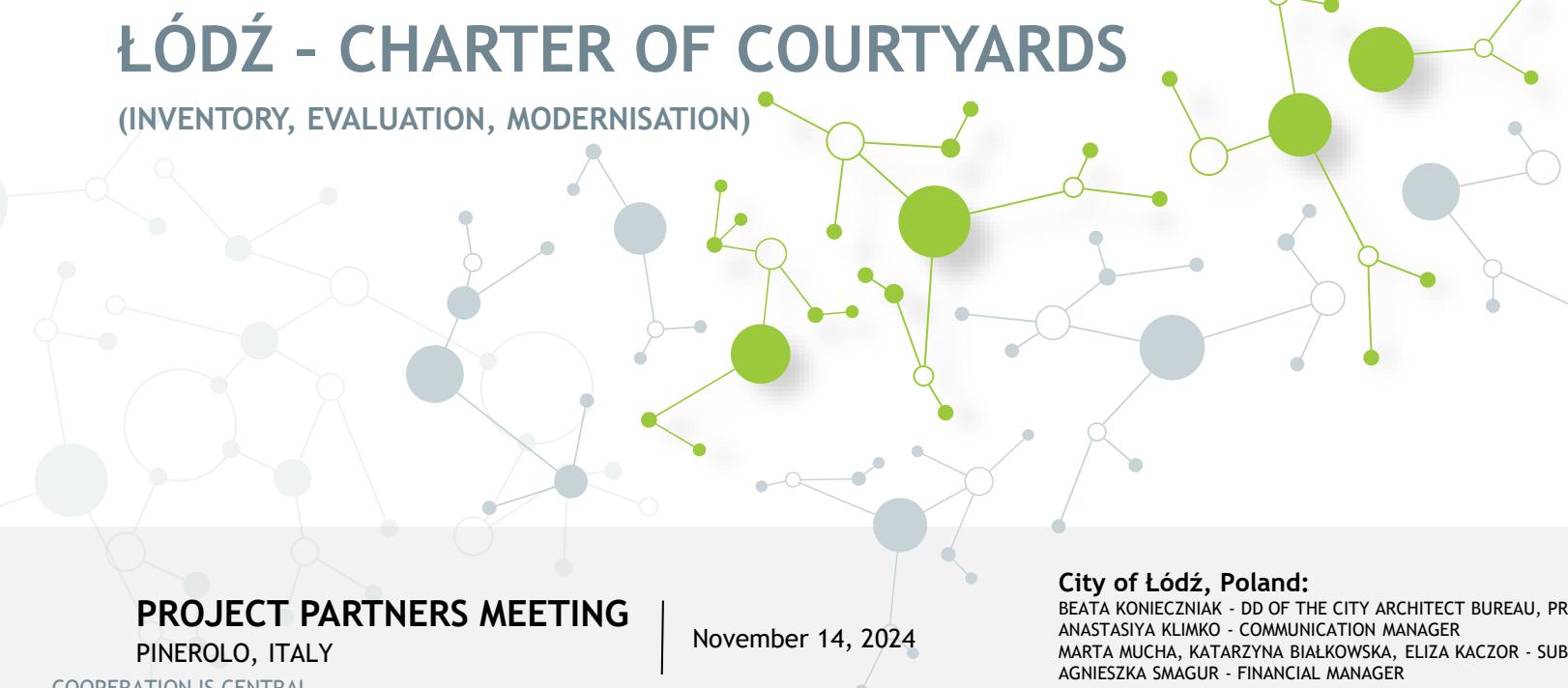
ŁÓDŹ - KARTA PODWÓREK

(INWENTARYZACJA, OCENA, MODERNIZACJA)

ŁÓDŹ - CHARTER OF COURTYARDS

(INVENTORY, EVALUATION, MODERNISATION)

RE-PUBLIC SPACES



STRUKTURA KARTY

THE STRUCTURE OF THE CHARTER

- CZEŚĆ I - INWENTARYZACJA I CHARAKTERYSTYKA / PART I - INVENTORY AND CHARACTERISATION
- CZEŚĆ II - CHARAKTERYSTYKA I OCENA / PART II - CHARACTERISATION AND ASSESSMENT
- CZEŚĆ III - WNIOSKI I UDOSKONALENIE / PART III - CONCLUSIONS AND IMPROVEMENT



CHARAKTERYSTYKA PRZESTRZENI PUBLICZNEJ W STREFIE WIELKOMIEJSKIEJ/ CHARACTERISTICS OF THE PUBLIC SPACE IN THE HISTORIC URBAN CORE

NAZWA MIASTA / NAME OF THE MUNICIPALITY	Miasto Łódź / City of Łódź
ROK ZAŁOŻENIA / DATE OF LOCATION	1423
TYPOLOGIA PP KRÓTKA CHARAKTERYSTYKA / PS TYPOLOGY BRIEF CHARACTERISTICS	<p>Łódź posiada jedyny w swoim rodzaju, autentyczny zespół historyzujących, eklektycznych i secesyjnych kamienic z przełomu XIX-XX wieku, liczne pałace, wille oraz zespoły fabryczne. Wszystkie te budowle są swoistymi symbolami wielonarodowej oraz wielowyznaniowej Łodzi, a przede wszystkim czynią ją Miastem wyjątkowym o unikalnym w skali Europy krajobrazie architektonicznym. Łódź początkowo była małą wsią leżącą w granicach księstwa łęczyckiego. Prawa miejskie nadane zostały jej 29 lipca 1423 r. Do końca XVII w. Łódź rozwijała się jako osada rolnicza. W 1820 rząd Królestwa Polskiego włączył Łódź do grona osad przemysłowych i przeznaczył jej rolę ośrodka tkackiego i sukienniczego. W latach 1824-1827 wytyczono osadę „Łódka”, położoną na południe od „Nowego Miasta”, wzdłuż osi, którą stanowiła ulica Piotrkowska. Początki Łodzi wielkopoprzemysłowej związane są z powstawaniem wielkich manufaktur m.in. K. Scheiblera, T. Grohmann i I. Poznańskiego oraz kompleksu fabrycznego L. Geyera, z pierwszą na terenach Królestwa Polskiego i jedną z pierwszych na terenach Imperium Rosyjskiego maszyną parową. W tym czasie rosły fortuny przemysłowe. Łódź stała się miejscem wielkich szans dla Żydów, Niemców, Polaków i Rosjan - przysłowiową Ziemią Obiecana. Ich ślady są ciągle czytelne w dzisiejszym mieście w postaci zespołów pofabrycznych, zabytków architektonicznych, świątyń czy cmentarzy.</p> <p>Łódź has a unique, authentic complex of historic, eclectic and Art Nouveau tenement houses from the turn of the 19th and 20th centuries, numerous palaces, villas and factory complexes. All these buildings are symbols of the multinational and multi-religious Łódź, and above all, they make it a unique city with an architectural landscape unique in Europe. Łódź was initially a farming settlement. It was granted city rights on July 29, 1423. Until the end of the 17th century, Łódź developed as a small agricultural town. In 1820, the government of the Kingdom of Poland included Łódź among the industrial settlements and assigned it the role of a weaving and cloth center. In the years 1824-1827, the settlement of "Łódka" was established, located south of the "Nowe Miasto", along the axis of Piotrkowska Street. The beginnings of large-scale industry in Łódź are associated with the establishment of large factories, among the others of K. Scheiblera, T. Grohmann i I. Poznańskiego including: Ludwik Geyer's factory complex, with the first steam engine in the Kingdom of Poland and one of the first in the Russian Empire. At this time, industrial fortunes were growing. Łódź became a place of great opportunities, mainly for Jews, Germans, Poles and Russians - the proverbial Promised Land. Their traces are still visible in today's city in the form of post-industrial complexes, architectural monuments, temples and cemeteries.</p>
COOPERATION IS CENTRAL	Page 173

CHARAKTERYSTYKA PRZESTRZENI PUBLICZNEJ / CHARACTERISTICS OF THE PUBLIC SPACE

OCHRONA KONSERWATORSKA / CONSERVATION POLICY	<ul style="list-style-type: none"> Rejestr Zabytków (wpis obszarowy) - Układ urbanistyczny ulicy Piotrkowskiej, 2 poł. XIX w.: od pl. Wolności do al. Mickiewicza A/48; Gminna Ewidencja Zabytków (wpis obszarowy) - Układ urbanistyczny i krajobraz kulturowy: Osada Łódka, Ogrody Sukiennicze Nowego Miasta, Dzielnica „Wiązowa”. The National Register of the Historic Monuments (area entry) - Urban layout of Piotrkowska Street, 2nd half 19th century: from Freedom square to Mickiewicz avenue, A/48; The Municipal Index of the Historic Monuments of Łódź (area entry) - Urban layout and cultural landscape: Łódka Settlement, Textile Gardens of the New Town, "Wiązowa" District
WŁAŚCIWY ORGAN KONSERWATORSKI / COMPETENT AUTHORITY CONSERVATION OFFICE	<p>Wojewódzki Urząd Ochrony Zabytków w Łodzi The Voivodeship (Provincial) Office of the Historic Monuments Protection in Łódź</p>
REALIZOWANE PROGRAMY REWITALIZACJI PRZESTRZENI PUBLICZNEJ I INNE DOKUMENTY STRATEGICZNE / REVITALISATION PROGRAMMES FOR PUBLIC SPACES AND OTHER STRATEGIC PAPERS	<ul style="list-style-type: none"> Gminny Program Rewitalizacji Miasta Łodzi 2026+ Załącznik do uchwały Nr LXXXVI/2594/24 Rady Miejskiej w Łodzi z dnia 17 stycznia 2024 r. Polityka przestrzennego rozwoju - Uchwała Nr LV/1146/13 Rady Miejskiej w Łodzi z dnia 16 stycznia 2013 r. w sprawie Strategii przestrzennego rozwoju Łodzi 2020+ Strategia Zintegrowanego Rozwoju Łodzi 2020+ - Uchwała Nr XLIII/824/12 Rady Miejskiej w Łodzi z dnia 25 czerwca 2012 r. w sprawie przyjęcia „Strategii Zintegrowanego Rozwoju Łodzi 2020+”. Strategia Rozwoju Miasta Łodzi 2030+ - Uchwała nr L/1535/21 Rady Miejskiej w Łodzi z dnia 17 listopada 2021 r. w sprawie przyjęcia "Strategii Rozwoju Miasta Łodzi 2030+". Studium uwarunkowań i kierunków zagospodarowania przestrzennego miasta Łodzi - Studium uchwalone uchwałą Nr LXIX/1753/18 Rady Miejskiej w Łodzi z dnia 28 marca 2018 r. z późniejszymi zmianami. The Municipal Revitalization Program of the City of Łódź 2026+ The Strategy of the Spatial Development of Łódź 2020+ The Strategy for the Integrated Development of Łódź 2020+ The Development Strategy of the City of Łódź 2030+ The Study Of The Conditions And Directions Of Spatial Development of the City of Łódź
AKTY PRAWNA MIEJSKOWEGO, WYTYCZNE KONSERWATORSKIE / LOCAL PLAN, CONSERVATION GUIDELINES	<ul style="list-style-type: none"> Miejskie Plany Zagospodarowania Przestrzennego Zalecenia i wytyczne konserwatorskie zgodnie z USTAWĄ z dnia 23 lipca 2003 r. o ochronie zabytków i opiece nad zabytkami The Local Spatial Development Plans and conservation recommendations The guidelines according to The Act on the Protection of Monuments and the Guardianship of Monuments

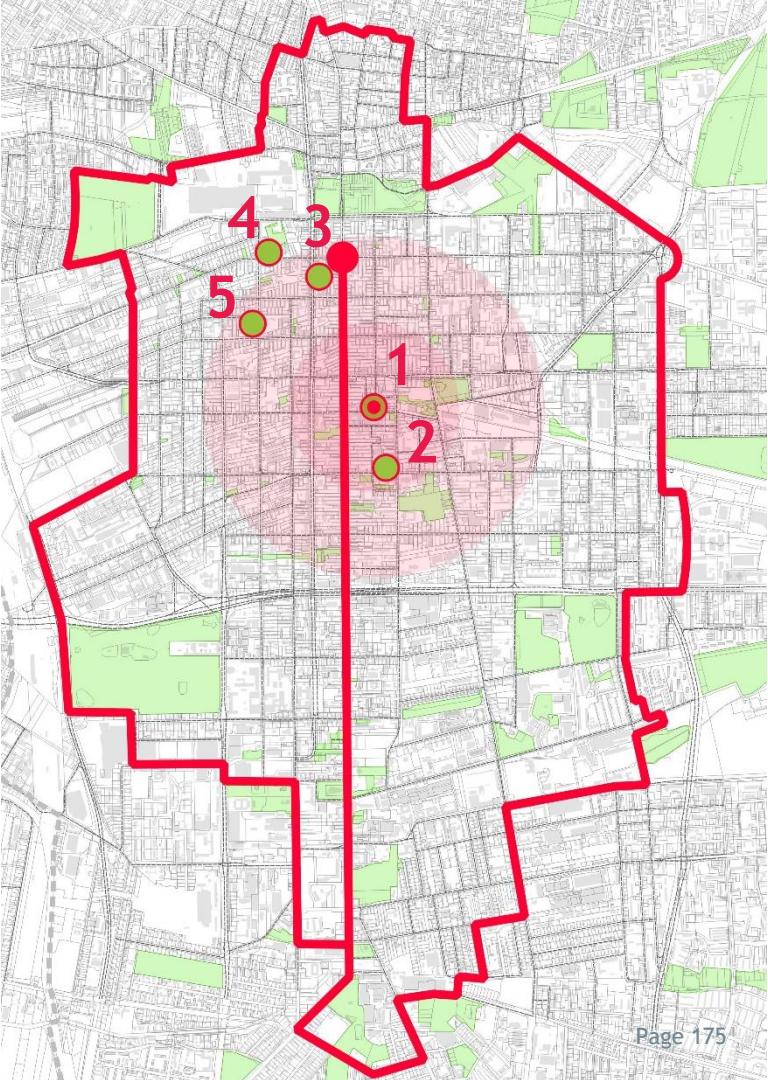
LEGENDA / MAP LEGEND

1. PODWÓRKO PILOTAŻOWE - UL. TRAUTGUTTA 8
PILOT INVESTMENT COURTYARD - TENEMENT
WITH SERVICES AT 8 TRAUTGUTTA ST
2. PODRÓRKO KAMIENICY PRZY UL. TUWIMA 16
TENEMENT HOUSE AT 16 TUWIMA ST
3. PODRÓRKO KAMIENICY PRZY UL. LEGIONÓW 2
TENEMENT HOUSE AT 2 LEGIONÓW ST
4. PODRÓRKO KAMIENICY PRZY UL. LEGIONÓW 31
TENEMENT HOUSE AT 31 LEGIONÓW ST
5. PODRÓRKO KAMIENICY PRZY UL. GDAŃSKIEJ 35
TENEMENT HOUSE AT 35 GDAŃSKA ST

STREFA WIELKOMIEJSKA ŁÓDZI Z JEJ GŁÓWNA
OSIĄ KOMPOZYCYJNĄ - UL. PIOTRKOWSKĄ
/ HISTORICAL URBAN CORE WITH ITS MAIN
URBAN AXIS - PIOTRKOWSKA STREET STARTED
FROM THE FREEDOM SQUARE

TEREN W ZASIĘGU 500M OD PODWÓRKA
PILOTAŻOWEGO / AREA WITHIN 500M RANGE
FROM THE PILOT INVESTMENT COURTYARD

TEREN W ZASIĘGU 1000M OD PODWÓRKA
PILOTAŻOWEGO / AREA WITHIN 1000M RANGE
FROM THE PILOT INVESTMENT COURTYARD



PART I

INWENTARYZACJA I CHARAKTERYSTYKA TECHNICZNA ELEMENTÓW PP

INVENTORY AND TECHNICAL CHARACTERISTICS OF PS ELEMENTS

AD.1 INWENTARYZACJA STAŁYCH ELEMENTÓW WYPOSAŻENIA PP

AD.1 INVENTORY OF FIXED LAND-USE ELEMENTS OF PS

AD.2. WYPOSAŻENIE PP (MEBLE MIEJSKIE)

AD.2. EQUIPMENT PP (URBAN FURNITURE)

AD.3 ZIELEŃ W PP

AD.3 GREENERY PS



AD.1 INWENTARYZACJA STAŁYCH ELEMENTÓW WYPOSAŻENIA PP

AD.1 INVENTORY OF FIXED LAND-USE ELEMENTS OF PS

- **PŁASZCZYZNY, RAMPY, SCHODY, MURY OPOROWE**
PLANES, RAMPS, STAIRS, RETAINING WALLS;
- **POSADZKA: MATERIAŁ I FORMA, KRAWĘŻNIKI, COKOŁY, INNE ELEMENTY WYPOSAŻENIA**
GROUND COVER MATERIALS: MATERIAL, FORM OF COVERING ELEMENTS (DIMENSIONS, SHAPE, COLOURS, JOINTS), KERBS - PAVEMENTS AND STREETS SEPARATELY; BANDS AND PLINTHS: I.E. THE EDGES FORMING THE PS, AND OTHER ITEMS;
- **INFRASTRUKTURA TECHNICZNA: RURY ODPROWADZAJĄCE, WŁAZY, INNE**
TECHNICAL INFRASTRUCTURE: DRAIN PIPES, MANHOLES;
- **ELEMENTY/CECHY BUDYNKU TWORZĄCE TOŻSAMOŚĆ PP**
BUILDING ELEMENTS/FEATURES FORMING THE IDENTITY OF THE PS (E.G. BRACKETS, FORECOURTS, COLOURED DOORS, COLOURS, MATERIALS)



INWENTARYZACJA STAŁYCH ELEMENTÓW WYPOSAŻENIA PP / INVENTORY OF FIXED LAND-USE ELEMENTS OF PS

Kamienica mieszkaniowa z usługami

Inwestycja pilotowa

Tenement with services

Pilot investment courtyard

Address: 8 Traugutta ST

Total area: 1171 m²

Courtyard area: 283,8 m²



Kamienica mieszkaniowa z usługami

Tenement with services

Address: 16 Tuwima ST

Total area: 1138 m²

Courtyard area: 260,7 m²



Biblioteka „Wolność”

Freedom Library

Address: 2 Legionów ST/4 Freedom square

Total area: 1262 m²

Courtyard area: 470 m²



Kamienica mieszkaniowa z usługami

Tenement with services

Address: 31 Legionów ST

Total area: 1051 m²

Courtyard area: 290,3 m²



Kamienica mieszkaniowa z usługami

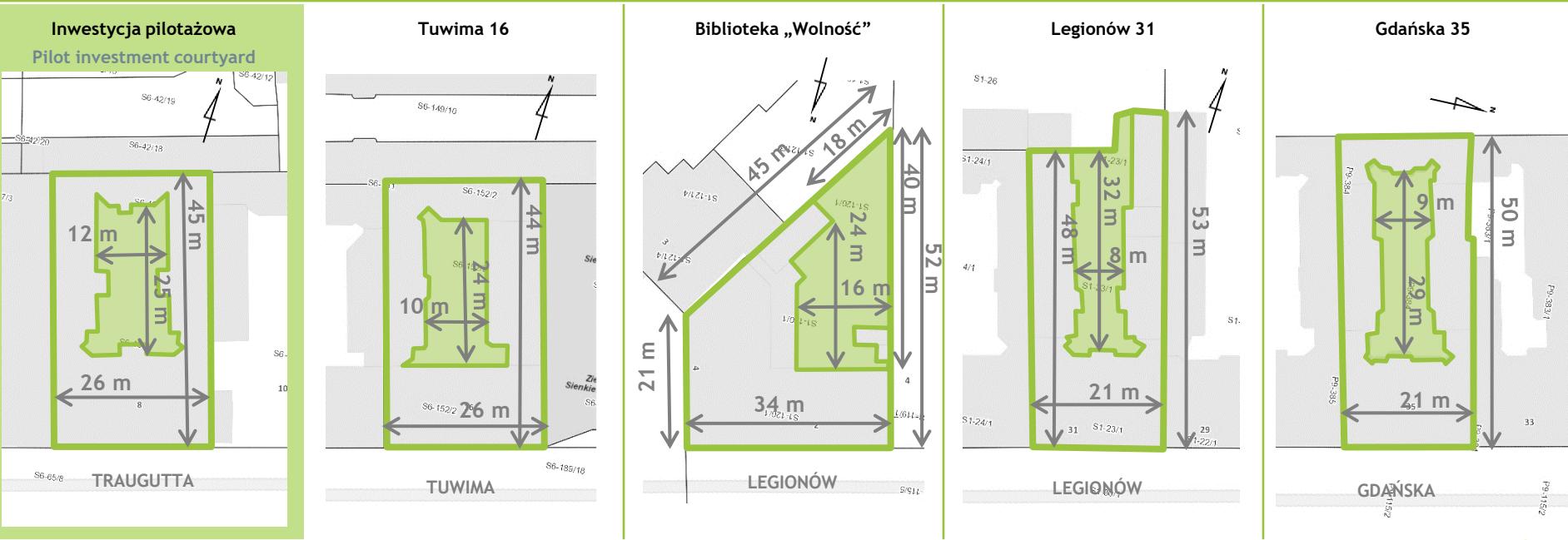
Tenement with services

Address: 35 Gdańska ST

Total area: 1078 m²

Courtyard area: 259,4 m²





OPIS:

Kamienice budowano etapowo, zaczynając od budynku frontowego z dobudowywaniem oficyn mieszkalnych w głębi działki w późniejszych okresach. Najczęściej występują w Łodzi układy kamienic o kształcie litery O, U lub L, umieszczane obok siebie i tworzące dojść wąskie długie podwórka o malej dostępności światła słonecznego w głębi działki. Obecnie miasto realizuje wiele strategii i inicjatyw ukierunkowanych na rewitalizację kamienic, a ich podwórka zaczynają pełnić funkcję przestrzeni publicznych lub półpublicznych. Obecnie nie ma kompleksowych wytycznych dotyczących adaptacji przestrzeni podwórek do zmian klimatycznych.

DESCRIPTION:

The tenement houses were constructed in phases, beginning with the front building and later adding residential outbuildings further into the plot. Common layouts for tenement houses in Łódź include O, U, or L shapes, situated adjacent to one another and creating narrow, elongated courtyards with limited access to sunlight deep within the plot. Nowadays, the city is implementing multiple strategies and initiatives focused on revitalization of tenement houses, and their courtyards are starting to serve as public or semi-public spaces.

CO There are currently no comprehensive guidelines for adaptation of the historical courtyards to climate change.

PŁASZCZYZNY, RAMPY, SCHODY, MURY OPOROWY / PLANES, RAMPS, STAIRS, RETAINING WALLS

Inwestycja pilotażowa

Pilot investment courtyard



Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35



OPIS:

Przestrzenie dziedzińców mają jednolity poziom posadzki względem poziomu ulicy. Wewnętrz podwórzy występują nieznaczne różnice poziomu terenu, zaprojektowane

na potrzeby odprowadzenia wód opadowych. Historycznie parter kamienic łódzkich był usytuowany nad poziomem terenu. Najnowsze rewitalizacje zmieniają zagospodarowanie tak, aby parter oficyn stał się dostępny dla osób z niepełnosprawnością ruchową, poprzez obniżenie jego poziomu lub wprowadzenie wtopionych ramp przy drzwiach wejściowych. W przypadkach, gdzie warunki lokalne nie pozwalały na zaprojektowanie rampy, do drzwi wejściowych prowadzą schody zewnętrzne.

OCENA I ZALECENIA:

W przypadkach, gdzie parter oficyny leży w przedziale 10 - 20 cm nad poziomem terenu sugeruje się wprowadzenie pochylni. Pochylnie nie powinny zaburzać tektoniki wewnętrz architektonicznych i stanowić element demontażowy. Nowo projektowane pochylnie powinny wpisywać się w przyjęte rozwiązania materiałowe oraz charakter rewitalizowanych przestrzeni. W przestrzeniach dziedzińców, gdzie stosowanie pochylni nie jest zasadne ze względu na warunki lokalne, należy zapewnić dostępność alternatywną.

DESCRIPTION:

The courtyards have a uniform ground level with the street, but there are slight variations in the ground level within the yards to facilitate rainwater drainage. Historically, the ground floor of tenement houses in Łódź was above ground level. However, recent revitalization efforts have focused on altering the layout to ensure that the ground floor of the outbuildings is accessible to individuals with mobility impairments. That has been achieved by either lowering the level of the outbuildings or installing embedded ramps at the entrance doors. In cases where the terrain makes ramp implementation unfeasible, external stairs provide access to the entrance door.

RECOMMENDATIONS:

In cases where the ground floor of the outbuildings is 10-20 cm above the ground level, it is recommended to install ramps. The new ramps should not disturb the architectural harmony of the yard's urban interiors and should not be removable. The design of the new ramps should complement the existing materials solutions and the ambience of the spaces. In cases where the use of ramps is not feasible due to local conditions of the courtyards, alternative access to the building should be provided.

POSADZKA: MATERIAŁ I FORMA, KRAWĘŻNIKI, COKOŁY / GROUND COVER MATERIALS: MATERIAL, FORM OF COVERING, KERBS, BANDS AND PLINTHS

Inwestycja pilotowa
Pilot investment courtyard



Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35



OPIS:

Stosowane materiały: kostka betonowa, kostka granitowa łupana, płyta betonowa/granitowa, wylewka betonowa. Kolorystyka: odcienie szarości i kolory ziemi. Rysunek posadzki: wzór prosty, cegielka lub łukowy. Historycznie przestrzenie dziedzińców utwardzane były brukiem kamiennym; na podwórkach, gdzie historyczna nawierzchnia zachowała się w dobrym stanie, można zobaczyć wyekspponowany dawny bruk (np. przy ul. Gdańskiej 35).

OCENA I ZALECENIA:

- Kontynuacja wypracowanych dobrych praktyk w zakresie materiałów, kolorystyki i wzorów posadzki.
- Zachowanie i wpisanie elementów historycznych w nową nawierzchnię.
- Stworzenie terenów biologicznie czynnych, w tym zieleni urządzonej.

DESCRIPTION:

Materials used: concrete setts, sawn-split granite paving stones, concrete/granite plates, concrete screed. Colors: shades of gray and earthy colors. Floor design: straight, brick, or arched patterns. Historically, courtyard spaces were paved with stone paving; in the yards where the historical surface has been preserved in good condition, you can see disclosed old paving (e.g. at 35 Gdańsk ST).

RECOMMENDATIONS:

- Continuation of formed good practices in the domain of materials, colors, and patterns of the paving.
- Preservation and integration of the historical elements into the new surface.
- Creation of biologically active areas, including greenery.

Inwestycja pilotażowa Pilot investment courtyard



Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35



OPIS:

Rury spustowe w przestrzeni dziedzińców najczęściej odprowadzane są bezpośrednio do kanalizacji burzowej. Rzadziej spotykane jest rozwiązanie w postaci rynny zakończonej rzygaczem. W przestrzeni dziedzińców występuje profilowany spadek nawierzchni od budynków do studienek kanalizacji deszczowej.

OCENA I ZALECENIA:

Zaleca się zatrzymanie wody opadowej na terenie podwórza poprzez wprowadzenie zbiorników, w tym retencyjnych i ponowne wykorzystanie deszczówka dla **CO DZIENNA I SPŁATEK** zieleni, zwiększenie bioróżnorodności, pomoc owadom i ptakom.

DESCRIPTION:

In most cases, drain pipes in courtyards are connected directly to storm sewers. However, an alternative solution involves the use of gutters with gargoyles at the end. The courtyards are designed with a sloped surface that directs rainwater towards drainage wells.

RECOMMENDATIONS:

It is advisable to retain rainwater in the yard by installing water tanks, including retention tanks, for activities such as maintaining greenery, increasing biodiversity, and supporting insects and birds.

ELEMENTY/CECHY BUDYNKU TWORZĄCE TOŻSAMOŚĆ PP / BUILDING ELEMENTS/FEATURES FORMING THE IDENTITY OF THE PS

Inwestycja pilotażowa
Pilot investment courtyard

Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35



OPIS:

Charakterystycznymi elementami budującymi genius loci łódzkich dziedzińców są:

- Układ urbanistyczny w postaci kamienicy frontowej z przejazdem bramnym na podwórko, z którego również wchodzi się do oficyn podłużnych (czasami również poprzecznych). Charakterystyczny kształt podwórek w formie liter O, U lub L.
- Kolorystyka kamienic - wg ustaleń historycznych, odkrywek stratygraficznych oraz zgodnych z zapisami obowiązujących Miejscowych planów zagospodarowania przestrzennego.
- Stolarka okienna i drzwiowa - historyczna drewniana lub współczesna PCV - utrzymywana w barwach brązu, zieleni, czerwieni, bieli, szarości. W większości pozostawione lub odtworzone podziały historyczne.
- Elementy dekoracyjne, historyczne w podwórzu - żeliwne kraty i balustrady, odboje przy bramach wejściowych.
- Historyczna posadzka: płytki ceramiczne w przejazdach bramnych lub bruk kamienny na podwórzu.

