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A New Approach for an Enhancement Method of Existing Built Environment: Contextual Sustainability of Antalya

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ABSTRACT

Existing structures have significant potential to control urban growth and resource consumption. Several studies are focused on enhancing the energy efficiency of current buildings and evaluating their adaptability. Nevertheless, the main issue lies in the lack of a comprehensive method that seeks to achieve the sustainability of already constructed structures on an urban scale. In this study, the concept of "contextual sustainability" reveals the necessity of an enhancement method that suggests that the sustainability of distinctive built environments depends not only on their structural integrity but also on their social and spatial connection capacities with the existing urban texture. The aim of this research is to support the sustainable enhancement of existing buildings in the city center by using a "contextual sustainability" approach. This process included identifying both common and unique character areas and focus axes by the headings of Settlement, Street Pattern, Architectural Design, Block Layout, Building Types, Land Use, Accessibility, and Place Identity under the "contextual analysis" method. Following this, "scenario-based enhancement plans" are created for each identified character area and focus axes. In conclusion, the "contextual sustainability" method highlights that each urban area has a unique role, requiring tailored enhancement strategies. Enhancement scenarios benefit the environment and promote social, cultural, and economic growth, supporting broader urban sustainability goals. Therefore, existing buildings with different structural features and socio-cultural uses should be considered within the context of their environment before enhancement. Integrated solutions with high-scale urban goals should be determined. Enhancement approach not only envisions the integration of existing buildings into urban uses and targets also provides a practical roadmap for doing so. Tailored to each building's environmental context, this method, which can be applied to other cities, offers a valuable guidance for urban planners and designers in diverse urban settings.

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1. Introduction

Today, 3.6 billion people live in cities, projected to increase to 6.3 billion by 2050 (Department of Economic and Social Affairs, 2019). This rapid growth disrupts the urban landscape and lifestyle (Çaglayandereli, 2005). Besides, the disruption in city centers results in functional displacement, creating challenges for urban development globally (Baransu, 1989). Consequently, urban policies prioritize "integrated sustainable urban development" (Dixon and Eames, 2014).

The 2030 sustainable development goals emphasize sustainable urbanization (United Nations, 2015). While sustainable development initiatives green building construction aims to save energy, the challenge lies in the fact that existing cities cannot be demolished and rebuilt from scratch (Lajevardi, 2012). Green buildings are more sustainable than conventional ones but integrating green practices into existing structures is less understood (Miller and Buys, 2008), particularly regarding the enhancement of long-lasting building stock (Nägeli et al., 2018). Therefore, urban transformation and renewal have aimed to address the economic, social, and environmental challenges since the mid-twentieth century, leading to diverse revitalization approaches at various scales (Tallon, 2010), such as urban redevelopment, rehabilitation, refurbishment, revitalization (Jones and Williamson, 2011; Sert, 2007). However, sustainable urban regeneration should integrate planning goals to enhance urban life within environmental limits (Lee and Rhee, 2008).

Existing building stock in Europe is estimated at 150 million housing, of which %70 is over 30 and %35 is over 50 ages (Balaras et al., 2004). There are more than 11 million buildings in Turkey. By 2080, the number of residential buildings is estimated to increase by 25%, reaching over 12 million (Tunç, 2021). In this respect, the "Renovate Europe" aims reduce the energy demand of buildings by 80% by 2050 (Renovate Europe, 2024). The European Commission plans to renovate 35 million buildings by 2030 as part of the "Renovation Wave" (World Green Building Council, 2021). Nevertheless, large-scale renovations often lead to excessive resource use as developed countries prioritize economic interests in urban renewal, neglecting public concerns. Small-scale renovations cannot adequately address community needs or provide livable spaces (Liao et al., 2023). In contrast, neighborhood-scale initiatives offer better opportunities for integrated improvements (Verosek et al., 2015).

For building renovation, several models have been developed to assess conditions and support decision-making processes (Juan et al., 2009; Kaklauskas et al., 2005), mostly focusing on energy retrofitting (Dadzie et al., 2020; Roberts, 2008). Most studies have concentrated on the contribution of existing structures to sustainability by lowering energy use and environmental impact (Jagarajan et al., 2015); also, energy performance assessment provides helping users make decisions for enhancements (Wang et al., 2012). Interest in the impact of maintenance on sustainability has increased, yet few studies have suggested indicators to measure this relationship (Douglas, 2006). These studies evaluate existing buildings in terms of physical integrity and performance on a single-building scale, which is insufficient for considering urban contexts and fails to propose a method that creates a holistic perspective. Beyond this, there are also financial, institutional, administrative, and technical barriers (Khodeir et al., 2023).

Even if a green building is built, maintenance is important to ensure building's performance efficiently (Franciosi et al., 2020). The role of buildings and their actual performance may decline due to external and internal factors (Douglas, 2006). Therefore, Langston (2008) developed a physical life calculator to evaluate existing structures and introduced the Adaptive Reuse Potential (ARP) model (Langston et al., 2008) to assess their remaining useful life. This model was tested using a multi-criteria sustainability assessment called SINDEX (Ding and Langston, 2004), focused on maximizing benefits while minimizing impacts (Langston and Shen, 2007). The ARP of structures was measured with ADAPStar, which considers physical, economic, and functional aspects (Conejos and Langston, 2010; Conejos et al., 2013). Additionally, Langston and Smith (2012) created a weighted matrix for adaptable interventions called iconCUR. On a larger scale, Bican (2016) created a matrix for enhancing social, cultural, economic, environmental, and livability aspects in urban regeneration, inspired by Kural's "place matrix." This approach emphasizes managing sustainability indicators in residential areas through "dimensions of place" and "sustainability elements" (Kural, 2009). Although these studies include a variety of social uses and functions at different scales, they are limited in including local relations and future scenarios. Additionally, social goals are not always realized in building adaptation (Wilkinson et al., 2009).

The significance of existing buildings holds immense potential in environmental, social, and cultural aspects. Therefore, the research and implementation of existing building-related practices are expected to grow in the coming years. However, a holistic perspective is lacking to consider existing structures within their broader environmental context and ensure their seamless integration into the urban fabric. On the other hand, historical cities are characterized as being human-scale, multi-functional, having a strong sense of belonging and identity, and having many features compatible with today's sustainable city concept (Hosagrahar et al., 2016). For this reason, the building stock in city centers, which represents the city in many aspects and is affected by the change and transformation due to urban growth, is particularly important.

The aim of this research is to present an upper-scale approach that can be applied in other cities to determine the enhancement method for the built environment in the city centers. The research introduces a method for incorporating existing buildings and building clusters into urban sustainability objectives. Unlike approaches that assess buildings on an individual basis, this method considers not only their structural integrity and adaptability but also their potential for social and spatial integration within the larger urban context. Existing buildings are examined by contextual relationships of the multilayered environment with sustainability. The proposed approach focuses on the preserved urban environment in the city center, considering various buildings and clusters. This offers a new, comprehensive perspective on understanding how to enhance existing structures according to city vision and sustainability goals, compared to methods such as adaptive reuse, renovation, and urban renewal,

and establishes the foundation for a method that can be applied in other urban areas.

2. Methodology

The article offers a widen perspective for determining the enhancement method of existing buildings in the city center, focusing on the concepts of sustainability, city and existing buildings.

