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COMMUNITY CENTRE OVER LAAGNA ROAD. INFLUENCES OF URBAN DENSIFICATION ON SOCIAL SUSTAINABILITY.

MAGISTRITÖÖ

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PREFACE

The following work was developed as a master thesis of the integrated studies in the field of architecture at Tallinn University of Technology.

Words would not be enough to describe sincere gratitude all my mentors and close people have deserved. For all of my teachers that spent the time of their life to educate and guide us on the path we have chosen, Thank You. My supervisor, Emil Urbel, who helped and supported me during the development of the thesis, Thank You for your time and dedication. My friends and colleagues, Sander Paljak, Ervin Golvih, Jegor Možeiko and German Leok, that knew what to say and listened when needed, Thank You! And my dearest family, for all your words, deeds, and love.

List of abbreviations and symbols

TLU - Transport land-use interactions that describe which land-use variations inflict changes on transportation dynamics and vice versa (Jaczewska et al., 2022)

NPO – non-profit organization

NIMBY – not in my backyard - social movement resisting urban densification policies on a local scale, but acting neutral or accepting of densification on a global scale. not in my backyard (Wicki & Kaufmann, 2022)

1. INTRODUCTION

1.1 Problem setting

As a consequence of global population growth an urgent need of additional living spaces is sensible worldwide. Driven by ideals set by popular culture, high availability of personal transport modalities and permissive suburban land-use policies set preconditions where cities are experiencing the effect called urban sprawl - large private house developments on new sites in suburban areas causing social and environmental problems (Artmann et al., 2019; Pelczynski & Tomkowicz, 2019). As a countermeasure to named phenomenon urban planners are challenged with the need of urban densification – encompassing the required amount of additional infrastructure within the existing urban areas (Artmann et al., 2019; Pelczynski & Tomkowicz, 2019). However, evaluation of spatial inceptions from social perspective faces difficulties in interpretation.

Local communities of urban areas face challenges of urban densification from an underpowered standpoint, having no alternatives but to cope with increasing population density and decreasing free space. Ignoring the essential factors contributing to social sustainability, urban transformations ought to weaken social bonds and disintegrate local communities.

1.2 Main objective

The main objective of the master thesis is to evaluate the effect of densified urban areas on local communities and provide architectural design solution for unifying separated communities. Theoretical part of the study defines metrics of urban environment in correlation with social sustainability and researches methods of sustainable urban densification. Architectural projects concerning aspects of densification are examined though the prism of social values. History of development, urban and social context of plot area is reviewed to define and justify proposed arhitectural inceptions.

1.3 Work structure and content

The master thesis is divided into two parts: theoretical research and design solution. Theoretical part of the thesis analyses aspects of socio-spatial interrelations, principles, and evaluation possibilities of urban densification. In order to conclude analysed methodologies author evaluates relative architectural projects to define appropriate architectural practices from urban densification and social sustainability standpoint. Analysis of the project area reveals spatial problematics that affect local communities, examines local communal activities, and justifies the location of the required architectural inception. The architectural proposal for the area resembles the densification possibility of Lasnamäe on the basis of existing Kotka Shop building and area above Laagna canal with the scope of unifying local communities.

1.4 Implemented methodologies.

Over the course of master thesis spatial aspects of urban environment are tested from the social perspective of local communities. The philosophical basis that has developed the main direction of the study is used as a derivative point, setting the ideology of architectural proposal. Theoretical research was developed based on scientific and architectural articles, thematic literatures, research studies, interview with local urbanist and environmental activist and analysis of architectural projects. Research of a local context provided an overview of the project area defining the character of required inceptions.

2. THEORETICAL PART

2.1 Background

On 19th of December 2019 architect Lydia Kallipoliti held an open lecture in big hall of Estonian Academy of Arts talking about closed systems and urban waste management and presenting her recently published book – " The Architecture of Closed Worlds, Or, What is the Power of Shit (2018)". Describing waste as an indivisible part of living existence, Lydia Kallipoliti argued that the term waste is often used for objects and substances do not represent value in a generalized, certain and obvious way (Kallipoliti, 2018). As a matter of opinion perspective, it is the society that defines categories of value, however, fails to recognize the preliminary stages of valued objects (Kallipoliti, 2018). Similar to natural resources that represent the first unrefined stage of a valued object, damaged, excluded from usage objects represent early stages of objects existing in other, yet undefined, consumption paradigms (Kallipoliti, 2018).

Recognizing the potential value of damaged objects is creatively acknowledged in japanese art of Kintsugi, where shattered elements of pottery are repaired using glue and golden paint. Cracks, nicks and dark lines of joints are covered using paint transforming the appearance of the object and adding a unique trait. The art of Kintsugi exists within japanese philosophy of Wabi-Sabi (Koren, 1994). Deriving from a land with unpredictably occuring climate disasters, Wabi-Sabi embraces the permanent life circle of people, objects and environment and defines 3 main paradigms of existance (Koren, 1994):

- All things are impermanent
- All things are imperfect
- All things are incomplete

Transformational processes are natural for Wabi-Sabi and the observer is challenged to cope with changes, thus creating a precedent for actions that cause reevaluation of the object (Parkes & Loughnane, 2018). The art of Kintsugi could be considered as an approach to revitalize broken ceramic utensils, however some Kintsugi artist refer to broken objects as "dead" (Zero = Abundance, 2017). A more precise description of the art is the way to repurpose broken objects for further existence embracing their history, thus enhancing their value (Zero = Abundance, 2017).

The problematics of the act of repurposing are inevitably faced with the challenge of proving reasonability of the action. The monetary value of new production is often considered as reasonable justification for implementation. The challenge of repurposing consists in defining the covert values of the existing object in order to be considered as an equally significant factor for choice making.

Figure 1. Kintsugi. (Zero = Abundance, 2017)

2.2 Communities

For the urban environment consisting of urban fabric and people, a covert value could be local communities. City inhabitants – people and local fauna – are the main triggers for dynamic transitions in the city environment. Urban structure encompassing those transitions could be evaluated by the balance between restrictive elements (fences, private or closed spaces, etc.) and accessible spaces. Guided by the pathways and waypoints customers of urban environment are set up for mutual interaction colliding with each other in the urban space. Uncovered from private spaces, public spaces are thus the only available location that allows to analyse the amount and quality of social interactions (Akcali & Cahantimur, 2022; Soltani et al., 2022). Exploring the factors contributing to changes in social behaviour of urban inhabitants and remarking the context of urban environment that encompass those actions it is possible to review the socio-spatial correlation of observed areas (Soltani et al., 2022). Exploiting that data in the context of required urban transformations and stressing the importance of socio-spatial interrelation it is possible to minimise the negative effect of urban densification for city inhabitants.

2.2.1 Socio-spatial interrelations

Multiple studies by authors listed in this work have revealed and analysed the relations existing between environmental properties of inhabited areas and local population.

Design as the toolkit for social changes. Contextualising the effects of environmental objects to social behaviour, especially in terms of architecture and landscape design, it is possible to describe several modalities that are related to certain quantitative and qualitative social indexes. However, it should be noted that the research on urban areas is conducted post-factum revealing relevant socio-spatial interrelations for multiple geographically distinct areas. A systematic nature of analytical methods creates a suitable basis for creation of potential urban design toolkit; however, it is possible that social dynamics of densified urban spaces (analysed by the most part of researchers) could differ from newly developed urban neighbourhoods.

Metrics of urban environment. Streets and open spaces of urban areas stand out as the main observable framework for various social exchanges, like movement, communication, education and recreation (Sartison & Artmann, 2020; Soltani et al., 2022). Thus, spatial configuration represented by combination of street, building and open space layouts has a capacity to influence social qualities of local communities (Akcali & Cahantimur, 2022; Soltani et al., 2022). Being able to refer to the metrics of spatial environment and analyse social behaviour with analytical tools it is possible to reveal correlations of urban spaces to social parameters over the span of necessary number of locations. According to Soltani et al., (2022) it is possible to distinguish following spatial modalities with their relation to social factors:

- Integration - closeness of a space in relation to the other surrounding spaces;
- Choice - Probability of falling on any shortest path that links any pair of segments of a street segment;
- Depth - Shortest distance between the spatial elements;
- Connectivity - Number of the immediate neighbours of each space;
- Reach - Number of destinations and opportunities around each building;
- Gravity - Attractiveness of the destinations and associated travel costs based on distance between two or more buildings.

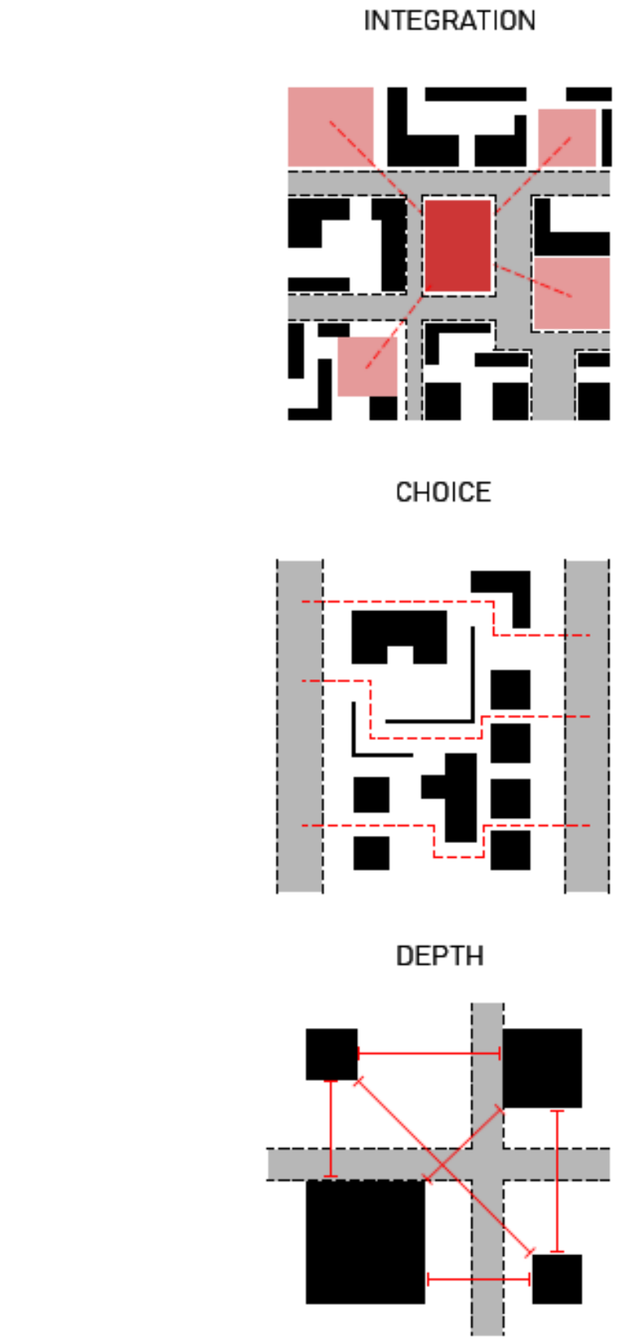

Figure 2. Integration, choice, and depth of urban entities. Author's illustration.

Soltani et al., (2022) describes several combinations of spatial modalities that might further describe certain spatial design characteristics:

- Intelligibility

Describes an urban area that is efficiently supplied by existing transportation network (Soltani et al., 2022). Intelligibility is used to analyse such social aspects as perception of place, movement pattern, wayfinding, legibility (Soltani et al., 2022).

- Permeability

Describes urban space that allows travellers to flow through the most physical entities of urban environment (Soltani et al., 2022). Permeability is analysed with correlation of integration and depth values. Characteristics of permeability reflects the perception of urban space in terms of social interaction possibilities and safety (Soltani et al., 2022).

- Layout accessibility and movement

The quality of urban space in terms of comfort for pedestrian movement defines the likelihood of using certain paths more often than others (Soltani et al., 2022). Using locally defined values of choice, integration, depth and values of connectivity it is possible to assess the transport modalities of the area in terms of quality and amount of flow (Soltani et al., 2022).

- Spatial density

The potential of urban areas in terms of provided services and the accessibility of these services for a spatial unit describes the spatial density for the area (Soltani et al., 2022). The values used to describe spatial density are gravity and reach (Soltani et al., 2022).

- Spatial accessibility

The values of gravity are used to interpret how location and provided transportation opportunities affect the usability of waypoints (Soltani et al., 2022). Spatial accessibility is found to be related to several factors including pedestrian accessibility, land use intensity, active mobility and housing prices (Soltani et al., 2022).

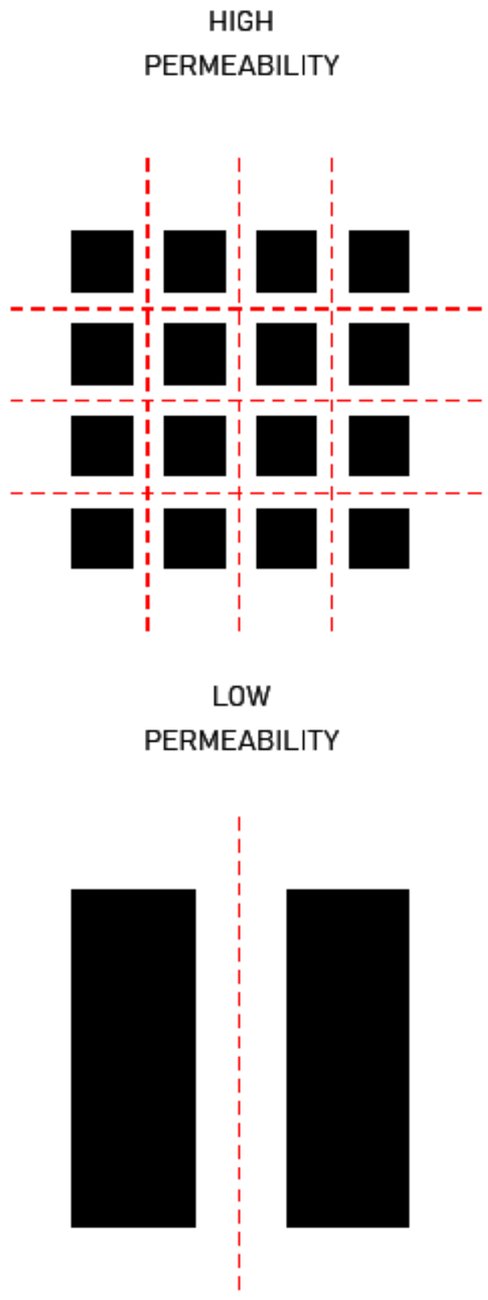

Figure 3. High and low permeability of urban fabric. Author's illustration.

Social sustainability

Being the environment that hosts a major part of people's life, one of the main characteristics of urban areas that has a long-term influence is the social sustainability (Akcali & Cahantimur, 2022; Soltani et al., 2022). Focusing on environmental, communal and individual factors of urban dwellers social sustainability describes city's modality to maintain harmonised coexistence and development of diverse communities (Akcali & Cahantimur, 2022). In order to provide contextual research on the urban environment it would be appropriate to select the metrics for the dynamics of social sustainability, defined by Soltani et al., (2022):

- sense of place
- safety
- social interaction
- community stability
- community participation

As a toolkit for social sustainability, spatial configuration has the potential to influence sense of place, safety and social interaction (Soltani et al., 2022). On the other hand, community stability and community participation have stronger relations to social context of the neighbourhoods, however lack of necessary services and uncontrolled urban densification are prone to have negative effect on urban communities (Soltani et al., 2022; Stanley et al., 2022; Wicki & Kaufmann, 2022).

Safety. One of the basic human needs that should be guaranteed by the urban environment is the feeling of safety. The study by Soltani et al., (2022) revealed, that the feeling of safety is higher, when:

- Choice value is higher
- Integration value is higher
- Intelligibility quality is higher
- Pedestrian movement is more active
- Depth value is lower
- Permeability value is lower
- Density value is lower

It is possible to conclude that the more open and observable, well integrated, well serviced and more popular urban areas with minimal covert areas, like abandoned buildings, blind corners, tall bushes, unilluminated spots are sensed as safer areas (Dawson et al., 2023; Soltani et al., 2022; Stanley et al., 2022). However, it is necessary to sustain the balance between the size and the permeability of the open area, as the bigger open spaces become, the more uncontrollable becomes pedestrian movement flow (Soltani et al., 2022).

Sense of place. It has been noted that the stronger notion of relation to the neighbourhood, also mentioned as the sense of place is dependable on following spatial characteristics (Soltani et al., 2022):

- Intelligibility quality is higher
- Layout is more accessible and attracts movement flow

Following the results, sense of place is related to the spatial design features, that allow customers of urban area find their waypoints in the fastest and most comfortable way possible. Findings on the sense of place appear to be significantly correlated with factors responsible for perception of safety in the neighbourhood, as in many cases the amount of people present in the area is often related to environmental disadvantages that are common for the area (Dawson et al., 2023; Soltani et al., 2022; Stanley et al., 2022).

Social interaction. As it could be expected, social interaction in the neighbourhood is significantly affected with local context (Soltani et al., 2022). Research conducted by Soltani et al., (2022) showed, that social interaction is positively correlated by following spatial factors:

- Higher value of integration
- Lower value of reach
- Lower value of gravity
- Less accessible spatial design

The methodology used by Soltani et al., (2022) allowed researchers to test the conclusions of several case studies in order to be consistent and prove the reasonability of suggested socio-spatial interrelations. It has to be noted that several social parameters might have specific factors majorly affecting the nature of interrelation, proving that socio-spatial interrelations might have strong context-based factors that derivate the performance of other correlations (Soltani et al., 2022). In case of social interaction, a vital social context component is community stability that describes the time of residential stay, amount of house owners compared to renting dwellers, etc. (Soltani et al., 2022).

The urban context of the neighbourhood in terms of enhancing social interaction suggests that denser urban areas with a more complex network layouts create difficulties in navigation, lowering the safety of the area (Soltani et al., 2022). Whilst streets and open spaces with shaded and intimate spaces have the potential to comfortably nest social interactions, it has been noted that enhancing the potential for social interaction often results in lower sense of safety (Soltani et al., 2022; Stanley et al., 2022).

2.2.2 Services and facilities

Apart from vital infrastructure services supplying fundamental needs, like heat, water, food, waste management, etc., neighbourhood areas should encompass a range of services in order to house communal and individual activity (Akcali & Cahantimur, 2022; Stanley et al., 2022). It is possible to differentiate urban facilities by categories, that formulate a certain type of emotional relation, that is defined by type of provided services/activities, areal location and supported modes of transport, occurrence of usage and personal emotional experiences, that refer to objects and locations (Dawson et al., 2023; Westerholt et al., 2022).

Perception of services and facilities. The importance of community perception comes from 2 main notions. Firstly, as it was discussed in previous paragraphs, the perception of neighbourhood affects the sense of place and the solidity of community bonds (Akcali & Cahantimur, 2022; Soltani et al., 2022). Negatively perceived areas tend to become avoided by pedestrians, are considered unsafe, leading for further degradation and, in worst cases, abandonment (Akcali & Cahantimur, 2022; Soltani et al., 2022). Secondly, it was found in the study of Westerholt et al., (2022) that the perception of services used on daily basis and occasionally used services are different in their nature. Workplaces, grocery outlets, transportation networks are reportedly the most used facilities by city population (Ha et al., 2023; Westerholt et al., 2022). Locations and facilities used on a daily basis tend to lose their uniqueness in the eyes of their customers, often resulting in prejudice relation (Westerholt et al., 2022). However, being vital components of urban structure, the lack of essential services is sensed as a more disruptive issue than aesthetical inconsistencies of the area (Akcali & Cahantimur, 2022; Westerholt et al., 2022). Providing alternative facilities for commonly used services, for example: shopping mall – open market, workstation – remote work, etc. introduces versatility and enhances the identity of neighbourhoods (Westerholt et al., 2022).

It is possible to constitute, that well equipped neighbourhoods in terms of facilities and provided services provide appropriate environment for social sustainability, but are not as expressive, as problematic neighbourhoods (Westerholt et al., 2022). This reveals the gap in potential research of the neighbourhoods, as assessing neighbourhood composition through public research might have compromised results, while quantifying facilities and services does not reveal the consistency of socio-spatial interrelations (Soltani et al., 2022; Westerholt et al., 2022).

Diversity of services. In order to extensively contribute to community's sustainable development, urban space has to be sensitive in terms of cultural diversities, climate and weather, communal needs and states of emergency (Akcali & Cahantimur, 2022; Dawson et al., 2023; Stanley et al., 2022). For example providing exclusively housed and managed recreational opportunities would be insufficient in case of lockdown (Dawson et al., 2023). Everchanging urban dynamics react much more rapidly to global trends, than urban spaces have the potential for reaction (Dawson et al., 2023; Ha et al., 2023; Westerholt et al., 2022). This notion suggests the need for feedback loop between users of urban space and planning committees as well as modularity of urban spaces.

Placement of facilities. Location of provided services has a direct influence on marking everyday moving trails of urban customers, thus influencing the choice of transport modalities (Jaczewska et al., 2022; Soltani et al., 2022). Densely grouped facilities form monofunctional negatively perceived urban areas, enhancing zoning and complicating transportation (Akcali & Cahantimur, 2022; Soltani et al., 2022; Westerholt et al., 2022). Whilst grouped, packed areas might have a wider range of services that might seem more profitable and requiring less expenses, a more distributed placement of services supports accessibility and improves social sustainability (Soltani et al., 2022).

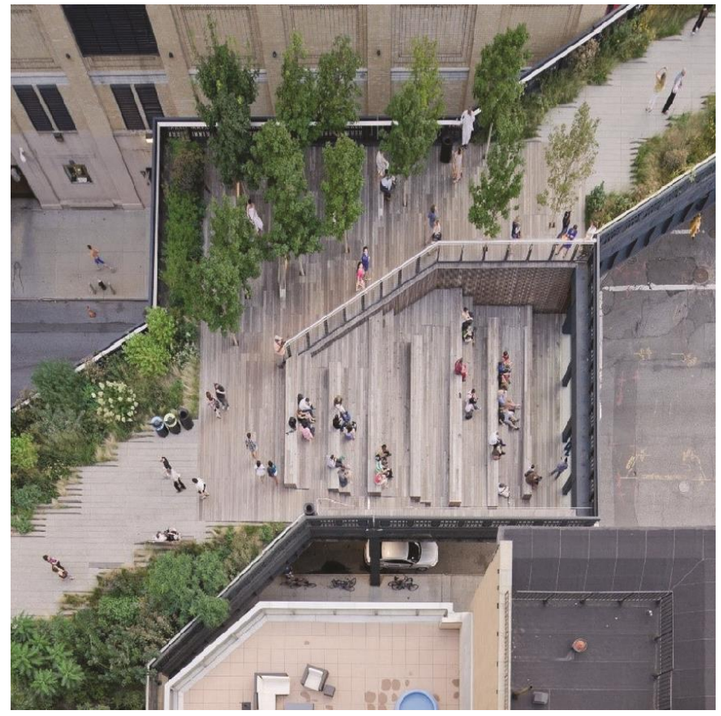

Figure 4. New York Highline. (Friends of the High Line, 2023)

Figure 5. Laagna community garden. (MTÜ Lasnaidee, 2023)

2.2.3 Shattered communities

Concerning the phenomenon of shattered communities, it is necessary to distinguish neighbourhoods from communities, as well as different levels of communities. Neighbourhood is a socio-spatial unity, referring to people living in the same geographical area (most typically part of the city), whereas community should be considered as a social group with a certain amount of involvement in common activities (Stanley et al., 2022). The aspect of bonding together on the terms of mutual interests, specialties, cultural backgrounds or even common problems brings us to the realisation that communities are social structures that are distinguishable in terms of size, type of involvement, geographical location and usage of facilities and services.

Communities and social exclusion. Opposing the phenomenon of social involvement in community participation, namely the process of social inclusion, stands the problematics of social exclusion. The definition of the term social exclusion often derives from the views and interests of concerned party (Agulnik et al., 2002). Considering various factors affecting the social structure of urban society, each interested party might be limited in abilities for improving the state of excluded social groups. Insufficient amount of data and research on the concerned neighbourhood often leads to inconsistent conclusions (Stanley et al., 2022). Deliberately or not, oversimplifications in definition of social exclusion result in underestimations of the problematics, thus being inaccurate in conclusions and proposed methods (Agulnik et al., 2002). To understand the phenomenon of social exclusion it might be useful to operate within 3 main paradigms that frame the problematics associated with social exclusion (Agulnik et al., 2002):

- Factors triggering social exclusion – human capital and financial assets, internal and external factors;
- Time – factors from past or present;
- Group size – individual, family, community, local, national, global, etc.

Factors from the past. As a deriving point of a person's choice making policy a certain agenda that is motivated by cultural, ethnical, educational, health, welfare and other circumstances, could be defined as factors from the past time (Agulnik et al., 2002). Being impossible to change the origins of this agenda, a certain relation to individuals decision making could be expected (Agulnik et al., 2002; Akcali & Cahantimur, 2022).

Factors from the present. Internal factors of social exclusion, also mentioned as self-exclusion, are the motives or reasons of each individual person that constrain or demotivate them from participation in communities (Agulnik et al., 2002; Stanley et al., 2022). Varying in origins that affect the choice of individuals from the past, it is important to point out, that the internal factor is considered to be chosen by the individual himself (Agulnik et al., 2002; Akcali & Cahantimur, 2022). On the contrary, external factors, such as institutional constraints, discrimination, lack of public rights, influence individuals creating constraints for the communal participation (Agulnik et al., 2002; Akcali & Cahantimur, 2022).

Figure 6. Baltic Station Market. (Franganillo, 2019)

Affected group sizes. Social exclusion is a phenomenon that exists in a society on various scales.

It is possible to distinguish factors of exclusion that are scale specific. For example, racial discrimination of a certain ethnic group does not affect social exclusion on the individual level as much, as it excludes a whole ethnic community from the public (Agulnik et al., 2002). On the contrary, extreme poverty might affect individuals and families more, as people in desperate need for elementary resources have no possibilities or motivation for building communal bonds (Stanley et al., 2022). Analysing the neighbourhoods, it is possible to qualify the social exclusion for the area understanding on what scale the community bonds of the area are the weakest. Assessment of this type can define the problematics of the area and specify the required transformations for the urban area as well as for individual / communal mentality.

It is important to note that social structures consist of groups of various sizes and are relevant to each other, meaning that scale specific exclusion factors have their indirect effect on related social groups. Analysing social exclusion should consider the spread of problematics between levels of social groups, understanding the initial targeted social group (Agulnik et al., 2002; Stanley et al., 2022).