OCENA I ZALECENIA:

Zachowanie historycznych elementów wyposażenia podwórek. Wykonywanie robót budowlanych w oparciu o zapisy Miejscowych Planów Zagospodarowania Przestrzennego oraz wytycznych konserwatorskich.

DESCRIPTION:

Characteristic elements that build the genius loci of Łódź courtyards are:

- The urban layout consists of a front tenement house with a gateway to the courtyard, which also provides access to longitudinal (and sometimes transverse) outbuildings. The courtyards are typically shaped like the letters O, U, or L.
- Colors of the tenement house facades - according to historical findings, stratigraphic outcrops, and the rules of Local Spatial Development Plans.
- Window and door joinery - historical wooden or contemporary PVC - in the colors of brown, green, red, white, and grey. Historical sash divisions have been preserved or recreated.
- Decorative elements in the yard - cast iron grates and balustrades, guard stones at the entrance gates.
- Historic pavement: ceramic tiles in a gateway or stone paving in the courtyard.

RECOMMENDATIONS:

Preservation of historical elements of the courtyard equipment. Carrying out construction works based on the guidelines of the Local Spatial Development Plans and conservation recommendations.

AD.2. WYPOSAŻENIE PP (MĘBLE MIEJSKIE) AD.2. EQUIPMENT PP (URBAN FURNITURE)

A. ELEMENTY UŻYTKOWE / A. UTILITY COMPONENTS:

- ŁAWKI / BENCHES,
- OŚWIETLENIE / LIGHTING,
- OGRODZENIA / FENCES,
- BRAMY / GATES,
- KOSZE NA ŚMIECI / TRASH CANS,
- STUDNIE / WATER INTAKES,
- STOJAKI NA ROWERY, MIEJSCA DLA SKUTERÓW / BIKE RACKS, SPACES FOR SCOOTERS,
- ODBOJE BRAMNE / GUARD STONES,
- PERGOLE, ALTANY, ZADASZENIA / PERGOLAS, ARBORS, SHEDS,
- OBIEKTY TYMCZASOWE, PARKLETY, USŁUGI TYMCZASOWE / TEMPORARY OBJECTS, PARKLETS, TEMPORARY SERVICES,
- OZNAKOWANIE, INFORMACJA, REKLAMA / SIGNAGE, INFORMATION, ADVERTISING,

B. ELEMENTY DEKORACYJNE / B. DECORATIVE ELEMENTS:

- POMNIKI I MIEJSCA PAMIĘCI / MONUMENTS AND MEMORIALS,
- FONTANNY / FOUNTAINS,
- OBIEKTY ARTYSTYCZNE / ART. OBJECTS,
- STREET ART., MURALE, GRAFFITI / STREET ART, MURALS, GRAFFITI,
- INNE / OTHERS.



A. ELEMENTY UŻYTKOWE: ŁAWKI / A. UTILITY COMPONENTS: BENCHES

Inwestycja pilotażowa
Pilot investment courtyard

BRAK/ LACK

Tuwima 16
BRAK/ LACK

Biblioteka „Wolność”



Legionów 31
BRAK/ LACK



Gdańska 35

OPIS:

Cechą charakterystyczną ławek w przestrzeni dziedzińców łódzkich kamienic jest połączenie ciemnych (rzadziej jasnych) gatunków drewna z ciemnym metalem. Często wykorzystywane są stylizowane ławki wzorowane na meblach XIX-wiecznych.

OCENA I ZALECENIA:

Zasady i warunki dla obiektów małej architektury (wg Uchwały nr XXXVII/966/16, tzw. uchwała krajobrazowa dla Łodzi):

- ustala się obowiązek zachowania istniejących zabytkowych i historycznych obiektów małej architektury;
- dopuszcza się stosowanie mebli miejskich wyłącznie jako formy ujednolicone stylistycznie i kolorystycznie oraz wykonane w stylistyce nawiązującej do dziedzictwa historycznej architektury miasta Łodzi;
- dopuszcza się obiekty małej architektury wykonane z zastosowaniem jednolitych rozwiązań w zakresie materiałów, z jakich są wykonane, takich jak metal np. stal lub żeliwo z wykluczeniem stosowania tworzyw sztucznych, kamienia sztucznego oraz innych materiałów substandardowych.

DESCRIPTION:

A common feature of benches in the courtyards of tenement houses in Łódź is the combination of dark wood and dark metal, often styled after 19th-century furniture.

RECOMMENDATIONS:

According to the Resolution on Establishing the Rules and Conditions for Locating Urban Furniture, Advertising Boards, and Advertising Devices, as well as Fences, Their Dimensions, Quality Standards, and Types of Building Materials From Which They Can Be Made, for the city of Łódź 2016 - the so-called LANDSCAPE RESOLUTION FOR ŁÓDŹ:

- It is mandatory to preserve existing historic urban furniture.
- Any new urban furniture must adhere to uniform style and color guidelines that reflect the architectural heritage of the city.
- New urban furniture should be made using uniform solutions regarding the materials, such as metal, e.g. steel or cast iron. The use of plastics, artificial stone, and other substandard materials is strictly prohibited.

A. ELEMENTY UŻYTKOWE: OŚWIETLENIE / A. UTILITY COMPONENTS: LIGHTENING

Inwestycja pilotażowa
Pilot investment courtyard



Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35



OPIS:

Cechą charakterystyczną oświetlenia na łódzkich podwórkach jest oświetlenie punktowe, podkreślające wejścia do budynków, układ zagospodarowania terenu. Na podwórkach można zobaczyć zarówno historyzujące rozwiązania lamp, jak i nowoczesne kształty.

OCENA I ZALECENIA:

Zaleca się wprowadzenie ujednoliconego estetycznie oświetlenia będącego elementem zestawu mebli miejskich, które będzie:

- Uwzględniać zasady i warunki dla obiektów małej architektury w rozumieniu Uchwały nr XXXVII/966/16;
- Wykorzystywać energoszczędne technologie, np. LED.
- Podkreślać architekturę, elementy wyposażenia
- Ograniczać emisję światła niepożądanego.

COOPERATION IS CENTRAL

DESCRIPTION:

A characteristic feature of lighting of courtyard lighting in Łódź is the use of spotlights to highlight the building's entrances and urban layout of the courtyards. Both traditional and modern lamp designs can be found in the courtyards.

RECOMMENDATIONS:

It is advisable to incorporate lighting as part of a cohesive urban furniture design that will:

- Adhere to the guidelines and criteria for urban furniture structures as outlined in Resolution No. XXXVII/966/16;
- Utilize energy-efficient technologies, such as LED lighting;
- Illuminate landmarks and points of interest with spotighting;
- Minimize the release of unnecessary light.

A. ELEMENTY UŻYTKOWE: OGRODZENIA / A. UTILITY COMPONENTS: FENCES

<p>Inwestycja pilotażowa Pilot investment courtyard</p> <p>NIE DOTYCZY / NOT APPLICABLE Podwórko-studnia A well-shaped courtyard*</p>	<p>Tuwima 16</p> <p>NIE DOTYCZY / NOT APPLICABLE Podwórko-studnia A well-shaped courtyard*</p>	<p>Biblioteka „Wolność”</p> 	<p>Legionów 31</p> 	<p>Gdańska 35</p> <p>NIE DOTYCZY / NOT APPLICABLE Podwórko-studnia A well-shaped courtyard*</p>
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OPIS:

Ze względu na różne możliwości finansowe dawnych właścicieli działki w Strefie Wielkomiejskiej posiadają od 1 do 3 oficyn. Na działkach, gdzie oficyny nie zostały zbudowane wzdłuż całej granicy, role ogrodzenia pełnią ściany szczytowe sąsiednich kamienic lub murowane ogrodzenia pełne. Obecnie istnieje tendencja do zazieleniania powierzchni ogrodzeń zarówno pełnych jak i ażurowych zielenią pnącą.

OCENA I ZALECENIA:

Należy utrzymać stosowane do tej pory dobre praktyki i rozwiązań materiałowych zgodnie z obowiązującymi przepisami prawa lokalnego m.in.:

- zakazuje się umieszczania elementów ogrodzeniowych poza liniami granic ewidencyjnych lub historycznych działek i liniami rozgraniczającymi teren z terenem przestrzeni ogólnodostępnej;
- elementy ogrodzeniowe stosowane w linii rozgraniczającej teren z terenem przestrzeni ogólnodostępnej powinny zachowywać formy ażurowe (tradycyjne lub współczesne), wpisujące się w charakter otoczenia i zachowujące wysoki poziom estetyczny i techniczny.
- Zaleca się zazielenianie powierzchni ogrodzeń zarówno pełnych jak ażurowych zielenią pnącą.

COOPERATION CENTER

DESCRIPTION:

In the Historic Urban Core of Łódź, the number of outbuildings on plots varies due to the different financial capabilities of the former owners, ranging from 1 to 3 outbuildings. In cases where outbuildings have not been constructed around the entire perimeter, the blind walls of neighboring tenement houses or solid brick fences act as fences. Currently, there is a growing trend to adorn them with twining plants.

RECOMMENDATIONS:

Best practices and material solutions must continue to be upheld by local laws, including the following:

- It is not allowed to install fencing elements beyond the boundaries of cadastral or historical plots, as well as the lines that separate private areas from public spaces.
- Fencing elements used along the border with public spaces should maintain openwork designs, whether traditional or contemporary, that harmonize with the surrounding environment while upholding a high standard of aesthetics and technical quality.
- It is recommended to adorn fence surfaces with twining plants.

*pl. studnia = en. the well

A. ELEMENTY UŻYTKOWE: BRAMY / A. UTILITY COMPONENTS: GATES

Inwestycja pilotażowa
Pilot investment courtyard



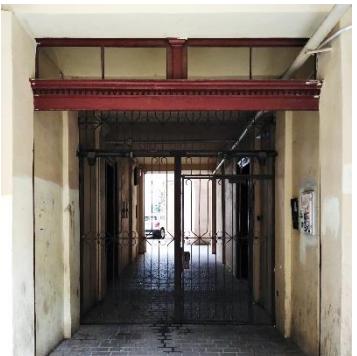
Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35



OPIS:

Jedną z charakterystycznych cech kamienicy wielkomiejskiej jest brama wejściowa, która prowadzi na podwórze. W przeświecie bramnym znajdowała się reprezentacyjna brama żeliwna lub drewniana, sufit i ściany były bogato zdobione, ze względu na to, że znajdowało się tu również główne wejście do kamienicy frontowej. Często, kiedy rewitalizacja zmieniła funkcję kamienicy z mieszkalnej na usługową, prześwit bramny zaczął pełnić dodatkową atrakcję dla użytkowników, na przykład jako przestrzeń wystawowa.

OCENA I ZALECENIA:

Zachowanie/odtworzenie historycznego wystroju prześwitu bramnych zgodnie CO Z REKONSTRUKCJĄ w tym bram wejściowych.

DESCRIPTION:

A defining feature of the tenement houses in Łódź is the entrance gate leading to the courtyard. This gate, often made of ornate cast iron or wood, served as the main entrance to the front of the tenement house and was richly decorated on the ceilings and walls. During revitalization efforts, when the tenement houses were repurposed from residential to service use, the gate opening began to serve as an additional attraction for users, for example as an exhibition space.

RECOMMENDATIONS:

Preservation/reconstruction of the historical appearance of the gate openings in accordance with the archival research.

A. ELEMENTY UŻYTKOWE: KOSZE NA ŚMIECI / A. UTILITY COMPONENTS: TRASH CANS

Inwestycja pilotażowa

Pilot investment courtyard



Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35

Schowane w specjalnie wydzielonym pomieszczeniu

Hidden in a separated room in the tenement

OPIS

Brak koszy na śmieci w przestrzeni dziedzińców. Historycznie brak dedykowanych miejsc na odpady komunalne. Współczesne pojemniki na odpady komunalne segregowane stanowią element dysharmonizujący w przestrzeniach dziedzińców. W podwórzach przy ul. Traugutta 8, ul. Legionów 2 i ul. Legionów 31 stoją na terenie podwórza. Kamienica przy ul. Gdańskiej 35 posiada wydzielone pomieszczenie śmiertnika w parterze z osobnym wejściem. Na podwórzu kamienicy przy ul. Tuwima 16 występuje rozwiązańe w postaci wiaty śmiertnikowej drewnianej.

OCENA I ZALECENIA:

Konieczność wyznaczenia miejsca na odpady komunalne. Zalecenie umieszczenia odpadów w pomieszczeniach zamkniętych.

Konieczna jest realizacja murowanych lub drewnianych wiat śmiertnikowych, lub lekkich konstrukcji przestaniających miejsca składowania odpadów, lub ostosowanie pomieszczenia na parterze budynku na cele przechowywania ww. pojemników. W przypadku rozwiązania w postaci wiaty lub konstrukcji przestaniającej, zaleca się wprowadzenie zieleni pnącej lub nasadzeń z krzewów. Kosze na śmieci powinny zostać dobrane do elementów małej architektury - jeden komplet mebli miejskich - dopuszczalna współczesna forma w stonowanej kolorystyce dostosowana do charakteru dziedzińców i utrzymana w jednym standardzie.

DESCRIPTION:

There are no trashcans in the courtyards. There has been a lack of dedicated places for municipal solid waste (MSW). MSW containers are disrupting the aesthetics of courtyard spaces. Modern MSW containers are located in the yard of 8 Traugutta ST, 2 Legionów ST, and 31 Legionów ST. There is a separate room for MSW containers on the ground floor of the tenement house at 35 Gdańsk ST. There is a wooden MSW shelter located in the yard of the tenement house at 16 Tuwima ST.

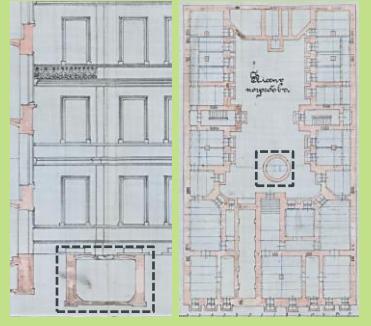
RECOMMENDATIONS:

It is essential to designate a specific location for municipal waste. It is also recommended to place containers in an enclosed place.

It is advised to consider constructing brick or wooden shelters for the MSW containers or implementing light structures to cover the storage areas. It is also recommended to cover the MSW shelter or a screening structure by twilling plants. Trashcans should correspond with the other elements of urban furniture as one set - opting for a modern design in subtle colors is acceptable if they adhere to a standard and blend well with the surroundings.

A. ELEMENTY UŻYTKOWE: STUDNIE, ZDROJE / A. UTILITY COMPONENTS: WELLS, WATER INTAKES

Inwestycja pilotażowa

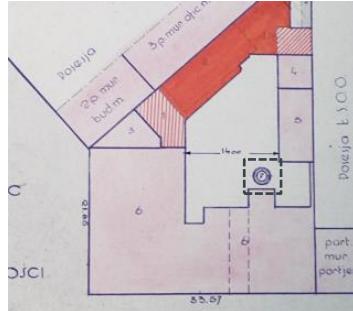


Tuwima 16

Wyłączony z użytkowania / Decommissioned



Biblioteka „Wolność”



Legionów 31

Brak zachowanych historycznych studni i materiałów archiwalnych wskazujących na ich lokalizację.

There are no evidence of historical wells or archival materials revealing their location.

Gdańska 35

Brak zachowanych historycznych studni i materiałów archiwalnych wskazujących na ich lokalizację.

There are no evidence of historical wells or archival materials revealing their location.

OPIS:

Na podwórku przy ul. Tuwima 16 znajduje się historyczny zdrój (obecnie wyłączony z użytkowania).

Na terenie analizowanych podwórek nie ma zachowanych widocznych/dostępnych historycznych studni. Na podstawie analizy dokumentów archiwalnych można przypuszczać, że na podwórkach przy ul. Traugutta 8 i ul. Legionów 2 były ulokowane studnie, niemniej wymagałoby to potwierdzenia.

OCENA I ZALECENIA:

- Zachowanie istniejących elementów historycznych przy dopuszczeniu ich wkomponowania w nową strukturę zagospodarowania terenu.
- W przypadkach, gdy studnie historyczne nadal istnieją zaleca się wyekspонowanie lub próbę wykorzystania historycznej substancji jako zbiornika retencyjnego.

DESCRIPTION:

There is a historical water intake (currently decommissioned) at the courtyard at 16 Tuwima ST.

There are no preserved historical wells in the analyzed courtyards. Archived documentation demonstrates that there were wells at 8 Traugutta ST and 2 Legionów ST, however, this would require confirmation.

RECOMMENDATIONS:

- The historic elements should be preserved and integrated into the new surface structure.
- It is recommended to expose or attempt to use the historical substance as a retention reservoir in cases where wells are still existing.

A. ELEMENTY UŻYTKOWE: STOJAKI NA ROWERY, MIEJSCA DLA SKUTERÓW / A. UTILITY COMPONENTS: BIKE RACKS, SPACES FOR SCOOTERS

Inwestycja pilotowa
Pilot investment courtyard

BRAK/ LACK

Tuwima 16

BRAK/ LACK

Biblioteka „Wolność”

BRAK/ LACK

Legionów 31

BRAK/ LACK

Gdańska 35



OPIS:

Wśród analizowanych podwórek tylko przy ul. Gdańskiej 35 znajduje się stojak na rowery, wykonany z jasnego metalu.

OCENA I ZALECENIA:

Zasady i warunki dla obiektów małej architektury(wg Uchwały nr XXXVII/966/16, tzw. uchwała krajobrazowa dla Łodzi):

- ustala się obowiązek zachowania istniejących zabytkowych i historycznych obiektów małej architektury;
- dopuszcza się stosowanie mebli miejskich wyłącznie jako form ujednoliconych stylistycznie i kolorystycznie oraz wykonanych w stylistyce nawiązującej do dziedzictwa historycznej architektury miasta Łodzi;
- dopuszcza się obiekty małej architektury wykonane z zastosowaniem jednolitych rozwiązań w zakresie materiałów, z jakich są wykonane, takich jak metal np. stal lub żeliwo z wykluczeniem stosowania tworzyw sztucznych, kamienia sztucznego oraz innych materiałów substandardowych.

DESCRIPTION:

A bicycle rack made of light metal is located at 35 Gdańsk ST, the only one found among the analyzed courtyards.

RECOMMENDATIONS:

According to the Resolution on Establishing the Rules and Conditions for Locating Urban Furniture, Advertising Boards, and Advertising Devices, as well as Fences, Their Dimensions, Quality Standards, and Types of Building Materials From Which They Can Be Made, for the city of Łódź 2016 - the so-called LANDSCAPE RESOLUTION FOR ŁÓDŹ:

- It is mandatory to preserve existing historic urban furniture.
- Any new urban furniture must adhere to uniform style and color guidelines that reflect the architectural heritage of the city.
- New urban furniture should be made using uniform solutions regarding the materials, such as metal, e.g. steel or cast iron. The use of plastics, artificial stone, and other substandard materials is strictly prohibited.

A. ELEMENTY UŻYTKOWE: ODBOJE BRAMNE / A. UTILITY COMPONENTS: GUARD STONES

Inwestycja pilotażowa
Pilot investment courtyard



Tuwima 16



Biblioteka „Wolność”

BRAK/ LACK

Legionów 31

BRAK/ LACK

Gdańska 35

BRAK/ LACK

OPIS:

Na analizowanym obszarze występują odboje żeliwne w kształcie słupkowym, koliste w przekroju poziomym, w kształcie kopulastym - przypominającym odwrócony lejek bądź czapę z pomponem, konsolowe (esowo-wolutowe), prostokątne w przekroju poziomym. Spotykane są również odboje murowane.

OCENA I ZALECENIA:

Zachowanie historycznych odbojów bramnych, przy dopuszczeniu ich wkomponowania w nową strukturę nawierzchni.

DESCRIPTION:

The most common guard stones are cast iron column-shaped, circular in horizontal cross-section, or dome-shaped - resembling the shape of inverted funnels or caps with pompoms, or console-shaped, rectangular in horizontal cross-section. There are also brick guard stones encountered.

RECOMMENDATIONS:

The historic guard stones should be preserved and integrated into the new surface structure.

A. ELEMENTY UŻYTKOWE: PERGOLE, ALTANY, ZADASZENIA / A. UTILITY COMPONENTS: PERGOLAS , ARBORS , SHEDS

Inwestycja pilotażowa Pilot investment courtyard	Tuwima 16	Biblioteka „Wolność”	Legionów 31	Gdańska 35
BRAK/ LACK	BRAK/ LACK	BRAK/ LACK	BRAK/ LACK	BRAK/ LACK

A. ELEMENTY UŻYTKOWE: OBIEKTY TYMCZASOWE, PARKLETY, USŁUGI TYMCZASOWE / A. UTILITY COMPONENTS: TEMPORARY OBJECTS, PARKLETS, TEMPORARY SERVICES

BRAK/ LACK	BRAK/ LACK	BRAK/ LACK	BRAK/ LACK	
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OPIS:

Jedynie na podwórzu przy ul. Gdańskiej 35 pojawiają się tymczasowe obiekty wyposażenia w postaci plastikowych mebli, domku do zabawy dla dzieci, huśtawki, umieszczanych tam z własnej inicjatywy mieszkańców.

OCENA I ZALECENIA:

W przypadku, kiedy elementy malej architektury nie były przewidziane w procesie rewitalizacji, podwórze powinno być uzupełnione w meble miejskie, zgodnie z estetyką wskazaną w zasadach i warunkach dla obiektów malej architektury w rozumieniu Uchwały nr XXXVII/966/16.

DESCRIPTION:

There are temporary furnishings in the form of plastic furniture, a playhouse for children, a swing, placed in the courtyard at 35 Gdańskie ST there on the residents' own initiative.

RECOMMENDATIONS:

If urban furniture was not originally planned during the revitalization, the courtyard should be supplemented with urban furniture that aligns with the aesthetic guidelines and criteria outlined in Resolution No. XXXVII/966/16 (the "Landscape Resolution for Łódź").

Investycja pilotażowa Pilot investment courtyard



Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35



OCENA I ZALECENIA:

- Tymczasowe komunikaty powinny być umieszczane na tablicy ogłoszeń zlokalizowanej wewnątrz budynku na klatce schodowej.
- Reklamy i szyldy zewnętrzne powinny być dostosowane do wymogów wynikających z Uchwyty nr XXXVII/966/16 i zaopiniowane przez odpowiedni COOPERATION IS CENTRAL organ nadzorujący.

RECOMMENDATIONS:

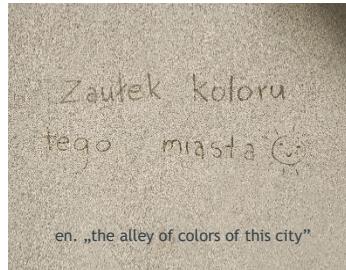
- Temporary notices must be displayed on the building's staircase notice board.
- External ads and signs must comply with Resolution No. XXXVII/966/16 and be approved by the supervisory authority.

Inwestycja pilotażowa Pilot investment courtyard	Tuwima 16	Biblioteka „Wolność”	Legionów 31	Gdańska 35
BRAK/ LACK	BRAK/ LACK	BRAK/ LACK	BRAK/ LACK	BRAK/ LACK

B. ELEMENTY DEKORACYJNE: FONTANNY / B. DECORATIVE ELEMENTS: FOUNTAINS

BRAK/ LACK				
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B. ELEMENTY DEKORACYJNE: STREET ART., MURALE, GRAFFITI / B. DECORATIVE ELEMENTS: STREET ART, MURALS, GRAFFITI

Inwestycja pilotażowa Pilot investment courtyard				Gdańska 35
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OPIS:

Prześwity bramne oraz dziedzińce kamienic w Łodzi często padają ofiarą dewastacji w postaci graffiti.

Rzadko pojawiają się graffiti o pozytywnym przekazie, jak np. na podwórku Biblioteki „Wolność”.

OCENA I ZALECENIA

- Wielkość większości graffiti na łódzkich dziedzińcach stanowi element dewastujący, a nie uatrakcyjniający przestrzeń. Do usunięcia/zamalowania.
- Dopuszcza się wykonywanie murali na gładkich ścianach szczytowych budynku, pod warunkiem zachowania wysokiego poziomu estetycznego takiej kompozycji.

COOPERATION CENTRAL

DESCRIPTION:

The gate passages and courtyards of tenement houses among analyzed sites frequently suffer from vandalism in the form of graffiti. Examples of graffiti conveying a positive message are rather rare, although an exception can be found in the courtyard of the "Freedom" Library.

RECOMMENDATIONS:

The majority of the graffiti found in the courtyards of Łódź is more of a destructive than an appealing elements and should be removed or painted over. It is acceptable to create murals on the smooth gable walls of the buildings, as long as the artwork maintains a high aesthetic standard.

B. ELEMENTY DEKORACYJNE: OBIEKTY ARTYSTYCZNE / B. DECORATIVE ELEMENTS: ART. OBJECTS'

Inwestycja pilotażowa
Pilot investment courtyard

BRAK/ LACK

Tuwima 16

BRAK/ LACK

Biblioteka „Wolność”



Legionów 31

BRAK/ LACK

Gdańska 35

BRAK/ LACK

OPIS:

Na podwórku przy ul. Legionów 2 pojawiają się obiekty artystyczne w postaci autorskich rzeźb, dekoracji i instalacji, wykonane jako połączenie metalu i drewna.

OCENA I ZALECENIA

Dopuszcza się umieszczanie obiektów artystycznych pod warunkiem zachowania wysokiego poziomu estetycznego takiej kompozycji.

DESCRIPTION:

Original sculptures, decorations, and installations created using a combination of metal and wood can be explored in the courtyard at 2 Legionów ST.

RECOMMENDATIONS:

It is acceptable to locate art. objects as long as the artwork maintains a high aesthetic standard.

AD.3 ZIELEŃ W PP / AD.3 GREENERY PS

- POWIERZCHNIA TERENÓW ZIELENI / THE SIZE OF GREEN AREAS,
- TERENY ZIELENI / THE FORMS OF GREEN SPACE,
- RODZAJ ZIELENI: ZIELEŃ NISKA / TYPE OF GREENERY: LOW GREENERY,
- RODZAJ ZIELENI: DRZEWIA DOJRZAŁE / TYPE OF GREENERY: MATURE GREEN,
- RODZAJ ZIELENI: DRZEWIA MŁODE / TYPE OF GREENERY: YOUNG TREES,
- RODZAJ ZIELENI: DRZEWIA POMNIKOWE / TYPE OF GREENERY: MONUMENTAL TREE,
- RODZAJ ZIELENI: DRZEWIA PRZY ULCY / TYPE OF GREENERY: STREET TREE,
- RODZAJ ZIELENI: ZIELEŃ PNĄCA / TYPE OF GREENERY: HIGH GREEN,
- RODZAJ ZIELENI: ZIELEŃ TYMCZASOWA W DONICACH / TYPE OF GREENERY: TEMPORARY GREENERY IN POTS.