In this sense, the study adopts Contextual Constructs Theory (CCT) and Contextual Analysis (CA) methods. At its core, CCT combines two essential parts of all research: (1) context and (2) cognitively driven constructs. The relationship between the two is also meaningful. CCT provides a comprehensive scaffold for research that requires conceptualizing constructs and contexts, which is ideal for complex problems. Contextual Model: A Process Consisting of four stages: 1) Conceptual, 2) Philosophical, 3) Implementation, and 4) Evaluation (Knight and Cross, 2012; Knight et al., 2010).

In the field study, as shown in the flow chart in Figure 1, the study's context consists of research involving the built environment and existing buildings. The aim is to adapt existing buildings to urban uses and provide a new perspective on the enhancement method to ensure their environmental, social, and economic sustainability. In this sense, the research has developed the concept of "Contextual Sustainability", which evaluates existing structures within their context through contextual analysis. This approach evaluates buildings in relation to the complex urban environment and creates enhancement scenarios specific to the determined character areas and focal axes.

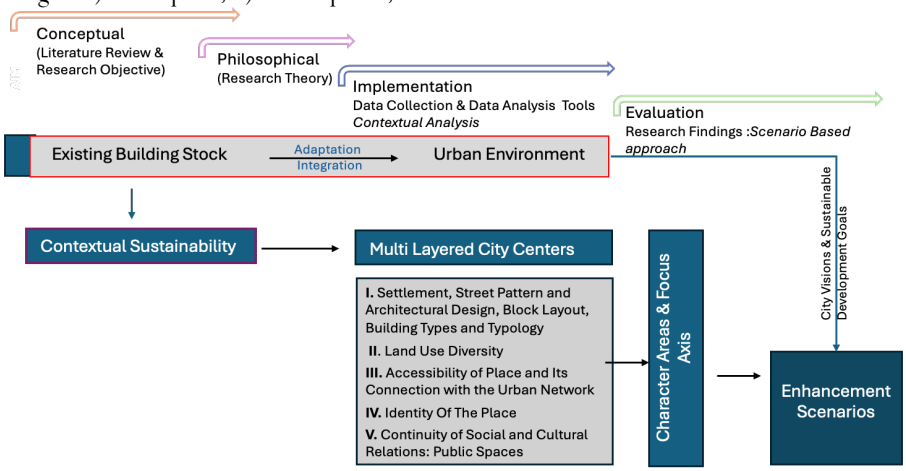

Figure 1 Methodological approach flow chart

Scenario planning assesses critical uncertainties and starts with a contextual analysis to identify key forces and predetermined targets (Avin, 2007). The scenario method is a planning tool for setting long-term goals in uncertain futures (Cabanes et al., 2023). This planning management requires reevaluating goals, strategies, structures, and resources, considering uncertainties (Ramírez & Selin, 2014). In scenario exercises and strategic analysis, SWOT analysis serves for contextual evaluation, while PESTLE (political, economic, sociocultural, technological, legal, and environmental) (van der Heijden, 2005) and STEPE (society, technology, environment, policy, and economy) frameworks help address contextual effects systematically (Avin, 2007). Therefore, in this study, the enhancement scenario development process was held with a data triangulation method, including field observation, spatial analysis, municipality strategies planning reports (Antalya Buyuksehir Belediyesi 2025–2029 Stratejik Plan, 2024), SWOT analysis (Protection Application and Inspection Offices–KUDEB, 2010), city visions (ATSO, 2019; Babüroglu et al., 2012; GYODER, 2017; Kentsel Vizyon Platformu, 2017), planning documents (West Mediterranean Development Agency, 2009; KUDEB 2010; KUDEB, 2011), and city council reports (Antalya City Council, 2024) Data Source Triangulation involves comparing and verifying data from different times, methods, and sources regarding the same subject (Patton, 1999). Bringing different data sources and methods together increases the reliability of the results and helps compensate for weak points (Carter et al., 2014).

The proposed enhancement scenarios consider not only physical environmental conditions but also planning visions, administrative priorities, and local decision-making dynamics. This approach enhances the study's contextual relevance and ensures compatibility with urban sustainability goals, supporting the theoretical concept of Contextual Sustainability with practical analyses.

2.1 Description of Study Area

Turkey has consistently included and referred to sustainable development policies in its National Development Plans (NDPs) since 1992, following the Rio Summit. The 11th Development Plan aims to create people-centered cities that respect nature and history, ensure fair access to urban services, and enhance quality of life (Presidency of Strategy and Budget, 2019). According to occupancy permit statistics, more than 100,000 new buildings are added to the building stock annually (Tunç, 2021). The National Energy Efficiency Action Plan aims to renovate existing buildings,

increase energy efficiency, promote sustainable green buildings, and improve the energy performance of existing public buildings between 2010 and 2023 (Republic of Türkiye Ministry of Energy and Natural Resources, 2018).

On the other hand, Antalya is a city directly impacted by national decisions and has established global relations independently since the 1980s. Antalya is a Mediterranean city with a population of nearly 2.5 million and a 630 km coastline known for agriculture and tourism. Tourism policies and demographic changes have influenced its urbanization. As can be seen in Figure 2, the city experienced rapid growth in the last 25 years due to tourism, resulting in uneven infrastructure and housing development.

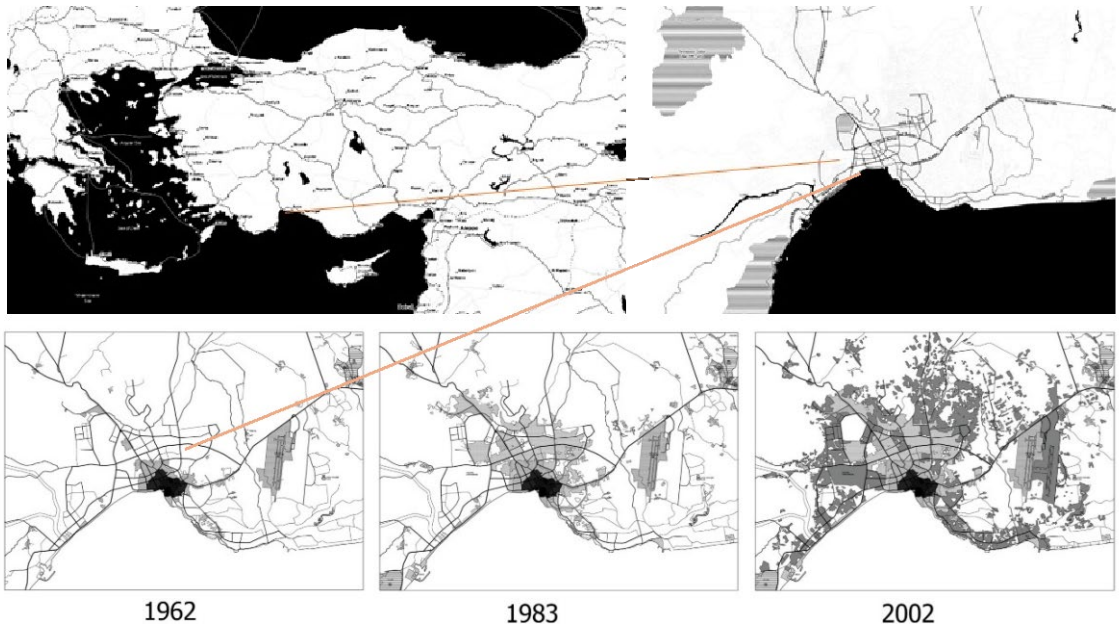

Figure 2 Location of study area and urbanization density over the years (Maps and Planing Unit (n.d)

The Antalya 2023 Vision (GYODER, 2017) focuses on environmental awareness, renewable energy, urban planning, trade, tourism integration, and quality of life (West Mediterranean Development Agency, 2009). City vision aims to preserve cultural and historical richness, promote renewable energy production, utilize local values, and increase awareness of the Antalya brand (Baburoglu et al., 2012). However, challenges include the lack of monuments, international organizations, and sustainable planning. Planned city center enhancements include reorganizing the old city, creating open green areas, and enhancing cultural activities (Kentsel Vizyon Platformu, 2017). Suggestions include restoring historical streets and revitalizing the urban fabric in the city center (Antalya City Council 2024; Baburoglu et al., 2012).

