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INSTITUTE OF ENGINEERING
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Conservation and Management of Mahalaxmi Temple at Balambu

by

Rasana Shrestha

A THESIS

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THE DEGREE OF MASTERS IN ARCHITECTURE (M. Arch.)**

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ABSTRACT

The conservation works in Nepal can be dated back to times long before the introduction of Ancient Monuments Preservation Act in 2013 B.S. that marked the provision of modern concept of heritage conservation in Nepal. In case of Nepal, often architectural heritage is closely linked to cultural heritage of the people due to which conservation of heritages has been deemed important and carried out by the people through institutions such as *guthis* even before the establishment of a conservation administration. Currently there are different stakeholders in the conservation arena in Nepal such as the Department of Archaeology, municipality, community and international actors that pursue widely divergent approaches. For this study the Mahalaxmi temple at Balambu is taken as the subject of the research. The temple was recently reconstructed through the joint efforts of the Department of Archaeology and a committee of local community known as *Mahalaxmi Purnanirman Samiti*. The conservation of the temple is studied through the analysis of the recent reconstruction of the temple. The objectives of this research are to study the process of the reconstruction of Mahalaxmi temple and to analyze the issues related to the conservation through reconstruction of Mahalaxmi temple. To investigate the process of the reconstruction and to study the reconstruction of the temple field observations were done in addition to interviews of key informants. This study provides a reference for a current conservation project and further organization needed for better results in future projects. Hence this study is expected to provide suggestions for planning of future conservation works.

Keywords: Conservation, reconstruction, cultural heritage, temple

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ACRONYMS AND ABBREVIATIONS

DoA	Department of Archaeology
DUDBC	Department of Urban Development and Building Construction
GoN	Government of Nepal
ICCROM	International Centre for the Study of the Preservation and Restoration of Cultural Property
ICIMOD	International Centre for Integrated Mountain Development
ICOMOS	International Council on Monuments and Sites
NTNC	National Trust for Nature Conservation
SPAB	Society for the Protection of Ancient Buildings
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER 1. INTRODUCTION

1.1 Background

The conservation works in Nepal can be dated back to times long before the introduction of Ancient Monuments Preservation Act in 2013 B.S. that marked the provision of modern concept of heritage conservation in Nepal. Historically, repairs to monuments carried out by ruling royal family or influential ministers. Institutionally, there were guthis (a type of trust) associated with important communal buildings to sustain their regular functions, maintenance and renovations as a form of community involvement. Other institutions also existed that were meant to take care of important monuments, such as an institution called *Chhen-Bhadel* seemed to be in existence from Malla period. After 1950s, initially there were some *Nirman samitis* (Construction Committees) and the Public Works Department, which used to be in charge of repairs to ancient structures. Currently, the Department of Archaeology (DoA) established in 1953 is responsible for the conservation of historic sites.

In case of Nepal, conservation of heritages is deemed important and has been carried out as often architectural heritage is closely linked to cultural heritage of the people. The architectural heritage of a community is of significance to the community as it carries religious, cultural, historical and social value to the community. It is also an important aspect of forwarding the cultural traditions such as *jatras* to the future generation. Reconstruction, renovation and conservation of monuments such as temples, shrines and monasteries across the country is currently more in focus after the damage to the heritages caused by the 2072 Gorkha earthquake.

According to the Department of Archeology, a total of 753 temples, shrines and monasteries across the country suffered damages from the earthquake. The earthquake damaged 241 temples and shrines in Kathmandu, 73 in Bhaktapur and 130 in Patan (Bhattraï & Rawat, 2021). Although, the department of archaeology established in 1953 is now responsible for the conservation of heritage sites and monuments in Nepal, it has been found that different stakeholders in the conservation arena such as the Department of Archaeology, municipality, community and international factors pursue widely divergent approaches (Haselberger & Krist, 2020). One such example of conservation is the Mahalaxmi temple at Balambu which began reconstruction in 2076.

Balambu is one of the 50 historic settlements in Kathmandu valley (Tokyo National Research Institute for Cultural Properties, 2016). Balambu is one of the oldest settlements in the Kathmandu Valley, populated by the Newars, the original inhabitants of the Kathmandu Valley. Balambu is a village and former village development committee that is now part of Chandragiri Municipality in Kathmandu district. Balambu is 4.53 kilometers west of Kathmandu between the villages of Satungal and Kisipiri, about 470 metres north of Tribhuvan Highway. The total area of the settlement is 2.17 km² (ICOMOS Nepal, 2015). Recently, works have undergone for the conservation of heritages including reconstruction of the temples in the area. The Mahalaxmi temple in Balambu has also recently completed reconstruction under the supervision of Department of Archaeology.

Mahalaxmi temple is one of the oldest temples in Balambu and Mahalaxmi is the tutelary deity of the settlement. Similar to other heritages in Kathmandu, the conservation of Mahalaxmi temple was managed by *guthis* before the establishment of Department of Archaeology. After the damages to the temple caused by the 2015 earthquake, the conservation of the Mahalaxmi temple was of high priority to the local community. The temple had cracks on the upper floor and the timber was rotting due to water leaking through the roof on the upper tier. The temple was reconstructed through the joint efforts of the Department of Archaeology and a committee of local community members known as *Mahalaxmi Purnanirman Samiti*. The reconstruction has been completed with financial input from both the department of archaeology and the local community.

1.2 Statement of the Problem

In Kathmandu valley, the number of important cultural and heritage sites is higher in the city center as compared to its outskirts (GoN/NTNC, 2009). While historic monuments in the historic settlements in Kathmandu are protected by the ‘Ancient Monumental Preservation Act, 1956’, a sufficient system does not exist to preserve the historic townscape which mainly consists of private residences (Tokyo National Research Institute for Cultural Properties, 2016). The monuments in such historic townscapes are also in need of conservation despite being under the protection of the ancient monument act. The heritage sites in the outskirts of Kathmandu are largely ignored and are subject to improper repair and reconstruction. The Mahalaxmi temple

at Balambu is one of the at risk heritage sites (GoN/NTNC, 2009). However, it is necessary to recognize all sorts of heritages for conservation.

After the recent reconstruction of Mahalaxmi temple under supervision of Department of Archaeology, the role of government authority in conservation of heritage is seen. But there are several other religious and cultural heritage in Balambu that require conservation.

1.3 Rationale of the Research

Although the attitudes in conservation globally has widened to include the conservation of areas, urban and rural sites, the environment, built heritage, tradition and culture as well as monuments and historic locations, the focus of conservation are the ‘world heritage’ sites (Isaiah, 1996). The less dramatic but equally important structures and historic areas that are important to the cultural fabric of their region are often negated. In case of Nepal as well Kathmandu valley has been the focus of heritage conservation programs in Nepal since the legal provisions have been designed (Chapagain, 2008). However, most of the focus has been towards the heritages sites in the core of the cities where the world heritage sites are. This has caused monuments on the outskirts of the valley to be ignored despite being of historical and architectural importance which has resulted in such heritages to be in states of disrepair or being repaired and reconstructed without following the proper policies of conservation in accordance to the DoA. It is also seen that the knowledge regarding the use of authentic materials in the conservation work is also lost or paid less attention as seen in reconstruction of various temples after the 2015 earthquake (Tiwari, n.d.). This is prominent in most construction works not overlooked by the DoA. Also, responding to Nepal’s diverse cultural contexts, the conservation policy in Nepal needs to count on local cultural institutions, cultural practices and economic bases (Chapagain, 2008).

The DoA established in 1953 is now responsible for the conservation of heritage sites and monuments in Nepal. Introduction of Ancient Monuments Preservation Act in 1956 marked the provision of modern concept of heritage conservation in Nepal. However, the conservation approach in Nepal, most of which is adapted from international frameworks mostly originating in different contexts abroad - needs to be evaluated in local cultural contexts (Chapagain, 2008) and conservation strategies need to concentrate on appropriate local distinctiveness (Isaiah, 1996).

The conservation of Mahalaxmi temple at Balambu is an example of coordination between the conservation authority and local community. Although, overseen by the DoA, there have been issues with the conservation project such as change in the original design of the temple. Hence, this research will be a study of conservation of a temple in a historic settlement of Kathmandu valley and will be helpful in identifying the issues of such conservation work.

1.1 Importance of the Research

Mahalaxmi temple of Balambu is one of the important cultural monuments in Kathmandu valley (ICIMOD, 2007). Built cultural heritage is a landmark of culture and diversity. It is the responsibility of the current generation to leave the heritage in excellent condition for future generations. (Lourenco, 2014). Conservation of such heritage is important as heritage buildings are a valuable asset for society and it reveals their achievements over the years (ElWahab, Bakr, & Raslan, 2018). It is also important to note that buildings of architectural or historical interest should be recorded for posterity (Sanday, 1978). Conservation itself has its importance in identifying, documenting, analyzing, and protecting heritage resources. The preservation of built heritage is a crucial instrument for urban development, as it helps to promote tourism and generate income. Additionally, it gives future generations a sense of permanence and identity in a world that is rapidly changing (ElWahab, Bakr, & Raslan, 2018).

In consideration for conservation, it is important to note that every place has unique socio-cultural elements. As such, research focuses on objective aspects of socio-cultural space only applies to the research location at the time of research. But, according to Lincoln and Guba in Meleong (1991), hypotheses of certain contexts of socio-cultural aspects are detachable and can be applied to other contexts even though incomplete. If researchers shift from one situation to another, their tasks are to describe and interpret the new, unique consequences that emerge (Runa, Warnata, & Putri, 2019) which means that by study of one conservation in one context, the principles can be applied to other similar contexts as well. So, with the understanding of the unique sociocultural contexts in case of localities in Nepal, this study is helpful to future individual and policymakers to understand the conservation work of smaller heritages regarding conservation and incorporate the information in future strategies and policies for conservation.

1.4 Research Objectives

The research will attempt to explore the process of conservation for the Mahalaxmi temple that was carried out through the process of reconstruction. The aim of this research is to study this conservation work and analyze the recent reconstruction of Mahalaxmi temple with the main objectives:

1. To study the process of conservation of Mahalaxmi temple building carried out during the reconstruction of the temple.
2. Analyzing the elements and issues related to the conservation through reconstruction of Mahalaxmi temple.

1.5 Scope and Limitations

The scope of the research is to study the conservation work of Balambu Mahalaxmi temple only. Also, this research attempts to study the conservation of the temple mainly through the recent reconstruction of the temple. The conservation also focuses mostly on the tangible aspects of the temple. The intangible aspects of the conservation are not studied but those related to the research were touched upon. The documentation of the temple structure prior to demolition is based on photographs, field observations and limited documentation available by the conservation team. The experts and members of the local reconstruction committee are considered major source of information in addition to the field studies.

1.6 Expected Output

This study will clarify and provide knowledge about the conservation process through an example of a monument in a historic town of Kathmandu valley by the study of the reconstruction of Mahalaxmi temple. This will help to analyze the level of government participation and coordination needed for conservation of such heritage sites. This study will also provide an example of conservation process and further organization needed for better results in future projects. Hence this study is expected to provide suggestions for planning of future conservation works.

CHAPTER 2. LITERATURE REVIEW

2.1 Architectural Conservation

Architectural conservation means to conserve the valuable architectures or architectural values (Del, Sedghpour, & Tabrizi, 2020). Architectural conservation is the process of extending the material, historical, and design durability of humankind's built architectural history so that it can endure longer, be resilient in challenging environments, or be kept sustainable, generally. The rehabilitation, restoration, reconstruction, and preservation of architectural heritages are only a few examples of the numerous ways and forms in which one could strive to protect them. (IEREK, 2017)

Identification, documentation, study, and protection of historic and cultural resources are all steps in the heritage conservation process. The definition of architectural heritage is not as simple as it first appears to be because it inevitably involves the definition of culture, a term that has been used in countless definitions but ultimately refers to clear fundamentals because it denotes customs, traditions, lifestyles, and urban and architectural production. (Al-Naim, 2011 cited in Zami & Bubshait, 2012). Cultural heritage is material cultural inheritance in the form of cultural heritage items, buildings, structures, locations, and areas on land and/or in water that must be preserved owing to their historical, scientific, educational, religious, and/or cultural significance through the stipulation process (Runa, Warnata, & Putri, 2019). Architectural heritage represents an integral composition created by the integration of buildings constructed in periods of various civilization with both culture and the natural environment (Karahan, Bulut, & Cakir, 2009).

The word "conservation" has been defined in a variety of ways by writers, academics, and conservationists. For example:

Conservation is the action taken to prevent decay. It embraces all acts that prolong the life of our cultural and natural heritage, the object being to present to those who use and look at historic buildings with wonder, the artistic and human messages that such buildings possess.

...Conservation must preserve and, if possible enhance the messages and values of cultural property (Feilden, 1989).

The International Charter for the Conservation and Restoration of Monuments and Sites (ICOMOS, 1990:14–15) defines conservation in articles 1–13, the first two of which are as follows:

The concept of a historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development or a historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time.

The conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of the architectural heritage.

In Esher (1968 p.73), conservation is defined as

... the careful management of a limited or vulnerable resource so as to ensure efficiency of use, while at the same time taking such steps as are necessary to ensure continuity of supply.

According to the Burra Charter, Article 1, page 4, conservation may be defined as:

“All the processes of looking after a place so as to retain its cultural significance. It includes maintenance and may according to circumstances include preservation, restoration, reconstruction and adaptation, and will be commonly a combination of more than one of these.”

Therefore, any activity made to stop degradation and avoid decay can be summed up as conservation. This covers anything from minor items to built-environment elements like old buildings or neighborhoods. Conservation's primary goal is to increase the natural and cultural heritage's lifespan so that future generations can enjoy it. The principles governing the conservation process must be agreed upon and taken into consideration on a global level in order to get the greatest results. Individual nations are then responsible for implementing the policies and plans within the context of their respective cultures. The Charter for the Conservation of Historic Towns and Urban Areas, adopted by ICOMOS in October 1987 outlines this approach (ICOMOS, 1990: 121-122).

The definition of "conservation" is extremely broad and subject to several interpretations and points of view. Since its inception, conservation has evolved. The monuments of the time, whether they be enormous temples or inscriptions on rocks,

demonstrate how humans have a need to leave behind traces of their existence. These monuments have diverse meanings, some of which are political and others religious. Jokilehto (1986) asserts that the sixteenth-century Renaissance marked the beginning of the present trends in cultural heritage preservation. This is supported by Ashworth and Turnbridge's (1990) assertion that it was started by:

the pre-occupation of a small, but influential, group who were motivated by a sufficiently crusading vision to allow this aspect of planning to be labelled a 'movement', whose driving force was the enthusiasm of amateurs rather than the technical expertise of professionals.

However, due to different approaches to architectural conservation theory itself, different treatment approaches to architectural conservation are in practice around the world.

In order to connect a location's history to its current people and culture, the planning movement known as historic preservation works to preserve historical structures. It is also a crucial element of green building because it reuses existing structures rather than developing new ones. The same concept of historic architectural conservation are referred in different terms in different countries. Only in the United States is the phrase "historical preservation" used, and it wasn't until the 1960s, in response to urban renewal, that it became well-known (an earlier failed planning movement). While "architectural conservation" only pertains to the preservation of buildings, other English-speaking nations frequently use the phrase "heritage conservation" to refer to the same procedure. The phrases "built environment/heritage conservation," "immovable item conservation," "landscape preservation," and "urban conservation" are additional" (Briney, 2019).

2.1.1 Different Terms Used in Architectural Conservation

Architectural conservation as a movement, and the preservation of historic buildings in particular, grew in popularity in the 18th and 19th centuries. During a period of significant archaeological discovery and scientific advancement, the movement for architectural conservation grew. Different schools of thought evolved within the area of architectural conservation as those educated in the discipline started to view various instances of architecture as either being "right" or "incorrect." *"The treatment of ancient monuments and works of art of the past can be seen to have evolved in three different*

directions or approaches” (Jokiletho, 1986 p.6). Different approaches to architectural conservation vary from conservation based on preservation of the original form and materials or an approach based on restoration i.e. preserving the historic designs but interventions with modern materials and methods. Due to different approaches to architectural conservation theory itself, different treatment approaches to architectural conservation are in practice around the world. Different architectural conservation treatment approaches can be defined as:

Renovation: To renovate anything simply is to make it appear new. The item to be refurbished is merely the foundation or point of inspiration for the client or designer. It is not crucial what the thing is, how it was made, its historical significance, or where it was made. The task at hand is not constrained by the object itself.

Restoration: It can be defined as, “a bringing back to a former position or condition.” The final appearance is the most crucial need for restoring a work of art, furniture, or architecture. The restorer does whatever is required to restore an object's look to the most desired time in its life, which is determined by the client and restorer.

Preservation: It involves keeping an object from destruction and seeing to it that the object is not irredeemably altered or changed. Preserving anything means preventing its destruction and making sure it isn't irrevocably changed or altered. According to preservation, repairs must be made with little to no alterations to the original building fabric, in similar materials, and if feasible, using the same techniques as when they were first produced in order to preserve as much of the building fabric as possible.

Reconstruction re-creates vanished buildings or parts of buildings by interpretive means. The goal of conservation is to maintain the greatest possible portion of the original material in its original, undamaged state. No original material may be removed, altered, or permanently bonded to during any repairs or additions. All alterations must be reversible and removable without impairing the current or long-term condition of the original material. Conservation does not include making artistic decisions or experimenting with the object's materials. (Bjorneberg, n.d.).

2.1.2 Theories of Architectural Conservation

Eugene Emmanuel Viollet-le-Duc (1814–79), John Ruskin (1819–1900), and William Morris are the key historical figures who have impacted conservation philosophy (1894-1936). Fundamental intervention theories for historic preservation are divided

between maintaining the status quo and "restoring" something that may have never genuinely been in the past. Viollet-le-Duc pushed for the latter, whereas John Ruskin strongly supported the former (Read, 2013).

2.1.2.1 Emmanuel Viollet-le-Duc

Through the 20th Century and up until the present, Emmanuel Viollet-le-Duc has had a significant impact on the advancement of architectural thought. He essentially rejected speculative aesthetic theories, viewing the structure and function of architecture as the only factors that determine its shape. He is credited for founding stylistic restoration. Restoration, according to Viollet-le-Duc, is a "means to re-establish a building to a finished state, which may in fact never have genuinely existed at any given moment." Viollet-le-Duc regularly combined historical accuracy with artistic modification in his "restorations." He oversaw, for instance, the cleaning and restoration of Notre Dame as well as its "updating," which included the addition of its distinctive third tower (a type of fleche) and other smaller alterations like the gallery of chimeras and Le Stryge, which have since come to serve as iconic representations of Notre Dame. (Nigilio, 2013)

2.1.2.2 John Ruskin

The romantic restoration movement was started by John Ruskin. He developed the ideas of picturesque, which is the capacity to mimic nature, integrated conservation, status conservation, and the preservation of the character and style of the architecture. He misrepresented architecture when he said Viollet-le-restoration Duc's techniques were used. Since the public and those responsible for maintaining public monuments frequently misunderstand what restoration actually means, total destruction of a building is equivalent to a destruction from which no remnant can be recovered and a destruction that is accompanied by an inaccurate description of the thing destroyed. His "The Seven Lamps of Architecture" book introduces an important comparison and differences between conservation and restoration (Read, 2013).

2.1.2.3 William Morris

Based on Ruskin's principles, William Morris established the Society for the Protection of Ancient Buildings (SPAB) in 1877.

Morris was especially troubled by the practice of trying to restore buildings to an idealized state from a long ago period (i.e., Viollet-le-approach), Duc's which

frequently involved removing elements added in their later development that Morris saw as adding to their interest as historical documents which he regarded this as a lie. Instead, he advocated for the repair of historic structures rather than their restoration in order to preserve their whole histories as cultural assets. This expanded on Ruskin's methodology by acknowledging alterations made to the structure following its construction as genuine additions to its ongoing narrative. The Society is still highly active, and key land and property owners like the National Trust uphold its principles. (Yount, 2005).

When restoration of a building or a landscape is being considered, the philosophical argument is still valid. Information and age value are also destroyed when a building's layers of history are stripped away, and they are lost forever. The addition of features, as Viollet-le-Duc did, can, however, appeal to modern audiences more. When we visit any historic structure or monument, the debate over whether method is "right" is shown in front of us all. Sometimes the Viollet-le-Duc solution appears to be "new."

Sometimes the Ruskin/Morris approach seems like a patchwork doll with clashing pieces of the old and new. The Australia ICOMOS Burra Charter (1999), developed under the auspices of the International Council on Monuments and Sites (ICOMOS) to replace the previous (1964) Venice Charter, serves as the standard for conservation architects today. Although it was intended for use in Australia, it is now regarded as the Gold Standard of Conservation Philosophy. (Read, 2013).

2.2 Conservation of Religious and Cultural Heritage

2.2.1 Tangible and Intangible Heritage

The goal of conservation is to preserve a site's or its architectural heritage's relevance. Heritage has both material and intangible components that contribute to its significance. (INTACH Charter, 2016). The tangible heritage includes historic buildings of all periods, their setting and their relationship to the natural environment. The intangible heritage includes traditional building techniques and knowledge, rituals and festivals, culture and lifestyle of the inhabitants.

The preservation and continuation of a place's cultural identity has become a recent emphasis of conservation practices in historic contexts. The neglect of intangible assets frequently causes issues with historic environment protection. In this regard, the

identification, investigation, and conservation of intangible values that are embodied in the elements of built environments acquire equal weight to tangible values.

Culture and the study of intangible values are closely intertwined. Therefore, establishing a connection between culture, intangible qualities, and the built environment is crucial for conservation. A historical built structure is made up of intangible values made up of cultural activities and cultural manifestations within built environments as well as some tangible qualities that are the physical structure made up of the built buildings. Although the term "culture" is overly ethereal, it refers to all human endeavors and outcomes that are connected to the built environment and intangible values.

Through the cultural manifestations produced by the structures within them, culture creates relationships with the built environment. In this way, it can be said that information is encoded and decoded during the design process and user perception process to create the built environment. Thus, the diversity of the structures in many cultures can be comprehended by interpretation by taking into account variations among cultural representations. The constructed environment expresses the cultural codes for future generations to decipher and depicts the entirety of the physical structures.

Tangible and intangible values are primarily associated in three stages of the generating process of environments: the formation of cultural activities, the formation of building typologies, and the generative process of buildings. The manipulation of dominant kinds by builders and users due to the variety and changes with cultural expressions is the cause of the diversity of buildings in settings.

The challenge of preserving and passing on intangible cultural legacy to future generations while incorporating contemporary fashion and technology exists in the preservation of historic sites. In this regard, the conservation approach must incorporate an assessment of the relationships among the three processes of generative, transformative, and current use. It is crucial to talk about how preserving intangible values interacts with the current environment and whether the relationships between tangible and intangible values can be sustained or preserved in the modern era. It is imperative to find a solution to this conflict between sustainability and conservation so that conservation may adopt a more adaptable, perceptive approach and avoid losing both tangible and intangible qualities. (Karakul, 2008)

2.3 Values in Architectural Conservation

The purpose of architectural conservation is to protect the heritage and its values. Prioritizing the values in the building in order to comprehend and communicate the value of the work is the first stage in the conservation process (Del, Sedghpour, & Tabrizi, 2020). Different values can be attributed to a heritage and often these values can be in conflict with each other. “*The first values to be attributed to heritage places were historic and aesthetic*” (Hearn 1990; Ruskin 1961 cited in Torre, 2013). Since then, efforts to identify and categorize the values that embody the sentiments, meanings, and purposes associated with the heritage have taken many different forms. Generally, any conservation effort occurs when an object or location is valued, and as a result, decisions regarding the work's treatment and intervention depend on these values (Del, Sedghpour, & Tabrizi, 2020).

When Australia ICOMOS published the Burra Charter (ICOMOS Australia, 1988), which acknowledged a new category of cultural values called social values, it marked a significant turning point in the evolution of heritage. These values were defined as “the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group” (Australia ICOMOS Guidelines 1999). The following year English Heritage added the recreational and economic values to the heritage.

Table 1 Heritage Values in architectural conservation

Art History Alois Reigl (1902)	ICOMOS Australia Burra Charter (1998)	English Heritage (1999)
Age	Aesthetic	Cultural
Historical	Historic	Educational & Academic
Commemorative	Scientific	Economic
Use	Social	Resource
Newness	Spiritual	Recreational
	Political	Aesthetic
	National	
	Cultural	

Source: (Torre, 2013)

According to Australia ICOMOS Guidelines (1999), “Conservation of a place should identify and take into consideration all aspects of cultural and natural significance without unwarranted emphasis on any one value at the expense of others”. The guideline defines the heritage values as follows:

2.3.1 Aesthetic Value

Aspects of sensory perception for which standards can and should be expressed include aesthetic value. These standards might take into account the fabric's shape, size, color, texture, and substance as well as the sounds and scents connected to the location and its intended use. The site may fundamentally possess and exhibit beauty, whether that characteristic is intrinsic in some way or it only emerges through its use by the visitor.

2.3.2 Historic Value

It is a value created in the course of time. Thus, it disappears by replacing the materials of a building with new ones. All of the values are largely based on historic value, which includes the history of aesthetics, science, and society. Agedness by itself is considered to be a value for the works (Del, Sedghpour, & Tabrizi, 2020). It is a value created by the increase in the age of a monument or a heritage building. Because it has impacted or has been influenced by a historical person, event, phase, or activity, a location may be considered to have historic importance. As the site of a significant event, it might also be of historical significance. For any given location, the significance will be larger where there is still in situ evidence of the association or occurrence or where the settings are mostly unaltered than in locations where it has been altered or where there is no in situ evidence. However, certain occurrences or linkages could be so significant that the location continues to hold significance despite subsequent treatment.

2.3.3 Scientific Value

The usefulness of a location for scientific or research purposes will rely on the significance of the facts involved, their rarity, quality, or representativeness, and the extent to which the location may provide additional significant information.

2.3.4 Social Value

Social value encompasses the characteristics for which a location has come to represent a majority or minority group's spiritual, political, national, or other cultural emotion. It's critical to realize that the values are linked to a heritage and aren't inherently present. Prior to being given a cultural value, heritage sites are value neutral. Those who are

interested in a place attribute its cultural values. Humans acquire knowledge of or discover value in heritage, and this depends on the specific cultural, intellectual, historical, and psychological frames of reference held by the individuals or groups concerned. As a result of their personal needs and wants, which are influenced by their existing social, cultural, and economic conditions, people assign value to things, places, or resources (Torre, 2013).

2.3.5 Cultural Value

It represents each society's character and the general populace's perception of a phenomenon. Conservation experts use the word "cultural importance" to condense the many historic assets. A heritage site's social value may be shown in the ways that its presence helps to the social stability and consistency, according to the interpretation of culture as shared values and beliefs uniting the communities. A historical landmark may have an impact on how people live in a society or forge a connection with it, help define the values of the community, and transform the society into a desirable location to live and work. The collection of principles and ideals that the society takes into account when deciding where or how to work. It is the value placed on an area by the local community based on the social wellbeing, spiritual significance, and preservation of culture and identity for future generations.

2.3.6 Contextual Value

It is a collection of values that are attributed to a structure or area of a city and are formed by placing in a certain location. These values include a sense of place, civic engagement, sense of worth and connectedness (Del, Sedghpour, & Tabrizi, 2020). For instance, a historic structure's placement inside the framework of a historic street that is taken into account in an improvement and rehabilitation plan can give value to both the building and the street.

In addition to this, architectural value shows importance of the elements and architectural factors, innovation, and authenticity of the architectural motives. A heritage location can have many different values, and most heritage locations have many different stakeholders. As a result, a location's significance is never determined by a single value. However, because they are affected by situation and can change over time, their values are malleable. Values can change over time as a result of social changes, such as those that affect a location's function or demographics. Many times,

the causes of changes in a place's values are obvious, while other times, change is the consequence of more subtle causes and may only be seen over a lengthy period of time. Multiple values must be prioritized in order for conservation decisions (not only physical interventions) to be made. These choices are neither neutral nor objective. Which values are prioritized is heavily influenced by those responsible for protecting the sites. Although they may be receptive to the views of various stakeholders, heritage professionals support specific values and are not neutral. Economic, political, and cultural developments all have an impact on conservation decisions, which illustrates the extremely complicated ways that different people at different periods value different places (Torre, 2013).