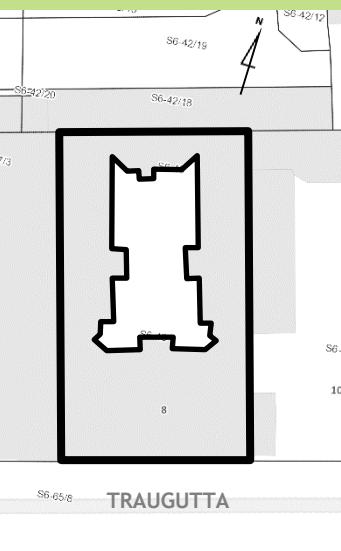


POWIERZCHNIA TERENÓW ZIELENI / THE SIZE OF GREEN AREAS

Inwestycja pilotażowa

Pilot investment courtyard

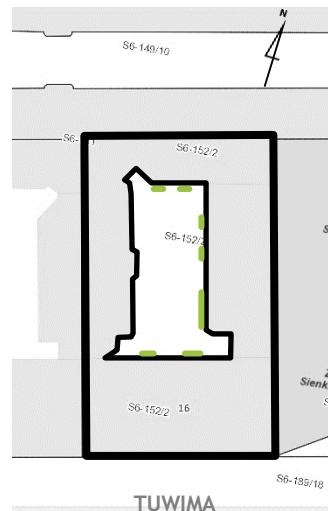
Pow. całkowita / Total area: 1171 m²
 Pow. podwórza / Courtyard area: 283,8 m²
 Pow. biologicznie czynna / Bioactive area: -



Tuwima 16

Pow. całkowita / Total area: 1138 m²
 Pow. podwórza / Courtyard area: 260,7 m²
 Pow. biologicznie czynna / Bioactive area: 15,5 m²

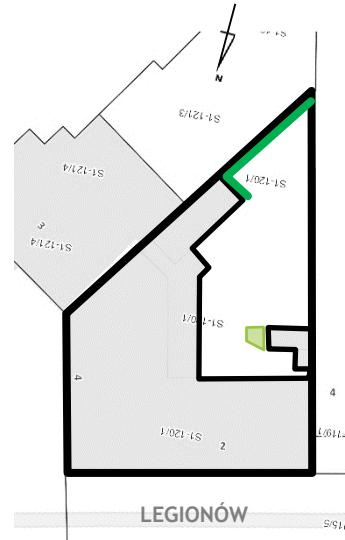
Bioactive to total: 1,4 %
 Bioactive to courtyard: 6 %



Biblioteka „Wolność”

Pow. całkowita / Total area: 1262 m²
 Pow. podwórza / Courtyard area: 470 m²
 Pow. biologicznie czynna / Bioactive area: 5 m²

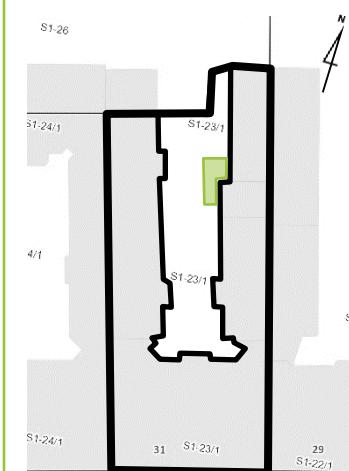
Bioactive to total: 0,4 %
 Bioactive to courtyard: 1,1 %



Legionów 31

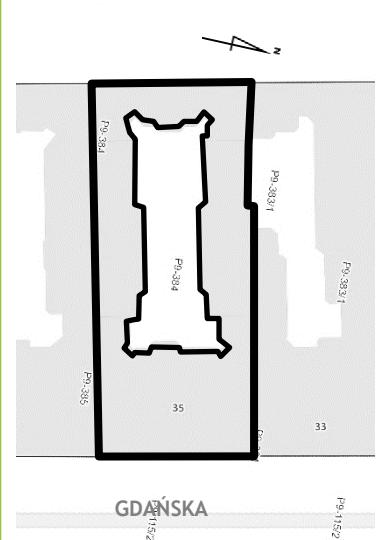
Pow. całkowita / Total area: 1051 m²
 Pow. podwórza / Courtyard area: 290,3 m²
 Pow. biologicznie czynna / Bioactive area: 21,1 m²

Bioactive to total: 2 %
 Bioactive to courtyard: 7,3 %



Gdańska 35

Pow. całkowita / Total area: 1078 m²
 Pow. podwórza / Courtyard area: 259,4 m²
 Pow. biologicznie czynna / Bioactive area: -



TERENY ZIELENI / THE FORMS OF GREEN SPACE

Inwestycja pilotażowa
Pilot investment courtyard

BRAK /LACK

Tuwima 16



Biblioteka „Wolność”



Legionów 31



Gdańska 35



OPIS:

- ul. Traugutta 8 - brak zieleni.
- ul. Tuwima 16 - wydzielone trawniki oraz rośliny w donicach.
- ul. Legionów 2 - duże drzewo - kasztanowiec, rośliny w donicach, winobluszcz.
- ul. Legionów 31 - rabata bylinowa - juka, piwonia, malwy, liliowiec, słoneczniki ozdobne - krzewy - róża, rododendron, drzewa - liliak i tuja średnich wymiarów.
- ul. Gdańską 35 - rośliny w donicach.

COOPERATION IS CENTRAL

DESCRIPTION:

- 8 Traugutta ST - no greenery.
- 16 Tuwima ST - separate lawns and plants in pots.
- 2 Legionów ST - large tree - horse-chestnut, plants in pots, grapevine.
- 31 Legionów ST - perennial flower bed - yucca, peony, hollyhock, daylily, ornamental sunflowers, shrubs - rose, rhododendron, medium-sized trees - lilac and thuja.
- 35 Gdańską ST - plants in pots.

RODZAJ ZIELEŃI: ZIELEŃ NISKA / TYPE OF GREENERY: LOW GREENERY

Inwestycja pilotażowa
Pilot investment courtyard

BRAK / LACK

Tuwima 16



Biblioteka „Wolność”

BRAK / LACK

Legionów 31



Gdańska 35

BRAK / LACK

OPIS:

- ul. Traugutta 8 - brak zieleni niskiej.
- ul. Tuwima 16 - wydzielone trawniki wzduł oficyn kamienicy z roślinnością ruderalną.
- ul. Legionów 2 - brak zieleni niskiej.
- ul. Legionów 31 - rabata bylinowa - juka, piwonia, malwy, liliowiec, słoneczniki ozdobne , krzewy - róża, rododendron.
- ul. Gdańska 35 - brak zieleni niskiej.

OCENA I ZALECENIA:

Zalecane jest sadzenie roślin wpasowujących się w przestrzeń podwórek z zachowaniem ich wymagań dotyczących stanowiska oraz odporności na warunki miejskie. Rekomenduje się stosowanie proekologicznych rozwiązań w zakresie zagospodarowywania powierzchni gruntów przy budowie oraz przebudowie. Tym samym należy unikać użycia żwiru i innego rodzaju kruszywa jako wypełniaczy powierzchni rodzimego gruntu.

DESCRIPTION:

- 8 Traugutta ST - no low greenery.
- 16 Tuwima ST - separate lawns along the outbuildings of the tenement with ruderal plants.
- 2 Legionów ST - no low greenery.
- 31 Legionów ST - perennial flower bed - yucca, peony, hollyhock, daylily, ornamental sunflowers, shrubs - rose, rhododendron.
- 35 Gdańska ST - no low greenery.

RECOMMENDATIONS:

It's important to choose the selection of native species, according to their tolerance to shade and resistance to urban conditions. It's also wise to incorporate eco-friendly land management practices during construction and reconstruction. Therefore, it's best to avoid using gravel as a mulch.

RODZAJ ZIELENI: DRZEW DOJRZAŁE / TYPE OF GREENERY: MATURE GREEN

Inwestycja pilotażowa
Pilot investment courtyard

BRAK / LACK

Tuwima 16

BRAK / LACK

Biblioteka „Wolność”



Legionów 31



Gdańska 35

BRAK / LACK

OPIS:

- ul. Traugutta 8 - brak drzew dojrzałych.
- ul. Tuwima 16 - brak drzew dojrzałych.
- ul. Legionów 2 - duży kasztanowiec.
- ul. Legionów 31 - liliak i tuja średnich wymiarów.
- ul. Gdańska 35 - brak drzew dojrzałych.

OCENA I ZALECENIA:

Zaleca się zachowanie zieleni dojrzałej. Wskazane jest wkomponowywanie nowych rozwiązań w istniejący dojrzały drzewostan oraz badanie stanu drzew na bieżąco poprzez obserwację i należytą pielęgnację (odpowiednie przycinanie koron drzew).

DESCRIPTION:

- 8 Traugutta ST - no mature green.
- 16 Tuwima ST - no mature green.
- 2 Legionów ST - large horse-chestnut.
- 31 Legionów ST - medium-sized lilac and thuja.
- 35 Gdańska ST - no mature green.

RECOMMENDATIONS:

It is recommended to preserve mature greenery. It is advisable to incorporate new plants into the existing greenery and to regularly monitor the condition of existing trees through observation and proper care, such as appropriate pruning of tree crowns.

RODZAJ ZIELENI: DRZEWA MŁODE / TYPE OF GREENERY: YOUNG TREES

Inwestycja pilotażowa Pilot investment courtyard	Tuwima 16	Biblioteka „Wolność”	Legionów 31	Gdańska 35
BRAK / LACK	BRAK / LACK	BRAK / LACK	BRAK / LACK	BRAK / LACK

RODZAJ ZIELENI: DRZEWA POMNIKOWE / TYPE OF GREENERY: MONUMENTAL TREE

BRAK/ LACK				
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RODZAJ ZIELENI: DRZEWA PRZY ULCY / TYPE OF GREENERY: STREET TREE

BRAK/ LACK				
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RODZAJ ZIELEŃI: ZIELEŃ PNĄCA / TYPE OF GREENERY: HIGH GREEN

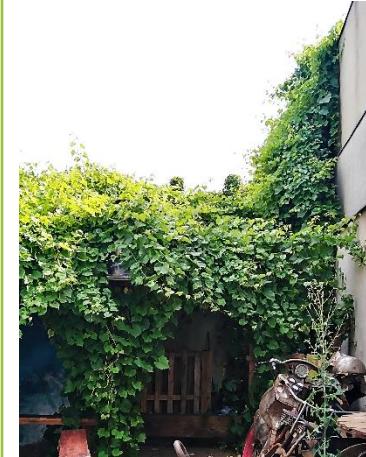
Inwestycja pilotażowa
Pilot investment courtyard

BRAK / LACK

Tuwima 16

BRAK / LACK

Biblioteka „Wolność”



Legionów 31

BRAK / LACK

Gdańska 35

BRAK / LACK

OPIS:

- ul. Traugutta 8 - brak zieleni pnącej.
- ul. Tuwima 16 - brak zieleni pnącej.
- ul. Legionów 2 - winobluszcz.
- ul. Legionów 31 - brak zieleni pnącej.
- ul. Gdańska 35 - brak zieleni pnącej.

OCENA I ZALECENIA:

Roślinność wertykalna zwiększa powierzchnię biologiczną, zabierając przy tym niewiele miejsca. Jest to doskonały wybór do zdobienia zielenią wąskich dziedzińców. Zalecana jest kontynuacja wprowadzenia roślinności pnącej wewnętrz podwórek. Przy wprowadzeniu podkonstrukcji w formie pergoli lub trejaży należy stosować się zasad i warunków dla obiektów malej architektury (wg Uchwały COOPKRAV/1966/16 GENERALichwała krajobrazowa dla Łodzi).

DESCRIPTION:

- 8 Traugutta ST - no high green.
- 16 Tuwima ST - no high green.
- 2 Legionów ST - grapevine.
- 31 Legionów ST - no high green.
- 35 Gdańska ST - no high green.

RECOMMENDATIONS:

To optimize biological surfaces while utilizing limited space, it is highly recommended to incorporate high greenery. This is an ideal solution for enhancing narrow areas with biologically active surfaces. When installing pergolas or trellises, it's essential to adhere to the regulations and guidelines for urban furniture as stipulated in Resolution No. XXXVII/966/16, the landscape resolution for Łódź.

RODZAJ ZIELEŃI: ZIELENЬ TYMCZASOWA W DONICACH / TYPE OF GREENERY: TEMPORARY GREENERY IN POTS

Inwestycja pilotażowa
Pilot investment courtyard

BRAK / LACK

Tuwima 16



Biblioteka „Wolność”



Legionów 31

BRAK / LACK

Gdańska 35



OPIS:

- ul. Traugutta 8 - brak zieleni w donicach.
- ul. Tuwima 16 - na oknach parteru z własnej inicjatywy mieszkańców.
- ul. Legionów 2 - na podwórzu jako element dekoracji artystycznych z inicjatywy lokalu gastronomicznego.
- ul. Legionów 31 - brak zieleni w donicach.
- ul. Gdańsk 35 - na podwórzu z własnej inicjatywy mieszkańców, w tym kwiaty, pnące na podkonstrukcję, małe drzewa.

OCENA I ZALECENIA:

Zaleca się dobrą donicę zgodnie z Zasadami i warunkami dla obiektów malej architektury (wg Uchwytu nr XXXVII/966/16, tzw. uchwała krajobrazowa dla Łodzi).

COOPERATION IS CENTRAL

DESCRIPTION:

- 8 Traugutta ST - no greenery in pots.
- 16 Tuwima ST - on the ground floor windows on the residents' own initiative.
- 2 Legionów ST - in the courtyard as an element of artistic decorations initiated by the local restaurant.
- 31 Legionów ST - no greenery in pots.
- 35 Gdańsk ST - in the courtyard on the residents' own initiative, including flowers, vines on the substructure, small trees.

RECOMMENDATIONS:

It is advisable to choose flower pots in accordance with Resolution No. XXXVII/966/16, the landscape resolution for Łódź.

Page 205

PART II

CHARAKTERYSTYKA I OCENA WYBRANYCH ASPEKTÓW PP CHARACTERISTICS/EVALUATION OF SELECTED ASPECTS OF PS

- AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA / AD.1 FUNCTIONING/USE
- AD.2 EKOLOGIA / AD.2 ECOLOGY
- AD.3 HISTORYCZNE ELEMENTY TWORZĄCE TOŻSAMOŚĆ / AD.3 HISTORIC ELEMENTS GIVING IDENTITY



AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA / AD.1 FUNCTIONING/USE

- ORGANIZACJA RUCHU / TRAFFIC ORGANISATION
- ZRÓWNOWAŻONE ZAGOSPODAROWANIE PRZESTRZENNE DO CELÓW FUNKCJONALNYCH / SUSTAINABLE SPATIAL DEVELOPMENT FOR FUNCTIONAL PURPOSES
- DOSTĘPNOŚĆ / ACCESSIBILITY
- BEZPIECZEŃSTWO / SAFETY
- OTWIERANIE I ŁĄCZENIE PRZESTRZENI / OPENING UP AND CONNECTING SPACES
- WPROWADZENIE USŁUG DO PRZESTRZENI PUBLICZNEJ / INTRODUCTION OF SERVICES INTO THE PUBLIC SPACES
- UŻYTKOWANIE PRZEZ OKREŚLONE GRUPY / USE BY SPECIFIC GROUPS



AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: ORGANIZACJA RUCHU

/priorytet ruchu pieszego, ograniczenie ruchu samochodowego, ścieżki rowerowe, komunikacja w terenie i do obszaru, komunikacja pionowa, organizacja parkingów/

OPIS:

Podwórza kamienic wielkomiejskich pełnią głównie funkcję komunikacyjną stanowiąc dojścia do budynków mieszkalnych i lokali usługowych. Dzięki procesom rewitalizacji następuje uzupełnienie dotychczasowego przeznaczenia o funkcje rekreacyjne. Podwórza przekształcane są w zielone przestrzenie, wyposażone w elementy małej architektury (tawki, pergole, stojaki na rowery itd). Najczęściej ruch kołowy na podwórzach jest wyeliminowany w celu stworzenia przyjaznej przestrzeni dla lokalnej wspólnoty. Sporadycznie występują nieliczne miejsca postojowe.

W przypadkach, kiedy rewitalizacja podwórka nie zakłada wprowadzenia zieleni urządzonej, mieszkańcy we własnym zakresie podejmują działania mające na celu zwiększenie ilości zieleni. W innych przypadkach przestrzeń dziedzińca zamienia się w nielegalny parking (np. przy ul. Traugutta 8). W takich przypadkach należałoby ponownie podejść do rewitalizacji zabytkowego dziedzińca.

OCENA I ZALECENIA:

Podwórka są niewielkimi przestrzeniami o charakterze wielofunkcyjnym. Zalecana jest kontynuacja wypracowanych dobrych praktyk, w tym wyeliminowanie funkcji parkingowej, udrożnienie (w miarę możliwości) komunikacji pomiędzy sąsiadującymi podwórkami czy też realizacja przebić międzykwartałowych.

AD.1 FUNCTIONING/USE: TRAFFIC ORGANISATION

/priority of pedestrian traffic, restriction of car traffic, bicycle lanes, communication in and to the area, vertical communication, organisation of parking lots/

DESCRIPTION:

The courtyards in Historic Urban Core tenement houses once primarily functioned as access points to outbuildings. Following revitalization efforts, they now provide also green spaces and urban furniture (benches, pergolas, bicycle racks, etc.) for recreation, with the removal of parking spaces to create a community-friendly environment.

In instances where revitalization didn't include the addition of greenery, residents have taken it upon themselves to enhance the biological diversity by placing plants in pots on the windowsills. However, in some cases, the courtyard space has been converted into illegal parking areas (e.g., at 8 Traugutta St). When this occurs, a re-evaluation of the historic courtyard's revitalization is recommended.

RECOMMENDATIONS:

The courtyards of the tenements are small and versatile spaces. It is recommended to continue good practices such as removing parking, enhancing communication between neighboring yards (as far as possible), and implementing inter-quarter openings.

<p>AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: ZRÓWNOWAŻONE ZAGOSPODAROWANIE PRZESTRZENNE DO CELÓW FUNKCJONALNYCH</p> <p>/np. spowolniacze ruchu, podwyższenie przejść dla pieszych, likwidacja podziału na ulicę i chodnik - woonerf itp./</p> <p>NIE DOTYCZY</p>	<p>AD.1 FUNCTIONING/USE: SUSTAINABLE SPATIAL FOR FUNCTIONAL PURPOSES</p> <p>/e.g. traffic slowdowns, raised pedestrian crossings, elimination of the division between street and pavement - woonerf etc./</p> <p>NOT APPLICABLE</p>
<p>AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: DOSTĘPNOŚĆ</p> <p>/dostępność dla osób niepełnosprawnych (architektoniczna i inna, w tym wzory przestrzenne i oznakowanie), łatwość obsługi (np. ławki, cień, źródła wody)/</p> <p>OPIS: Wnętrza podwórzy i partery budynków dostosowują się do potrzeb osób z niepełnosprawnościami i starszych dzięki procesom rewitalizacji. W rzadkich przypadkach nie występują rozwiązania w postaci ramp przy dużej różnicy wysokości.</p> <p>OCENA I ZALECENIA: Zalecana jest kontynuacja wypracowanych dobrych praktyk w postaci wprowadzenia niewielkich pochylni, w terenach gdzie to jest uzasadnione. Pochylne nie powinny stanowić elementów demontażowych ani zaburzać charakteru danej przestrzeni miejskiej. Nowoprojektowane pochylnie powinny wpisywać się w przyjęte rozwiązania materiałowe oraz rewitalizowaną przestrzeń. Zalecana jest również kontynuacja działań mających na celu „odebetonowanie” nawierzchni podwórek a tym samym uzyskania przestrzeni z udziałem zieleni, służących rekreacji i poszerzeniu kontaktów międzyludzkich wśród lokalnej wspólnoty.</p>	<p>AD.1 FUNCTIONING/USE: ACCESSIBILITY</p> <p>/disability accessibility (architectural and other including spatial patterns and signage), user friendliness (e.g. benches, shade, water sources)/</p> <p>DESCRIPTION: The local tenement courtyards and ground floors of the buildings have been adapted to meet the needs of disabled and elderly people through revitalization. Nevertheless, there are still no ramps for significant height differences in some courtyards.</p> <p>RECOMMENDATIONS: It is advisable to maintain good design practices by incorporating small ramps in applicable courtyards. The ramps should seamlessly blend into the urban interiors and not be easily removable. Any new ramp designs should harmonize with the chosen materials and the character of the renovated spaces. Furthermore, it is recommended to continue efforts to "de-concreting" the courtyard surfaces and to create biodiverse areas with greenery, perfect for leisure and fostering social relations within the community.</p>

AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: BEZPIECZEŃSTWO

/nawierzchnie antypoślizgowe, oświetlenie, ograniczenia ruchu, monitoring, niskie płoty - ograniczniki oddzielające chodniki od zieleni/

OPIS:

Na dziedzińcach występuje oświetlenie zarówno bram, jak i podwórek. Jest to najczęściej oświetlenie punktowe. Posadzka na analizowanych podwórkach wykonana jest z materiałów antypoślizgowych (kostka betonowa/granitowa z warstwą licową bez szlifowania). Na podwórzach kamienic, gdzie na parterze budynku są usługi ogólnodostępne, instaluje się również monitoring.

OCENA I ZALECENIA:

Zalecana jest kontynuacja wypracowanych dobrych praktyk przy rewitalizacji podwórzy.

AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: OTWIERANIE I ŁĄCZENIE PRZESTRZENI

/ np. włączenie dziedzińców do PP/

OPIS:

Podwórka przy ul. Traugutta 8, ul. Tuwima 16 i ul. Gdańskiej 35 charakteryzują się zamkniętym do środka kształtem - podwórka studnie.

Dziedzińce przy ul. Legionów 2 i ul. Legionów 31 mają układ otwarty - z tyłu działki zamiast budynku znajduje się ogrodzenie. Tworzy to możliwość wykonania przebicia i połączenia sąsiadujących podwórek. Taki potencjał posiada np. podwórko Biblioteki „Wolność”, które wraz z podwórzem budynku biurowego przy Placu Wolności 3 i Pasażem Róży mogłoby stanowić spójną przestrzeń. Dla kamienicy przy ul. Legionów 31 istnieje połączenie poprzez furtkę w ogrodzeniu z podwórkiem kamienicy przy ul. Gdańskiej 8.

OCENA I ZALECENIA:

Zalecana jest kontynuacja wypracowanych dobrych praktyk przy rewitalizacji podwórzy, w tym udrożnienie (w miarę możliwości) komunikacji pomiędzy sąsiadującymi podwórkami czy też realizacja przebić międzykwartałowych.

AD.1 FUNCTIONING/USE: SAFETY

/anti-slip surfaces, lighting, traffic restrictions, monitoring, low fences - delineators separating pavements from greenery/

DESCRIPTION:

Courtyards are equipped with lighting for both the gates and the yards, typically in the form of point lighting. The flooring in these areas is made of anti-slip materials, such as concrete or granite paving stones with a non-grinding facing layer. Monitoring systems are also installed in the courtyards of residential buildings where public services are available on the ground floor.

RECOMMENDATIONS:

It is recommended that good practices continue to be used in the following revitalizations.

AD.1 FUNCTIONING/USE: OPENING UP AND CONNECTING SPACES

/ e.g. incorporation of courtyards into PS /

DESCRIPTION:

The courtyards at 8 Traugutta ST, 16 Tuwima ST, and 35 Gdańsk ST feature a closed layout, often referred to as a "well-shaped courtyard".

Courtyards at 2 Legionów ST and 31 Legionów ST have an open layout at the rear of the plot with a solid fence. This design offers the opportunity to create connections with adjacent courtyards. The "Freedom" Library has the potential to be linked with the courtyard of the office building at 3 Wolność Square and with Rose's Passage, creating a unified space. These plots are currently separated by a solid wall with twinning greenery. Furthermore, there is a gate in the fence linking the tenement house at 31 Legionów ST with the courtyard of the tenement house at 8 Gdańsk ST.

RECOMMENDATIONS:

It is recommended that good practices continue to be used in the following revitalizations such as enhancing communication between neighboring courtyards (as far as possible), and implementing inter-quarter openings.

AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: WPROWADZENIE USŁUG DO PRZESTRZENI PUBLICZNEJ

/np. ogródki gastronomiczne, stoiska, markety, kioski, lodowiska)/

NIE WYSTĘPUJĄ

AD.1 FUNKCJA I SPOSÓB UŻYTKOWANIA: UŻYTKOWANIE PRZEZ OKREŚLONE GRUPY

/np. place zabaw dla dzieci, dla dorosłych - ciche gry - szachy, boule itp., tereny sportowe - m.in. siłownie zewnętrzne, skatepark, wybiegi dla zwierząt/

OPIS:

Na obszarze analizowanych podwórek nie stwierdziliśmy wprowadzenia dodatkowych funkcji umożliwiających użytkowanie ich przez różne grupy mieszkańców.

Jedynie na podwórzu przy ul. Gdańskiej 35 pojawiają się niezwiązane z gruntem elementy wyposażenia w postaci plastikowych mebli, domku do zabawy dla dzieci, huśtawki, umieszczanych tam z własnej inicjatywy mieszkańców.

OCENA I ZALECENIA:

- Dostosowanie i wyposażenie podwórek w elementy służące zróżnicowanym grupom mieszkańców (dzieci, osoby starsze, osoby z niepełnosprawnościami, właściciele zwierząt domowych itp.)
- Nowowprowadzone elementy powinny być dostosowane do wymogów wynikających z Uchwały nr XXXVII/966/16.

AD.1 FUNCTIONING/USE: INTRODUCTION OF SERVICES INTO THE PUBLIC SPACES

/e.g. catering gardens, stands, markets, kiosks, ice rinks)/

DO NOT OCCUR

AD.1 FUNCTIONING/USE: USE BY SPECIFIC GROUPS

/e.g. children's playgrounds, adults - silent games - chess, boules etc., sports areas - e.g. outdoor gyms, skate park, pet walkers/

DESCRIPTION:

There is not any additional functions introduced to the analyzed courtyards that would allow them to be used by different groups of residents.

There are temporary furnishings in the form of plastic furniture, a playhouse for children, a swing, placed in the courtyard at 35 Gdańsk ST there on the residents' own initiative.

RECOMMENDATIONS:

- It is recommended that courtyards be equipped with elements that would serve different groups of residents (children, seniors, disabled people, pet owners, etc.)
- New elements should align with the aesthetic guidelines and criteria outlined in Resolution No. XXXVII/966/16 (the "Landscape Resolution for Łódź").

AD.2 EKOLOGIA / AD.2 ECOLOGY

- ROZWIĄZANIA OPARTE NA PRZYRODZIE / NBS VEGETATION
- UDZIAŁ NAWIERZCHNI UTWARDZONEJ I POWIERZCHNI BIOLOGICZNIE CZYNNEJ / AMOUNT OF CONCRETE PAVEMENT AND BIOLOGICALLY ACTIVE SURFACES
- EKOLOGICZNE MEBLE MIEJSKIE / SUSTAINABLE URBAN FURNITURE
- GROMADZENIE WODY DESZCZOWEJ / DRAINAGE, WATER COLLECTION
- FOTOWOLTAIKA, STACJE ŁADOWANIA SAMOCHODÓW ELEKTRYCZNYCH / PHOTOVOLTAICS , ELECTRIC CAR CHARGING STATIONS
- GOSPODAROWANIE ODPADAMI / WASTE MANAGEMENT



AD.2 EKOLOGIA: ROZWIĄZANIA OPARTE NA PRZYRODZIE

/(ilość, forma, rodzaj) (zieleń niska - np. zielone aleje, łąki kwietne, zieleń ruderálna), (zielona architektura - zieleń dachowa i pionowa/zielone ściany hydroponiczne, zielone pergole i ogrodzenia), ogrody warzywne i ziołowe - forma podniesionych grządki, las miejski itp./

OPIS:

Podwórza charakteryzują się małym udziałem powierzchni biologicznie czynnej (średnio do 2% powierzchni całej działki i do 8% powierzchni dziedzińca). Na terenach pojawiają się wydzielone trawniki/rabaty, drzewa o średniej wysokości oraz rośliny w donicach, umieszczone z własnej inicjatywy mieszkańców.

OCENA I ZALECENIA:

Zaleca się zwiększenie powierzchni terenów biologicznie czynnych. Biorąc pod uwagę rozmiary i niski stopień nasłonecznienia łódzkich dziedzińców, rekomendowanym rozwiązaniem jest zieleń wertykalna w postaci pnączy na ścianach budynków i ogrodzeniach.

AD.2 EKOLOGIA: UDZIAŁ NAWIERZCHNI UTWARDZONEJ I POWIERZCHNI BIOLOGICZNIE CZYNNIEJ

/(identyfikacja wysp ciepła), powierzchnie przepuszczalne, nawierzchnie podwieszane, oddzielanie korzeni drzew od infrastruktury/

OPIS:

W przestrzeni dziedzińców nie zidentyfikowano rozwiązań w postaci nawierzchni przepuszczalnych, z wyjątkiem niewielkich trawników w podwórzach przy ul. Tuwima 16 i ul. Legionów 2 oraz rabaty bylinowej przy ul. Legionów 31.

OCENA I ZALECENIA:

Zaleca się zwiększenie udziału nawierzchni przepuszczalnych w zagospodarowaniu przestrzeni podwórek.

AD.2 EKOLOGIA: EKOLOGICZNE MEBLE MIEJSKIE

/tworzenie zielonych przystanków autobusowych, domków dla ptaków i owadów, uli itp./

OCENA I ZALECENIA:

Na terenie podwórek nie stwierdzono rozwiązań w postaci ekologicznych mebli miejskich wspierających bioróżnorodność. Należy przewidzieć takie rozwiązania.

AD.2 ECOLOGY: NBS VEGETATION

/(quantity, form, type) (low greenery - e.g. green lanes, flower meadows, ruderal greenery), (green architecture - rooftop and vertical greenery/ green hydroponic walls, green pergolas and fences), vegetable and herb gardens - form of raised beds, urban forest, etc./

DESCRIPTION:

The courtyards have a small amount of bioactive areas, up to 2% of the total plot area and up to 8% of the courtyard area. These areas include lawns, flower beds, medium-sized trees, and potted plants, which are placed on the residents' initiative.