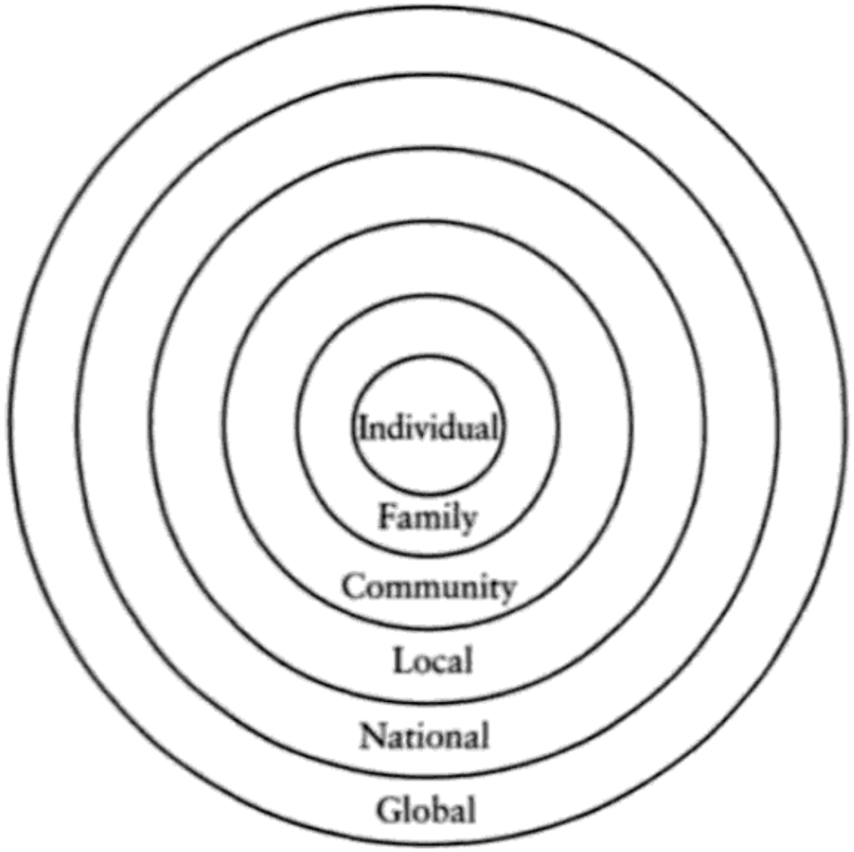

Figure 7. Levels of social structure. (Agulnik et al., 2002)

Neighbourhoods and environmental disadvantages. Whilst social exclusion prevents the development of sustainable urban society from the communal standpoint, environmental disadvantages, such as ineffective spatial configuration, lack of services, noise and air pollution, increased traffic, lack of urban green spaces, high rates of crime activity and lack of open space are the factors disturbing the development of sustainable neighbourhoods (Akcali & Cahantimur, 2022; Dawson et al., 2023; Soltani et al., 2022; Stanley et al., 2022; Wicki & Kaufmann, 2022). Neighbourhoods being the cradle of communities houses the potential for human interactions, thus the quality of those interactions depend on the design and condition of the neighbourhood (Soltani et al., 2022). However, it is common for people to get unified and strengthen relationships facing mutual problems as such. In certain cases, when environmental disadvantages appear in the areas of active communities with strong relationships, sense of place and belonging, common problematics tend to bond communities and trigger problem solving actions (M. Derlõš, personal communication, 3 March 2023). Facing challenges of problematic neighbourhoods communities have the potential to form an agenda for social transformation collectively participating in policy- and decision-making processes (Akcali & Cahantimur, 2022; M. Derlõš, personal communication, March 3, 2023).

Definition of a shattered community. The phenomenon of shattered community is possible to describe as a socially excluded community existing within environmentally disadvantaged neighbourhood. Referring to both social and spatial aspects of urban space term “shattered community” unifies the notion of described problematics for a more holistic interpretation. Regarding architectural and urban planning projects consideration for using a holistically descriptive term should derive from the understanding, that spatial inceptions have an indirect effect on social problematics of the areas. Managing specifically spatial aspect of socially problematic areas would be inconsistent without required institutional changes, policies or/and shift in mentalities (Agulnik et al., 2002; Akcali & Cahantimur, 2022).

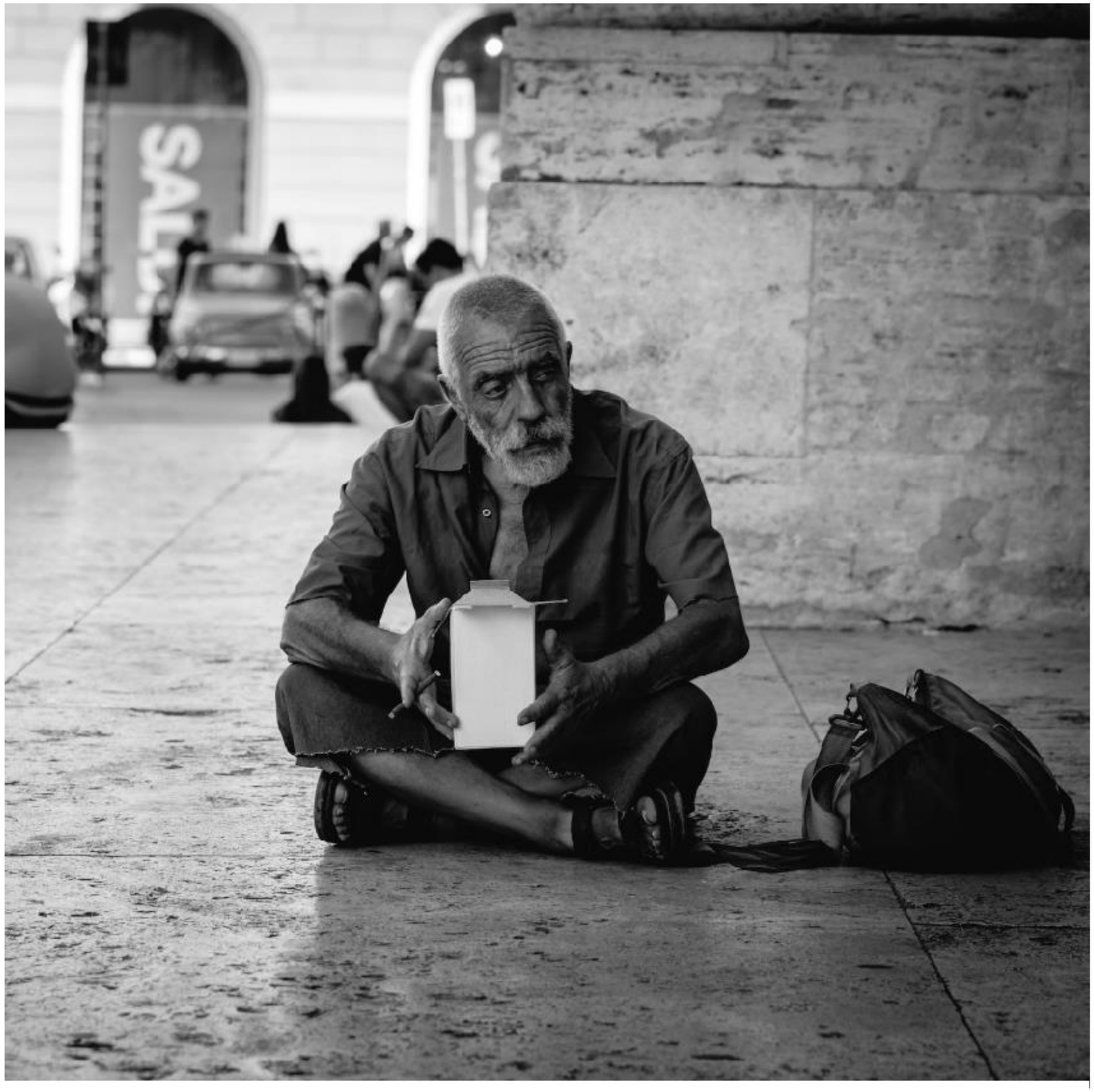

Figure 8. Man sitting on tiles. (Bauan, 2018)

2.3 Densification

2.3.1 Concept of urban densification

Urban densification should be considered as a complex issue of interrelated processes – quantitative and qualitative changes in artificial and natural environment, revisioning of customer services and correlation of named processes with the inhabitants. Opposing itself to the phenomenon of urban sprawl in terms of land-usage and implementation of existing infrastructure potential, methods used in urban densification exploit the sustainable development possibilities for urban areas (Pelczynski & Tomkowicz, 2019). As a spatial transformation method densifying urban landscape might be achieved with the potential of existing structures as well as by the spatial potential of areas within the structures. As the spatial capacity of urban areas is limited with physical amount of free space, regulatory, social and biological factors (Haaland & van den Bosch, 2015) the implementation of urban densification methods requires critical, unorthodox mindset.

2.3.2 Principles of urban densification

Spatial transformations required for incorporating additional building volumes in existing urban environment could be distinguished by types of architectural inceptions. Main principles that are conceptually described within the article of Pelczynski & Tomkowicz, (2019) list four methods of urban densification:

- Repurposing- increasing the effective use of existing buildings by transforming their functions.
- Intensification - exploiting free spaces in the city.
- Extensions - using free volumes below and over existing buildings.
- Replacement - demolishing existing buildings and replacing them with new buildings.

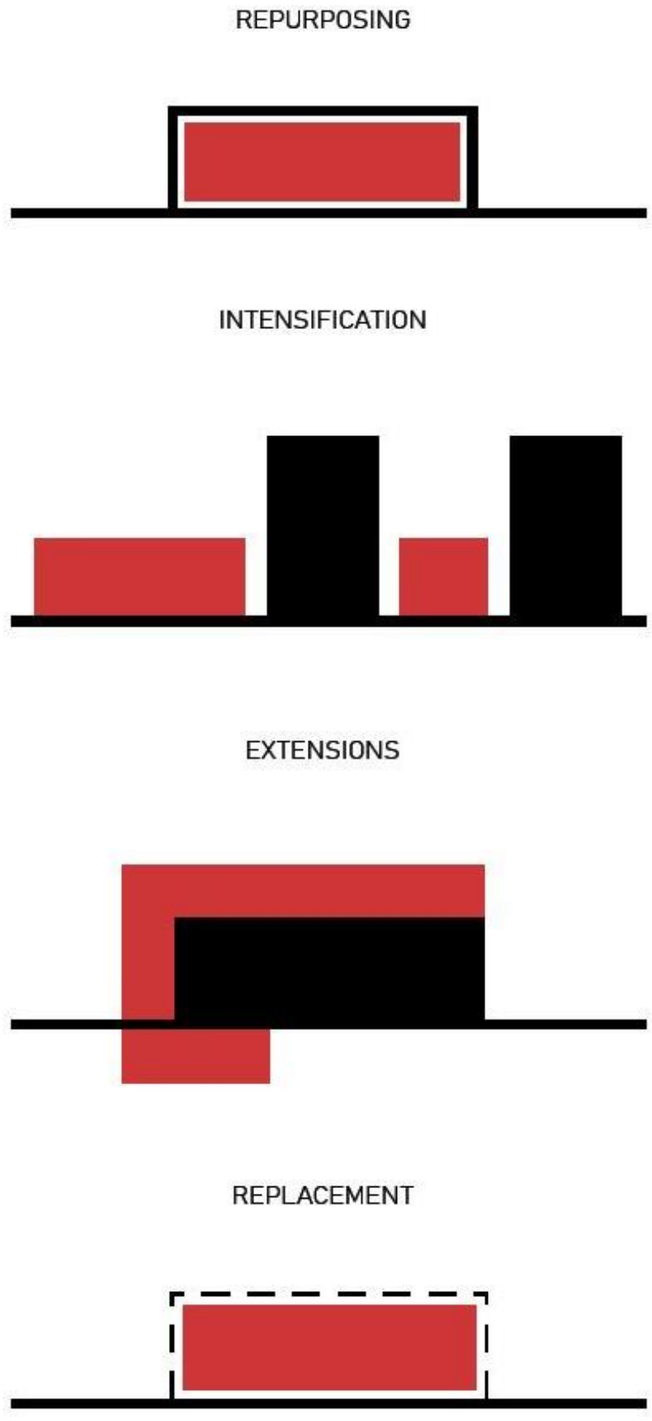

Figure 9. Principles of urban densification. Author's illustration.

The reasoning behind implementation of each densification methodology comes from estimated cost value, required net area, spatial quality of a project, provided quality of existing infrastructure, integrity of existing load-bearing structures and regulatory limitations considering heritage, environmental requirements and local policies (Pelczynski & Tomkowicz, 2019).

Repurposing. Being the most environmentally sustainable way of revitalising urban environment, densification provided by potential of existing building volumes should consider several related complications. Provided by existing structural components, repurposing projects do not require associated financial and time investments for additional constructions (Pelczynski & Tomkowicz, 2019). Improvements of existing infrastructure are beneficiary in a local context, enhancing social sustainability of local communities (Pelczynski & Tomkowicz, 2019; Soltani et al., 2022). Absence of major demolitions contrast with other densification methods in terms of environmentally friendly approach (Pelczynski & Tomkowicz, 2019). However several limitations considering possible spatial configurations, restrictive regulatory policies related to heritage preservation and safety and technical aspects suggest that repurposing of existing buildings requires unconventional planning approach, thus being one of the most complicated densification methods (Pelczynski & Tomkowicz, 2019).

Intensification. Exploiting undeveloped urban areas for densification demands appears as one of the simplest yet unwanted urban transformations. Free space within existing urban areas proved required network and configuration possibilities for new building volumes. However, areas reserved for recreation and environmental sustainability purposes are endangered with potential fragmentation and elimination by emerging densified volumes (Haaland & van den Bosch, 2015; Pelczynski & Tomkowicz, 2019). However sustainable planning policies are considered to prevent extensive densification, problematics of allocating potential densification areas faces differences of urban zoning defined by city planning regulations

and actual land usage by local dwellers. Unsensitive zoning policies providing densification areas in socially significant locations result in unacceptance of densification policies, appearance of NIMBY movement and decrease existing environmental values (Pelczynski & Tomkowicz, 2019; Wicki & Kaufmann, 2022).

Extensions. Potential provided by free volumes over and under existing buildings is associated with environmentally sustainable, yet structurally and architecturally complicated solutions. Providing new building volumes within developed urban areas does not cause decrease and fragmentation of urban green and recreational areas (Pelczynski & Tomkowicz, 2019). Provided architectural solutions have the potential for revitalising appearance of existing spatial volumes (Pelczynski & Tomkowicz, 2019). However, complications associated with changes in local cityscape, intensification of existing infrastructure and required technical solutions should be considered before implicating described method (Pelczynski & Tomkowicz, 2019).

Replacement. Construction of new building volumes instead of existing ones is a controversial, yet considerable method of urban densification. Providing necessary planning solution and characteristics of a required building volume, construction of a new spatial unit in place of existing one does not affect recreationally and environmentally significant areas (Pelczynski & Tomkowicz, 2019). Provided building qualities ensure a long-term service of a building. However, required demolition, construction and waste management solutions introduce complications for the densification process and require significant financial investments (Pelczynski & Tomkowicz, 2019).

Modal shift. Long-term strategies of urban densification sustainability would be imperfect without the assessment of modal split (Jaczewska et al., 2022). Changes in spatial and functional qualities of areas undergoing densification develop new mobility patterns. Whilst the effect of urban sprawl results in dispersing of services and housing units, intensifying urban areas in terms of availability results in modal shift towards public transport, pedestrian and bicycle means of travelling (Pelczynski & Tomkowicz, 2019). Reducing the individual car volume by indirect inceptions, such as enhancing pedestrian and bicycle pathways, spatial transformations of environment and increased availability of services (Jaczewska et al., 2022; Pelczynski & Tomkowicz, 2019) modal shift becomes a self-regulatory process based on competitiveness of the qualitative characteristics of inceptions. Thus, being insufficient in regulatory terms, measures such as parking pricing, road pricing, traffic restrictions should be incorporated into modal shift strategies.

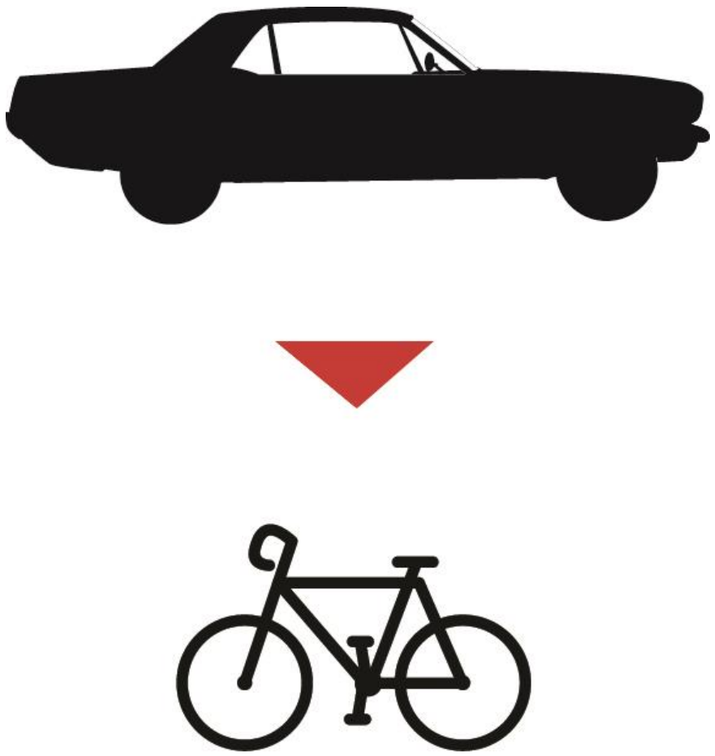

Figure 10. Modal shift. Author's illustration.

Financial justification. With distinguished methodological approaches it is possible to assess the benefits and disadvantages of urban densification project construction from the sustainability and cost-efficiency perspective (Pelczynski & Tomkowicz, 2019), as well as to analyse changes in vital ecosystem services (Haaland & van den Bosch, 2015). The reasonability of interrelated densification project assessment comes from the notion of long-term benefits of sustainable urban environments. The quality of urban space having the potential to affect customer perception of urban space suggests, that cost-making factors of urban projects are related to environmental sustainability in a long-term perspective (Haaland & van den Bosch, 2015; Lin et al., 2015; Soltani et al., 2022). Although price per square unit of a construction project often claims an imperative voice in terms of decision-making, the interrelated nature of urban densification suggests, that it is necessary to assess social, biological, environmental and architectural aspects to understand the possible transitions of housing prices in areas undergoing densification (Broitman & Koomen, 2015; Haaland & van den Bosch, 2015; Pelczynski & Tomkowicz, 2019).

2.3.3 Densification of urban green spaces

Urban planning solutions guided by principles of densifying existing town spaces are inevitably faced with challenges regarding preservation of urban green spaces (Haaland & van den Bosch, 2015). Regarding planning policy and the approach of urban densification factors contributing to loss of biodiversity list (Haaland & van den Bosch, 2015; Lin et al., 2015; Võsaste, 2021):

- Decrease and fragmentation of urban green spaces;
- Increase in heat waves due to intense artificial coverage;
- Increased air and noise pollution;
- Overused underground layers;
- Poor planting diversification;
- Unequitable social distribution;
- Regulatory and planning constraints.

Biological diversification. The increase in building volumes within urban free spaces should be approached considering the interrelated nature of urban ecosystem services (Haaland & van den Bosch, 2015), proposing strategies for preserving and enhancing of urban green spaces. One of the main measures to keep functional green spaces consistent and retardant towards external factors is maintaining urban green belts and green fingers (Haaland & van den Bosch, 2015; Võsaste, 2021). Being adaptive in terms of nutritional and behavioural preferences biological elements of urban environment are strongly dependant on human activity (Võsaste, 2021). As shown by Võsaste (2021), urban environments show a great potential for enhancing biological diversity of pollinators and spiders, however lack of knowledge and uneven public opinion in terms of green area maintenance are the factors stressing the biological networks. Main factors contributing to negative perceivement of biologically diversified areas list (Võsaste, 2021):

- Fear of crime in densely planted areas;
- Increased amount of insects in recreation areas;
- Allergies to certain plants;
- The need to contribute space for green spaces.

Social benefits of urban green spaces. As the size of densified urban natural areas is decreasing the usage of green spaces is intensifying. It is vital for urban densification projects to rely on scientific research methods in terms of urban green space planning providing stronger biologically bonded ecosystems and spreading specific guidelines for usage and management of public areas (Haaland & van den Bosch, 2015; Võsaste, 2021). Lack of public awareness on the subject of urban biodiversity results in the struggle of implementing strategies for sustainable green space planning leading for the loss of interest from the investors (Haaland & van den Bosch, 2015; Võsaste, 2021). However, the adequate contribution for the sufficient green spaces leads to increase in housing pricing (Haaland & van den Bosch, 2015), this may seem like the unnecessary investment from the short-time benefit perspective. On the contrary, densified urban areas lacking urban green spaces are prone for rising social inequities (Haaland & van den Bosch, 2015; Lin et al., 2015) triggering lower housing prices and overall degradation of the area in terms of public services and security. Yet the necessary concern in terms of urban green space in proximity to living spaces is to be achieved, it is the local authorities and investment parties that should consider spreading the knowledge to public on the subject of benefits from sustainable urban green spaces (Lin et al., 2015; Võsaste, 2021).

Health benefits of urban green spaces. Natural environment contribution for maintaining both physical- and mental health in urban areas is a vital sustainability factor especially in proximity to the living spaces (Lin et al., 2015; Võsaste, 2021). One of the main challenges regarding infilling the unused urban space is the effective maintenance of harmonised coexistence of public, private and natural areas. The nature of urban densification relies on the role of modal shift towards pedestrian and bicycle means of travelling, thus encouraging local people to change their travelling habits for the healthier ones. As shown in the work of Lin et al., (2015) provision of green walking pathways along residential roads results in higher life expectancy of senior citizen population. On the contrary, the major resistance on the subject of biodiversity in urban green spaces is found to be among the elderly population (Võsaste, 2021), meaning that the main potential beneficiaries of the sustainable strategies implementation are left uninformed. Foliage coverage on the streets and indoor areas are found to significantly mitigate heat distortion in urban areas (Lin et al., 2015; Pelczynski & Tomkowicz, 2019; Võsaste, 2021). Compared to open urban areas with mostly paved surfaces passive heat mitigation is found to be a good alternative for architectural sheltering solutions. Reducing the need for extensive air conditioning natural canopies and land coverage contribute for energy saving (Lin et al., 2015) and reduce related health issues. Integrating sufficient green areas also results in improved air quality lowering the amount of harmful particles in the air and helps with the flood mitigation and natural water filtration (Lin et al., 2015; Võsaste, 2021).

Figure 11. Prinzessinengärten Community Garden. (MTÜ Lasnaidee, 2021)

Figure 12. Tagamõisa meadow on Saaremaa. (Kuusemets, 2017)

Potential of urban green spaces. Urban densification is considered to moderate the negative effect of urban sprawl on the suburban biodiversity (Haaland & van den Bosch, 2015) utilising existing capacity of urban natural assets (Pelczynski & Tomkowicz, 2019). Historically situated on preferably fertile landsites (Võsaste, 2021) urban areas have the potential of developing bonded ecosystems based on biological species common for the local environment. Although largely manageable and densely populated urban areas must be guided and transformed with the direct inceptions of local people. The concept of edible cities promotes bottom-up interventions on the subject of urban gardening (Sartison & Artmann, 2020). Undergoing city densification process promotes the in-city lifestyle lacking connection to the natural environment (Sartison & Artmann, 2020) whilst methods such as eco-education and hands-on gardening help to contemplate the roots of food production and strengthen the community bonds (M. Derlõš, personal communication, March 3, 2023; Sartison & Artmann, 2020). Implementation of contemporary food production technologies might achieve food self-sufficiency in terms of locally produced fresh food redusing packaging and transportation costs (Bayley et al., 2011; Sanjuan-Delmás et al., 2018). New plant sites create fertile space for insects and small animals enchansing biodiversity (Sartison & Artmann, 2020).

2.3.4 Analysing urban densification.

During research on the subject of urban densification several analytical methods could be distinguished in terms of context scale and subject of analysis. Different methodological approaches could be used prospectively and retrospectively as a tool to identify effectiveness of densification process, sustainability of the method, tendency of transformations and to assess possible advantages and disadvantages of chosen methods. As urban densification is a complex interrelated process, several methods of analysis may form an informational framework that reflect dynamics of the process and form a feedback loop for further developments. However, considering the scale and character of the following work, described analytical method was chosen as an appropriate tool for evaluating effects of urban densification.

TLU feedback cycle. According to Jaczewska et al., (2022) analysis of urban densification potential could be shown as the interaction between spatial transformations and transportation modals. Transport land-use interactions (TLU) describe which land-use variations inflict changes on transportation dynamics and vice versa (Jaczewska et al., 2022). According to specifics of urban transformations, diversified dense urban areas require accessible short distance transport modals, such as walking, cycling, electric scooters, etc. (Jaczewska et al., 2022). Increased number of customers influences financial growth of the area thus increasing the need of accessibility improvements triggering the cycle again (Jaczewska et al., 2022). Assuming the transformations are local and within pedestrian accessibility, the need of motorized transport should be limited to public transportation modals. Opposing compact development is a more dispersed placement of activities that leads to a more intensified transportation network, which shifts accent from accessibility and concentration of services (Jaczewska et al., 2022).

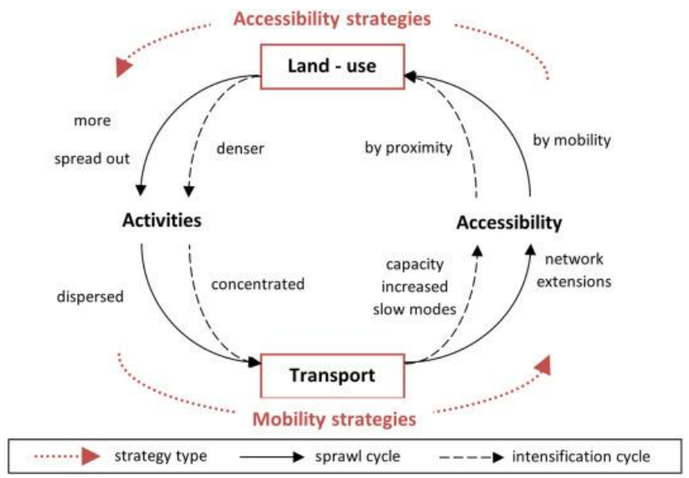

Figure 13. Two possible versions of the TLU feedback cycle: intensification and sprawl. (Jaczewska et al., 2022)

Given the characteristics of both densification and sprawl processes, it is possible to identify the possible dynamics of chosen urban strategies. Spatial changes being the institutive actor of urban development may vary in geographical and functional parameters as transportation networks tend to adapt to requirements of urban areas. Analysing interactions between land-use patterns and alterations in transportation network reveals densification transformations on the levels of spatial and social developments. As the spatial and network parameters of the city are the limitative factors in development (Duffhues & Bertolini, 2016), the TLU method itself requires additional research to be conducted before implementation. Thus, the TLU feedback cycle is an appropriate tool for a district to city scale planning projects.

