

# Between Challenge and Opportunity: Analysing Sustaining Bethlehem's Old Town from an Urban Conservation Perspective

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**Abstract—** Bethlehem's Old Town is one of the most prominent historical urban models in Palestine, representing a unique interplay of religious, cultural, and architectural values. This study aims to assess the reality of the urban fabric of the Old Town from a sustainability perspective, through strengths, weaknesses, opportunities, and threats (SWOT) analysis. This allows the development of a practical vision for preserving its heritage and environmental values. The results showed that traditional architectural features, such as thick stone walls, internal courtyards (Hosh), and narrow roads, represent strengths that support sustainability. In addition, haphazard changes using modern materials and the relative absence of effective legislation make up the most significant weaknesses. Significant opportunities for preservation are also highlighted by the high percentage of buildings that preserve their traditional characteristics. While threats such as uncontrolled expansion, a lack of community awareness, and political pressures also exist. The study recommends developing a comprehensive urban conservation plan, engaging the local community, enforcing legislation, and utilising sustainable restoration techniques.

## I. INTRODUCTION

Palestine is home to historic cities dating back to pre-Christian times, such as Jericho, and Roman times, such as Nablus and Sebastia. However, the most prominent urban presence was in cities that arose for religious reasons, such as Jerusalem, Hebron, and Bethlehem, during the Islamic era, when ancient towns crystallised around religious landmarks such as Al-Aqsa Mosque, Al-Haram Al-Ibrahimi, and the Nativity Church.

Palestinian architectural identity was formed within a traditional style influenced by Levantine architecture in terms of form, building materials, and construction methods. This produced a distinctive urban fabric that has preserved its characteristics since the Mamluk and Ottoman eras, despite being subjected to wars, earthquakes, deliberate demolition, or neglect.

Because of their historical and architectural significance, several towns, including Bethlehem, have been inscribed on the World Heritage List, while others remain on the tentative list to safeguard their urban fabric and distinctive religious, cultural, and social values.

Indeed, Bethlehem derives its unique character from its position as a meeting point between Christian religious

heritage and the Islamic urban landscape. This has made its historic centre vulnerable to political and architectural transformations that have impacted its spatial structure and sustainability.

In addition, its traditional buildings were designed to harmonise with the local environment, considering the climate, building materials, and construction techniques, thereby embodying sustainability principles such as natural lighting and ventilation, rainwater harvesting, shading, and thermal insulation.

However, historical and demographic changes, the haphazard introduction of modern buildings and additions, and insufficient legislation and low awareness have led to the degradation of the urban fabric and the loss of numerous sustainability elements.

This study aims to analyse the remaining elements of sustainability in Bethlehem's Old Town, monitor the factors that weakened them, and explore the opportunities available to reactivate them, as well as the challenges that prevent this, through SWOT analysis as a model for studying strengths, weaknesses, opportunities, and threats.

Then, to measure the reality of urban sustainability in the Old Town, and to arrive at a vision that contributes to preserving the city's historical and heritage value, according to the following criteria:

- Strengths: internal factors that support sustainability.
- Weaknesses: internal factors that weaken the urban fabric and reduce sustainability.
- Opportunities: positive external factors that can be invested in and increase sustainability.
- Threats: adverse external influences that may undermine sustainability.

## II. HISTORICAL OVERVIEW OF URBAN AND ARCHITECTURAL DEVELOPMENT IN BETHLEHEM'S OLD TOWN

Bethlehem's Old Town has witnessed successive stages of development and change, linked to major political and religious events, beginning with the construction of the Nativity Church in the Roman era, through the Sassanian Persians' periods, successive Islamic eras, the Mamluk and Ottoman eras, and finally the British Mandate period, the Israeli occupation, and the Palestinian Authority.

Indeed, these phases were characterised by urban expansion, reconstruction, and partial or total destruction of buildings, as well as restoration using local materials. This has enabled the architectural fabric to preserve much of its authenticity despite change. Table 1 outlines the key historical periods the city has undergone, which have shaped its architectural fabric.

