



Research Article

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Unveiling the Subterranean Heritage: A Case Study of the Underground City of Kukës, Albania

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Abstract

This paper investigates the viability of conserving and repurposing Kukës' underground city, which was built as a system of civil defence tunnels during the communist era in Albania. Beneath contemporary Kukës, the underground complex, which houses administrative offices and hospitals, is an important but underutilized historical and architectural asset. This study assesses the architectural elements, historical value, and present state of the tunnels using an extensive methodology that includes expert interviews, public consultations, on-site inspections, and archival research. Results highlight the site's dual significance as a historical landmark and a possible center for innovation and tourism.

The research offers strategic proposals for reviving the tunnels to strengthen the local economy, maintain cultural identity, and increase tourist attraction, drawing on foreign case studies. By promoting the inclusion of Kukës' underground city in larger regional development projects and considering both community goals and pragmatic concerns, the article adds to the current conversations in urban planning and cultural preservation.

Sustaining and repurposing Kukës' underground city has various benefits, including enhanced cultural tourism and economic resurgence that encourage sustainable growth, the paper points out. Still, challenges like deteriorating infrastructure, security concerns, and accessibility issues must be overcome. Urban planners and politicians can apply the research's practical implications by using it to develop a model for cultural preservation that aligns with modern social and economic goals.

A sense of shared identity and legacy among the local community's members is fostered by the initiative, which has significant social implications as well. The study has some drawbacks, including the need for significant funding and the potential for opposition from groups who do not recognize the advantages of these kinds of initiatives. To summarise, this research highlights the potential of adaptive reuse to bolster the sustainability and resilience of urban

ecosystems by offering useful guidance and strategies that may be used to comparable initiatives worldwide.

Keywords: Subterranean constructions, Bunkerization, Revitalization, Adaptive reuse, Resilience.

1. Introduction

Underground cities exemplify human ingenuity and adaptability, showcasing structures and networks hidden beneath the Earth's surface across various regions and eras. These subterranean spaces have been developed for numerous purposes, including protection from invaders, harsh weather, storage, and habitation. Notable examples include the Beijing Underground City in China, a Cold War-era bomb shelter complex (Zhu, 2017); Coober Pedy in Australia, where residents live in rock-carved homes to escape desert heat (Gökalp, 2014); and Naours in France, a medieval refuge repurposed during World War II (Fleury, 2020). Southeast Asia also offers significant examples, such as the Cu Chi Tunnels in Vietnam, used extensively during the Vietnam War (Tran, 2017). These underground networks highlight the diverse ways subterranean spaces have been utilized throughout history, demonstrating human resilience and resourcefulness in creating safe and functional living environments beneath the surface (Lluka, 2024).

Studying underground cities in Albania is crucial for understanding the region's historical strategies for defence and survival, particularly during times of conflict and occupation. These subterranean structures offer valuable insights into the architectural ingenuity and cultural practices of past civilizations in Albania, contributing to the broader knowledge of human adaptability and resilience. Additionally, preserving and exploring these sites can enhance cultural heritage tourism, fostering economic growth and international interest in Albania's rich history (Kovačić, 2023).

The Underground Bunker of Kukës stands as a testament to Albania's tumultuous history, representing a unique architectural endeavour with profound historical significance. This study aims to highlight archival documents to better understand the underground city of Kukës. Previously unknown, this structure occupies a large area beneath the surface of this northern city, presenting significant potential for both economic and tourist developments. Understanding and proposing ways in which this structure can be repurposed is of particular interest to us as architects and to the Municipality of Kukës. The site survey and visit conducted by architecture students offer a unique perspective on the intersection of history, politics, and architecture, providing a newfound appreciation for the complexities of Albania's past and the enduring legacy of its built environment (Bexheti, 2021).

2. Methodology

The methodology of the study takes a comprehensive approach to comprehending Kukës, the underground city. An on-site survey, as shown in figure 1, was carried out in cooperation with third-year architecture students in order to document architectural

features and make detailed observations. Then, the site's proportions and design were carefully measured, giving vital information about its external characteristics. A Google Drive-created online survey with 62 respondents from various cities was used to collect data. Public talks with Municipality of Kukës experts addressed the site's historical context and administrative difficulties. Speaking with locals and tour guides provided insights on the bunker's social importance and its function as a tourist attraction. Talks with urban projects also brought up the possibility of incorporating the underground city into larger plans for urban development. Through this varied approach, the study seeks to evaluate the underground city's potential for preservation, adaptive reuse, and integration into Kukës' urban landscape.



Figure 1 Students and staff engaged in fieldwork

2. Historical Context



Figure 2 A view of the city of Kukës as seen from Google Earth

Located in the northeastern part of the Republic of Albania, Kukës is a city with a rich and complex history marked by significant transformations. This story begins

with the old Kukës, a historic settlement depicted in picture 3, which was submerged under an artificial lake in 1976. This lake, now known as the expansive Fierza Lake, spans an area of 72.5 square kilometres, covering the remnants of the original town. The submergence resulted from the deterioration of dams built by the Chinese, necessitating a large-scale hydroelectric project. The creation of this lake served as a reservoir for a new hydroelectric power station, drawing its water from the confluence of two rivers: the Black Drini, originating from Ohrid Lake, and the White Drini, emerging from the Rugova Mountains of Kosovo. These rivers merge to form the Drini River, which flows to the Adriatic Sea via the Gulf of Lezha. Despite these drastic changes, the merging of these waterways has endowed Kukës with a unique peninsula shape, as shown in figure 2, offering stunning views in every season.