2.3.5 Financial justification

With distinguished methodological approaches it is possible to assess the benefits and disadvantages of urban densification project construction from the sustainability and cost-efficiency perspective (Pelczynski & Tomkowicz, 2019), as well as to analyse changes in vital ecosystem services (Haaland & van den Bosch, 2015). The reasonability of interrelated densification project assessment comes from the notion of long-term benefits of sustainable urban environments. The quality of urban space having the potential to affect customer perception of urban space suggests, that cost-making factors of urban projects are related to environmental sustainability in a long-term perspective (Haaland & van den Bosch, 2015; Lin et al., 2015; Soltani et al., 2022). Although price per square unit of a construction project often claims an imperative voice in terms of decision-making, the interrelated nature of urban densification suggests, that it is necessary to assess social, biological, environmental and architectural aspects to understand the possible transitions of housing prices in areas undergoing densification (Broitman & Koomen, 2015; Haaland & van den Bosch, 2015; Pelczynski & Tomkowicz, 2019).

2.4 Case study

Analysis of selected case studies examines architectural design solutions through the prism of urban densification effect on social sustainability. Defined metrics of socio-spatial interrelations are used to define spatial effect of densification on social perception of projects.

2.4.1 Tainan Spring.

Location: Tainan, Taiwan

Author: MVRDV: Winy Maas, Hui Hsin Liao, Angel Sanchez Navarro, Stephan Boon, Xiaoting Chen, Chi Yi Liao, Dong Min Lee, Andrea Anselmo, Yi-Chien Liao, Zuliandi Azli, Olivier Sobels

Surface: 54600 m2

Year: 2020

Figure 14. MVRDV's Tainan Spring - Pool view. (MVRDV, 2020)

Description. A project by Dutch architectural office MVRDV features an attempt to revision the purpose of an abandoned city mall building to a new public space within the centre of the Tainan city. Located between the Tainan canal and promenade of Hainan road, the project unites densely planned district with heavy traffic to a waterfront with recreational possibilities (MVRDV, 2020).

In order to bring air and light to the area architects decided to demolish the mall building. Existing structural skeleton of the mall was meticulously appropriated as a sculptural element, excess materials were separated, categorized and recycled (MVRDV, 2020). Using white paint and glass structural architectons were visually unified and appropriated to serve as a rhythmical ensemble of the pedestrian axis.

First level of the project is located below ground in reference to the street level. On the sides of the 45m wide platform under the street level are located various spaces providing services for the visitors. The central area of the area is uncovered from the top and features curved paved surfaces with small hills and integrated plant islands. Having the uneven surface, the underground level has the possibility to transform into multiple water pools on the rain season, whilst provided mist sprayer help to mitigate the effect of high temperatures in dry seasons (Crook, 2020; MVRDV, 2020). Underground level is connected to the street surface by several elevators and staircases situated along the pedestrian roads.

The street level of the project provides a pedestrian pathway from Hainan road to the waterside of the Tainan canal guiding a passer-by along the underground spaces. A possibility to maintain constant eye contact with the underground level unifies two levels of the project (MVRDV, 2020).

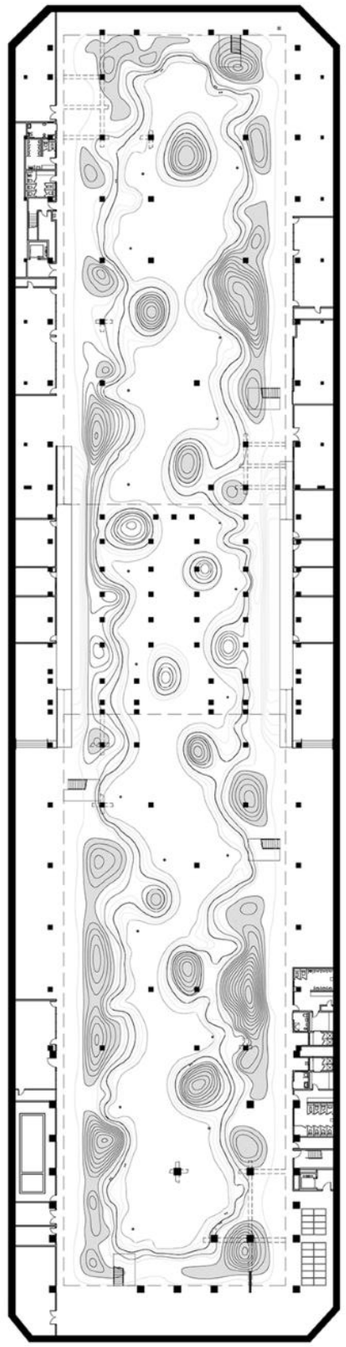

Figure 15. MVRDV's Tainan Spring - Basement floor. (MVRDV, 2020)

Analysis. Tainan spring project features several possibilities for enhancing social sustainability. A 175-meter-long underground level features a variety of spaces diversifying the project for different communities: secluded covert spaces under active road bridge, open spaces in proximity to the water pools and Tainan canal, expressive structural compositions. Underground level with various public services for kids has a good visual connection with surrounding areas enhancing safety, however affecting privacy (Soltani et al., 2022; Stanley et al., 2022). Project enhances local flora using a variety of local plants and grasses (MVRDV, 2020). The implementation of mist sprayers and water pools helps to relief the effects of overheating without the use of air conditioning (MVRDV, 2020). The reusing of existing structures on the existing urban plot and creating usable public spaces within urban areas could be considered as a sustainable apporach to urban densification.

Figure 16. MVRDV's Tainan Spring - South view. (MVRDV, 2020)

2.4.2 New York High Line.

Location: New York City, USA

Authors: James Corner Field Operations (Project Lead), Diller Scofidio + Renfro, and Piet Oudolf

Length: 2.33 km (1.45 mile)

Year: 2014

Description. The New York High Line is located on the island of Manhattan stretching from West Village district to Hudson Yards on the abandoned elevated freight train tracks 9 meters (30 feet) above the street level. The track lane was built in 1933 serving as a supply trail for lower Manhattan (Friends of the High Line, 2023). The train service became obsolete in the 1980s with extensive use of trucks and cars and from 1983 to 2006 the New York High Line remained unused and was not maintained (Friends of the High Line, 2023). The absence of traffic, extensive maintenance and human activity, exposure to sunlight and climate has triggered the growth of plants along the rail tracks. A revision of the freight track to a High Line was inspired by the wild nature located in the city centre, thus a project was repurposed as a public space with a variety of recreational possibilities (Friends of the High Line, 2023).

The project features an elevated pedestrian pathway with 14 access points, 4 of which are equipped with elevators and 2 have ramp access (Friends of the High Line, 2023). Abandoned train track surface with existing vegetation was used as a basis that was enhanced by more than 500 plant species (Friends of the High Line, 2023) distributed along the pedestrian pathways. The High Line is remarkable for featuring dynamic, polychromic, multifunctional spaces along the mostly straightforward and linear axis of existing railroad. Locations of High Line vary in size, placement and permeability creating different experiences for the customers (Soltani et al., 2022; Stanley et al., 2022). Multifunctional aspect of the High Line allows to use it for transportation, recreation, public and business purposes.

Figure 17. New York Highline. (Friends of the High Line, 2023)

Analysis. As one of the main factors that had triggered the initiation of the High Line redevelopment projects was the community initiative, derived from the organization called "Friends of High Line", which attracted interest of the public and policymakers to the plans of preservation and repurposing of the existing rail tracks (Friends of the High Line, 2023; Holmes, 2014). Engaging the public discourse into the planning process was featured during the next stages of the development (Friends of the High Line, 2023). Concerning the community opinion for the design of the project, providing educational activities as well as featuring public programs designed to enhance community collaboration is considered to positively affect the sense of community and the community participation of the area.

The straightforward spatial design of the High Line moderates the permeability of area and provides a comfortable and safe passage for the pedestrian, enhancing the perception of safety in the area (Soltani et al., 2022). Integration of small businesses providing services and recreational possibilities creates multiple attraction points along the neighbourhood, attracting movement flow (Soltani et al., 2022). Several points of access along the High Line enhance the accessibility of the area, however being available only at a cost (Soltani et al., 2022). Listed features are considered to enhance the sense of place of the area, that combined with high community participation and sense of community are the main factors contributing for social sustainability of the area (Soltani et al., 2022; Stanley et al., 2022).

Figure 18. Diverse areas of New York Highline. (Friends of the High Line, 2023)

Featured vegetation program of the High Line could be considered sustainable, as the plants of the area are diverse in species and are regularly maintained by the staff of the High Line (Friends of the High Line, 2023). Community involvement into the gardening is remarkable for using smart technologies for educational and alerting purposes: community receives seasonal upcalls for garden works, planting season, plants of the moment, etc. (Friends of the High Line, 2023). The importance of insects in urban green spaces is translated for the public using activities and public agendas (Friends of the High Line, 2023). The effective coexistence of vegetation along a densely populated city within actively used pedestrian trail is achieved using appropriate design techniques that retain balance between self-sustaining abilities of the plants and animals, adequate maintenance of green spaces, provided services and public acceptance.

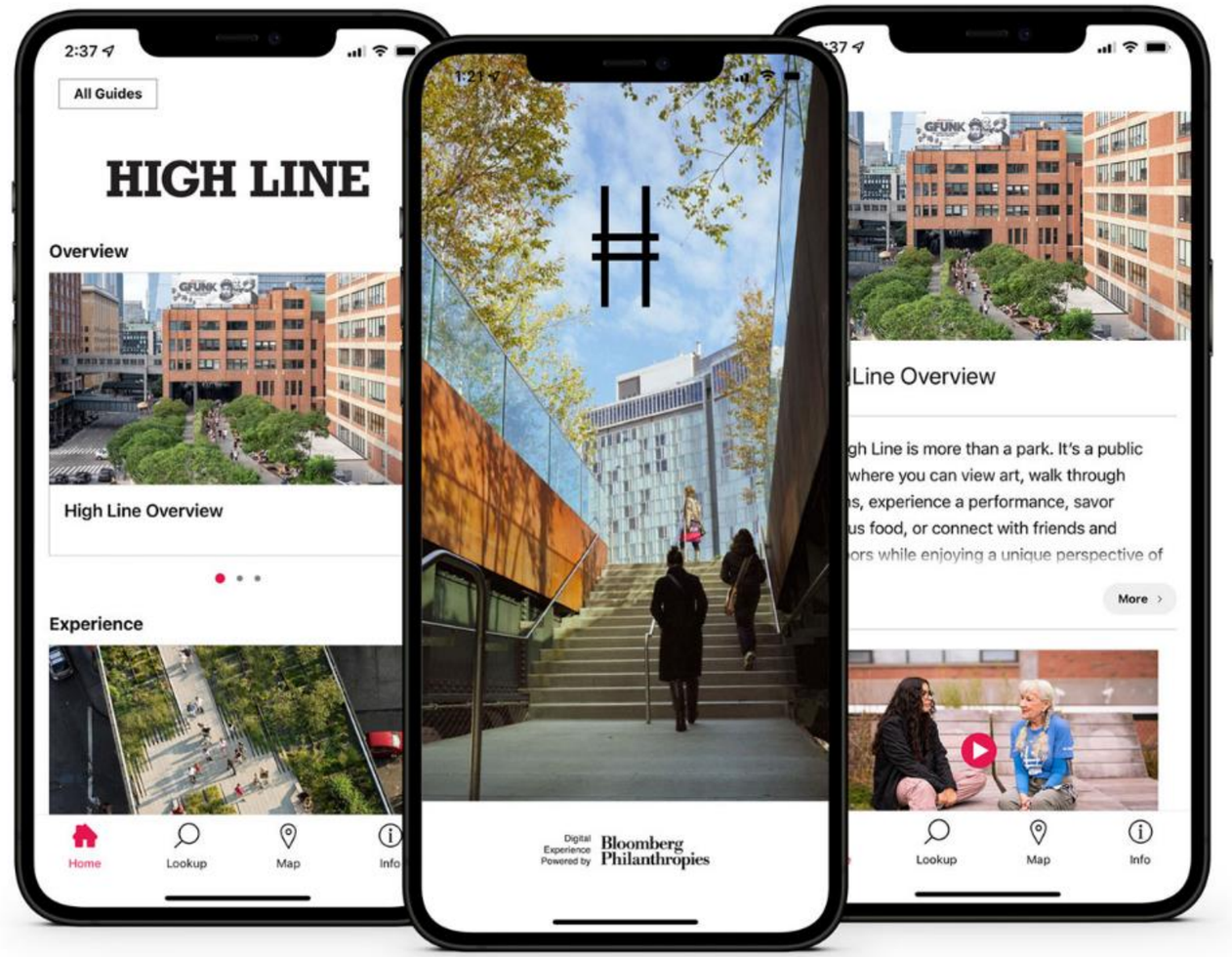

Figure 19. Smart Technologies for public education. (Friends of the High Line, 2023)

2.4.3 Shipyard 1862.

Location: Shanghai, China

Authors: Kengo Kuma and Associates (KKAA): Javier Villar Ruiz, Yutaka Terasaki, Junki Wakuda, Minoru Ko (Shi Hu), Tian Qiu

Building area: 9000 m2

Year: 2017

Description. The Shipyard 1862 project has transformed a ship factory building to a multifunctional theatre and retail complex. Located in Pudong district on the shore of Huangpu River a facility used to perform as a semi-functional industrial complex (Kengo Kuma and Associates, 2017). The rapid transformation of the district from concentrated industrial area to business-oriented district has triggered the plans to reform the existing facility, as the location next to the riverbank and massive construction elements of the factory provided great potential for development of large-scale project (A&C Magazine, 2019). Due to effects of time and previously performed demolitions the structural integrity and the state of materials has varied along the building (A&C Magazine, 2019). Acknowledging the named aspects enabled architects to insight the potential of the location to meticulously define the strongpoints and the design approach.

Figure 20. Shipyard 1862. (Kengo Kuma and Associates, 2017)

The project features 1 underground and 5-story floor plan encompassing restaurants, boutiques, open spaces and a theatre for 800 visitors (Architonic, n.d.; Kengo Kuma and Associates, 2017). A 5-story high atrium situated along the main hallway linking main entrance to the theatre exemplifies the structures of the factory.

Analysis. References to the history of the facility are represented in exposed and untreated structural elements, as well as could be found in practical design solutions, for example navigation signs made of old piping, in interior design as well as in untreated rough surfaces of existing structural elements. Located near the tallest buildings in Shanghai Financial District a 26-meter-high Shipyard 1862 allows the passer-by a relief in terms of scale of the environment. Located in a dead-end of a Jimo road, a promenade located along the Huangpu River enhances the recreational possibilities of the complex, making the complex more accessible from the Financial District with alternative transport modalities (Jaczewska et al., 2022; Soltani et al., 2022). Multifunctionality of the project providing variety of services ensures positive perception of the complex for local people as well as occasional visitors (Westerholt et al., 2022).

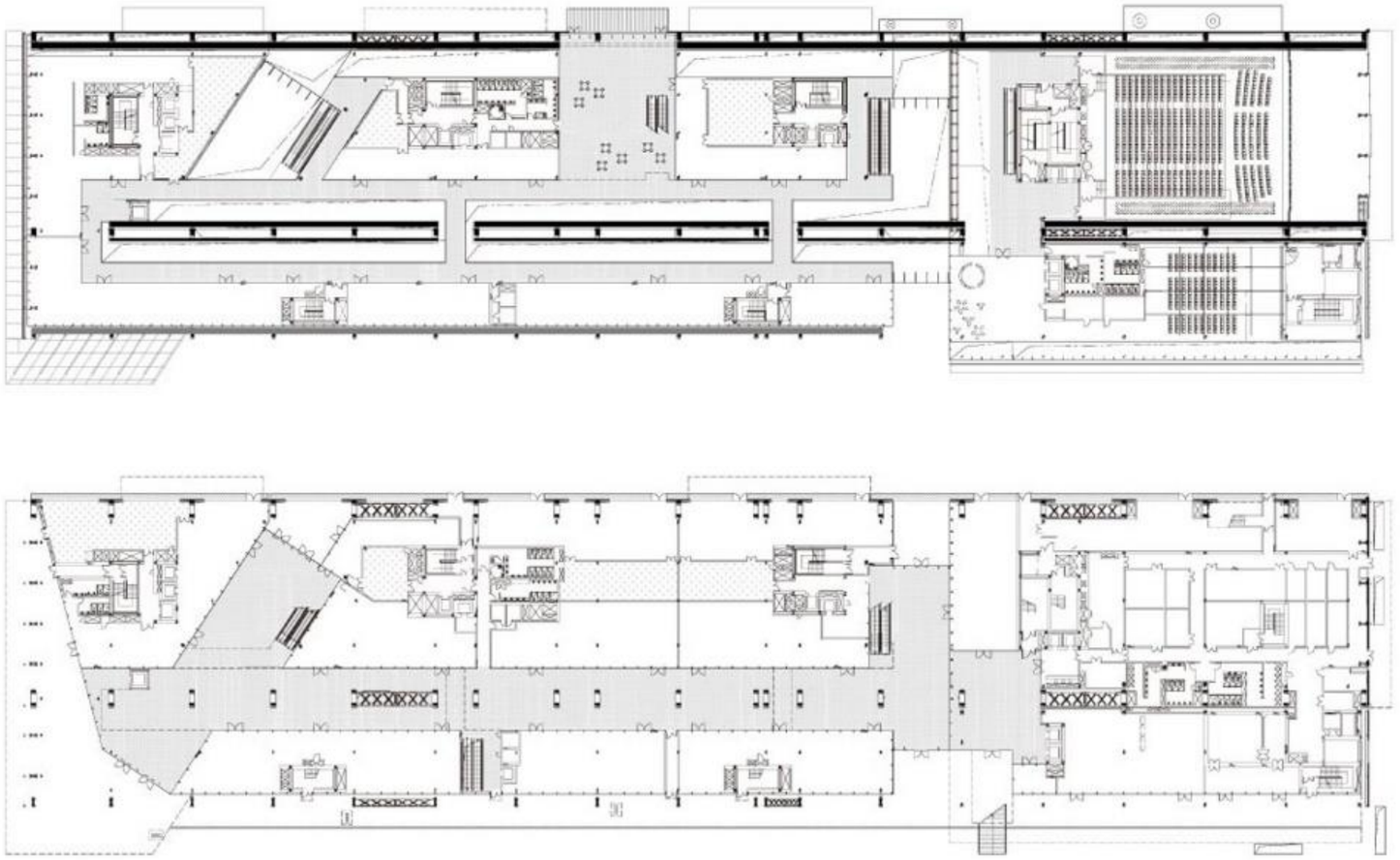

Figure 21. Shipyard 1862 1. and 3. floor plan. (Kengo Kuma and Associates, 2017)

2.4.4 Luther Machinery Hall.

Location: Tallinn, Estonia

Authors: HGA (Hayashi – Grossschmidt Arhitektuur): Hanno Grosschmidt, Tomomi Hayashi, Liis Voksepp, Marianna Zvereva, Anna Endrikson, Jüri Nigulas, Andres Ristov, Sander Treijar

Building area: 6520 m2

Year: 2017

Description. On the rise of the era of reinforced concrete in the architecture timed the innovation of plywood in the furniture design (Andrejeva, 2018). On the crossing of the two design disciplines stands the Luther Machinery factory, that became the major plywood furniture manufacturer in pre-war Estonia (Andrejeva, 2018). A modern building with wide spans was an innovative in approach for the year 1912 (Andrejeva, 2018). Building featured wide central nave with roof windows allowing light to enter the manufacturing spaces and leaving air for the headspace (HGA, 2021). The factory was operating up unitl year 2004, when the manufacturing was relocated, and the building was abandoned (HGA, 2021). By the time of renovation project, the building was degraded, and architects faced certain problems, like corrosion and leakages, regarding preservation of the complex (HGA, 2021).

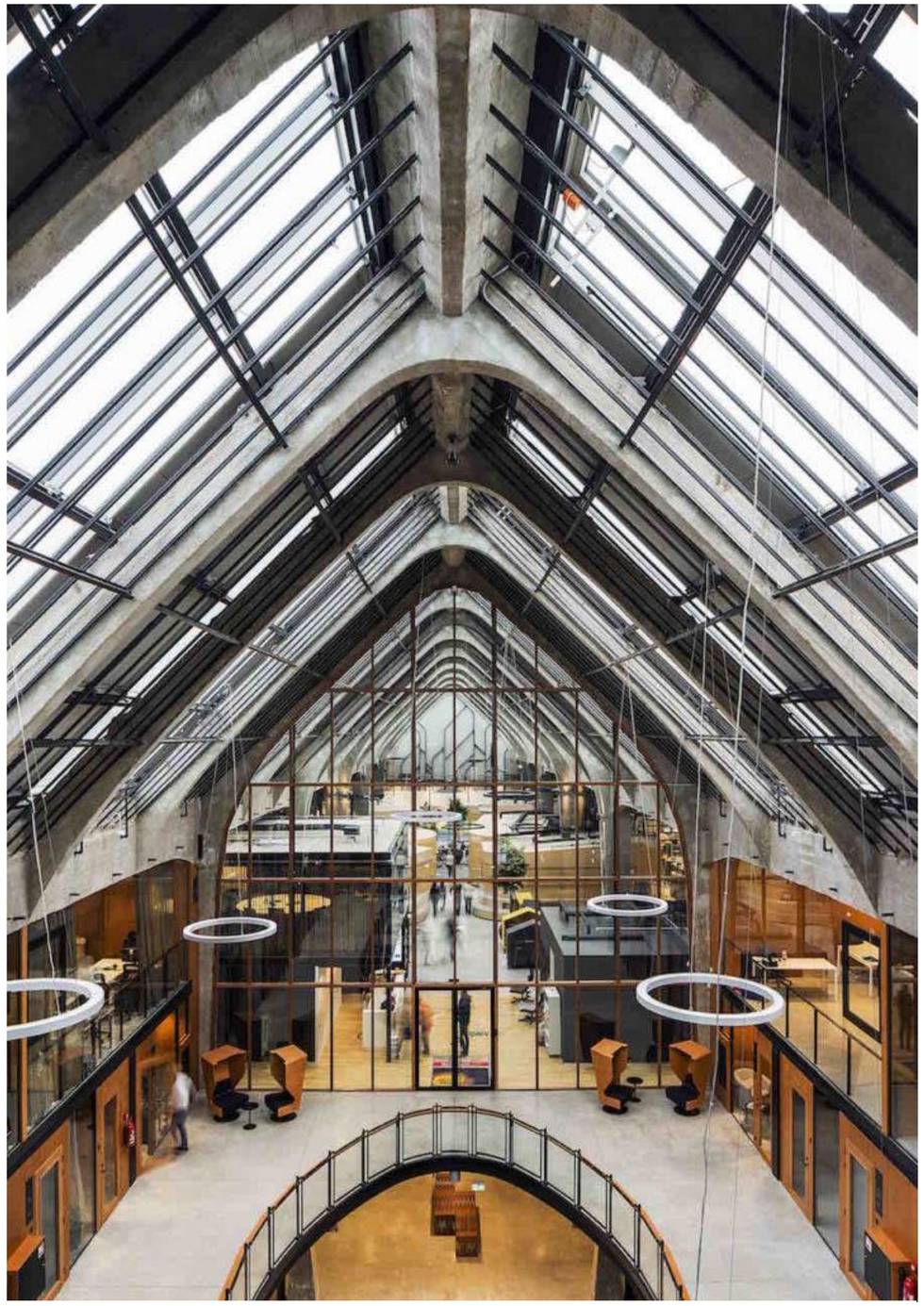

Figure 22. Luther Machinery Hall. (HGA, 2021)

Being the building under the protection of National Heritage Board of Estonia the architects were required to represent the existing structural elements while reorganizing the existing plan from industrial to business purposes (Andrejeva, 2018; HGA, 2021). The project consists of 3 stories of business areas placed along the central axis of the building with an atrium and a glass roof. The plan of the bulding is divided in two by a glass wall and features two variations of working spaces. First floor of the building features office spaces and a central stage area that ends with a central stair leading to the second floor. Second and third floors feature multi-plane work environments and are located in a separated block of the building. Exposed structural elements of the building form a certain rhythm and are incorporated into the interior design solutions. The distinction between old and new elements is enhanced both visually and tangibly using metal and plywood in the interior (Andrejeva, 2018; HGA, 2021).

Analysis. The project of Luther Machinery Hall is remarkable for implementation of a variety of working spaces with distinguishable perception in a symmetrical and homogeneous space. The flexibility of a complex enhances the potential for incorporating diverse working communities. The project is located in the city centre being well reinforced in terms of available services to support a healthy work environment.

The downside of the location is the distant availability of public transport relatively to office buildings located in the centre of the town as well as a good availability of car parking solutions in the neighbourhood. This leads to the conclusion that for the time being the complex has an obvious shift for using personal transport modalities comparing to alternatives (Jaczewska et al., 2022). However, the surrounding areas of Luther Quarter and Veerenni Quarter are undeveloped central areas of the city, leaving the potential for positive changes in integration and intelligibility of the area (Soltani et al., 2022).

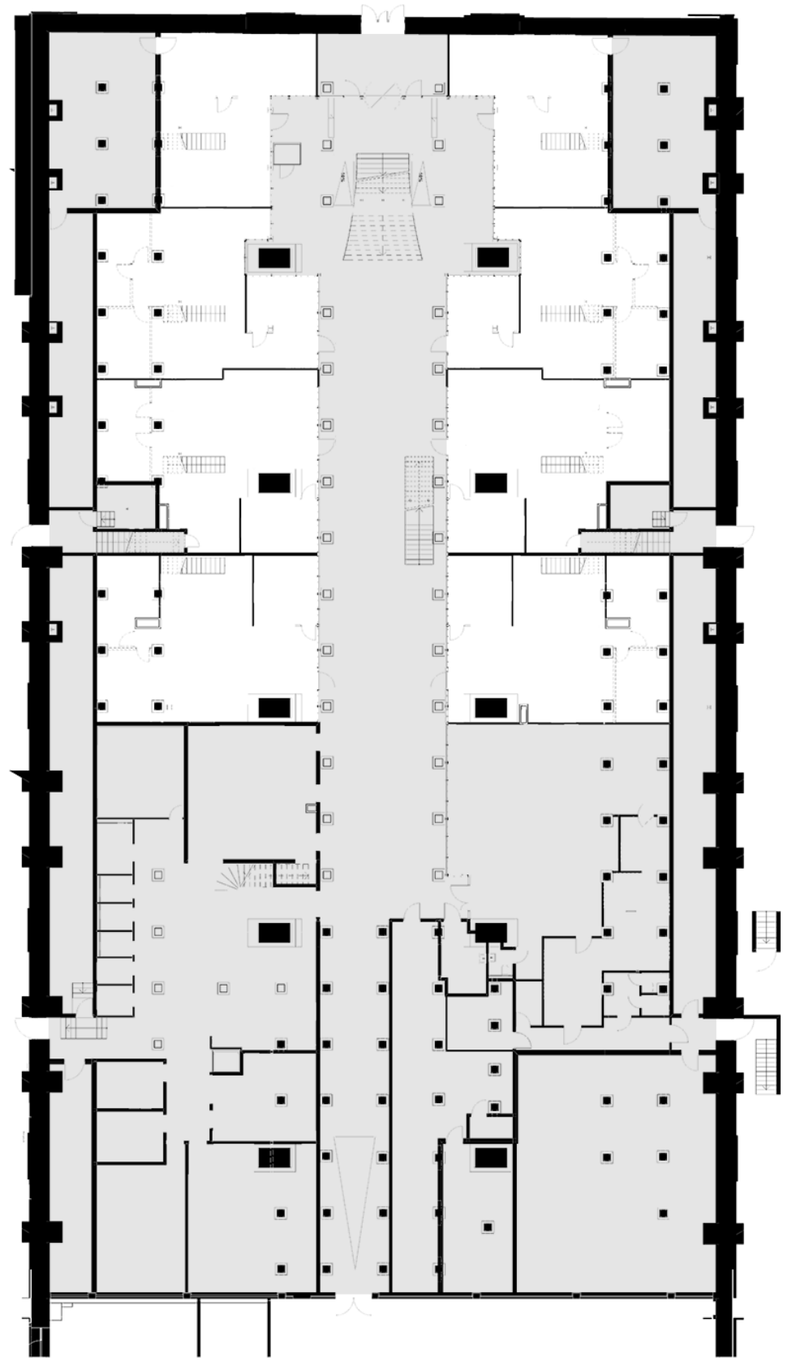

Figure 23. Luther Machinery Hall 1. floor. (HGA, 2021)

2.4.5 Under the Bridge.

Location: Stockholm, Sweden

Authors: Visiondivision: Anders Berensson and Ulf Mejergren

Year: 2014

Description. A visionary project by Swedish architects Anders Berensson and Ulf Mejergren proposed a strategy to enhance pedestrian movement between the district of Kungsholmen and neighbouring western parts of the city. The existing Traneberg bridge built in 1934 spans over the 200-meter wide Tranebergssund strait (Berensson, 2014). After an expansion in 2005 a bridge started performing as a 4-lane transport bridge that created additional noise pollution for the pedestrians (Berensson, 2014). Granted for the bridge construction methods, surface elevation of the transport lanes begins prior to the crossing of the obstacle, meaning that a pedestrian movement on the bridge becomes more complicated (Berensson, 2014).