RECOMMENDATIONS:

It is recommended to increase the area of biologically active areas. Given the dimensions, proportions, and sunlight availability in the courtyards, the optimal approach for the Łódź courtyards would be to introduce high greenery, such as vines, on the walls of buildings and fences.

AD.2 ECOLOGY: AMOUNT OF CONCRETE PAVEMENT AND BIOLOGICALLY ACTIVE SURFACES

/(identification of heat islands), permeable surfaces, suspended pavements, separating tree roots from infrastructure/

DESCRIPTION:

There are no solutions in the form of permeable surfaces identified on the courtyard, except for small lawns in the courtyards at 16 Tuwima ST and 2 Legionów ST and a perennial flowerbed at 31 Legionów ST.

RECOMMENDATIONS:

It is recommended to increase the amount of permeable surfaces.

AD.2 ECOLOGY: SUSTAINABLE URBAN FURNITURE

/creating green bus stops, birdhouses, insecthouses, beehives, etc./

RECOMMENDATIONS:

There has been no inventory of sustainable urban furniture solutions supporting biodiversity in the courtyards. It is essential to analyze the potential of such solutions.

AD.2 EKOLOGIA: ZBIERANIA WODY DESZCZOWEJ

/(ponds, retention basins, infiltration and bioretention ditches, rain gardens/potted rain gardens)/

OCENA I ZALECENIA:

W przestrzeni dziedzińców nie występują rozwiązania mające na celu retencję wody deszczowej. Konieczne jest przeprowadzenie analiz dotyczących gospodarowania deszczówką w podwórzach, włączając w to ocenę możliwości jej retencji i infiltracji. Rekomenduje się implementację systemów zbierania i magazynowania deszczówka, np. poprzez zastosowanie niewielkich zbiorników retencyjnych czy zielonych dachów np. na wiatach śmietnikowych.

AD.2 ECOLOGY: DRAINAGE, WATER COLLECTION

/(ponds, retention basins, infiltration and bioretention ditches, rain gardens/potted rain gardens)/

RECOMMENDATIONS:

The courtyards currently lack any rainwater retention solutions. It is essential to analyze rainwater management in these areas, including the feasibility of retention and infiltration. Installing rainwater collection and storage systems, such as small retention tanks or green roofs on garbage shelters, is recommended.

AD.2 EKOLOGIA: FOTOWOLTAIKA, STACJE ŁADOWANIA SAMOCHODÓW ELEKTRYCZNYCH

OCENA I ZALECENIA:

W przestrzeni dziedzińców nie występują rozwiązania mające na celu przetwarzanie światła słonecznego. Konieczne jest przeprowadzenie analiz możliwości wykorzystania takich rozwiązań, na przykład poprzez instalację systemów fotowoltaiki np. na dachach oficyn.

AD.2 ECOLOGY: PHOTOVOLTAICS, ELECTRIC CAR CHARGING STATIONS

RECOMMENDATIONS:

There are no solutions that aim to process sunlight in the courtyards. It is essential to analyze the potential of using solutions like solar panels to harness sunlight in the courtyards and outbuildings.

AD.2 EKOLOGIA: GOSPODAROWANIE ODPADAMI

OCENA I ZALECENIA:

Kosze na śmieci powinny harmonizować z elementami małej architektury tworząc spójny komplet mebli miejskich. Dopuszcza się współczesną formę, dostosowaną do charakteru dziedzińców i utrzymaną w jednym standardzie.

Pojemniki na odpady komunalne stanowią element dysharmonizujący w przestrzeniach dziedzińców. Rekomenduje się realizację murowanych lub drewnianych wiat śmietnikowych, bądź innych lekkich konstrukcji przesłaniających miejsca składowania odpadów. Dopuszcza się także dostosowanie pomieszczeń usytuowanych na parterze budynków na cele przechowywania pojemników na odpady. W przypadku rozwiązania w postaci wiaty lub konstrukcji przesłaniającej, zaleca się wprowadzenie zieleni pnącej lub nasadzeń z krzewów.

AD.2 ECOLOGY: WASTE MANAGEMENT

RECOMMENDATIONS:

Trashcans should correspond with the other elements of urban furniture as one set. Opting for a modern design in subtle colors is acceptable if they adhere to a standard and blend well with the surroundings.

MSW(municipal solid waste) containers are disrupting the aesthetics of courtyard spaces. To address this, it is advised to consider constructing brick or wooden shelters for the MSW containers or implementing light structures to cover the storage areas. It is also recommended to cover the MSW shelter or a screening structure by twilling plants. Alternatively, a room on the ground floor of the building can be adapted for MSW container storage.

AD. 3 ELEMENTY HISTORYCZNE I CECHY IDENTYFIKUJĄCE PP / AD.3 HISTORIC AND IDENTITY ELEMENTS OF PS

- SPIS WSZYSTKICH ELEMENTÓW HISTORYCZNYCH I CECH, TWORZĄCYCH TOŻSAMOŚĆ PP
/ ENUMERATION OF ALL ELEMENTS AND FEATURES THAT ARE HISTORIC AND FORM THE IDENTITY OF THE PS



AD. 3 ELEMENTY HISTORYCZNE I CECHY IDENTYFIKUJĄCE PP: SPIS WSZYSTKICH ELEMENTÓW HISTORYCZNYCH I CECH, TWORZĄCYCH TOŻSAMOŚĆ PP

/np. oznaczanie przebiegu linii obronnych w kondygnacjach PP, eksponowanie w przestrzeni fundamentów obiektów zabytkowych, wykopalisk itp., formy upamiętnienia/

OPIS:

Charakterystycznymi elementami budującymi genius loci łódzkich dziedzińców są m.in. układ urbanistyczny, kolorystyka kamienic, stolarka okienna i drzwiowa; elementy ozdobne, historyczna posadzka: płytki ceramiczne lub bruk kamienny.

OCENA I ZALECENIA:

- Ochrona historycznych cech rozplanowania poprzez zachowanie tradycyjnego układu podwórzy z zabudową oficynową, z dopuszczeniem łączenia oraz wspólnego zagospodarowywania przestrzeni;
- Określenie i respektowanie zaleceń konserwatorskich zgodnych z obowiązującymi formami ochrony zabytków;
- Zaznaczenie historycznych granic działek, wskazanych na rysunku mpzp;
- Zachowanie historycznych elementów zagospodarowania, których lokalizację wskazano na rysunku mpzp i wymieniono w ustalenach szczegółowych, przy dopuszczeniu wkomponowania ich na obszarze działki budowlanej bez obowiązku zachowania miejsca dotychczasowej lokalizacji;
- Zakaz realizacji monolitycznych nawierzchni betonowych lub asfaltowych w podwórzach.

AD.3 HISTORIC AND IDENTITY ELEMENTS OF PS: ENUMERATION OF ALL ELEMENTS AND FEATURES THAT FORM THE IDENTITY OF THE PS

/e.g. marking the course of defensive lines in PP floors, exposing in space the foundations of historic buildings, excavations etc., forms of commemoration/

DESCRIPTION:

Characteristic elements that build the genius loci of Łódź courtyards include: urban layout, colors of fasades and colors of window and door frames, cast iron decorative elements in the yard, historic pavement - ceramic tiles or stone paving.

RECOMMENDATIONS:

- It is crucial to preserve the traditional courtyard characteristics by maintaining the original layout, frontages, and outbuildings. It is also allowed to jointly develop the courtyards of neighboring tenements.
- Defining and respecting conservation recommendations in accordance with applicable forms of monument protection.
- It is required to honor the historical boundaries of the plots by marking them in the pavement's surface.
- It is required to preserve the historical elements, as indicated on the master plan layout (in the Local Plan of Urban Development) and specific conservation guidelines. These elements should be incorporated into the new courtyard layout, however not necessary being constrained to their previous locations.
- It is prohibited to implement monolithic concrete or asphalt surfaces;

PART III

ULEPSZENIE I OCHRONA WYBRANYCH ASPEKTÓW PP IMPROVING/PROTECTING SELECTED ASPECTS OF PS

- AD.1 OCENA/POPRAWA JAKOŚCI ELEMENTÓW MATERIAŁOWYCH / AD.1 ASSESSING/IMPROVING THE QUALITY OF THE MATERIAL ELEMENTS
- AD.2. OCENA/POPRAWA JAKOŚCI UŻYTKOWANIA / AD. 2. EVALUATION/IMPROVEMENT OF QUALITY OF USE
- AD.3 OCENA/POPRAWA ASPEKTÓW EKOLOGICZNYCH / AD.3 ASSESSMENT/IMPROVEMENT OF ECOLOGICAL ASPECTS
- AD 4. OCENA/ POPRAWA OBSZARÓW ZIELONYCH / AD 4. EVALUATION/IMPROVEMENT OF GREEN AREAS
- AD.5 OCHRONA WARTOŚCI/TOŻSAMOŚCI I ELEMENTÓW HISTORYCZNYCH / AD.5 PROTECTION OF HISTORIC ELEMENTS AND VALUES/IDENTITY
- AD.6 OCENA/POPRAWA ESTETYKI / AD.6 EVALUATION/IMPROVEMENT OF AESTHETICS

AD.1 OCENA/POPRAWA JAKOŚCI ELEMENTÓW MATERIAŁOWYCH

/(zadanie odrębne od kryteriów jakościowych materiałów, niezależne od dalszych punktów)poprawa stanu technicznego elementów tworzących przestrzenie publiczne (konieczność oceny czy jest to konieczne - stan techniczny wszystkich elementów materialnych)modernizacja elementów PP/

- Rekomendowane jest dążenie do ujednolicenia poziomów nawierzchni w obrębie dziedzińców. Tam, gdzie historyczne podziały uniemożliwiają to ujednolicenie, zaleca się implementację pochylni, szczególnie w przypadku niewielkich różnic wysokości (do 10-20 cm) lub wprowadzenie rozwiązań alternatywnych.
- W celu zapewnienia spójności estetycznej i funkcjonalnej zaleca się ograniczenie różnorodności materiałów nawierzchni do niezbędnego minimum.
- Standard i rodzaj nawierzchni powinny być dostosowane do charakteru i funkcji przestrzeni podwórek, z uwzględnieniem, o ile to możliwe, cech historycznych.
- W przypadku stwierdzenia uszkodzeń elewacji kamienic konieczne jest przeprowadzenie stosownych prac remontowych uwzględniających cechy historyczne budynków i zalecenia konserwatorskie.
- W celu zachowania spójności wizualnej i funkcjonalnej zaleca się standaryzację elementów małej architektury, takich jak ławki, kosze na śmieci czy oświetlenie (wg obowiązujących aktów prawa w tym miejscowych planów zagospodarowania przestrzennego oraz Uchwały nr XXXVII/966/16, tzw. uchwała krajobrazowa dla Łodzi)
- Rekomendowane jest wprowadzenie odpowiednich elementów identyfikacji wizualnej oraz tablic informacyjnych stanowiących istotne ułatwienie dla użytkowników przestrzeni miejskich, w tym dla osób niepełnosprawnych (wg zaleceń dla nośników reklamowych oraz Uchwały nr XXXVII/966/16, tzw. uchwała krajobrazowa dla Łodzi).
- Rekomendowane jest stworzenie wzornika projektowego ze szczegółowymi wytycznymi w zakresie preferowanych wzorów nawierzchni, z uwzględnieniem sposobów ich układania, kolorystyki, materiałów itp.

AD.1 ASSESSING/IMPROVING THE QUALITY OF THE MATERIAL ELEMENTS

/ (separate task from the material quality criteria, independent of further points)

improvement of the technical condition of the elements forming the public spaces (need to assess whether it is necessary - technical condition of all material elements)

upgrading of PS elements/

- Unification of surface levels: it is necessary to aim unification of the surface levels of the courtyards by minimizing height differences. Where historical conditions prevent such unification, it is recommended to implement ramps, especially in cases of small height differences (10-20 cm), or to introduce alternative access to the buildings.
- Limiting the diversion of surface materials: in order to ensure aesthetic and functional consistency, it is recommended to limit the diversity of surface materials to the necessary minimum.
- The surface standard should be adapted to the nature and function of the internal spaces of multifunctional courtyards.
- Modernization of facades: in the event of damage, it is necessary to modernize the facades of tenement houses.
- It is advisable to standardize urban furniture, including benches, waste bins, and lighting, to ensure visual and functional consistency. This should be done in accordance with the guidelines of local spatial development plans and Resolution No. XXXVII/966/16, also known as the landscape resolution for Łódź.
- In the courtyard area, it is recommended to include visual identification elements and information boards to assist all users, including those with disabilities, in orienting themselves and accessing necessary information. These elements should adhere to the guidelines for advertising media and the Resolution No. XXXVII/966/16, also known as the landscape resolution for Łódź.
- Creation of a design template: It is recommended to create a design template based on analyses, containing detailed guidelines for surface patterns, methods of their edging, and other architectural elements.

AD.2. OCENA/POPRAWA JAKOŚCI UŻYTKOWANIA

- improving functionality; e.g. subordination of pedestrian traffic and large numbers of people, bicycle transport (is it really desirable), transport within the area and to the area, elimination of the division between streets and pavements (is it really so); provision of parking, slowing down, raised pedestrian crossings,
- signage
- improving accessibility (accessibility for the disabled as well as general access)
- safety (non-slip surfaces, lighting, traffic restrictions)
- signposting/information
- opening up and connecting spaces
- allowing services to move out into the street (gardens)

- Rekomendowane jest dążenie do ujednolicenia poziomów nawierzchni w obrębie dziedzińców a także w razie potrzeby wprowadzania niewielkich pochylni w celu niwelowania barier architektonicznych i tym samym zapewnienia dostępności dla wszystkich użytkowników, w tym osób z niepełnosprawnościami i starszych.
- W uzasadnionych przypadkach wskazane jest zapewnienie dostępności alternatywnej (np. w postaci wind zewnętrznych).
- Rekomendowane jest zwiększenie powierzchni biologicznie-czynnych w celu zapewnienia bioróżnorodności, w tym dostępu do odkrytych źródeł wody niezbędnych dla funkcjonowania lokalnych ekosystemów.
- Rekomendowane jest przeanalizowanie zasadności montażu monitoringu w przestrzeni dziedzińców.
- W przestrzeniach dziedzińców zaleca się wprowadzenie infrastruktury dedykowanej różnym grupom wiekowym mieszkańców. Forma architektoniczna zastosowanych rozwiązań powinna być spójna kolorystycznie i zgodna z wytycznymi obowiązujących aktów prawa (w tym miejscowych planów zagospodarowania przestrzennego oraz Uchwały nr XXXVII/966/16, tzw. uchwała krajobrazowa dla Łodzi).

AD. 2. EVALUATION/IMPROVEMENT OF QUALITY OF USE

- improving functionality; e.g. subordination of pedestrian traffic and large numbers of people, bicycle transport (is it really desirable), transport within the area and to the area, elimination of the division between streets and pavements (is it really so); provision of parking, slowing down, raised pedestrian crossings,
- signage
- improving accessibility (accessibility for the disabled as well as general access)
- safety (non-slip surfaces, lighting, traffic restrictions)
- signposting/information
- opening up and connecting spaces
- allowing services to move out into the street (gardens)

- It is necessary to ensure accessibility of the tenements for all users by removing architectural barriers and implementing ramps to ensure access for all users, including senior citizens and disabled people.
- It is recommended to introduce alternative access to the buildings. (e.g. external elevators) in justified cases.
- It is advisable to increase bioactive surfaces to support biodiversity and provide access to open water sources, essential for the functioning of local ecosystems.
- It is suggested to evaluate the need for installing monitoring systems in the courtyards.
- The courtyards should serve multiple functions and be equipped with infrastructure suitable for residents of different age groups. Any new urban furniture should have a consistent and preferably understated design and aligns with the aesthetic guidelines and criteria outlined in Resolution No. XXXVII/966/16 (the "Landscape Resolution for Łódź").

AD.3 OCENA/POPRAWA ASPEKTÓW EKOLOGICZNYCH

/zielność traktowana jest podwójnie - jako stały element i jako element ekologiczny - w tym drugim przypadku będą zapewne inne priorytety - będzie założenie wprowadzenia zieleni/ - tutaj można przeprowadzić analizy temperaturowe (programy/analizy komputerowe)

- wprowadzenie zieleni i wody (obszary biologicznie czynne)• zacienienie (zasadzenia, w tym te o wysokim albedo, ale także poprzez wprowadzenie wysokiej zieleni)

- gospodarka wodami opadowymi

- kosze na śmieci (segregacja odpadów, ukryte kosze na śmieci)/

- Rekomenduje się odbezonowanie dziedzińców poprzez wprowadzenie obszarów zieleni (nasadzenia) oraz wody (np. oczka wodne, fontanny), które pełniłyby funkcje ekologiczne, wspierające różnorodność biologiczną a także stanowiłyby element poprawiający estetykę przestrzeni miejskiej.
- W celu poprawy komfortu cieplnego, w uzasadnionych przypadkach, rekomenduje się instalację elementów zacieniających, np. daszków czy pergoli. Możliwe jest także wykorzystanie w tym celu wysokiej zieleni, takiej jak drzewa czy pnącza.
- Rekomenduje się przeprowadzenie analiz dotyczących sposobu gospodarowania deszczówką na obszarze dziedzińców, włączając w to ocenę możliwości retencji i infiltracji wody.
- Rekomenduje się implementację systemów zbierania i magazynowania deszczówka, np. poprzez zastosowanie zbiorników retencyjnych czy realizacji ogrodów deszczowych.
- Zaleca się wyznaczenie miejsca na odpady komunalne i umieszczanie odpadów w pomieszczeniach zamkniętych poprzez realizację murowanych lub drewnianych wiat śmieciowych, lub lekkich konstrukcji przesłaniających miejsca składowania odpadów, lub dostosowanie pomieszczenia na parterze budynku na cele przechowywania ww. pojemników. W przypadku rozwiązania w postaci wiaty lub konstrukcji przesłaniającej, zaleca się wprowadzenie zieleni pnącej lub nasadzeń z krzewów.

AD.3 ASSESSMENT/IMPROVEMENT OF ECOLOGICAL ASPECTS

/greenery is treated twice - as a permanent fixture and as an ecological element - in the latter case there will probably be other priorities - there will be an assumption of introducing greenery/ -- here temperature analyses (computer programs/analyses) can be done

- introduction of greenery and water (biologically active areas)
- shading (canopies, including those with high albedo, but also through the introduction of tall greenery)

- rainwater management

- rubbish bins (waste segregation, concealed rubbish bins)/

- It is recommended to "de-concrete" the courtyard's surface in favor of green areas and water that will not only serve as a permanent decoration but also fulfill ecological functions, by supporting biodiversity.
- To improve thermal comfort, it is advisable to install shade, e.g. canopies or pergolas. It is also possible to use tall greenery, such as trees or vines, which will additionally provide natural shading.
- It is essential to analyze rainwater management in these areas, including the feasibility of retention and infiltration.
- Installing rainwater collection and storage systems, such as small retention tanks or green roofs on garbage shelters, is recommended.
- It is advised to consider constructing brick or wooden shelters for the MSW (municipal solid waste) containers or implementing light structures to cover the storage areas. It is also recommended to cover the MSW shelter or a screening structure by twining plants. Alternatively, a room on the ground floor of the building can be adapted for MSW container storage.

AD 4. OCENA/ POPRAWA OBSZARÓW ZIELONYCH

• wielkość terenów zielonych (różne formy); • istniejące formy przestrzenne zieleni; • ocena gatunkowa zieleni/

- W celu optymalnego zarządzania zielonymi obszarami miejskimi, konieczne jest stworzenie katalogu, uwzględniającego specyficzne wymagania ekologiczne oraz walory estetyczne proponowanych gatunków. Katalog ten będzie stanowić wsparcie dla planistów miejskich oraz właścicieli nieruchomości przy podejmowaniu decyzji dotyczących obsadzenia terenów zieleni, w tym dziedzińców.
- W kontekście zmiennych warunków klimatycznych oraz presji antropogenicznej, istotnym aspektem wyboru gatunków roślin jest ich odporność na ekstremalne warunki środowiskowe. Zaleca się wybór gatunków, które są odporne na zasolenie gleby oraz suszę hydrologiczną, aby zapewnić trwałość i zdrowotność zieleni miejskiej.
- Współczesne trendy urbanistyczne kładą nacisk na zachowanie bioróżnorodności oraz promowanie ekosystemów miejskich. Z tego względu, zaleca się preferowanie gatunków drzew liściastych, które charakteryzują się większą zdolnością do adaptacji do zmieniających się warunków klimatycznych oraz posiadają korzystny wpływ na mikroklimat i jakość powietrza.
- Istniejąca zieleń dojrzała często stanowi cenny zasób ekologiczny i krajobrazowy. Aby zachować jej wartość oraz zapewnić jej dalszy rozwój, rekomenduje się odpowiednią pielęgnację oraz modyfikację donic w celu poprawy warunków wzrostu i zdrowia roślin.
- Ideę sadzenia pnączy oraz wykorzystania pergoli i trejaży należy kontynuować jako elementy wspierające bioróżnorodność i estetykę przestrzeni dziedzińców.

AD 4. EVALUATION/IMPROVEMENT OF GREEN AREAS

• size of green spaces (various forms); • existing spatial forms of greenery; • species assessment of greenery/

- It is essential to create a Catalog of Plant Species that considers the specific ecological needs and visual appeal of the proposed plant species to effectively manage urban green spaces. This catalog will help city planners and property owners in making conscious decisions about green areas, including courtyards.
- It is crucial to prioritize the selection of plant species based on their resilience to extreme environmental conditions, given climate change and anthropogenic pressure. It is advisable to choose species that can withstand soil salinity and hydrological drought to ensure the longevity and vitality of urban greenery.
- Current urban trends underscore the importance of preserving biodiversity and promoting urban ecosystems. Thus, it is recommended to favor deciduous tree species, as they demonstrate better adaptability to changing climatic conditions and positively impact the microclimate and air quality.
- It is recommended to preserve and enhance mature greenery, as it serves as a valuable ecological and landscape asset. Proper care and modifications to the soil should be undertaken to maintain its value and facilitate further growth.
- The concept of planting climbing vines and utilizing pergolas and trellises should be continued as elements that support biodiversity and enhance the aesthetics of courtyard spaces.

AD.5 OCHRONA WARTOŚCI/TOŻSAMOŚCI I ELEMENTÓW HISTORYCZNYCH

- Rekomenduje się stworzenie katalogu wytycznych konserwatorskich, który uwzględniałyby wprowadzanie koniecznych zmian w przestrzeniach zabytkowych związanych z przeciwdziałaniem skutkom zmian klimatycznych przy zachowaniu głównych wartości historycznych danego miejsca i ochronie elementów zabytkowych, z uwzględnieniem wymogów wynikających z różnych form ochrony konserwatorskiej (regulowanych przez obowiązujące akty prawa).
- Zaleca się zdefiniowanie charakterystycznych cech zabytkowych podwórek w obszarze miasta tworzących genius loci tych miejsc, takich jak: kształt, wielkość, zabudowa, wystrój architektoniczny. Przy projektowaniu nasadzeń w przestrzeni podwórza cechy te powinny być brane pod uwagę aby zachować spójność między nową szatą roślinną a zabytkowym otoczeniem, a w szczególności zapewnić harmonijne współistnienie zachowanej kompozycji historycznej z nowymi elementami, z uwzględnieniem osiowości fasad zabytkowych budynków, gabarytów zabudowy, relacji przestrzennych pomiędzy poszczególnymi jego elementami, cech własnych obiektów budowlanych (tj. np. ryzality) oraz ekspozycji widokowej.
- Konieczne jest zinwentaryzowanie i udokumentowanie wszystkich elementów historycznych na etapie przedprojektowym (z uwzględnieniem kwerendy archiwalnej) w celu ustalenia zakresu ich ochrony, określenia ewentualnych niezbędnych prac konserwatorskich bądź doprecyzowania możliwości relokacji niektórych z nich (jak np. ma to miejsce w przypadków odbojów, włączów czy zdrojów) i wkomponowania w nowoprojektowaną przestrzeń (o ile takie rozwiązanie dopuszczone jest w odniesieniu do formy ochrony konserwatorskiej danego zabytku).
- Zaleca się budowanie tożsamości miejsc zabytkowych poprzez podkreślanie fizycznych (artystycznych, architektonicznych, historycznych) a także społecznych (kulturowych) wartości danej przestrzeni. Ważnymi elementami dla budowania takiej tożsamości mogą być np. zachowane dawne szyldy, wyeksponowane (zabezpieczone lub zrekonstruowane) elementy historyczne istotne dla danej przestrzeni lub tablice informacyjne.

AD.5 PROTECTION OF HISTORIC ELEMENTS AND VALUES/IDENTITY

- It is advisable to develop a set of conservation guidelines that consider the implementation of necessary modifications in historical areas to mitigate the impact of climate change while preserving the key historical values of the location and safeguarding historic elements, in compliance with various conservation protection requirements stipulated in relevant laws.
- It is recommended to delineate the distinctive characteristics of historical courtyards within urban areas that contribute to the unique atmosphere of these places, including their shape, size, layout, and architectural embellishments. When planning landscaping in courtyard spaces, it is important to consider these features to ensure harmony between the new greenery and the historical surroundings, and particularly to facilitate the balanced coexistence of preserved historical compositions with new elements, while taking into consideration the axial alignment of the facades of historical buildings, the dimensions of the layout, the spatial relationships among its components, the structural features of architectural objects (e.g., projections), and the view exposure.
- Prior to the design phase, it is essential to inventory and document all historical elements (taking into account archival research) to ascertain the extent of their protection, identify necessary conservation efforts, or assess the feasibility of relocating certain elements (such as bollards, manhole covers, or springs) and integrating them into the newly designed space, if permitted under the relevant conservation protection regulations for a specific monument.
- It is recommended to cultivate the identity of historical locales by highlighting the physical (artistic, architectural, historical) and social (cultural) values of the area. Preserved old signs, exhibited (secured or reconstructed) historical elements significant to the area, or informational displays can be crucial in establishing such an identity.

AD.6 OCENA/POPRAWA ESTETYKI

- Działania mogą być albo wskazaniami konkretnych elementów, albo w formie Przewodników Dobrych Praktyk (ogrody gastronomiczne, parasole, ławki, znaki itp.).
- Poprawa estetyki poprzez standaryzację (np. reklamy, parasole, witryny sklepowe),
- balustrady, tynki, wieszanie prania - co można zobaczyć z przestrzeni publicznych
- murale, dekoracje przestrzenne, graffiti• poprawa funkcjonalności (spełnianie funkcji)
- jakość użytkowania (jakość mebli).

• Rekomenduje się wprowadzanie elementów w postaci instalacji artystycznych bądź murali pod warunkiem zachowania ich wysokiego poziomu estetycznego i umiejscowienia w przestrzeniach dziedzińców zgodnie z obowiązującymi aktami prawa (w tym miejscowymi planami zagospodarowania przestrzennego oraz Uchwałą nr XXXVII/966/16, tzw. uchwałą krajobrazową dla Łodzi).

• Rekomenduje się stworzenie „Katalogu standardów” zawierającego wytyczne i przykłady dobrych praktyk z zakresu estetyki kształtowania przestrzeni publicznych, w tym podwórzy. Katalog powinien uwzględniać rekomendacje projektowania przestrzeni użytkowych (tj. np. ogrody gastronomiczne), dekoracji przestrzennych, murali, estetyki i zasad umieszczania reklam oraz znaków informacyjnych itp.

AD.6 EVALUATION/IMPROVEMENT OF AESTHETICS

- Actions can be either indications of specific elements or in the form of Good Practice Guides (catering gardens, umbrellas, benches, signs, etc.).
- Improving aesthetics through standardisation (e.g. advertising, umbrellas, shop windows),
- railings, plasterwork, hanging laundry - what can be seen from public spaces
- murals, spatial decorations, graffiti
- functional improvement (fulfilment of functions)
- quality of use (quality of furniture).

• It is advisable to consider incorporating artistic installations or murals, ensuring that the artwork meets high aesthetic standards and complies with local regulations and plans, including Resolution No. XXXVII/966/16 and has been approved by the overseeing authority.

• It is recommended to develop a "Catalogue of Standards" consisting of guidelines and exemplary practices for enhancing the aesthetic appeal of public spaces, including courtyards. This catalogue should encompass recommendations for designing functional areas such as dining gardens, spatial embellishments, murals, aesthetics, and the placement of advertising and informational signs.