- **Rights of the Community**

Each community has its own culture of traditions, beliefs, rituals and practices, all of which are essential to defining the architectural heritage and the meaning of the site. Conservation strategies must take into account the fact that local culture is not static, and therefore need to promote active community involvement in the decision-making process. This ensures that symbiotic relationships between indigenous communities and their own heritage are strengthened through conservation. (Indian National Trust for Art and Cultural Heritage, 2016)

- **Legibility of Intervention**

The legibility of any intervention must be viewed in its own context. Historic building methods must be held in higher esteem than the requirement to modernize all interventions in historic buildings.

2.4 Charters and Acts for Heritage Conservation

Since the introduction of the Venice Charter in 1964, many conservation guidelines have been developed and adopted by international organizations such as UNESCO and ICOMOS in the form of charters, recommendations, and resolutions (Ahmad, 2006).

Charters contain valuable guidelines on how to maneuver complicated matters such as when to conserve or restore and when to remove old restorations. In some cases, conservation work and investigations can even lead to finding out that certain objects have dubious, possibly illegal provenances. Charters help to navigate the various aspects of dealing with cultural heritage at the international scale. The Charter

establishes a standard of conduct for owners, managers, and custodians who offer guidance, make decisions about, and carry out work to places of cultural value.

The laws for heritage conservation provide regulations of conservation principles and specific implementation. The summary of the principles stated in the most important international documents regarding reconstruction are as follows:

Charter of Athens (1933): “In the case of ruins, scrupulous conservation is necessary, and steps should be taken to reinstate any original fragments that may be recovered (anastylosis); the new materials used for this purpose should in all cases be recognizable”

Charter of Venice (1964): (art. 15) “All reconstruction work should however be ruled out a priori. Only anastylosis, that is to say, the reassembling of existing but dismembered parts can be permitted. The material used for integration should always be recognizable and its use should be the least that will ensure the conservation of a monument and the reinstatement of its form”

(art. 9) “respect for original material and authentic documents. It must stop at the point where conjecture begins, and in this case moreover any extra work which is indispensable must be distinct from the architectural composition and must bear a contemporary stamp. The restoration in any case must be preceded and followed by an archaeological and historical study of the monument”

(art. 12) “replacements of missing parts must integrate harmoniously with the whole, but at the same time must be distinguishable from the original so that restoration does not falsify the artistic or historic evidence”

World Heritage Convention (1972): “That reconstruction is only acceptable if it is carried out on the basis of complete and detailed documentation on the original and to no extent to the conjecture”

Burra Charter of Australia ICOMOS: “Article 1.8: Reconstruction means returning a place to a known earlier state and is distinguished from restoration by the introduction of new material into the fabric

Article 20. Reconstruction

20.1. Reconstruction is appropriate only where a place is incomplete through damage or alteration, and only where there is sufficient evidence to reproduce an earlier state of

the fabric. In rare cases, reconstruction may also be appropriate as part of a use or practice that retains the cultural significance of the place

20.2. Reconstruction should be identifiable on close inspection or through additional interpretation”

World Heritage Operational Guidelines (2015): “Reconstruction of archaeological remains or historic buildings or districts is justifiable only in exceptional circumstances” and “is acceptable only on the basis of complete and detailed documentation and to no extent on conjecture”

Summary:

- The principles for conservation by means of reconstruction mainly focuses on anastylosis i.e. the restoration of a ruined monument or building by reassembling fallen parts and, when necessary, incorporating new materials.
- Reconstruction should not be based on conjecture
- Use of new materials should be identifiable

2.5 The Process of Architectural Conservation

Typically the conservation process deals with the three main stages of documenting, analyzing and action.

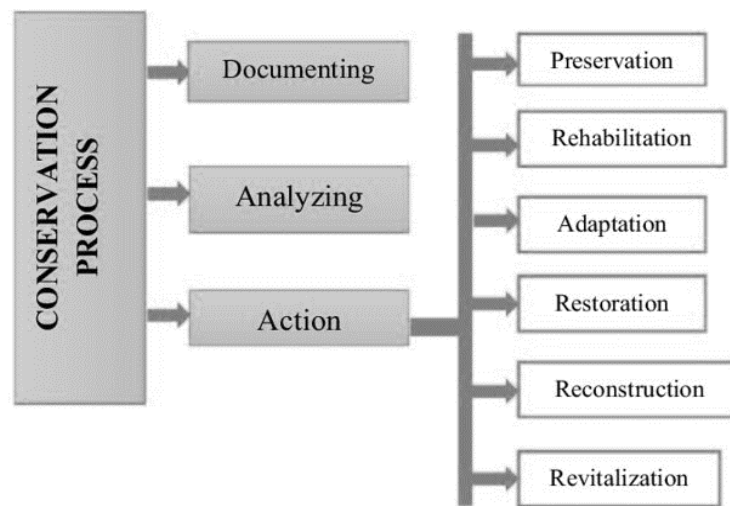


Figure 1 Stages of Conservation Process

Source: (ElWahab, Bakr, & Raslan, 2018)

The process of conservation differs from a new construction project as in the conservation process a great deal more of analysis and investigation of existing conditions is done before action is taken. (Duguay, 1992)

2.5.1 Planning Phase

2.5.1.1 Initiation/ Preliminary Assessment

The process of researching and evaluating existing buildings in order to identify those which may be of national, provincial, regional or community significance is known as preliminary assessment. Identification and protection of particularly significant buildings is usually dealt with by government agencies through enacted policies or legislation.

2.5.1.2 Feasibility research

An extensive investigation and analysis of the character, condition and limitations of the existing buildings and its site is done. It includes an evaluation of any proposed preservation strategies and possible uses and recommendations for the most appropriate conservation treatment. To conduct this broad range of research, a number of professionals and specialists may be employed. This team may include architects, planners, engineers, historians, archaeologists, curators, conservators, landscape architects and experts in historic resource interpretation.

Table 2 Phases of a conservation project

Phase	Stage
A. Planning Phase	1. Preliminary Assessment
	2. Research
	3. Program Definition
B. Implementation Phase	4. Schematic Design
	5. Design Development
	6. Construction Documents
C. Execution	7. Bid and Negotiations
	8. Construction and Contract Administration
	9. Commissioning

Source: (Adapted from Duguay, 1992)

2.5.1.2.1 Historical research

The main objectives of historical research are to obtain and document information about the history of the building and about the persons and events associated with it. Historical research may be presented encompassing the topics of: theme and resource assessment, narrative or social history, materials history and structural or building history.

a) PRIMARY SOURCES	i) Physical Evidence	Architectural Analysis Archaeological Analysis
	ii) Written Materials	Legal Records Publications Municipal Business Records
b) SECONDARY SOURCES	i) Written Materials	Local Histories Bibliographies Genealogies
	ii) Oral Histories	

Figure 2 Historical Research

Source: (Duguay, 1992)

2.5.1.2.2 Architectural Research

The purpose of architectural research is to obtain a thorough understanding of the building. A detailed on-site investigation and analysis of the building is undertaken to provide a description of its present state, to identify evidence of its development, and to evaluate the integrity of its building materials and systems. The information obtained through this investigation is particularly useful in the selection and development of an appropriate conservation strategy. It may also contribute to the evaluation of the building’s significance as a heritage resource. The investigation of the structure is usually done in two phases: documentation and analysis.

ARCHITECTURAL RESEARCH	
a) DOCUMENTATION:	i) Field Notes ii) Measured Drawings
b) ANALYSIS:	i) Non-Destructive ii) Destructive
c) WRITTEN REPORT	

Figure 3 Architectural research steps

Source: (Duguay, 1992)

2.5.1.3 Program Definition

Program definition refers to the preparation of a preservation brief which synthesizes the research data, assesses the interpretive potential, establishes a tentative use and recommends a preservation strategy, including a proposed schedule and budget.

2.5.2 The Implementation Phase

2.5.2.1 Schematic Design

Schematic design focuses on the particular preservation strategy recommended in the preservation brief and illustrate the impact of the proposed intervention.

2.5.2.2 Design Development

Design development deals with referring the schematic design to show the extent of changes to be made and indicate which methodologies would be most appropriate to carry them out.

2.5.2.3 Construction Documents

The working drawings and specifications are used to form the basis for construction work in accordance with the execution strategy. These documents must allow for unanticipated variations in the existing conditions. The organization of the construction documents will rely upon the implementation strategy and the type of contract.

2.5.3 Execution Phase

2.5.3.1 Bid and Negotiations

It involves a call for tenders, briefing bidders, issuing addenda, analyzing tenders received and selecting the most advantageous, carrying out negotiations and awarding the contract. The bidders are made aware of the conservation work and significance of the heritage.

2.5.3.2 Construction and Contract Administration

It involves reviewing drawings, proposed methods and materials, inspections and conduction final acceptance and releasing of holdbacks. Theses ensure that construction is carried out on time, on budget and in accordance with the drawings and specifications. In conservation, this phase may also involve in the extensive testing of original or replacement material, assessing the quality and condition of the remaining materials, verifying the effectiveness of proposed methods and procedures, checking compatibility between replacement and original materials and ensuring quality control.

2.5.3.3 Commissioning

In a conservation project, as built documentation and maintenance manual are prepared. The as built documentation will become part of the archival record of the intervention and is the basis for the development of the maintenance manual. The as built documentation consists of a written and illustration report describing in detail where and how the existing conditions varied from the measured drawings. The report also describes how and why modifications to the working drawings were required during the actual construction. Photographs taken during the site visits, copies of the revised working drawings, field sketches and change orders are also mentioned in the report.

2.6 Management of Architectural Heritage

Various types of interventions are used to manage historic buildings. (Trif & Burada, 2021). As determined by the level of protection, the interventions are made by the conservation authority, or through its existing value derived by studying it. For the management and conservation of heritage, heritage management plans are prepared for significant heritage sites. A heritage management plan outlines a place's heritage values and appropriate management policies in order to preserve those values for use and appreciation in the future. (Australian National University, n.d.).

While specific location-specific management arrangements exist, a management plan will often serve the following purposes:

- Outline the history of the place;
- Describe the place in extensive detail;
- Describe the heritage values of the place;
- Determine the opportunities and restrictions applicable to the location;
- Decide on management policies and improvement strategies to be implemented.

2.7 Architectural Conservation in Context of Nepal

2.7.1 History of Architectural Conservation

Considering that the temple building work had started earlier than the 5th century as the existing temple of *Changu Narayan* amply shows, there must have been a traditional way of conserving the buildings. Many of such texts are not available but still a few existing records give enough indication of marked degree of conservation works carried

out in the early periods. The surviving examples of Nepal's cultural legacy are from many historical eras, and they have endured for a very long time mostly due of the maintenance and repair practices implemented by their individual sponsors. Numerous historical inscriptions document these maintenance practices and the precise repairs made to these monuments. The reigning royal family or powerful ministers frequently gave such restoration and maintenance commissions. Important communal buildings had guthis (a form of trust) attached to them institutionally to support their routine operations, maintenance, and repairs. For reasons of either achieving 'dharma' or personal dignity, powerful and wealthy donors (such as a king or other social leader) would typically sponsor important cultural and communal structures. As a result, these donors would typically make some provisions for the maintenance and repairs necessary to ensure the longevity of such monuments. Other organizations existed to maintain significant monuments, such as Chhen-Bhadel, which appears to have existed since the Malla era and has been maintaining historic and public structures as its specific duty.

The need for "conservation" was not urgent because, prior to 1950, Nepal was a relatively remote country and both the urban and rural areas were expanding independently. In the 1950s, Nepal was made more accessible to the outside world, and as a result, the speed of development accelerated. The Public Works Department, which used to be in charge of repairs to historic buildings, and several Nirman samitis (Construction Committees) were there at first. On the occasions of King Mahendra and King Birendra's coronations, a number of public organizations and government ministries undertook some beautifying and restoration work of a number of monuments. At times, many community organizations have contributed in part to the upkeep and repair of significant cultural heritages. Even after the Department of Archaeology (DoA) was established in 1952–1953, these numerous organizations continued to carry out such projects. In actuality, DoA's work on Kasthamandapa was the organization's first significant rehabilitation project. The DoA and the Guthi Sansthan collaborated on the Kasthamandapa project, and the Guthi Sansthan actually covered all costs associated with the repairs. Later in 1967, the Guthi-Jirnodhar tatha Nirman Samiti was established, and its cooperation with the DoA gave conservation efforts significant leverage.

The Ancient Monuments Preservation Act was enacted in 1956 after the DoA was established in order to preserve ancient monuments, regulate the trade in archaeological artifacts, limit the excavation of ancient monument sites, and acquire and preserve ancient monuments and other archaeological, historical, or artistic objects. Under the United Nations Technical Assistance Programme, UNESCO and the United Nations sent out a number of missions in the 1960s to advise on the development of conservation measures with experts in town planning and the restoration of cultural property. The expansion of conservation programs and frameworks occurred further in the 1970s as a result of ongoing financial and other support from other nations and international organizations.

UNESCO advisors began investigating the preservation of historical structures and archaeological sites as early as 1963. Following this expedition, UNESCO consultants conducted a number of investigations into the growth of cultural tourism, which ultimately resulted in the creation of the Hanuman Dhoka Royal Palace conservation program in the Kathmandu Durbar Square and the idea for a fully integrated report. The Master Plan for the Conservation of the Cultural Heritage in the Kathmandu Valley (Sanday, 1978).

In order to broaden the scope of this initial effort, His Majesty's Government of Nepal made the decision in March 1974 to create a Master Plan for the Conservation of the Cultural Heritage in the Kathmandu Valley. With financial support from UNDP and technical aid from UNESCO, the Department of Archaeology of the Ministry of Education completed this project. The project was initially given the green light by UNDP in July 1974 for just two months (to allow a multidisciplinary team to create the Master Plan), but it was later extended to December 1980. Although UNESCO's missions were not always focused on influencing policy, they had a big impact on organizational planning and policy because many of the DoA's officials were "trained" through these programs. The DoA has also primarily focused on the Kathmandu valley, for which the master plan by UNESCO undoubtedly served as a vital resource.

The developments in the 1970s were intended to get Nepal ready to join the global conservation movement, which was spearheaded by the UNESCO-adopted Convention for the Protection of the World Cultural and Natural Heritage in 1972. The World Heritage Committee (formed by the aforementioned convention) approved Nepal's

proposal to designate seven landmark sites in the Kathmandu valley as World Heritage Sites in 1979 after Nepal became a party to the convention in 1978.

Numerous national international development organizations are actively involved in conservation efforts in addition to intergovernmental organizations like UNESCO and ICOMOS. Their work has been recognized by a wider audience nationally and internationally, and frequently their operating principles have placed Nepal in theoretical and practical experiments on the global conservation debate, even though they may not directly influence cultural heritage policy in the same way that UNESCO may (as mentioned above) (Chapagain, 2008).

2.7.2 Problems in Architectural Conservation

Though the conservation works in Nepal can be dated back to times even before the Malla period, an official regulation regarding conservation was promulgated in 1956 in the form of Ancient Monuments Act of Nepal. One of its initial suggestions was to establish a "building code" for its "monument zones" to control "growth as well as cultural preservation," but this idea was never carried through.

In Nepal, Department of Archaeology (DoA) is responsible for the conservation of historic sites. However, the conservation works are mostly carried out in collaboration with various organizations, often with financial support from the other organizations. This has brought up a few problems regarding different organizations identifying different rules for the purpose of conservation. Instead of adhering to building codes, the 1974 German government-funded "Bhaktapur Development Project" chose to take direct conservation action by using public funds in private structures. A conservation project financed by UNESCO had only recently been conceived and implemented a few years prior at the Hanumandhoka Durbar, the main structure of the Durbar Square, the traditional monumental center of Kathmandu town. The project created and adopted its own methods for conserving monuments. Additionally, it used a fairly forceful method to building reinforcement by adding covert concrete ring beams to the medieval building (Tiwari, n.d.).

The conservation works in Nepal often require the knowledge of various crafts such as wood and stone carving, masonry etc. Some of these crafts are lost in transition from the past to present generation. The knowledge regarding the use of authentic materials in the conservation work is also lost or paid less attention as seen in reconstruction of

various temples after the earthquake. It can most notably be seen in the controversy in the reconstruction of Matrikeshwor Mahadev temple at Ranipokhari which was due to the use of unauthentic materials and technology in its reconstruction.

2.7.3 Different Approaches to Conservation in Nepal and Concept of Cyclical renewal

The primary administration of architectural conservation in Nepal is the Department of Archaeology. However other different stakeholders such as municipality, community and international actors are also involved in conservation activities. Conservation takes place in often in collaboration with various organizations and sometimes involves financial support from the other organizations. This causes input to a conservation project from multiple stakeholders and development of different approaches to monument conservation. Voices of conservation with use of traditionally used materials only can be heard while some approach conservation such that modern materials to strengthen the structural integrity of the building is used.

In case of Nepal, however, the concept of cyclical renewal is also necessary to be considered. The idea of "cyclical renewal" has persisted in Nepal for generations as a means of coping with the destruction caused by recurrent earthquake disasters, which occur around every 80-100 years. (Haselberger & Krist, 2020). It refers to the replacement of broken parts and the reconstruction of damaged buildings. It is feasible to make modifications, extensions, or technological advancements that aim to modernize and strengthen the monuments, especially to increase their safety and seismic resistance. Additionally, embellishments and decorations may be added for aesthetic purposes or to correspond to prevailing taste. However, historical configurations should be honored. This keeps craftsmanship alive with the continued practice by providing creators of tangible heritage opportunities to perform their skills. The Nepalese tradition of conservation is based on an authenticity manifested in a temple's or its constituent elements' design as well as in the skills and knowledge of craftsmen passed down from one generation to the next (Tiwari, n.d.).

This is in contrast to the provision of "Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072", phrased by the Department of Archaeology, that prescribes under paragraph 32 c the use of "uncarved elements resembling the original size, type and quality" in case evidence is lacking.

Moreover, “no gods and goddesses, or other images may be carved based on conjecture” (Gutschow, 2016). In such case decisions of embellishments and decorations are left to the demands of the “local residents” as mentioned in §13 of the Guidelines to avoid blank surfaces and to replicate deities, the iconographical details of which in most cases is common knowledge.

Another example of cyclical renewal is in case of Japan's Nara Temples where every 20 years, they are demolished and rebuilt (Del, Sedghpour, & Tabrizi, 2020). Therefore, it is not possible to conserve the values by keeping the materials; instead, it is necessary to think about preserving craft skills and intangible values. In order to conserve a specific kind of intangible qualities, materials and physical characteristics go through entire transformations and are destroyed. This relationship between conservation and value is purposefully cyclical.

2.7.4 Reconstruction Techniques Relevant to Traditional Buildings in Nepal

The reconstruction techniques are for the most common materials found in the traditional Nepali buildings and heritage buildings which include timber, bricks, tiles and stones. These methods are as documented by Sanday (1978) while documenting the various techniques that were developed to repair, conserve and consolidate historic buildings that were looked after by the Hanuman Dhaka Conservation Project Office. The reconstruction principles were to adhere to use local materials and skills as much as possible and repairs should be carried out so that they can be recognized as such by future archaeologists (Sanday, 1978).

2.7.4.1 Timber

The problems that occur in timber can be caused by fungal attack, rots and timber destroying insects. The following methods of timber repair can be used or adapted according to the problems encountered.

- Defective rafters - usually at the feet - and beams - usually at the bearings - can be repaired by splicing in short new lengths of timber to replace the decayed sections, using a scarfed joint.

- Decayed beams that have rotted in the core as a result of heart rot can be repaired by cutting away the defective center and inserting either new timber or stiffening the member with flitch plates.
- Decayed joints can be repaired in a variety of ways by using some ingenuity in inserting new work.
- It is necessary consider whether the part to be repaired is in tension or compression. Iron straps can be usefully employed for tension members and mild steel sections for restoring bearings. They should be painted or varnished to inhibit rust.
- In old buildings the timbers are generally of much bigger section than would be employed today. Even if they are partially decayed, there is frequently plenty of sound wood left to carry the stresses to which the timber is subjected.
- Framed structures which have become distorted can often be pulled back into shape or jacked up but before either pulling up or jacking a distorted frame, it is essential to clean out thoroughly all the joints and other possible hindrances, such as accumulated dirt, because this will prevent any movement.

2.7.4.2 Bricks

In the historic buildings of the Kathmandu Valley, special bricks and tiles are used and although it is not strictly a conservation technique, these bricks are now no longer made commercially and it may be necessary for an organization to revive this technique again.

It is possible to reinforce the structure or redistribute the loading once the cause of failure has been identified (following a comprehensive investigation and evaluation of the structural loads). If failure is only due to movement and no high weight is involved, this can be accomplished by carefully bonding new brickwork set in a stronger mortar or by reinforced concrete poured in situ. When the bond between the brickwork fails in a relatively isolated area, it may be possible to remove a part of the brickwork, insert a concrete bond over the crack, "cast it in situ," and then rebuild the wall to cover the concrete.

Brickwork efflorescence needs to be removed by repeatedly brushing with a stiff, dry bristle brush over time. The brickwork should never be dampened because doing so

will cause the salts to re-enter the wall. Finally, the wall can be polished to reveal its full sheen using a clean, oiled cloth.

2.7.4.3 Stones

There are only a finite number and quality of stones available. Frequently, the stones in the constructions will be set on the incorrect bed and will be an odd blend of various stones. There are, nevertheless, a select few extraordinary examples of sculptured stone structures with distinct issues that require conservation; in each of these situations, specialized and individual care will be required.

Many of the stones in the structures have fractured or have had a piece, like a corner, or, in the case of sculptures on some of the structures, an arm or a head, broken off. These types of repairs may now be completed quickly and easily using specially created stone glues, which are incredibly strong and similar to timber glues. Concrete repairs should be made before it sets. The tensile strength must always be maintained, and the beams must be continuous, regardless of how the ring beam is shaped to suit the scenario.

2.7.4.4 Wood Carvings

Using as little water as possible while cleaning wood carvings is a key idea. This procedure is separated into three fundamental operations as a result.-

- **Dry Cleaning:** The first time-consuming and difficult procedure is to mechanically scrape off as much of the colored covering as you can. Only small, dull scalpels held between the forefinger and thumb are used for this. Scraping is done carefully to prevent injuring the *sal* wood, which is a particularly resilient type of wood. The piece is prepared for the second procedure once all the debris has been removed by brushing. If the wood is too soft for this kind of treatment or if it has been harmed by fungus or beetle attack, it will be essential to skip scalpel cleaning and move on to the next procedure after just a light brushing.
- **Wet Cleaning:** Wet cleaning is quite quick in comparison to the time-consuming dry cleaning technique. It is therefore advisable to get multiple items ready for wet cleaning at once. Although this technique is extremely straightforward, time

is of the importance. In a small basin, produce an ammonia-water solution that is dilute (about 1:8). This is scrubbed on the wood with a brush that has sharp bristles to remove any last bits of pigment. Once the piece is dry, the coloring is then pressure sprayed off, and if it still shows after that, the process should be repeated.

- **Clay Poultice:** Use a clay poultice consisting of finely powdered clay combined with ammonia diluted (1:5) with water on delicate carvings or damaged wood that won't tolerate scraping. The poultice needs to be combined into a hard paste before being applied to completely cover the carving. The carving should then be wiped down with a pressure spray and cleaned with a gentle brush after the poultice has been applied for several hours to allow the diluted ammonia to soften the paint. Once the piece has dried, the procedure should be repeated if the paint is still present.

The carvings should be referenced and cleaned before being studied to determine whether any repairs are required. In many instances, it is best to entirely replace a piece of carving that has been severely defaced because there may still be enough proof and detail to recreate the piece perfectly. In many circumstances, if a partially damaged piece in a structure is not replaced, its rate of decay may be substantially faster than the nearby pieces'; this will effect both its longevity and the façade's overall decline. It is logical to keep the precise precision and sharpness of line originally intended in the carvings when competent and traditional craftsmen are readily available and are working in the same style and way as their forebears.

It is best to examine the practical elements of fixing individual carvings with the artisans themselves, keeping in mind that every effort must be taken to preserve the carving if the carving is sound but the joints or the backing timber is damaged. Carved components can be cut off and re-attached in the same way onto a new backing timber. Defective tongues or tenons can be cut out and replaced by dowelling and putting in new ones. For dependability and strength, bamboo dowels work well coupled with resin-bonded glue. Avoid using metal fasteners wherever you can because they were never utilized in the past. Only use screws under supervision, and make sure they are correctly countersunk and plugged afterward.

2.7.4.5 Use of Newly Developed Materials

Repairs to wooden structures should for preference be made in the same timber as the original. However, metal work can be useful in cases where strength is vital, as noted above. New materials have been developed in recent years and these have their uses in special circumstances where pieces of carved wood have lost their structural strength. Epoxy glues made up of two compounds can be used to make a very strong bond between two or more pieces of timber and the joint can be of greater strength than the wood itself.

Epoxy and polyester resins can be used to repair woodwork and make a strong bond to timber. Such repairs can be structural or used merely as fillers for repairing or infilling damaged parts. The compounds can be mixed with sawdust but any inert material such as stone dust can be used also. These resins set in about half an hour, become rock hard in thirty-six hours and they can be sawn, chiseled and planed like ordinary timber.

2.8 Legislation on Architectural Heritage Conservation in Nepal

2.8.1 Provision of Ancient Monument Act 2013

The ancient monument preservation act was formulated in 2013 (1956 A.D.). The act has been amended five times since its formulation (in 2020 by Some Nepal Laws and in 2049, 2053, 2056 and 2058 by ancient monument preservation amendments). The ancient monument preservation act focuses more on the declaration of monument areas for their preservation under the authority of the department of archaeology. It defines ancient monuments as “*temple, monument, house, abbey, cupola, monastery, stupa, bihar etc. which have their importance above one year, from the point of view of history, arts, science, architectonics or art of masonry, and this word shall also mean the site of the monument as well as the human settlement or place, and remnant of ancient human settlement, relies of ancient monument, cave etc. having specific value from the national or international point*” (Department of Archaeology).

Under Article 3, it has provisions for the declaration as Preserved Monument area with the following sub sections:

3 (1): provisions for notice and protesting the declaration.

3 (5): provision for permission from the department for installation of facilities or organization of ceremonies, festivals and fairs requiring painting, pasting of poster or parking in the monument area.

Under Article 3A, the provision for classification of ancient monuments is given.

3A (1) from the viewpoint of ownership, the ancient monuments shall be classified in two categories as public ancient monuments and private ancient monuments.

3A (2) from the view point of importance, the ancient monuments shall be classified in three categories as of international importance, of national importance and of local importance".

Under Article 3B, for ownership, conservation, maintenance and renovation of public ancient monuments, it states that "*Ownership of the public ancient monuments shall be vested in the Department of Archaeology. The Department of Archaeology shall conserve, maintain and renovate such public ancient monuments.*"

Under article 3C, for conservation, maintenance and renovation of the ancient monuments under private ownership:

3C (1) The Conservation, maintenance and renovation of the ancient monuments under private ownership which are inside the Protected Monuments area shall be carried out by the concerned person. Provided that if it is deemed necessary to conserve, maintain and renovate the private ancient monuments which are of importance from the national and international view point, by the Department of Archaeology, the Department of Archaeology may, conserve, maintain and renovate such ancient monuments.

3C (2) In order to change the fundamental features of the ancient monuments, their maintenance and renovation or to demolish such ancient monuments, the concerned person shall obtain an approval from the Department of Archaeology.

Under Article 3E, for operation of temples and monasteries,

3E (1) The person operating a religious temple, monastery etc. shall use up to fifty percent of the amount of the donation offered to such temple or monastery for the conservation of the temple or monastery and for bringing reformation in its surrounding environment.

Under Article 3G (1) it is stated that, Various committees may be formed in order to survey and classify the ancient monuments; to give advises to the Department of Archaeology as to the style or standard of the house or building to be constructed in the private land.

Under Article 9, for protection of shrines and temples, arrangements to the prevention from misuse or any kind of ill- treatment of places of archaeological importance or pilgrimage or temples is to be done by the department is stated.

Under Article 17D, Ancient Monuments Conservation Fund, it is stated that there shall be a fund as prescribed in order to conserve the ancient monuments which are important from the historic and artistic point of view.

2.8.2 Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072

After the 2072 earthquake, a directory for conservation and reconstruction of earthquake damaged heritages was formulated (Department of Archaeology). The general provisions and provisions for monuments in this directory are as follows:

Section 1: General provisions

Guideline 5: Rights and responsibilities

The heritages are under rights of Department of Archaeology according to the ancient monuments act 2013. The department can coordinate with national and international organizations in conservation of heritages. The conservation works must be done under the supervision of Department of Archaeology.