The proposal of the architects was to support the attractiveness of pedestrian movement between two sides of the strait by adding a pedestrian lane on the support arches of the bridge. As for the time being, both sides of the supporting structures are open to movement and have pedestrian walkways following the waterline. Using the support arches of the strait to construct a pedestrian crossing of the waterpassage is claimed to reduce the travelling time from 15 minutes to 3 minutes (Berensson, 2014). It is possible to implement various attraction points along the unused space under the bridge, like art exhibitions or movie screenings (Berensson, 2014).

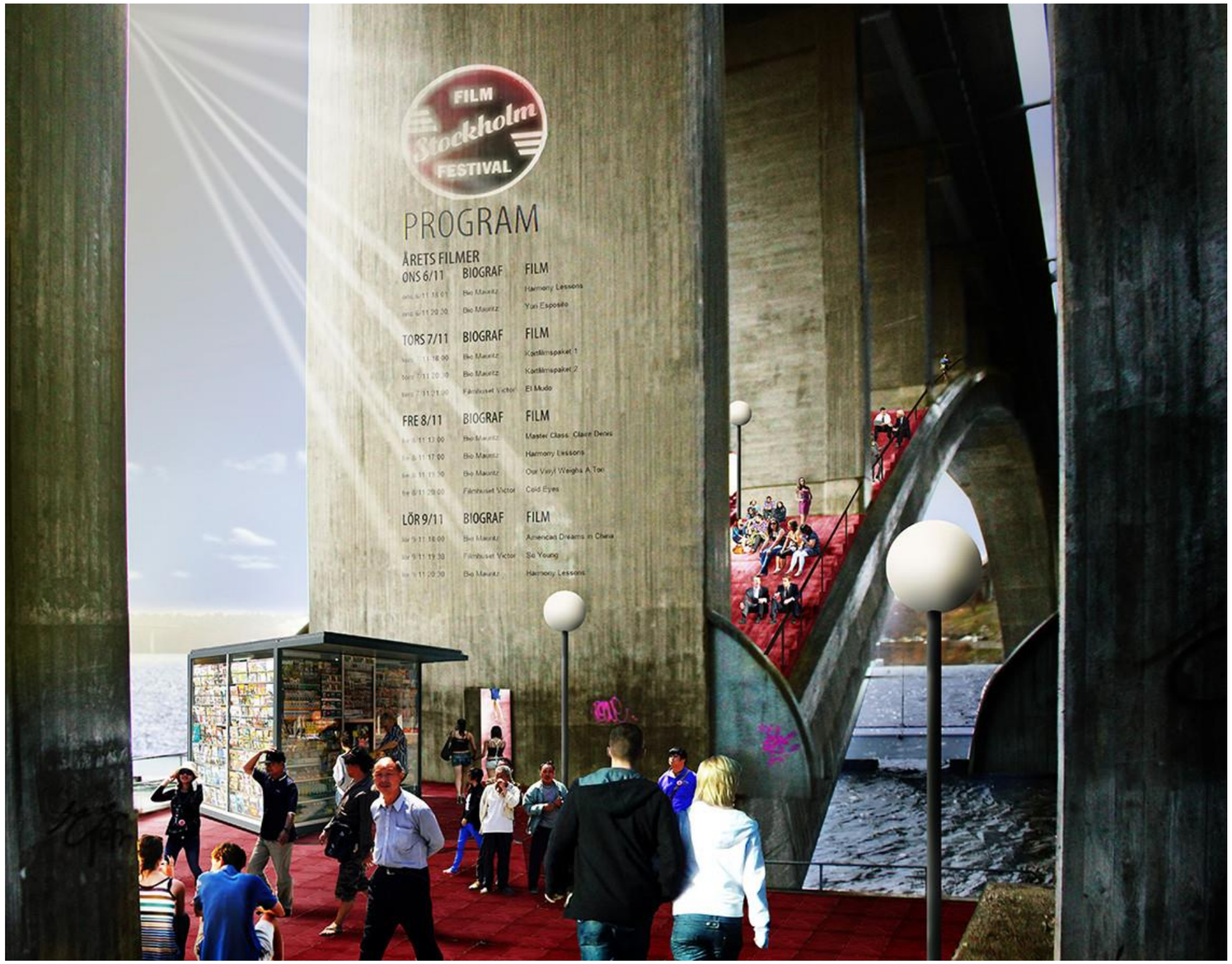

Figure 24. Under the Bridge. (Berensson, 2014)

Analysis. The connected areas of Kungsholmen and Bromma are areas undergoing active urban development, meaning that densification of those areas requires additional inceptions enhancing social sustainability (Frearson, 2014; Jaczewska et al., 2022; Soltani et al., 2022). Enhancing alternative transport modalities would provide health benefits for the customers of pedestrian bridge in a noise- and air-pollution free environment (Jaczewska et al., 2022; Soltani et al., 2022). Improved connection between two neighbourhoods separated by the strait would positively affect the layout accessibility and intelligibility of the neighbourhood (Soltani et al., 2022). As the main constructive element of the project is an existing bridge support, the construction of a new pedestrian crossing would be more profitable than building a new pedestrian bridge (Berensson, 2014).

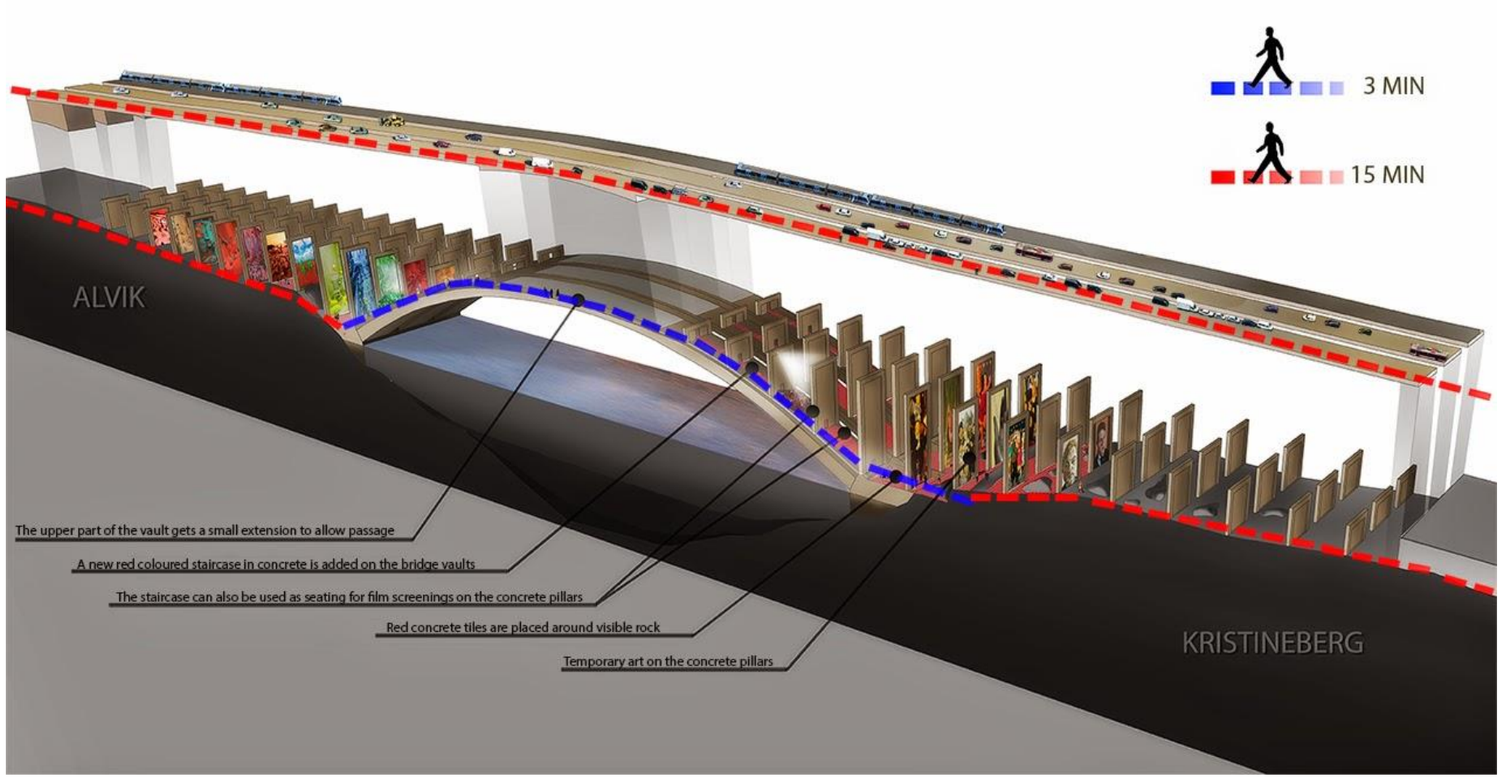

Figure 25. Improved pedestrian passage. Under the Bridge. (Berensson, 2014)

2.4.6 Kogukond katuste all (Community under the roof).

Location: Raadi borough, Tartu County, Estonia

Authors: Arhitekt 11 (Estonia) and Lundén Architecture (Finland): Rubén Tomas Verde, Carmen Lee, Eero Lundén, Sander Aas and Nitika Srivatava

Site Area: 144725m^2

Building Area: 21024 m^2

Year: 2014

Description. The project of educational and community centre located in Raadi, Tartu County is an upcoming development project, that was announced within an open architectural competition held from July 2022 until October 2022. Raadi borough being one of the actively ongoing development areas has been enriched with various projects in recent years, supplying the growing housing demand from the neighbouring city of Tartu. It should be noted, that ongoing urban expansion of Tartu has been accompanied by reusing of existing landmarks, such as the Raadi airstrip that was redeveloped with a project of Estonian National Museum by HGA in 2016 (HGA, 2016).

Figure 26. Community under the roof. (Arhitekt11 & Lundén Architecture, 2022)

Project site is surrounded by existing and planned residential areas. Southern part of the competition site faces 1- and 2 story private houses, while northern part is limited with limited speed road that separates planned northern residential areas from the projects school and community centre (Riigihangete Register, 2022). The competition encouraged contestants to envision the possibilities of integrating a multipurpose educational and communal centre into the dynamically changing landscape (Riigihangete Register, 2022). The specifics of the contemporary education policies required the facility to promote self-edaucation and provide the appropriate services and environmental conditions (Riigihangete Register, 2022).

The competition program specified, that the complex is supposed to be unified with external spaces both visually and functionally, integrating educational and recreational spaces within the masterplan (Riigihangete Register, 2022). The program encouraged the usage of alternative transport modalities, focusing on inclusion of bicycle parking for 450 users (Riigihangete Register, 2022).

Analysis. Competition proposal managed landscape planning and the design of community and educational facilities. Landscape of the site was divided into stripes referring to traditional cropland North-South field separations (Arhitekt11 & Lundén Architecture, 2022). Each stripe of landscape was uniquely designed enhancing the variability of usage, the separations were performed with shallow trenches that following the existing elevation differences providing passive soil drainage (Arhitekt11 & Lundén Architecture, 2022). The variety of landscape design features enabled authors to diversify outdoor activities for children education, encourages local people to engage in communal activities, like public events and gardening, and creates buffer zones for gradual downscaling from relatively high apartment buildings to private housing areas (Arhitekt11 & Lundén Architecture, 2022). Architectural proposal allocates communal functions to the northern part of the complex and educational areas to the southern part, opening them to the vegetation areas (Arhitekt11 & Lundén Architecture, 2022).

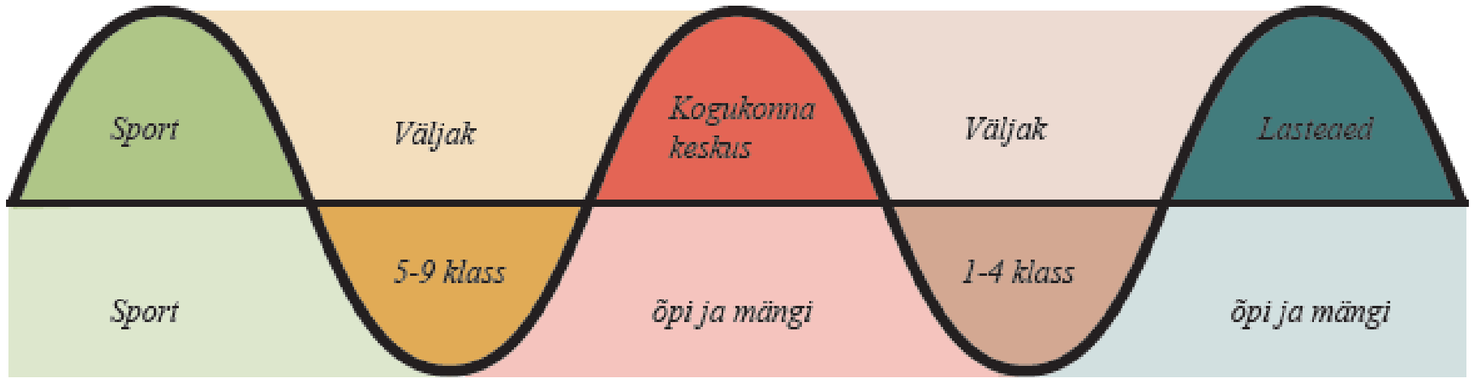

Figure 27. Room program. Community under the roof. (Arhitekt11 & Lundén Architecture, 2022)

Complex features multiple winter gardens located within hallways allowing additional sunlight to enter the recreational areas. Multiple open spaces and absence of dead-ends in planning program enhances safety and creates observable and illuminated spaces. Various vegetation typologies located within passages enhances accessibility, biodiversity and provides recreational and educational opportunities (Haaland & van den Bosch, 2015; Soltani et al., 2022). Providing communal activities for areas located within ongoing development projects provide bonding opportunities for newly developing communities, countering segregation and enchansing sense of place and sense of community (Soltani et al., 2022; Westerholt et al., 2022). Project is versitile in terms of development staging allowing possible expansion of educational facilities to match the demand of developing local communities (Arhitekt11 & Lundén Architecture, 2022).

2.5 Plot study

2.5.1 History of Lasnamäe district development.

With massive developments triggered by industrial revolution at the end of XIX century the city of Tallinn faced unprecedented population growth (Bruns, 1993; Liivik, 2019). Triggered mainly by immigration of local peasants attracted to work availability in newly formed manufacturing enterprises, Tallinn population gained from 29 162 people in year 1871 to 58 820 people in year 1897 (Bruns, 1993). Growing maritime industry, developing railroad network, new industrial factories: AS Franz Krull (1875), Mayer Chemical plant (1887), Volta Manufacturing (1899), Dvigatel Metal Factory (1899), Luther Machinery Hall (1912), Noblessner Shipyard (1912) - resulted in active housing development, that lacked provisioned planning strategies (Bruns, 1993). Until 1914 city of Tallinn was mainly envisioned in district planning projects, that did not comprehensively establish directions or strategies for urban development (Bruns, 1993). Foreign manufacturing companies that established the main part of Tallinn's production facilities were not interested in holistic development of the city (Bruns, 1993). This resulted in uncontrolled spread of wooden private house neighbourhoods, outside of railroad circle, mainly in areas of Northern-Tallinn, Sikupilli district, Pärnu highway and Lasnamäe (Bruns, 1993). The need for city master plan was expressed on the brink of XX century and after a decade of preparation works in year 1912 an international urban planning competition was announced (Bruns, 1993). The competition was won in 1913 by Finnish architect Eilel Saarinen, that proposed a staged city development strategy that was composed considering existing urban volumes and potential urban expansion (Bruns, 1993).

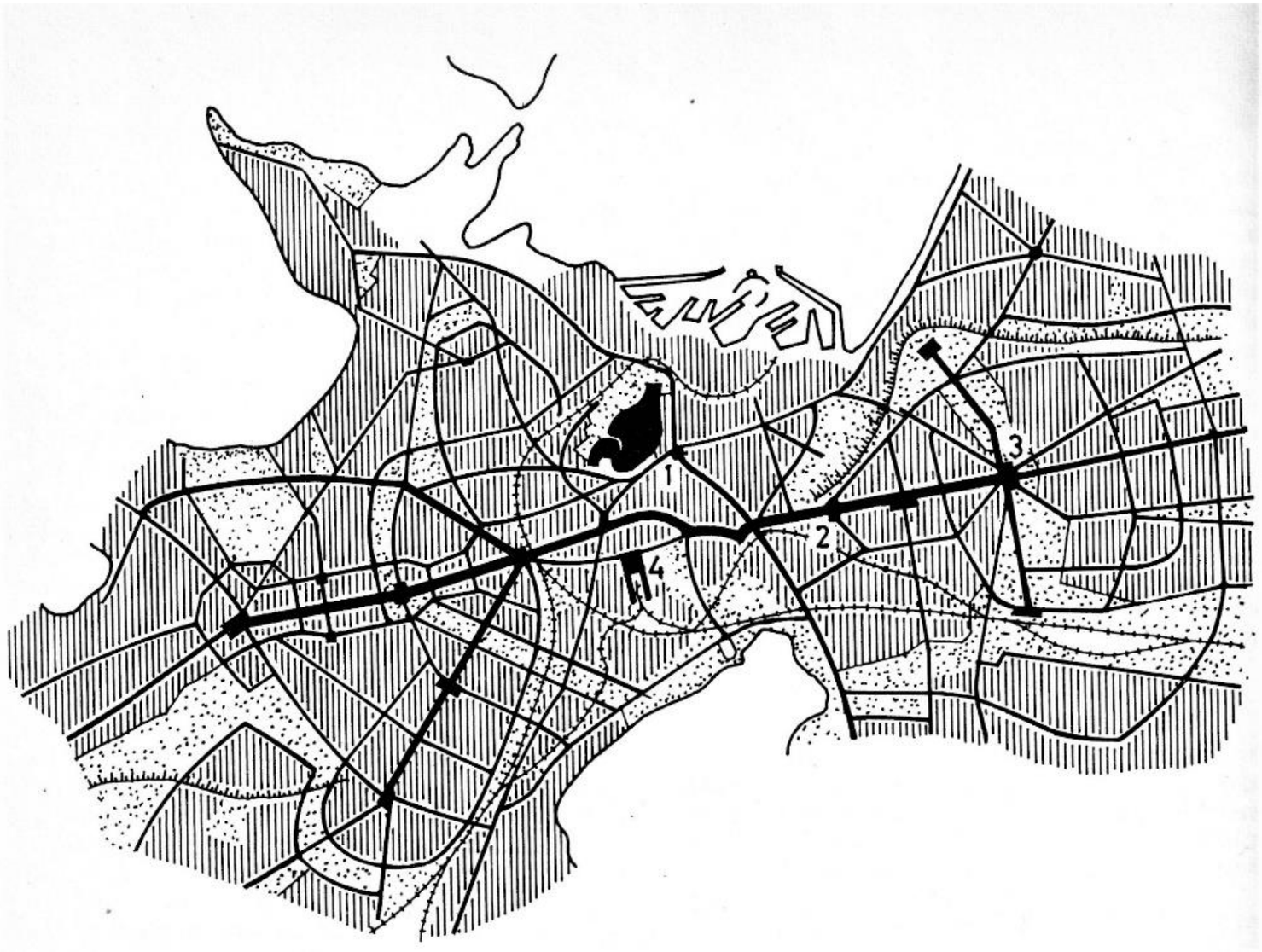

Figure 28. Tallinn city master plan by Eilel Saarinen (1913). (Bruns, 1993)

2.5.2 Preconditions of Tallinn first master plan.

First conceptual master plan of Tallinn proposed a linear city concept, where main city districts were united by main transportation highway orienting from East to West (Bruns, 1993). Main urban districts were planned along transportation network from Lasnamäe plato to the intersection with railroad where highway should have split in the directions of Mustamäe forest and Lilleküla (Bruns, 1993). The direction of Lasnamäe was supposed to be marked with 2 public squares that were enriched with valuable architectural compositions (Bruns, 1993). The project of E. Saarinen was not supposed to be realised, as with the breakout of World War I and, later, War of Liberation changed the economic situation in the country and Tallinn development strategies were postponed. Project featured solid greenbelts surrounding central city areas and outskirts, new location of main train station, but most notably, the concept set the direction for potential city expansion and proposed innovative solutions for public transport on rails (Bruns, 1993).

2.5.3 Post-War period.

During the post-war period urban planning in Tallinn was concerned about rebuilding and restructuring city infrastructure, focusing mainly on restoring manufacturing capacities and providing residential opportunities (Bruns, 1993). By the end of 1950-s the majority of war time destructions were restored, and the city began its expansion towards Mustamäe (1958), Õismäe (1968) (Bruns, 1993; Liivik, 2019). The first master plan of Tallinn (1953) expected the population of city to reach 300 000 people by the end of year 1970 defining the main development areas: restoring Central City areas, North-West towards Pelgulinna district and North-East towards Lasnamäe. By the end of 1950-s Lasnamäe was developing mainly as a manufacturing area along the Narva highway.

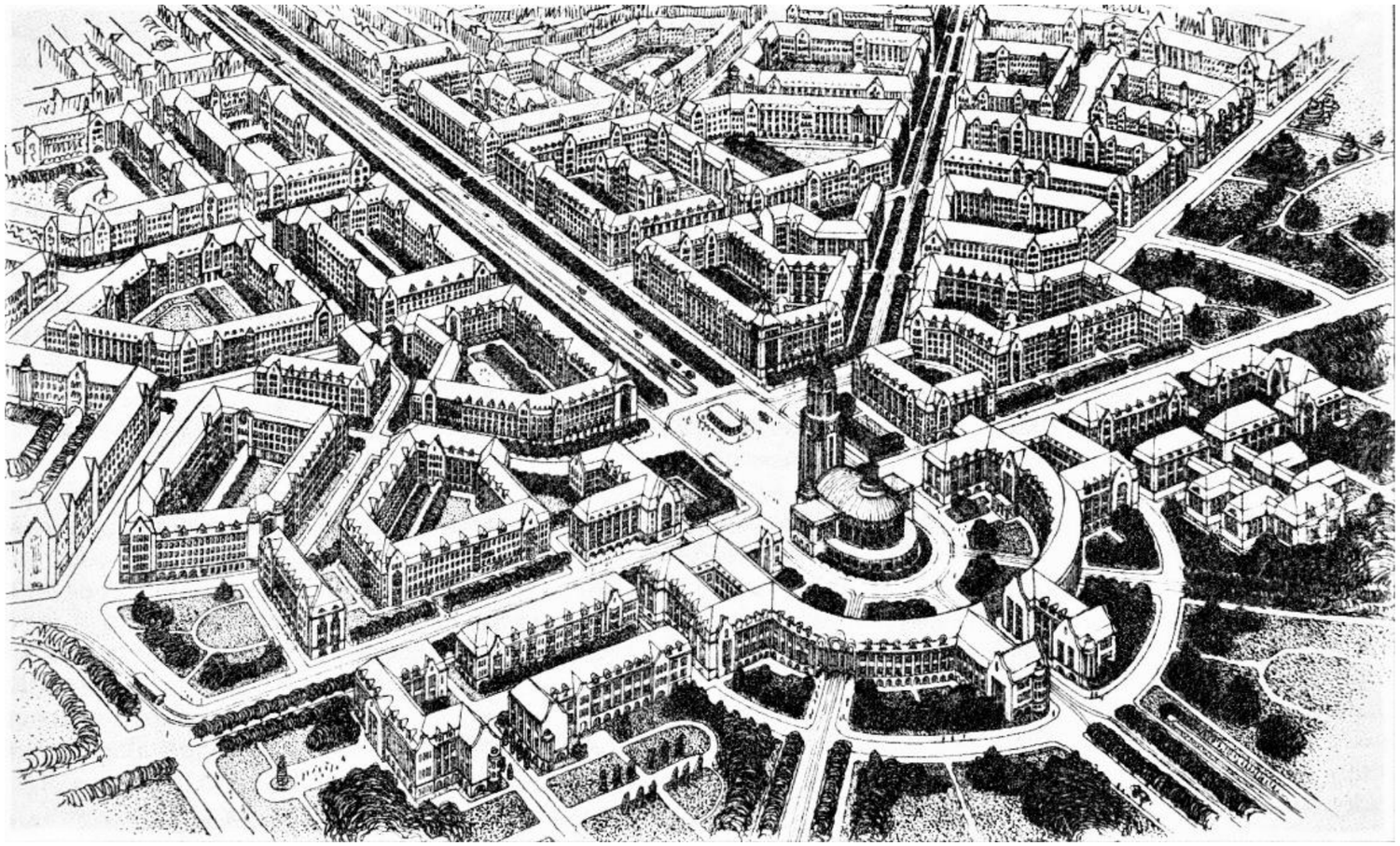

Figure 29. Lasnamäe square by Eilel Saarinen (1913). (Bruns, 1993)

According to Bruns, (1993) first master plan of Tallinn was developed in scope of post-war restauration of damaged social- and manufacturing infrastructure. However, lacking in envisioning strategies, master plan did not evaluate the limitations of city expansion (Bruns, 1993). Appearance of new modernist zoning and transportational strategies in late 1950-s led to introduction of a second master plan of Tallinn in year 1961 (Bruns, 1993).