Figure 3 Historic Photograph of the City of Kukës (Source: Municipality of KUKES)

Emerging from the historical floodwaters, the new Kukës was established at the base of the towering Gjallica Mountain, which rises to 2,487 meters (Figure3, figure4). This modern city, one of Albania's newest, began construction in the 1970s on a plateau situated 320 meters above sea level. The city is surrounded by the serene waters of Fierza Lake and is connected to the rest of the country by three bridges (figure 5), providing picturesque views of the eastward snow-capped peaks of Gjallica.



Figure 4 The map of the new city of Kukës, highlighted in red, shows the underground city tunnels. (Source: Municipality of Kukës)

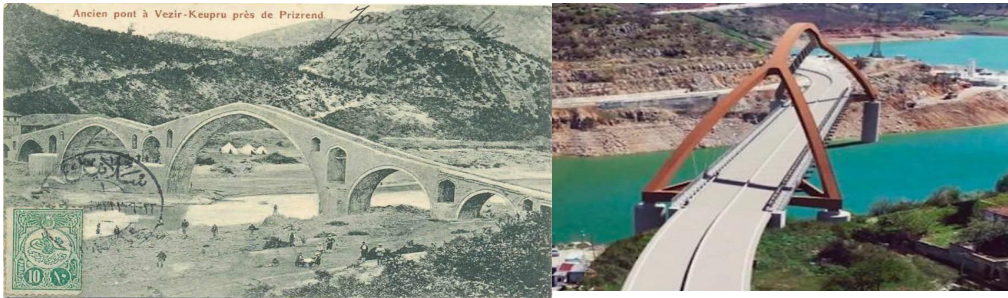


Figure 5 The old bridge (source Wikipedia) and new bridge (source: <https://gazetaeprizrenit.net/>) connecting the New city of Kukës with the rest of the country

Beneath the surface of the modern city lies another hidden layer of Kukës, which remains shrouded in secrecy and is inaccessible to tourists (Vimeo, 2012; Mydyti, 2012). Figure 6 illustrates the old city of Kukës, now submerged underwater, and the newly constructed city nearby. Beneath the new city lies an extensive network of tunnels, including a 15-kilometer tunnel, which is part of a larger subterranean complex. This structure is a remnant of the communist regime's extensive bunkerization program, designed to protect against potential invasions from Yugoslavia. Although this underground network is not open to visitors, it adds a fascinating and mysterious dimension to Kukës's already rich history, earning the city the nickname "three cities in one." This intricate layering of history and geography highlights Kukës's multifaceted identity and its remarkable journey through time.

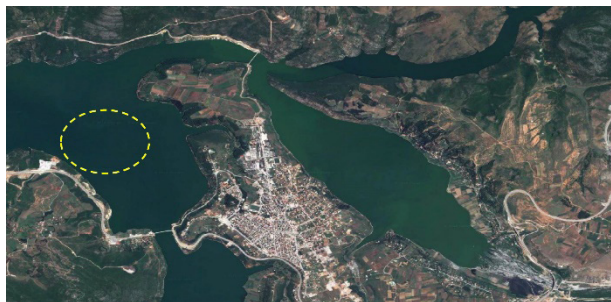


Figure 6 An illustration of the new city of Kukës, with dashed lines marking the submerged location of the old city. (Source: Authors)

After a thorough investigation, the underground city of Kukës has been shown to serve as both a historical landmark and a driving force behind modern socioeconomic advancement. This project not only pays tribute to the past but also opens the door for a thriving future by fusing innovative urban design techniques with historical preservation. Heritage protection and creative economic revitalization initiatives can work in harmony together, as this project demonstrates. It also emphasizes the

significance of community involvement in crafting sustainable development and provides a compelling model for comparable programs globally.

3. Architectural Features and Construction Techniques

After Albania's souring relations with Yugoslavia in 1949, the Soviet Union in 1961 and China in 1978, the country's communist government, led by Enver Hoxha, placed around 5% of its annual budget for military purposes. This consequently led to the construction of numerous types of bunkers throughout the country including those in customs areas, residential quarters, military zones and tunnel-shaped shelters under towns such as Kukës (Brunga, 2022).

The new city of Kukës, shown in figure 7, has a subterranean town constructed during the communist era; it is characterized by five-story buildings, as shown in the picture 4, built in a Soviet style after an artificial lake submerged its old city in 1978. In addition to this, there were water systems and electricals that made up an underground network which had five openings so that all inhabitants could go inside if one was attacked. Not all areas were however fully facilitated for their intended uses before the regime collapsed. The tunnels had respective places for different buildings and they always enjoyed good air circulation as well as water supply. These included different section of buildings like bakery, school, hospital, maternity ward, prosecutor's office, police station, radio station, printing press, training areas for both sexes: men, women as shown in the figure 8.