Guideline 6: Provision of means

The provision of means for conservation that includes technological, financial means etc. will be overseen by department of archaeology. The resources utilized will be documented by the department as well.

Guideline 7: Damage evaluation

The evaluation of damage that includes damage to physical and intangible aspects should be done.

Guideline 8: Priority in conservation

The priority to monuments and heritages sites should be given based on the seriousness of damage due to the earthquake.

Guideline 9: Documentation

Documentation of monuments and heritages should be done with proper identification. Documentation should be done by means of writing, drawing, photos, sketches and visual means.

Guideline 10: Conservation based on available evidences

The conservation of heritages and monuments should be based on available evidences and not on speculation.

Guideline 11: Conservation planning

The conservation planning for any heritage should be done with detail study of the heritage, past conservation works and analysis.

Guideline 12: Use of traditional materials and technology

- a) Traditional materials and technology should be used for conservation works. If improper techniques and modern materials were found to be used in any previous conservation works, it can be corrected based on available evidences.
- b) If use of traditional materials poses risk to the monument or heritage, use of appropriate materials can be done with permission from the department of archaeology. Use of such material should not be visible from the outside and should be reversible.

Guideline 13: Local participation

Since local population are guardians of heritages, their involvement in various stages of conservation should be ensured.

Guideline 14: Ownership

Based on the ownership of the heritage, all stakeholders will be involved in the conservation.

Guideline 15: Maintenance and cyclical renewal

For sustainable conservation of monuments and heritages, periodic observation, maintenance works and funding shall be organized.

Guideline 16: Risk management

Disasters such as earthquake, flood, landslide, lightning and other disasters such as fire should be considered and proper measures should be taken.

Guideline 17: Heritage Impact Assessment

For any new development in and near the heritage area, the impact on the heritage should be assessed and department approved design should be followed.

Guideline 18: Conservation of living heritage

Intangible heritages related to the heritage or monument area such as traditions and rituals should be conserved.

Guideline 19: Traditional and adaptive reuse

The traditional use of heritages and monuments is generally encouraged. If traditional use is discontinued, a suitable reuse of the heritage based on community value should be provisioned.

Guideline 20: Installation of modern facilities

Modern provisions such as electricity, cameras for theft prevention and water supply for fire control can be installed. Such installations should not impact the overall form of the building.

Guideline 21: Material sourcing and quality

- a) Quality control for both traditional and modern materials shall be assured by the department.
- b) Quality timber sourced from within the country should be used. Timber used should withstand the weather and be suitable for carving.

Guideline 22: Skilled workers and trainings

Skilled workers shall be employed and new workers can be trained as well.

Guideline 23: Oversight and quality control

The quality of materials used and quality of work should be checked. The provisions for quality check and oversight will be provided by the department.

Guideline 24: Study and investigation

During conservation and reconstruction of heritages, surroundings, foundations, elements, design methods used and load bearing capability of the structure should be scientifically studied. The earthquake resistance measures required for the structure should also be studied.

Section 3: Guidelines for monuments

The earthquake damaged monuments will be categorized into three categories of completely destroyed monuments, partially damaged monuments and monuments with ordinary damages.

Guideline 31: Provisions for monuments completely destroyed

- a) Available documents should be studied and after detail study documentation of the monuments should be done.
- b) The construction phases and cultural sequence for a monument should be established and departmental oversight and permission is necessary for any excavation studies.

- c) Reconstruction should be in original form, appearance and build of the monument. Undamaged elements should be reused.
- d) Reconstruction should be based on available evidences and speculation should not be done. For replacement of statues and carved elements, similar quality material and replication of original elements by skilled workers should be used. Replacement based on assumptions should not be done.
- e) In case of available evidences, reconstruction should be done in its original form if structural integrity is not compromised.
- f) Traditional materials with available evidences must be used. In case of use of new materials, it should be non-intrusive and reversible.
- g) The foundation should be kept intact as much as possible and any changes can be made only if evidences are available citing differences.

Guideline 32: Provisions for monuments partially destroyed

- a) If the monument requires intervention due to damages to structural integrity, it will be considered partially destroyed.
- b) The monument shall be studied and any portions to be kept intact shall be determined. The structure and materials should be scientifically studied.
- c) Documentation with drawings, writings, photographs etc. should be done before demolition.
- d) Existing structure should be prioritized. Use of new materials should be reversible.
- e) Proper documentation and evidence should be presented to the department of archaeology for demolition needs and permission from the department should be granted for demolition.
- f) Proper documentation and evidence should be presented to the department of archaeology in case of necessity of location change for the monument. If permission is granted by the department, the monument may be rebuilt in a nearby location with the agreement of the stakeholders and the local community.

Guideline 33: Provisions for monuments with ordinary damages

- If a monument is not structurally compromised and can be conserved with simple interventions, it will be considered monument with ordinary damages.
- For conservation, materials similar to original materials shall be used and skilled workers for original form and build replication.

2.9 Case Studies of some Conservation Projects

2.9.1 Conservation of Cathedral of Porto, Portugal

In the heart of Porto's historical city, there stands a Roman Catholic Church called the Porto Cathedral. It is one of the most significant Romanesque structures in the area and one of the oldest monuments in the city.

(Pastor, n.d.). The Porto Cathedral was first built in the middle of the 12th century. For 800 years, the settlement was a repository of



Figure 4 Porto Cathedral

Source: (Pastor, n.d.)

added parts. Romanesque and proto-gothic, gothic, renaissance, mannerist, baroque, neoclassical, contemporary works from the first half of the 20th century, and, ultimately, current works are the principal fabrics within the framework of a continuous construction yard. (Lourenco, 2014)

Infestation control, consolidation, water tightness, ventilation, and protection were the five activities around which the intervention in the building was structured. The objective was to reactivate, rehabilitate, and upgrade the structures', materials', forms', and space's competence, where competence is considered as the capacity to operate properly as a support for functionality. The complex consists of the church, a south-facing gothic cloister, side chapels, a north-facing gallery, a sacristy, several chapels, and other annexes. The church has two rectangular towers facing west and a typical Latin cross with three naves and five spans. The Cathedral's grounds measure around 60 m² by 60 m² in layout, with towers that can reach a maximum height of 35 m.

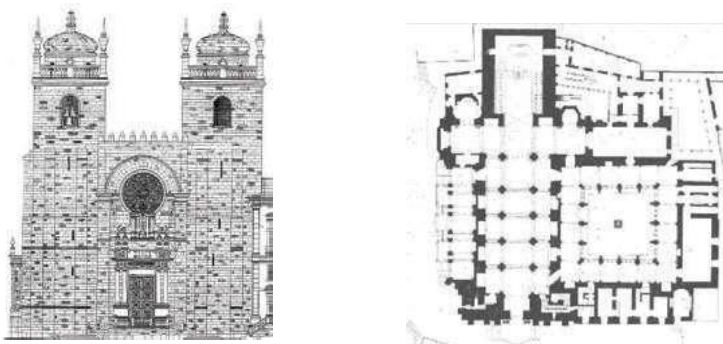


Figure 5 Façade (left) and plan (right) of Porto Cathedral

2.9.1.1 Remedial measures in the tower

The towers' cross sections are roughly square with 10.0 m sides and a varied thickness that drops to 1.7 m near the base. The towers are around 35 meters tall, thus the base of each one experiences an average stress of 1.0 N/mm². This value is relatively high for rubble masonry but relatively low for conventional granite masonry (with or without mortar joints). Each tower has two buttresses that are visible on the main façade. The building underwent multiple significant alterations throughout time, creating an extremely complicated internal structure with various load-bearing internal parts at each level.

For structural concerns, it is impossible to understand the towers' structure, and some openings that would have faced vaults or staircases are walled off. With a connection between the two towers at the top of the main vault, the entrance to the towers is situated midway up. The two towers, however, are built very differently. The North Tower has a horizontal mid-level with stone slabs and architraves that appear to be supported on columns and stone struts. The tower currently houses bells and a clock. The South tower has an interior core with a helicoidally formed staircase. Visual inspection, removal of stones from the outer leave inside the tower, and use of a boroscopic camera placed in cracks or in holes drilled in joints were used to characterize the construction of the masonry walls from the towers. The inspection allowed it to be determined that the three-leaf walls have external leaves formed of loose smaller stones and silty soil, with a thickness ranging from 0.30 to 0.70 m, and a center leave constructed of granite ashlar with a thickness ranging from 0.30 to 0.70 m. A damp infill even in the summer and constant washing out of the infill are caused by the combination of frequent rain in Porto, high winds at the top of the hill where the Cathedral is situated, and the open joints in the exterior stone face.



Figure 6 Skylight with aerial view, cracks in columns and vaults

The towers show considerable out-of-plane motions and dispersed cracks. Three iron ties were just added because to the damage that has already occurred (date unknown). The anchorage of tie T1 is substantially distorted, and tie T3 is damaged and corroded. After tie T3 was broken, the divide between the East and West façades of the South tower persisted. Due to the application of a significant point load, the masonry walls next to the anchorages have likewise undergone the anticipated deformation. With extensive cracks and out-of-plumb walls, the South tower is worse off than the North tower. The longitudinal cracking seen in the majority of the apertures, with a maximum width of a few millimeters, confirms separation between the internal and external leaves of the walls.



Figure 7 Tower ties with deformed anchorage T1 and broken tie T3

The main component of the strengthening solution, which aims to confine the structure along the two orthogonal directions to the only site possible, is a steel ring in each tower. To avoid generalized injection, the rings are constructed from welded stainless steel plates (class AISI 316L) and attached to the towers using long, inclined stainless steel anchorages. The steel profiles' lengths are set such that the components may be delivered to the site through the doors that are already there and that they can be quickly and readily put together there without the need for additional welding.

The ring in the North Tower also seeks to support the stone pavement for the bells because the stone columns there are severely damaged, serving no structural use, and the stone struts have very poor design. The channel profiles used to create the steel ring are 240 x 120 mm and 200 x 100 mm in height. A pair of two ties were given to the ring in the South tower because it was possible for aesthetic reasons and they are evidence of the old, broken knot. Because of the tower's intricate internal layout, the ring must cross the staircase at a specific position. The steel ring is composed of 180 x 180 mm H profiles because a significantly stiffer steel frame is required because there

are no internal stiffening components. Several short ties have been added to the structure to stitch the East and South façades together, and two long ties through the core of the South façade have been added to connect the West and East façades due to the bulging outwards of the East and South façades and the severe cracks in the corners. Given the structure's cultural significance and the serious damage to the South tower, a monitoring system was designed and set up. Four waterproof crackmeters, two strain gages for the new ties, two biaxial clinometers to measure the tilting of the tower, temperature, humidity, and wind sensors are all part of the system. Additionally, the system has a GSM interface for remote monitoring. The measurements in the clinometers (amplitudes less than 0.6 mm/m) and crackmeters (amplitudes less than 0.3 mm) are rather modest and they correspond to the temperature measurements.

According to the wind speed measurement, the gusty wind is coming from the north or northwest and can reach speeds of up to 150 km/h. According to an auto regressive exogenous model, the measurements of the cracks are accurate, and the changes are caused by environmental factors rather than crack opening. For the measurements of stresses in the steel ties, the same conclusion applies. Although the tiltmeter readings are minimal, it appears that the South tower rotates at a rate of 0.01° per year or 0.1° per decade.

2.9.1.2 Skylight

The skylight, which is positioned above the transept, has several cracks in it from the construction work done in the first part of the 20th century. A recent collapse of vault filling material also caused damage to the transept. With the exception of the East façade, which doesn't have any openings, the skylight is composed of four walls that are supported by big arched windows that were first opened in the 18th century. It is square in shape with 7.5 m sides and walls that are 6.5 m tall and 0.65 m thick.

The thickness is decreased to 0.2 m in the battlements and to 0.4 m above the vaults. Each corner has buttresses, and the ceiling is made of a ribbed stone vault that is capped with a wooden double slope roof. The walls' masonry, which is built of shattered stone and flimsy lime mortar, is of very poor quality. The openings are supported at the thirds of the span by T-shaped columns and take the form of pointed arches. Stone slabs that range in thickness from 0.14 to 0.54 meters are used to construct the vault. The vault's top was cleared of loose infill rubble (about 10 m^3).

The West, North, and South façades of the three walls that have windows have maximum crack widths of 10, 1, and 0.5 mm, respectively. Additionally, these walls are jutting outward. The primary crack in the West façade, which runs the length of the wall. Additionally, smaller fractures can be seen beneath the opening and closer to the buttresses, along with bending-related horizontal fissures in the window columns. The interior's widest crack, which indicates that the vault is detached from the wall at the West façade, measures 25 mm in width. The stone vault slabs are no longer supported by this gap in the side rib, and the key of the vault has settled by around 20 mm.

The damage to the skylight, along with the local relief, the stark separation between the East façade and the chancel, the bulging of the nave walls, and old documentation showing consolidation and enlargement of foundations, all point to soil settlements and weak foundations as the likely culprits. To comprehend and defend the current damage, a finite element model of the skylight was used.

The self-weight of the structure, the weight of the infill, seismic activity, and differential temperature are among the acts taken into account. The window sills and ribs were where the maximum tensile stress, which was found to be less than 0.1 N/mm², was found to be lower than self-weight alone. Under self-weight and filling, the skylight should sustain only slight or no damage. The structure was then modified to include seismic loading and temperature in an effort to explain the damage. The stresses discovered are too low to do any harm, even if the deformation for seismic loading bears some similarities to the movements in the structure that have been seen. The deformed mesh linked to the temperature difference suggests that the walls shift to the outside and flex significantly, leading to large column curvatures. The deformation is not consistent with the motions that have been recorded, and there are still some modest strains present, indicating that the temperature effect is relevant but not the primary source of the damage. The influence of the skylight, the neighboring structure, and the soil were then examined using a complete model of the church. The skylight exhibits extremely high tensile strains, and the deformation is consistent with that seen in the structure, indicating that this is the primary source of the damage.

2.9.2 Conservation of Reads Cutlers, Ireland

Located in the almost entirely intact 1760s shop and domestic interiors of the Wide Streets Commissioners building fronting onto Parliament Street, Read's is the only intact 18th century retail space in Dublin. It also occupies previously unknown much earlier 17th and 18th century premises fronting onto Crane Lane that were incorporated into the mid-18th century alterations.

Reads was founded in 1670 on nearby Blind Quay, moved in 1762 to 4 Parliament Street, and operated there until its closure in 1988.



One of the most major restoration efforts in Ireland in recent years was the conservation and restoration of Reads Cutlers, a small mid-18th century mercantile establishment located at 4 Parliament Street in central Dublin and a protected structure..

The Wide Street Commissioners opened up Parliament Street in 1762 to offer an appropriately opulent approach from Essex Bridge to Dublin Castle. Parliament Street was designed and put up according to the design of the Wide Streets Commissioners architect, George Semple, in 1761. The majority of the homes bordering the street have changed much over the past plus 250 years,

but one structure still has its original exterior and inside.

The most preserved building on the block is No. 4, a terraced two-bay five-story house over store. Its constructed fabric and architectural detail, as well as its shop fittings, fixtures, and goods, notably its distinctive 18th century counter tops and display cases, are all still present.

Due to a combination of neglect and poorly thought-out interventions in the 1770s that removed crucial internal structural support in order to expand the retail unit at ground level and to provide a Guild or Meeting Room at first floor, the building had fallen into severe dilapidation and had experienced serious structural destabilization.

The strategies for conservation were:

- a. To address essential weatherproofing and stabilization of the structure.
- b. To research and investigate both the history and construction of the building to enable
a thorough conservation process to be initiated.

The dismantling, conservation, and repair of the shop front and fittings, window sashes above, brick repair, and re-pointing in lime to match the original Wide Streets Commissioners intentions, the removal of rotted sill timbers at the base of the shop front, the structural tying in of brick facade to ensure the cellular integrity of the structure was retained, and the repair and strengthening of shop front bressumer beam were all included in the structural stabilization of the shop front and brick facade over.

2.9.2.1 Historical research

In addition to compiling a genealogy of the Read Family in Ireland, the historical research included primary auditing and archival categorization of the remaining trade goods on the premises, including all surviving trade goods, account books, trade cards, tools and equipment. It also included research into the role of the Read family in the cutlery trade in Ireland, the range of goods produced by the family, a history of the shop, and a record of goods produced.

2.9.2.2 The planning process

Under Section 5 Approval from Dublin City Council, an enabling program of exploratory opening up works was carried out in the beginning of 2016. This technique revealed a large number of problems with the front façade and spine wall structures that were seriously endangered by historical changes and On July 8th, 2016, planning permission was given for the essential repairs to the shop front, window joinery, and front façade. With Dublin City Council, a first minimal intervention strategy emphasizing roof weatherproofing was agreed upon.

The following were the main problems that were determined to be the building's structural failure:

- Poor quality intervention works carried out in the 1770s which resulted in the removal of a chimney breast at ground and first floors (leaving the stack through three floors above in place).
- The removal of the spine wall of the original 1760's shop and dwelling at ground and first floor in the 1770s'.

- Poor original building practices in the front façade, which was found to be free-standing without restraint to the main structure, and lacking adequate floor joist tie ins to the front walling. Significant subsidence due to adjacent building works and poor-quality historic maintenance of the built fabric.
- General dilapidation decay and neglect.
- Excessive wear and tear in daily use particularly with regard to cabinetry and fittings and fixtures which had remained in constant daily use from 1762 right up to 1988.

2.9.2.3 Resolution:

In agreement with the Planning and Conservation Officers, a solution was developed that identified a number of necessary works necessary for a "minimal intervention" based process of structural intervention to stabilize the building, a schedule of brick repair and re-pointing to weather it, and a series of repair-based interventions to windows and shop-front. For the restoration of fittings and fixtures, a schedule and repair plan that prioritized preservation of the original fabric and minimal repair were decided upon. Early September 2016 saw the start of roofing repair and related weatherproofing work after opening up works. By agreement, those works were expanded to encompass a variety of other interior finishing tasks, such as plumbing, heating, work on the upper floors, plastering, etc. A conservation joinery specialist repaired the windows and made general historic joinery repairs to the staircase, shopfront, skirting, and architraves.



Figure 8 Historical image and current state of interior walls

Source: (Kelly, 2022)

All joinery repairs and work were based on the idea of preserving the original structure and isolated restoration (following disassembly, cleaning, and assessment) of individual elements by consolidation and grafting in of new matching timber when necessary.

After erecting scaffolding, removing the shop front, and granting full access, it became apparent that while the roof beam over the shop front was in better-than-expected condition, the wall above had moved significantly, and the front portion of the brick, which it turned out was made up of snapped headers rather than full depth brick, had delaminated due to poor original construction.



Figure 9 Interior after completion of conservation works

Source: (Kelly, 2022)

It also became apparent that the front wall was not connected to the building's primary framework and that the fourth-floor wall and the parapet level above were in danger of collapsing, necessitating their removal and restoration. However, the original 1760s brick pointing that served as the model (in accordance with the Conservation Officer) for the front façade's re-pointing was discovered when the original brick hidden under the remaining shop fascia from the late 18th century was exposed.

Further inspection found that the brickwork needed substantial lateral stabilization into the fabric of the party walls even though it was in reasonable condition. In the depths of the floors, a combination of corner Heli Ties and Bow Ties was used to accomplish this. It was discovered that the intervention works of the 1770s and 1780s, which had destroyed two intermediary levels of chimney stack and a spine wall at the ground and first floor, were largely responsible for the destabilization of the interior fabric. By attaching the front wall to the floors and party walls and strengthening the existing

timber floor beams—which support the second floor and higher—that were built in the 1770s but were initially too small—stability was attained.

These repairs required the addition of a new supplementary steel structure while preserving the existing fabric to the greatest extent practicable. Following the creation of a pertinent Conservation Impact Assessment, this work was completed as emergency structural stabilization works in accordance with conservation and planning officers. The project moved on and was finished in late 2017, with the last minor internal items being completed in 2018.

2.9.3 Conservation of Kasthamandap, Nepal

Kasthamandap is a three-storied public shelter that included a shrine consecrated to Gorakhanath situated at Maru in Kathmandu Durbar Square. It was enlisted in UNESCO world heritage list in 1979 along with other structures of Basantapur Darbar Square. “Kasthamandap was a home where everyone was welcomed, commoners and nobility, travelers and locals. It still embodies that spirit.” It collapsed on 25th April 2015, the ancient timber could not withstand the quake force. Reconstruction was done referring the drawings by Wolfgang Korn.



Figure 10 Kasthamandap

Source: (Tuladhar, 2020)

As per the legend the architectural masterpiece, Kasthamandap, was built out of a single Sal tree and has neither nails nor rivets holding it together. Legend claims that “According to legend, the tree god Kalpa Brikshya visited Kathmandu while posing as a human to attend the Machindranath chariot festival. When one of the Buddhist tantric priests saw him, he captured the sage and demanded anything in exchange for his release. Being the god of trees, Kalpa Brichya magically conjured forth a huge tree big enough to furnish the Kasthamandap project when the people of Kathmandu requested wood for it.” It is said that the town is named as Kathmandu after the construction of Kasthamandap. The smallest on the top level to the largest on the bottom, three level

pagoda style defining south Asian architectural style. Foundation consists of 9 footings as 9 pit mandaps, known as Navakunda foundation under central shrine of Gorakhnath as per religion.

2.9.3.1 Socio-cultural aspect

The temple consists of 2 statues – Statue of Gorakhnath and Statue of Lopipad. For the reconstruction, Kasthamandap Reconstruction Committee was established. Ground floor is accessible whereas the first floor and second floor is not accessible to public. Upper floor will be accessible in case of exhibition programs only. Whereas historically the upper floors are predicted to be area for resting.

Main *guthi* related to Kasthamandap is called sa *guthi khala*. Maghe Sankranti as a festival with participation of Maharjan and Mannandhars. Manandhars offer salt/water, chaku and wheat grains. Bhadra Krishna Trayodashi is celebrated by making kheer and chamri; serving with separate spatula. On Tahran Chatan tamrakars participate as the richest social groups in crafts exporting days. Also, panchadan is done by Bajrachrayas and Shakyas at south of Kasthamandap.

2.9.3.2 Historical Information

“The first references to the building date back to the 11th and 12th centuries A.D. The name Kasthamandapa was used in 1143 A.D. when referring to the settlement around the building, thus indicating the importance of the Mandapa and its early establishment.” (Korn, 1998, p. 94) The post-earthquake archeological research has now scientifically dated that Kasthamandap was constructed in seventh century AD and its ritual core foundations were re-configured two hundred years later. (Coningham, Acharya, Davis, & Kunwar, 2015; 2017 cited in Tiwari, 2019). A capital from one of the four central ground floor column is found to be from 5th century as per its carbon dating. This could be due to an older building being salvaged for the 7th century construction of Kasthamandap (Tiwari, 2019). A major reconstruction in mid-eleventh century, when its four central posts were replaced (Tiwari, 2019).

The foundations date back to 7th century and 9th century showing foundation was reconfigured in 9th century CE (Tiwari, 2019). The 7th century *mandap* had a pit and pond sanctum at -27 brick courses depth with the four posts rising on piers on the water. The 9th century reconfiguration of the temple had introduced a new large sanctum at the level of top of the brick piers and the pit/pond area filled up. The present building was

renovated during the seventeenth century and the middle roof was added during the rule of King Laxminarasimha Malla (Himalayan Dreams, 2011). Kasthamandap was last repaired in 1967 during the reign of King Mahendra (Aryal & Shrestha, 2016).

2.9.3.3 Repair and Maintenance Problems

Only when they are maintained and watched over are the traditional designs and modifications robust. Recent quick reconstruction projects that prioritize modern materials are erasing underlying history without being recorded and erasing information about collapse causes and seismic adaption.

Lack of proper and timely maintenance could be seen as:

“the northeast saddle stone had been sealed below a tiled floor. It was identified that this had most likely occurred during conservation in the mid-twentieth century, where the rotten tenon of the large northeastern pillar was pushed into the socket below and then covered over by the tiled surface, rather than being replaced, which would have maintained the direct link between superstructure and foundations. This was likely to be a major contributing factor towards the Kasthamandap’s collapse, as we found no major or catastrophic earthquake damage within the brick piers or foundations exposed during archaeological assessments, and no significant damage was reported for the monument in relation to the 1934 earthquake.” (Davis, et al., 2020)

2.9.3.4 Past Construction

The structure consists of three floors. Each floor consists of an open hall. The ground floor has a base of 18.70m x 18.73m and the structure is 16.30 m in height (Korn, 1998)

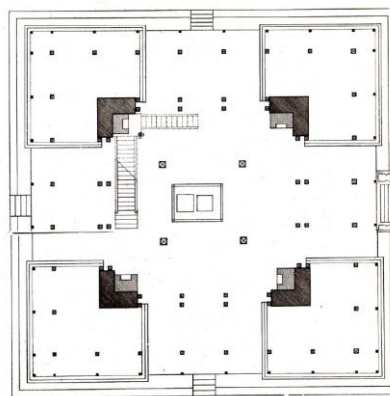


Figure 11 Ground floor plan

Source: (Korn, 1998)

On the ground floor four entrances in each direction and brick quoins of each corner of the hall can be found. Main entrance to the east has two bronze lions on each side of the entrance stairs. There are small rooms on each corner over which the four mezzanine level balconies rest. Wide wooden stairway on the western portion of the open hall leads to the first floor. Statue of Gorakhnath is placed facing east and a little off center at the western portion of the ground floor open hall. Also, four Ganesh images are kept at four corners.

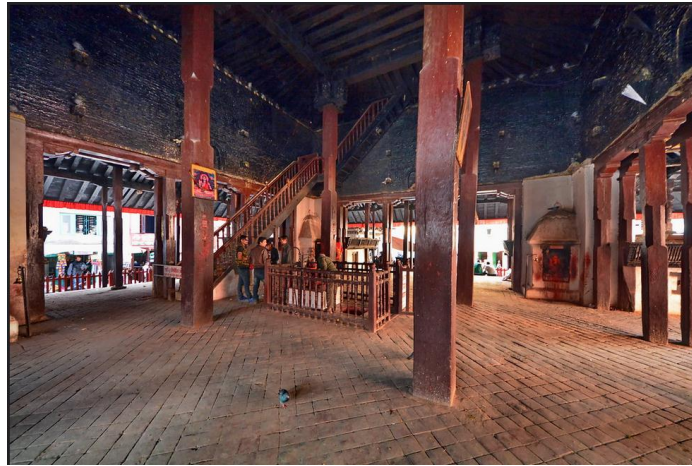


Figure 12 Ground floor open hall showing wooden stairway leading to the first floor and Gorakhnath statue

(Sommer, 2015)

First floor is an open hall with balconies on all sides. A small ladder leads from first to second floor. Second floor consists of open hall with a square arrangement of 20 wooden posts only i.e. does not have brick quoins like the previous floors. It also has balconies on all sides similar to first floor

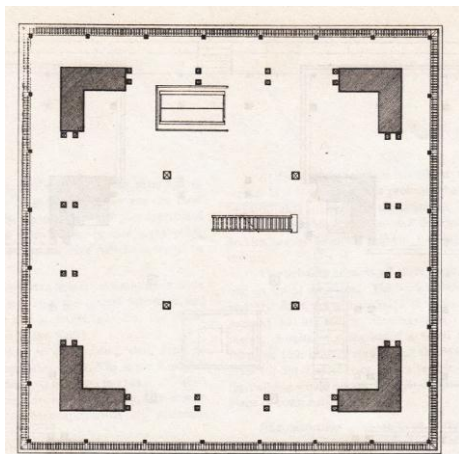


Figure 14 First floor plan

Source: (Korn, 1998)

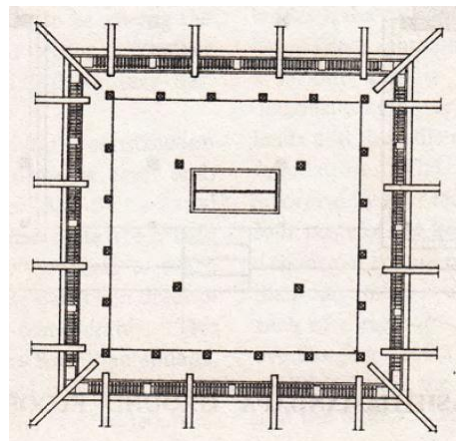


Figure 13 Second floor plan

Roofs on both tiers are *jhingati* covered. The upper tier roof has a pinnacle made out of wood.