2.5.4 Lasnamäe district planning.

The paradigm changed after the introduction of second Tallinn master plan, that envisioned city final expansion to 490 000 citizens by the end of year 1995 (Bruns, 1993). In reminiscence of master plan competition held in 1913, a transportation axis unifying East and West parts of the city was supposed to lift the networking pressure of central city areas and provide fast electric tram transportation (Bruns, 1993; Liivik, 2019). The area of Lasnamäe was supposed to turn into apartment block district consisting of 13 neighbourhoods for 12 000-18 000 people (Liivik, 2019). Neighbourhoods were planned along 2 indented highways – Laagna Road and Rahu Road, that were planned to serve as main transportation highways with tramline in the centre (Bruns, 1993; Liivik, 2019). Neighbourhoods were supposed to consist of main apartment block of 5- and 9 stories and accentuated 14- and 16 storey tower blocks, schools and kindergartens located between neighbourhoods and shopping/service facilities located on the edge of 50m-wide highway canal (Bruns, 1993; Liivik, 2019). Pedestrian bridges uniting neighbourhoods over Laagna and Rahu Roads were supposed to unite local service areas and underground parking garages serving as points of attraction and freeing the top levels of the neighbourhood from traffic (Bruns, 1993). Bus- and tram stops were allocated to the bottom of 6.5 m deep highway next to each pedestrian bridge that was accessible by wide external stairway (Bruns, 1993). Lasnamäe district communal centre was planned in central area of the green belt in Tondiraba (Bruns, 1993).

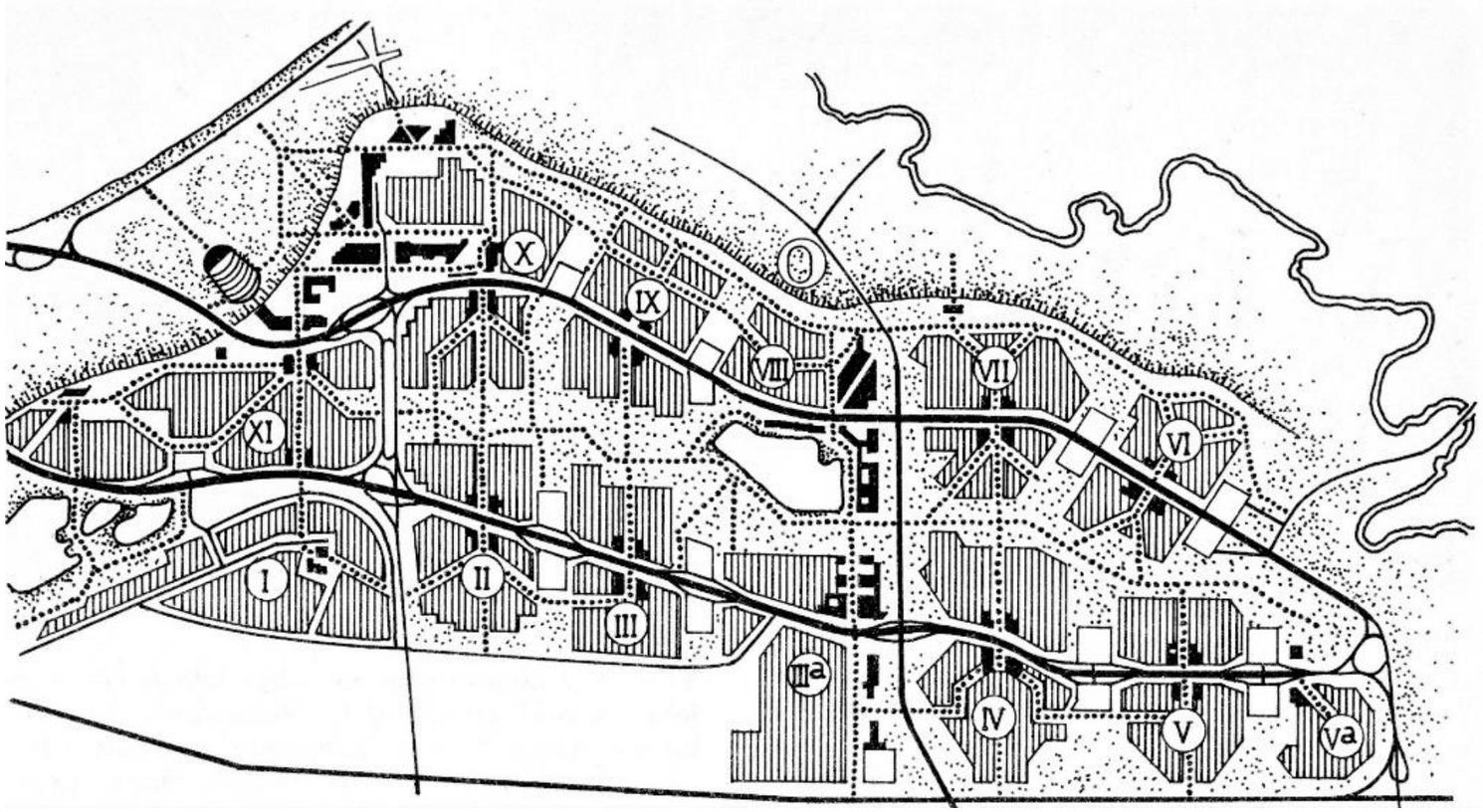

Figure 30. Lasnamäe district masterplan by Mart Port, Malle Meelak, Hugo Sepp, Irina Raud and Oleg Žemtšugov (1973). (Bruns, 1993)

2.5.5 Construction of Lasnamäe.

Construction of a new district begun along the Laagna Road, notable cavities that could be seen along the walls of the cut have been formed from drilling works and create an essential rhythm for passing transports. During construction process in 1981 a revised project of a master plan abandoned ideas of deepening the Laagna and Rahu Road levels beneath the surface of a ground (Bruns, 1993). The cut of Laagna was completed from the beginning of I neighbourhood to Varraku bridge and has deepening under Mustakivi and Raadiku bridges. With the fall on Soviet Union in 1991 active development of Lasnamäe district was ceased and a portion of planned neighbourhoods were not finished. Main construction force during the Soviet period focused on finishing residential volumes of the neighbourhoods, resulting in lack of service facilities (Bruns, 1993). The Rahu Road was completed as a 1-lane detour around VIII neighbourhood with Narva Highway serving as a main transportation opportunity for northern part of the district. Large areas within IX, X and XI neighbourhoods were not completed, as main socially valuable facilities on the extending plato with valuable sea-views and green belts.

2.5.6 Urban concept of Lasnamäe.

The district of Lasnamäe is located on a Lasnamäe plateu within a roughly 7.5 km long axis starting from Sikupilli neighbourhood to Väo roundabout. Divided into 16 neighbourhoods, Lasnamäe is zoned for industrial (Sõjamäe, Väo) and business (Ülemiste) areas to the South and residential neighbourhoods to the North (Tallinna Linnavalitsus, 2023). The separation between residential and business areas is defined by Peterburi Road with exclusion of Sõjamäe industrial zone between Peterburi Road and Punane Street. The residential area of Lasnamäe might be described as 3 volumetric areas split by a canal of Laagna Street and large undeveloped green belt in Tondi area. Whilst development in the area of the green belt has begun with projects like Tondiraba Ice Arena (KTA Architects, 2014) and Tondiraba park (Roadplan OÜ, 2021), large undeveloped areas within North-Western part of the district are responsible for inconsistent perception of the urban area. Neighbourhoods of Lasnamägi consist of groups of 5-9 storey apartment blocks surrounded by 2-lane car roads. The vision of car-free neighbourhoods with pedestrian passages between communal areas was abolished in 1990-s: extreme raise in personal transport availability on Estonian market was not assessed by Lasnamäe planning in terms of standards for parking spaces. Unfavourable presence of large unmanaged parking spaces and lack of service providers (Andres Alver et al., 2021) does not support the attractiveness of alternative transport modalities (Jaczewska et al., 2022; Soltani et al., 2022).

Comparing Lasnamäe to other districts of Tallinn, it is notable, that spatial and social parameters of the area are prone to be oversized. The population of the district constitutes ¼ of the population of Tallinn (Tallinna Linnavalitsus, 2023). The modernist approach towards city planning of Lasnamäe defined areas of the district as zones that should serve for certain purpose as the part of the mechanism. Monofunctional residential areas of Lasnamäe being less flexible in terms of required transformations have failed in terms of providing quality pedestrian passages. Thus, large green areas in Pae and Tondiraba provided for recreation and social activity are located on opposite sides of Laagna street lacking in pedestrian accessibility and integrity (Andres Alver et al., 2021).

Bridges over Laagna street that were intended to serve as points of attraction with local services and community centres are unable to provide the intended purpose. The absense or degraded state of facilities and environmental conditions in the areas of bridge crossings lead to further separation of 2 sides of Lasnamäe. Bus stops located on the bottom of the Laagna canal force their customers to travel the externally located stair and wait for the transport within a noisy and polluted environment.

Figure 31. Unmanaged parking in Laagna area. Author's illustration.

Figure 32. Lindakivi Bridge. Author's illustration.

2.5.7 Urban potential of Lasnamäe.

However, Lasnamäe district has a unique potential comparing to other city districts – the availability of free space within existing infrastructure. The development potential of the district was revised in many conceptual planning projects that were aiming for redeveloping residential areas of the district, enhancing service availability, developing functional and sustainable green spaces, enhancing transportation network within the district and the city centre (Andres Alver et al., 2021). Discussions over various problematics regarding Lasnamäe aesthetics, monotony and unavailability of services often disregard the market potential of the district defined by existing and potential residential capacity. Lasnamäe is the second dense district of Tallinn with the number of 4187.7 residents per sq.km (Statistikaamet, 2022). Being one of the most available urban areas in terms of housing prices Lasnamäe efficiently attracts new residents to the area (Andres Alver et al., 2021). So far, whilst the unrealised potential for urban densification of Tallinn remains in the loop of cost-efficiency assessment, urban planners propose strategies that should potentially increase housing prices of the district triggering the economic revitalisation of the area (Andres Alver et al., 2021).

Located on a plato above the Tallinn, geographically, Lasnamäe resembles of a contemporary version of medieval Tallinn's Toompea – an elevated city in the city. Conceptualizing the development of Lasnamäe inseparably from the main city categorizes the district as a residential container that should be inevitably linked to central business areas. Treating Lasnamäe as a new independent part of the city might change the paradigm, promoting development of vital services and business areas withing the district. Focusing on unused industrial areas within Punane Street and Peterburi Road could change the transportation axis relieving pressure of Laagna Road and promoting passages over Laagna Road (Andres Alver et al., 2021).

The Laagna Road could become a tunnel. Unused spaces over the canal reveal possibilities for linking two separated parts of the district and relieving pedestrians and local dwellers of noise- and air pollution caused by high-speed high-volume Laagna Road.

2.5.8 Local communities.

Lasnamäe resides various ethnical, cultural and religious groups that notably differ from average composition of other districts of Tallinn. For example, Lasnamäe has more ethnically Russian people than Estonians and more Orthodox people than people feeling unaffiliated by any religion (Statistikaamet, 2022). This socio-cultural aspect defines the amount of available double-speaking service providers residing in the area of Lasnamäe district. Cultural diversity of Lasnamäe capacitates the potential for bonding and integration of two main ethnical groups of Estonia. Spontaneous acts of cultural exchange are inevitable in culturally diverse dense urban areas, examples of that nature are often reflected in popular culture, especially in music (Jazepov, 2021; Mõttus, 2014). Suggesting that social inclusion should be housed and provided with activities, Lasnamäe requires spatial inceptions aimed for enhancing social interaction and connectivity of the area (Soltani et al., 2022).

The study by Cerrone & SPIN Unit, (2016) and repeated in Andres Alver et al., (2021) suggests, that local points of attraction in Lasnamäe are relatively equally spread across the district. The area with greater spread of points of attraction has a bigger potential for achieving social sustainability (Soltani et al., 2022), however the amount of service providers and local activities in Lasnamäe does not meet the required demands (Andres Alver et al., 2021). Defined by activity in social media, most notable social activity appears in next locations (Andres Alver et al., 2021; Cerrone & SPIN Unit, 2016):

- Pae and Punane street roundabout – Drifting Centre, Lasnamäe, Community Garden of Pae park
- Pae - Lasnamäe Market
- Laagna Centre area - Lindakivi Culture Centre, Tallinn Art Hall, Laagna Community Garden, Laagna Library, Russian Youth Theatre
- Tondiraba and Virbi area – Tondiraba Ice Hall, AK Gym, Palõch's Bar, Tondiraba park
- Mustakivi – McDonalds restaurant, Circle K gas station
- Tondiloo – Tondiloo Park, HC Gym

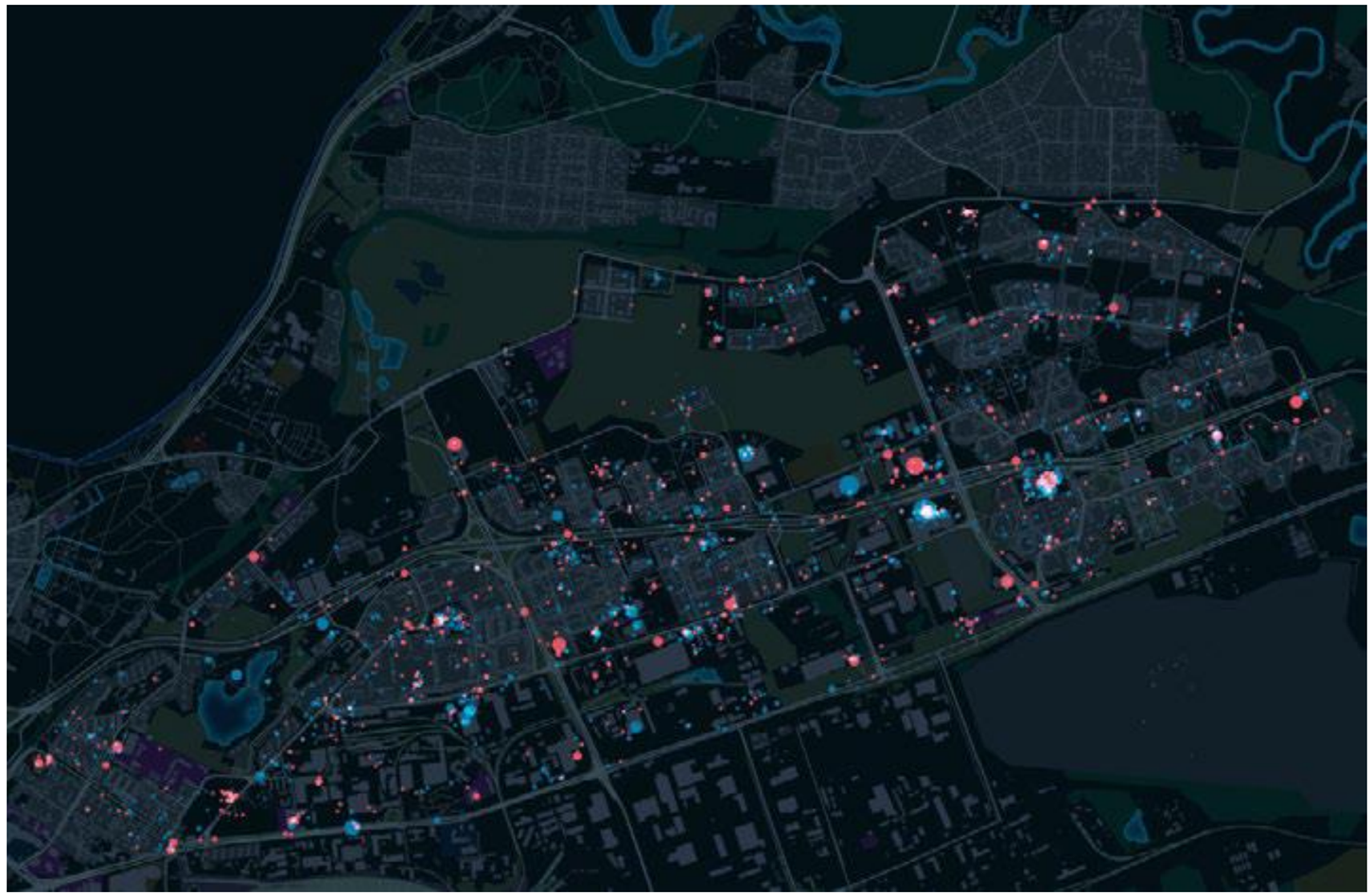

Figure 33. Social activity in Lasnamäe district. (Andres Alver et al., 2021; Cerrone & SPIN Unit, 2016):

However, outreaching the Instagram community of Lasnamäe stands the elderly population of the district. People with smaller movement capacity are prone to search for close by activities, that in Lasnamäe are often housed by cellar shops, markets, local gardens and lawn yards. A photo project by Vladimir Ljadov presents a variety of services located on a basement floor of local apartment buildings (Ljadov, 2014).

Social initiatives of Lasnamägi are represented by Lasnamäe District Government, Lasnamäe Youth Center and NPO Lasnaidee. Lasnamäe District Government hosts educational and communal events for all age groups and publishes local newspaper (Tallinna Linnavalitsus, 2023). Lasnamäe Youth Centre provides event spaces, games, councelling services, educational and leisure activities for young people from 7-26 years (Lasnamäe Youth Center, 2023). Located in 2 areas at Tondiraba and Raadiku neighbourhoods Youth Centre provides variability in activities and unites young residents of Lasnamäe (Lasnamäe Youth Center, 2023).

Figure 34. Commercial Lasnamäe. (Ljadov, 2014)

Figure 35. Thematic evening at Lasnamäe Youth Center (Lasnamäe Youth Center, 2022)

A rather unique organization practising social inclusion and communal activity in terms of restoring and enhancing local environment is non-profit organisation Lasnaidee (MTÜ Lasnaidee, 2023). Starting in year 2014 as a pilot project by NPO Linnalabor – Estonian urban research organisation, Lasnaidee aimed on enhancing social inclusion in the district of Lasnamäe (MTÜ Linnalabor, 2023). During 9 years of activity Lasnaidee managed several communal projects arranging multiple communal meetings engaging people of all age groups (MTÜ Lasnaidee, 2023):

- Lasnavärvid - project of painting external stairway of Kotka shopping mall held in 2014.
- Lasnakino – a recurring project of open-air public cinema held in various locations across Lasnamäe. Project is remarkable for its pop-up nature enabling the creation of dynamic expositions in various locations.
- Lasnakirbukas – thrift shop project organized on Lindakivi boulevard in 2015 and 2017 that engaged local people to upcycle unneeded goods reselling or exchanging them on a public market.
- Lasnapiknik – an event for local communities entitled to provide social interaction in a form of a street festival.
- Priisle park. Priisle kaared 2.0 - a community initiative started in year 2014 with a mission to save a unique monument of Lasnamäe - Arcs of Priisle from demolishing within the development project of a new convenience store. As a result, initiative had negotiated the development of a new monument in the same area.
- Laagna aed – a project of a community garden in Laagna neighbourhood. The project promoted urban gardening and triggered the creation of community gardens across the Tallinn. As of today, Lasnamäe hosts 3 community gardens in Pae park, Laagna and Priisle districts. Lacking in availability of free gardening beds, Lasnamäe and other districts of Tallinn are up to meet the demand of local people creating new locations across the city (M. Derlõš, personal communication, 3 March 2023).

Figure 36. Lasnamäe community. (MTÜ Lasnaidee, 2023)

3. SUMMARY

The process of urban densification could be defined by responsible initiative triggering the process. Local initiatives for repurposing existing facilities, market driven factors developing free urban spaces or urban planning policies could stimulate densification development varying in the nature of outcome. As a matter for consideration, densification strategies imposing short-time benefits as primary objective of densification have the potential of devaluing urban spaces implementing unsustainable densification practises. Thus, regulatory policies based on requirements for sustainable urban development should be developed to ensure the applicability of densification strategies in the future.

The study defined principles of urban densification in relation to social sustainability factors. Similar to Hippocratic Oath stating, "First do no harm", architectural inceptions of sustainable urban densification strategies are expected to enhance the existing local values. In order to define the appropriate method of urban densification, urban planners are challenged to meticulously evaluate existing spatial organisation, potential of existing structures and communities and define the required amount of additional technical and recreational infrastructure. In order to contribute for positive social perception of developed area, architectural and planning solutions should enhance (Akcali & Cahantimur, 2022; Soltani et al., 2022; Westerholt et al., 2022):

- sense of place;
- safety;
- encourage social interaction;

and create urban spaces that are:

- well integrated;
- intelligible;
- less permeable;
- sufficiently supplied by diversified services.

Social sustainability of local communities is related to quality and availability of recreational possibilities. Environmentally sustainable provision of additional living spaces should not degrade vital biological networks. Decreased availability of free public space should be compensated with biologically diversified, unfragmented and recreational green spaces with appropriate maintenance strategies (Haaland & van den Bosch, 2015).

Recent data on prognosed increase of Lasnamäe dwellers number by year 2050 suggests, that in case of reasonable urban planning decisions, most attractive sea-side plots would be relieved of extensive development on behalf of areas in Lasnamäe, Mustamäe and Haabersti districts (Kalm et al., 2023). This would result in population increase of 92 620 people for the city of Tallinn, 6 354 of which are approximated to reside in Lasnamäe adding 5.4% to district residents (Kalm et al., 2023). Although relatively small increase in population might seem insignificant for the biggest district of Tallinn, the age distribution for the neighbourhood is expected to introduce more young and work-age people (Kalm et al., 2023). Thus, existing lack of social facilities would become more sensible unless managed otherwise.

However, current trends of house developing in Tallinn cast aside potential densification areas in Lasnamäe, constant population of the neighbourhood would provide potential for development of local communal bonds. Emerging local initiatives encouraging local people to participate in social activities show empathy towards local communities. Housing this empathy would significantly increase social sustainability, improving common perception of the neighbourhood, increasing development potential of the district.

4. KOKKUVÕTE

Linnade tihendamise protsessi on võimalik defineerida vastutava initsiatiivi abil, mis käivitab selle protsessi. Kohalikud algatused olemasolevate rajatiste ümberkasutamiseks, turupõhised vaba linnaruumide arendusprojektid või linnaplaneeringulised määrused võivad stimuleerida linnatihendamise arendust, mis oleks eristatav enda tulemuse olemusest. Linna tihendamisstrateegiad, mis kehtestavad lühiajaliste eeliste saavutamist kui peamist tihendamise eesmärki, potentsiaalselt alandavad linnaruumi väärtust rakendades rakendades jätkusuutmatuid tihendustavasid. Seega, oleks vajalik välja töötada jätkusuutliku linnaarengu nõuetel põhinevad regulatiivsed poliitikad eesmärkiga tagada linnatihendamise rakendatavust tulevikus.

Uuringus määratleti linnade tihendamise põhimõtted lähtudes sotsiaalse jätkusuutlikkuse teguritest. Sarnaselt Hippokratese vandega, milles öeldakse: „Kõigepealt ei kahjusta", eeldatakse, et arhitektuurilised ettekujutused linna säästvatest tihendusstrateegiatest parandavad olemasolevaid kohalikke väärtusi. Linnade tihendamise sobiva meetodi määratlemiseks on linnaplaneerijatel väljakutseks hinnata hoolikalt olemasolevat ruumilist korraldust, olemasolevate struktuuride ja kogukondade potentsiaali ning määratleda vajalikul hulgal täiendavat tehnilist ja meelelahutuslikku infrastruktuuri. Eesmärgil toetada positiivse sotsiaalse tajumise arenendatavate piirkondade suhtes, arhitektuursed ja planeerimislahenudes peaksid võimendama (Akcali & Cahantimur, 2022; Soltani jt, 2022; Westerholt jt, 2022):

- kohatunnet;
- ohutus;
- julgustage sotsiaalset suhtlemist;

ja looma linnaruume mis on:

- hästi integreeritud;
- arusaadavad;
- vähema läbilaskvusega;
- piisavalt vatustatud mitmekesiste teenustega.

Kohalike kogukondade sotsiaalne jätkusuutlikkus on seotud harrastusvõimaluste kvaliteedi ja kättesaadavusega. Täiendavate elamispindade keskkonnasäästlik tarnimine ei tohiks halvendada elutähtsaid bioloogilisi võrgustikke. Vaba avaliku ruumi vähenenud kättesaadavus tuleks kompenseerida bioloogiliselt mitmekesiste, lahtiharutamata ja harrastuslike haljasaladega sobivate hooldusstrateegiatega (Haaland & Van den Bosch, 2015).

Hiljutised andmed Lasnamäe elanike arvu prognoositud suurenemise kohta aastaks 2050 viitavad sellele, et mõistlike linnaplaneerimise otsuste korral vabastatakse kõige atraktiivsemad merepoolsed krundid ulatuslikust arengust Lasnamäe, Mustamäe ja Habersti linnaosade piirkondade nimel (Kalm et al., 2023). Selle tulemuseks oleks Tallinna linna rahvaarvu suurenemine 92 620 inimese võrra, neist 6 354 on eeldatud valima majutamiseks Lasnamäed, lisades ringkonna elanikele 5,4% (Kalm et al., 2023). Ehkki Tallinna suurima ringkonna jaoks võib rahvaarvu suhteliselt väike kasv tunduda ebaoluline, peaks naabruskonna vanusejaotus tutvustama rohkem noori ja tööeaseid inimesi (Kalm et al., 2023). Seega muutuks olemasolev sotsiaalsete rajatiste puudumine tundlikumaks, kui ei juhita teisiti.

Kuid praegused hoonete arendamise suundumused loobuvad Lasnamäes potentsiaalseid tihenduspiirkondi kõrvale, naabruskonna pidev elanikkond võimendaks potentsiaali kohalike kogukondlike sidemete arendamiseks. Tekkivad kohalikud algatused, mis julgustavad kohalikke inimesi sotsiaalses tegevuses osalema, näitavad empaatiat kohalike kogukondade suhtes. Selle empaatia majutamine suurendaks märkimisväärselt sotsiaalset jätkusuutlikkust, parandades naabruskonna välisilmet, suurendades linnaosa arengupotentsiaali.

5. PROJECT DESCRIPTION

5.1 Project area.

The area of master thesis project is located between Kotka Shop and Lindakivi Culture Centre. Kotka Shop (arh. L. Aljaste) is 1 of 3 shopping centres planned as a communal attraction point on the southern side of Laagna canal (Bruns, 1993; Raam, 1993). Hosting various small shops, convenience store and a bar, Kotka Shop has a little to offer for local communities concerning the strategic location of the facility. Lindakivi Culture Centre was built in year 1988 as a local cinema (KK Lindakivi, 2023). Unsuccessful performance of the cinema caused repurposing the facility to a culture centre in 1994 (KK Lindakivi, 2023). Lindakivi Centre consists of main concert hall for 256 seats, dance- and exhibition areas and a cafeteria (KK Lindakivi, 2023). Lindakivi Square located between the Lindakivi bridge and Lindakivi Centre is an open area, that was revitalised by a project of Tallinn Art Hall Pavilion (arh. Maarja Kask, Ralf Lõoke, Margus Tamm) in year 2022. A small pavilion created as a temporary substitute for Tallinn Art Hall in the city centre introduced new dynamics to the area. Two sides of the Laagna Canal for the time being are connected by a pedestrian Lindakivi bridge. The bridge is 9m wide and 60m long, open from the top and bordered by a 0.9m high handrail.