Figure 7 The model of the new city of Kukes (source authors)

The tunnel system is located beneath the ground, 30 metres deep and has a lot of rooms incorporated in it which entails an array of spiral staircases, interchanges and links to diverse parts of the underground city. It contains a 300-bed hospital, a bakery, military command locations spaces, administrative offices and a printing press. The layout for the hospital can be seen in figure 7 and it is near the above-ground general hospital.

The construction of Kukës tunnels commenced in the 1970s until early 1990s. Kukës had an underground network that could accommodate up to 16,000 people at once for six months during war time with its five-story buildings resembling those in the Soviet Union. This was Albania's biggest fortification project with tunnels stretching as far as seven kilometres.

Visits to the area have included discussions and surveys, particularly engaging with elderly residents who have vivid memories of the underground tunnel. This passage was primarily constructed by numerous local workers and was utilized only once during a civil defence drill in the late 1980s. On occasion, drills and exercises were conducted where the residents of Kukës would evacuate to the underground passage upon hearing an alarm, often occurring at various times, including during the night. The party leader and the city mayor would walk five miles through the tunnel to reach the command centre.

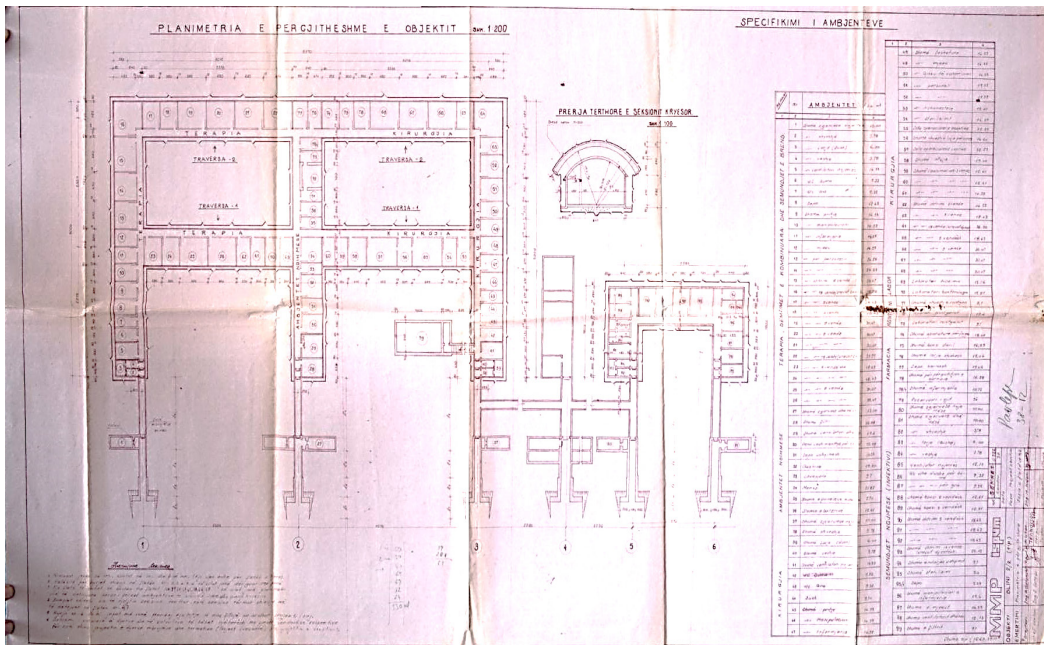


Figure 8 Floor plan section of the underground tunnel, designed to accommodate hospital patients in the event of an invasion, which were intended to function as an underground hospital (Source: Municipality of Kukës)

Subterranean tunnel building involves a variety of approaches, from conventional to modern, adapted to regional conditions, as evidenced by the examination of methods and materials utilized. Structural integrity was preserved in tunnels built in the late 1980s by using reinforced concrete. An infiltration-proof drainage channel was placed between the tunnel wall and the terrain's retaining wall to stop water from getting in. Long-term functionality and safety of the tunnels are ensured by the use

of ventilation systems and waterproofing materials, which show consideration for environmental conditions.

Figure 9 of the archival material shows foundation and reinforced slab details, sanitary system layouts, black water drainage details, and techniques for removing subterranean water. This combination emphasizes the need for civil defence infrastructure to be carefully considered. The tunnels have been excavated and shaped by skilled local labourers using mechanical tools and equipment, guaranteeing a high degree of resilience to any threats.