RE-PUBLIC SPACES



RE-PUBLIC SPACES ŁÓDŹ, POLAND



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42 638 4333



ANASTASIYA KLIMKO (COMM MNGR)



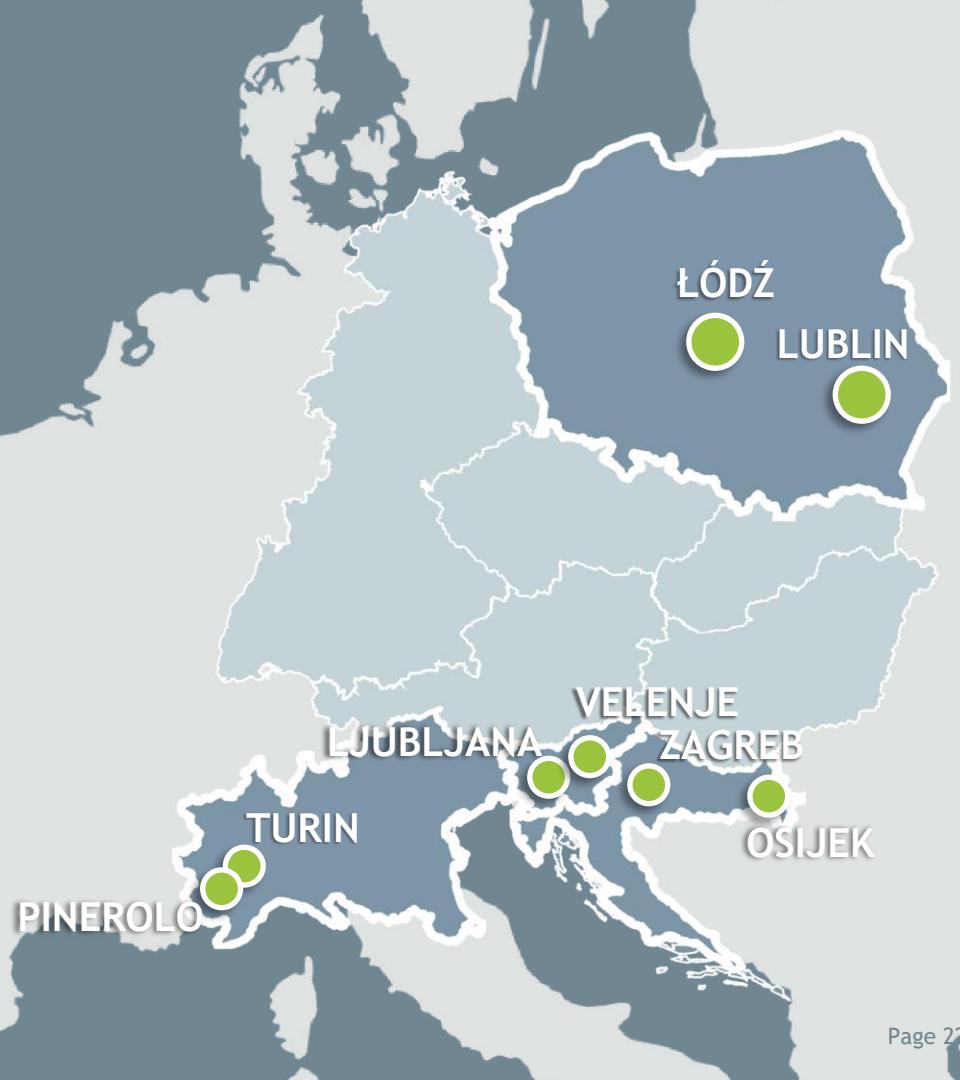
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PARTICIPATORY MEETING

8 TRAUGUTTA ST, ŁÓDŹ



RE-PUBLIC SPACES

KONSULTACJE
SPOŁECZNE

WEŹ UDZIAŁ W SPOTKaniu!
TWOJE ZDANIE SIĘ LICZY!
JAKIE PODWÓRKO KAMIEŃCY
PRZY UL. TRAUGUTTA 8?



Chcemy poznać Twoją opinię na temat zaproponowanych działań oraz
wysłuchać propozycji dotyczących zmian jakie można by wprowadzić
na podwórku kamienicy przy ul. Traugutta 8.

DOWIEDZ SIĘ WIĘCEJ



DECYDUJEMY
O ŁÓDZI

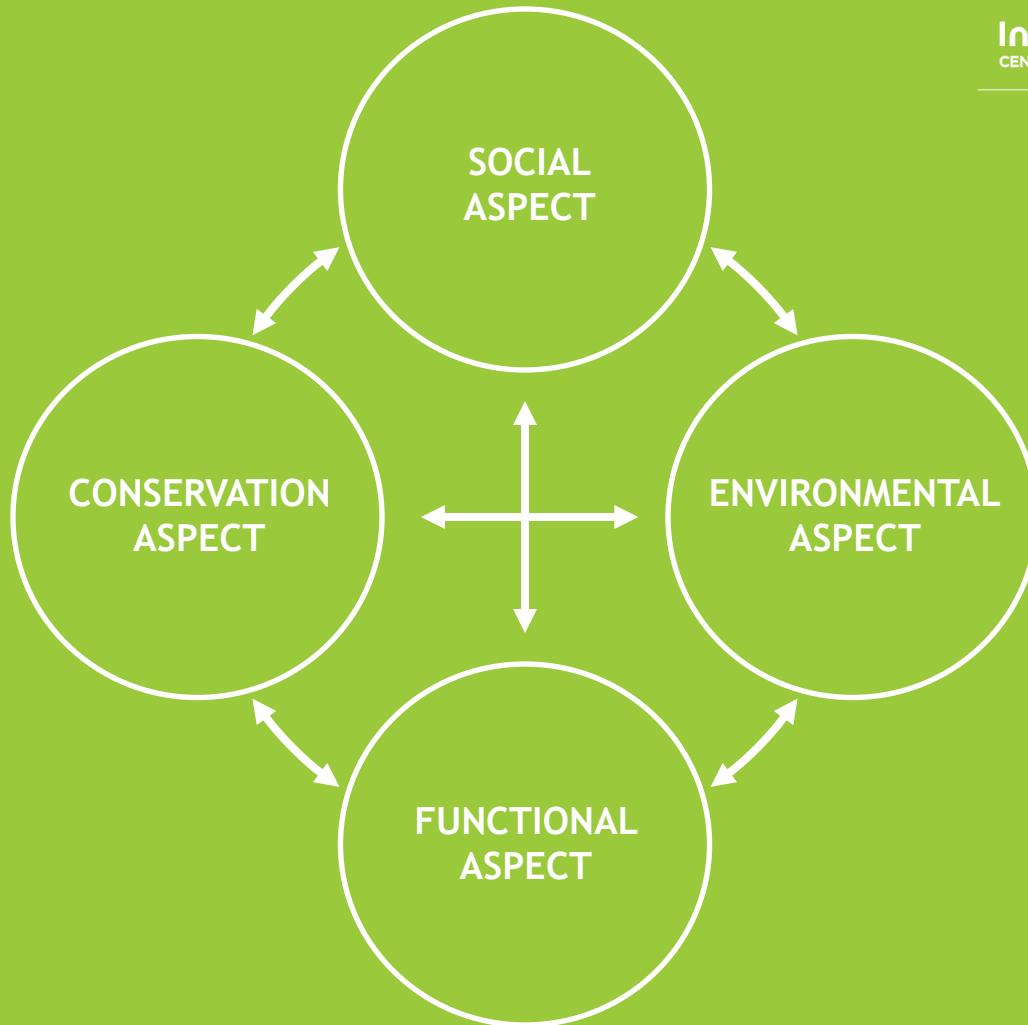
KIEDY? 04.07.2024 r. GODZ. 17.00

GDZIE? UL. TRAUGUTTA 8, PRAWA OFICyna
SIEDZIBA STOWARZYSZENIA "SZTUKA
DOBREGO ŻYCIA"

PARTICIPATORY MEETING TIMELINE

RE-PUBLIC SPACES







COOPERATION IS CENTRAL

COURTYARD AT 8 TRAUGUTTA ST.



8 TRAUGUTTA ST. - COURTYARD VIEWS



8 TRAUGUTTA ST. - COURTYARD VIEWS



FUNCTIONAL ASPECT

WHAT ARE THE NECESSARY STEPS?

PRE-PROJECT WORK:

- Allocate a room for storing municipal waste.
- Repaint and clean the gate passage and the plinths of the outbuildings' elevations.
- Perform necessary technical repairs.

PROJECT ACTIVITIES:

- Create a welcoming space for the integration and recreation of residents.
- Ensure that all existing entrances to the outbuildings remain accessible.
- Provide a communication route for the efficient removal of municipal waste.



ENVIRONMENTAL ASPECT

CLIMATE FACTORS

1. **SOLAR RADIATION** - sunshine analysis, shading, etc.
2. **TEMPERATURE FACTOR** - heating of materials, impact of urban heat island, outdoor thermal comfort, wind flow, etc.
3. **NBS AT THE NEIGHBORHOOD SCALE** - retention basins, rainwater retention ponds, or green water squares to store water, small-scale rainwater catchment and drainage interventions
4. **NBS INTEGRATED INTO BUILDINGS** - green roofs, green facades etc.



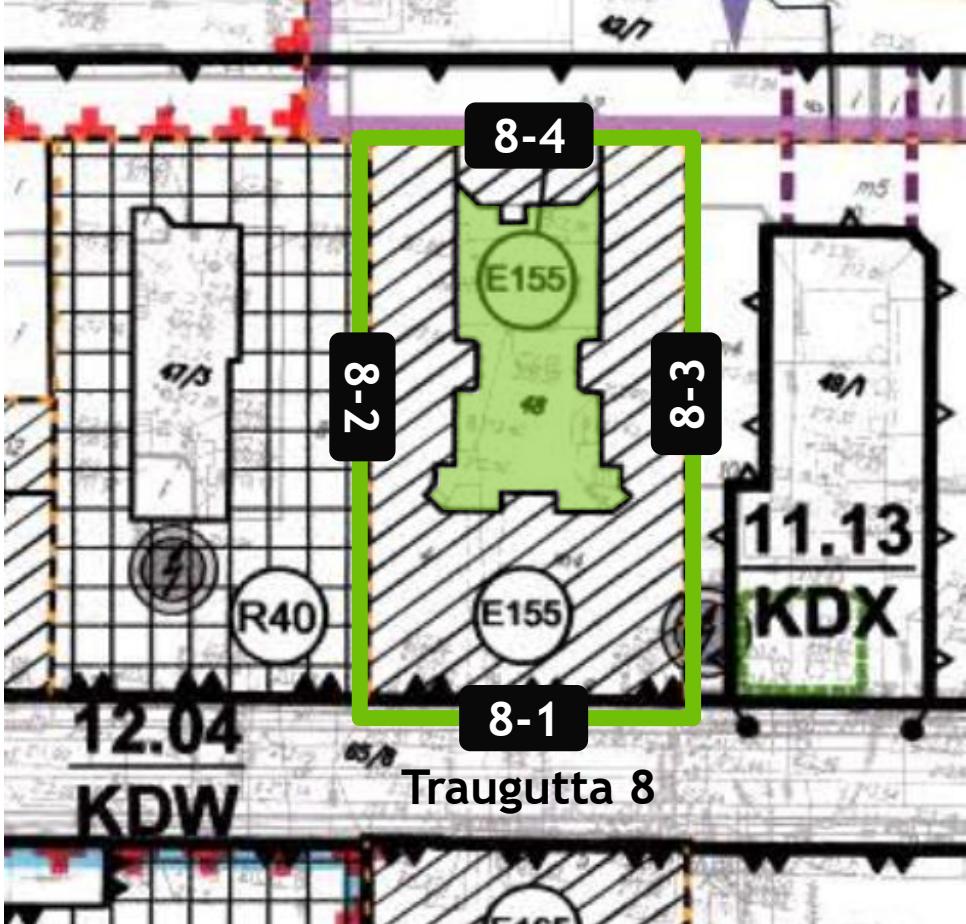
CONSERVATION ASPECT

ADHERENCE TO THE LOCAL SPATIAL LANDSCAPING PLAN RECOMMENDATIONS:

1. All construction and renovation works require a permit from Voivodeship (Provincial) Office of Historic Monuments Protection in Łódź.
2. When carrying out earthworks or changing existing activities involving disturbance of the land, archaeological supervision is obligatory based on the introduction of the archaeological protection conservation zone.

3. DEMANDS:

- Maintenance of the historical walls' composition of the courtyard interior.
- Maintenance of the historical gate's guard stones.
- Maintenance of the historical walls' composition (pilasters), ceiling with architectural details and the historical elements of gate's carpentry (2 transoms).
- Maintenance of the historical doors' elements (wooden pannels) leading to the staircases of annexe buildings.



8-1 Front building.

8-2 Left outbuilding (West).

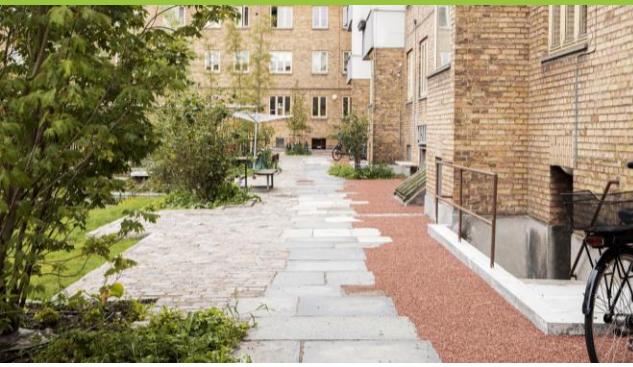
8-3 Right outbuilding (East).

8-4 Outhouse.

GOOD PRACTICES - ŁÓDŹ, POLAND



GOOD PRACTICES - WORLDWISE



COOPERATION IS CENTRAL

HOW WAS IT?

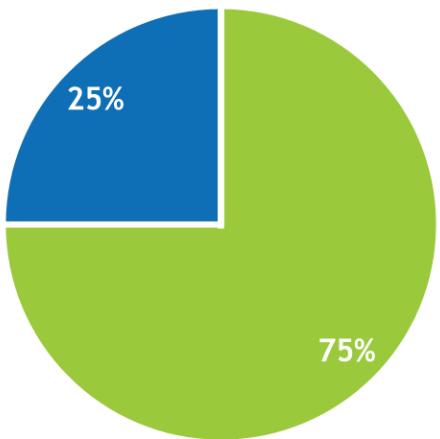
PUBLIC CONSULTATIONS: HOW WAS IT?



PUBLIC CONSULTATIONS: HOW WAS IT?



1. Płeć / Sex



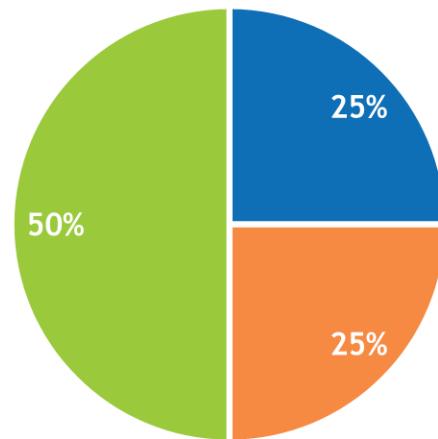
Kobieta / Female

Mężczyzna / Male

Osoba niebinarna / Non-binary

Inna / Other

2. Wiek / Age



Poniżej 18 lat / Under 18

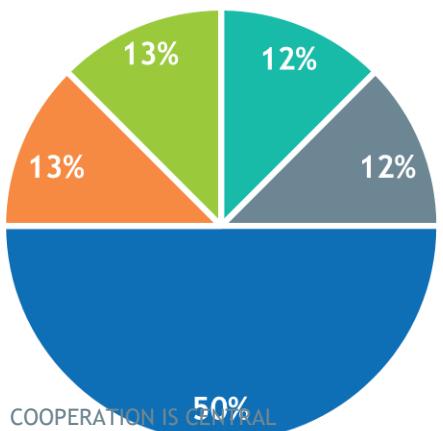
18-24 lata / 18 to 24

25-44 lata / 25 to 44

45-64 lata / 45 to 64

65 i więcej lat / 65+

3. Wykształcenie / Education



Podstawowe / Primary education

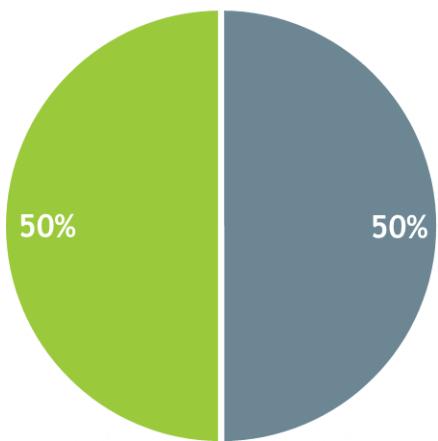
Zasadnicze zawodowe / Vocational education

Średnie / Secondary education

Wyższe / Higher education

Inne / Other

4. Aktywność zawodowa / Employment Status



Uczeń/student / A student

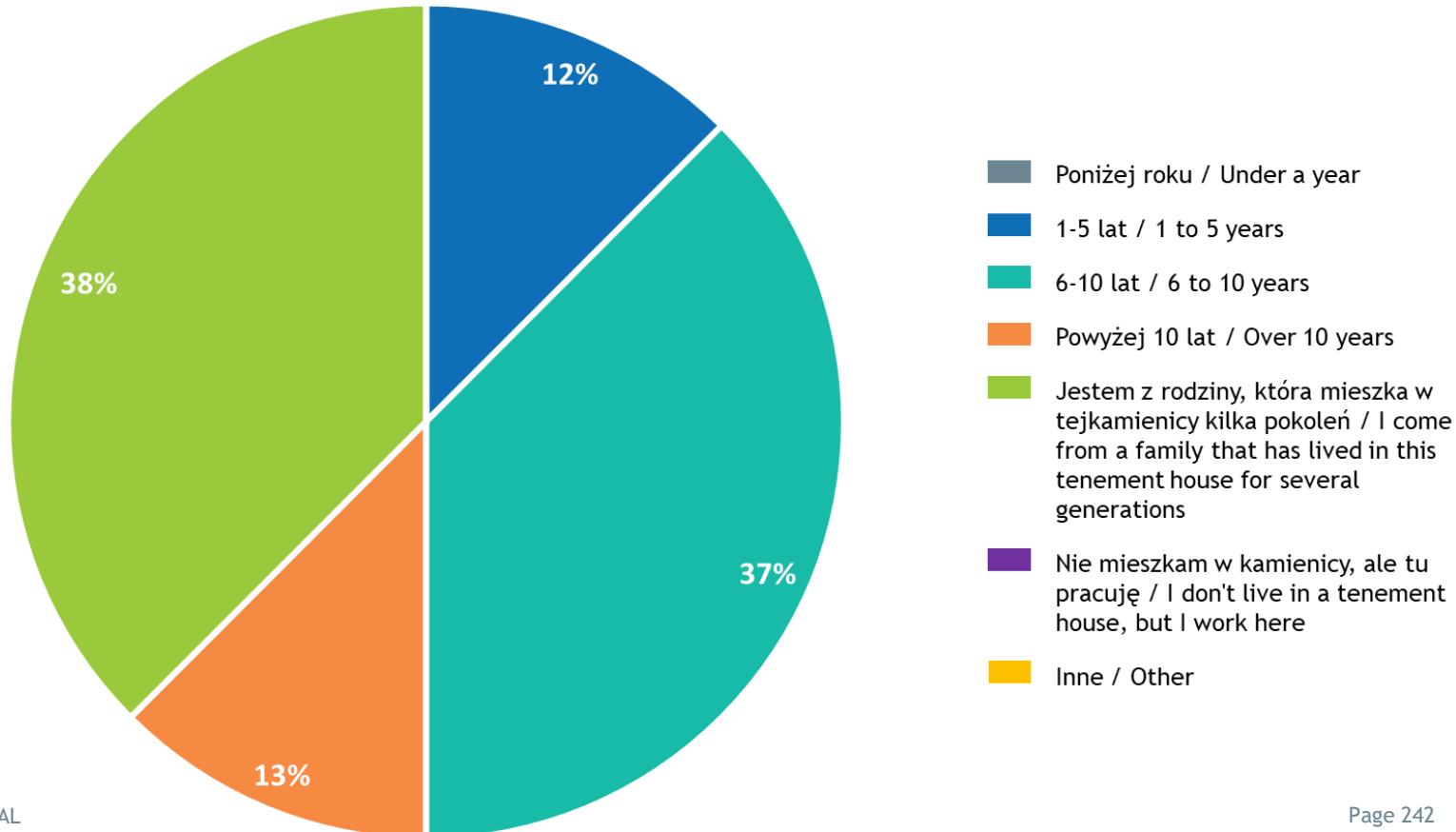
Osoba pracująca / Employed

Osoba bezrobotna / Out of work

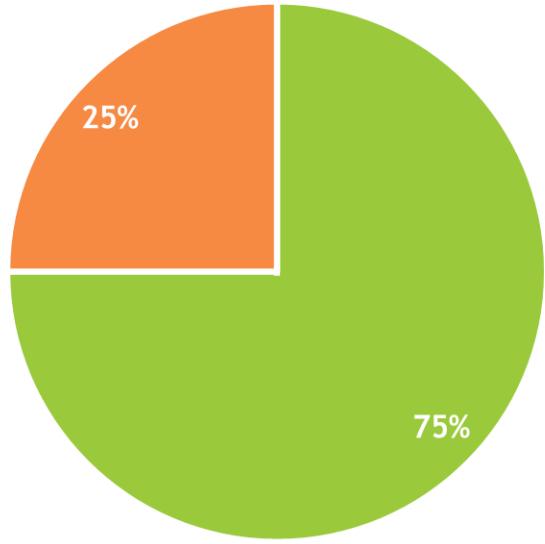
Przedsiębiorca / Entrepreneur

Emeryt/rentista / Retired/Pensioner

5. Proszę podać jak długo Państwo mieszkają w kamienicy przy ul. Traugutta 8 / Please state how long you have lived in the tenement house at ul. Traugutta 8



6. Jakie są Państwa relacje z sąsiadami? /
What are your relations with your
neighbours?



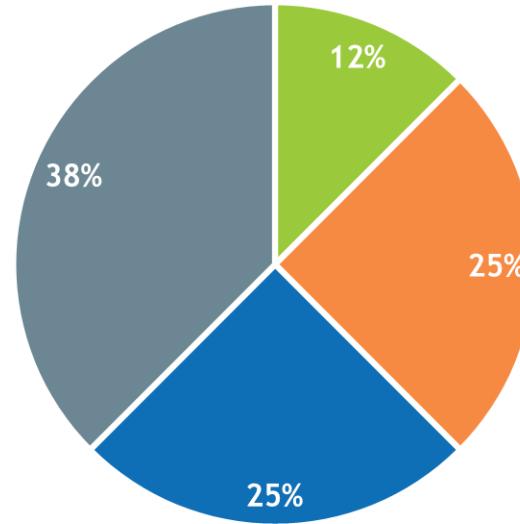
■ Bardzo dobrze, uczestniczę w życioredzinnych sąsiadów / Very good, I participate in the family life of my neighbor

■ Dobre, utrzymujemy poprawne relacje sąsiedzkie / Good, we maintain good neighborly relations

■ Nie znam sąsiadów / I don't know my neighbors

■ Chcę poznać sąsiadów / I want to get to know my neighbor

7. Jak ocenia Państwo obecne
zagospodarowanie podwórza przy ul.
Traugutta 8? / How do you assess the current
setup of the courtyard at 8 Traugutta ST?