Figure 37. Project location. Author's illustration.

5.2 Architectural concept.

A notion of neighbourhood's disintegration emerged from the landscape of Lasnamäe district that is carved by Laagna canal in 2 pieces. Environmental exclusion coupled with a lack of communal facilities left an open question – what is the unconsidered value of the district that could act as a unifying force for Lasnamäe neighbourhoods?

Japanese art of Kintsugi uses glue and golden paint to repair broken ceramic pottery and exemplify the imperfections of these objects as an additional value (Zero = Abundance, 2017). For the Laagna neighbourhood the exemplified value became the local community. The core of a project consists of a repurposed Kotka Shop facility and a plato stretching over the Laagna Road, providing areas and facilities for communal activity. Building composition provides comfortable pedestrian passages whilst creating several secluded recreational spaces. A quick passage for alternative transport modalities is allocated on the side of the plato, secured with transparent barrier and covered by extended roofing. The angle of pedestrian passage in relation to the plato is defined by North-South axis and provides natural illumination through the opening in a shading structure. The composition of pedestrian passages is defined by the location of local points of interest - Laagna community garden, Laagna library, Tondiraba Ice Arena, Russian Youth Theatre.

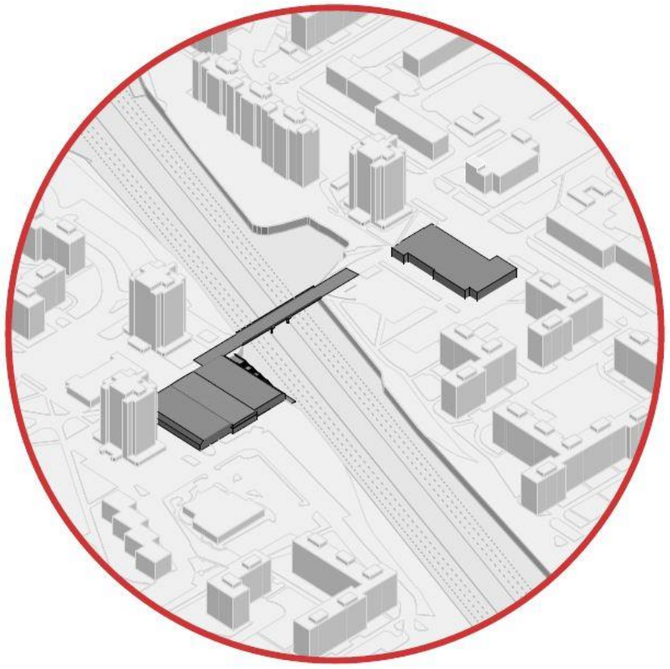

Figure 38. Present situation. Author's illustration.

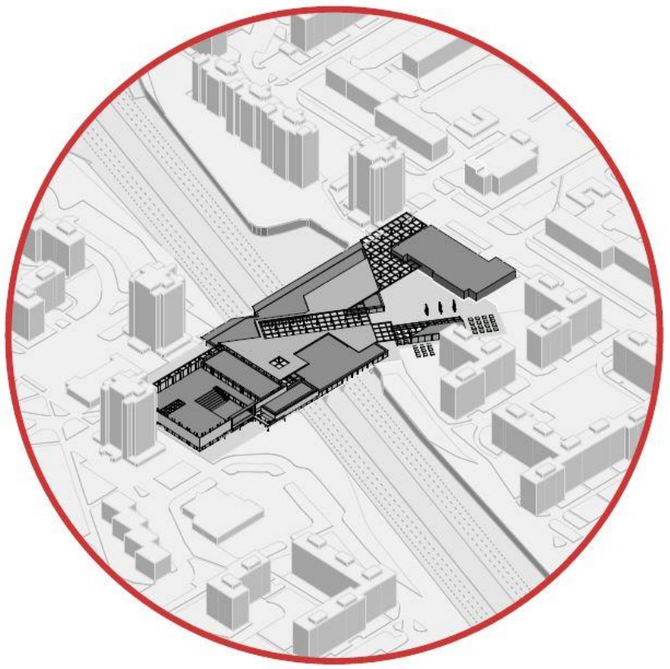

Figure 39. Architectural proposal. Author's illustration.

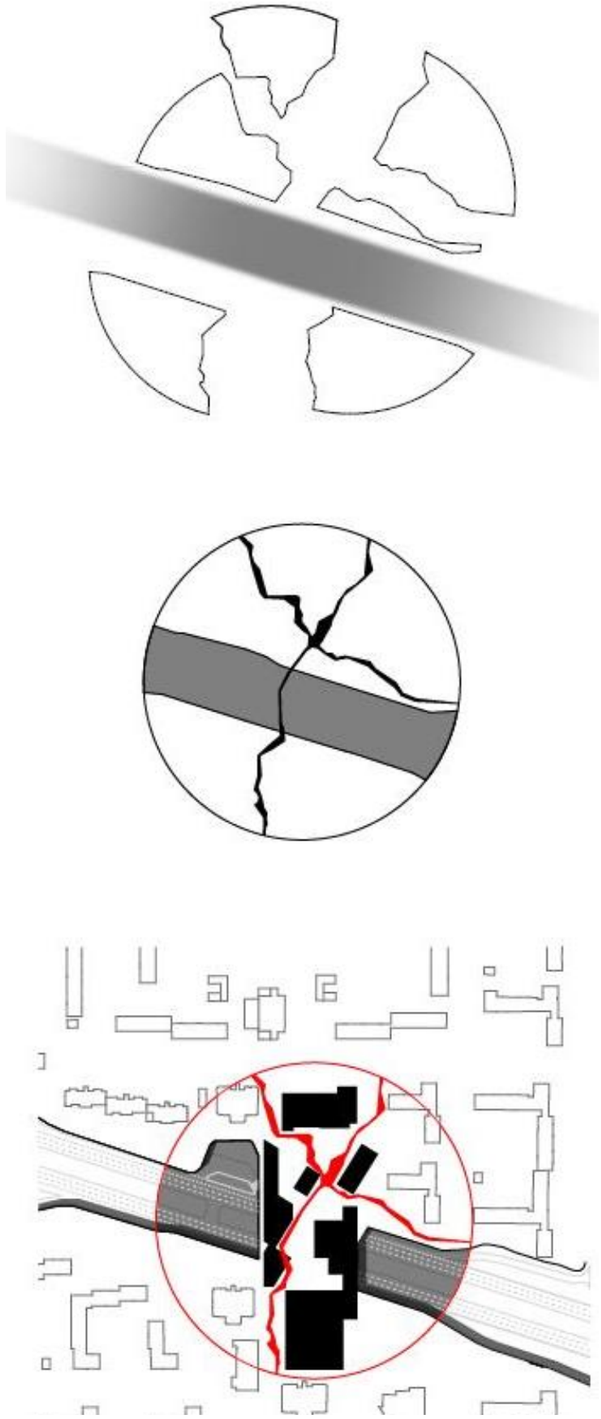

Figure 40. Architectural concept. Author's illustration.n

5.3 Building concept.

The community centre consists of 4 story building in the volumes of existing Kotka Shop and an elevated platform over Laagna canal. Serving as a linking passage between two main parts of the district, facility has a linear distribution of services.

Figure 41. Building scheme. Architectural concept. Author's illustration.

Ground floor of the project is located on the elevation of local residential neighbourhoods. The ground floor part of the Kotka Shop is repurposed as an open communal area for general meetings and community fairs, grocery and shopping stores. The repurposed part of the floor is connected directly to recreational part of the centre by a gallery hosting art studios. Recreational area provides various arcade gaming areas, reading spaces, hosts a book shop, bar and a restaurant. A passage along the platform connects southern side of Laagna district to northern along a semi-open area. Along the passage is located a market and areas for service providers, separating pedestrian passage from bike road. The Lindakivi square is partially covered with shading structure and is framed with a café and a greenhouse. Recreational area of a greenhouse has a more open area with swings next to the Lindakivi square and a more private area with community gardens oriented towards courtyards of local residential buildings.

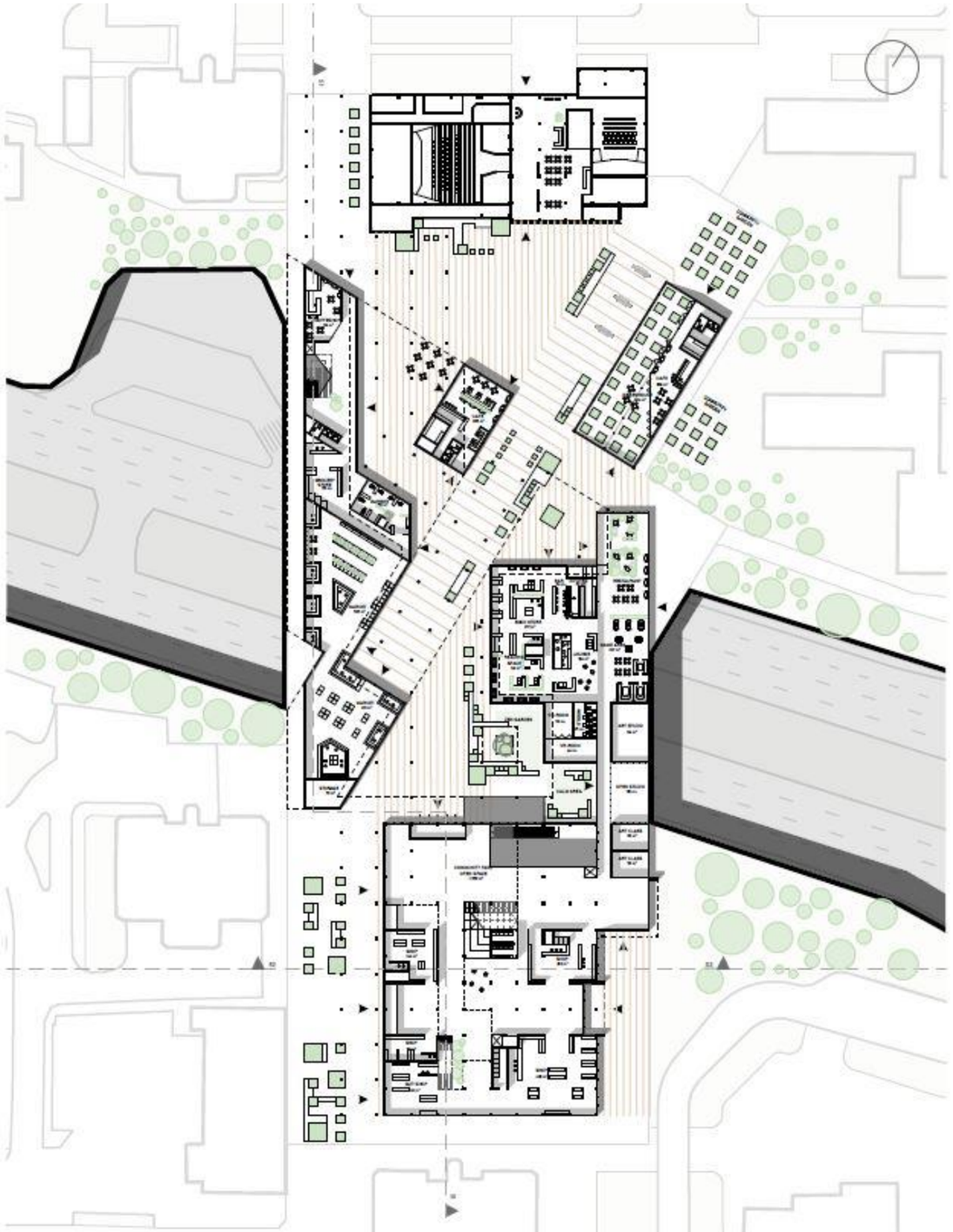

Figure 42. 1 story plan. Author's illustration.

Second floor of the project is introduced mainly in the volumes of the existing Kotka Shop and hosts communal workshops, rental rooms and counselling rooms. Additional volume provides therapy services and is located next counselling section. An extruded volume in the centre of existing structure hosts a multilevel open arena for communal open-air film sessions, that have proven to be a popular activity in Lasnamäe district. The arena is shielded from precipation by a shading structure and frames viewports over the Laagna canal.

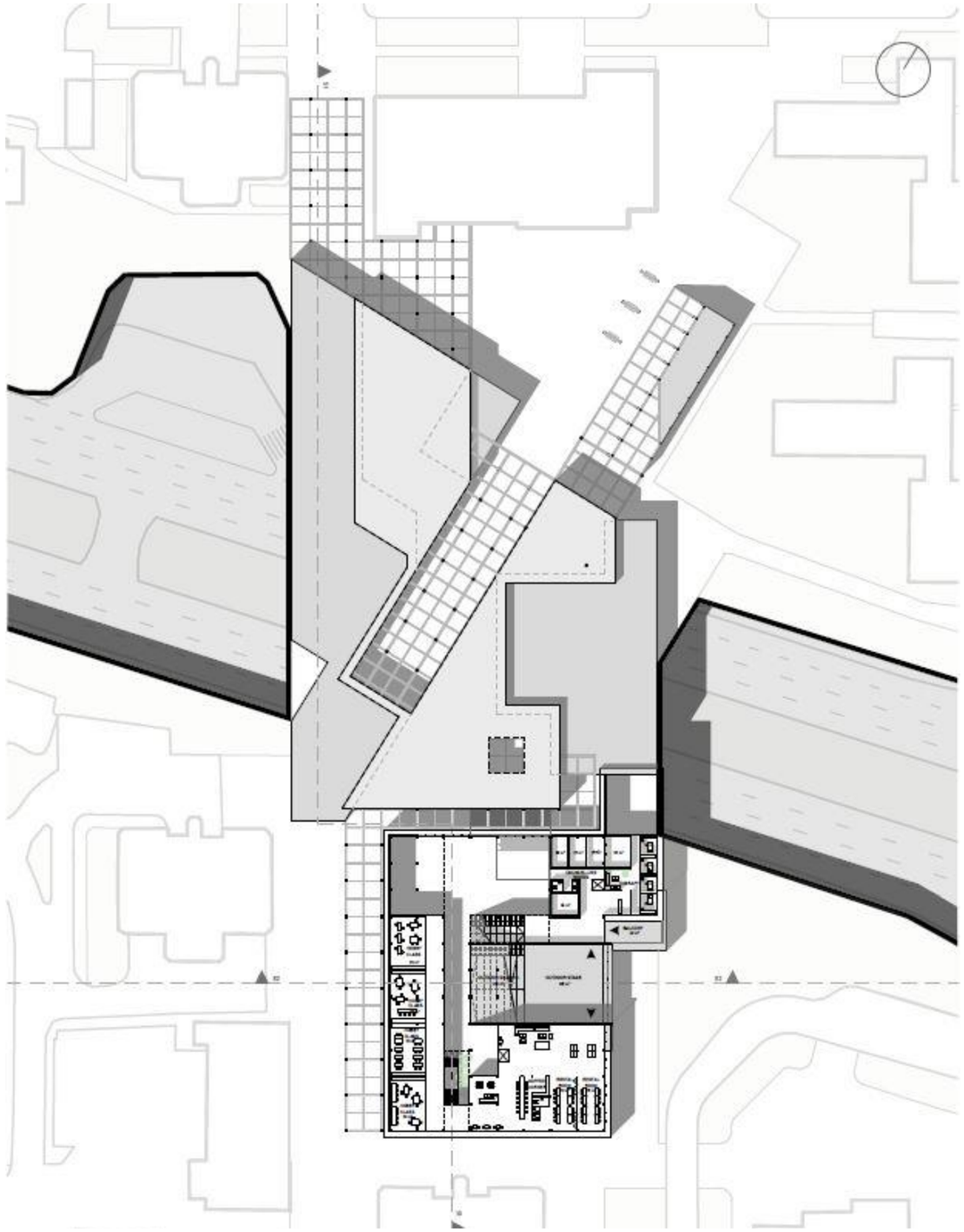

Figure 43. 2 story plan. Author's illustration.

Third floor of the project is the additional floor of the project and hosts gaming areas and a cafe. The floor is located on the roof of the existing Kotka Shop building and is connected to the open-air arena by a shaded roof terrace.

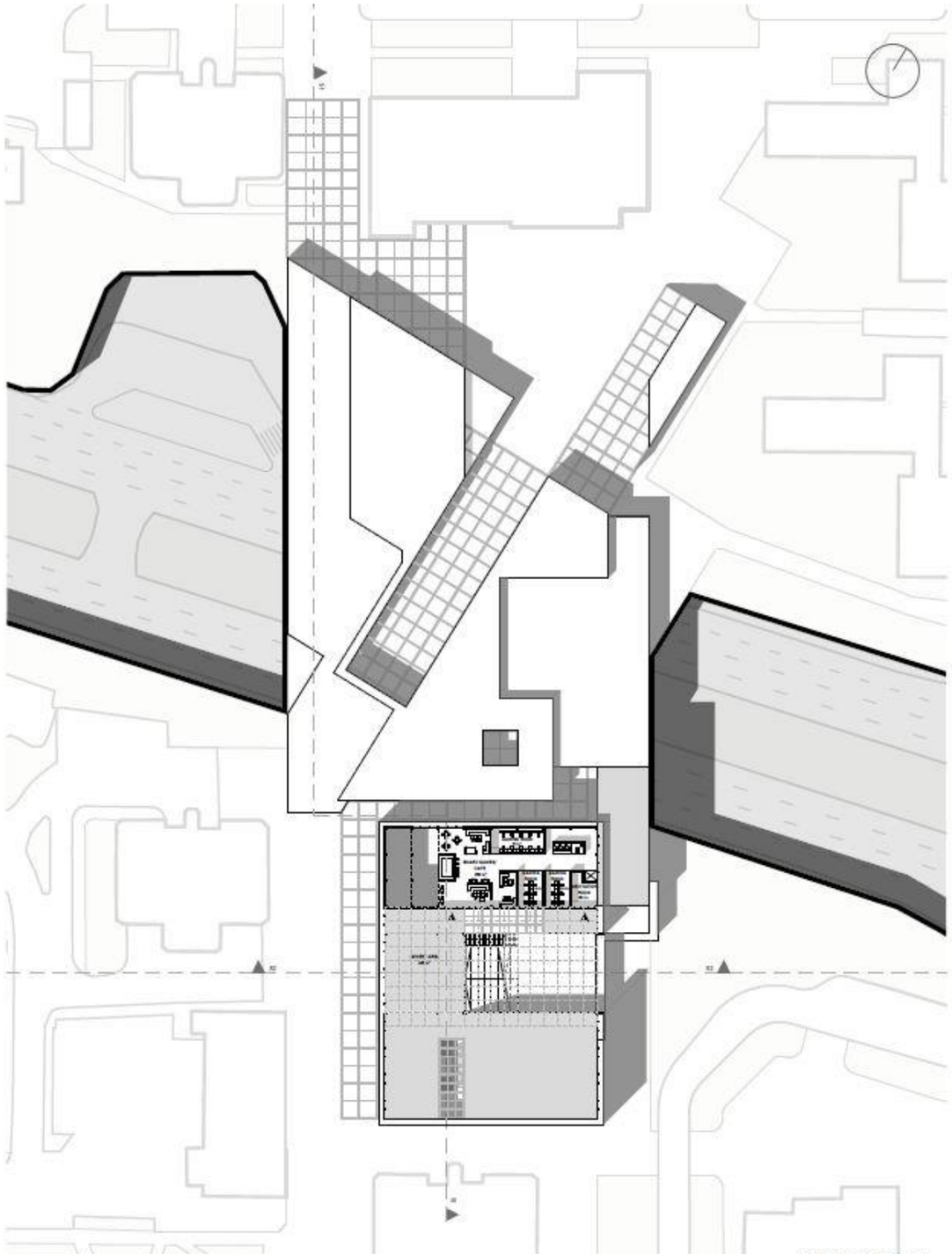

Figure 44. 3 story plan. Author's illustration.

The underground floor of the project is located in the existing volume of Kotka Shop. Providing multifunctional services, the floorplan introduces bus waiting area, foodcourts, dance floor, blackbox for 56 seats, bar area, storage and technical rooms. Provided services are located in a circular motion enabling cross-usage and comfortable passage. The opposite side of Laagna road has a vertical connection to the existing bus stop by a stairway and an elevator integrated into the slab of limestone.

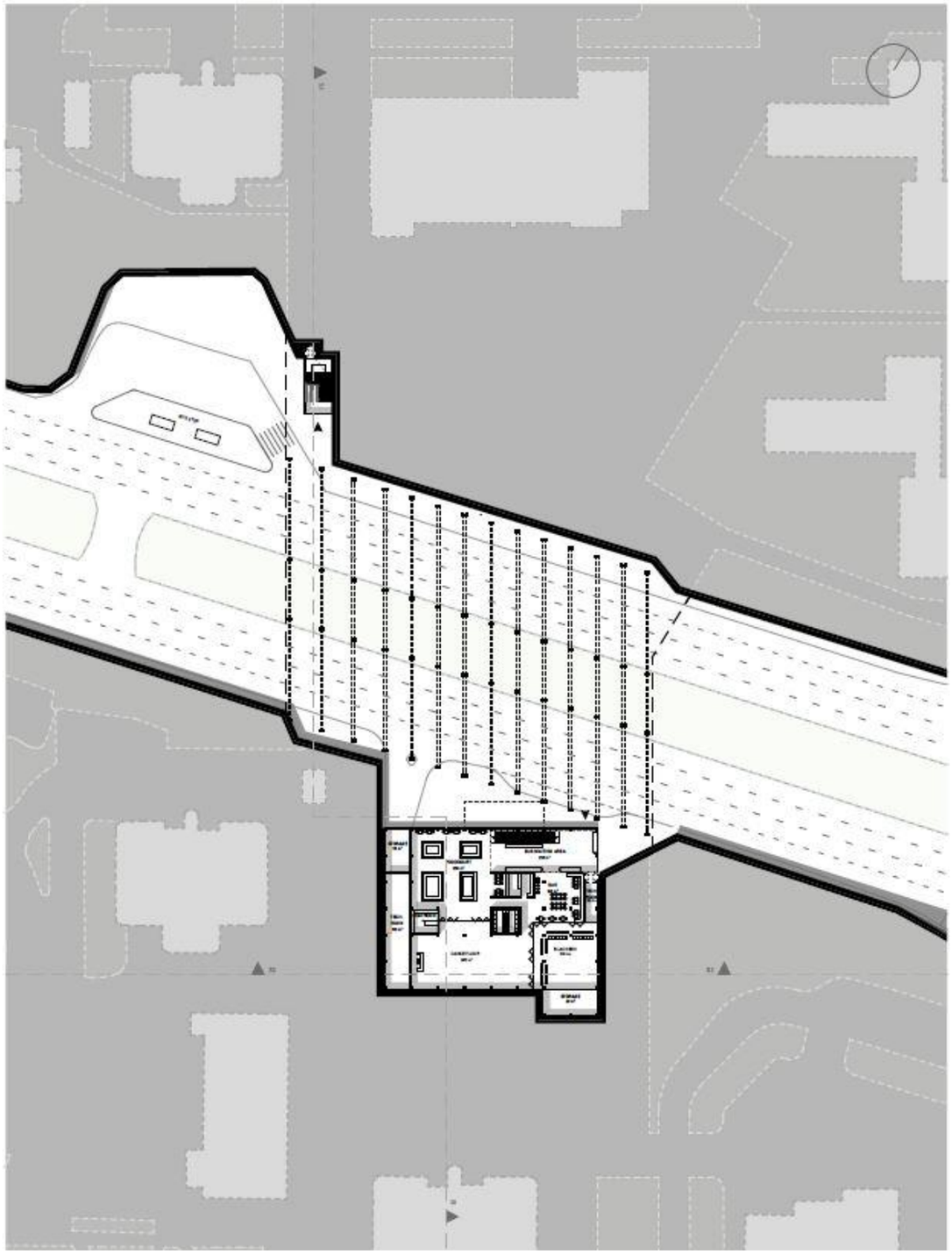

Figure 45. -1 story plan. Author's illustration.

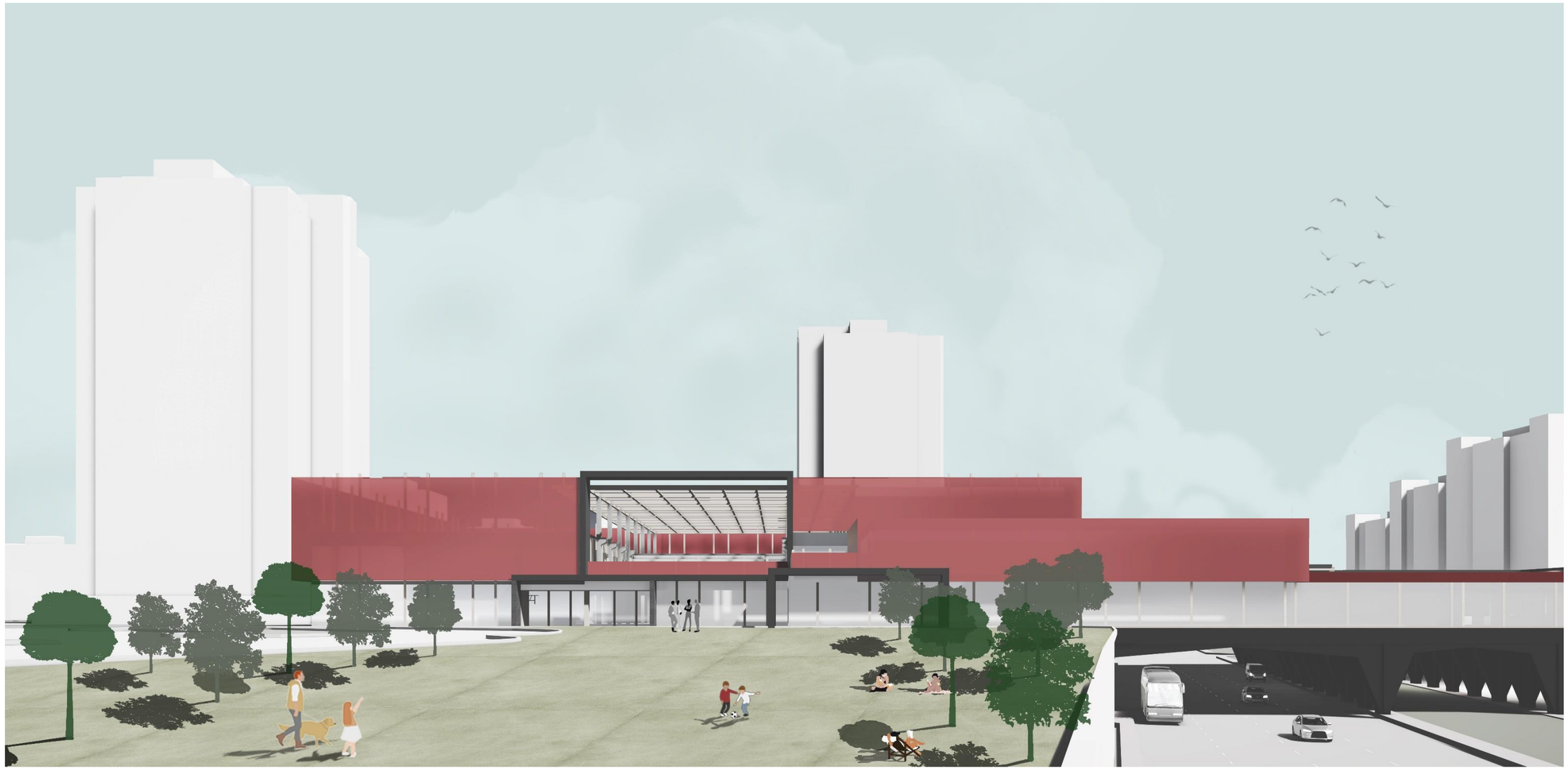

Figure 46. East view. Author's illustration.