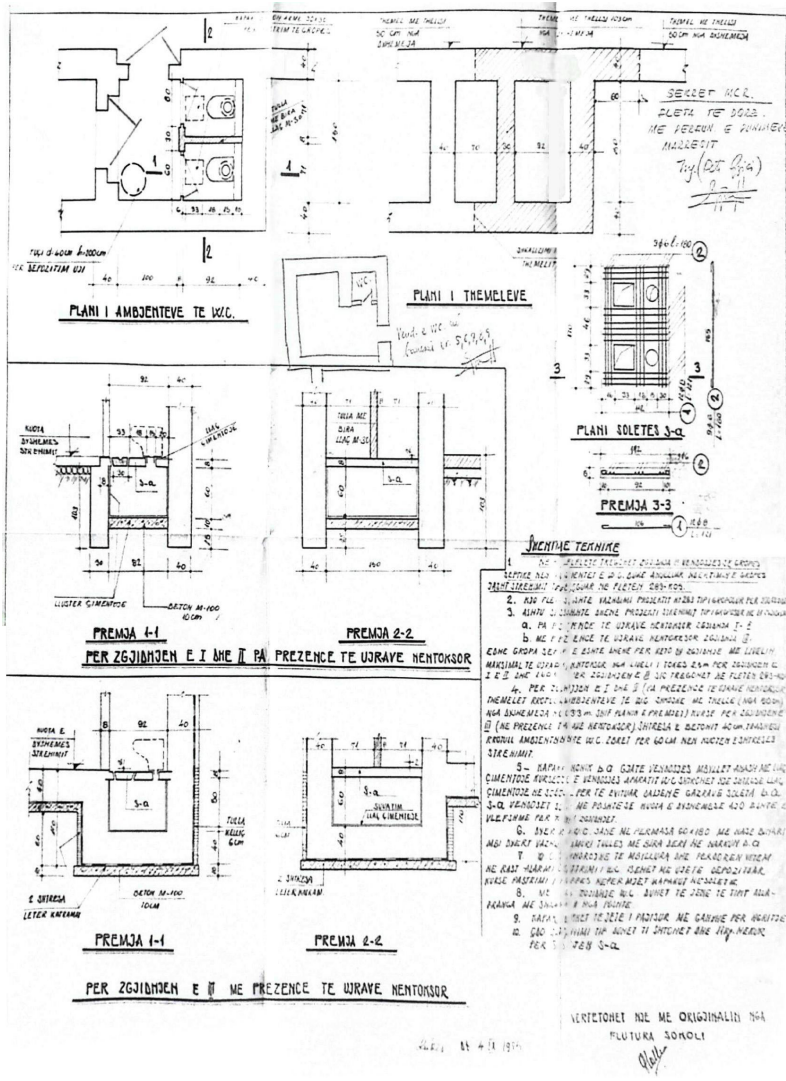


Figure 9 Archival material illustrating construction details (Source: Municipality of Kukës)

4. Analysis on the importance of the Conservation and Challenges proposals for these area in Kukes

The revitalization of underground tunnels in Albania presents a significant opportunity to capitalize on the growth of tourism in the country, providing a new dimension of exploration and utilization of these hidden infrastructures. In this context, several positive examples from the experiences of other countries can be enlightening:

In many cases, interventions in these areas have brought about a noticeable improvement in the economy and a rejuvenation for the regions where they are located. These initiatives have leveraged the potential of underground infrastructure to create new tourist attractions, impacting tourism development, employment growth, and the restoration of cultural identity in their respective areas.

Beijing Underground City in China: This structure, a subterranean complex dating back to the Cold War era, has been transformed into a tourist and cultural centre. Investments in restoring and promoting this area have led to a significant increase in tourism, contributing to Beijing's economic development and the preservation of historical memory (Zhu, 2017).

Coober Pedy in Australia: The use of underground tunnels for habitation and mining has created a new economic ecosystem in this area. The opal mining industry has become a major source of revenue, leading to infrastructure development and local trade growth (Gökalp, 2014).

Naours in France: These underground tunnels, utilized as shelters during World War I, have been turned into a tourist and cultural destination. This project has boosted cultural tourism in the Amiens area and increased income for the local community (Fleury, 2020).

Cu Chi Tunnels in Vietnam: The utilization of these underground tunnels during the Vietnam War has brought significant changes to the economy and tourism of the region. Today, this structure is a key tourist attraction, generating income for the local community and contributing to the country's economic development (Tran, 2017).

Overall, interventions in these areas have led to a reimagining of lifestyle and sustainable economic growth at local and national levels. Through innovation and the utilization of natural and cultural resources, these projects have served as positive models for urban and tourist development worldwide. These examples demonstrate that the revitalization of underground tunnels can be a significant opportunity to boost tourism and promote the development of peripheral areas in Albania. By employing creativity and effective marketing and project development strategies, Albania can harness the potential of these hidden resources to enhance tourist attractiveness and reap economic and human or social benefits (Peng, 2021).

5. Field surveys

Approximately 62 questionnaires have been conducted to understand the thoughts of residents, professionals in the area, employees in the urban planning office of the

Kukës municipality, and their relationship with the tunnel area. The questions in the questionnaire focused on the interviewees' age, their knowledge or personal experience with the Kukës underground tunnel; their awareness of the main issues related to the Kukës underground tunnel and how these issues could be improved; what their main needs are regarding the use and functionality of the Kukës underground tunnel; what benefits they believe a reconstruction and revitalization of the Kukës underground tunnel would bring to the residents; whether they have any ideas on how to improve the accessibility and reuse of the Kukës underground tunnel for the local community; what the main challenges they foresee in implementing such a project are; and their suggestions for local authorities and enterprises to improve or implement a plan for the reconstruction and revitalization of the Kukës underground tunnel.

Based on the questionnaire data, it was observed that the highest average age was between 30 and 45 years old, which corresponds more with the age of people who are working or are more active in the city.