When considering urban renewal at the city level, Özden (2000), evaluates factors including urban deprivation, economic and geographical potential, infrastructure quality, and historic housing. According to Öcal and Ince (2012), transformed settlements are dense slums and illegal apartment areas at high risk of natural disasters and urban collapse. These include old city centers with dense building stock that are dilapidated and have completed their economic life. With this perspective, Hasim Iscan District is chosen as the study area because it represents the city's spatial layering and socio-cultural structure. Situated in the city center, it holds many landmarks and embodies the city's memory and urban identity. Due to these factors, it has great potential to be integrated into the city's future development goals and visions.

The Hasim Iscan neighborhood, situated in the Antalya city center east of the castle walls and adjacent to the old town Kaleici, has undergone significant changes since the early 1980s. Zoning plans specify building regulations, including "Adjoining Order - 8 Floors" along the main boulevard, "Block Order - 7 Floors" on Isıklar Boulevard, "Block Order - 5 Floors" on Arık Street, and "Block Order - 2 Floors" in the neighborhood's interior (KUDEB), 2010). However, the rise of high-rise buildings has isolated the area and diminished its integration within the city (see Figure 3).

Figure 3 General view of the study area

In 1990, the Municipality organized an urban design competition to address the issue of "Urban Identity" arising from tourist activities in the city center. The goal was to design a city center that supports urban living, enhances the city's identity, promotes tourism, and balances renewal with the preservation of its historical heritage (Gül, 2006).

After that, in 1993, the Hasim Iscan neighborhood was declared an Urban Protected Area (see Figure 4). KUDEB has prepared planning studies for 39 examples of civil architecture. The city center was designated as a "Culture and Tourism Protection and Development Zone" in 2004 and as a "Central Conservation and Transformation Area" in 2005. The plan aimed to decentralize working areas, functionalize, revitalize, and develop tourism. A protocol was signed in 2006 to transform the traditional city center into a "Historical Cultural Centre" to protect cultural and natural assets and create strategies for local ownership and implementation. Conservation zoning plan studies were conducted in 2010 for neighborhood development (KUDEB, 2010).

Transformations in the Kaleici (oldtown) Archaeological Protection Area have successfully set a national example and impacted tourism. Despite its experience in protection and transformation, the city struggled to make a similar impact in historical areas like Balbey and Hasim Iscan neighborhoods. For this reason, the study considers the implementations from Kaleici while developing enhancement scenarios.

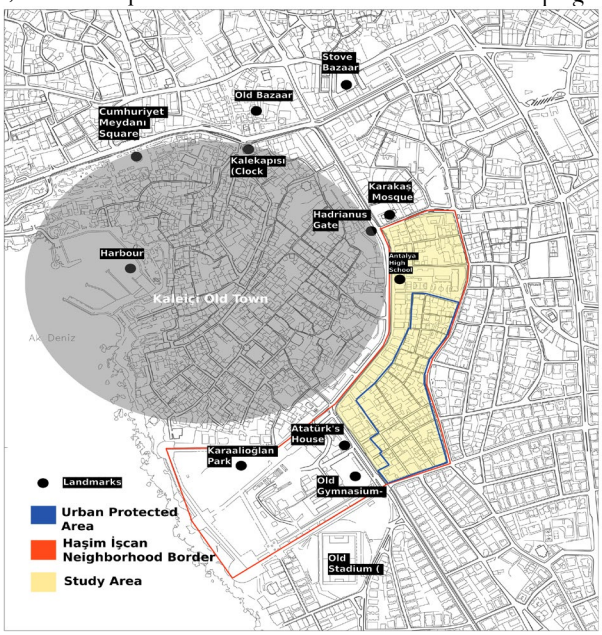

Figure 4 Location of the case study area

Despite being a protected area, the region has aged and now has a unique mixed built environment. It has potential for tourism and preserving urban memory but struggles economically due to its inward-looking structure. In addition, investment in the city center is expected to continue with renovation and ongoing transformation projects.

2.2 Data Collection - A Selection of Respondents

The data about the area in this study consists of primary data obtained from on-site observations in multiple times, municipal reports, planning maps, and research. The study sees contextual relationships as a fundamental element in ensuring the sustainability of the existing built environment. Examining the local context of sustainability under the concept of Contextual Sustainability focuses on the local situations hidden in the city layers. It proposes scenario-based enhancement for the character areas limited by physical and social relations by considering the city as a stack of layers. In this sense, the concept of Contextual Sustainability, as exemplified in the work of Bican (2016), includes the concepts of social sustainability and livability, while, as inspired by Vallance et al. (2011), local concerns about daily contexts, making decisions, and acting accordingly. It should also include contextual adaptation and the ability to automatically execute or modify a service according to the current context (Dey, 2014).

Using the Contextual Analysis (CA) method to expand Contextual Sustainability in the field, the aim is to work with internal relationships, evaluate different parts in relation to each other, and evaluate how they depend on each other in terms of their meanings.

In this sense, Contextual Analysis (CA) is the collection and processing of data on a case-by-case basis. Conceptualizations are based on distinguishing these entities as a whole. Within the case as a whole, the meanings of the parts of the case are distinguished; that is, the case is considered to consist of some interrelated parts. By parts, it means both aspects and components of the phenomenon. Conceptualization is concerned with the meaning of the whole based on the meanings of the parts and the relationships between them as seen in the larger context (Svensson, 2021).

The CA method is not just a theoretical concept, but a practical tool that can be used to understand the context of the built environment in the city center. This application is particularly relevant in the field of urban planning, where the city is considered a mass of social and physical layers as Arıkan and Gökmen (2016) defined the city as a collection of layers consisting of social forms and human-created environments. Mumford (2011), on the other hand, states that instead of relying solely on the massification of the population to produce the necessary social concentration and social drama, these results should now be sought through conscious local nucleation and a more sensitive regional articulation. Additionally, the importance of considering the continuity of space in the context of the past, present, and future. It is crucial to assess the economic, social, and physical heritage that accumulates over time as well as the changes that occur as a unified whole (Arıkan and Gökmen, 2016). According to Mumford (2000), the field can be considered an instantaneous whole in terms of all functions of social existence. Lewis Mumford states, "The city that is perceived only when looking at the current moment is actually the result of the accumulation of layers that differ from each other in an unfinished and never-ending cycle of change." (Arıkan and Gökmen, 2016). According to Tan (2013), a separate effort is required to understand the countercultural representations produced in the neighborhoods and the changing economies, ethnicity, multicultural structure, and the data of the locality reproduced in the neighborhoods.