■ Bardzo dobrze / Very good

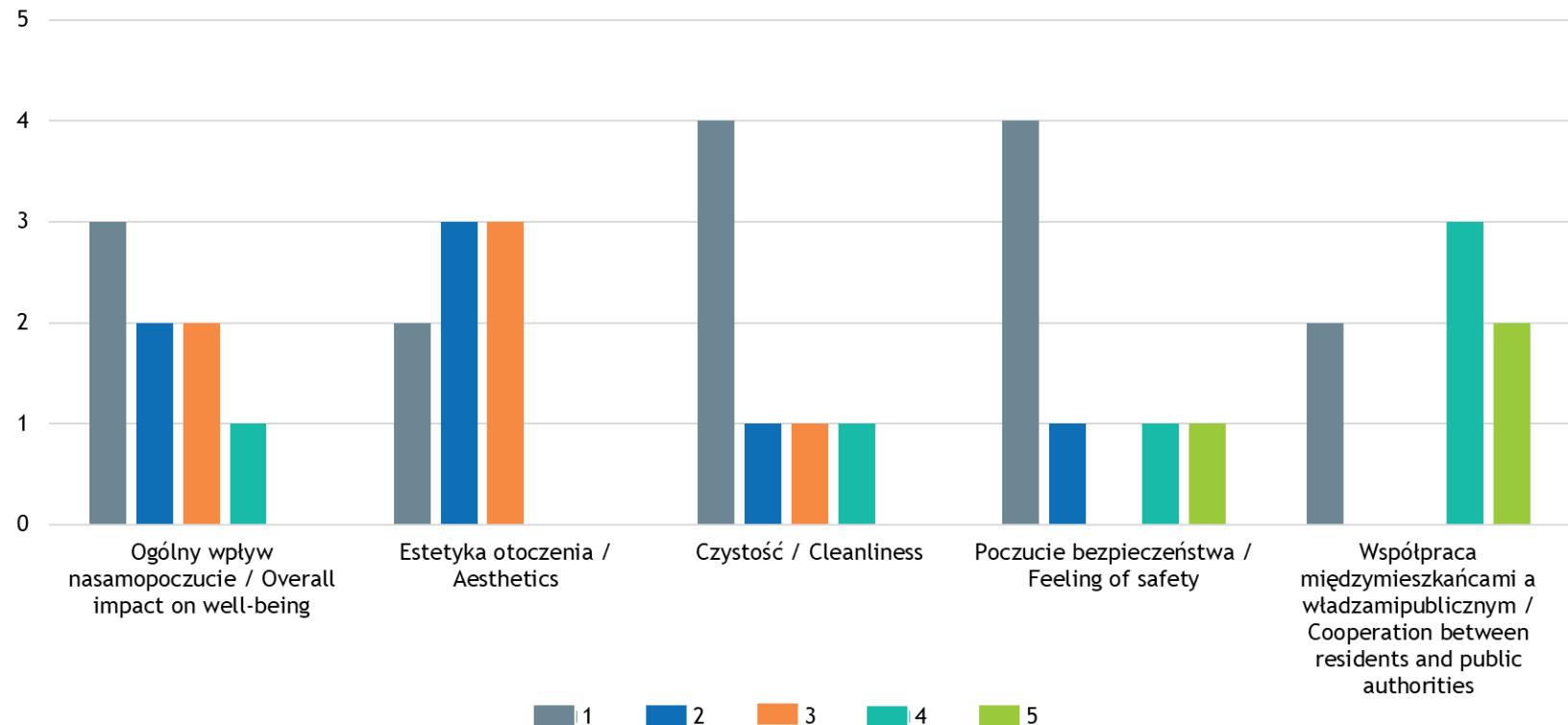
■ Dobrze / Good

■ Średnio / Average

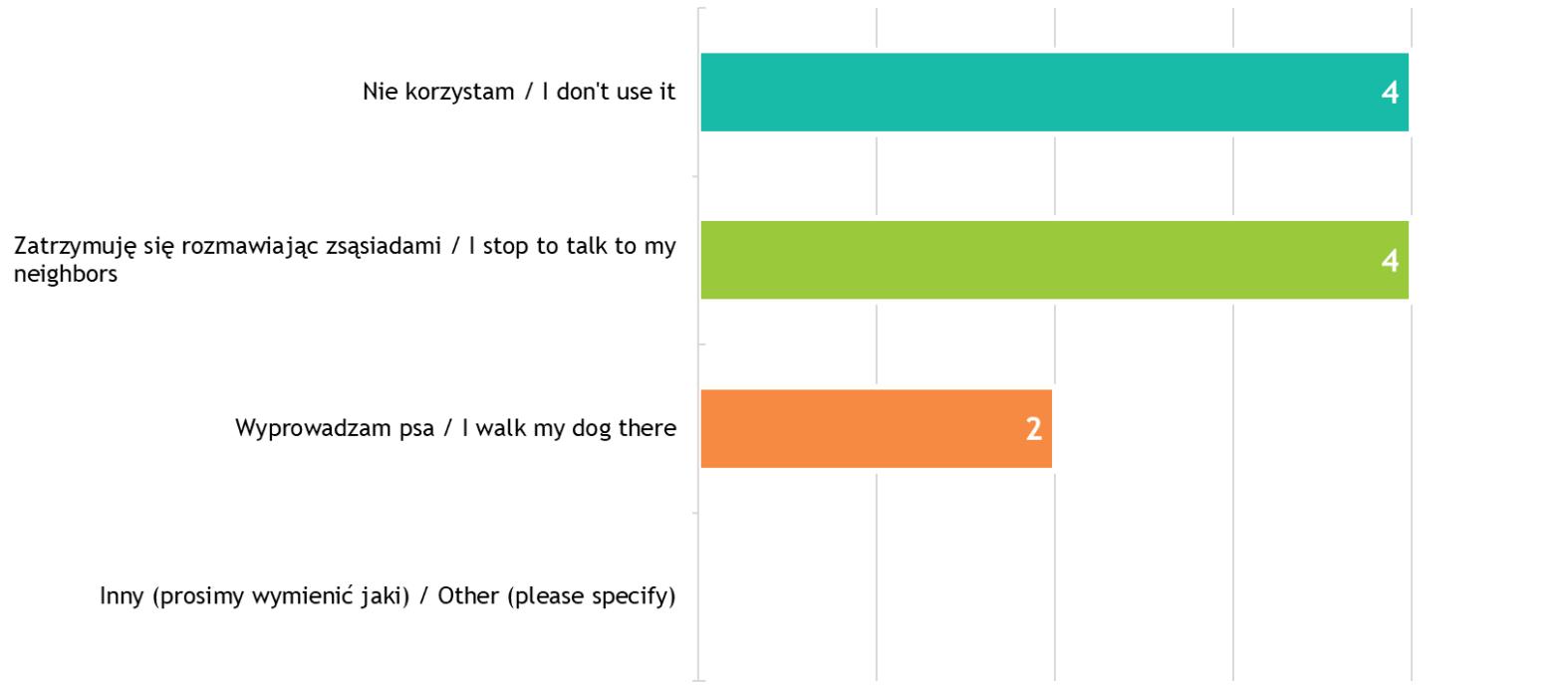
■ Źle / Bad

■ Bardzo źle / Very bad

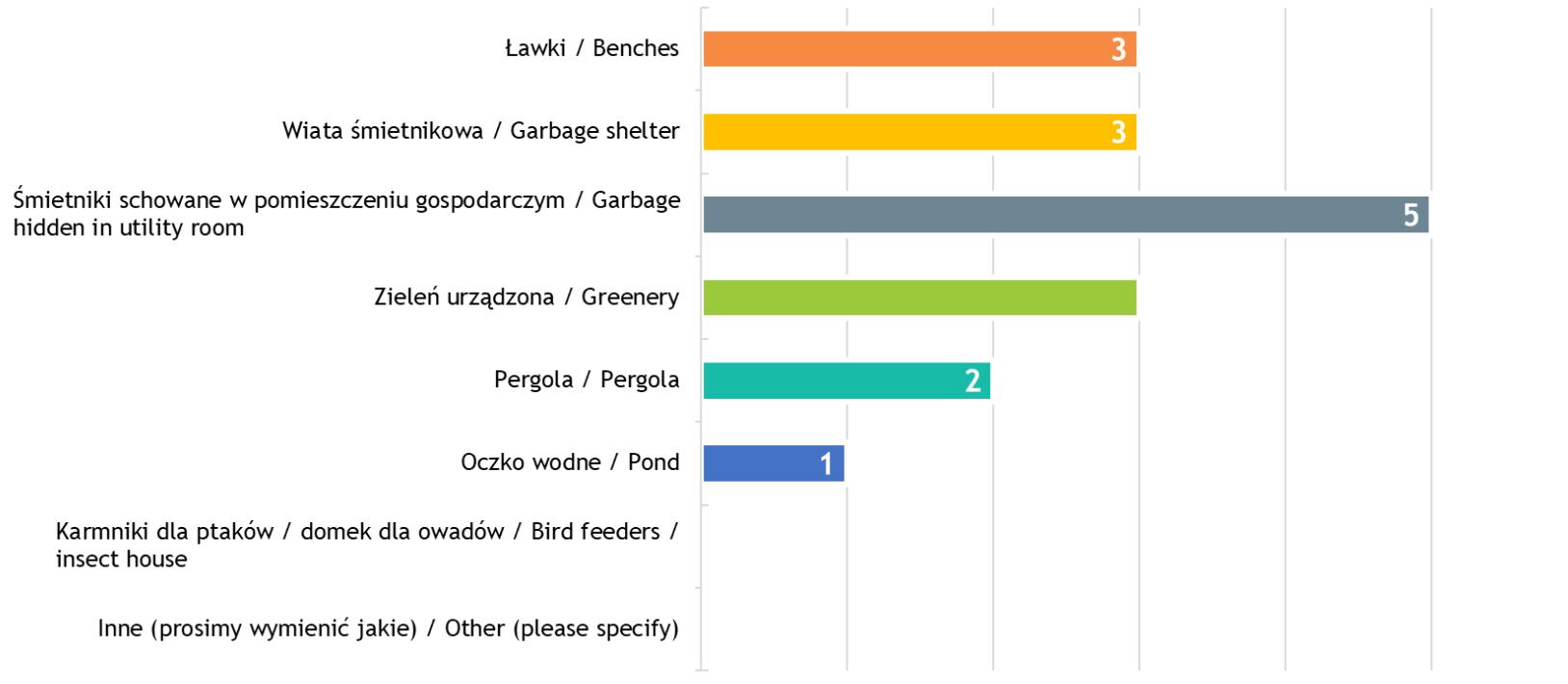
8. Proszę ocenić wymienione elementy związane z jakością życia w obrębie podwórka kamienicy przy ul. Traugutta 8 (od 1 - zły/niski, do 5 - dobry/wysoki)
/ Please rate the listed elements related to the quality of life in the courtyard of the tenement house



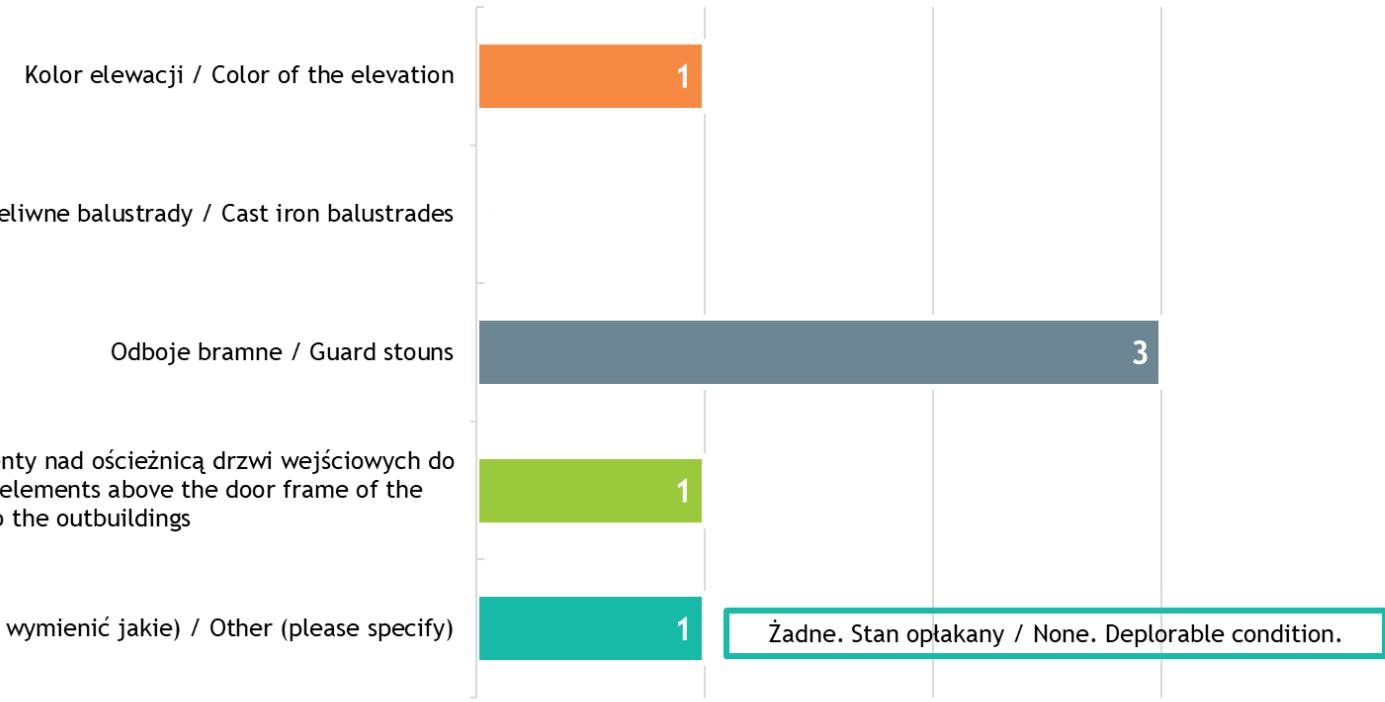
9. W jaki sposób obecnie korzystają Państwo z przestrzeni podwórka? /
How do you currently use your courtyard?



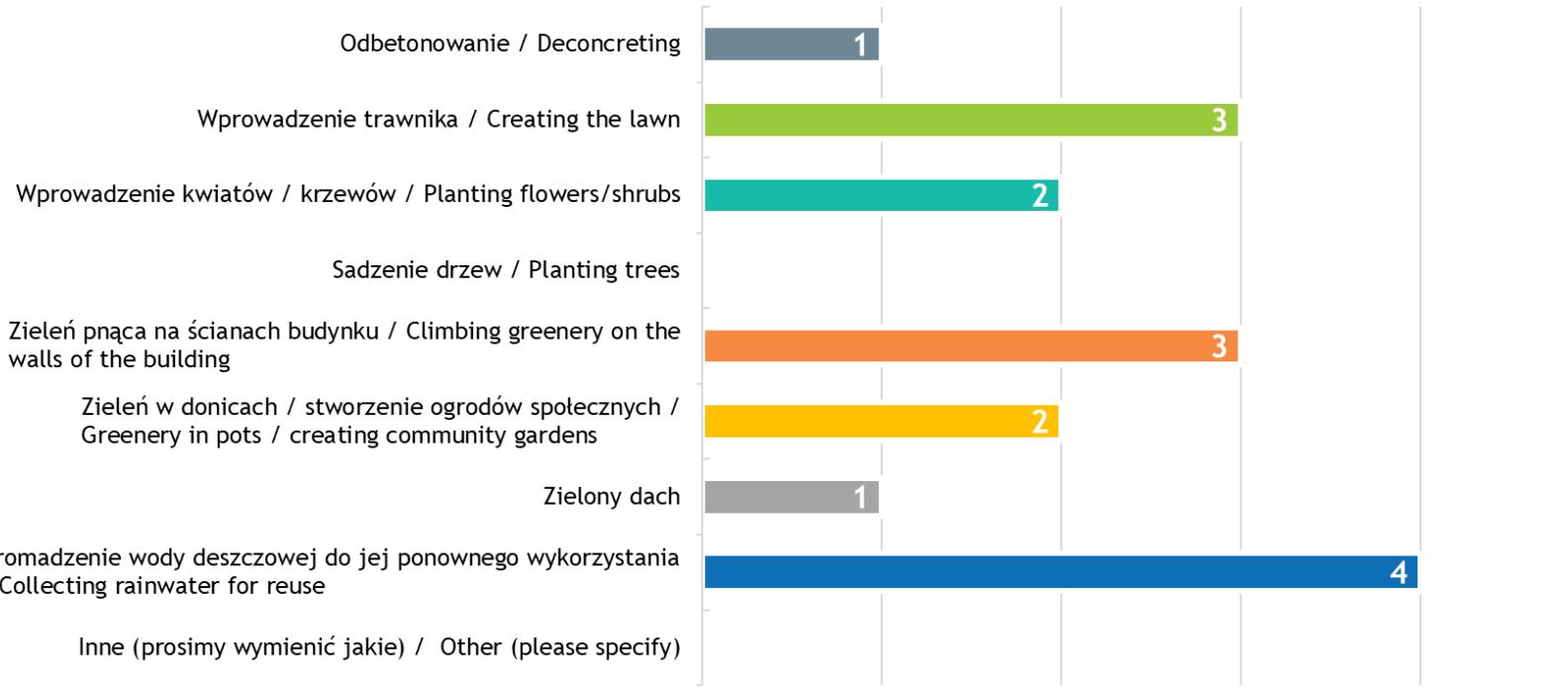
10. Które z poniższych elementów wyposażenia podwórza chcieliby Państwo wprowadzić na podwórku przy ul. Traugutta 8 (prosimy o wybór maksymalnie 3 elementów)? / Which of the following yard equipment would you like to have at the courtyard at 8 Traugutta S



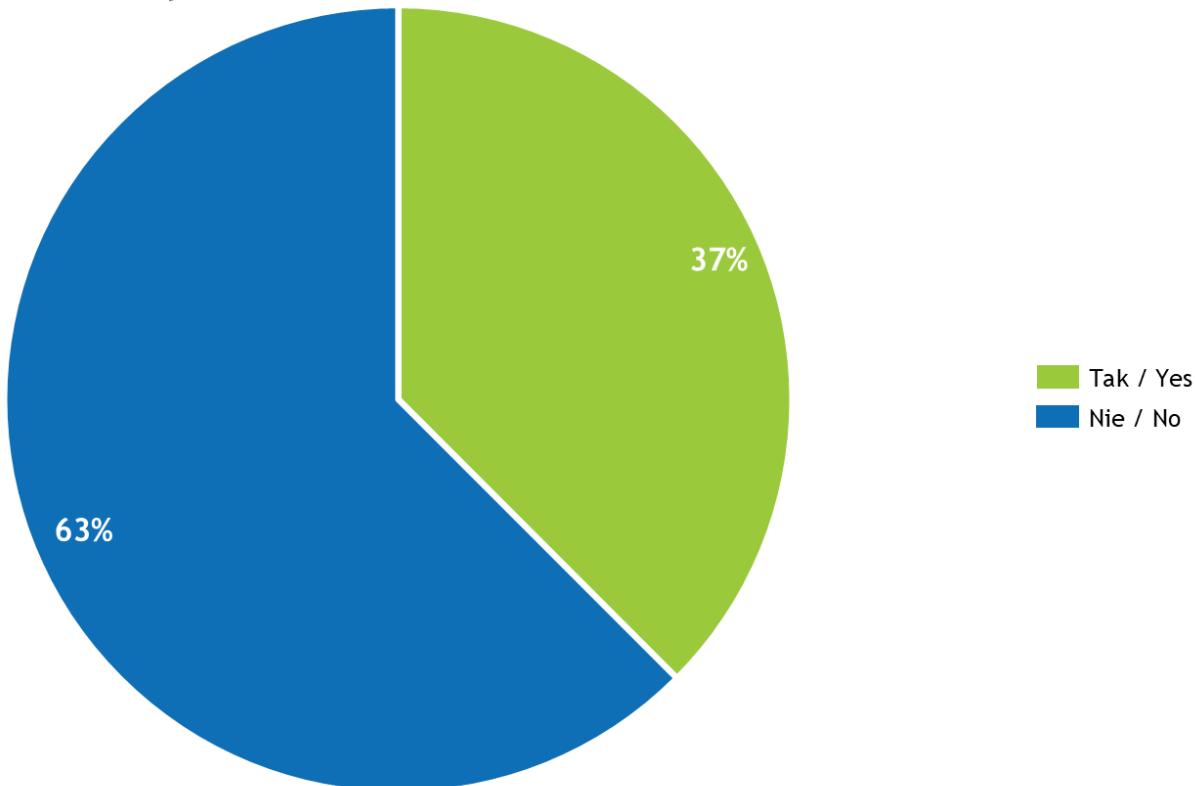
11. Które z poniższych elementów wyposażenia historycznego podwórza przy ul. Traugutta 8 są dobre w Państwa ocenie?/ 11. Which of the following elements of the historic equipment of the courtyard at 8 Traugutta ST are good in your opinion?



12. Jakie ekologiczne działania były by najlepsze do zastosowania na Państwa podwórzu? / 12. What eco-friendly practices would be best to implement in your courtyard?



13. Czy jako mieszkańcy kamienicy będą pomagać Państwo w utrzymaniu m.in. zieleni na wspólnym podwórku? / As residents of the tenement house, will you help maintain, among other things, the greenery in the shared yard?

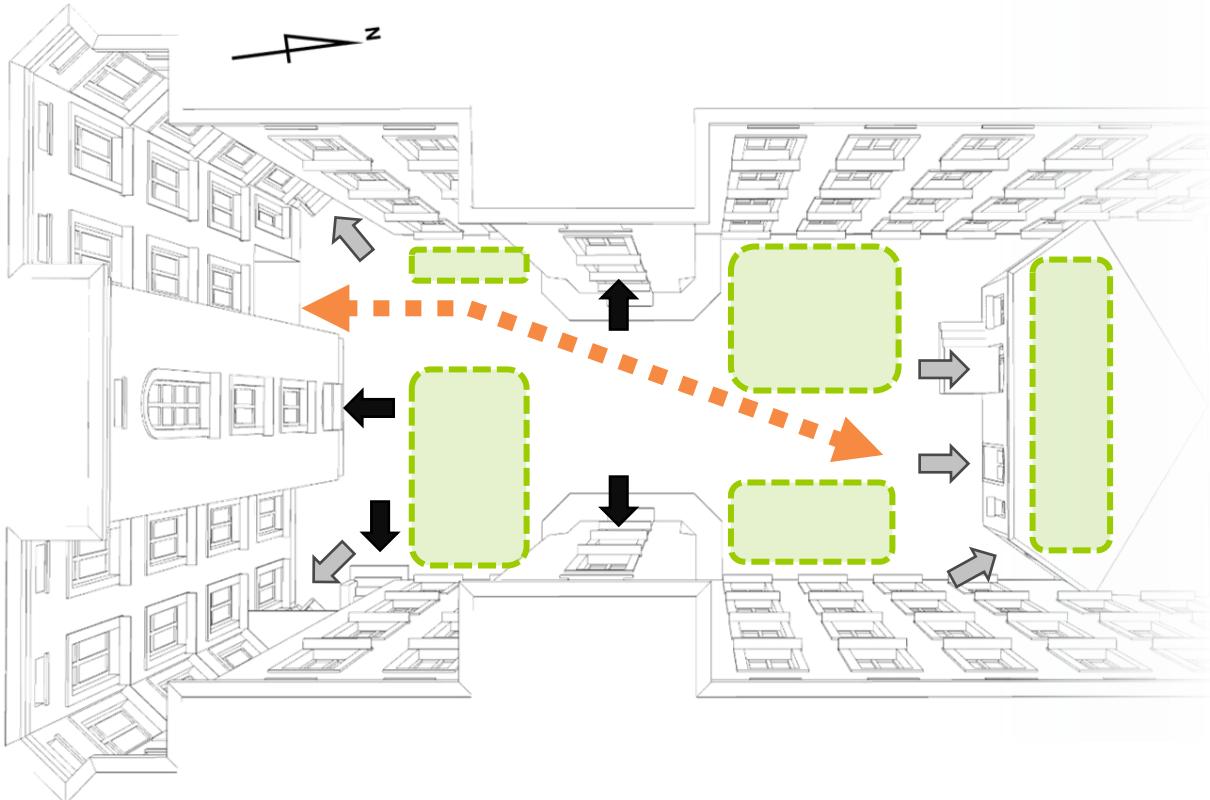


13. Uwagi i dodatkowe spostrzeżenia / Comments and additional observations

3 odpowiedzi / 3 answers:

- 1. Stojaki na rowery, 2. Trzepak
/ 1. Bike racks, 2. Carpet beater
- Zakaz wyprowadzenia psów. Całkowity zakaz parkowania samochodów. Za duże płacę czynsz żeby pomagać w utrzymaniu podwórka. Proszę zatrudnić porządnego gospodarza domu.
/ No dogs allowed. No parking allowed. I pay too much rent to help with the maintenance of the courtyard. Please hire a decent housekeeper.
- Przydałby się trzepak, stoliki z ławkami z szachownicą, stojak na rowery.
/ A carpet beater, tables with benches with a chessboard, and a bicycle rack would be useful.

FUNCTIONAL REQUIREMENTS



1. Accessibility of all the existing entrances.
2. MSW room and the route for containers removal.
3. Benches.
4. Climbing greenery on outhouse.
5. Lawns.
6. Flowers and shrubs.
7. Bike racks.

RE-PUBLIC SPACES



RE-PUBLIC SPACES ŁÓDŹ, POLAND



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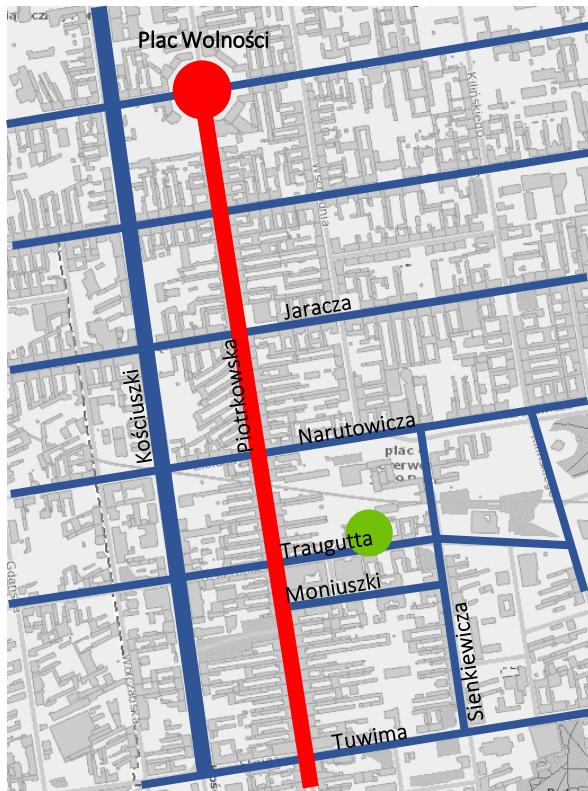


RE-PUBLIC SPACES

8 TRAUGUTTA ST CONSERVATION GUIDELINES



LEGAL ACTS ANALYSIS & CONSERVATION GUIDELINES _ RE-PUBLIC SPACES



- 8-1 Front building (Traugutta street)
- 8-2 Left annexe building (western)
- 8-3 Right annexe building (eastern)
- 8-4 Outhouse building



TRAUGUTTA 8

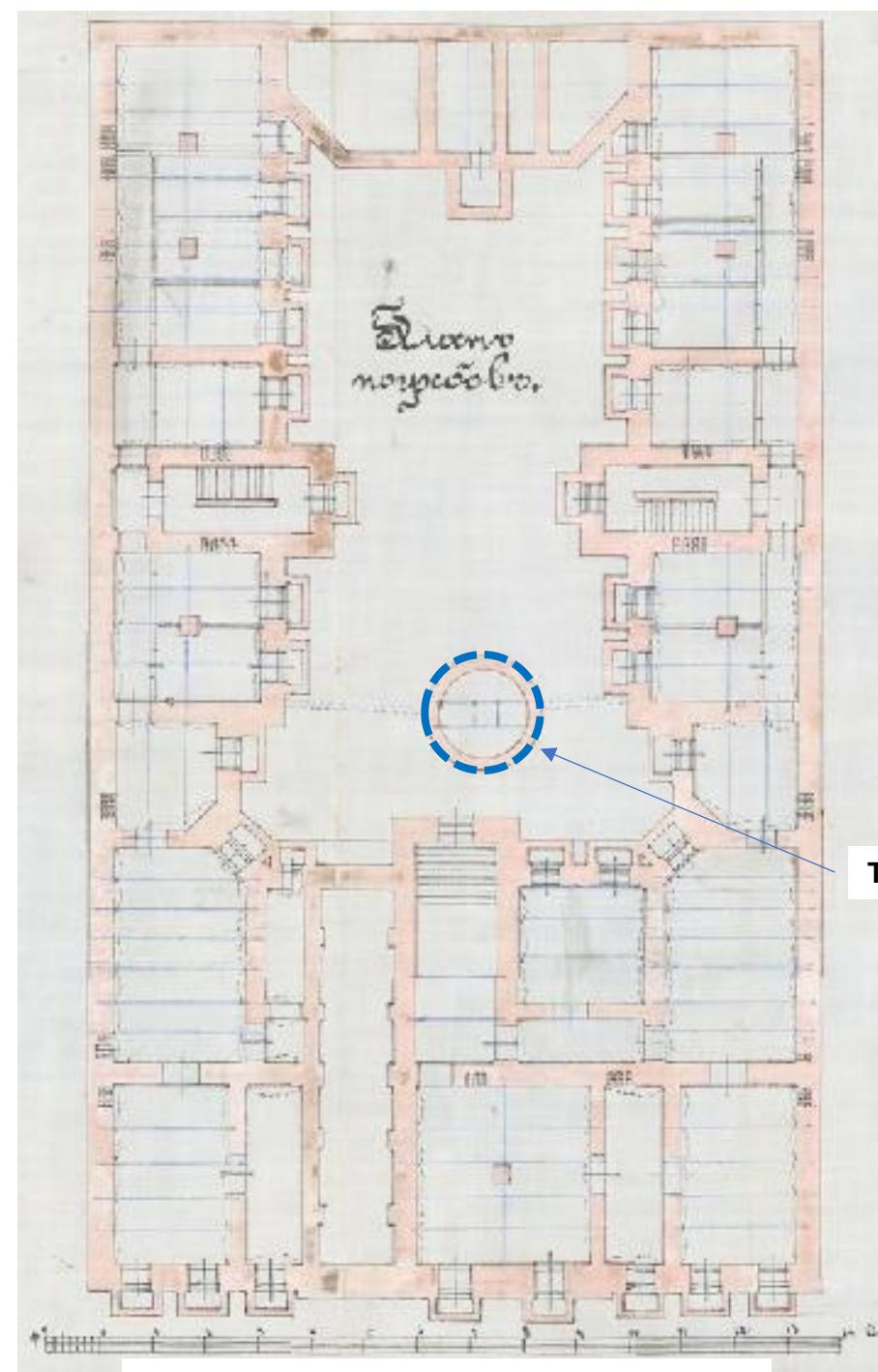
Page 54

LEGAL ACTS ANALYSIS & CONSERVATION GUIDELINES _ RE-PUBLIC SPACES



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Plan view



Historical well location in archive documents



the front tenement view from the courtyard

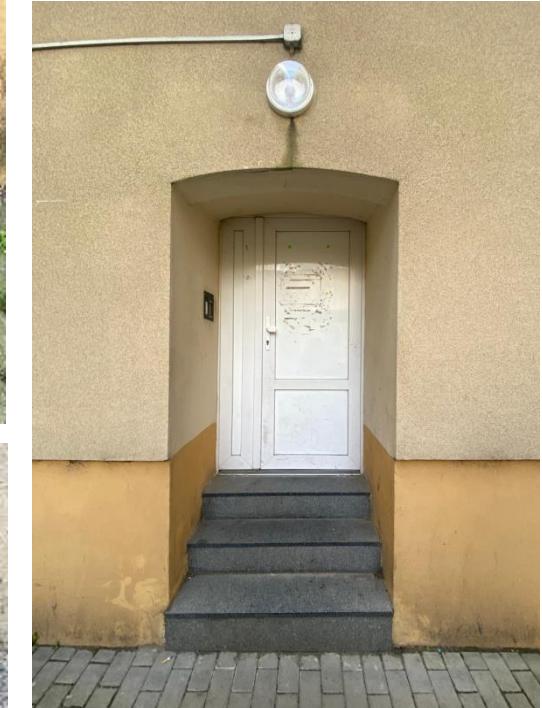
COOPERATION IS CENTRAL



the courtyard view with the outhouse building



TRAUGUTTA 8 - LEGAL ACTS ANALYSIS & CONSERVATION GUIDELINES



LEGAL PROTECTION:

1. **THE NATIONAL REGISTER OF THE HISTORIC MONUMENTS – area entry No. A/48 of The urban layout of Piotrkowska Street (from Freedom Square to Adam Mickiewicz Avenue)** [the decision of the Voivodeship (Provincial) Office of Historic Monuments Protection in Łódź - 20.01.1971]
2. **THE MUNICIPAL INDEX OF THE HISTORIC MONUMENTS OF ŁÓDŹ- individual registration of front tenement (Traugutta 8) with annexe buildings and outhouse building** [The Mayor of Lodz Regulation No. 4072/VI/13 - 29.04. 2013]
3. **THE MUNICIPAL INDEX OF THE HISTORIC MONUMENTS OF ŁÓDŹ- area entry of the urban layout and cultural landscape „Łódka Settlement”** [The Mayor of Lodz Regulation No. 4072/VI/13 - 29.04. 2013]
4. **THE LOCAL SPATIAL LANDSCAPING PLAN – protection of cultural heritage requirements based on the statements in the present plan** [Resolution No XXIX/756/16 City Council of Łódź - 11. 05.2016]

Pre- project recommendations according to Local Spatial Landscaping Plan:

➤ Demands:

1. All construction and renovation works require a permit from Voivodeship (Provincial) Office of Historic Monuments Protection in Łódź
2. When carrying out earthworks or changing existing activities involving disturbance of the land, archaeological supervision is obligatory based on the introduction of the archaeological protection conservation zone.