The majority of poll respondents are from the nation's capital and have connections to Kukes. The remaining participants, shown in Figure 10, are mostly from Kukes, with a few representing Durres and Shkoder.

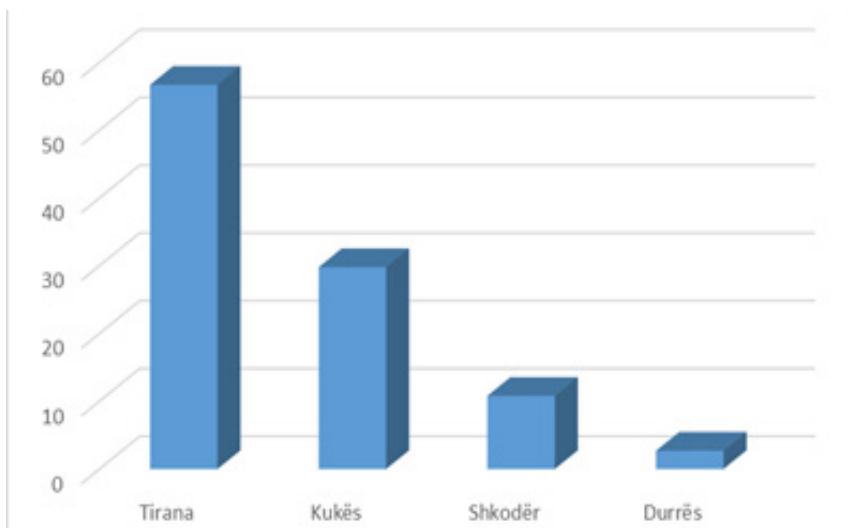


Figure 10 Diagram illustrating the cities where the poll respondents are from
(source: authors)

When questioned about their first-hand knowledge of the Kukës subterranean tunnel—which is shown in the figure 11 diagram—the majority of respondents stated they had visited the island and had heard about it from people there, some via television, but very few had actually seen the tunnel. Many were largely unaware that it even existed.

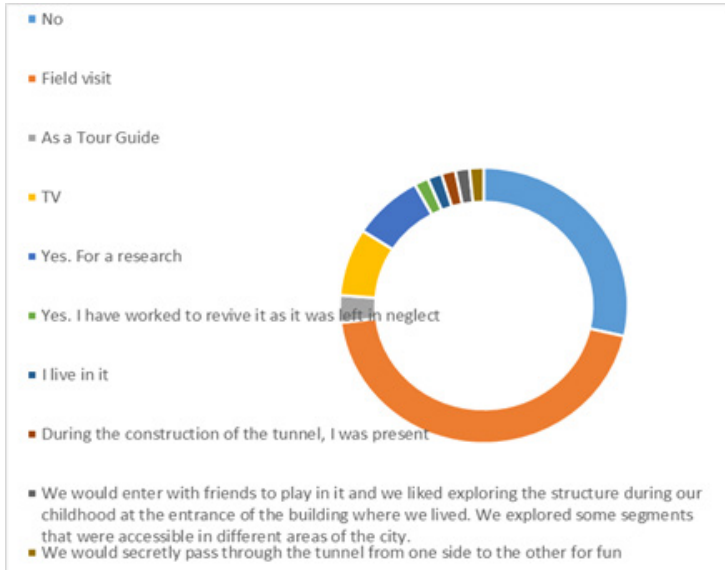


Figure 11 Survey Results on Awareness of the Kukës Underground Tunnel. (Source: authors)

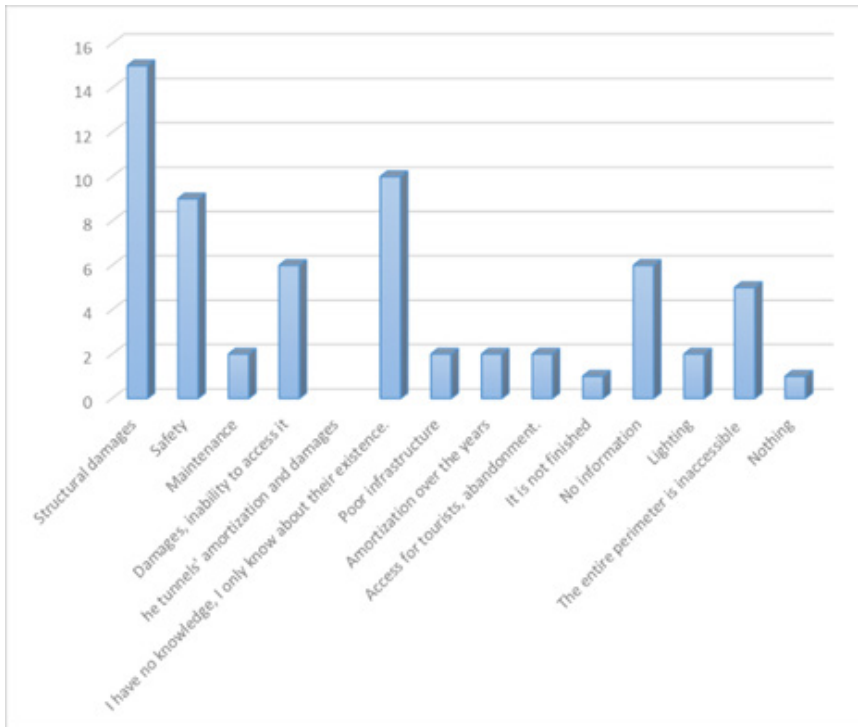


Figure 12 Diagram illustrating the primary concerns related to the Kukës underground tunnel. (Source: authors)

To the question about what are the main problems you have encountered or heard about regarding the underground tunnel in Kukës, a significant number responded that structural damage is the primary issue, as shown in figure 12, followed by concerns about safety, access, poor infrastructure, maintenance, timely amortization, etc.