2.3 Data Analysis

What is at issue here in CA is not the defined general meaning of the units but a clear starting point in phenomenal situations as a whole and discerning the meaning of the parts as internally related parts within the whole (Svensson, 2021). Here, when the city is considered as a whole, as described in the previous section, the meaningful conceptualized parts of the whole are the analysis of the components of the multi-layered structure of the city center. The parts that make up the context and their relationships are examined under specific headings of multi-layered analysis based on the urban planning and neighborhood design codes referenced from work of Ergönül et al. (2019) and Mimar Sinan Fine Arts University (MSGSÜ) (2017) that listed below:

- Settlement, Street Pattern and Architectural Design, Block Layout, Building Types and Typology
- Land Use and Diversity,
- Accessibility of 'Place' and Its Connection with the Urban Network
- Identity of Place: Historical Ecological,
- Continuity of Social and Cultural Relations: Public Spaces

Analysis of internal relationships is a matter of interpretation aspects and components of the case/event. The main sections are examined as if they consist of smaller parts; the meanings of the main parts are explained by interpreting the meanings of the smaller parts according to their context. What represents the whole of the cases/phenomena, and what parts constitute these wholes? The focus is on finding the main parts that make up the whole together (Svensson, 2021). This crucial information will form the basis for implementing a sustainability-driven approach with defined character areas and focus axes, which is a promising strategy that could significantly upgrade the existing building stock in the area.

2.3.1 Settlement, Street Pattern and Architectural Design, Block Layout, Building Types and Typology

Changing standards depend on the typological differences of identity spaces and character areas, buildings, parcels, building blocks, streets, etc., in connection with the urban space scale in question (Ergönül et al., 2019).

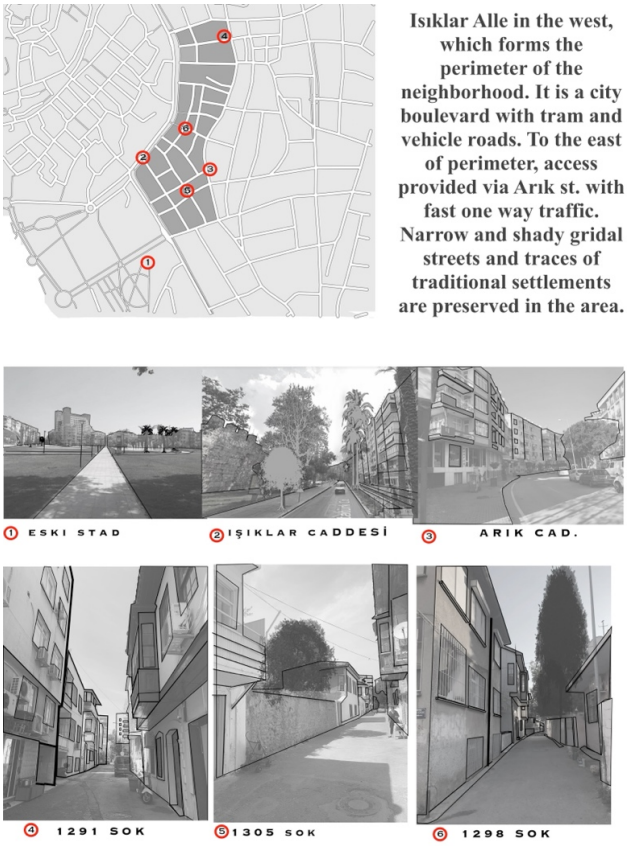

Figure 5 Settlement pattern and street type

While Hasim Iscan neighborhood is bordered by the city's most famous boulevard in the west (Isıklar Boulevard), there is Arık Street, which has a one-way traffic flow, in the east. For the streets within the neighborhood, which consist of traditional narrow and shaded areas, see Figure 5. The architectural settlement and building type-character of the region evolved over time, influenced by planning decisions and social and environmental factors. The neighborhood has transformed into a hybrid urban character, preserving some traditional housing texture while undergoing changes in structural and functional aspects.

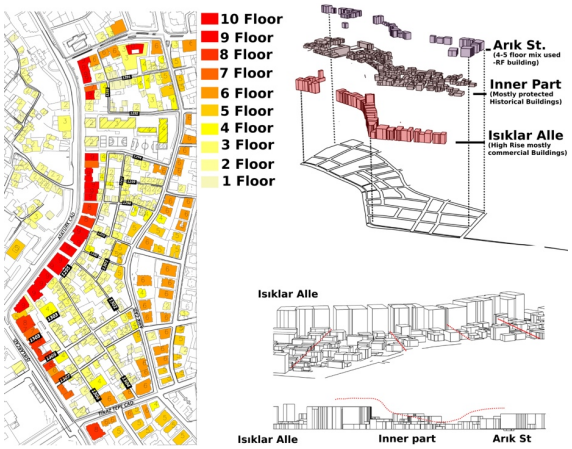

Figure 6 Block layout and building type

There are concrete mixed structures, 4-5 story buildings built between 1970 and 1980 on the eastern axes of the area, which can be considered as an example of modern architecture, and on Atatürk Boulevard in the west, reinforced concrete high-rise apartment blocks built after 1980. In short, as can be seen in Figure 6, when the layers forming Hasim Iscan District are examined through the building types of the axes of change in the historical process:

1. 1-2 story Traditional Buildings (Local- Vernacular Architecture)
2. 4-5 story detached apartment buildings 1970-1984 (National-Modern Architecture)
3. 8-9 story attached buildings 1980-2000s (mass production apartments)

2.3.2 Land Use and Diversity

To analyze the context, purpose, and land use relationships, as well as spatial and usage connections with other functions to support mixed uses, balanced distribution, inclusive neighborhoods, and consider land use, social equality, functional diversity, and alternative transportation connections. (Ergönül et al., 2020).

Hasim Iscan neighborhood, one of the earliest settlements outside the city walls for Greeks, has undergone significant social and functional changes. Studying its functional distribution is crucial in predicting its future and ensuring housing continuity.