Figure 16 Pinnacle on the second floor roof

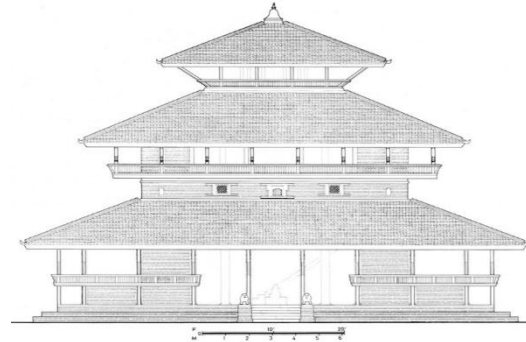


Figure 15 Front elevation

Source: (Korn, 1998)

2.9.3.5 Construction Style

It is a Pagoda style building with open pagoda-roofed pavilion. It also has a *mandap* temple with a square sanctum with three bayed openings on all four sides (Tiwari, 2019). Sattal design and mandap design combined shows a hybrid of rest house, viewing pavilion and temple (Tiwari, 2019)

2.9.3.6 Foundation System

Collection and distribution of load through posts and walls to the foundations. It is a strip foundation in brick-in-mud-mortar for both the colonnaded perimeter enclosure and the sanctum square. Saddle stone under each post which rested on brick pier each 2m deep (Davis, et al., 2020) The central brick piers were abutted by cross walls also made of brick.

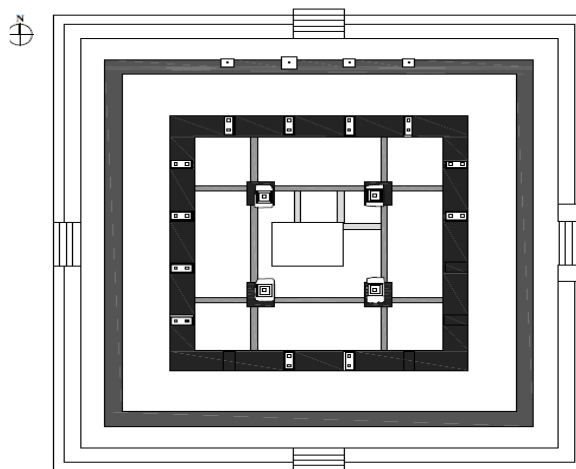


Figure 17 Foundation plan showing three groupings of columns on the ground floor (Tiwari, 2019)

It is built over a set of nine-pit ritual foundations dating to 7th and 9th centuries AD (Tiwari, 2019). The sanctum square had been provided with a set of 1 brick thick and 35 courses deep cross-walls that ran in both directions making a *navakunda* configuration.



Figure 18 Nine-celled mandala formed through brick-piers, foundation wall and cross-walls uncovered during archaeological assessments at the Kasthamandap

(Davis, et al., 2020)

All of the foundations, the outer perimeter wall, the sanctum core and the four pier for the central posts were dated to 7th century CE, while the cross walls and the infill materials belonged to 9th century reconstruction. The central square defined by the four piers also had a regular nine square pits *navakunda* foundation made up of eight courses high and 1 brick thick cross walls. Mud mortars within the foundations allowed for flexibility of the monument during seismic events.

Only damage to foundation: short vertical cracks located below a double saddle stone on the western length of the main foundation of the structure. The cross walls in the foundation date to 200 years after the original construction as part of seismic bracing for the foundation. The infills deposited within the ‘cells’ formed by the cross-walls were purposefully prepared with soils and materials brought from outside which aided in earthquake dampening.

2.9.3.7 Wall and Post System

Brick quoins of the ground and first floor provide structural support. The core of the ground floor consists of four massive 7m high wooden posts on which the four posts of the first floor rest. In the second floor a square of twenty posts forms the structure

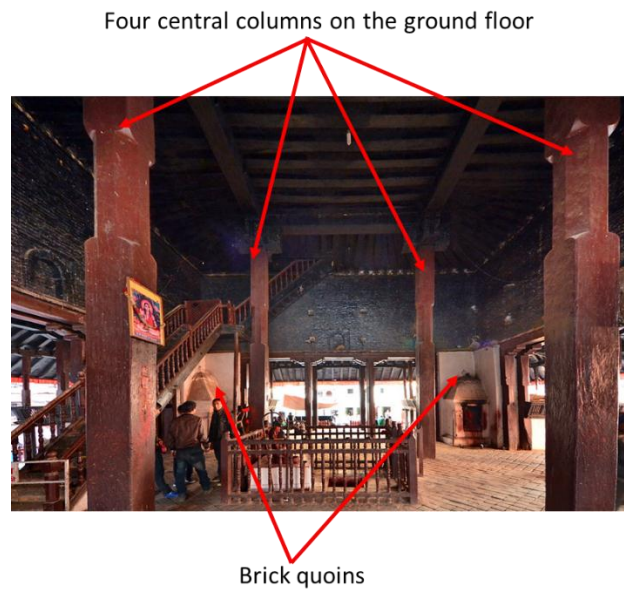


Figure 19 Ground floor of Kasthamandapa

(Sommer, 2015)

Both first and ground floors have different groupings of columns around the central four. The wooden posts support wooden beams upon which wooden floor boards are placed.

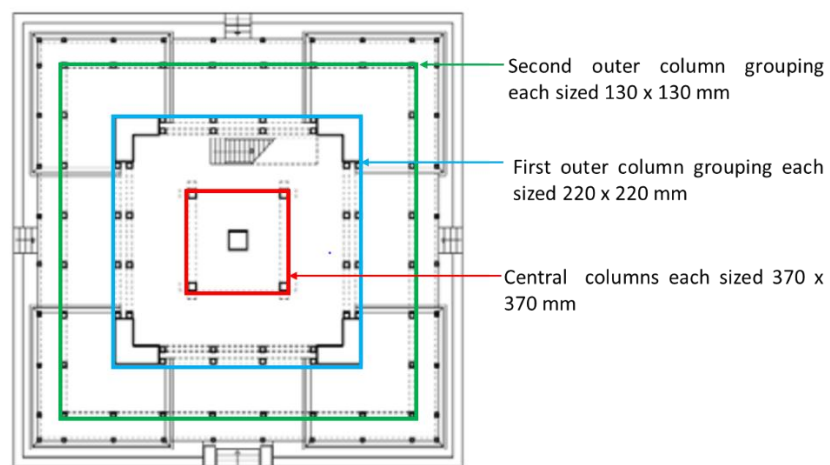


Figure 20 Ground floor column grouping

2.9.3.8 Roof system

Both first and ground floors have different groupings of columns around the central four set to bear the two wide overhanging roofs on both these floors. The second floor roof is supported by the arrangements of 20 timber posts. The central four column arrangement ends at the first floor and does not extend to the second floor.

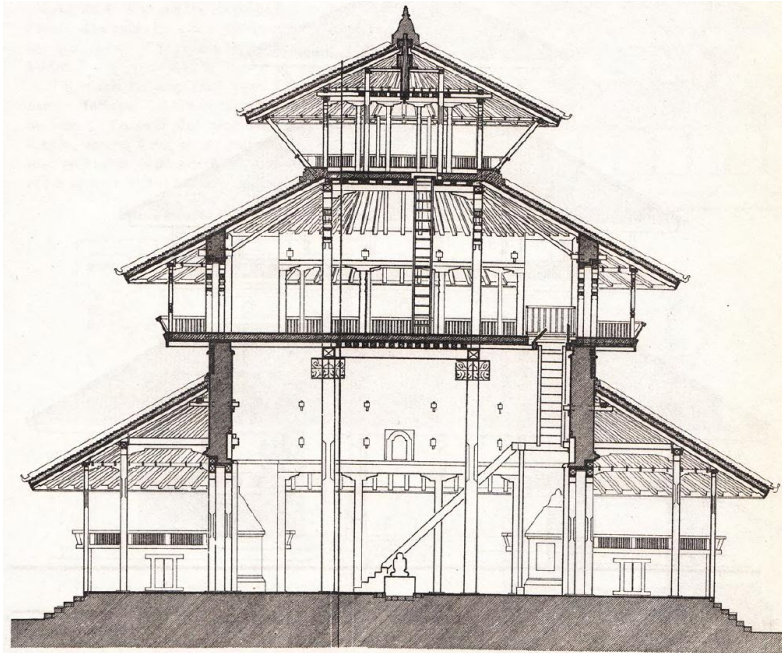


Figure 21 North- south Section showing arrangement of columns and roof support

Source: (Korn, 1998)

The roofs have symmetrical pitches springing from the central point of the cell consisting of central four posts. The pitches are made up of small rafters that spring from the corners in a radial arrangement.

2.9.3.9 Process of Reconstruction

Kasthamandap funded by the nation and local people participation for the construction. Nepali experts are involved for Kasthamandap reconstruction. Several tests conducted before construction such as Sieve analysis test, Hydrometric test, Resistograph test for assessment. Kasthamandap have closely collaborated with DUDBC, Department of Archeology, local communities, volunteer organizations, and also the donor organizations.

Based on the necessity, few things has been modified from the old one e.g. Railings, copper tie in footing, metal nails in few places.

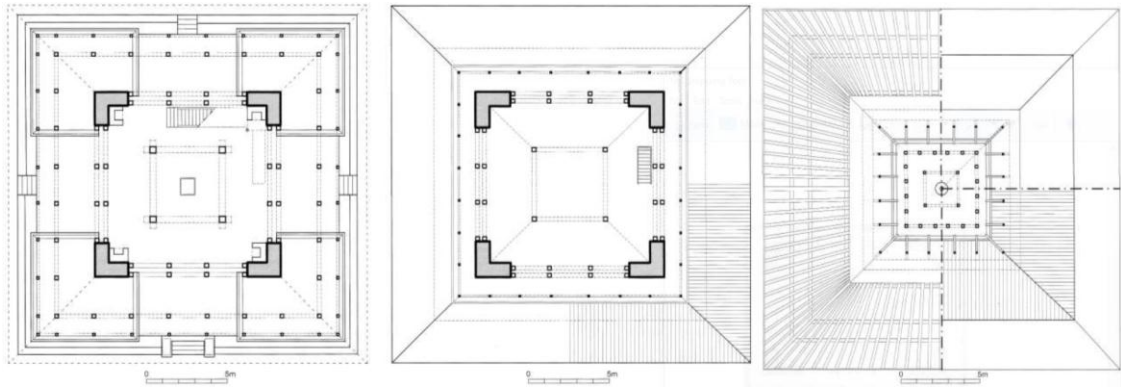


Figure 22 plans for reconstruction of kasthamandpa

2.9.3.9.1 Use of modern materials

Black Japan (Bitumen) in between wood and mud to prevent from moisture absorption. Anti-termite and Linseed oil for surface treatment. Telia tiles for flooring. Use of modern materials such as metal nails was avoided. Traditional tongue and groove joints in timber was used.

2.9.3.9.2 Reuse of materials

No changes in plan of the building. Reuse of suitable materials from the old structure was done. Bricks and metha from were reused. Timber posts were analyzed and ones with sound structural capacity were reused. 10-15 percent timber used in the original structure were reusable. Resistograph test was done to determine the strength of the old timber. The timber friezes found were reused in the construction.



Figure 23 Frieze details from Kasthamandap: a group of monks worshipping the Buddhist stupa (left) and another group of devotees worshipping the Shiva Linga (right)

Particulars	Previously existing	Recovered			Remarks
		Usable*	Unusable	Lost	
Wooden frieze carved with the Saivo Buddhist story in four pieces	4	4			Some pieces of balustrade are flaked off (605 cm). It seems that frieze piece is not lost to be replicated anew - old one to be sent to museum
Wooden images of Bhairav	48	48			2 are completely broken, Some are cracked and effaced. 35 pieces are in good condition
Stone Icon of Gorakhnath	1		1		Broken into two pieces - to be replaced
Stone icons of Ganesh	4		4		2 of the with broken arms to be replaced
Pillars					
Big	4	3		1	
Small		30			
Meth					
Big		16			
Small		135			
Deco. Piece	2	2			
Copper Inscription		3			Recorded Inscription in copper

* Directly usable or usable after repair.

Figure 24 Assessment for use of old materials

(Aryal & Shrestha, 2016)

2.9.3.9.3 Use of new materials

Mud mortar was prepared by studying the composition of the old building. 10 mm thick mud mortar of 1:2:3 clay, silt and sand mortar was used. New brick required were also prepared by studying the old ones to match the size and composition. Ma Aappa- 22 cm x 15 cm x 5 cm size were produced and used. New timber for use had to be imported from Bardibas, Mahottari, Rautahat and Sarlahi districts. Saal wood was used for the timber requirements. New timber pinnacle was made.



2.9.3.10 Changes made (Structural)

2.9.3.10.1 Foundation

Made over the existing foundation. Sieve analysis test and Hydrometric test to determine strength of foundation and to find out the composition of the soil filling in the brick foundation. Saddle stone that is larger in size than old one to uniformly transfer the load to foundation. Copper ties were used.

2.9.3.10.2 Wall ties and Corner Posts

Size of posts were not changed but corner posts were added. Wall ties were used in in form of timber bands at 1.2m interval heights internally and 1.8 m interval externally. Timber posts were added in corners of brick walls.



Figure 25 Corner post first floor

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Conceptual Framework

This research aims to explore the conservation and management of Mahalaxmi temple in the reconstruction of the temple. The main agenda requires a qualitative evaluation for understanding different aspects of the conservation project.

Therefore, qualitative analysis with interviews are done using open ended questions as a guideline for fulfilling the research purpose. Qualitative analysis deals with the subjectivity of humans which can be recorded and studied in the form of notes, videos and audio recordings, images, and text documents; which is suitable for this research. This, research is based on the pragmatic paradigm which most likely gives the research a proper feasible direction to understand the realities as viewed by the people and create findings. It cannot be considered as experimental research; therefore, a pragmatic paradigm is considered. The pragmatic approach uses the philosophical and/or methodological approach that works best for the particular research problem that is being investigated. Pragmatics can combine both, positivist and interpretivism positions within the scope of a single research according to the nature of the research question (Dudovskiy, n.d.).

Ontology and the ontological assumptions describe the nature of reality, its existence, and the way they are related (Blaikie & Priest, 2018). The ontological claim of the research is the different elements of the reconstruction to be analyzed by study of the conservation process. Epistemological assumptions are based on the adequacy and legitimacy of different kinds of knowledge that are possible (Blaikie & Priest, 2018). This research intends to produce knowledge about the conservation of the heritage and seeks to identify the valid source of knowledge.

3.2 Research Methodology

For the research qualitative approach under case study research is used to analyze the reconstruction of Mahalaxmi temple. This research is a qualitative research which involves collecting and analyzing non-numerical data to understand concepts, opinions, or experiences (Bhandari, 2020). Qualitative research relies on data obtained by the researcher from first-hand observation, interviews, open ended questionnaires, focus groups, participant-observation, recordings made in natural settings, documents, and

artifacts. This study lies in case study research where research is done to understand the complexity of a case in the most complete way possible. A case study is a detailed study of a specific subject, such as a person, group, place, event, organization, or phenomenon. Case studies are good for describing, comparing, evaluating and understanding different aspects of a research problem (McCombes, Case Study | Definition, Examples and Methods, 2019). This research uses case study to explore the reconstruction process of the Mahalaxmi temple. Since this research intends to gain contextual and in-depth knowledge regarding the case of reconstruction of Mahalaxmi temple, case study in qualitative research has been found the most appropriate strategy. The analysis of the temple building itself and reconstruction process is required for the research.

Therefore, qualitative analysis with observation and unstructured interviews is done using open ended questions. The questions related to the reconstruction of temple are used to obtain answers to the research questions. Participants for interview for qualitative research are selected through purposive sampling.

3.2.1 Research Methods

Research methods are the strategies, processes or techniques utilized in the collection of data or evidence for analysis in order to uncover new information or create better understanding of a topic (The University of Newcastle, 2020). Information regarding the reconstruction of the temple is collected through field visit observations and interview with involved experts and local participants.

3.2.1.1 Observation method

Observation of the temple building was done to study the reconstruction works while observation of reconstruction work was done during site visits. Observation of physical traces is a particularly useful techniques in architecture and urban design (Data Collection I: Observational Techniques, 2003). Observation involves the systematic and careful observation of subjects, objects, or phenomena in their natural setting (Gabr). Observation of the site includes taking photographs, sketches, study of site

before, after and during reconstruction of the temple. Observation helps in understanding the phenomenon that is the conservation work itself.

3.2.1.2 Interview method

Interview is used as a data collection tool for the research. An interview is a common method of data collection in basic research that involves having a one-on-one interaction with an individual in order to gather relevant information about a phenomenon (Formplus Blog, 2020). Unstructured interview but with premediated open ended questions related to the research are done.

This research comes under non-probability sampling in which individuals are selected due to the non-random parameters which are based on the convenience of the respondent. This technique is often appropriate for exploratory and qualitative research (McCombes, 2019). Since the sampling collected is random, according to the convenience of the researcher, convenience sampling is done. The process is defined as a type of non-probability sampling method in which not all members of the population has a chance of participating in the study (Dudovski, 2012). The research employs purposive sampling as the researcher can chose the members of the population to participate in the study. “Purposive sampling is a non-probability sampling method and it occurs when elements selected for the sample are chosen by the judgment of the researcher” (Purposive sampling, n.d.). For the research, respondents are chosen on the criteria of the respondents being involved and having expertise in the reconstruction of the Mahalaxmi temple and expertise in conservation.

3.2.2 Sources of Data

The primary data is collected for concluding the study by means of interview and observation. Literature review will be used for secondary data collection. Primary data sources include information collected and processed directly by the researcher, such as observations, surveys, interviews, and focus groups.

Information types of knowledge based and values, opinions and thought process based are collected. These include historical, physical, economic, process, political, social, cultural and religious data in order to gain knowledge about the temple and its reconstruction. Interview with reconstruction committee members, involved architects and experts are done to understand the reconstruction. Interview with elders and historians are done to get historical, cultural and religious information. Interview with conservation experts are done to analyze the conservation process.

Table 3 Data collected from interview based on information type

Information Type	Construct Dimensions	Variables
Knowledge of heritage based	Historical	History of temple, related myths and stories
	Physical	Building, location, building mass/form, materials, architectural details and construction techniques (before and after reconstruction)
	Economic	Finance and management
	Process	Decision making, relevant policies and regulations, implementation and management
	Political	Committees, local authorities involvement and control
Values, opinions and thought process based	Cultural and religious	Main cultural and religious events, festivals and celebrations, sacred practices
	Social	Community use, relationships
Knowledge on conservation based	Process	To check validation of conservation methods used
	Physical	To analyze building techniques, materials used

Source: (Adapted from Ahmed, 2012 p.27)

3.2.2.1 Interview questions

A premediated set of open-ended questions were drafted for obtaining data through the participant interviews. In the unstructured interview, open-ended questions about the Mahalaxmi temple and its reconstruction were asked and questions were modified as per need during the interview process. The questions were asked to 1) involved architects and experts 2) local community members, historians and elders and 3) conservation experts.

3.3 Analysis of Data

The information regarding the perception of the reconstruction of the temple was taken from interviews of two groups of people: local community members involved in the reconstruction and conservation experts. The data from these interviews were transcribed and analyzed using the ATLAS.ti software. The data from interviews was then triangulated with the observed data, literature study findings to study the reconstruction and conservation process.

CHAPTER 4. STUDY AREA: BALAMBU MAHALAXMI TEMPLE

4.1 Historical Background of Balambu

Balambu is a village and former village development committee that is now part of Chandragiri Municipality in Kathmandu district. Balambu is 4.53 kilometers west of Kathmandu between the villages of Satungal and Kisipiri, about 470 meters north of Tribhuvan Highway. The total area of the settlement is 2.17 km² (ICOMOS Nepal, 2015). The population according to 2011 census is 7,323. Balambu is one of the 50 historic settlements in Kathmandu valley (Tokyo National Research Institute for Cultural Properties, 2016). Balambu is one of the oldest settlements in the Kathmandu Valley, populated by the Newars, the original inhabitants of the Kathmandu Valley.

Although the establishment of settlement at Balambu cannot be traced to a specific time period, the settlement can be traced back to Lichhavi era based on the inscriptions found in the area. Based on this, the settlement was already present around 5th to 6th century CE (Bajracharya, 2030 cited in Shrestha, 2074). According to Bajracharya (cited in Shrestha, 2074), the inscription of Bhimarjun dev and Jisnu Gupta from 55 B.S. is one of the oldest inscriptions to be found in Balambu. The Balambu settlement also seems to be important given the fact that 9 different Lichhavi era inscriptions were found. In addition to this, seven medieval (Malla) era inscriptions were also found here.

Balambu is an ancient settlement based on the prevalence of inscriptions found here. Although the Lichhavi name for the settlement cannot be deciphered due to the degradation of the inscriptions, the existence of several Lichhavi era settlement such as Tegwal gram, Jolpring gram, Nupun gram etc. around it proves that it used to be a settlement during the Lichhavi era (Bajracharya, 2030 cited in Shrestha, 2074).

Based on the Malla era inscriptions, Balambu used to be called 'Bharatyapur' (Bajracharya, 2056 cited in Shrestha, 2074). The village was also known by the name of Balambu during this era. It is not certain where the name Balambu is derived from but one of the possibilities is it is derived from the name Balbahu who was possibly the person who commissioned the construction of the Mahalaxmi temple in Balambu (Shrestha S. , 2074).

4.2 Settlement Pattern of Balambu

The development of the settlement of Balambu can be divided into different development phases according to the historical periods i.e. ancient, medieval and present as per the inscriptions found here (Shrestha S. , 2074). Before immigration and increase in population, the settlement reflected the traditions of the community of the village and the settlement akin to traditional Newari settlements was of compact in nature. The settlement was a walled settlement with four gateways on the tar protected from the flood plain of the Indrawati River or *mu: khusi*.



Figure 27 Balambu Settlement Area in 1975
Source: (Pruscha, 1975)



Figure 26 Balambu Settlement area in 2003
Source: Google Earth



Figure 29 Balambu Settlement area in 2012
Source: Google Earth



Figure 28 Balambu Settlement area in 2022

As seen in the images above, the evolution of the settlement pattern can be seen from 1975 to 2022, earlier the settlement used to be confined to the core traditional area only. Gradually, houses are built along the road from the Tribhuvan highway to Balambu. In the 2012 image, the settlement has started expanding to the farm land as well. After the 2015 earthquake, the settlement has shown a drastic expansion due to high immigration and people building houses outside the core settlement area.

According to a study done on the settlement of Balambu by Vajracharya, the houses were generally three storied and built with bricks (Vajracharya). The houses of Balambu village have changed over time with the residents opting to build new houses in place of their old ones. These newly built houses are no longer limited to three stories. People have also preferred a change in materials, no longer favoring the roof tiles and ornately carved wooden windows. Use of concrete and modern baked bricks has become common in the construction of residential buildings.



Figure 30 Northern gate (left) and eastern gate (right)

The traditional settlement is divided into 21 different toles which are: *gachhen*, *dhwakshi*, *shin bahal*, *dabali*, *bakunani*, *lachhi tole*, *pasinani*, *nhakanani*, *wopi*, *nyanani*, *dychhen*, *lukubaha*, *takachhen*, *tadha libi*, *kumara tole*, *hamnani*, *khadya tole*, *bahitha*, *ga tole*, *mahadhyo tole* and *hithiga tole*. *Lachhi tole* and *Kumari tole* are important *toles* situated along the main road going from north to south.

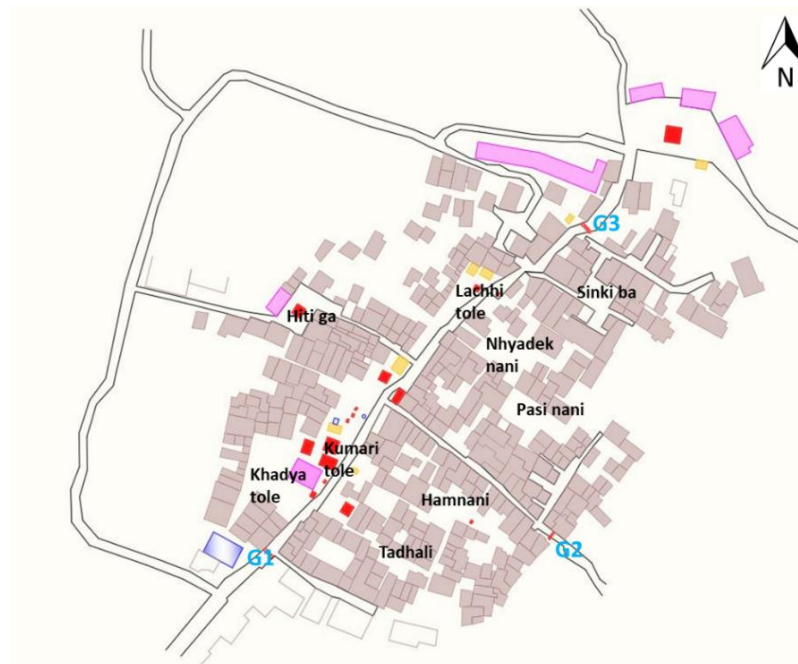


Figure 31 Toles in traditional settlement of Balambu

In the main square at *Kumari tole*, the important structures such as Mahalaxmi temple, *Dya Chhen*, ganesh temple, Narayan temple, Krishna temple, kumara temple and other shrines of different deities can be found these two *toles*. These are the main *toles* where the procession route of main *jatra* of Balambu is also focused.

4.3 Temples and Monuments in Balambu

The temples and monuments are the important heritages in Balambu which include the Mahalaxmi temple, Kumari temple, Kot ghar, Ganesh temple, Hiti gaa, Nasa Dya, Tarhan Phalcha, Pinga Mahalaxmi temple, Muka Chhen, dyo chhen, pukhusi (now known as Buddha pukhu) and historical city boundary wall (Sanskriti Samrakshan Samiti, 1998).

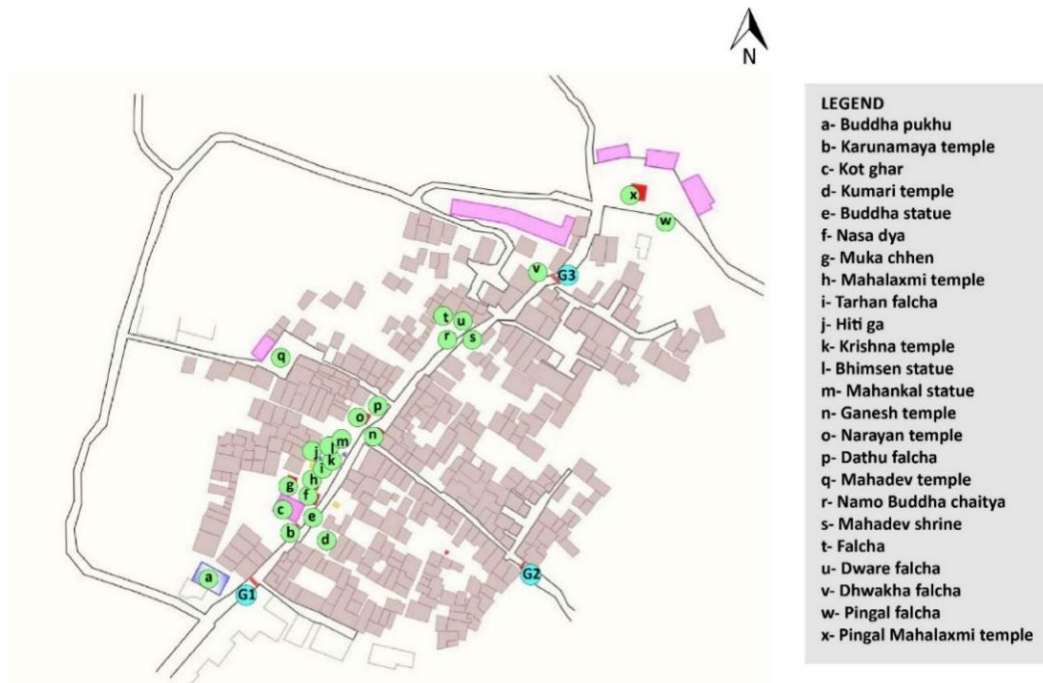


Figure 32 Temples, monuments and heritage buildings in Balambu

Source: Author

a) Buddha Pukhu

This shrine with a statue of Buddha was built in 2014 when the pond it stands on was renovated. It is situated at the southern and main entrance to the traditional settlement.