According to the questionnaires, to enhance safety in Kukës' underground tunnel, several measures and improvements can be considered as shown in figure 13. These include advanced monitoring technology such as security cameras and sensor devices to swiftly identify potential risks and respond to emergencies. Effective lighting and clear signage inside the tunnel can improve visibility and guide drivers safely through. Adequate ventilation systems are crucial to prevent gas build-up and maintain air quality. Advanced fire suppression systems minimize fire hazards, while measures to prevent air pollution inside the tunnel are essential for passenger health and safety. Proper training for tunnel personnel and drivers enhances operational safety and satisfaction. Regular inspections and maintenance are fundamental to promptly

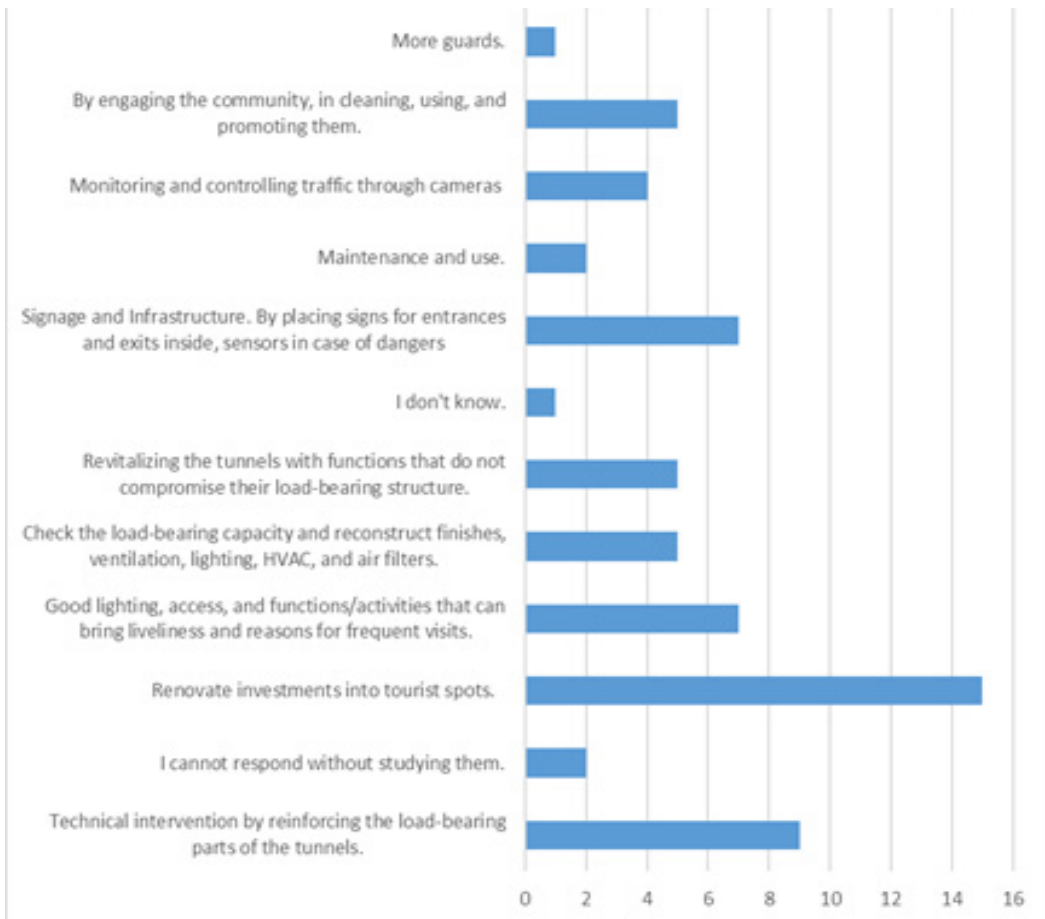


Figure 13 Diagram illustrating recommendations for improving safety in the underground tunnel of Kukës. (Source: authors)

address any potential issues. Safety enhancements should integrate these measures to ensure a secure environment for tunnel users. Local authorities and tunnel operators should collaborate closely to implement and manage these improvements effectively. When asked about the potential functions of the underground tunnel in Kukës, as shown in figure 14, 15 and 15, the responses primarily focused on tourism and historical tourism. Many suggested the tunnel could serve as a memorial museum or a space for activities, while others envisioned it as a storage facility and a place for air-raid protection. Additional ideas included transforming it into a tourist information point, a museum with experiential tours, culinary experiences, and thematic hotels. There were also suggestions for it to host museum functions related to the city's cultural and ethnographic traditions, as well as contemporary and digital arts. Other proposed functions included recreational spaces for hotels and restaurants, storage or archives for schools, stadiums, and apartment residents, and ensuring the tunnel's proper slope and width to avoid any issues. Some respondents saw potential in using the tunnel for mineral extraction, as a warehouse or granary, and as a laboratory or experimental space. There were also ideas for restoring the tunnels and opening them to the public, as treated in the references (Ashworth, 2011; Kovačić, 2023; Luca,2016), creating archives and computer rooms, developing cultural heritage tourism, setting up small restaurants, souvenir stands, and a small open cinema to show short films about the city's history.