TABLE I. Key historical and architectural milestones in the development of the Old Town

Historical period	Significant Transformations
Roman era (326 A.D.) [2]	The Nativity Church was built for the first time.
Samaritan period (529 A.D.) [2]	Burning of the church.
Roman era (530 A.D.) [2]	Reconstruction of the church.
Sassanian Persian period (614 A.D.) [3]	Destruction of the city.
Islamic period (637 A.D.) [3]	Umar ibn al-Khattab conquered the city and began constructing buildings around the church.
Crusader period (1099 A.D.) [3]	Destruction of the city and fortification of the church.
Islamic/Mamluk period (1250 A.D.) [4]	Reconstruction and prosperity of the city.
Islamic/Ottoman Era (1517 A.D.) [3]	The city expanded. The earthquake destroyed numerous buildings. They were rebuilt with original stones. It comprised seven neighbourhoods.
Islamic Era/Reign of Ibrahim Pasha (1831 A.D.) [5]	Revolts and earthquakes destroyed most of the city.
Islamic/Ottoman Era (1840 A.D.) [1]	The Saraya was built as a centre of government, along with the Omar ibn al-Khattab Mosque, and other churches were added to the Nativity Church.
British Mandate Period (1920) [1]	The Saraya was converted into a police station, then burned and replaced with another building in the 1940s as a police station. Numerous buildings were destroyed in the 1927 earthquake and rebuilt.
Israeli occupation period (1948)	The city was under Jordanian administration.
The Jordanian rule (1966) [1]	Numerous buildings in the city centre were demolished, creating an open square.
The Palestinian Authority (1995) [1]	Demolished the police station and built a "Peace Centre" service centre using reinforced concrete.
The Palestinian Authority (1970s) [1]	Built the current municipality headquarters in the city centre using reinforced concrete.

Thus, these stages demonstrate that the urban fabric of Bethlehem was constantly influenced by political and natural

factors, with alternation between periods of prosperity and reconstruction and periods of destruction, which was reflected in its spatial structure and traditional architectural characteristics.

## III. THE URBAN AND ARCHITECTURAL FABRIC OF BETHLEHEM'S OLD TOWN

The urban fabric of Bethlehem's Old Town consists of traditional stone buildings arranged around an open inner courtyard (Hosh), surrounded by several rooms, often two or three stories high, with thick walls (80–120 cm), and roofs of cross-vaults, domes, or flat roofs with I-Beam. Indeed, this style provides privacy and climate suitability, as the houses are connected by narrow, winding alleys, some of which are covered with arches that provide shade and moderate the atmosphere.

In addition, the courtyard "Hosh" plays a key role in providing natural lighting and ventilation, regulating the indoor climate through the exchange of cool and hot air. It often consists of a well to collect rainwater, and trees or plants to provide shade and to moderate the heat.

Whereas the alleys, with their winding and narrow form, provide shade, mitigate wind, and reduce noise, the open courtyards enhance ventilation by facilitating air exchange between narrow and open spaces.

Indeed, this cohesive architectural fabric embodies the local community's environmental, economic, and social adaptations, representing a model of inherently sustainable building traditions long before the emergence of modern sustainability concepts.

## IV. ANALYSIS OF THE REALITY OF THE OLD TOWN USING SWOT

### A. Strengths

- Thick stone walls provide highly efficient thermal insulation and achieve thermal storage that ensures year-round thermal comfort. In addition, the white colour of the building reflects sunlight and improves lighting, while also supporting the possibility of reusing stones in construction, which aligns with the principles of sustainability.
- Urban compactness reduces areas exposed to the sun and enhances natural shading.
- Inner courtyards (Hosh) act as a thermal regulator, provide effective natural ventilation, collect rainwater, and create a comfortable environment, Figure 1.
- Cross-vaulted ceilings enhance natural lighting, promote air circulation, and minimise heat absorption.
- Narrow and winding roads provide shade, reduce the effects of heat and noise, and improve air movement.
- Public squares contribute to improving natural ventilation through pressure differences between sheltered and open zones.



Figure 1. Stone wall, buildings' compactness, and Hosh

### B. Weakness

- Some stone buildings were replaced with concrete buildings or introduced cement additions, which reduces sustainability and distorts the historic fabric, Figure 2.
- Restoration using inappropriate materials such as cement, which impedes the walls' breathing and causes dampness.
- Changes to original openings that compromise ventilation and daylighting.
- Disappearance of courtyard components such as fountains and trees.
- Lack of effective enforcement of urban conservation laws.



Figure 1. Changes in the urban fabric between 1937-2014 (CCHP, p 50, 2014)

### C. Opportunities

According to the traditional buildings survey conducted by the Bethlehem Heritage Preservation Centre, the percentages of some of the impacts on buildings within the Old Town boundaries are listed in Table 2.