Figure 33 Buddha Pukhu



b) Karunamaya temple

The small temple is dedicated to Karunamaya Lokeshwor. The single storeyed structure was renovated in 2003 and has the cement plaster façade due to it.

Figure 34 Karunamaya temple

c) Kot ghar

Kot ghar is a public cultural building used by different guthis for their festivities and gatherings. Kot ghar also houses the face idols used in the khadga jatra. It is undergoing reconstruction currently.



Figure 35 Kot ghar



d) Kumari temple

The shrine to the goddess kumari is a roofless structure with the formless stone idol of the goddess embedded on the ground in the middle.

Figure 36 Kumari temple

e) Buddha Statue

A Shakyamuni Buddha statue made of stone is placed on a raised platform in front of the kot ghar along the main north south road.

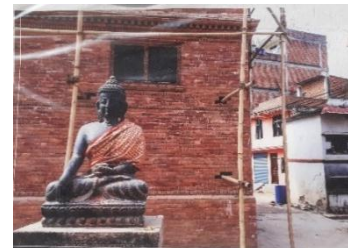


Figure 37 Buddha statue



Figure 38 Nasa dya

f) Nasa dya or Nriteshwor

Nasa dya is worshipped as the god of traditional music and dance. The temple is a one storeyed brick building with double pitched tiled roof. The wooden door and windows are carved. The temple had a wooden carved toran above the *hifa dya* idol on the northern wall of the temple which was stolen. The lakhe pay their respects to nasa dya during their yearly dance.

g) Muka chhen

The two storeyed dyo chhen or muka chhen houses the muka or the masks that are used in the Mahalaxmi jatra. It has carved lattice windows 3 on the first floor and 2 on the ground floor. The building had a wooden carved toran above the main door which was stolen and has not been replaced. On either side of the entrance are a statue of a dwarfpal. During the renovation of the building the double pitched roof was removed and a flat concrete roof was added to the original building and white cement plaster exterior was also added. The kha guthi of Balambu are responsible for the maintenance of this building.



Figure 39 Muka chhen before and current

h) Mahalaxmi temple

Mahalaxmi temple is a major monument in Balambu and houses the matron deity Mahalaxmi of Balambu. It is a two tiered pagoda style temple.

i) Tarhan falcha

Tarhan falcha is named so as it is the bigger rest house compared to the chiran falcha across the road from it. It was also renovated in similar style to muka chhen with its double pitched roof removed and a flat concrete roof added to the original. It houses the khat and picture display of Krishna during Krishna janmastami.



Figure 40 Tarhan falcha



Figure 41 Hiti ga

j) Hiti ga

It is a small stone pond behind tarhan falcha. Water from this pond is taken for the nitya puja in the Mahalaxmi temple.

a) Krishna temple

It is a small single storey temple dedicated to Krishna.

b) Bhimsen statue

It is a shrine of Bhimsen. It does not have a temple structure.



Figure 42 Bhimsen and Mahankal shrines

c) Mahankal statue

It is a shrine of mahankal bhairab.



Figure 43 Ganesh temple

d) Ganesh temple

It is a temple dedicated to Bajra Ganesh. It is unique due to its build similar to traditional falchas and three sided slope roof. It housed a brass plated idol of ganesh but after the recent reconstruction a new stone statue has been placed in the temple.

e) Narayan temple

This is a temple dedicated to Narayan. It is a single storey temple with four sided pitched roof. The traditional temple was rebuilt with cement and concrete roof. It was recently renovated to add a traditional façade.



Figure 44 Narayan temple before reconstruction, after reconstruction and after renovation

f) Dathu falcha

It is a falcha in that lies at the middle along the north-south road hence its name. It is used by Bhasipur Gyanmala Bhajan Khala for everyday bhajan programs.



Figure 45 Dathu falcha

g) Mahadev temple

This is a temple dedicated to mahadev and it also provides its name to its location mahadyo tole.

h) Namu Buddha chaitya

Namu Buddha chaitya stands out among the chaityas near it due to its combined white and black stone stupas and different size. It is a bajra dhatu chaitya dating back to the 17th century. (Pruscha, 1975)



Figure 48 Bhuvan chaityas near the Western gate



Figure 46 Namu Buddha Chaitya



Figure 47 Bhuvan chaitya south of Namu Buddha chaitya

a) Mahadev Shrine

It is a small shrine of Mahadev. It is a stone framed opening on the ground which contains a stone inscription giving evidence that this settlement dates from the Lichhavi period. (Pruscha, 1975)



Figure 49 Mahadev shrine

b) Dware falcha

Dware falcha is a resthouse named so because the *dware* used to wait here for the rath to arrive during Mahalaxmi jatra. It was reconstructed using modern materials.



Figure 50 Dware falcha before and after

c) Dhwakha falcha

The dhwakha falcha is a rest house near the northern gate of Balambu.



Figure 51 Dhwakha falcha

d) Pingal Mahalaxmi

The pingal Mahalaxmi temple is situated on a sacred ground call pinga. This place is important for the Mahalxmi jatra as the procession begins here. The Mahalaxmi from the Mahalaxmi temple is brought to pingal temple for the jatra rituals. This temple is structure a newer concrete and cement mortar construction with the statues and idols arrangement inside similar to Balambu Mahalaxmi temple.



Figure 52 Pingal Mahalaxmi temple



a) Bir Binayak temle

This is a single storey brick and stone temple with *gumbaj* style roof dedicated to *Bir Binayak*. It was recently reconstructed.



Figure 53 Bir Binayak temple

4.4 Mahalaxmi Temple

The Mahalaxmi temple is situated about 600m north from Gurjudhara chowk along the Tribhuwan highway. In Kathmandu valley, most of the small towns and villages have their association with a tutelary deity (Shrestha M. N., 1981) which is considered the protector deity of the village and a temple for the deity is in the middle of the settlement. For example, Thimi has Balkumari, Satungal has Bishnudevi and similarly, Balambu has Mahalaxmi. The temple of Mahalaxmi is in the Kumari tole of Balambu.



Figure 54 Mahalaxmi temple location

Source: Author

4.4.1 Historical Information

The temple is speculated to be commissioned by Balbahu (Shrestha S. , 2074) from whom the name of the village 'Balambu' is also said to be derived. According to Pruscha (1975) the temple was constructed in the 17th century. Several inscriptions can be found around and near the temple.



Figure 55 Inscriptions found around and near Mahalaxmi temple

According to the inscriptions, the lions were added in 1666 and the struts in 1704 (Pruscha, 1975). The temple is also supposedly older than the name Mahalaxmi for the goddess and used to be known as ‘*Balbal devi*’ from which the name of the village ‘Balambu’ can also be speculated to origin.

4.4.2 Architectural features:

The temple is a two tiered temple; 30’3” high with a base of 13’5” x 13’4” on the ground floor. The temple had wooden carved doors on the main entrance to the southern side. There are doors on three facades all except the northern façade which has a lattice window on the ground floor. The doors on east and western facades are simple wooden doors.



Figure 57 Mahalaxmi Temple and Nasa dya



Figure 56 Stone toran found above the entrance of the temple

The upper two levels have lattice windows on all four sides. The brick walls are whitewashed. The jhingati tiled roof is supported by timber structure. A stone plinth surrounds the temple. A stone toran can be seen above the entrance of the temple. Stone statues of lions can be found on either side of the entrance. The struts which support the two tile roofs are carved with Matrikas and Bhairab.



Figure 58 Stone statues inside Mahalaxmi temple after the demolition of the temple for reconstruction

Inside the temple, stone statues and stones representing deities are placed in a linear manner. The stone statue of Mahalaxmi is placed at the center. During the reconstruction after the 1990 earthquake, few tudals were replaced. The contrast between the replaced and older tudals could be seen. The temple complex consists of a dyochhen, a pati and a hiti ga. Lichhavi era inscriptions can be found near the temple and the hiti ga. With the inscriptions and stone toran, it can be speculated that the temple was built during the Lichhavi era. Although the exterior of the temple are certainly later additions.

4.5 Intangible Heritage of Mahalaxmi temple

4.5.1 Myths related to Mahalaxmi temple

According to legend, a demon was wreaking havoc in the Kisipidi village which lies to the southwest of Balambu. The people were forced to bring food and a person every day to the demon for consumption. The people were devastated due to the demon. One day an old man from the village who did not have any children was chosen to be fed to the demon. The same day a guest showed up to his house and offered to take food to the demon instead of the old man. The guest placed food for the demon under a tree and climbed up the tree. At nightfall, the demon showed up and became angry upon seeing only the food and not a human for his dinner. Upon grabbing the food, the guest challenged the demon to a fight and stated the condition that the demon was allowed to eat only if he could defeat the guest. The demon became angrier and the two fought throughout the night. When the villagers showed up to see the result of the fight in the morning, they found the demon's body hanging from the tree and the guest smiling nearby. Then the guest exclaimed, 'I am the goddess Mahalaxmi from Balambu and I showed up to help you because you were in dire need. To repay this you have to visit Balambu to offer goja: during sithi nakha every year.' The tradition of the people from Kisipidi to Balambu to offer goja: during Shrawan sithi nakha continues to this day and the people believe skipping this tradition would bring about bad luck to the village of Kisipidi. (Shrestha S. , 2074)

According to another legend, a tiger was killing people in the village of Satungal to the southeast of Balambu. The tiger was also killed by Balambu Mahalaxmi goddess and the people from Satungal had to offer bwo every year during sithi nakha. Unlike the people of Kisipidi, the people from Satungal have not continued this tradition and

stopped the offerings about 15 years ago. (Shrestha S. , 2074) These legends show the goddess Mahalaxmi to be very powerful.

4.5.2 Festivals and rituals related to Mahalaxmi temple

4.5.2.1 Mahalaxmi Jatra

The festivals of the tutelary deities have regional importance such as Biska in Bhaktapur, Kumari in Kathmandu and Rato-Machhendranath in Bungamati and Patan. The festival of Mahalaxmi in Balambu is celebrated for 3 day(s), it begins on the 8th day, ends on the 10th day and the main day of attraction falling on 10th day of the Bright fortnight of Kachhala, the 1st month in the lunar Nepal Era calendar. Although it is not clear when the tradition of celebrating Mahalaxmi Jatra of Balambu started, it can be said that it is a festival based on ancient traditions. An inscription belonging to the era of Lichhavi king Shivadeva II from 129 B.S. found just outside the north of the village near the Indramati River mentions the celebration of jatra in the village (Bajracharya, 2030 cited in Shrestha, 2074). This leads to speculation that the Mahalaxmi jatra could have been celebrated during the Lichhavi period. Similarly the Mahalaxmi jatra was also mentioned in an inscription from the rule of Malla king Shri Niwas Malla from 787 B.S. (Bajracharya, 2056 cited in Shrestha, 2074).



Figure 59 Mahalaxmi jatra and puja during the jatra

4.5.2.2 Other festivals

Besides Mahalaxmi *jatra*, other festivals also take place in the Mahalaxmi temple complex courtyard. During Krishna *astami*, *khat* and pictures of Krishna are displayed

in the *tarahaun falcha* near the temple. During *gaijatra*, the procession goes through the temple premises. The lakhe dance is also performed in front of the temple. On the day of *badadashain*, a ritual called *chala pikayagu* is conducted near the temple. The lakhe dance that is conducted from *gathemangal* to *yeya punhi* also takes place in the temple premises but has more connection to the Nasa dya which is situated to the west of Mahalaxmi temple.

Temple is important due to religious purposes as it is the temple for the matron deity of the village. Besides Mahalaxmi jatra, other festivals also take place in the Mahalaxmi temple complex courtyard. During Krishna *janmastami*, khat and pictures of Krishna are displayed in the *pati* near the temple. During *gaijatra*, the procession goes through the temple premises. The lakhe dance is also performed in front of the temple. On the day of *badadashain*, a ritual called *chala pikayagu* is conducted near the temple.



Figure 60 Lakhe dance in front of Mahalaxmi temple (left) and Tarahaun falcha during Krishna jatra (right)

4.5.2.3 Rituals related to Mahalaxmi temple

The major ritual involves the statue of Mahalaxmi temple being taken out of the temple to Muka chhen and masks and ornaments from the muka chhen being placed on the Mahalaxmi statue. This ritual is conducted three times a year during the Balambu jatra, Dashain and sithi nakha. This ritual is overseen by the tarha Guthi. The statues are cleaned 1 day before and after the main muka event. Another major ritual is the nitya puja which is the daily worship of Mahalaxmi in the temple which is overseen by the thakali from the tarha Guthi. Every morning water from hiti ga is used to clean the temple statues and to offer to the gods. The hiti ga is situated to the north of the temple just beside the tarahaun falcha.

On *Mahastami* during *dashain* a ritual is conducted in which ‘*moni mey*’ is sacrificed inside the temple by *sasula guthi*. On *Mahanawami* during *dashain* another ritual is conducted in which ‘*manda me*’ is sacrificed on the *mandap* outside the temple by the *thakali* along with the *pujari* and *naa*. Every year on the day of *sithi nakha* a procession from Kisipidi arrives to bring offerings of *go ja:* to the Balambu Mahalaxmi temple. The ritual is done due to the myth of Mahalaxmi goddess helping to solve the problem of demon in the nearby village of Kisipidi.



Figure 62 Muka being brought out from muka chhen for sithi nakha



Figure 61 Procession arriving from Kisipidi for go ja: chyau ritual

4.5.3 Social Use of Temple premises

The temple premises is used for community gatherings and meetings. Community meetings and gatherings are organized in temple premises. Everyday social gatherings can also be seen in the temple area. Special gatherings such as *dya vwe* are also conducted here.



Figure 63 Dya vwe in the temple premises

CHAPTER 5. RESEARCH FINDINGS

5.1 Management of Mahalaxmi Temple

The day to day management and conservation works for the Mahalaxmi temple are mainly carried out by the various *guthis* in Balambu and *naya* group of Balambu. The *tarhan guthi* is mainly involved as the *thakali* of this *guthi* is appointed pujari who conducts the daily cleaning and *nitya puja* every morning. The *dwa guthi* is responsible for the yearly cleaning of the temple and surrounding fifteen days before *ghatasthapana*.

The *guthis* related to Mahalaxmi temple are important during the procession of the Mahalaxmi *jatra* (Shrestha S. , 2074). *Dwa guthi* is the most important *guthi* involved as they conduct the puja in the temple during the *jatra*. The *guthis* are:

Dwa guthi: Initially composed of 12 elder members which is now reduced to 9, they conduct the puja in the temple. *Dwa guthi* is made of the Shrestha people of Balambu.

Tarha guthi: It is a *Maharjan guthi* composed of 7 elders which conducts the *Kumari puja* during the *jatra*.

Ja pakegu guthi: This *guthi* is responsible for cooking and offering rice to the *siwal tole mahadev* on the main day of the *jatra*. This *guthi* is not in operation anymore.

Kha: guthi: this *guthi* is composed of 8 members and are responsible for carrying the Mahalaxmi *khat* during the *jatra*.

Sinha guthi: This *guthi* is responsible for conducting the *Sinha jatra* after the sarkari puja on the last day of Mahalaxmi *jatra*.

5.2 Conservation of Mahalaxmi Temple

Similar to other heritages in Kathmandu, the conservation of Mahalaxmi temple was managed by *guthis* before the establishment of Department of Archaeology. Many conservation activities or addition to the temple structures were also often contributed by devotees. For example, according to a medieval inscription, the lion statues were added to the temple by one Gunsingh Bhare (Bajracharya, 2056 cited in Shrestha, 2074). The records for renovation of the temple can be found in 1666 and 1704. According to inscriptions, the lions were added in 1666 and the struts in 1704. The last major renovation was in 1949 after the 1934 earthquake damage to the temple (Pruscha, 1975)

5.2.1 Reconstruction after 2075 Earthquake

After the 1949 renovation, the latest major act of conservation was the reconstruction of temple after the 2015 earthquake. According to Kathmandu Valley Temples (2020) the two Roof Temple (Pagoda Style) of Mahalakshmi was partially damaged 2015 by earthquake. After the 2015 earthquake, meetings were called among the locals that included members from Mahalaxmi guthis, political parties and other local members to discuss the earthquake damage and conservation needed for the heritage in Balambu. From the initial meetings, it was determined that the reconstruction of the Mahalaxmi temple was desired as other reconstruction projects were also going on after the earthquake. A committee called '*Mahalaxmi Purnanirman Samiti*' consisting of seven members was established and they began efforts for the reconstruction of the temple in coordination with the local authority (ward no. 12 office of Chandragiri Municipality). Initially, the plan was to gather fund locally and the reconstruction of the temple to be overseen by the committee. After learning of the requirement of Department of Archaeology involvement in conservation of old temples, the committee and ward office approached the department with initiation through senior archaeology officer Jayram Shrestha. The department of Archaeology after initial check recommended the reconstruction of temple as the structure was damaged after the earthquake. Cracks were seen in the interior of the upper floor and in addition to this the timber was rotten due to leaks on the roof. The reconstruction project started in 2076 B.S.



Figure 64 Mahalaxmi temple during and after reconstruction

The reconstruction was completed in Kartik of 2078 B.S. The design and construction contractor was overseen by the Department of Archaeology. The local committee was also involved in the construction supervision and checking the progress of the construction. In later phases, the committee was involved in the design of the decorative elements for the temple. The majority of the budget was provided by the DoA at 84 lakhs Nrs. and the financial contribution by the local is around 18 to 20 lakhs Nrs. according to committee president Sanjay Maharjan. The local authority which is the ward no. 12 of Chandragiri municipality contributed financially by providing 3.5 lakhs Nrs to the budget. The ward is involved in the construction of the temple premises. Financial contribution by devotees from outside Balambu could also be seen. An example of this is a contribution of one lakh Nrs by a devotee from Bafal according to committee treasurer of the reconstruction committee. In addition to direct financial contribution, the locals also contributed by donating elements of the temple such as gold plate for the temple spire, northern window on the ground floor, eastern and western doors, gold plated illhan (ceiling on the interior), jal nhekan on the eastern façade, hanging lamps for the exterior, stone posts for bells etc.

5.3 Process of Reconstruction of Mahalaxmi Temple

5.3.1 Planning Phase

5.3.1.1 Preliminary Assessment:

From the preliminary assessment, it was found that the monument was significant as it was found to be more than 300 years old.

5.3.1.2 Feasibility Research

The monument was identified in need of conservation after the 2075 earthquake. There were cracks found in upper floor and timber rot due to water leaks. It was then classified into partially damaged monument for repair according to reconstruction guidelines of 2072.

5.3.1.3 Historical Research

The analysis of the building and its site along with historical research was done by the study of inscriptions and local information. But archaeological study of the site was not done.

5.3.1.4 Architectural Research

Architectural research was done to identify the building form, details and devising necessary conservation measures. The documentation of the existing structure was also done. Documentation of existing structure in forms of measured drawings (2 level floor plans, section, front elevation and rafter plan) and photographs was done.

5.3.2 Implementation Phase

5.3.2.1 Schematic Design:

After study of the temple, the recommended conservation strategy was to reconstruct the temple building.

5.3.2.2 Design Development:

The design for the reconstruction and the intended design details were proposed by the DoA. Initially, changes to temple design showing exposed brick and raised plinth was proposed but the design was changed to whitewashed and existing plinth height after protest from locals.

5.3.2.3 Construction Documents:

Construction documents required were also prepared by the DoA. Plans on five height levels (including floor, rafter and joist plans), section, and front elevation with measurements were prepared. Changed rafter plan and addition of corner posts were shown in plans. Wall ties, sill and lintel level timber reinforcements shown in section.

5.3.3 Execution Phase

5.3.3.1 Bid and Negotiations

The DoA under the government of Nepal was responsible for calling tenders, funding and awarding the contract to the suitable bidder. Eligible bidders were ones with knowledge in conservation and traditional construction

5.3.3.2 Construction and Contract Administration

The construction work was conducted by the constructor contracted by the DoA. The construction took place under the supervision of both the DoA and the local reconstruction committee. The demolition started in 2076 B.S. and reconstruction of temple was then commenced. The materials required were sourced and approved by the DoA which includes *sal* timber, bricks, *surkhi* mortar, water proof single plastic layer on roofs, *telia* tiles for floor and new *jhingati* on roofs.

5.3.3.3 Commissioning

After the project, as built documentation and maintenance manual were not prepared.

5.4 Participation of Local Community

The Mahalaxmi Purnanirman Samiti worked as a bridge between the locals and the department of archaeology. Many local participants were involved in consultation and group discussions regarding the reconstruction. Many local residents also provided financial contributions towards the reconstruction. Few were involved through labor and skill input. Many residents who lived near the temple helped out by managing materials, carrying bricks, doors and windows from nearby carving area in the *kot ghar* to the temple etc. Most involved participants were involved through more than one type of participation such as involvement in overseeing the work and providing workers with food, materials etc. when needed.

Participants were involved in consultation through meetings and discussions regarding the reconstruction. Participants from the *guthi* and *pujari* of the temple were involved in the consultation about dismantling the temple, design for reconstruction, rituals needed continuing daily worship etc. for the reconstruction committee. Participants who both work in the field of wood carving and contributed by providing their skills to the temple reconstruction. Participant locally mostly contributed financially or providing elements for the construction of the temple.



Figure 65 Local people helping out in the construction work

Another form of involvement were the mass meetings held by the locals who were not involved in the reconstruction committee. These were responsible for the local voice being considered by the reconstruction committee and the DoA. Many participants were involved in such meetings. These meetings were also responsible for bringing up the design change when a brick exposed façade and raised plinth for the temple was proposed initially by the DoA. The local mass meetings voiced interest for the temple to be built with whitewashed walls as it was before.

Many people from Balambu are involved wood carving. In the reconstruction of Mahalaxmi temple, local people were involved in the wood carving for the temple. According to the committee, several local wood carvers were involved in the reconstruction process. These skilled workers are also experienced in previous works of heritage conservation.

Local company of wood carvers were sub contracted to provide all the necessary carved elements for the temple (includes 8 windows, 2 doors, 32 struts and cornice on 2 levels) Member of the company later carved and provided eastern door out of his own pocket for the temple. One community member experienced in wood carving was consulted regarding the old *tudals* for reuse considerations initially. The community member carved and donated lattice window for northern side of the ground floor

5.5 Challenges of Reconstruction

The temple reconstruction was done during the covid-19 pandemic due to which the sourcing of the building materials from out of was slowed down. This caused the temple completion to be delayed and finished nearly six and half years after the 2072 earthquake and two and half years after commencement of the project.

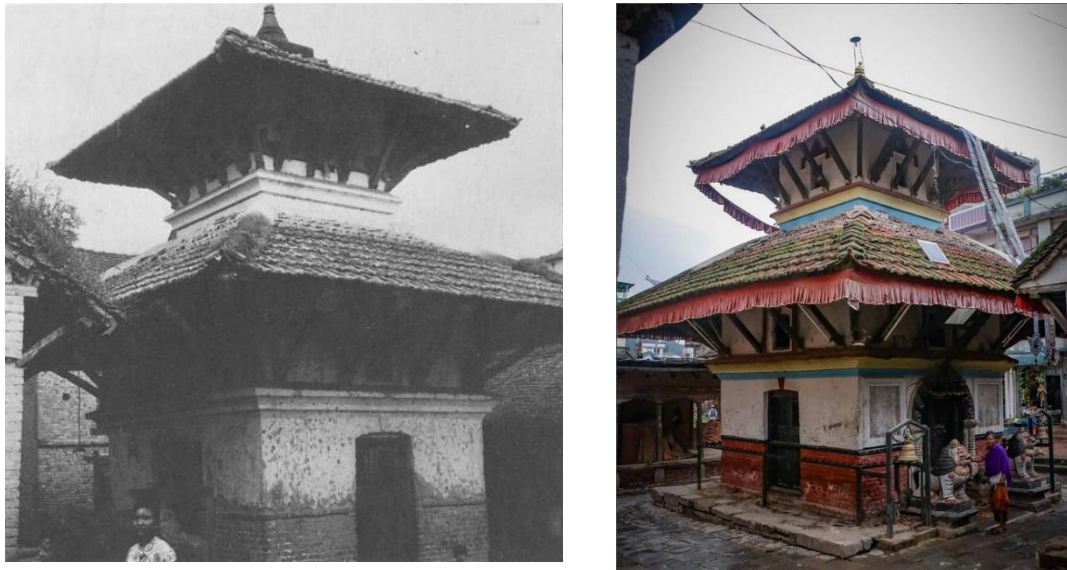


Figure 66 Mahalaxmi temple old (left) and prior to 2075 earthquake (right)

Due to lack of prior documentation, finding existing proof for decorative modifications as demanded by the people was not possible. However, changes were made regardless. Before the demolition of the temple, various changes were made throughout the years such as painting, addition of tile etc. In the initial proposals, the department of archaeology proposed a brick exposed design for the temple which was widely rejected

and protested by the community due to which in the end white washed plaster façade was done for the finished construction. Due to lack of conservation knowledge among the people, the simple design conserving the original proposed by the DoA was met with resistance from the local community.

5.6 Perception of Reconstruction

To understand the perceptions of reconstruction interviews were conducted with key informants from the local community and conservation experts. With the information from two different sides of conservation stakeholders, the reconstruction could be analyzed.

5.6.1 Interview with Community Members

From the community members, the respondents chosen were involved in the reconstruction of Mahalaxmi temple in different capacities such as involvement in the reconstruction committee (*Mahalaxmi Purnanirman Samiti*), contribution of their skill in woodcarving for the reconstruction and consultation who provide information about the reconstruction. Aside from these, other informants include *pujari* of the temple and *guthi* members who are knowledgeable about the temple. The local community members were asked about their understanding of the importance of the temple, their involvement in the reconstruction and their satisfaction with the reconstruction.

1. Respondent 1

The chairman of the reconstruction committee was involved in overseeing the reconstruction and involved at a ground level in day to day activities of the reconstruction. He has experience in woodcarving and has been involved in other conservation projects such as Okhaldhunga Ganesh temple and Gorkha Mahadev temple.

Interview Transcript	Initial Coding Framework	Final Codes
Q. Describe the status and importance of Mahalaxmi temple in your opinion.		-importance of temple
<i>“As a resident of Balambu, the Mahalaxmi temple is very important</i>	-importance to locals	-participation of local community

<p><i>to us the local residents. It is an old temple and carries religious importance.”</i></p>	<p>-old temple -religious importance</p>	<p>-success of reconstruction</p>
<p>Q. What was your involvement in the reconstruction of Mahalaxmi temple?</p>		
<p><i>“As the president of the reconstruction committee, I dedicated a lot of time to this reconstruction project. I was there to solve any problem raised, resolving conflict, supervising the work and providing resources, food for workers etc. when necessary.”</i></p>	<p>-involvement in supervision and work</p>	
<p>Q. Who do you think is responsible for the conservation of the temple?</p>		
<p><i>“The conservation cannot be successful without the coordination of all the stakeholders involved but the involvement of local community is most important. “</i></p>	<p>-coordination -local community involvement</p>	
<p>Q. Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?</p>		
<p><i>“Yes I would like to be part of such a committee if need ever arises. I would like to contribute financially, physical labor if needed and consulting about conservation activities.”</i></p>		
<p>Q. Are you satisfied with the reconstruction of the Mahalaxmi temple?</p>		

<i>“I think the project has been successfully completed due to the involvement of the local community.”</i>	-success of reconstruction -local community involvement	
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2. Respondent 2

The treasurer of the reconstruction committee was involved in managing the funds collected and resources donated by the local community.

Interview Transcript	Initial Coding Framework	Final Codes
Q. Describe the status and importance of Mahalaxmi temple in your opinion.		
<i>“The Mahalaxmi temple is very important. It is one of the oldest temples in the area built during the Lichchhavi era and has religious and archaeological importance. The temple is of importance to the religious faith to the locals. “</i>	-importance to locals -old temple -religious importance	-importance of temple
Q. What was your involvement in the reconstruction of Mahalaxmi temple?		-participation of local community -success of reconstruction
<i>“I was involved in organization of the project since the beginning, forming the reconstruction committee, conducting meetings, handling and transporting materials. I also devoted my time to overseeing the work throughout the project.”</i>	-involvement in supervision and work	
Q. Who do you think is responsible for the conservation of the temple?		