Figure 14 Design Concept for Adapting and Reusing Tunnel Interior Spaces (Source: Students of Architecture 3 at Barleti University)

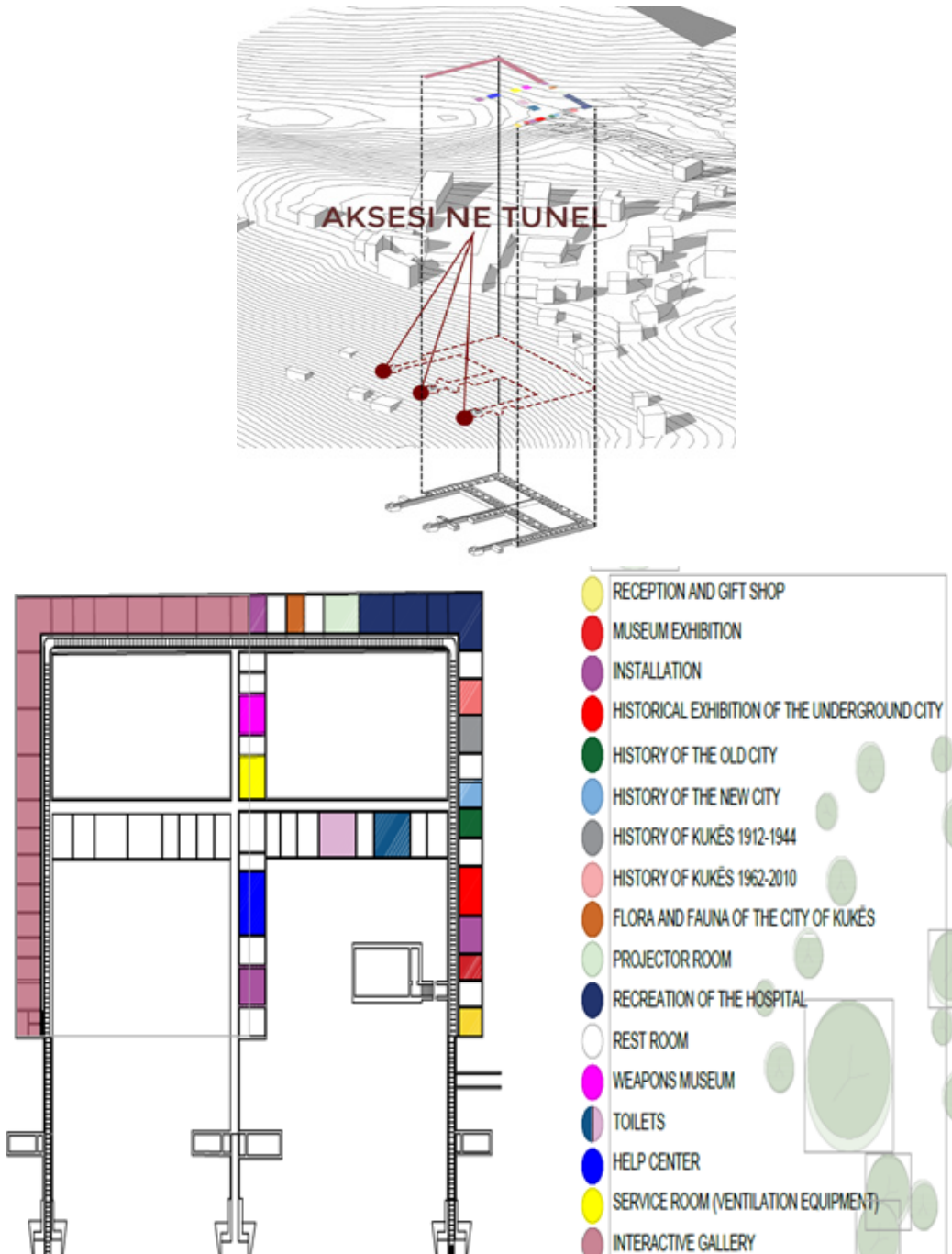


Figure 15 Diagram illustrating the proposed plan for the project (Source: Students of Architecture 3 at Barleti University)



Figure 16 Graphic proposals illustrating potential uses for a portion of the tunnel, including facilities for services and accommodation. (source: students of architecture 3 at Barleti University)

The repurposing and revitalization of the Kukës underground tunnel represent a significant investment for the local community, bringing tangible benefits for residents and the development of the area. Through 63 responses received, it has been emphasized that this improvement will play a key role in the development of tourism and the local economy. Opportunities for creating enterprises and youth stimulation programs have been highlighted, directly impacting income growth and the creation of new jobs. Furthermore, the number of visitors is expected to increase, generating new revenue and making the city more attractive to tourists. Such investments have the potential to enliven the social and cultural life in the city, raising the level of economic and cultural activity. A rebuilt and improved tunnel (figure 16,17) will serve as a tourist attraction and a new asset for the city, drawing in new tourists and promoting the area. Additionally, improving infrastructure and creating opportunities for new enterprises will help enhance the quality of life for the local community.