➤ Bans:

1. The construction of monolithic concrete or asphalt surfaces in courtyards is forbidden.

➤ Permits:

1. The reconstruction of the monument's facade can be done only through the change of the height of facade's openings maintaining the location and shape of the lintel or its rebuilding in accordance with historical features.
2. Partial dismantling of the roof and terraces construction in the place.
3. Artistic project management, for ex. mural on the surface of the side or back walls (without architectural detail).



Conservation recommendations for pilot project:

➤ Demands:

1. Maintenance of the historical gate's guard stones (4 from Traugutta ST. side and 2 from courtyard), by integrating them with the new surface structure.
2. Maintenance of the historical walls' composition (pilasters), ceiling with architectural details and the historical elements of gate's carpentry (2 transoms).
3. Maintenance of the historical doors' elements (wooden pannels) leading to the staircases of annexe buildings.
4. Archaeological supervision of activities involving disturbance of the land related to the project management of a rainwater system including the creation of a retention reservoir in the court, or possible adaptation of the old well (currently covered but probably located in the courtyard – based on the archive documents).
5. When adapting rooms for waste storage (garbage), requiring the widening of door's openings in a outhouse building, a permit from the Voivodeship (Provincial) Office of Historic Monuments Protection in Łódź is obligatory.
6. When managing artistic mural project a permit from the Voivodeship (Provincial) Office of Historic Monuments Protection in Łódź is obligatory.

Conservation recommendations for pilot project:

➤ **Recommendations:**

1. Planning green areas in the courtyard requires preservation of consistency between the new plants and the historic surroundings, especially ensuring harmonious coexistence of the historical composition with the new elements, including horizontal and vertical axis of the historical facades, buildings' dimensions, relations between all elements, specific features of the buildings (ex.risalit), exposure, with permission for:
 - a) covering up to 35% of the courtyard area with plants (which is around 8% of the whole surface of the building plot);
 - b) using climbing plants on the risalits (from courtyard side), or on the surface of the „blind” wall of the neighboring building, located along the northern border of the plot (what requires obtaining the agreement of the property owner).
2. Managing mural, delivery of the high aesthetics and artistic value project is a must, with permission for location on the surface of the „blind” wall of the neighboring building, situated along the northern border of the plot (what requires obtaining the agreement of the property owner). When planning other location ex. the gate's walls, a permit from Voivodeship (Provincial) Office of Historic Monuments Protection in Łódź is obligatory.
3. Use of urban furniture such as benches in accordance with the guidelines of Resolution No XXXVII/966/16 (16. 11. 2016), excluding the use of plastics or other substandard materials.
4. Unification of the patterns of the designed courtyard surface with the surface of the gate through the use of harmonizing materials.
5. Replacement of non-historical doors in buildings (in the courtyard side), with an indication of its unification and the reference to historical elements, designed in the corresponding style of the preserved historical elements of the upper parts of the doors (wooden panels) and of archival documentation, using colors consistent with the woodwork of the facade of the front tenement house *.

* Out of pilot project management



➤ Recommendations:

6. Assessment of the preservation and accessibility of the former well (visible on historical maps) in terms of its use in the project, including possible adaptation for a retention reservoir.
7. Adaptation of the outhouse building rooms for a waste storage place (trash cans). Widening the door openings with reference to the historical composition of the building and its decoration (by reproducing the shape and height of the lintels). Installation of a ramp leading to the building (in line with the adopted material solution and the style of the revitalized space) *.
8. Replacement of the non-historical cladding of external stairs leading to the buildings (taking into account also the gate area) using materials harmonizing with the newly designed Surface of a courtyard *.
9. Replacement of disharmonizing external lighting elements located at the entrances to buildings with solutions harmonizing with the newly designed doors (designed in the corresponding style of the preserved historical elements) * and at the same time harmonizing with the planned illumination of the courtyard space as part of the project implementation.



ŁÓDŹ - ZRÓWNOWAŻONY DRENAŻ MIEJSKI

(MIASTO WIELOGATUNKOWE)

ŁÓDŹ - SUSTAINABLE URBAN DRAINAGE

(MULTISPECIES CITY)



PROJECT PARTNERS MEETING

PINEROLO, ITALY

COOPERATION IS CENTRAL

November 14, 2024

RE-PUBLIC SPACES



City of Łódź, Poland:

KINGA KRAUZE - SENIOR RESEARCHER AT EUROPEAN REGIONAL CENTRE
OF ECOHYDROLOGY OF THE POLISH ACADEMY OF SCIENCES

BEATA KONIECZNAK - DD OF THE CITY ARCHITECT BUREAU, PROJECT MANAGER

ANASTASIJA KLIMKO - COMMUNICATION MANAGER

MARTA MUCHA, KATARZYNA BIAŁKOWSKA, ELIZA KACZOR - SUBSTANTIVE CONSULTANTS

AGNIESZKA SMAGUR - FINANCIAL MANAGER



Critical Issues for Planners and Architects

Site Analysis

Thorough understanding of the historic context, microclimate, and existing infrastructure.

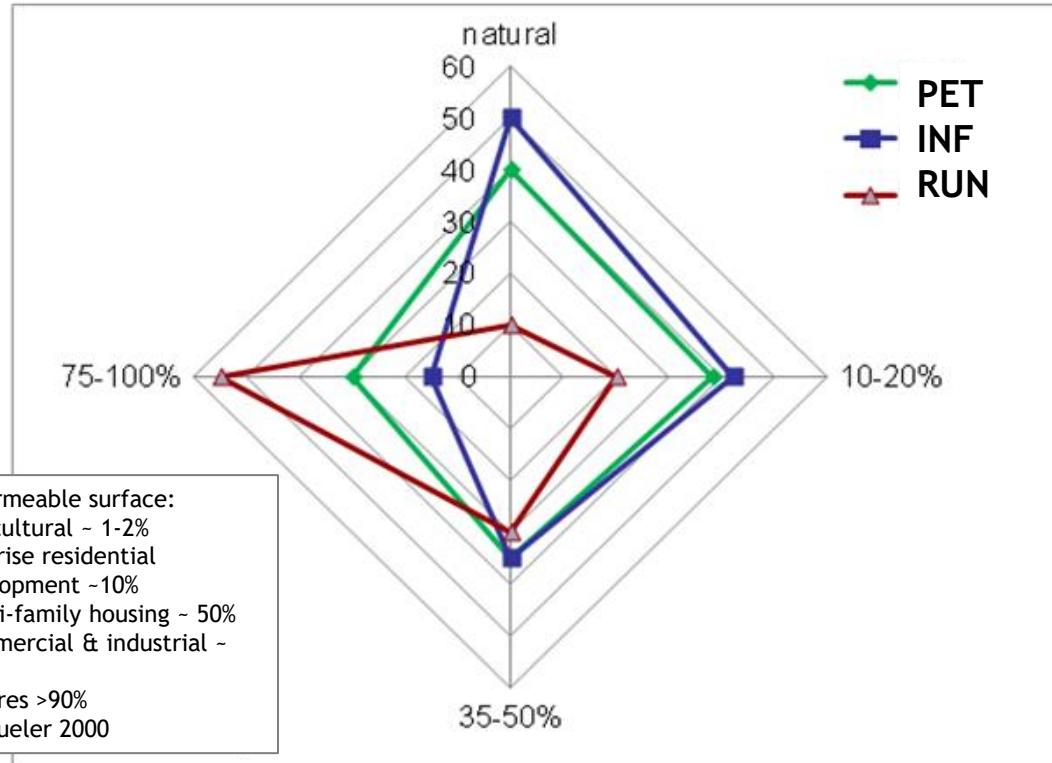
Multifunctional Design

Solutions that balance aesthetic, ecological, and practical considerations.

Maintenance Planning

Developing long-term maintenance strategies to ensure the longevity of solutions.

Actual & desired state



PET ↑ INF ↑ RUN ↓

Approximate degree of catchment sealing in areas with different land-use characteristics and the impact of sealing changes (natural systems vs. sealed at 10/20% - 35/50% - 75/100%) on the proportions of water cycle components;

PET - potential evapotranspiration;
INF - infiltration;
RUN - surface runoff.



OCENA HYDROLOGII I TOPOGRAFII TERENU | ASSESSING SITE HYDROLOGY AND TOPOGRAPHY

Understand Terrain

Analyze the site's slopes, depressions, and overall topography to identify natural drainage pathways and potential infiltration zones.

Map Drainage Patterns

Trace the flow of surface water during rainfall events to understand existing drainage patterns and potential problem areas.

1

2

3

Identify Soil Conditions

Evaluate soil types, permeability, and infiltration rates to determine the suitability for different nature-based solutions.

ZASADY: GLEBA | RULES: SOILS

Important features:

- Profile
- Permeability
- Erosivity
- Field capacity
- Ability to transfer water
- Topography



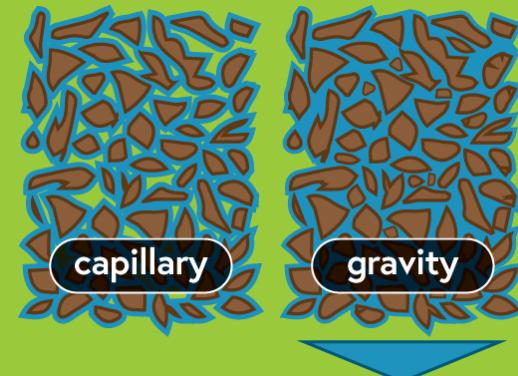
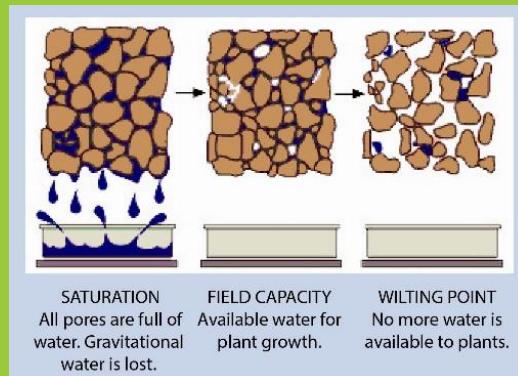
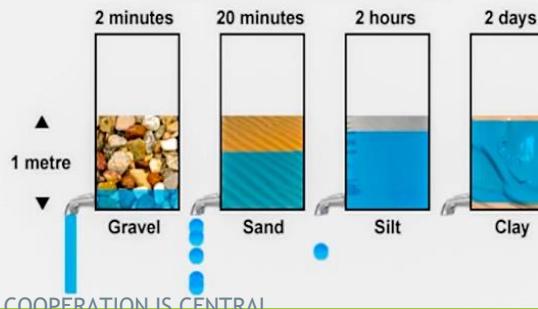
Urban soils

Natural brown soil

ZASADY: GLEBA | RULES: SOILS

PROFILE	PERMEABILITY	EROSIVITY	FIELD CAPACITY	ABILITY TO TRANSFER WATER	TOPOGRAPHY	OTHER FEATURES
To identify potential obstacles to water flow, growing plants NBS construction, usable soil depth	To decide between NBS for infiltration and / or retention; to learn the infiltration rate, bulk density,	To understand risk to soils related with run off, & proper selection of solutions	To assess soil water retention options beneficial for soil formation, biodiversity, water cycle & microclimate	To understand availability of water to plants if they are planted in original soils.	To observe run off generation, transfer & accumulation zones, to properly locate NBS, lower the investment & maintenance costs	i.e. land use affecting the structure and characteristics of soils, e.g. compaction, contamination; to locate run off infiltration or storage areas

Permeability



ZASADY: ROŚLINY | RULES: PLANTS

<p>Important land features: existing vegetation, light, temperature, space, water availability, predominant use of the space</p>	<p>To preserve existing vegetation & plan space accordingly, to be able to properly chose plant species and locate them within the available space; to plan for optimal biodiversity</p>
<p>Important rules: look at natural species around; chose from native species, even from the local ones, keep number of species high, pay attention to ecological functions (fruit production, flowering, dust binding...), plans are social beings, they require other plants company</p>	<p>To better adjust species to local abiotic & biotic conditions, to create diverse, resistant plant community, to secure delivery of multiple services (with emphasis on services to nature), to lower the maintenance costs & make nature persistent</p>

| www.ogrod.uw.edu.pl, ktomalek.pl



Balancing two processes:



RETENTION

Resources available for immediate use, but not necessarily supporting groundwater recharge and nature.
Attractive local solution.



INFILTRATION

A long-term investment, water is used by organisms and supports the renewal of groundwater and aquifer resources.
Critical cumulative effect.

Evaluating Rainfall Patterns and Runoff Volume

Rainfall Analysis

Collect and analyze historical rainfall data to determine the frequency, intensity, and duration of precipitation events.

Runoff Estimation

Use hydrological models to estimate the volume of runoff generated by rainfall, accounting for impervious surfaces and soil conditions.

Flood Risk Assessment

Identify areas prone to flooding and assess the potential impacts of extreme rainfall events on the urban environment.

Important aspects:

amount of water (source: rainfall, run off, groundwater), quality of water, availability

Water at the site originates from rainfall - direct fall, run off - water transferred from other places either as surface flow or with infrastructure, groundwater - when the groundwater table is shallow soil easily gets saturated;

Quality of water may create risk to people and animals, influence the quality of created habitats, but may be a subject of NBS implementation;

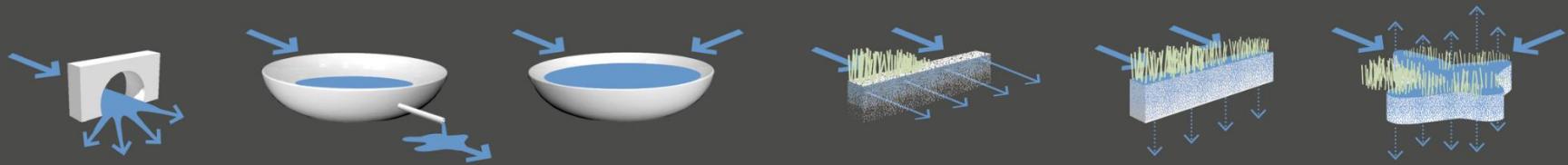
Availability: number of sources, catchment delivering water, seasonality / frequency / intensity of precipitation;

Processes to be used:



mechanical

biological



slow

→ spread →

flow control: The regulation of stormwater runoff flow rates.

detention: The temporary storage of stormwater runoff in underground vaults, ponds, or depressions to allow for metered discharge that reduce peak flow rates.

retention: The storage of stormwater runoff on site to allow for sedimentation of suspended solids.

filtration: The sequestration of sediment from stormwater runoff through a porous media such as sand, a fibrous root system, or a man-made filter.

infiltration: The vertical movement of stormwater runoff through soil, recharging groundwater.

treatment: Processes that utilize phytoremediation or bacterial colonies to metabolize contaminants in stormwater.

Understanding the Current Drainage System

Before implementing any rain water nature-based solutions or rain water tanks, it's essential to thoroughly investigate the existing grey infrastructure in the area.

Understanding the current drainage system, mapping storm water infrastructure, and evaluating its capacity & condition are crucial first steps.

Second, investigate the technical conditions of the buildings within the area: structure of the foundations, their protection against moisture. If any infiltration is planned NBS must be located not closer than 5 m from the walls.

Mapping the Network

A thorough mapping exercise is required to create a detailed representation of the existing storm water drainage network. This includes identifying the location, size, and type of all pipes, catch basins, manholes, and other drainage components. The mapping should also highlight the connectivity between these elements, revealing the flow paths of storm water through the system.

Assessing Capacity

The existing drainage system's capacity must be evaluated to determine its ability to handle current and future stormwater runoff demands. This involves assessing the size of pipes, the number and capacity of catch basins, and the overall storage capacity of the system. The assessment should consider the anticipated increase in runoff due to urbanization, climate change, and other factors that could affect the drainage system's load.

1

2

3

Identifying Flows

Understanding the direction and volume of water flow is crucial for assessing the system's performance during heavy rain events. This can be achieved by analyzing historical data, conducting site inspections, and simulating the flow behavior using hydrological models. Identifying the main flow paths and the volumes of water moving through different sections of the drainage network is essential for optimizing rainwater capture and management.



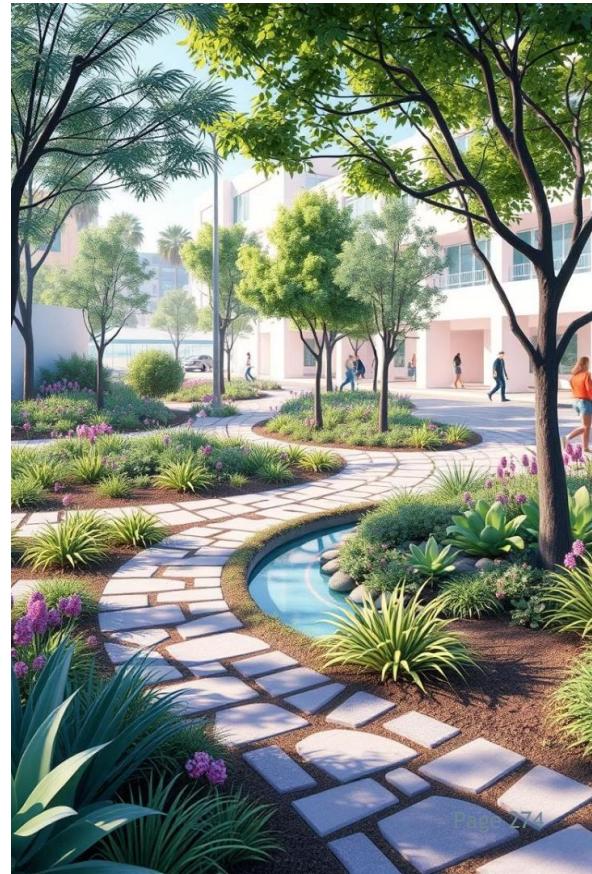
Integrating Nature-Based Solutions into the Existing System

- 1 Identify Opportunities**

Analyze the existing infrastructure to pinpoint areas where nature-based solutions can be seamlessly integrated.
- 2 Design Integration**

Develop a plan to connect the nature-based features with the existing storm water drainage system.
- 3 Ensure Compatibility**

Verify that the nature-based solutions and grey infrastructure work together to enhance overall storm water management.



PRZYKŁADY | EXAMPLES

Gutters



COOPERATION IS CENTRAL

| Wendy Allen Designs

Page 275

PRZYKŁADY | EXAMPLES

Gutters



| Fra-Dor



COOPERATION IS CENTRAL

| Pinterest



| Sandra's Garden



| Pinterest

PRZYKŁADY | EXAMPLES

Underground Drainage



INFRASTRUKTURA | INFRASTRUCTURE

Rain chains



| gardenista.com
COOPERATION IS CENTRAL



| answersingenesis.org



| Wendy Allen Designs

PRZYKŁADY | EXAMPLES

Flow diversion



INFILTRATION



RETENTION



PRZYKŁADY | EXAMPLES

Tanks



PRZYKŁADY | EXAMPLES

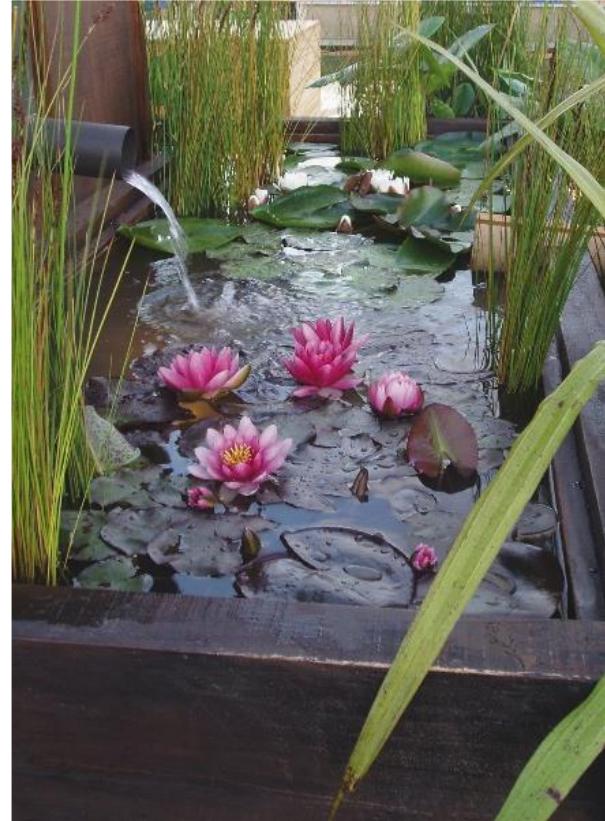
Tanks



| leaffilter.com



| Backyardville



| Completehome



| makezine.com

PRZYKŁADY | EXAMPLES

Roofs & walls



If rain water flows over the ground it may carry sand or even petrochemicals. Then it is necessary to install sedimentation tanks or separators on its way to NBS to allow undesirable substances to be captured & stored. **Separators must be adjusted to flow intensity & amount of pollution, & regularly cleaned.**

In case of less polluted waters also biofilters can be applied.

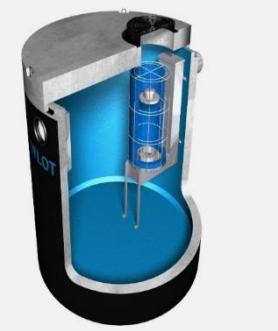
Sedimentation tank



Mini-separator
of oils and sand



Separator
of petrochemicals &
sand



Biofilter cleaning water due
to infiltration process

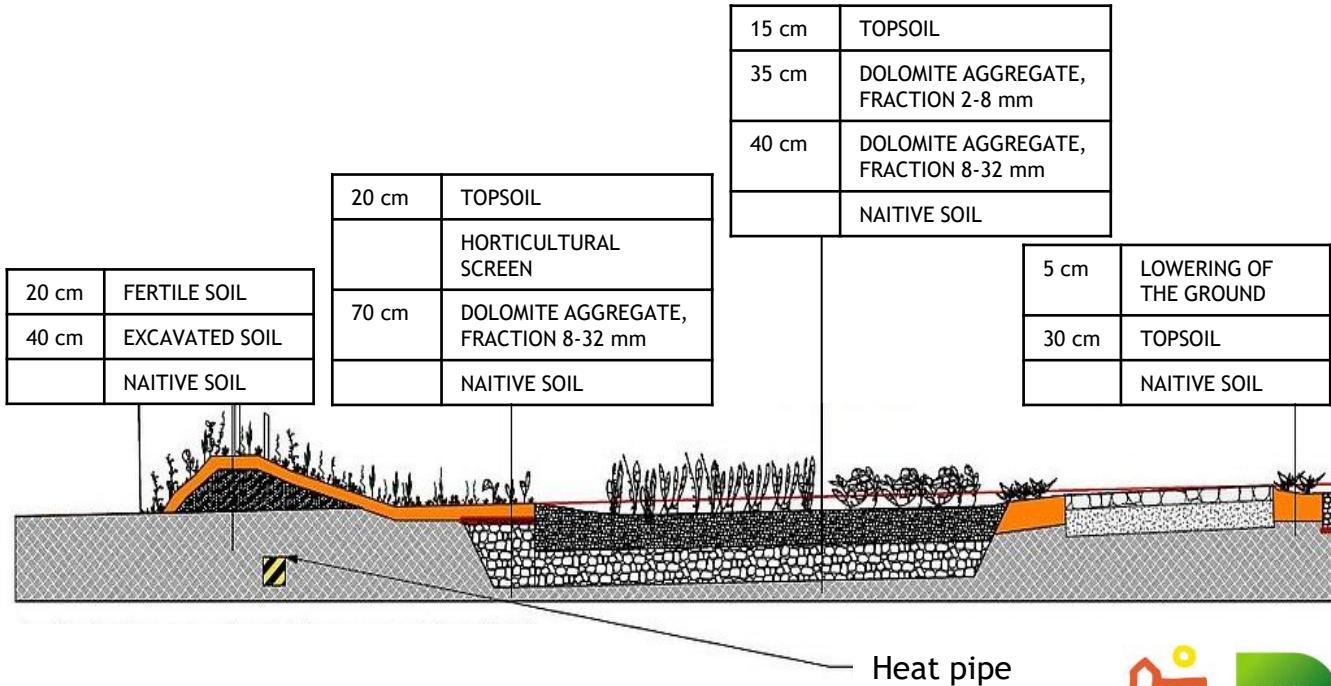


Contained

- 300-600mm Filter media (700mm min for trees)
- 100mm Transition layer
- 150mm min. Drainage layer
- Underdrainage pipe
- Impermeable liner

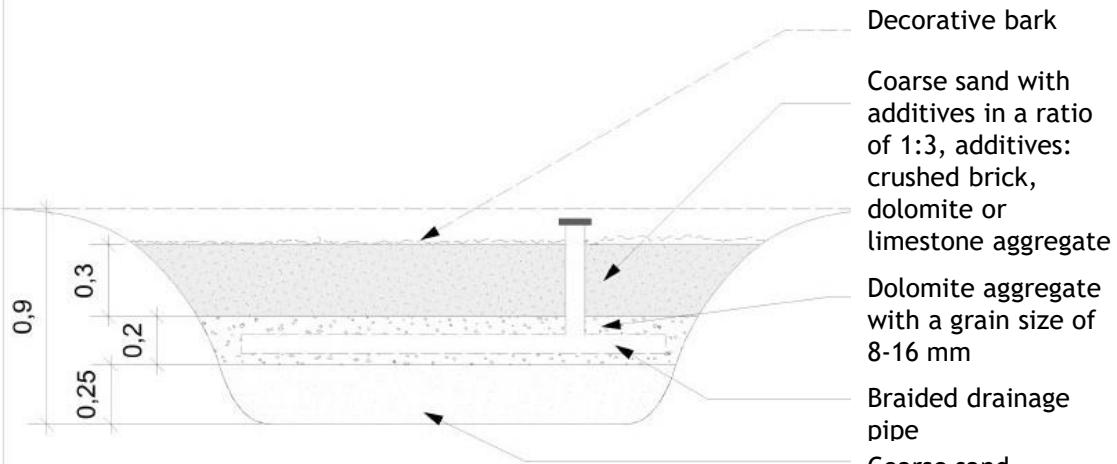
PRZYKŁADY | EXAMPLES

„Dry” rain garden in ‘Nasz Podwórko’ at the intersection of Żeromskiego and Sienkiewicza streets, Olsztyn, Poland



PRZYKŁADY | EXAMPLES

Rain garden in foil in the 'Optimist's Corner' at the junction of Puszkina and Żeromskiego Streets, Olsztyn



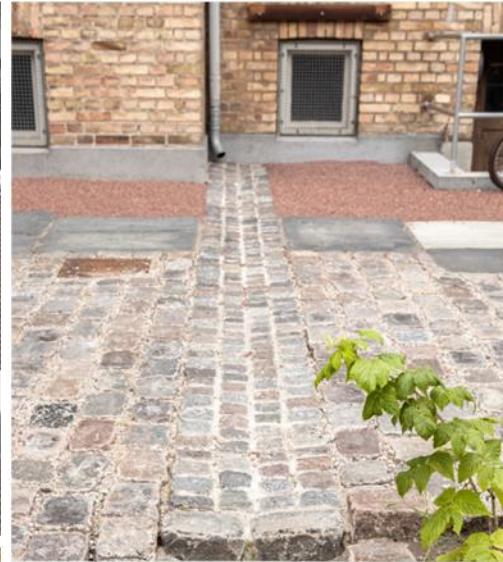
Recalculated area feeding the rain garden 150 m²