<p><i>“In this reconstruction, the locals played an important part. So the local residents and institutions such as guthis will play an important role in future conservation as well. The locals themselves are more responsible than the local ward office and others as the local people are those who feel the religious faith towards the temple.”</i></p>	<p>-local community involvement</p>	
<p>Q. Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?</p>		
<p><i>“Yes I would like to be involved in conservation in the future as well. In fact the funds collected from the locals for the reconstruction has not been fully spent so there are plans to continue the reconstruction committee as a conservation committee with addition of members if necessary”</i></p>	<p>-future of conservation -local community involvement</p>	
<p>Q. Are you satisfied with the reconstruction of the Mahalaxmi temple?</p>		
<p><i>“I feel like the initial design suggested by the DoA with the exposed bricks would have been better. Some changes to design such as copper roof and increasing plinth height would have nice updates. Traditional design should still be important”</i></p>	<p>-changes to design -traditional design</p>	

3. Respondent 3

One of the respondents was a local resident involved in the reconstruction project by working in the wood carving areas for the temple and employed in the project. He has experience working in conservation prior to this in projects such as Chundevi temple in Balambu.

Interview Transcript	Initial Coding Framework	Final Codes
Q. Describe the status and importance of Mahalaxmi temple in your opinion.		
<i>“The temple is very important to the local residents. The temple has religious importance and important to locals culturally and traditionally. “</i>	-importance to locals -religious importance -cultural and traditional importance	-importance of temple
Q. What was your involvement in the reconstruction of Mahalaxmi temple?		-participation of local community -success of reconstruction
<i>“I was involved in the woodcarving for the temple extensively. I worked on basically all the wood carving elements including the doors, struts, cornice and windows. I also donated the eastern door that was carved by me and my company. I was also present in meetings and gatherings regarding the reconstruction.”</i>	-contributing elements to temple reconstruction -involvement in reconstruction work	-change to design
Q. Who do you think is responsible for the conservation of the temple?		

<p><i>“I took part in this project because I felt like as a local I should be involved in this local project rather than woodcarvers being invited to work from somewhere else. I also feel that the involvement of the locals that I saw was important for the success of this project. The important party is the committees such as the reconstruction committee that represent the voice of the people. At the same time coordination of the institutions such as the department of architecture is also necessary”</i></p>	<ul style="list-style-type: none"> -participation of local community -success of reconstruction -coordination of institutions -committees of reconstruction 	
<p>Q. Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?</p>		
<p><i>“Yes I would like to be involved in conservation in the future as well. I would like to be involved in consulting or any woodcarving work in future if necessary.”</i></p>	<ul style="list-style-type: none"> -future conservation of temple 	
<p>Q. Are you satisfied with the reconstruction of the Mahalaxmi temple?</p>		
<p><i>“I feel like the ornamentation to the temple design was necessary that was successfully achieved in this project. Traditional design and build for the temple is important for such heritage buildings”</i></p>	<ul style="list-style-type: none"> -success of reconstruction -traditional design -changes to design 	

4. Respondent 4

Respondent has experience in wood carving and donated a carved window that he worked on to the temple.

Interview Transcript	Initial Coding Framework	Final Codes
Q. Describe the status and importance of Mahalaxmi temple in your opinion.		
<i>“The temple is religiously important. It is an important heritage and art of traditional construction can be learnt“</i>	-religious importance -traditional construction	
Q. What was your involvement in the reconstruction of Mahalaxmi temple?		
<i>“I contributed the ground floor northern window that I and my brother carved ourselves. I was initially consulted about reuse of the original struts and my suggestion was to reuse the intact reusable ones and only replace if necessary but did not follow up on it afterwards.”</i>	-contributing elements to temple reconstruction -involvement in consultation	-importance of temple -participation of local community -success of reconstruction -change to design
Q. Who do you think is responsible for the conservation of the temple?		
<i>“I feel like the local residents should take more responsibility in such conservation.”</i>	- participation of local community	
Q. Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?		

<i>"I would like to be involved in future conservation of the temple and work in wood carving related works as it is my expertise."</i>	-future conservation of temple	
Q. Are you satisfied with the reconstruction of the Mahalaxmi temple?		
<i>"I am satisfied with the overall reconstruction of the temple."</i>	-success of reconstruction	

5. Respondent 5

The *pujari* and member of *thakali of tarhaun guthi* was present every day for the reconstruction period as he is responsible for conducting the *nitya puja* at the temple.

Interview Transcript	Initial Coding Framework	Final Codes
Q. Describe the status and importance of Mahalaxmi temple in your opinion.		
<i>"The temple is religiously important as the temple is devoted to the protector god of Balambu village"</i>	-religious importance	-importance of temple
Q. What was your involvement in the reconstruction of Mahalaxmi temple?		-participation of local community -success of reconstruction
<i>"I was involved in initiating the reconstruction project in the community and approaching the DoA for the temple reconstruction. I was consulted about the demolition of the temple and necessary measures to continue worshipping rituals during the reconstruction"</i>	-involvement in consultation -financial contribution	-change to design

<i>process. I also contributed financially to the project.”</i>		
Q. Who do you think is responsible for the conservation of the temple?		
<i>“I think the people of Balambu should be responsible for the conservation of the temple.”</i>	-participation of local community	
Q. Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?		
<i>“I wish to be part of conservation efforts in the future through the guthi.”</i>	-future conservation of temple	
Q. Are you satisfied with the reconstruction of the Mahalaxmi temple?		
<i>“There was involvement of the Department of Archaeology so the reconstruction was properly done in my view.”</i>	-success of reconstruction	

6. Respondent 6

Respondent is a member of the *nayaa* group of Balambu which is an institution responsible for conservation of culture and tradition in Balambu.

Interview Transcript	Initial Coding Framework	Final Codes
Q. Describe the status and importance of Mahalaxmi temple in your opinion.		-importance of temple -participation of local community
<i>“It is an important temple in Balambu and one protected by</i>	-religious importance -legislation for protection	

<i>Department of Archaeology. It is religiously important and gets visitors from outside Balambu as well. “</i>		-success of reconstruction -change to design
Q. What was your involvement in the reconstruction of Mahalaxmi temple?		
<i>“I was involved in consultation as a member of Nayaa group of Balambu in overseeing that the cultural activities and traditions regarding the temple were preserved during and after the reconstruction.”</i>	-involvement in consultation	
Q. Who do you think is responsible for the conservation of the temple?		
<i>“The tarhan guthi and dwa guthi should continue their duty in the conservation and maintenance of the temple. The local authority of Chandragiri Municipality and the department of archaeology also have responsibility in the conservation as the temple is technically under the protection of the department”</i>	-participation of local community	
Q. Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?		
<i>“I would like to continue being involved in conservation through the nayaa group.”</i>	-future conservation of temple	

Q. Are you satisfied with the reconstruction of the Mahalaxmi temple?		
<p><i>“The removal of idols in the temple reconstruction should not have been allowed. Change in the temple façade to brick exposed was rejected by the locals which I take as a positive outcome. Changes in design such as reducing the number of struts, increasing plinth height should not have been done. However the decorative additions and embellishments should be taken as a development and not negative changes.”</i></p>	<p>-changes in design -partial satisfaction in success of reconstruction</p>	

7. Respondent 7

Respondent is member of *tarhan guthi* which is responsible for the conservation and maintenance of the Mahalaxmi temple.

Interview Transcript	Initial Coding Framework	Final Codes
<p>Q. Describe the status and importance of Mahalaxmi temple in your opinion.</p>		<p>-importance of temple -participation of local community</p>
<p><i>“The temple is of religious and historical importance. The temple has become an identity of Balambu with many social media posts of Jheegu Balambu (a facebook page that documents Balambu’s heritage,</i></p>	<p>-religious importance -historical importance -legislation for protection</p>	<p>-success of reconstruction -change to design</p>

<i>cultural and traditional activities)</i> <i>“showing Mahalaxmi temple. “</i>		
Q. What was your involvement in the reconstruction of Mahalaxmi temple?		
<i>“I was involved in consultation providing suggestions to the reconstruction committee and contributed financially to the reconstruction as well.”</i>	-involvement in consultation	
Q. Who do you think is responsible for the conservation of the temple?		
<i>“Conservation cannot be successful without the involvement of the local community. However the financial help provided by other stakeholders is also important. ”</i>	-participation of local community	
Q. Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?		
<i>“I wish to be involved conservation and in an organizational manner as part of committees if necessary. I am also willing to contribute financially and provide suggestions when needed. I will be continuing to work as a member of the tarhaun guthi for the temple.”</i>	-future conservation of temple	
Q. Are you satisfied with the reconstruction of the Mahalaxmi temple?		

<p><i>“Change in the temple façade as suggested by the DoA to brick exposed from existing white washed was rejected by the people. In all my lifetime I have seen the temple in its current façade of white walls only. In my opinion traditional buildings should be built using traditional materials which was done in the completed reconstruction which is satisfactory to me.”</i></p>	<p>-changes in design -partial satisfaction in success of reconstruction</p>	
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8. Respondent 8

Respondent is a member of local community who is involved in conservation of heritage in the area.

Interview Transcript	Initial Coding Framework	Final Codes
<p>Q. Describe the status and importance of Mahalaxmi temple in your opinion.</p>		
<p><i>“The temple is of historical importance. The temple has cultural and religious importance to the locals as well as outsiders. Temple is of social importance to the locals as well.”</i></p>	<p>-religious importance -historical importance -cultural importance -social importance -legislation for protection</p>	<p>-importance of temple -participation of local community -success of reconstruction</p>
<p>Q. What was your involvement in the reconstruction of Mahalaxmi temple?</p>		<p>-change to design</p>
<p><i>“I was involved in meetings and gatherings by the locals regarding the reconstruction.”</i></p>	<p>-involvement in consultation</p>	

Q. Who do you think is responsible for the conservation of the temple?		
<i>“The local people should be responsible for the conservation in the future.”</i>	-participation of local community	
Q. Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?		
<i>“I am willing to be involved in conservation committee in the future if opportunity arises.”</i>	-future conservation of temple	
Q. Are you satisfied with the reconstruction of the Mahalaxmi temple?		
<i>“I am not completely satisfied with the reconstruction. I feel like the temple reconstruction needed to be in its original appearance. I feel like the brick exposed design with raised plinth initially proposed by the DoA was due to lack of study of the temple and history. When the temple was demolished and the foundation was excavated, archaeological study could have been conducted which was a missed opportunity ”</i>	-changes in design -partial satisfaction in success of reconstruction	

5.6.2 Interview with Conservation Experts

Interview 1

Prof. Dr. Sudarshan Raj Tiwari is revered in the field of architectural conservation in Nepal. He has published numerous articles on topics of traditional architecture and

architectural heritage conservation. He has extensive experience in the areas of heritage management and conservation.

Interview Transcript	Initial Coding Framework	Final Codes
<p>Q. What are your views on changes made to the design of the Mahalaxmi temple?</p>		
<p><i>“Changes made in such a manner are wrong. The temple carries religious and cultural value to the community. But in addition to this there are historical, artistic, scientific and archaeological values. Only the decisions of the community should not be final. When the project is financed by the community, the decisions of finance should be given by the community but decisions of design and material change that affect the values of the heritage should not solely rest on the community. In such cases often use of traditional materials are not given priority. Even when traditional materials are used, architectural value is changed by such conservation. For e.g. in traditional constructions, richly carved posts, torans and lintels can be found but nowadays carved door shutters are prevalent. This also alters the cultural value of our traditional construction. However, religious value regarded by the community might not be changed. Due to the excavation and increasing depth of the foundation archaeological value was lost. In archaeologically important sites like this, foundation should not be excavated and reconstruction should be plinth upwards only.</i></p>	<p>-heritage values -community involvement -traditional materials -traditional construction</p>	<p>-changes to temple design -change in temple values</p>

<p><i>The existing foundation should not have been deemed insufficient as the temple was not structurally damaged due to lack of foundation depth. Original materials of foundation and technology is also ignored. During the reconstruction the values of the heritage should be maintained.”</i></p>		
<p>Q. Should changes to design be allowed in case of conservation of architectural heritage in any context?</p>		
<p><i>“In Nepal due to the nature of destruction of buildings caused by earthquakes, monsoon and other climate phenomenon, material authenticity is not of internationally upheld kind. Instead there is a system of cyclical renewal and every 100-150 years the materials or sometimes the structure are replaced. Still the heritage is enlisted as world heritage and shows that there is a system of conservation by the Nepali people. This can be seen in the designated day for yearly maintenance of temples by the people with celebration. Every 30-50 years, temples are fitted with new roof by new kings which ensures conservation necessary. There is an established precedent of maintaining authenticity in conservation despite changes in the context of conservation in Nepal. Elements are replaced only when necessary. This includes reuse of materials such as seen in the case of Kasthamandap where the columns are reused. Reconstruction</i></p>	<p>-cyclical renewal -maintenance of heritage by people -reuse of materials</p>	

<i>is done in such a manner that heritage values are preserved.”</i>		
Q. In case of Mahalaxmi temple of Balambu changes were due to the demands of the local community. How can the conservation effort be regulated in future cases?		
<i>“The rights of the community should not be disregarded in matters of conservation. Demands of changes that arise from within the community should be addressed. However, the community should be educated that they make the right decisions. Community should understand the value of their heritage and ultimately the decisions given by the community itself is best. Throughout the history, proof of construction in different eras can be seen and the present community also have rights to contribute their construction to the heritage.”</i>	-rights of the community	

Interview 2

Dr. Rohit Ranjitkar is a conservation architect working at the Kathmandu Valley Preservation Trust. He is currently engaged in the conservation of Patan Durbar Square.

Interview Transcript	Initial Coding Framework	Final Codes
Q. What are your views on changes made to the design of the Mahalaxmi temple?		
<i>“Changes to the heritage structure can be done based on existing evidence only. During conservation, the reuse of materials and parts are part of the process. While international principles give priority to reusing the original and restoration by reassembling the fallen</i>	-change in design -reuse of materials -local context	-changes to temple design -change in temple values

<p><i>parts, traditional conservation in Nepal can be replacing the materials and elements as necessary due to the nature of material used and traditional construction in Nepal. The variations in contexts of the monuments should be taken into account and the interventions necessary for each should be done by studying the respective monuments and their needs.”</i></p>		
<p>Q. Should changes to design be allowed in case of conservation of architectural heritage in any context?</p>		
<p><i>“Considering the earthquake risk in Nepal, any improvements against earthquake failure should be implemented by technology available now. The exact traditional materials used in a structure may not be used in the reconstruction. The exact type of timber, stone and quality of mud mortar may not be available. For example, since 1970 wooden planks are replacing the chirpat used in the roofing and flooring. Traditional material timber is still used but the manner of use is evolving. Sometimes, use of modern technology may be necessary for preserving the materials. For example, the Bhimsen lion pillar in the Patan Durbar Square was damaged during the earthquake and was repaired by inserting steel pins. By use of steel pins the original material was reused and preserved instead of preparing a replica. Such changes should however, be able to preserve</i></p>	<p>-gradual change in traditional construction -traditional materials -structural improvement</p>	

<i>the aesthetic value of the heritage and be able to improve the structure”</i>		
Q. In case of Mahalaxmi temple of Balambu changes were due to the demands of the local community. How can the conservation effort be regulated in future cases?		
<i>“The tradition of rebuilding every 80-90 years has been carried out by the communities in Nepal and has been the structure of conservation long before modern conservation was introduced to Nepal. In the current context, mistakes such as in case of the Mahalaxmi temple by changing the foundation needs to be avoided. The foundation is built from experience after long process of trial and error and is a testament of traditional construction of Nepal. The involvement of community should be encouraged but they should be made aware of the conservation values. ”</i>	-cyclical renewal -involvement of community	

Interview 3

Dr. Shree Hari Thapa is a researcher and member of Archaeologist Society of Nepal. He also teaches conservation at Institute of Engineering, Thapathali Campus.

Interview Transcript	Initial Coding Framework	Final Codes
Q. What are your views on changes made to the design of the Mahalaxmi temple?		
<i>“Changes made to the temple should be based on whether they affect the architectural identity of the building or not. Careful considerations should be taken for documentation of the materials, type of</i>	-change in design -reuse of materials -documentation	-changes to temple design -change in temple values

<p><i>materials, measurements and layering and age of the structure. In the rebuilding process, the materials should be reused or replacement of same quality should be used. When changes are made, the change should represent existing character of the heritage”</i></p>		
<p>Q. Should changes to design be allowed in case of conservation of architectural heritage in any context?</p>		
<p><i>“Use of new materials should be allowed in the context of absence of old materials only. The new materials used should be of same character to the old or the construction should be reversible. “</i></p>	<p>-use of new materials</p>	
<p>Q. In case of Mahalaxmi temple of Balambu changes were due to the demands of the local community. How can the conservation effort be regulated in future cases?</p>		
<p><i>“Reconstruction and changes to the heritage should first be approved by conservation authority which is the department of archaeology in this case. Major design changes based on conjecture in which case the heritage can be considered a new construction instead of reconstruction should not be allowed.”</i></p>	<p>-design changes</p>	

CHAPTER 6. DATA DISCUSSION AND ANALYSIS

6.1 Analysis of Reconstruction of Mahalaxmi Temple

6.1.1 Location

The temple is located in *Kumari tole* alongside the main road to the temple's east. The temple complex consists of *Nasa dya* to Mahalaxmi temple's south, *Muka Chhen* to its west and *tarahan falcha* to its north. The temple was reconstructed in its exact location. No changes were made to the location of the temple.

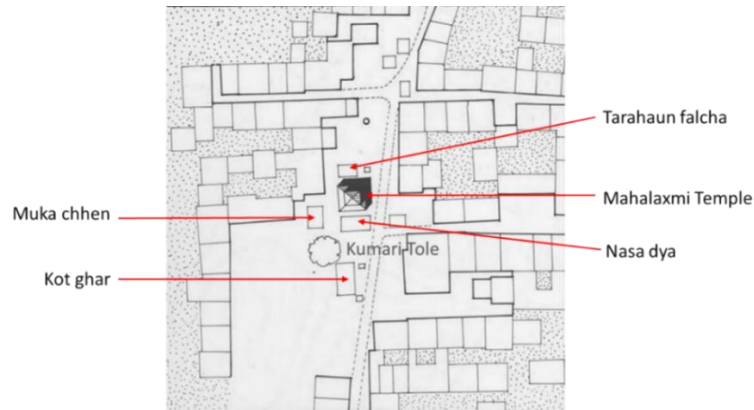


Figure 67 Mahalaxmi temple location

Source: (Kathmandu Valley Temples, 2022)

Though the context was not changed by the reconstruction, overtime the surrounding of the temple has changed. Traditional Newari houses that were lower in height than the temple have been replaced with taller houses with modern cement plaster and color finish. The important structures in the temple complex i.e. the *muka chhen*, *nasa dya* and *tarhan falcha* are in need of conservation.

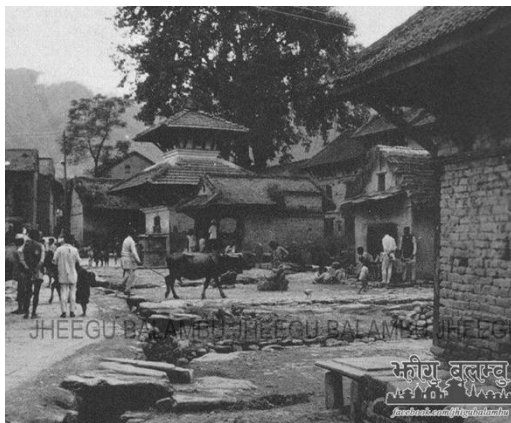


Figure 68 Mahalaxmi temple surrounding in 1975

Source: (Jheegu Chandragiri, 2021)

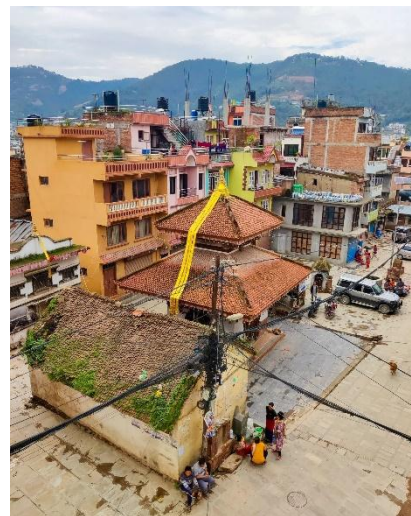


Figure 69 Mahalaxmi temple surrounding in 2022

Source: (Jheegu Balambu, 2022)

6.1.2 Building Description

The temple is a two storied pagoda style temple. The temple has wooden doors on three facades all except the northern façade which has a lattice window on the ground floor. The upper two levels have plain windows on all four sides. The brick walls were whitewashed. The *jhingati* tiled roof is supported by timber structure. The main façade of the temple faces the south direction.



Figure 71 stone lions at the entrance



Figure 70 stone *toran* above the entrance

A stone plinth surrounds the temple. A stone toran can be seen above the entrance of the temple. Stone statues of lions can be found on either side of the entrance. *Tudals* can be seen on all sides on both upper levels.

Inside the temple, stone statues and stones representing deities are placed in a linear manner. The statues are surrounded by raised stone platform. The stone statue of Mahalaxmi is placed at the center.



Figure 72 stone idols before (left) and in the process of removal for new column placement (right)

6.1.2.1 Foundation

The foundation is not exposed. The original foundation was stone in mud mortar of 12” depth. For the new construction, the foundation was increased to 3.5’ and lime concrete in 1:2:4 lime, sand and aggregate was used.

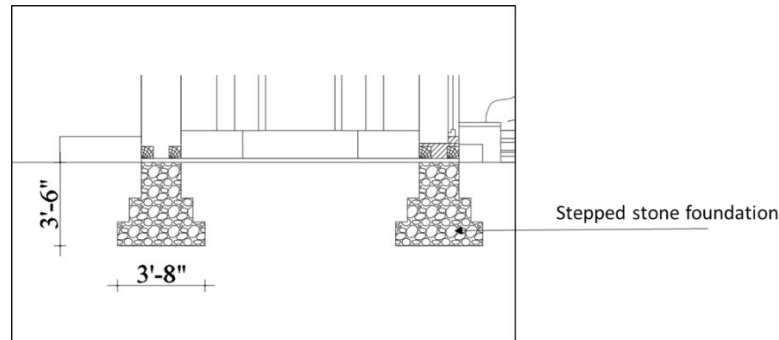


Figure 73 foundation detail new

6.1.2.2 Plinth

The old plinth structure was stone in mud mortar. Mortar was changed to lime surkhi with lime sand and surkhi in 1:1:1 ratio. Common red brick was used for soling and ma aapa was used for wall. Decorative bricks were added and telia tile flooring finish was added in place of stone finish.

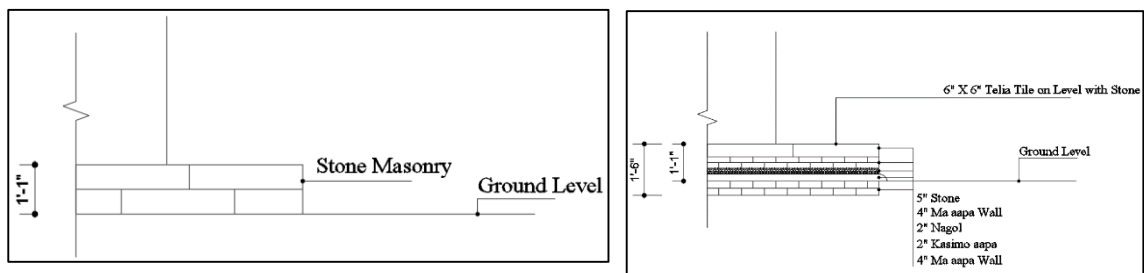


Figure 74 Plinth detail old (left) and plinth detail new (right)

6.1.2.3 Ground floor wall exterior

For the exposed brick portion on the ground floor exterior, the old design had ma aapa wall with sundried brick masonry on the inside.

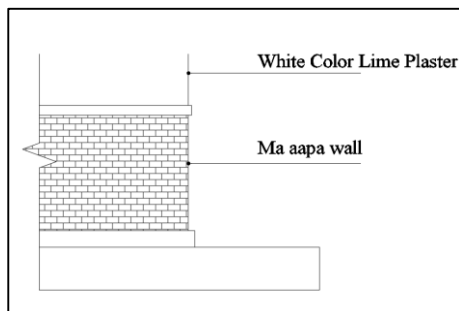


Figure 76 Ground floor wall detail old

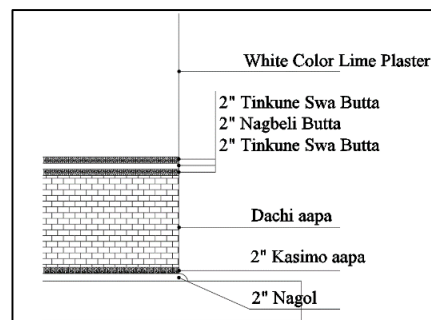


Figure 75 Ground floor wall detail new

The new design has a single layer of dachi aapa (having a thickness of 4" to 5" thickness) exposed with decorative bricks layers added on all four sides. On the inside ordinary brick masonry can be found. On the upper band of decorative bricks, on each door bricks with images of dwarfpals are placed on either sides.

6.1.2.4 Ground floor wall

The ground floor wall in the originally was ma aapa in mud mortar of 21" thickness. In the new structure, ma aapa is used with dachi aapa and decorative bands for the exposed portion only. Lime, sand and surkhi mortar in 1:1:2 ratio is used. The walls are still 21" thick but 6" x 6" posts are added to the corners of the walls for increased support. The size of the four central columns are also increased from 7" x 5.5" to 9" x 9".

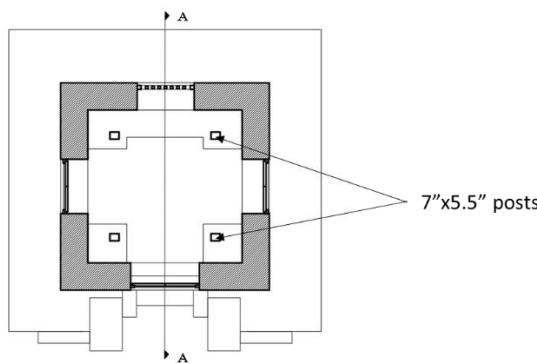


Figure 78 Ground floor plan old

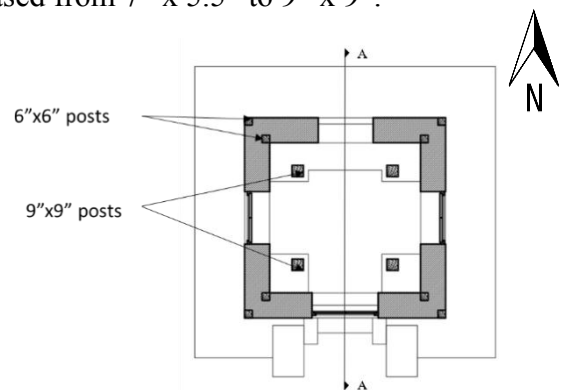


Figure 77 Ground floor plan new

6.1.2.5 Upper floor wall

The upper level had 21" exterior wall and 12" interior ma aapa wall in mud mortar with outer layer of ma aapa and internal layer of sundried bricks. The external wall also had additional layer of whitewashed mud plaster. For the new structure, corner posts were added to both internal and external walls; 5" x 5" in internal and 6" x 6" in external. Lime, sand and surkhi mortar in 1:1:2 ratio is used. Common red baked brick is used as well with reused ma aapa from the old structure.

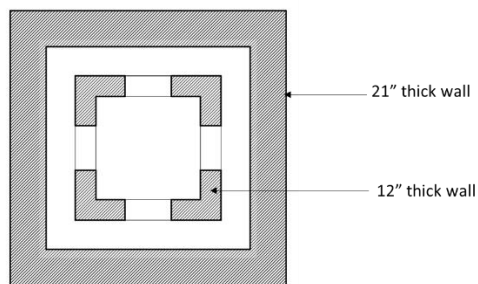


Figure 80 Upper floor plan old

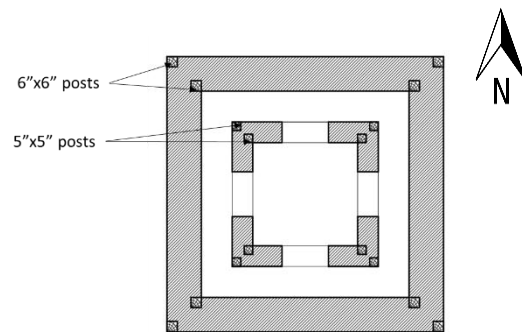


Figure 79 Upper floor plan new

6.1.2.6 Rafter

Rafter plan was changed increasing the number of rafters to accommodate for the increased weight of sal (agrath) timber use instead of salla and change in jhingati type as well on both tiers. Originally the rafters were arranged in perpendicular to each other radiating from the corner rafter. In the new design the rafters are radiating from the center.