Suggestions for improving the accessibility and use of the tunnel include adjusting signage, improving lighting, and repairing roads around the tunnel. Investment in infrastructure to create an intermodal station and ensure access for pedestrians, bicycles, and public transport will facilitate movement for the community and tourists. Proper management of tourist flows and the construction of special stations for specific functions such as restaurants, museums, and tourist activities could bring significant economic and tourism revitalization to the city of Kukës.

The responses indicate that this project is eagerly anticipated and important for the local community, preserving the historical asset and serving as a tourist and economic point of interest. Investment in this project is expected to bring new dynamism to the city and create new opportunities for the development of tourism and the local economy, while also improving traffic safety and efficiency and protecting the environment. In conclusion, the reconstruction of the Kukës underground tunnel is expected to bring numerous benefits to the local community and contribute to the development of the city and the region as a whole

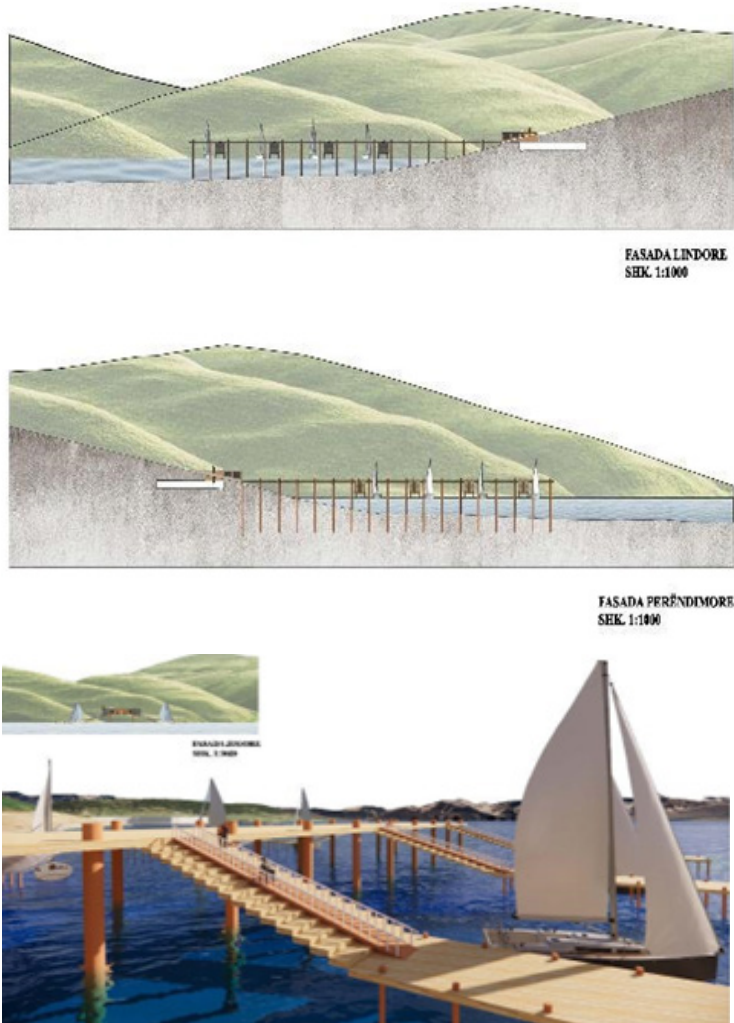


Figure 17 Illustration of the tunnel's connection to the lake. (Source: Students of Architecture 3 at Barleti University)

6. Conclusion

Exploration of Kukës' underground city has revealed a wealth of possibilities to support the municipality's sustainable economic growth and benefit its people, while also preserving an important historical landmark. Through in-depth fieldwork, expert consultations, and community involvement, it has become clear that repurposing this underutilized tunnel could stimulate economic activity in a manner consistent with the principles of the circular economy. This approach not only reduces waste and

conserves resources but also fosters innovation across various sectors utilizing the tunnel, including military, healthcare, and urban planning.

By considering suggestions from local stakeholders and architecture students, and drawing inspiration from international precedents, the project to convert the tunnel into a multipurpose space appears promising. Promoting local cultural identity through artistic installations, immersive lighting schemes, and the construction of exhibition centers honouring Kukës' rich heritage could attract tourists. Partnerships with the private sector, including restaurants and entertainment centers, further highlight the potential for substantial investment and creative utilization of existing infrastructure.

A thorough investigation has shown that Kukës' underground city can serve as both a historical landmark and a catalyst for modern socioeconomic advancement. This project pays tribute to the past while opening the door to a thriving future by integrating innovative urban design techniques with historical preservation. It demonstrates that heritage protection and creative economic revitalization initiatives can work in harmony. Additionally, it underscores the importance of community involvement in crafting sustainable development and provides a compelling model for similar programs globally.

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