Project promotes the usage of alternative transport modailities comforting the usage of public transport, bike and pedestrian passages. The bus waiting area is located near several recreational areas and the connection to the neighbourhood level is enhanced by elevators and escalators. The slower motion of pedestrian movement is accompanied by the variativity in terms of privacy and functions of the areas along the passage, faster travelling modalities are provided with a simple and straightforward linkage between attraction points. Introduced facilities and shading structures along the pedestrian passage over the Laagna Road provide air- and noise barriers.

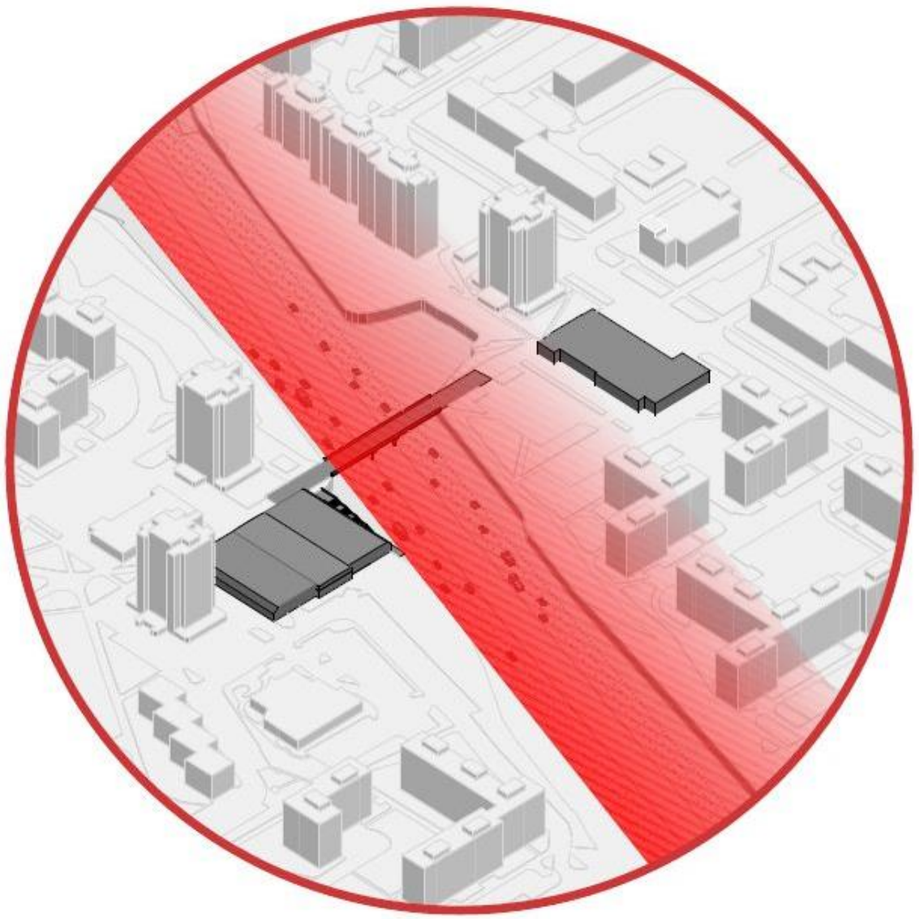

Figure 48. Existing environmental disadvantages. . Architectural concept. Author's illustration.

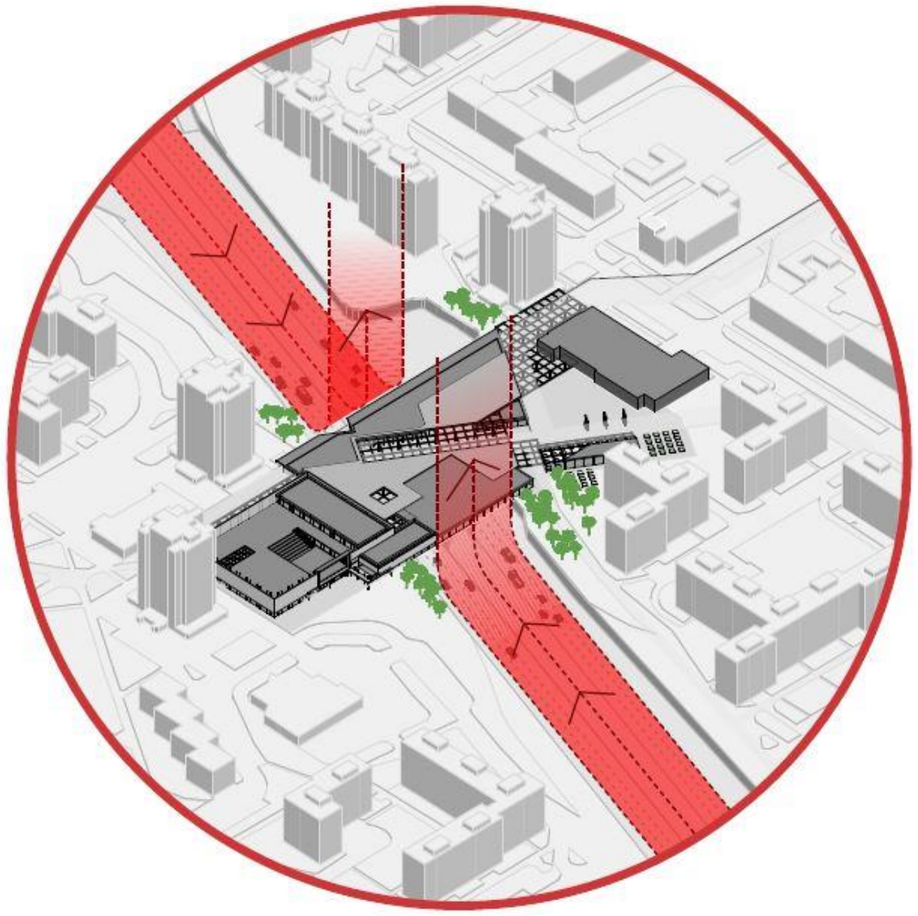

Figure 47. Proposed solutions for comfortable passage. Author's illustration.

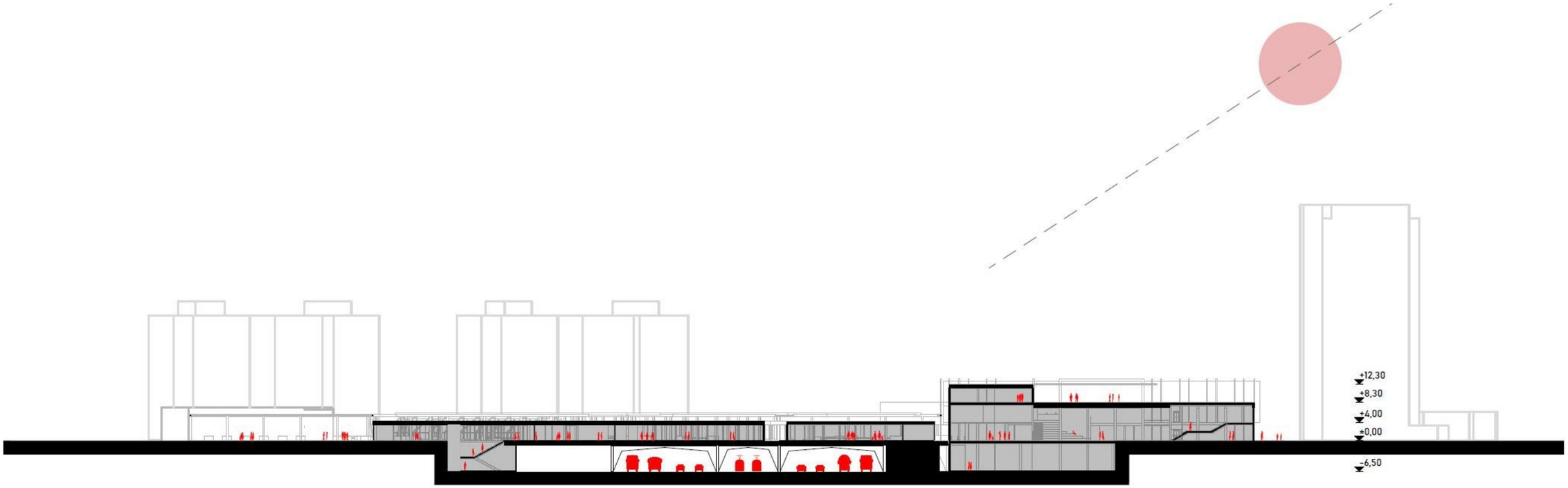

Figure 49. Section 1-1. Author's illustration.

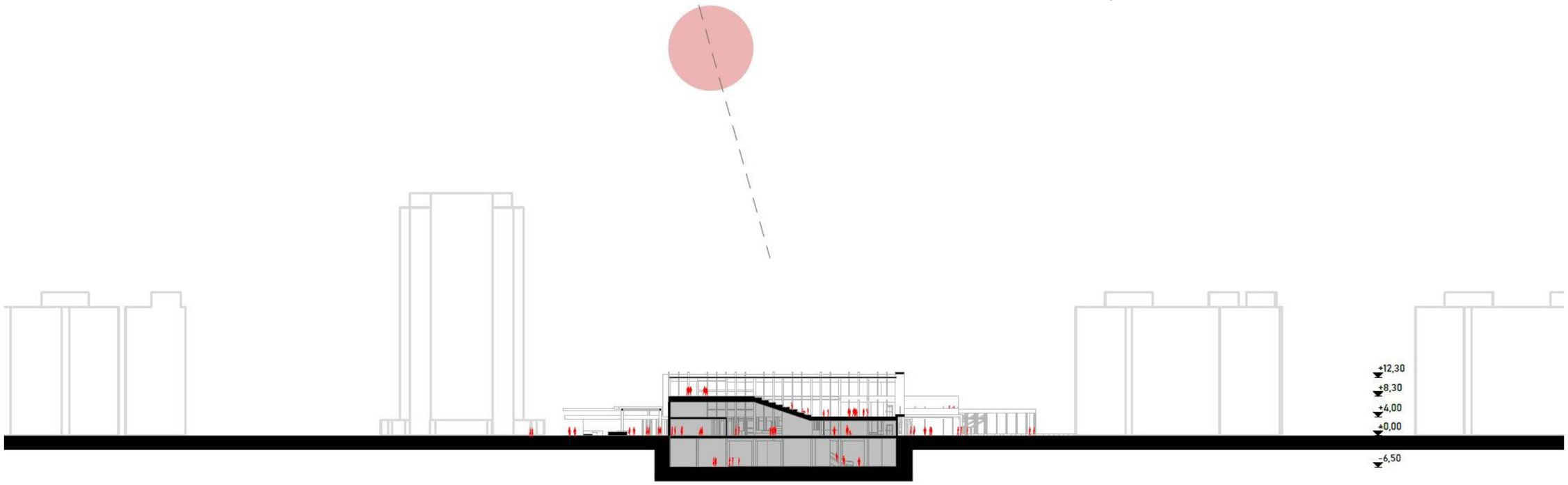

Figure 50. Section 2-2. Author's illustration.

5.4 Densification.

Reusing the existing structures of the building is considered to be an environmentally sustainable densification strategy. The limitations in terms of required volume of community centre are moderated with inclusion of unused volumes above Laagna canal into the areal program. Enhancing local biodiversity introducing community gardens contributes to natural sustainability of the area. Located in a strategic location defined as a are of communal activity by the initial Lasnamäe district plan, the community centre has a potential to introduce new means of densifying the district of Lasnamäe creating usable spaces above the unused volumes of Laagna canal.

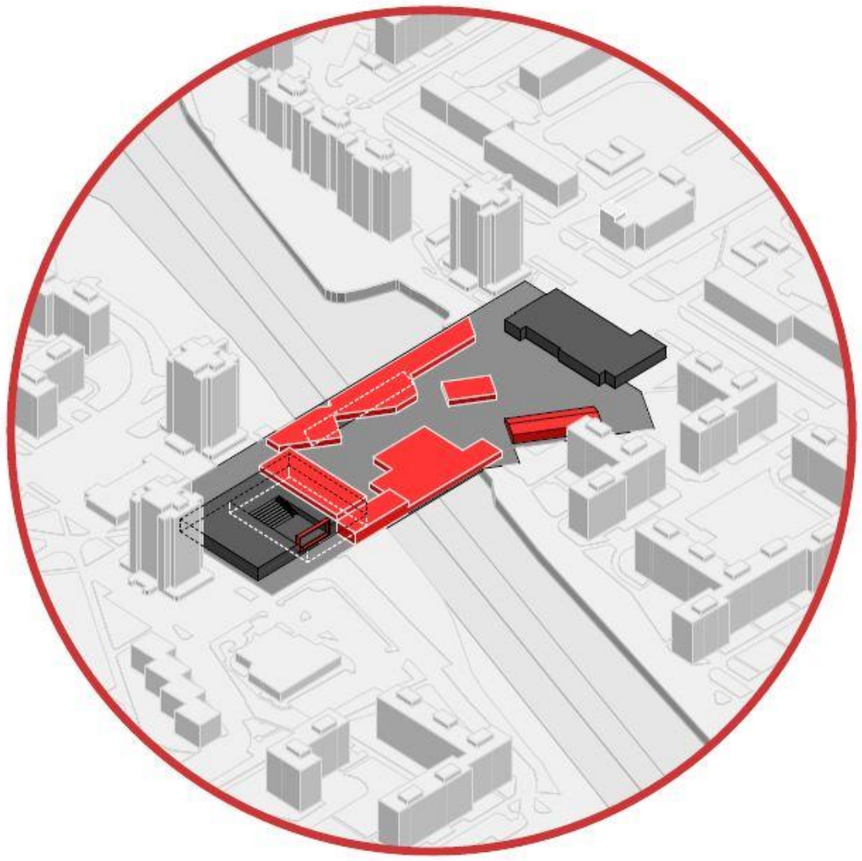

Figure 51. Densification strategy. Author's illustration.

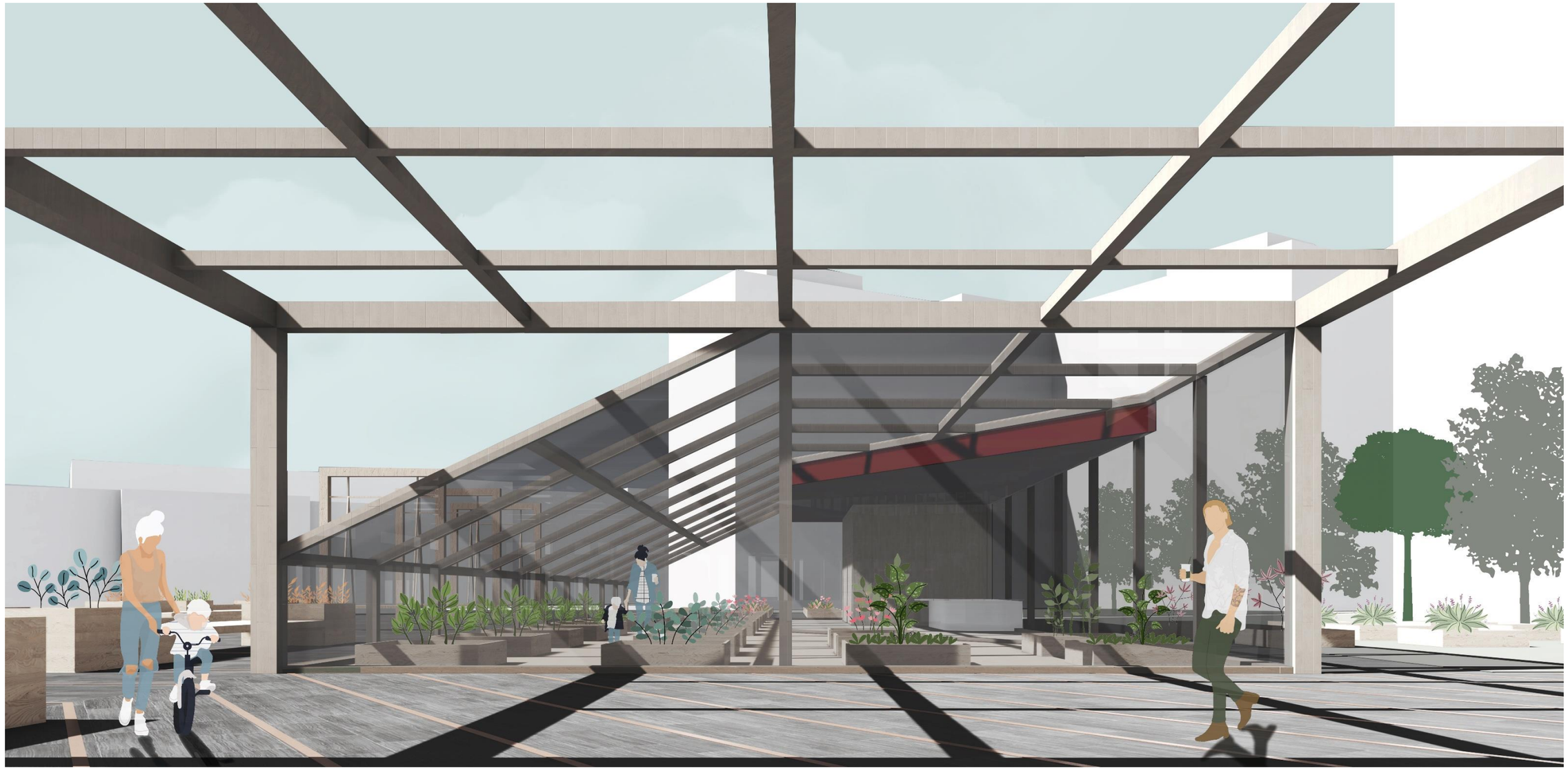

Figure 52. Greenhouse view. Author's illustration.

5.5 Local communities.

The project features a building composition that would enhance communal and social bonding in the neighbourhood. Educational services of the project are represented in multi-purpose workshop classes, art studios located next to the VR-centre and community greenhouse and gardens. Located next to recreational areas, floor plan enables the occasional passage of educational facilities enhancing interest to the subject. Masterclasses hosted by enthusiasts and professionals enhance in provided facilities enhances communal involvement and social bonding.

Recreational facilities of the project feature arcade areas, various gaming and lounge spaces and several food and healthcare providers. A variety of occasions associated with the usage of facilities suggests the potential for diversity of involved service providers.

The layout of the project provides a variety of spaces in terms of privacy, scale and seclusion. The deepened building corners located along the central passage of the platform provide shaded areas for social interaction. Even more secluded gardens next to the art section of the building host open, calm, meditative spaces. Third floor of the area program locates the open and covered roof terraces for meetings and social events. Thus, the project aims on retaining the balance between integration and accessibility of the layout.

As a housed space for community of Lasnamäe the project embodies the notion of community bonding in concept and programm of the complex. Unifying separated parts of the district on behalf of local communities provides a solid baseline for enhancement of social sustainability of the neighbourhood.

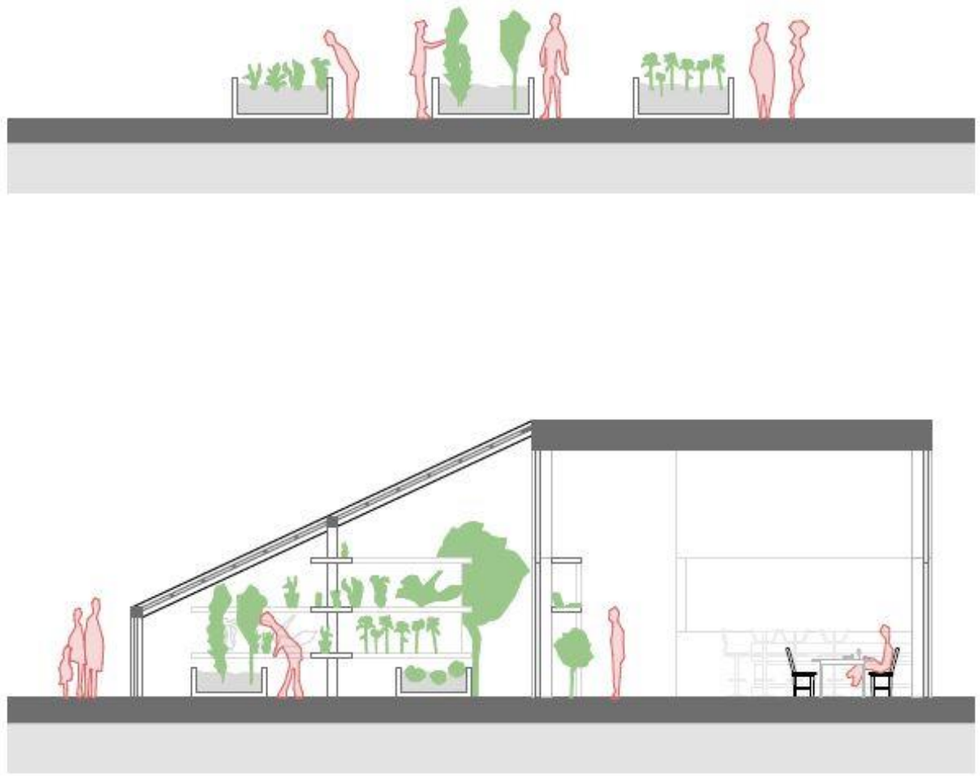

Figure 53. Proposed community gardens. Section scheme. Author's illustration.

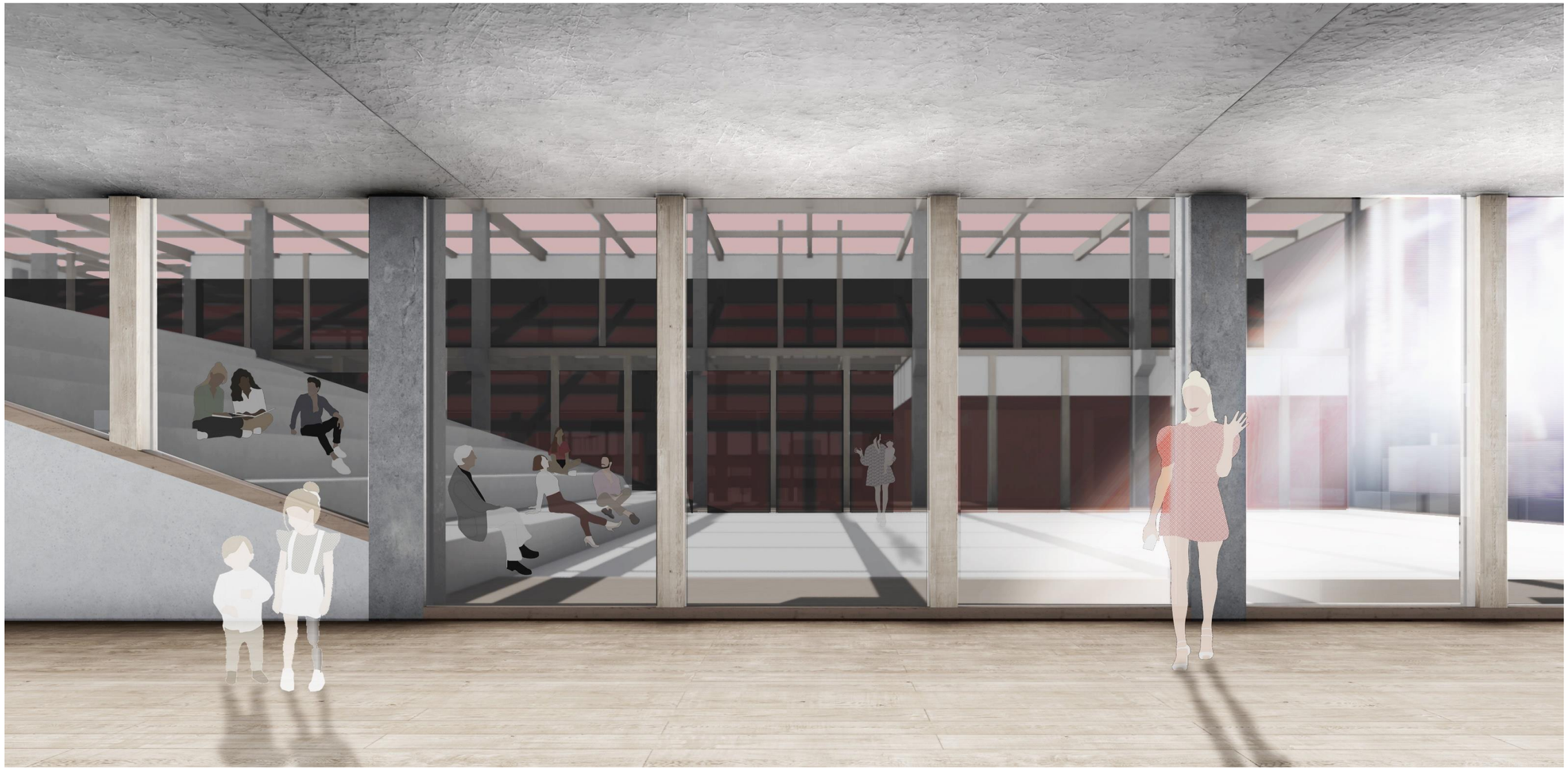

Figure 54. Open film stage area. Author's illustration.

5.6 Urban potential.

Various activities noted in previous chapters form a certain axis crossing Laagna canal defining the possible location for spatial connection of the areas. Noisy and dusty conditions of Lindakivi bridge connecting 2 sides of Laagna canal do not support free movement in the area. Judging from the urban perspective, locating a pedestrian-friendly connection with various attraction points and services in the linking point between two sides of the district creates a potential for new urban promenade. Recent development of a new Pae promenade near Lasnamäe Market, social activity in Pae Park and potential development of a new Urban Green Belt in central Lasnamäe suggest the need for linking Southern and Northern parts of the district.