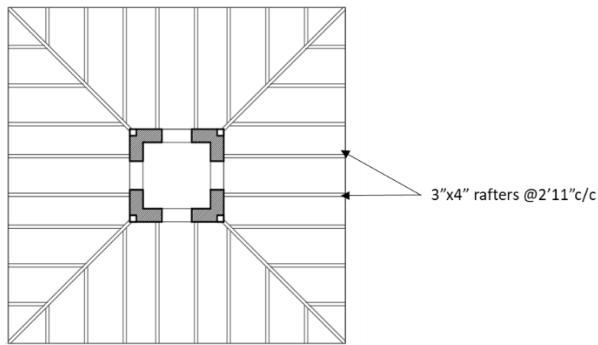


Figure 82 Rafter plan old

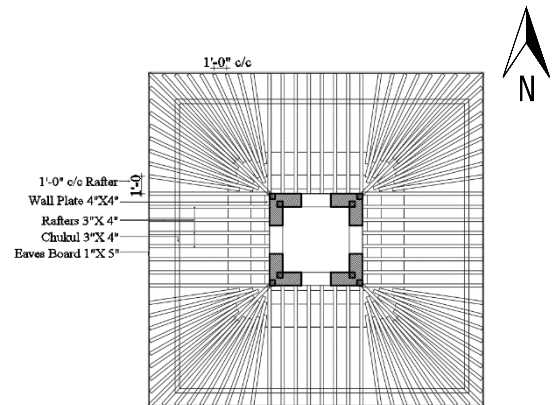


Figure 81 Rafter plan new

6.1.2.7 Cornice

The old design had a simple brick cornice on both levels. In the new design, carved wood cornice is added instead of the brick one. Eave ends called *fyo* are also added on four corners.

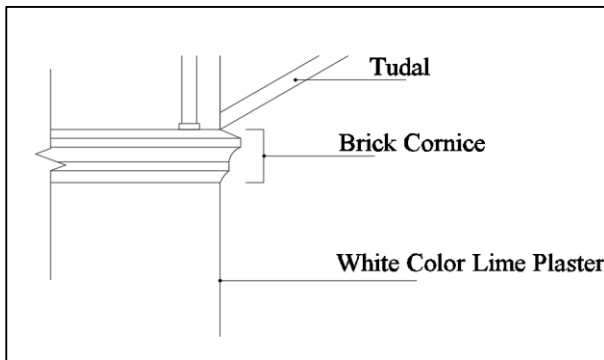


Figure 84 Cornice design old

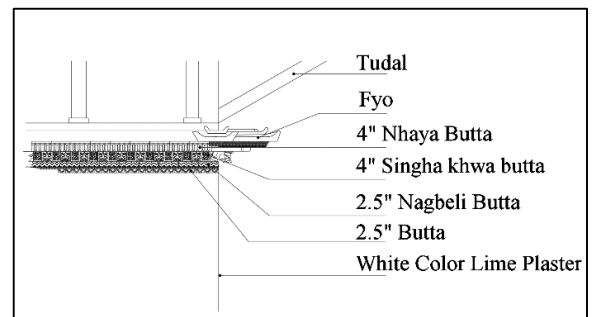


Figure 83 Cornice design new

6.1.2.8 Roof

The use in jhingati size is changed from 21''x7.5''x1.5'' to smaller ones of 7''x3.5''x0.5'' size. Wood planking is done above the rafters. A single layer of plastic waterproof layer

is added below the mud layer. Other changes include addition of bells and metal gold plated front called *illhan* to the eave ends (*muthal*) on both levels.

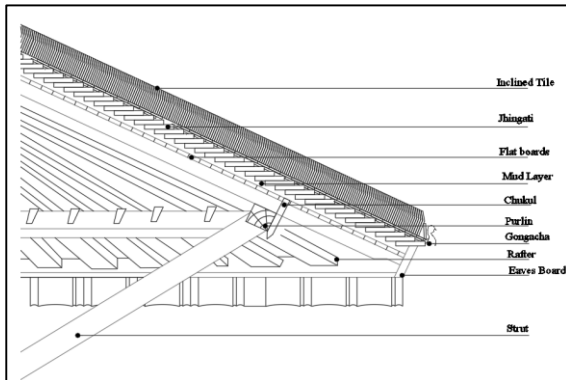


Figure 86 Roof detail old

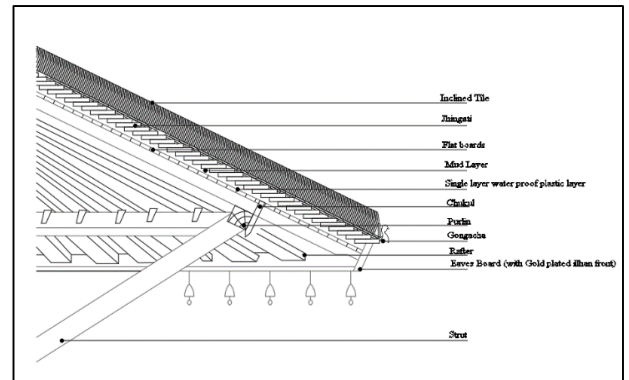


Figure 85 Roof detail new



Figure 87 Different *jhingati* tiles and plastic waterproof layer used on roof in the reconstruction

6.1.2.9 Gajur

The stone temple *gajur* was reused but gold plated for reconstruction. New additions were made to the spire.

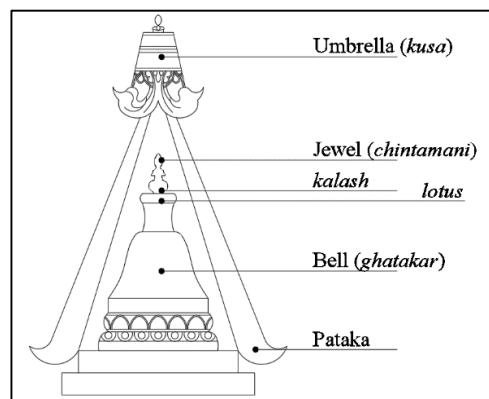
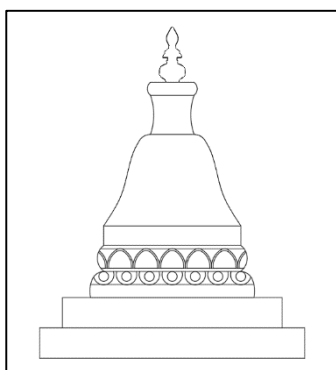


Figure 88 Changes to temple pinnacle new (left) and old (right)

6.1.2.10 Doors

All three doors in the old temple building were plain wooden doors. In the reconstruction, the east and west doors are made more elaborate in design with carvings

added to them. Devi ko and bhaila ko are added to the sides and carvings of astamangal and lattice are added to the shutters. For the main door, shutters and most of the frame are reused but copper plated. The copper plated design adds design of astamangal to the shutters. In the front entrance, the stone toran and two sets of lion statues are reused.

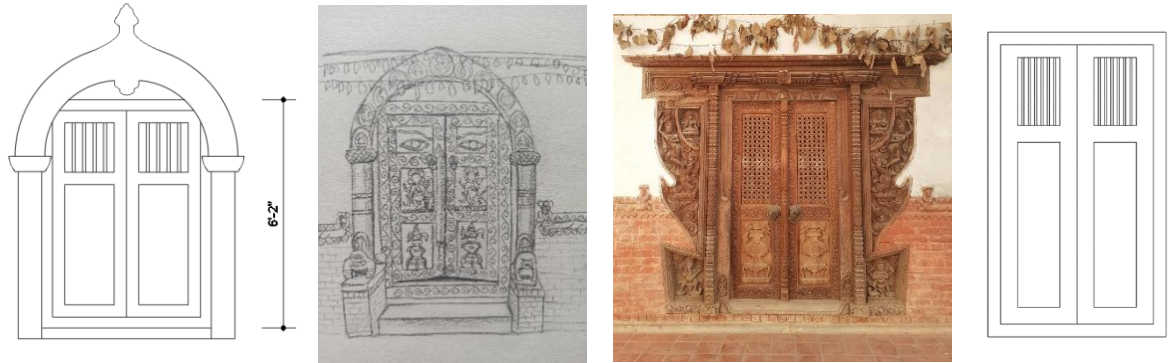


Figure 90 Main door old (left) and new (right)

Figure 89 Side doors new (left) and old (right)

6.1.2.11 Windows

Windows in the old structure were plain wooden ones. For the new structure, the windows are made more elaborate in design with carvings and multi leafed.

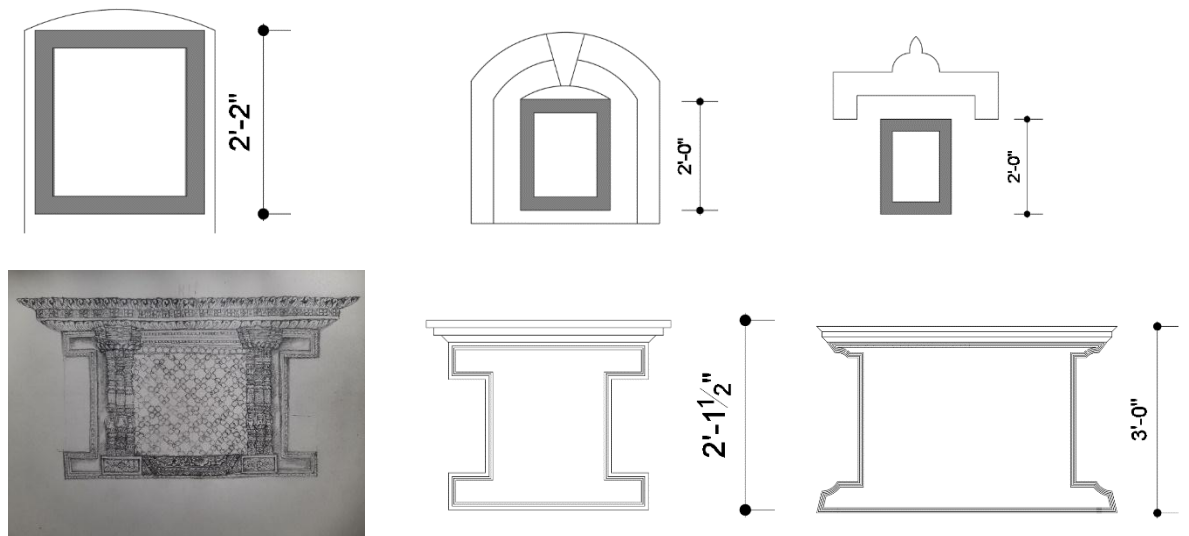


Figure 91 Windows old design (upper row) and new (lower row)
Ground floor (left), first floor (middle) and top floor (right)

6.1.2.12 Wall Plates, sill and lintel

Wall plates were added in three heights in each wall which also acted as sill and lintel bands for the openings. Since the columns are new, the timber from previous columns were used for wall plates.

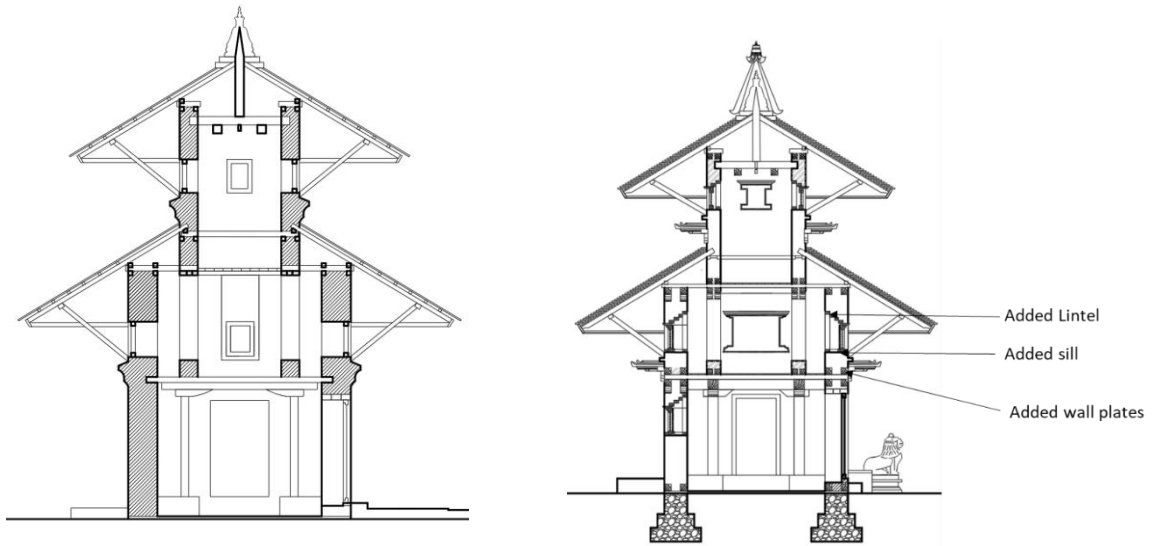


Figure 92 Section at A-A old (left) and new (right)

6.1.2.13 Struts

The number of struts in the lower roof remains 20 from old temple to new. For the upper roof the number of struts is reduced from 20 to 12. In the old design only 7 struts were carved on the lower roof and 4 were carved in the upper. The carved ones have images of matrikas and bhairabs. Most of the struts in the original were plain whereas all struts in the new building are carved. Timber is also changed from salla to sal for easiness



Figure 93 struts south eastern corner lower roof new

of carving. In the new ones the carvings of matrikas and bhairabs can be found. The four corner struts known as shardula have carving of a hybrid animal.

6.1.2.14 External decorative elements

Metal lamp rail was removed. Metal posts for bells were replaced with stone ones. Metal illhan was added to both levels of roofs. Carved wooden decorative bands

(cornice) were added on both upper levels. Wooden eave ends were added on four corners of the wooden decorative bands. Wind bells and hanging lamps (twaranchas) were added on roofs of both levels. The twaranchas were increased from 2 to 10. A jal nhekan was added to the eastern façade in place of two mirrors. The window and door designs were changed to make them more ornate. Stone plinth on the exterior has reused some stones from the previous structure.



Figure 94 Exterior decorative elements changes

6.1.2.15 Interior decorative elements – general

Illhan (metal decorative ceiling) was added to the ground floor interior. The temple previously had a gold plated *illhan* which was stolen and then replaced with a fabric one. Stone post for bell was added.



Figure 96 metal decorative ceiling in the temple

Figure 95 stone bell post and tile floor

The mud floor was replaced with *telia* tile floor. Stone idols placement positions were changed due to increase in column size.



Figure 97 Stone idols placement before and after reconstruction

6.1.3 Sourcing of Materials

The department of archaeology handled the sourcing of new materials (i.e. not reused ones) for the construction. Materials such as timber were imported from outside Kathmandu Valley. Bricks including the new *dachi aapa*, *ma aapa*, decorative bricks and common red bricks were sourced locally within Kathmandu valley.

6.1.4 Reuse of Building Materials

Although some elements such as gajur, lion statues and main door were reused, majority of the construction using brick and timber used new materials. Also, no effort were made to reuse the old doors and windows, struts and jhingati harvested from the demolished structure.

Table 4 Reuse of temple elements

Elements	Reuse
Main door	Main door was copper plated and reused
<i>Gajur</i>	Gajur was gold plated and additions made to it
Stone lions	All four stone lions were reused
Stone <i>toran</i>	Stone toran was coated with protective layer and reused.

Table 5 Reuse of Materials

Materials	Old	Reuse
Timber	Columns and beams	Wall plates, window and door inner frames
Brick	Plinth, masonry wall and foundation	Walls inner layers
Stone	Plinth and foundation	Plinth and foundation

6.2 Changes to the Temple Design

One of the major outcome of people's involvement in reconstruction of Mahalaxmi temple was changes to the design to the temple made to update the aesthetics of the temple. The reconstruction committee chose decorative additions such as the changed design for the doors and windows for the temple. Although efforts were made to retain the appearance of the temple similar to the past one with efforts made to keep the white walls instead of brick exposed, a lot of changes were made to the design of Mahalaxmi

temple for the reconstruction. Most of the changes were made to add embellishments and make the temple more ornate. The windows and designs were all made more ornate, pinnacle was gold plated, main doors were copper plated, wooden carved cornice and eave ends were added, wind bells, hanging lamps, stone posts for bells and gold plated *illhan* were added. Inside the temple as well, floor was redone with *telia* tiles and gold plated ceiling was added.

6.2.1 Structural Changes

Various structural changes were made to improve the structure of the temple building. This includes increasing foundation depth, increasing size of posts, and addition of reinforcements to masonry walls on both floors and change in rafter plan with addition of rafters. Rafter plan changes and increase of post size is to accommodate the increased weight due to change in timber type from *salla* to *agrath*.

6.2.2 Decorative Changes

Embellishments and decorative changes to the design were made as per the decisions of the local community and committee. These can be seen in the use of decorative brick layers in the plinth and exposed brick portion of the ground floor. The cornice is also changed from plain brick layers to carved wooden layers with addition of carved wooded eave ends called *fyo*. The old stone *gajur* is reused but is gold plated and additions of *pataka* and *kusha* are made to it. The doors and windows are ornately carved replacing the plain wooden ones before. The plain wooden doors of the main entrance to the south is reused but copper plated with carvings of *astamangal* on the copper plate.

The number of struts in the lower roof remains 20 from old temple to new. For the upper roof the number of struts is reduced from 20 to 12. In the old design only 7 struts were carved on the lower roof and 4 were carved in the upper. The carved ones have images of *matrikas* and *bhairabs*. Most of the struts in the original were plain whereas all struts in the new building are carved with images of *matrikas* and *bhairabs*.

6.2.3 Change in Building materials

Building materials from the demolished structure was reused to an extent but new materials were used a lot. The *jhingati* tiles (21"x7.5"x1.5") on the roof were changed to smaller ones (7"x3.5"x0.5"). The additional timber used was *sal* (*agrath*) instead of

the original *salla*. Sal was used for its preference for ease of carving. The mortar is also changed from mud to lime *surkhi* mortar. Use of *dachi aapa* instead of *ma aapa* on the exposed part of ground floor exterior can be seen. In addition to this, use of materials that were not traditionally found includes modern baked bricks and plastic water proof layer on the roofs.

Table 6 Changes in materials used for reconstruction

Use of new materials	Use of modern materials
<ul style="list-style-type: none"> • New <i>jhingati</i> tiles on roof • Use of lime <i>surkhi</i> mortar instead of mud mortar • Use of sal instead of <i>salla</i> for new timber • Gold for plating <i>gajur</i> • Copper for plating front doors • <i>Telia</i> tiles for ground floor and plinth floor • Decorative bricks 	<ul style="list-style-type: none"> • Common baked bricks in interior leaf of walls • Plastic water proof layer on roofs

6.2.4 Confirmation of Reconstruction Process with the Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072

The reconstruction process took place under the supervision of the department of Archaeology for which the Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072 should have been followed according to guideline 5 of the same guideline directory. Under the general provisions the following conservation activities have been performed:

Guideline 7: For the reconstruction, study of damage caused by earthquake on the temple and architecture of the temple was done. The intangible heritage affected by the damage and valuation of the damage is required still.

Guideline 9: Documentation of the temple with its identification was done with proper measurements in form of architectural drawings.

Guideline 10: It states that repair and reconstruction should not be based on conjecture. The temple structure itself was based on available measurements, configuration,

position of openings, and placement of idols. Changes made were for the purpose of embellishing and not based on available evidences.

Guideline 12 a: Use of traditional construction materials was done in the reconstruction however, use of exact materials previously used was not done such as the change in the timber type. Marble panels added to the front of the temple in previous renovation was removed during the reconstruction.

Guideline 12 b: With the approval of DoA, additions of timber reinforcements not visible from the outside were made.

Guideline 13: The participation of the local community could be seen in the reconstruction.

Guideline 15: For the maintenance and periodic renewal of the temple, a local committee with funds raised from the local population has been established.

Guideline 18: For the reconstruction and reestablishment of the idols, *kshema puja* was done after the completion of the construction of the temple.

Guideline 21: Traditional materials for the use in reconstruction was sourced through the DoA. However, change in brick type with dissimilar quality to original brick used can be seen but not visible from the outside.

Under the specific guidelines for the partially damaged monuments the following interventions were done:

Guideline 32 c and e: Due to the damages caused by earthquake and water leakage, the temple was decided to be reconstructed and documentation including photographs and drawings were done prior to demolition.

Guideline 32 f: The reconstruction took place without change in location or orientation with the permission of the department of archaeology and the agreement of local authorities and community.

6.3 Change in Heritage Values due to Reconstruction

Due to the major changes in the reconstruction of the temple, the values the heritage carried has changed.

Aesthetic value: Aesthetic value includes aspects of sensory perception. The addition to the decorative elements was done to add to the aesthetic value of the temple. Despite the additions, the temple retains the original appearance since the modern materials used are not visible from the outside. The white washed walls and exposed brick look

of the original has been reconstructed. However, upon closer inspection, use of decorative bricks, carved struts and cornice that was not present in the old design becomes visible to the eye.

Historic Value: The temple gains the historic value from the historic existence from its 17th century construction till now. The historic value is retained through preserving its original form and materials. In case of Nepal where cyclical renewal is done, the historical character is conserved by continuation of the materials, form, technology and crafts. With the change in use of crafts altering continuation of its existing design, the historic structure and build are lost in the reconstruction.

Scientific Value: Traditional buildings of Kathmandu Valley possess significant interest to the scientific studies due to their use of materials and building techniques. The Balambu Mahalaxmi temple was not completely demolished due to the earthquake and significant damages can be attributed to rotting of timber due to water leakage. But during reconstruction, increasing depth of foundation was considered necessary and the existing foundation was disturbed. This caused scientific value to be lost as the functional foundation and building could be studied but instead was replaced.

Social and cultural Values: The social and cultural values are attributed to the temple by the local community and its people. The people have continued to value the temple as a place for social gatherings and community functions. The cultural aspects such as *jatras* and rituals are diligently performed by the people showing people still attribute cultural value to the temple.

Contextual Value: Contextual value is attributed to the location of the heritage. The temple surroundings show changes in form of the townscape composed of the houses changing overtime from traditional to modern appearances. This has impacted the context of the temple being in a historic traditional setting. The surrounding buildings of muka chhen, nasa dya and tarhan falcha are in state of disrepair and in need of conservation causing their current appearance to be in contrast to the recently reconstructed Mahalaxmi temple.

6.4 Analysis of Perception of Reconstruction

From the information gathered from the interviews of the key informants and conservation experts, there was contrast in the perception of the reconstruction varied among the two groups of interviewed people. The local community members were

disturbed and any detail study regarding soil type, mortar use was not done. Use of modern materials should be done when traditional is no longer available. But the temple was reconstructed with use of modern materials such as baked bricks despite the traditional *ma aapa* being available and used in some capacity here as well.

While the local community were not concerned with documentation, conservation experts pointed out the importance of documentation for future reference and also to distinguish the reconstruction from the old construction. In many cases of conservation and this one the construction work itself is given priority over detail documentation. In the future it can cause problems with understanding the era of construction and authenticity.

Another important factor to be considered in a case like this where the community is an important stakeholder, the rights of the community needs to be considered. Conservation has been carried out by community itself long before the administration and improvements deemed necessary by the community have been part of the conservation. Only now this method has gone awry due to use of inappropriate materials and methods such as concrete use in reconstruction.

People do not understand the difference between traditional design and reconstruction with actual traditional use materials.

CHAPTER 7. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

This research provides an insight into an example of heritage conservation by means of study of the conservation of Mahalaxmi temple of Balambu through its reconstruction. Kathmandu valley has similar settlements as Balambu and heritages similar to Mahalaxmi temple of Balambu can be found in these settlements. Most heritage settlements in Kathmandu valley have temples of their tutelary deity similar to the settlement in Balambu. After the earthquake many such heritages have undergone through conservation works including repair and reconstruction or are in need of conservation. This study shows that even with the involvement of department of archaeology, the reconstruction process presented problems and errors. Despite the DoA's involvement in the reconstruction, the department's own guideline of not reconstructing based on conjecture was not followed here.

However, this study also shows that community participation can be found for conservation projects in communities such as Balambu. It is also found that people are willing to participate in conservation works in the future. The study also highlights deviations from the conservation directions provided by the department of archaeology in the reconstruction process due to lack of awareness among the participants. Despite this a sustainable conservation and maintenance of the Mahalaxmi temple in future seems possible due to the ownership and responsibility people feel towards the temple due to their involvement in the conservation.

The study shows that while rights of the community and participation of the community should be given importance, in the context of lack of conservation knowledge among the community members, conservation can cause loss in heritage values. Despite technical and financial involvement of Department of Archaeology, there is need of conservation awareness among the local residents especially when they are involved in the decision making process.

The conservation guidelines needs to be context based as seen by the deterring by the community by changing so much of the temple design and the department itself by allowing it. In cases like this where reconstruction is done where changes are preferred and done with traditional materials and methods, the balance between changes allowed

by involvement of community and conservation principles followed needs to be devised in the context appropriate guidelines instead of out ruling them all. Community involvement is an essential component to conservation practices to heritages such as Mahalaxmi temple of Balambu but the government needs to establish a sound mechanism to implement better coordination among the stakeholders to ensure the values of one does not overwhelm the conservation.

7.2 Recommendations

The Mahalaxmi temple itself will need maintenance and conservation in the future. Also, there are other heritage structures in need of conservation such as the *Nasa dya*, *Muka chhen* etc. in Balambu. In addition to this there are several heritages in similar context that could improve their conservation plan based on the findings from this one. For the Mahalaxmi temple the following are the recommendations for future conservation:

- Drafting a management plan for future conservation is necessary. Prior to this conservation, an accurate valuation of heritage values and historical importance of the heritage could not be calculated. For future references the management plan should provide detailed description of the heritage and identify management policies and strategies for implementation.
- Proper documentation in detail of the temple building and the interventions made during the reconstruction is necessary for future references.
- Conservation of monuments in the temple complex and other conservation activities should be done with similar principles of traditional materials and construction.
- The legibility of any intervention must be easily identifiable and made aware to the public. The information about the reconstruction and changes made should be made available to visitors by means of a display such as a stone inscription that would not be in odds with the temple environment.
- Further conservation work should focus on the surrounding and context of the temple as well. Regulations for surrounding buildings construction befitting the temple visuals should be introduced to preserve the setting and historic location.

The general recommendations are for improvement of future conservation works in Balambu and to adapt similar conservation strategies in similar heritage sites or monuments. The conservation guidelines should apprehend the conservation culture of a place and understand the general circumstance of heritage conservation requirements. Whenever specific issues to a heritage arises, specialist authorized by conservation authority should be consulted for solutions. Such issues are then solved by proper study and research into the matter. In case of Mahalaxmi temple, the depth of foundation was increased and excavation was done without proper archaeological study and scientific study of soil quality. This could have been avoided with consultation with an expert. The stakeholders for conservation should be identified and participants in decision making levels that can communicate effectively to the community and are knowledgeable in heritage and conservation. While community is a stakeholder that values cultural, religious and social values, it could be seen that scientific and historic values were less prioritized due to lack of knowledge among involved community members. Conservation authority can identify and categorize heritage values by hierarchy. Thus, proper regulation and decision making by the conservation authority can mitigate such problems.

The Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072 from the department of Archaeology states that since local population are guardians of heritages, their involvement in various stages of conservation should be provisioned. However it is necessary to include local participation in the maintenance and periodic supervision of the heritage as well. In case of Mahalaxmi temple, there are *guthis* and *dware* that are involved in the maintenance of the temple. In future, coordination from department of archaeology with the local organizations would be more effective for sustainable conservation.

There are cases of heritages not graded by department of archaeology and in conservation of heritages that do not lie under the jurisdiction of the department, the decision of community needs to be more effective. Awareness programs that teaches people about traditional design and its importance in conservation needs to be conducted. The department of archaeology's policies and principles regarding conservation also needs to be more common knowledge to avoid discrepancies in future conservation projects.

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ANNEX

Annex 1: Interview Questions

- **About temple and Reconstruction (For involved architects and experts)**
 - What was the reason for the reconstruction of the temple?
 - Was there any changes made to the design of the temple (plan, structure, windows, roof, doors and decorative elements)?
 - Was any material reused from the demolished temple structure?
 - For new materials used, what sort of considerations were made (such as using the same type of wood, brick or stone as the previous structure)?
 - What is your view on changes made to the original design of the temple?
 - Were the local authorities involved in the project?
 - What is your opinion of local public participation in the project?