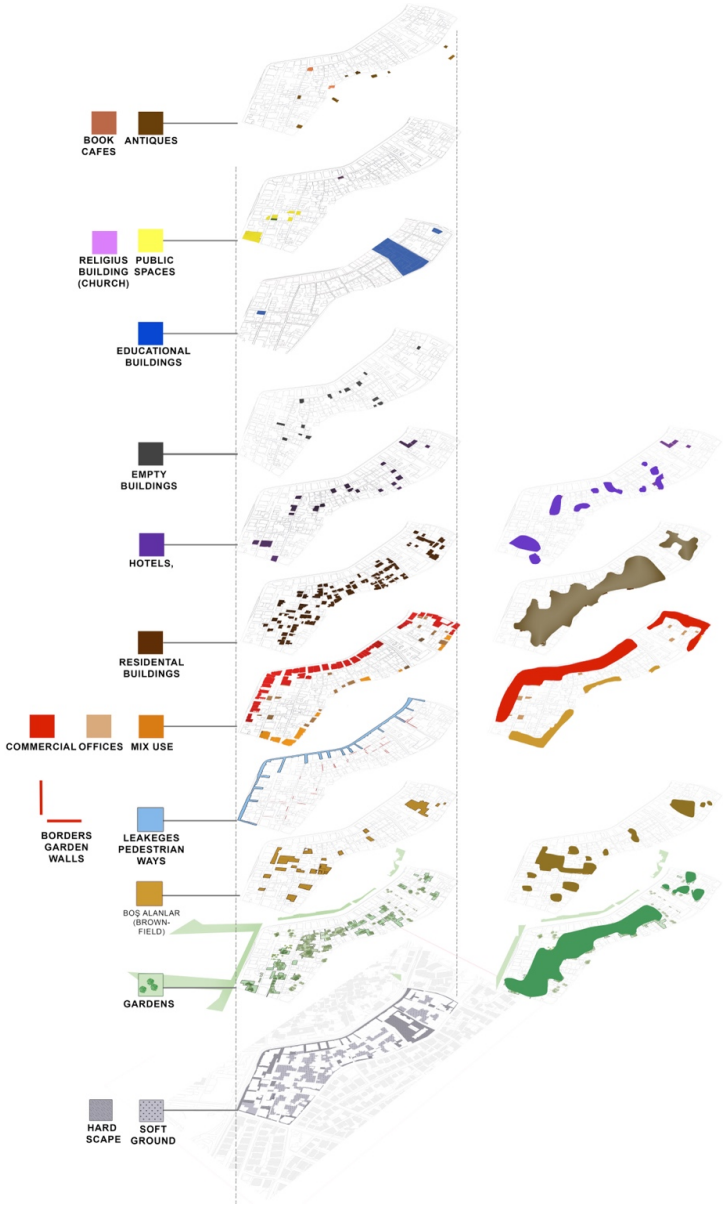

Figure 7 Ground floor functions and density

The neighborhood has high-rise apartment buildings and small standalone houses. It also has various commercial establishments and small-scale businesses, and has seen the emergence of hotels and hostels catering to tourism (see Figure 7). A notable landmark is the high school building with a walled garden, which could foster a stronger connection between locals and students. Considering the architectural building types, land use and functional diversity, the character area layers that make up the neighborhood are:

- High-rise buildings with commercial functions on Isıklar Boulevard,(main boulevard on west)
- Housing texture (inner part of the ne
- Mixed-function apartments on Arık Street, (east periphery)
- Green Areas and Gardens
- Vacant Lands and vacant buildings

2.3.3 Accessibility of Place and Its Connection with the Urban Network

As stated by Ergönül et al.(2020), given the project area's characteristics, it's important to implement sustainable transportation planning for connections between buildings and their surroundings while establishing an effective traffic pattern. Focus on axes that provide convenient transitions of the built form to neighboring areas, generally defining an urban structure with a high degree of connectivity (Ergönül et al., 2019).

Access to the Hasim Iscan neighborhood is possible by car and tram via the city boulevard. Although the narrow roads are open to vehicle traffic, the usage density is low due to the lack of parking lots. The main transportation axes are used as shortcuts within the neighborhood to reach the target points. The neighborhood serves as a transition area between Arık Street and Isıklar Boulevard, and the highest interaction with the area is experienced on both sides of Isıklar Boulevard (see Figure 8 for pedestrian routes and transportation).

Figure 8 Urban mobility and access framework

The area's integration into the city will be facilitated by transportation and interaction of usage areas. Creating routes to make the neighborhood a destination instead of just a transit area is essential. Pedestrian access between high-rise buildings on Isıklar Boulevard and bridges over the water arc allow movement towards Kaleici (old town). These routes also enable pedestrian access to Isıklar Boulevard, while offering narrow perspectives on the area's visibility.

Transportation layers of the existing area;

- Urban boulevard,
- Pedestrian and vehicle roads within the area,
- Backbone axes within the neighborhood

2.3.4 Identity of The Place: Transformative

The concept of space, which constitutes the identity of the contemporary city, is the place identity that is considered not in the sense of equality with anything else but in the sense of unity or individuality (Ergönül et al., 2019). For this reason, it is necessary to determine the focal axes to protect and develop the social relations and spatial contexts that form the area's identity and revitalize the urban memory.

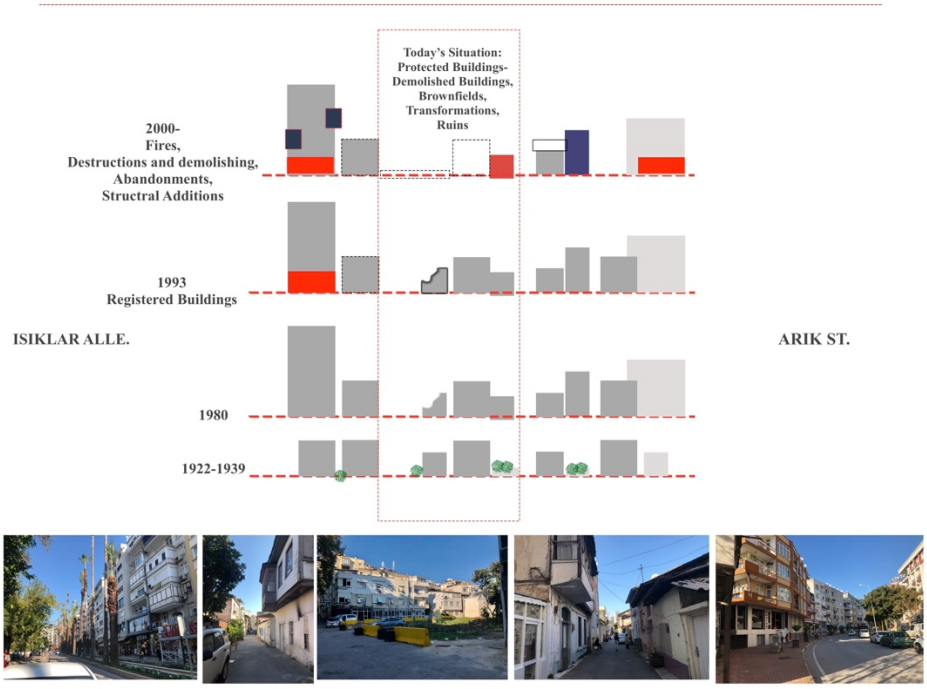

Figure 9 Spatial variations of the area over time

The study area has transformed over the years, and now different types of local zones can be observed, such as peripheral settlements and protected historical settlements, which have also evolved in terms of structure, function, and users, as seen in Figure 9.

Figure 10 Transformation process of the area.

The neighborhood is changing, as seen in Figure 10, with old buildings being transformed, abandoned, or demolished. Abandoned heritage buildings are left to their fate. In the revitalization process, it is important to include elements that symbolize the area's social and physical identity. Hybrid identity influences the area with diverse architectural structures and people such as tourists, urban dwellers, students, residents, small business operators, and workers.

2.3.5 Continuity of Social and Cultural Relations: Public Spaces

The physical characteristics of living spaces are important for social sustainability and also enhance the sense of community and place attachment. Public spaces play a crucial role in ensuring social sustainability and cannot be disconnected from society's cultural and social relations (Açık Etike and Erdönmez Dinçer, 2022).

Social sustainability relies on local relationships but needs global solutions. In the built environment, the key issue is understanding the performance difference between planned activities (ex-ante) and actual outcomes (ex-post) (Ergönül et al., 2020). The performative result sought in public space design determines social relations in social sustainability indicators such as sustainability localization, quality of life, livable environments, education equality, and accessibility.

Figure 11 Observations of street life and neighboring

While daily relationships such as eating and drinking, visiting, and commercial ground usage are observed on the main boulevard, meeting and encountering on the busiest street visited by many urban residents, the area differs in the inner parts of the neighborhood. This social relation and functional distribution are also considered for different zoning.