Unused volume located over Laagna canal represent potential for urban densification of the neighbourhood not only in defined location of the project, but throughout the whole length of the canal deepening. Judging from financial standpoint, more open locations near Kadriorg Park and Kumu Museum could result in more profitable land use of densified areas, however dedicating the first plato over the Laagna canal for the community would enhance communal bonds of the neighbourhood represented in symbolic architectural inception.

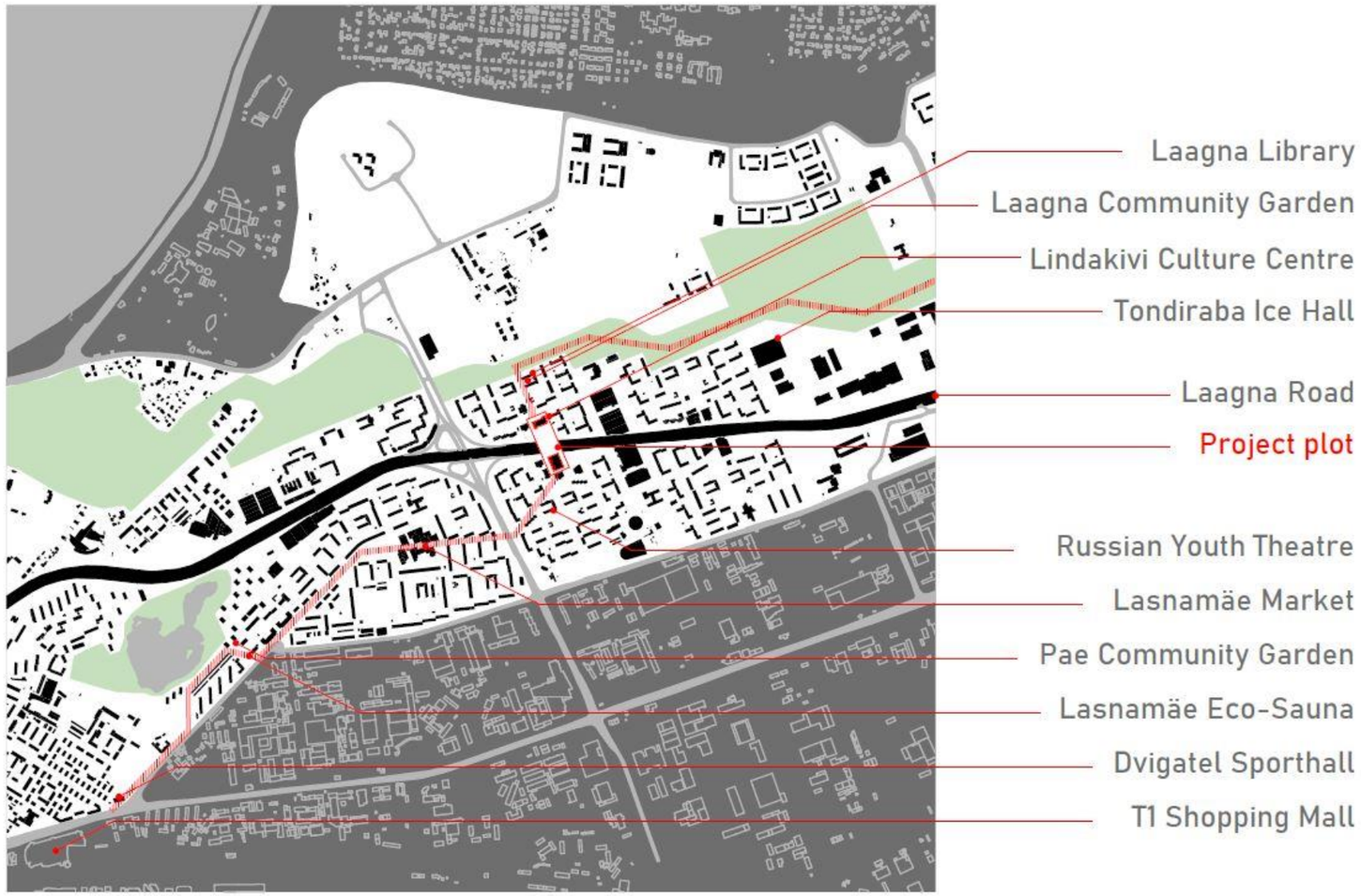

Figure 55. Urban potential of Lasnamäe. Author's illustration.

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7. LIST OF FIGURES

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8. APPENDIX

Interviewer: Nikita Berendejev

Interviewee: Maria Derlõš, Urbanist and Community collaboration strategist at MTÜ Linnalabor, local activist in the district of Lasnamäe.

- For my master thesis project, I have chosen the location over the Laagna street next to the Lindakivi bridge. As defined by Lasnamäe district planning the areas of Lindakivi centre and Kotka store a supposed to become new community centre areas, however separated from each other (by Laagna street). My proposal is to unify them by a new covered area over the Laagna street.

First thing that I would like to point out is that this location for community centre is definitely the right one. As defined by the Lasnamäe district planning and by the initial Soviet era planning, the areas accented by pedestrian bridges (over Laagna street) were supposed to form central areas of local neighbourhoods. For example, Lindakivi bridge used to form the central area for the 3. microdistrict; the other side of Pae bridge that is currently leading to a wasteland was simply undeveloped untill the end of the Soviet era, however areas on each ends of pedestrian bridges were supposed to become local points of attractiveness.

For the time being Laagna district is the area with the most number of recreational opportunities, located within a 10-minute walk around the Laagna bridge. Points of interest list Lindakivi Cultural Centre, Laagna Library, Lasnamäe Hobby School, that unifies a big amount of people. Adding another area that could unify existing points of interest could create a strong point of attraction in the whole neighbourhood.

- Along with the Lasnamäe district planning a Strategic Environmental Assessment for the named planning was set to evaluate environmental aspects of the planning proposing alternatives for development strategies. The analysis was finished in year 2007 and brought up the areas located 300 m away from the nearest urban green space that is suitable for recreation.

In my opinion, for that time (2007) this assumption was correct, however for now the situation has changes. For example, the open courtyard of Võru 11 - the building that used to be kindergarten, but was closed, was used by local people as a walking ground. This area was used to develop the first community garden in Lasnamäe, so for now, this place could be defined as a green recreational space. In addition, the Lasnamäe green belt is situated wihtin a 10-minute walk from the Laagna bridge.

In comparison, the area of Kotka is much more affected by the lack of recreational space.

- As part of the project the Laagna community centre seeks to become a unifying ground for the local communities. Is there a problem with community fragmentation in the district of Lasnamäe? How strong is the local identity?

In my opinion, the problem of community fragmentation in Lasnamäe is overwhelmed. In comparison to other districts of Tallinn, the communal identity of older neighbourhoods, such as Nõmme or Kalamaja, is the strongest and is supported by the local history and traditions. However, the newer districts such as Õismäe, Haabersti and Mustamäe have all associated uniqueness that helps forming the local identity.

The prejudice of Lasnamäe lacking in local identity is derived from the times, when the district was in development. Problems associated with high criminal activity, anonymity of local areas and lack in uniqueness of local architecture are outdated. However, there are some local problematic spaces, for now, generally Lasnamäe has significantly improved urban green spaces.

Aspect of local identity is a complex one - there is a sort of local identity, although it could be distinguished on a neighbourhood level. The perceivement of Lasnamäe in Katleri and in Läänemere could be unique in their own ways. One obstacle that stands in the way of local identification is the fact that the development of Lasnamäe has not been finished and many areas lack in the community spaces. The existing community spaces are concentrated particularly in the area of Laagna bridge.

- On which level (households, hobby and interest clubs, apartment associations, district associations) the communal bonds are expressed most significantly?

On the level of apartment associations communal bonds are the strongest. It is remarkable to see the development of communal bonds on this level, for example in the district of Katleri several active apartment associations have formed a non-profit organisation with a purpose of creating their own community garden. Another example of unification happened in the district of Pae, where the bonding happened on the subject of anti-social activity in the area of Pae promenade. Local community required to get additional representation in the reconstruction project of Pae promenade. In the district of Sikupilli local community is gathered to provide the day of courtyard cafes.

Another level of unification is Hobby Clubs, that has an excellent potential in unifying young people.

- How strong is the demand for community gardens in Lasnamäe?

My own experience shows that community gardens show a great potential in unifying local communities and the demand for them is very high. For example, the community garden in Võru 11 is already full and the queue for the spot in the garden already lists lots of people. Located next to the location of your project a new spot for community garden will be in high demand as well. However, in the area of Laagna bridge several issues regarding wind and noise pollution should be assessed to create comfortable and cosy spaces for community gardens.

- What is Your opinion on the community greenhouses? Would implementation of greenhouses bring certain benefits for community unification?

Implementation of community greenhouses is definitely a step-up requiring bigger investments and would prolong the time of gardening season. A community greenhouse would require a good maintenance strategy that would fairly delegate responsibilities among the users. Although sounding like a complicated issue, common problems have a tendency to unify people. In the quest of resolving those issues comes the need for communication. The balance between private gardening spots and public greenhouses is the key in forming strong communal bonds.

An example of community gardens shows a potential in forcing communal interactions. People involved in gardening tend to be curious and actively engage in experience sharing. Similar effect is found among the dog owners, where usually introverted people find themselves actively conversating with each other on the basis of their pet's contact. Such common ground for positive interactions is in high demand especially among the grown population, as children already have various facilities and locations for social interaction.

- Is there a need for a new community centre in Lasnamäe?

A project of Lasnamäe community centre was announced in year 2021. The idea of a complex is based on cross-used workshop areas with the ability of using professional equipment and appliances. Being a unique object for a whole city of Tallinn the complex would unify different age groups.

Certain communal spaces are located across Tallinn, for example Kopli 93 offers basic repair possibilities for locals and stands out as a workshop ground. Paranduskelder in Tartu is a location where for several years specialists form different fields of work come to provide qualified workshops for interested public. As a common ground for different generations such activities help spreading out the knowledge and the mentality of reusing and repairing.

Although, local communities are diverse and certain activities might be unsuitable for people with different attitudes and levels of involvement. Some people tend to be more introverted, however in need of social interaction. The example of community garden shows, that there is a need for community spaces, that enhance the social interaction without the direct involvement of people into the process.

- In Your opinion, is there a need for a new night club in Lasnamäe? How would in match with the other functions of community centre?

A certain event space could be a good addition to a community centre. A rentable modular space that could house different types of activities is lacking in Lasnamäe. For example, festival of Tallinn Music Week has been interested in providing events in Lasnamäe, however could not find a suitable space.

- In terms of community garden plants, are there any suggestions in terms of certain sorts of plants? Are there any special requirements for planting in such area?

In case of community garden one aspect is the movement flow of the area. Gardening requires concentration and the place should be more intimate. A more open area containing plants would serve as an urban vegetation.

Another issue is concerning the heat from paved and built surfaces. Edible plants are sensitive to moisture levels and require regular irrigation. In this case a good solution would be Mediterranean plants and herbs like thyme, rosemary, lavender or grass plants that are not very sensitive in terms of used soil and tolerate dryness. As a solution for urban vegetation good choice could be meadow plants that also could tolerate dryness and loss of nutrients in the soil.

- What is Your experience in terms of lifetime of community gardens? How sustainable are community gardens in urban environment?

In terms of materials used our community gardens were made out of wood that should be replaced after a certain period. A more robust material for plant containers would be recycled plastic. Metal elements for plant containers would be affected by temperature thus might not be the best solution for external use. An interesting solution would be usage of thermally treated wood – a robust material that could be used both for plant containers and seating areas.

However, an inevitable part of public areas is the damage from vandalism. Possible effects of this issue should be assessed and included in costs of maintenance.

- What is Your opinion on locating community gardens on rooftops of the community centre? How will it affect usage of community gardens by retired people?

It should be remarked that in our time people retire at a relatively young age thus being quite lively and engaging in different activities. Also, people in retirement quite often seek for additional physical activity. Many of elderly people are living in 5-story apartment houses that are not equipped with an elevator. Reaching the rooftop of community centre should not become an obstacle in these terms, especially if an elevator would be provided.

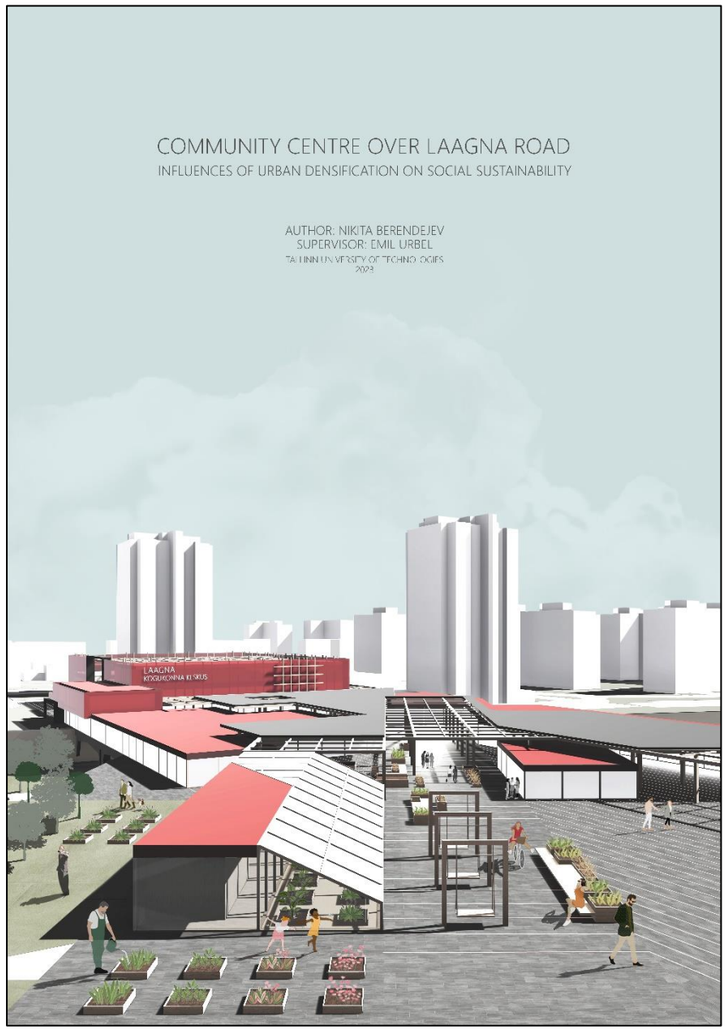
Although, in terms of construction in Tallinn, there is no defined lack of space, thus constructing usable community garden on the rooftop might not seem as a reasonable investment. The rooftop areas are affected with strong wind that would disturb the sense of intimacy in a community garden. As solution that does not require special treatment technologies like extensive green roof could be used.

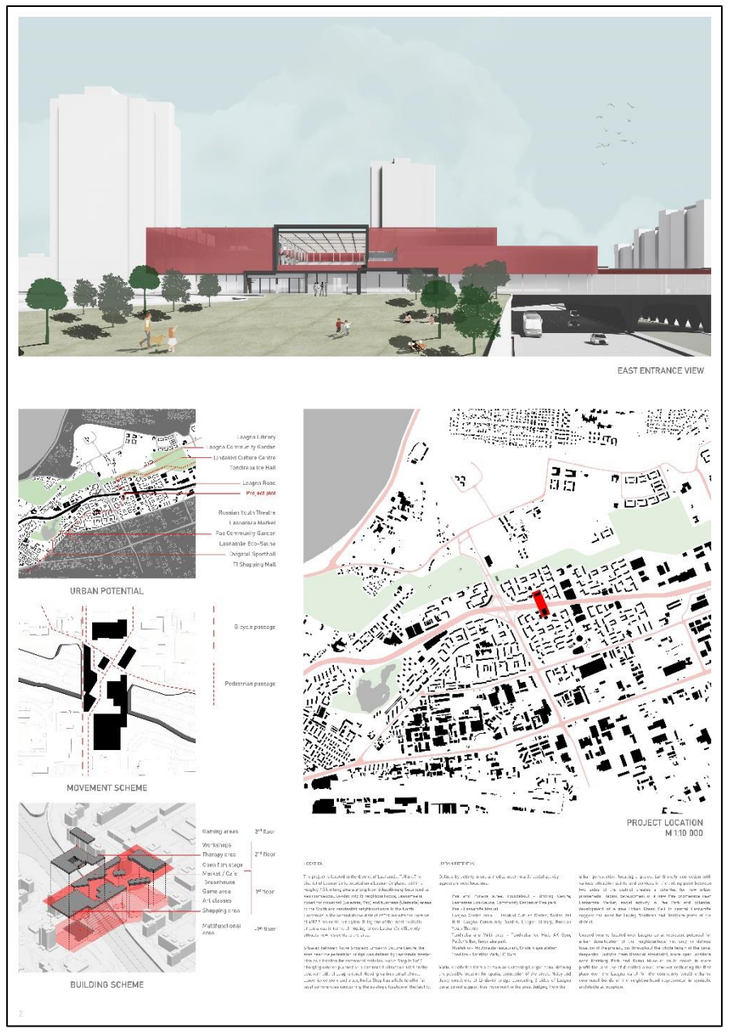
There is an example of public space with rooftop greenery that is located on the upper floor of Solaris centre in Tallinn - café Komeet.

- How do light conditions affect plants and vegetation in community gardens?

With the sun must come the water. Extensive sunlight might damage sensitive plants; thus, it might be a smart solution to implement automatic irrigation systems. Although there are many plants that perform well in urban environments, for example plants from mountain and Mediterranean areas

9. POSTERS


COMMUNITY CENTRE OVER LAAGNA ROAD
INFLUENCES OF URBAN DENSIFICATION ON SOCIAL SUSTAINABILITY
AUTHOR: NIKITA BERENDEJEV
SUPERVISOR: EMIL URBEL
TALLINN UNIVERSITY OF TECHNOLOGIES
2023
LAAGNA
KOGUKONNA KESKUS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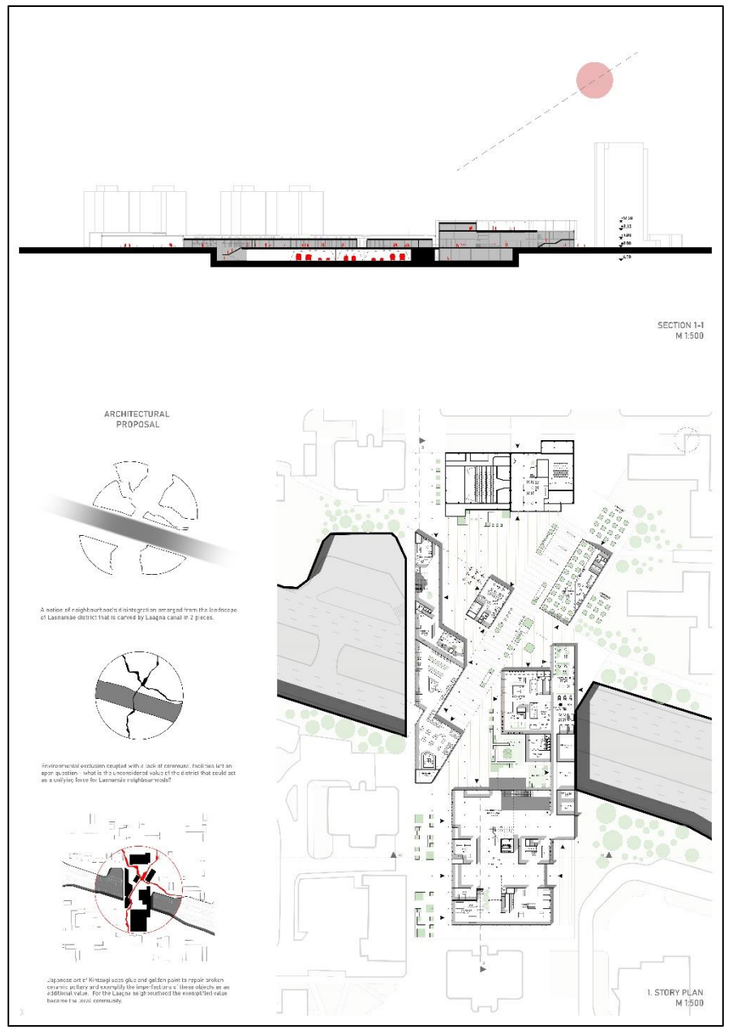
URBAN POTENTIAL
MOVEMENT SCHEME
BUILDING SCHEME
PROJECT LOCATION
M 1:10 000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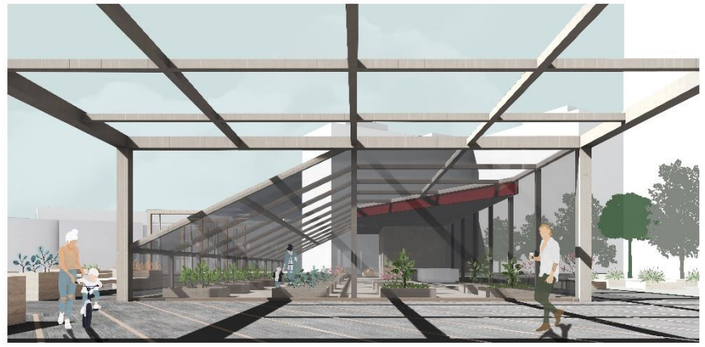
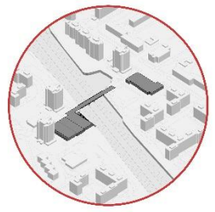
ARCHITECTURAL
PROPOSAL
1. STORY PLAN
M 1:500



COMMUNITY GREENHOUSE VIEW



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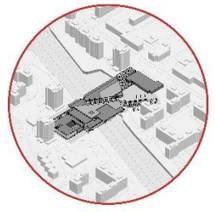
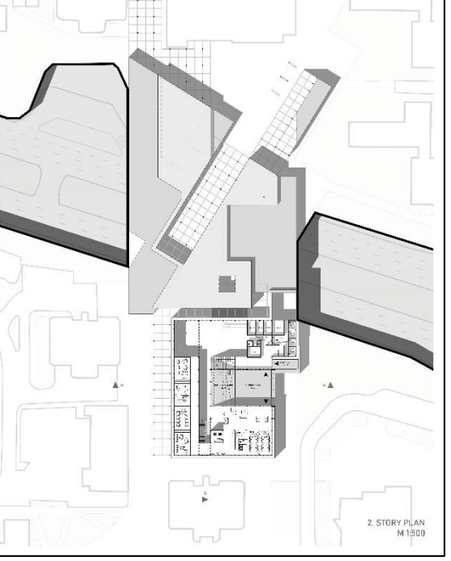


PROPOSAL

The core of a project consists of a repurposed Kicho Shop facility and a plate stretching over the Lisagno Road, providing green and flexible for commercial activity. Existing composition provides comfortable pedestrian passages with flat crossing several secluded recreational spaces. A catch-like passage is located on the side of the plate, secured with transparent barrier and covered by extended cycling. The composition of pedestrian passages is defined by local points of interest - Lisagno community garden and library, Tordinona los Arcona, Russian Youth Theatre.



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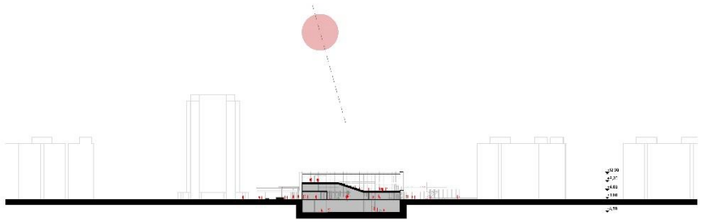

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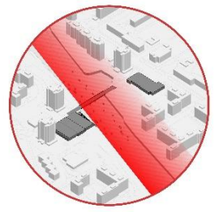
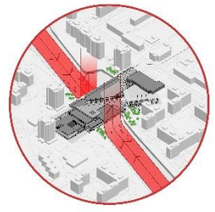
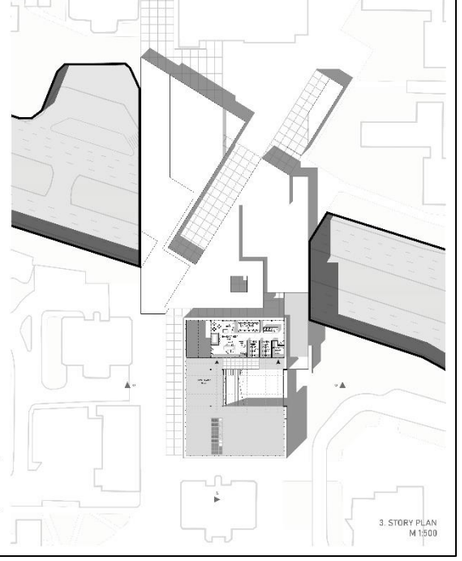


NOISE- / AIR POLLUTION



COMFORTABLE PASSAGE

Project promotes the usage of alternative transport modalities conferring the usage of public transport, bike and pedestrian passages. The bus-loading area is located near several recreational areas and the connection to the neighbouring level is ensured by elevators and escalators. The lower section of pedestrian movement is accompanied by the variability in terms of privacy and functions of the areas along the passage, several travelling modalities are provided with a simple and straightforward linkage between attraction points. Introduced facilities and shading structures along the pedestrian passage over the Lisagno Road provide air- and noise barriers.



3. STORY PLAN
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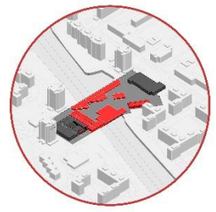
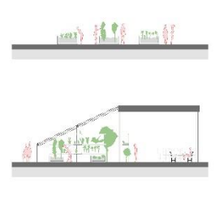
OPEN-AIR CINEMA VIEW

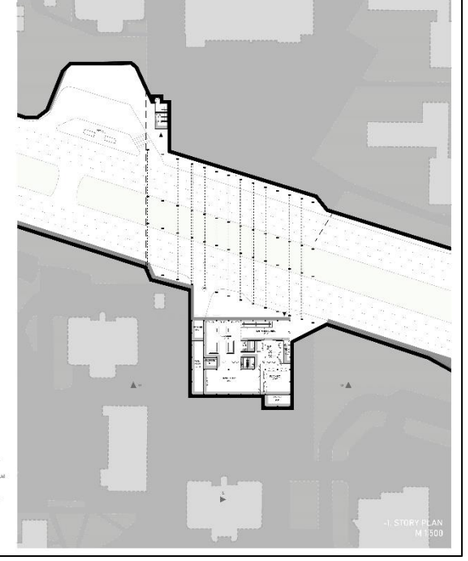


DENSIFICATION



COMMUNITY GARDENS

Reusing the existing structures of the building is considered to be an environmentally sustainable densification strategy. The limitations in terms of required volume of community centre are redressed with inclusion of unused volumes above Lisagno canal into the areal program. Enhancing local biodiversity, introducing community gardens continuities to natural sustainability of the area. Located on a strategic location the community centre has a potential to introduce new means of development of the district, of Leonardo creating usable spaces above the unused volumes of Lisagno canal.



-1. STORY PLAN
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