Appropriate rain garden area 3 m²

Area of the rain garden flower bed development 11 m²



PRZYKŁADY | EXAMPLES



The Courtyard
of the Future at Straussvej by BOGL, 2021



PILOT IMPLEMENTATION

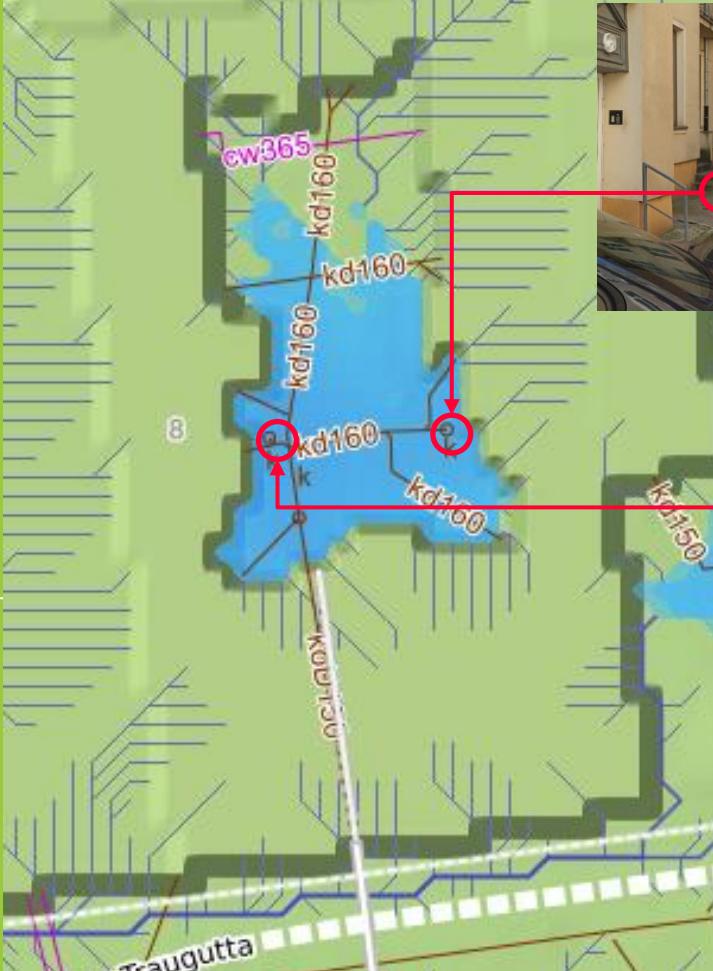
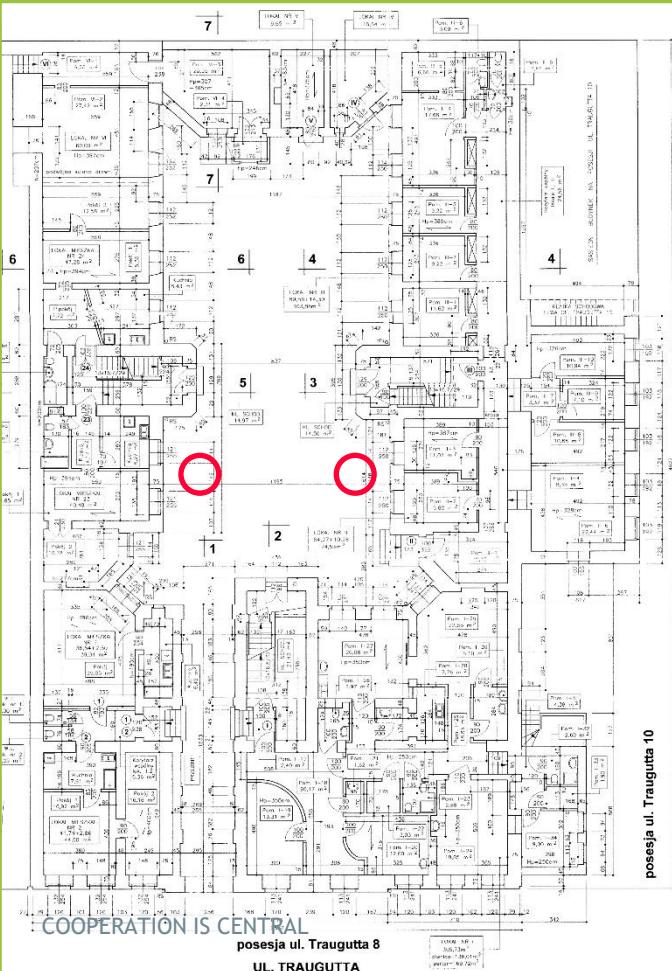
8 TRAUGUTTA ST,
ŁÓDŹ, POLAND





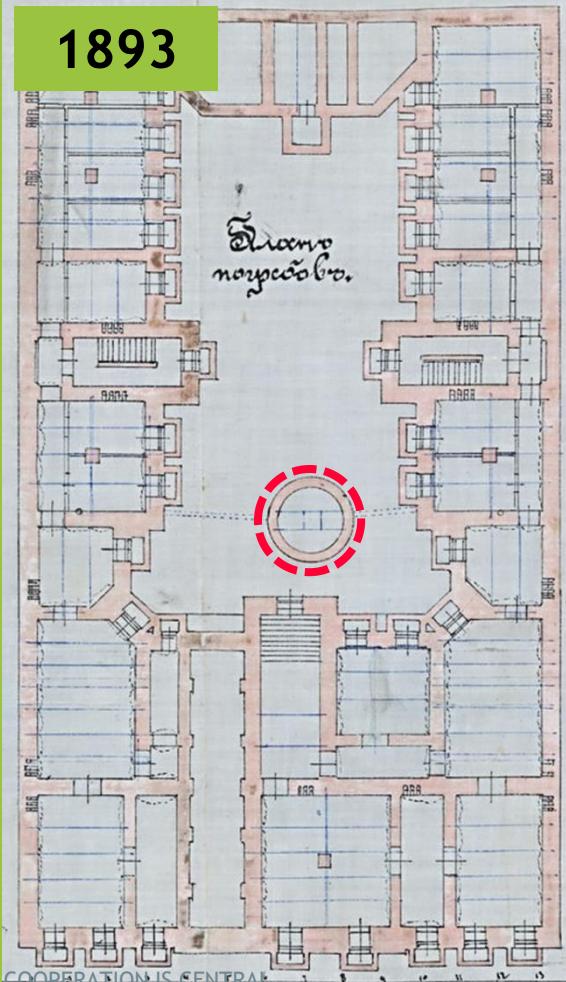


8 TRAUGUTTA ST. - CURRENT WATER MANAGEMENT

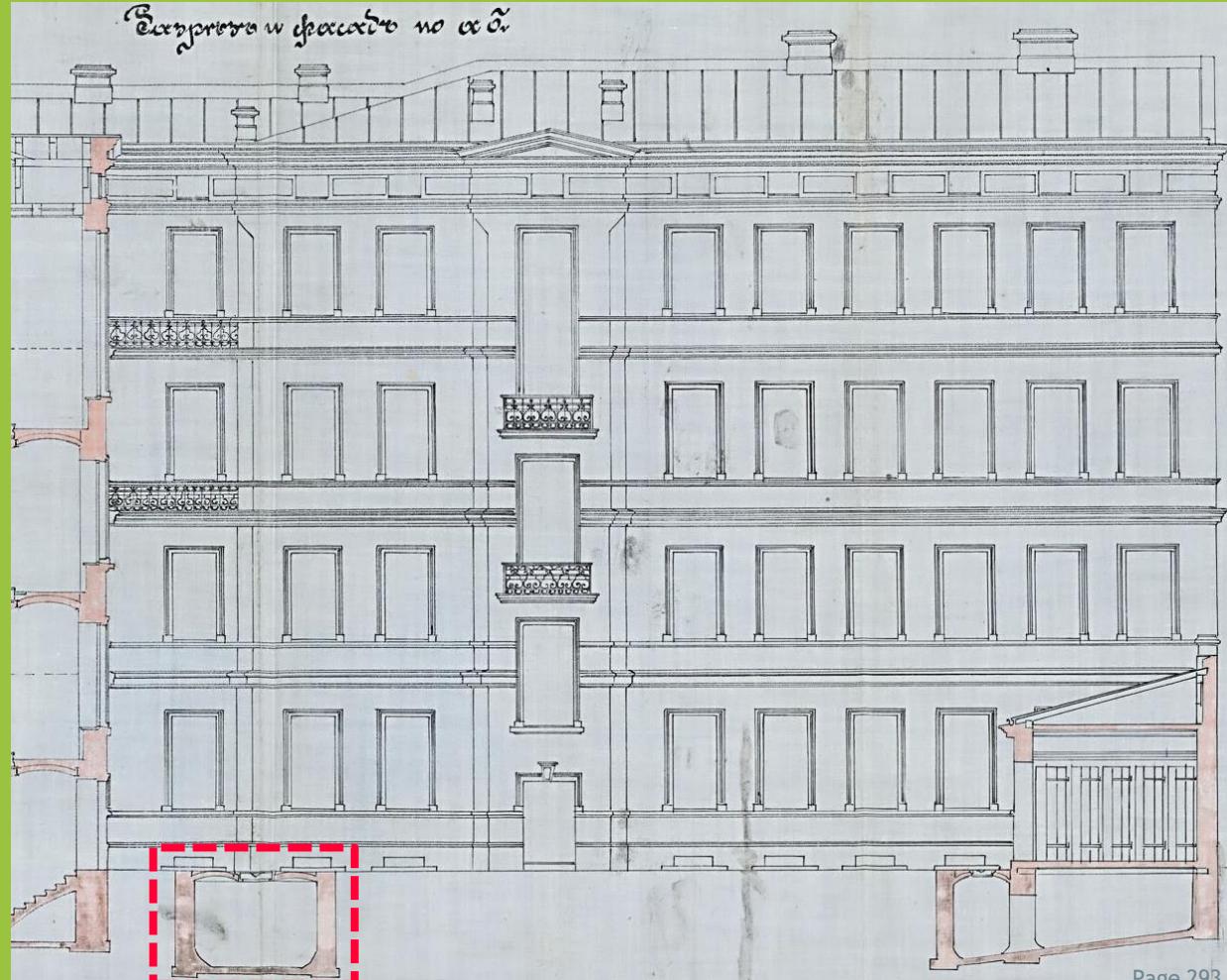


- 5 gutters
- 2 water collectors
- 1 potential well
- Cw - heating system
- Kd - combined sewage system
- Slope 30 cm South

1893

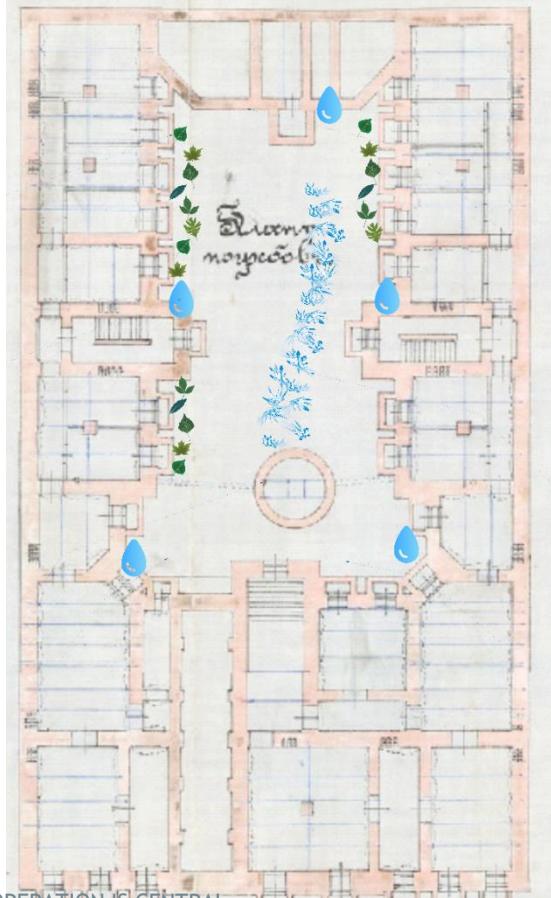


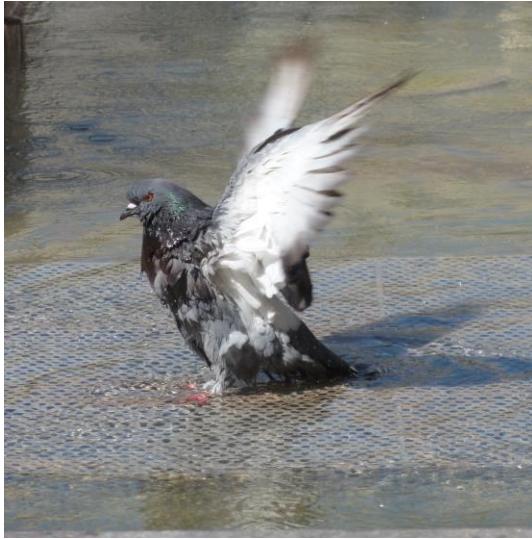
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Page 293

8 TRAUGUTTA ST. - POSSIBILITIES





TO ENABLE
WATER TO
ALL
TO CREATE
SUSTAINABLE
HABITATS

RE-PUBLIC SPACES



RE-PUBLIC SPACES ŁÓDŹ, POLAND



<https://lodz.pl/>



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ANASTASIYA KLIMKO (COMM MNGR)



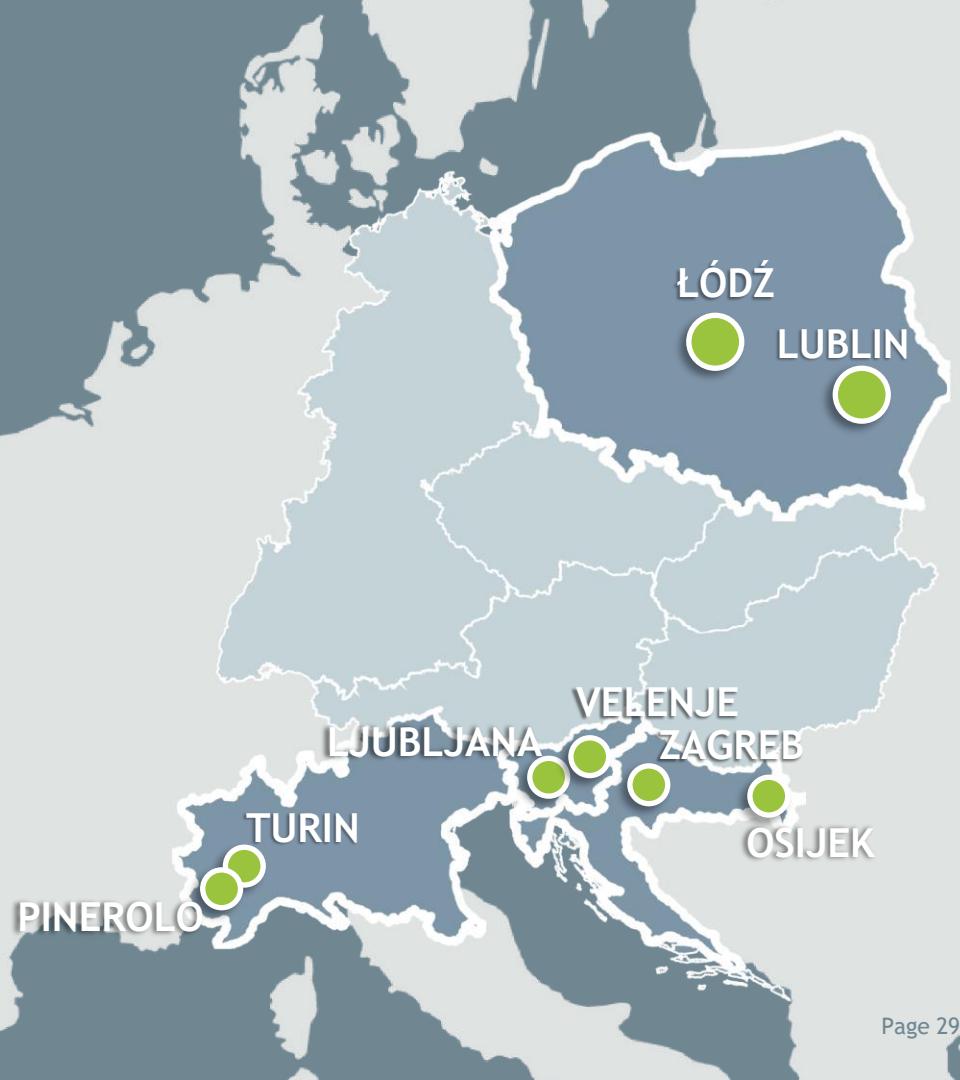
a.klimko@uml.lodz.pl



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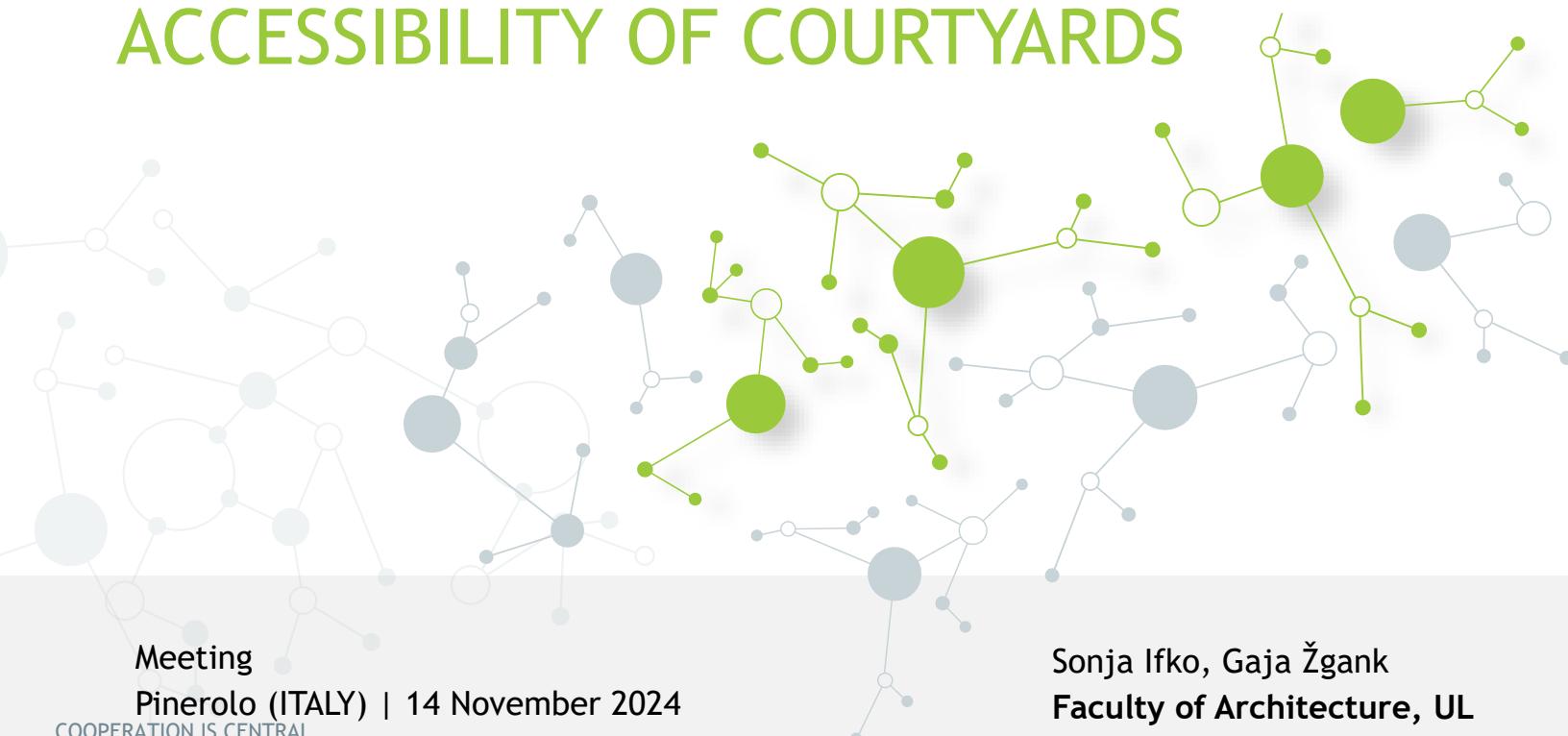


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RE-PUBLIC SPACES

ACCESSIBILITY OF COURTYARDS



Sonja Ifko, Gaja Žgank
Faculty of Architecture, UL

Accessibility to the built and virtual environments, to information and communication technologies (ICT), goods and services, including transport and infrastructure, is an enabler of rights and a prerequisite for the full participation of persons with disabilities on an equal basis with others.

(European Commission. Directorate General for Employment, Social Affairs and Inclusion., 2021)

"Universal design is design that is usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."

Ron Mace (What Is Universal Design?)

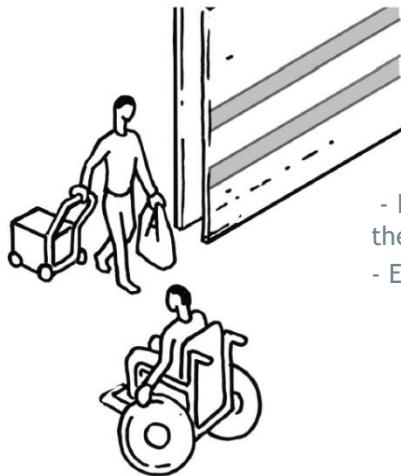


7 PRINCIPLES OF UNIVERSAL ACCESS



1

Equitable use

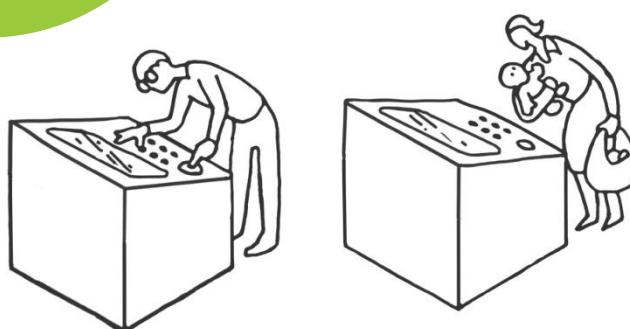


Do not single out or segregate particular groups of users, where possible ensure that everyone uses the space (object, service) in the same way, ensure equal security and privacy for all users.

- If possible , ensure that everyone uses the space in the same way.
- Ensure equal security and privacy for all users

2

Flexibility in use



Ensure that people can use the space (object, service) in different ways at their own pace.

- Ensure that people can use the space in different ways
- Ensure that each person can use the space at their own pace

3

Simple and intuitive



Avoid unnecessary complexity, design spaces (objects, services) consistently and according to user expectations and intuition, cater for a wide range of users with different language and reading abilities, arrange information according to its relevance.

- Avoid unnecessary complexity
- Design spaces consistently and according to the user's expectations and intuition

4

Perceptible information



Present important information in ways that use different senses, ensure sufficient visual contrast and good legibility.

- Important information is presented in ways that use different senses
- Ensure that the signs are easy to read

5

Tolerance for error



Elements should be arranged to minimise the potential for error, design should ensure that, despite possible misuse, no danger or damage occurs.

- Elements should be arranged in such a way as to reduce the possibility of errors
- The design should ensure that, despite possible misuse, no danger or damage will occur

6

Low
physical
effort



Allowing the user to maintain his/her natural posture, reducing the strength required for use.

- Allowing the user to maintain their natural posture
- Reduce the force needed to use

7

Size and space for approach and use



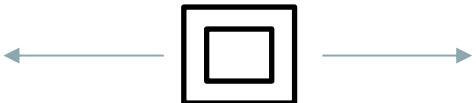
Ensure an unobstructed view of important elements, whether the user is standing or seated, ensure access and management for all users

- Ensure an unobstructed view of important elements, whether the user is seated or standing
- Ensure that all users have access and control

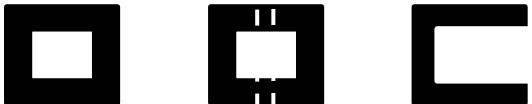


THROUGH THREE PARAMETERS THAT ALLOW FOR THE APPROPRIATE TREATMENT OF EACH SPACE

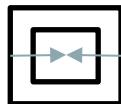
- Embeddedness in the wider context (access from the city)



- Define the ownership (public, semi-public, private)



- Dominant use of courtyard





The need for accessibility to green spaces was recognized as being particularly important during the COVID-19 pandemic, when residents' mobility was restricted to their local surroundings.

(Kleinschroth and Kowarik, 2020)

TABLE 1: KNOWING WITH COURTYARD

Identifying vulnerable user groups and adapting the space accordingly

Question based on Embeddedness in the wider context, ownership, dominant use, users, fair accessibility to environmental	Answer	Suggestions, solutions
Who are the potential users of courtyard?		
Which potential users, if any, could be excluded due to space barriers?		
What are all the uses that take place in the courtyard?		
What are the expectations / user experiences of the courtyard? (owners)		
How could courtyard avoid limits to physical, psychological approachability for diverse users in diverse contexts of use?		
How can we ensure that different users in different environments can perceive the information presented in space-use related systems?		
How could a space that relates courtyard assist in preventing errors or minimize them?		
Are there elements of the courtyard that some users may not be able to interact with, use in the same way or in an equivalent way (perhaps due to difficulty of access to the area itself)?		

TABLE 2:

REQUIREMENTS for Universal design of Courtyards (SIST ISO 21542)

1. Use of related outdoor areas and facilities	Connecting with the wider environment. Adequate links with appropriate signage to the urban mobility network are important.
2. Use of entrances	The minimum external width of the gangway shall be 90 cm The minimum height of the external gangways shall be 230 cm.
3. Use of paths in horizontal circulation	The maximum height of the threshold that is useful for all those who require wheeled mobility aids is 15 mm. If possible, the gangway should be free of thresholds. Path slopes The cross slope shall not be greater than 1:50, unless there is a drop due to a dropped kerb in the pavement area. If the longitudinal slope of the path is greater than 1:20 it shall be designed as a ramp. Nonslip, tactile surface, the approach to the ramp should be highlighted using colour contrast, tone and texture change. Manoeuvring space (a person in a wheelchair can turn 180 degrees). The space must be large enough to accommodate a circle 150 cm in diameter. Grilles Wheelchair users and white cane users are often obstructed by grilles covering light or other shafts. The gap between the grilles should be less than 15 mm so that it does not obstruct wheeled mobility aids, and the white cane does not get stuck in it.
4. Use of paths in vertical circulation	Height differences: in the case of a space height difference, access must be provided by means of a ramp and steps. The entrance is designed in this way to allow access to the building for people with wheeled mobility aids as well as for those who can walk more easily with stairs and therefore need shorter routes. Smart technologies (lifts, elevators) are very useful, but they can also help the disabled. The technology should be selected based on a unifying design so that it can be used by all.
5. Use of equipment and facilities used in the provision of the service	Control elements (lift switches, blinds, lighting, sound information, etc.) must be positioned at a height of between 80 and 110 cm and at least 60 cm from all internal corners. Appropriate accessibility for the blind and visually impaired, such as visual contrast, tactile elements, Brie font, etc., must be considered. ⁶
6. Use of exits, evacuation routes and concepts for emergency planning	Obstacles that are necessary (rubbish bins, benches, bollards, etc.) must be designed and placed in such a way that they can be detected in time by the blind and partially sighted. Paths, passageways, stairways, ramps should be kept as clear and free of obstacles as possible.
7. Communication and orientation via more than one sensory channel	Contrast for orientation should be appropriately coloured (e.g. edges of stairs appropriately marked). The lighting shall not cause glare, reflection or strong shadows. Preparation for the installation of equipment for the deaf and hard of hearing is primarily defined by the interior spaces, but adequate lighting and hearing loops at doorbells with intercom are important.
8. Use of facilities and buildings for their foreseeable purpose	Bench, seating: position of seats should be min. 60 cm from the line of movement, seats: 45 - 48 cm (high), back and arm rests min. 45,5 cm (high), space between seats 90 cm width, 140 cm depth; Resting areas should be adjacent to accessible routes with access. Parking spaces for disabled persons should be of an appropriate size and located as close as possible to the entrance with adequate access.
9. Appropriate choice of materials	Floors should be slip-resistant in dry and wet conditions, firm and level to allow easy passage by wheeled mobility aids or other mobility-impaired persons. On large, paved areas, homogeneous materials are recommended, and joints should be no deeper than 2 mm. Floor and wall coverings should be chosen in such a way that they do not impair visual perception. In particular, shiny and highly reflective materials should be avoided, as well as excessive use of mirrors (on several walls in the same room), brilliant white paint and strong contrasting patterns (for example, a chessboard and patterns giving the impression of a three-dimensional image). Glare severely impairs the visual perception of most people with visual impairments. Mirrors and highly reflective materials distort the image of a room and have a bad effect on orientation in the room, and high contrast patterns make some users feel dizzy.

1. Use of related outdoor areas and facilities, 8. Use of facilities and buildings for their foreseeable purpose

Problem:



COOPERATION IS CENTRAL

No wider connection, access to courtyard is not for all (stairs, paving)

Good example:



Wider connection, access to courtyard is for all

2. Use of entrances, 6. Exits, evacuation routes and concepts for emergency planning

Problem:



architectural barrier
(stairs)

Good example:



Without
barriers

3. Use of paths in horizontal circulation

Problem:



Good example :



4. Use of paths in vertical circulation, 5. Use of equipment and facilities used in the provision of the service

Solutions to overcome vertical links



Ramps

9. Appropriate choice of materials

Problem:



Good example:



Content of the study/elaboration

1. Introduction of topic (definition of accessibility and universal design)
2. Main challenges of accessibility in courtyards
3. Solutions, guidelines (REQUIREMENTS for Universal design of Courtyards (SIST ISO 21542))
4. Overview of European legislation
5. Examples of problems and solutions in courtyards
6. How can we define accessibility? (Table 1: knowing with courtyard, Table 2: REQUIREMENTS for Universal design of Courtyards)
7. List of literatures



RE-PUBLIC SPACES



RE-PUBLIC SPACES

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