The study area features street use as a natural extension of residents' habits and culture, depending on the climate. The streets are vital for social interaction and are integral to daily life and local identity. The absence of public squares or parks in the neighborhood furthers the use of streets for gathering and leisure. The 1304th Street, with its concentrated street use, serves as the main backbone of the neighborhood, connecting residential and active areas. Street use in the neighborhood reflects its relationships, with building entrances opening directly onto the street and facing each other, as shown in Figure 11. Social participation plays a driving role in achieving sustainability by strengthening urban identity and promoting creativity, innovation, and access to culture for all creative and recreational economic sectors of the city, which can be one of the sustainable development tools that can be used. (The Reference Framework for Sustainable Cities: 5 Dimensions And 30 Objectives for A European Vision of Tomorrow's Cities, 2016).

As a common public space for the Hasim Iscan neighborhood, street use comes to the fore. For this reason, the street and spine axes, where neighborly relations are intense within the neighborhood regarding the existence of public spaces that form social layers, were determined.

2.3 *Analysis Results: Character Areas and Focus Axes*

In CA, comparisons between situations are the basis for making critical limitations between parts of the whole. Moreover, the purpose of comparing cases is to group components according to all their characteristics and the type of relationship to the context. This is achieved by comparing the similarities and differences between states of all features and relationships with contexts (Svensson, 2021).

In this sense, as a result of the multi-layered analysis, and by including the identity spaces and character field formations that make up the city character areas and focus axes were determined, and enhancement scenarios were created to address problems and potentials for each zone.

The identity spaces and character areas that make up the morphological structure of the city ensure the continuity of the details of the place, the way of construction, and, therefore, the holistic life of urban dynamics from past to present (Ergönül et al., 2019). In urban standardization projects, smart city codes and form-based codes aim to strengthen community-specific characteristics and protect local character in cities. Likewise, for prestige axes and focus areas, determining goals to ensure urban

integrity and establishing their relationship with the context comes to the forefront of the approach to be taken in the formation of urban identity. It's important to define the size, scale, and uses of structures within urban spaces to establish identity and character. User participation in designing buildings and interfaces is crucial for enhancing the quality of life. (MSGSÜ), 2017). Changing standards based on the typological distinctions of identity spaces and character areas should be defined in detail for urban elements such as buildings, parcels, building blocks, streets, etc., in connection with the urban space scale in question and their connection with higher-scale planning should be ensured (Ergönül et al., 2019).

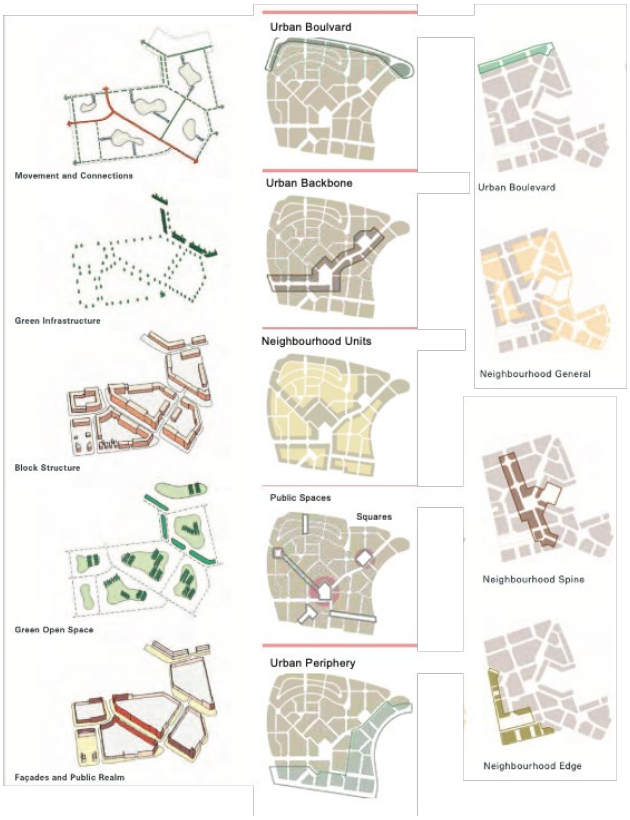

Figure 12 Adapted urban planning standards examples (MSGSÜ,2017), (Upton On Design Code, 2005), (Upton-By-Chester Neighborhood Plan Design Code, 2020)

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In this sense, context is considered not only as a network of social relations but also as the connection between spaces and the harmony of the place with the upper scale. Context is linked to identity because it is a place-specific value. Identity, a natural process, is the language and narrative of urban life. The factors that form this identity include the form of the settlement, its structural and spatial configuration, ecological relations, infrastructure, location, and especially the inhabitants' relationship with the place. Therefore, defining areas of character and identity is very important. Context is considered as a network of social relations and connections between spaces, shaping the identity of a place through its structure, ecology, infrastructure, and the inhabitants' relationship with it (MSGSÜ, 2017).

Character areas defined by the separation and convergence of physical and social connections have been identified, as stated in urban planning and standards, which are shown in Figure 12. The analysis grouped buildings into distinct areas with unique characteristics, as illustrated in Figure 13. The previous stage of the study involved analyzing buildings and building groups to categorize them based on typological and functional historical blocks and settlement patterns. There is the group of high-rise blocks with commercial and mixed-function ground floors built after 1980 on the city boulevard, which is the most dominant in the area, and the peripheral area consisting of reinforced concrete buildings with mixed-use, mainly housing and 4-5 story buildings bearing traces of national architecture on Arık Street, the western edge of the area. The inner part is mainly preserved, for the original dwelling part is 1-2 story wooden, wood-masonry, mixed construction techniques building group (see Figure 14).

(

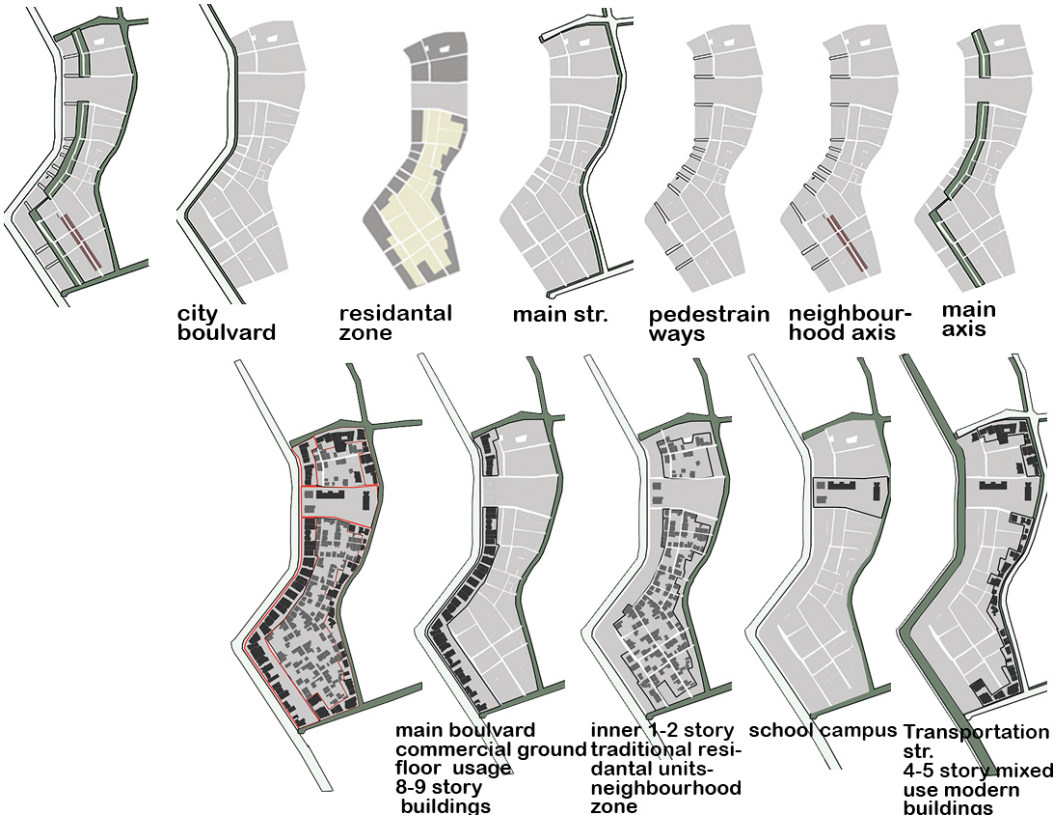


Figure 13 Street type and settlement character areas

Hasim Iscan District Character Areas in Figure 14:

1. Area where high-rise buildings are located on Isıklar Boulevard
2. Area associated with Arık Street on the periphery
3. Educational Zone
4. Protected Settlement Texture with mostly Residential

Figure 14 Character areas

The backbone axes, which form the main transportation axes of the area and are the most used, and the axes where neighborhood relations are intensely observed, have been determined as the focal axes of the region. In addition, other focal axes were determined by including the axes used as shortcuts for pedestrian transportation within the area and to the area into the routes that will interact with the city (see Figure 15).

Focus Axes created within the neighborhood area:

1. The backbone axes of the neighborhood: Trade Axes
2. Neighborhood Residential Axes
3. Transition Areas and Transportation Routes within the Neighborhood

Figure 15 Focus axes and routes

3. Results as Enhancement Scenarios

Hasim Iscan neighborhood has different character areas due to its multi-layered structure and its transformations. Scenarioizing of the enhancement method considers its contextual relationships towards sustainability. Scenario planning is a strategic management tool that enhances decision-making by envisioning future scenarios and mitigating risks (Cordova-Pozo and Rouwette, 2023; Varum and Melo, 2010). Scenario planning explores long-term change and tests strategies, requiring creative thinking beyond existing paradigms (Cordova-Pozo and Rouwette, 2023). It serves different purposes—from visioning to strategy testing—(FHWA, 2011) and should align with project goals (Ange et al., 2017), eventually becoming part of the contextual environment (Avin, 2007).

The research field in the city center offers a multi-layered perspective with various fragmentations, reflecting the ongoing change and transformation process. The proposed enhancement approaches for each character area and focus axes are defined qualitatively using a deductive method, as shown in Table 1 and Table 2, that aligns with the city's vision and sustainability goals. Deductive Scenario Construction provides a framework for developing scenarios by identifying general patterns in data, progressing from general to specific (van der Heijden, 2005). In this direction, qualitative scenarios consist of comprehensive descriptions, including texts, visuals, and maps explaining future developments (Abou Jaoude et al., 2022).

The general purpose of the field study, as mentioned in the city vision works and research, is listed below:

- To increase the visibility of the area by the citizens, as stated in the urban vision,
- To prevent structural obsolescence and subject abandonment of registered buildings within the urban protected area,
- To eliminate the danger of fire and destruction in areas,
- To be able to involve local people in current functional changes,
- Creating a business model and financing model for living residents,
- To ensure that the area becomes the specified destination point rather than a transition in the use of the area by the citizens,
- Incorporating the area into festivals held nearby,
- To make street and facade arrangements by highlighting the urban identity,
- To create qualified public spaces with high spatial quality, which can be intersection areas with the urban population, based on the street use of the local people,
- To ensure the spatial transformation of vacant brownfield lands by using transportation, etc., infrastructure.

Table 1. Enhancement scenarios for character areas (Antalya City Council, 2024) (Babüroglu et al., 2012)

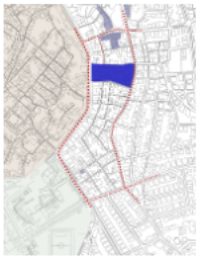
CHARACTER AREA: HIGH-RISE BUILDINGS ON ISIKLAR AVENUE		
	The 9-10 story buildings on Işıklar Street affect visibility and create sustainability concerns. Historical buildings are overshadowed, and there's a contrast in street usage and density.	
	S.1	Creating strategies for Energy Consumption
	S.2	Facade Arrangement
	S.3	Adding Building-Scale Waste and Recycling systems
	S.4	Improving ground floor uses: activating the rear facades of the building used as warehouses and facing the area
CHARACTER AREA: 4-5 STOREY BUILDINGS ON ARIK STREET		
	Buildings on Arık Street feature a mix of modern and apartment building architecture. Ongoing urban transformation projects aim to preserve modern architectural heritage while implementing new construction and materials. It's important to protect the facades with modern architectural traces.	
	S.5	Structural Strengthening
	S.6	Making facade improvements and highlighting architectural identity elements
	S.7	Improving ground floor usage and increasing spatial quality
	S.8	Ensuring that antique dealers participate in the urban network and collaborating with hotels
CHARACTER AREA: NEIGHBOURHOOD UNITS MAIN RESİDENTIAL AREA		
	The main residential area has a mix of vacant and occupied buildings, with vacant land and unused buildings. The goal is to connect transformed structures with existing ones, increase the neighborhood's capacity, and preserve the housing texture. Cooperation with family businesses and hotels is planned to boost economic welfare.	
	S.9	Planning the vacant lands in the area as public intersection points
	S.10	Solving the infrastructure problem of the area - making parking arrangements
	S.11	Creating family businesses with residential users and creating employment opportunities that integrate them into the existing system
CHARACTER AREA: Antalya High School-Education Zone		
	Antalya High School, one of the city's symbolic buildings, consists of 125-year-old historical twin buildings, educational structure, administration building, and open areas, dividing the area into two parts, north and south. It aims to connect the young population with housing and integrate activities, trainings, and seminars with the local people to increase the region's resilience in education, employment, and demographic structure. It also aims to involve local people in the institution's events and ensure high school students participate in festivals and events to benefit from their observations and ideas.	
	S.12	Involving local people in training, seminars and events held at the educational institution
	S.13	To ensure that high school students take part in installations and festivals in order to benefit from their observations and ideas about the field, and to make them a part of the organization.
	S.14	Considering the students' movements in the city arising from their social use, including the student profile as a user in the secondary commercial axis to be created in the neighborhood, associating it with the theater center, book cafe, culture house currently located in the neighborhood can be related to S:15.