TABLE I. SOME IMPACTS ON BUILDINGS WITHIN THE OLD TOWN BOUNDARIES (DERIVED FROM CCHP, PP 204-224)

	Inside the limits of the historic town	Rating Percentage	Evaluation
Percentage of buildings before the Ottoman Empire (before 1517 AD)	9%	Low	Good
The percentage of buildings during the Ottoman Empire (1517-1917 AD)	63%	High	Very Good
Percentage of buildings that do not require urgent intervention	91%	Very High	Very Good
Percentage of buildings requiring urgent intervention	9%	Low	Very Good
Percentage of buildings with cross vaults	62%	High	Very Good
Percentage of buildings with reinforced concrete ceilings	25%	Medium	Medium
Percentage of buildings without modern additions	50%	Medium	Good
The percentage of buildings that were added is 1-20%.	35%	Low	Good
The percentage of buildings that were added is 101-150%	2%	Very Low	Very Good
Percentage of buildings in good physical condition	55%	High	Good
Percentage of buildings in average physical condition	23%	Medium	Medium
Percentage of buildings in poor physical condition	5%	Low	Very Good
Average building ventilation ratio	48%	High	Good
Percentage of poorly ventilated buildings	11%	Low	Very Good
Average building ratio to light	47%	High	Good
Average building ratio to light	13%	Low	Very Good

The table shows that:

A significant proportion of buildings continue to preserve their traditional features (63% dating back to the Ottoman period, with 91% not needing immediate restoration).

The low percentage of modern concrete additions facilitates its restoration.

Together, these indicators represent essential opportunities to preserve and restore the remaining buildings to ensure their spatial and architectural sustainability, while also removing or addressing modern additions that hinder the achievement of sustainability principles.

### C. Threats

- The absence of effective laws and penalties that deter unauthorised changes or additions.
- Unchecked urban expansion incorporates materials and architectural styles inconsistent with the historic fabric.
- Controlled urban development utilising materials and designs unsuitable for the traditional context.
- Limited community awareness of sustainability concepts and heritage preservation regulations.
- Political pressures that limit the potential for planned expansion or effective preservation.

## V. PROPOSED SOLUTIONS

The analysis results confirm that Bethlehem's Old Town possesses many architectural components that align with sustainability principles, despite changes that have weakened some of its environmental functions. These components can be strengthened through a package of measures, most notably:

1. Prepare a comprehensive urban conservation plan that protects the traditional urban fabric.
2. Restore buildings using traditional materials and methods consistent with international heritage conservation standards.
3. Revitalise the city's traditional functions to support the local economy (crafts, heritage tourism).
4. Involving the local community in decision-making and intensifying awareness programmes on sustainability concepts and the importance of heritage preservation.
5. Developing urban planning legislation and enforcing its implementation to ensure the protection of historical character.

## VI. DISCUSSION

Finally, the analysis results display that Bethlehem's Old Town retains significant elements of urban sustainability, particularly in buildings that have not undergone substantial change.

However, challenges- those related to uncontrolled expansion and the absence of binding legislation- pose a direct threat to the sustainability of these characteristics.

It also indicates that the inherent strengths of traditional buildings can be exploited to revitalise their environmental and architectural functions, while weaknesses can be addressed by removing inappropriate concrete additions and reintegrating missing environmental elements.

Indeed, the good physical condition of most buildings also represents a golden opportunity for early intervention before threats escalate, given the risks posed by the absence of

effective laws and the pressures of uncontrolled urban expansion.

## VII. CONCLUSION AND RECOMMENDATIONS

Preserving Bethlehem's Old Town not only represents the preservation of a unique architectural heritage but also an investment in a sustainable environmental and social model shaped over centuries of adaptation to the local climate. Therefore, to maintain a sustainable city, the urban fabric of the Old Town must be preserved, which requires:

1. Develop an integrated urban conservation plan that complies with international standards.
2. Restore buildings using traditional materials and techniques.
3. Revitalise traditional functions and revitalise the local economy.
4. Involve the local community in conservation and awareness-raising efforts.
5. Develop urban legislation and enhance implementation oversight.

Ultimately, this study confirms that combining the preservation of heritage values with the application of sustainability principles is a vital approach to ensuring that Bethlehem's Old Town remains a witness to its history, active in its present, and viable in its future.

## REFERENCES

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