Table 2. Enhancement scenarios for focus axes

FOCUS AXLE: THE SPINE TRANSPORTATION OF THE NEIGHBORHOOD AND COMMERCIAL AXLE		
	The main axis is being redeveloped to create new commercial spaces, reduce congestion, and improve safety and security for residents and visitors. The plan is to re-function the area for commercial use, creating new job opportunities and reducing the concentration on main boulveard. .This transformation aims to enhance the neighborhood's self-sufficiency and visibility while addressing security and nighttime usage concerns also new point of meetings for locals.	
	S.15	Installation of commercial functions and improvement of existing workplaces in order to plan it as a secondary axis that will be an alternative to Işıklar Street.
	S.16	Creating a social reinforcement area and a center of attraction that will create employment for the people of the neighborhood
FOCUS AXLE: RESIDENTIAL TEXTURE AND STREET USE, NEIGHBORHOOD RELATIONSHIP		
	The neighborhood of Haşim İşcan is known for its diverse ethnic structure, hosting the gastronomy, old town, religious festivals and vibrant street life. The close-knit community values neighborly relations and children playing in the streets. Efforts are being made to integrate the area into city-wide festivals and reflect the cultural richness of the Old Town in the neighborhood.	
	S.17	Incorporating street use into designated routes within the neighborhood
	S.18	Highlighting and protecting door sills
FOCUS AXLE: TRANSITIONS,SHORTCUTS AND ROUTES		
	The connection points between high-rise buildings in Haşim İşcan neighborhood serve as pedestrian entrance points, allowing passage between Işıklar Street and Kaleiçi. There are plans to redirect pedestrian traffic to make it a main destination.	
	S.19	Establishing the connection between Işıklar Street and the area: assigning guiding and attractive functions to ground floor uses in transition areas
	S.20	Urban use and assignment of public space and infrastructure functions to vacant lands in the area
	S.21	Creating touristic stopping routes that include the Karaoğlan Park, Old Stadium, Vatan Kahvesi, Işıklar and Kaleiçi route and spread throughout the city. (Fig.17)

This study highlights the role of sustainability in enhancing urban environments, particularly in rapidly urbanizing areas like Antalya's Hasim Iscan neighborhood. It highlights the importance of considering local contexts to create enhancement scenarios that align with city targets, acknowledging the unique intentions of each area and stakeholder in urban use.

In residential areas, the emphasis is on enhancing public spaces and achieving functional balance to prevent displacement and boost economic resilience. In the education zone, supporting students' social needs and involving locals in community activities is vital. Reducing the environmental impact of high-rise buildings on Isıklar Boulevard and reinforcing 4–5-story modern structures on Arık Street are also key interventions.

The proposed holistic enhancement scenario approach involves functional adaptation, structural reinforcement, and stakeholder collaboration. By integrating sustainability goals with local needs, the framework promotes livability across social, cultural, economic, and environmental dimensions.

4. Conclusion

This study proposes a "Contextual Sustainability" approach for enhancing existing buildings in urban multi-layered settlements based on Contextual Constructs Theory (CCT) and Contextual Analysis (CA). The analysis of the city center's building stock focuses on Layout, Street Pattern, Architectural Design, Block Layout, Building Types, Land Use, Accessibility, and Place Identity, including historical and cultural aspects. This framework classifies buildings into character areas and effectively proposes enhancement scenarios.

The built environment in cities encompasses physical, geographical, socio-economic, and governance aspects such as "urban renaissance" and "sustainable community." Knowledge mapping should recognize its complexity in three axes: existing/new buildings, physical/social, and scale. Sustainable development can be valid for building, neighborhood, city, regional, national, and global scales (Dixon and Eames, 2014). The study focused on enhancing the social, environmental, and economic aspects of existing buildings in Antalya city center through a sustainability approach. It sought to establish a holistic

relationship between buildings and the city by aligning sustainability targets with the city's original goals.

The existing literature has increasingly researched the development of old building stock worldwide, especially in Europe, with efforts to increase energy efficiency and structural reinforcement. Unlike the literature, the proposed approach goes beyond technical targets and integrates contextual elements such as cultural identity and social continuity into the process. Evaluating existing buildings in terms of their relationships with the city and changing socio-cultural practices is important for ensuring long-term sustainability.

4.1 Main Findings

The study highlighted that Contextual Sustainability can be applied to cities as a holistic blend of different urban layers. Analyzing the spatial and social components revealed different character areas with varied contextual relationships in urban settlements. The field study in Antalya's city center presents a scenario-based enhancement approach aligned with urban planning and sustainability goals. The scenarios are tailored to specific character areas identified through field observation, analysis, and relevant literature. Methods applied in terms of the enhancement of existing buildings can be grouped under the following thematic headings:

- Social participation and local integration,
- Ground floor usage and revitalization of urban activities,
- Protection of cultural heritage and highlighting identity elements,
- Social participation and local integration,
- Evaluation of empty areas and infrastructure development,
- Arrangement of pedestrian-oriented transportation and transition routes,
- Energy efficiency, structural reinforcement, and façade improvements.

Urban vision and sustainability goals guided the integration of character area-specific enhancement scenarios into urban use and sustainability. The scenarios support each other, forming an integrated roadmap for a long-term urban vision. A key finding is that they are diversified based on spatial differences and shaped by each character area's unique physical, social, and cultural dynamics and focus axes. This reflects the flexibility of the Contextual Sustainability approach and emphasizes multi-scale, multi-layered interventions rather than a one-size-fits-all solution for enhancing urban environments.

4.2 Study Limitations

The study utilized publicly accessible strategic planning documents for Antalya, the municipality's reports, and literature research. It focused on Antalya's city center, particularly Hasim Iscan Neighborhood, and was informed by local planning goals rather than a general urban development model. The field study is limited by the neighborhood's physical, social, economic, and demographic characteristics. The study area has great potential due to its historical and cultural significance, but regulations on registered buildings restrict possible changes and limit proposed plans.

One main objective of the study's scenarios was to propose economic models and strategies for functional transformation that help local residents remain in the neighborhood. However, user participation is crucial in these approaches, and human behavior's unpredictability makes planning less predictable. The implementation of the models relies on technical analyses, support from stakeholders (municipalities, private sector, NGOs), and incentive structures. Since physical interventions have yet to be implemented, the applicability of the proposals depends on local conditions and governance structures.

4.3 Further Discussion

The following research phase will detail Contextual Sustainability as a holistic urban planning tool and test its applicability in similar settlements. This process will focus on determining and evaluating optimal physical and social interventions to enhance existing structures, particularly at the neighborhood and building levels.

Contextual Sustainability's key contribution is its ability to yield varied results in different cities due to its emphasis on location specificity. Each city has its own dynamics and built environment, so using the same approach can lead to varying results and sustainability-enhancement scenarios. This situation increases the potential of existing structures to contribute to sustainable urban development in various fields. Therefore, the method is not only sensitive to unique contexts but also offers a highly adaptable and reproducible model. These analyses, backed by successful examples, will enhance the theoretical framework of the Contextual Sustainability approach and its application in various cities.

Considering the increasing uncertainty and complexities in urban planning, scenario-based approaches stand out as an important tool for developing future predictions (Abou Jaoude et al., 2022). The study diversified the enhancement scenarios by considering the specific potential and problems for each character area and focal axes. Scenario studies in urban planning vary because each is carried out in a unique context with different purposes and methods (Stojanovic et al., 2014). Urban problems arise in a specific geographical, economic, and political context (Andersen and Leather, 1999). Each city needs to be redeveloped considering its own historical, visual, functional, social, cultural, economic, and administrative characteristics (Baransu, 1989).

Contextual Sustainability emphasizes the significance of local factors in urban development by evaluating buildings within their specific environments. This approach enhances physical elements as well as the area's identity, history, and social dynamics. It promotes sustainable intervention models that consider future urban scenarios. Scenario-based approaches can enhance existing structures by providing flexible solutions that address social, environmental, and economic aspects of sustainability. However, effective processes require active planning participation from local governments, experts, and users. In return, the need for an integrated approach that

explicitly links urban scenarios to strategy development has been emphasized (van der Heijden, 2005). The proposed framework offers urban planners and municipal authorities a strategic tool to integrate sustainability goals across multiple scales, applicable in historical and mixed-typology urban centers.

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Conflicts of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper

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