- **About temple and Perception of reconstruction among locals**
 - Describe the status and importance of Mahalaxmi temple in your opinion.
 - What was your involvement in the reconstruction of Mahalaxmi temple?
 - Who do you think is responsible for the conservation of the temple?
 - Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?
 - Are you satisfied with the reconstruction of the Mahalaxmi temple?

- **Perception of reconstruction from conservation experts and professionals**
 - What are your views on changes made to the design of the temple?
 - Should changes to design be allowed in case of conservation of architectural heritage in any context?
 - Is the current approach to heritage conservation by the conservation authority (DoA) sufficient?
 - In case of Mahalaxmi temple of Balambu changes were due to the demands of the local community. How can the conservation effort be regulated in future cases?

Annex 2: Mahalaxmi temple drawings before reconstruction

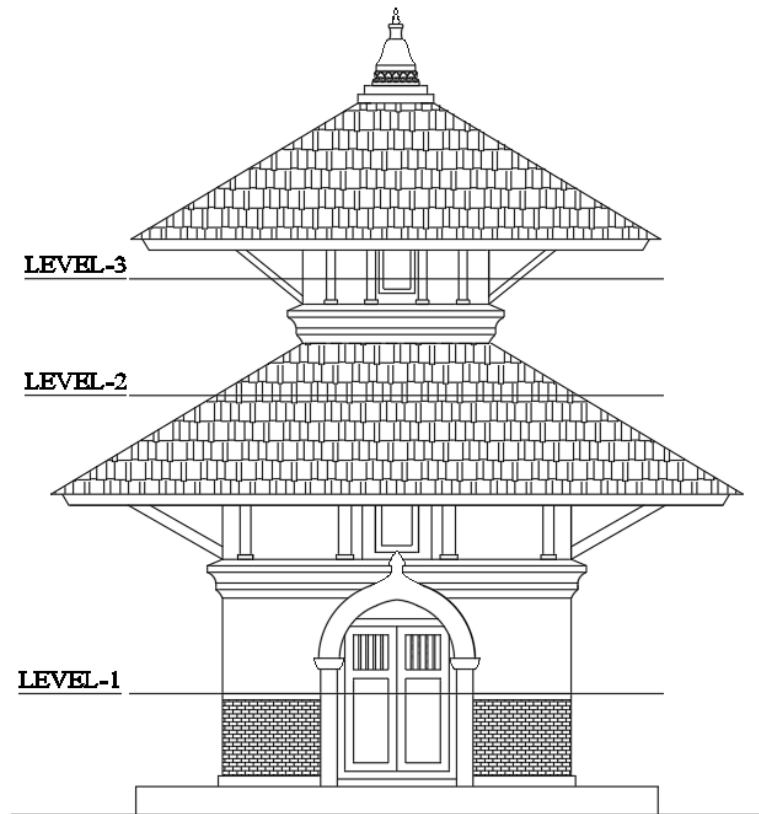


Figure 100 Front (South) Elevation

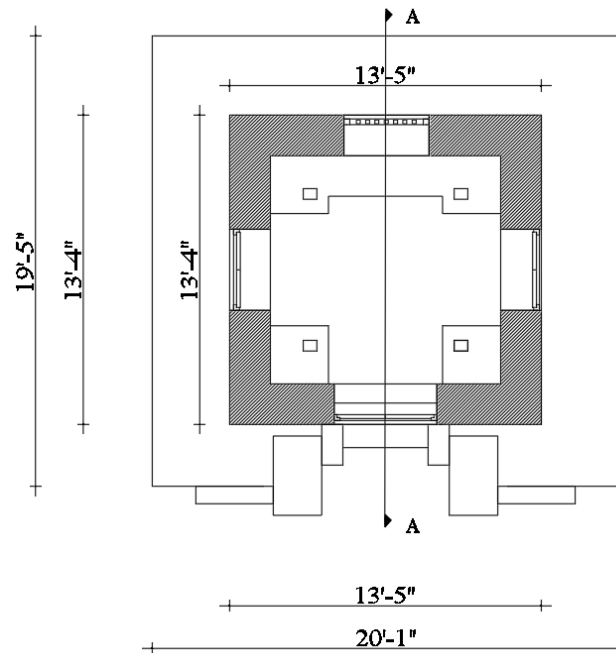


Figure 101 Ground floor (plan at level 1)

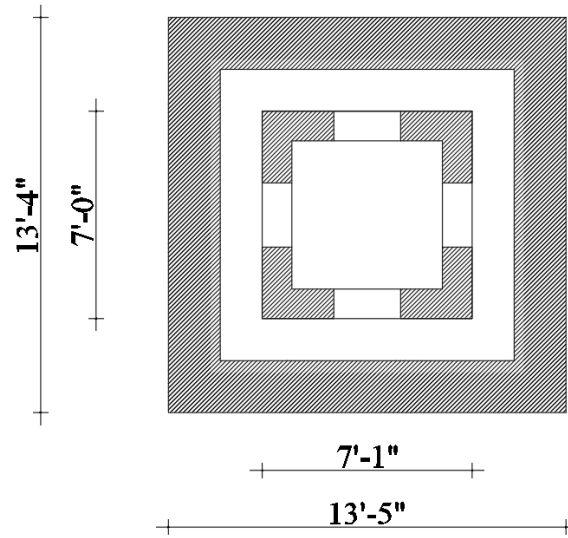
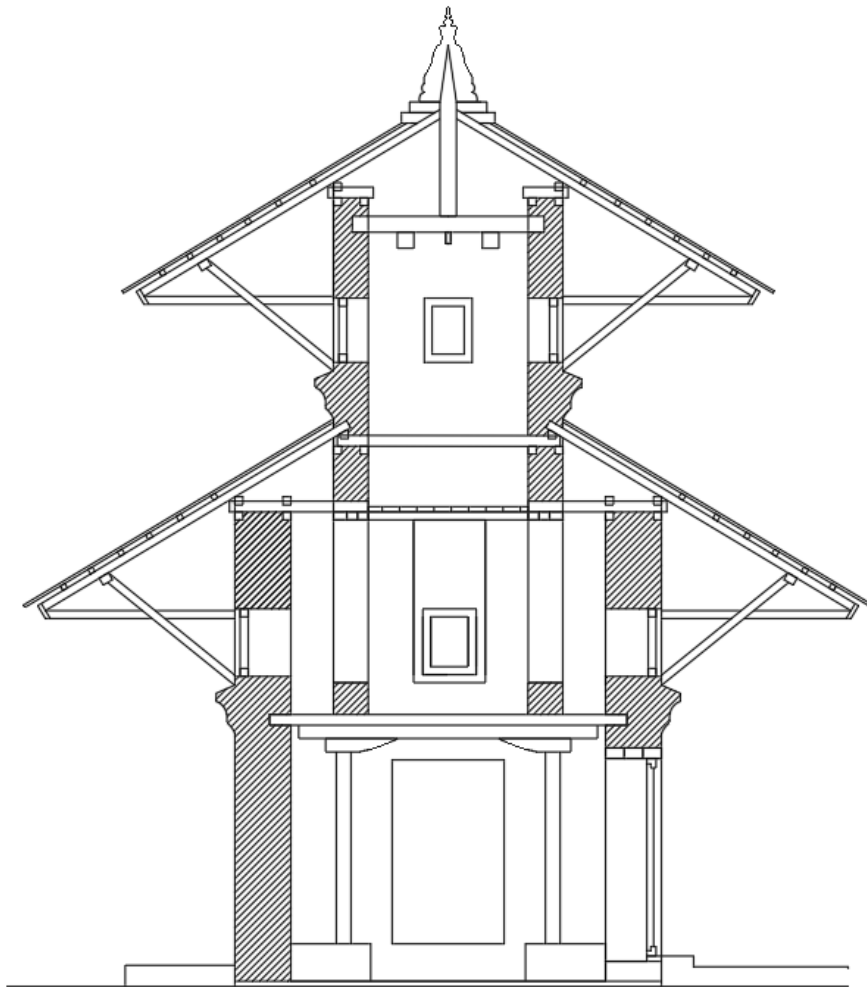


Figure 102 Plan at level 2



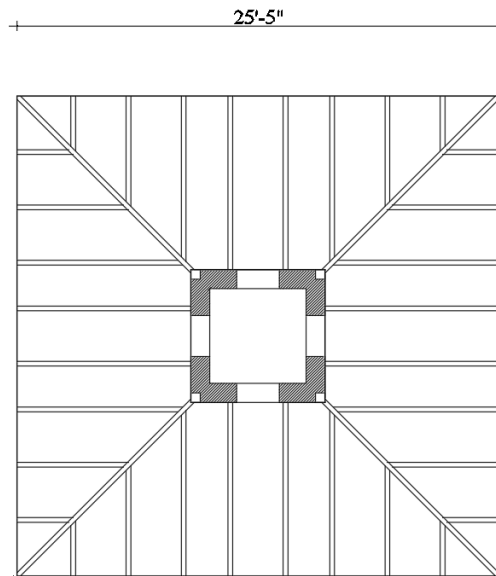


Figure 104 Rafter plan (plan at level 3)

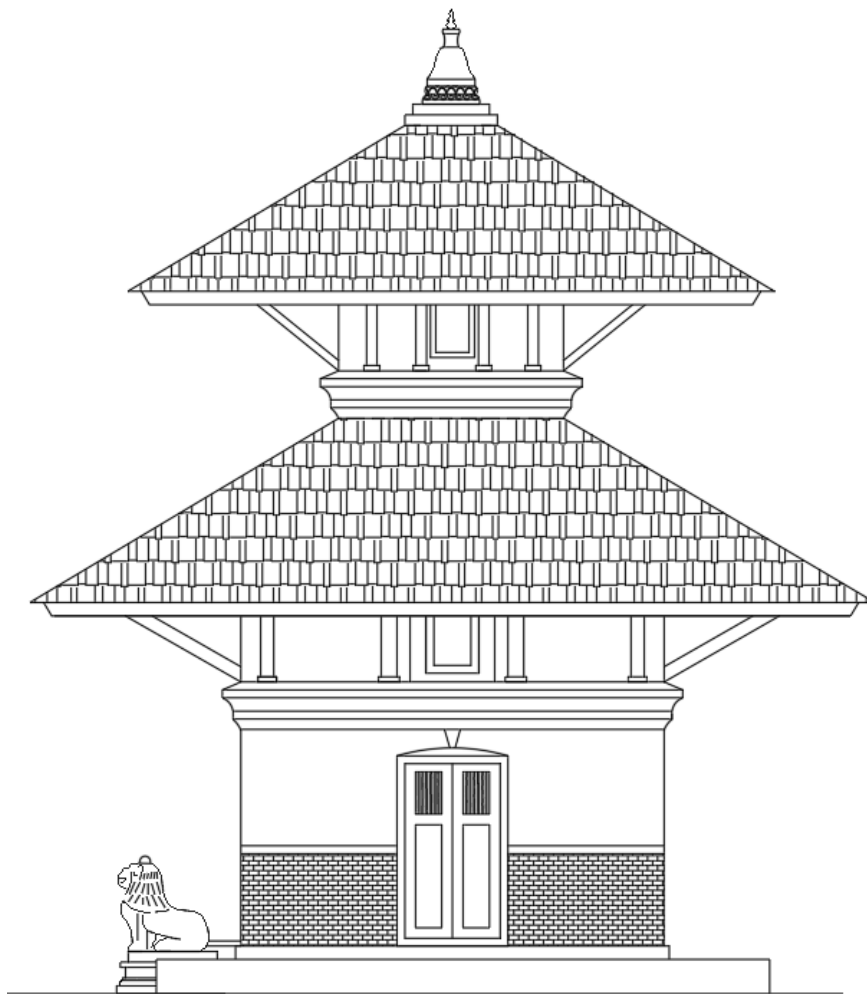


Figure 105 East Elevation

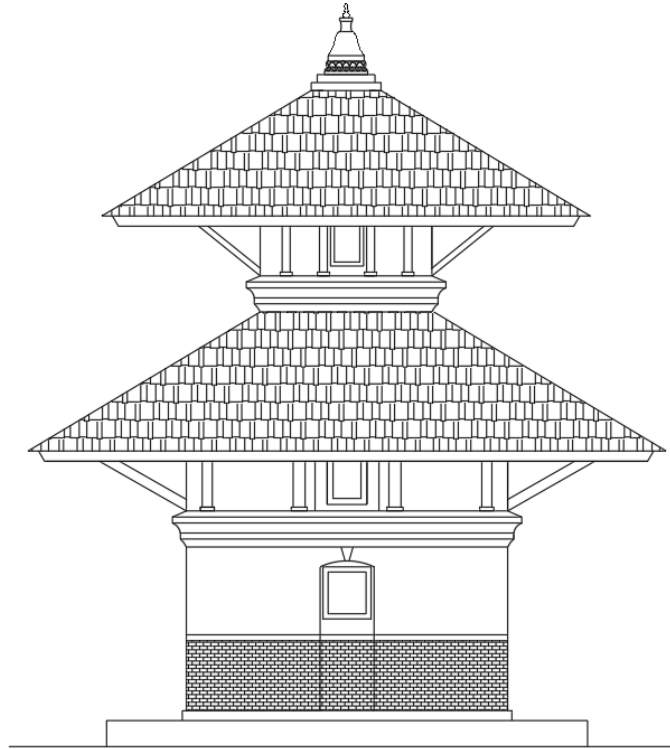


Figure 106 North Elevation

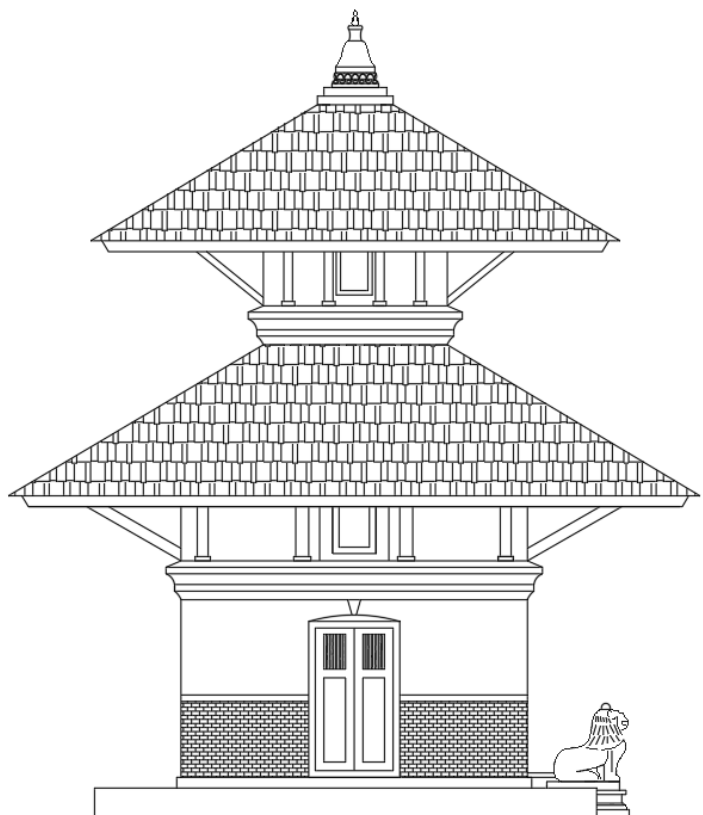


Figure 107 West Elevation

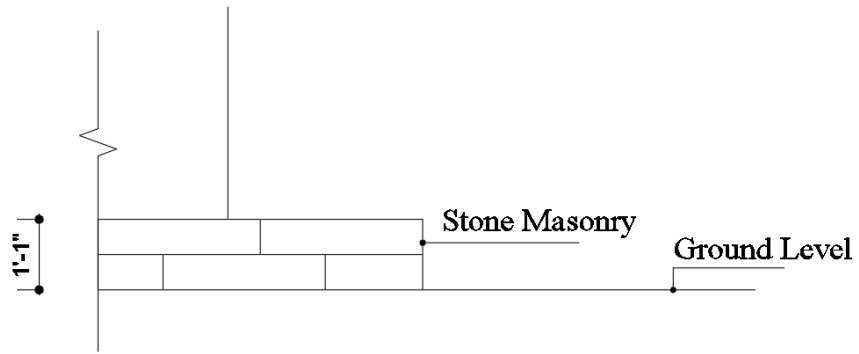


Figure 108 Plinth details

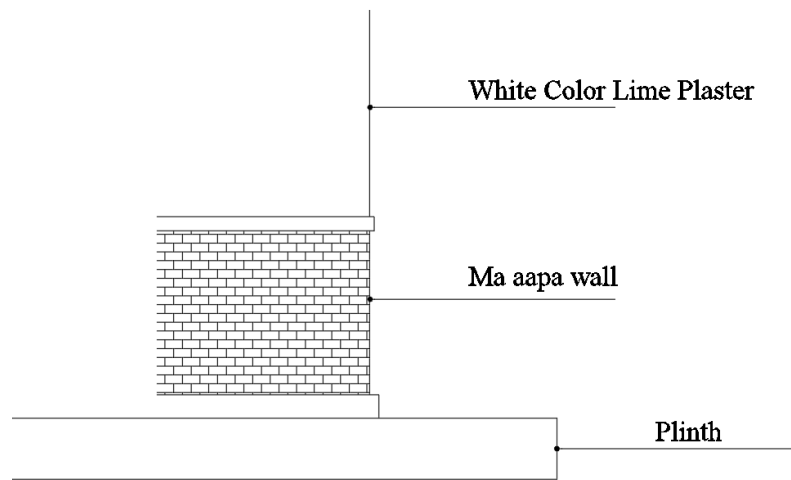


Figure 109 Ground floor exterior wall

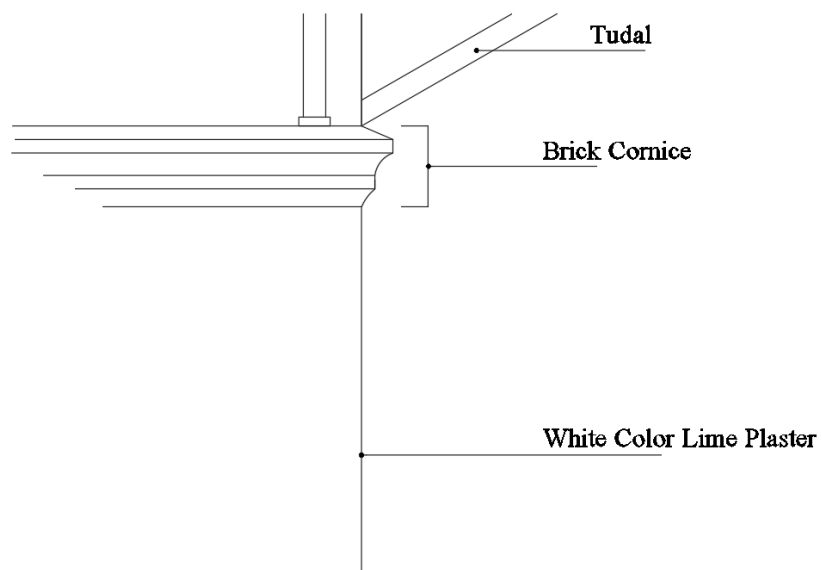


Figure 110 Cornice details

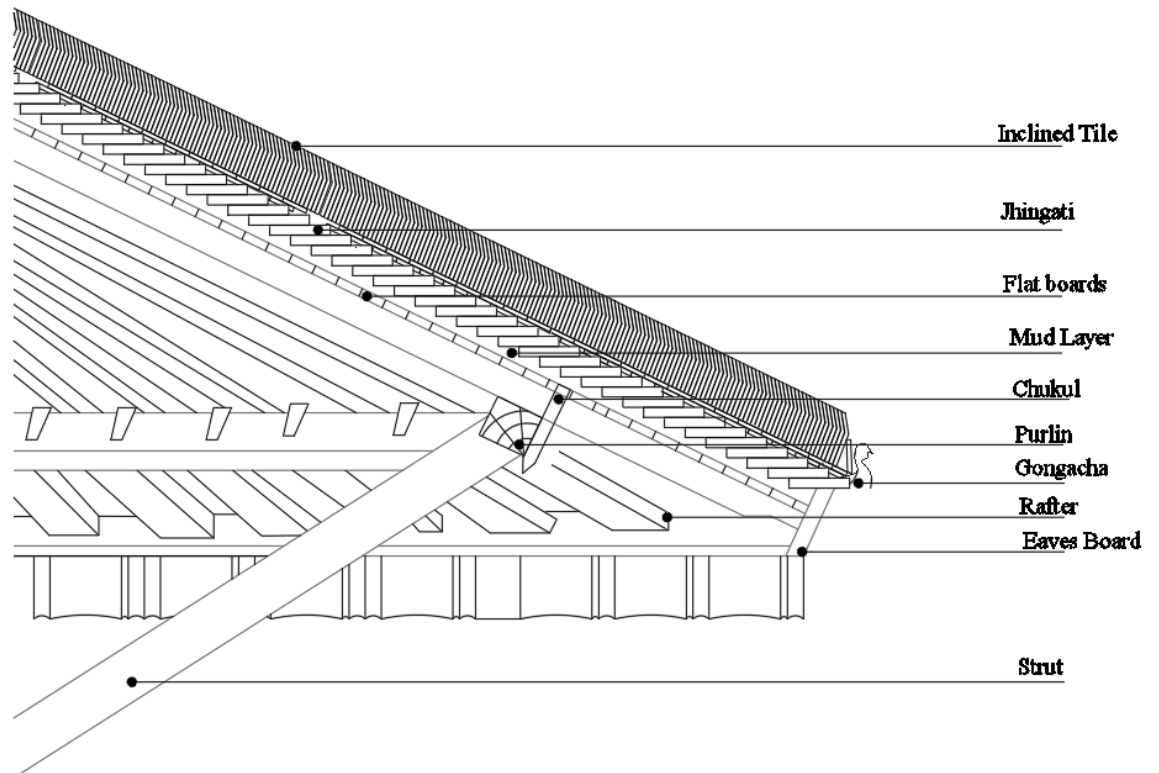


Figure 111 Roof details

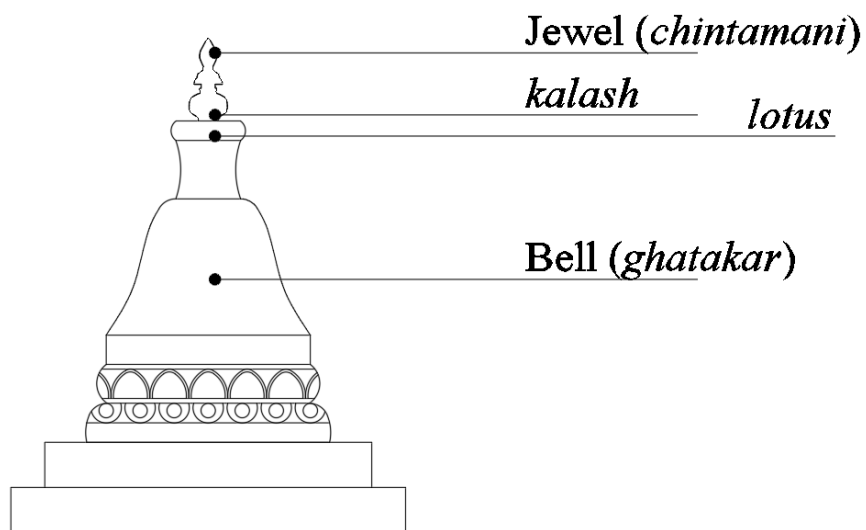


Figure 112 Gajur details

Annex 3: Mahalaxmi temple drawings after reconstruction

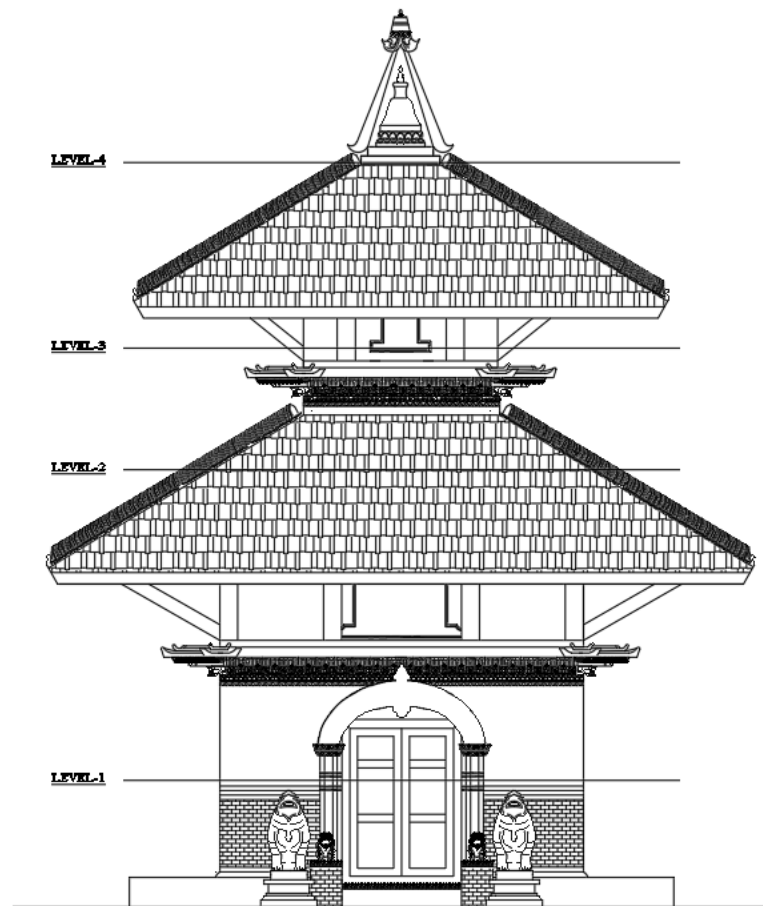


Figure 113 Front (South) Elevation

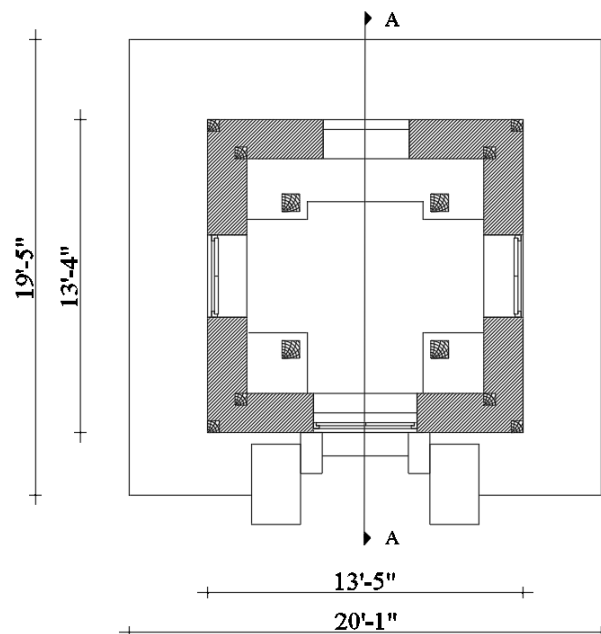


Figure 114 Ground floor (plan at level 1)

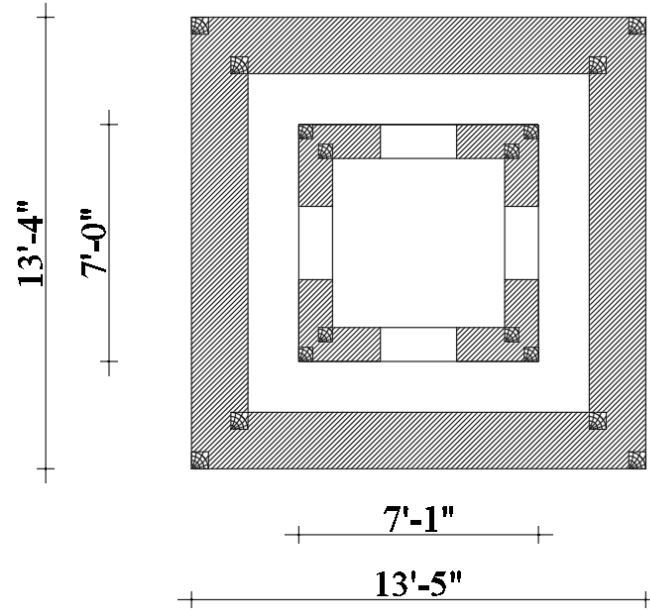


Figure 115 Plan at level 2

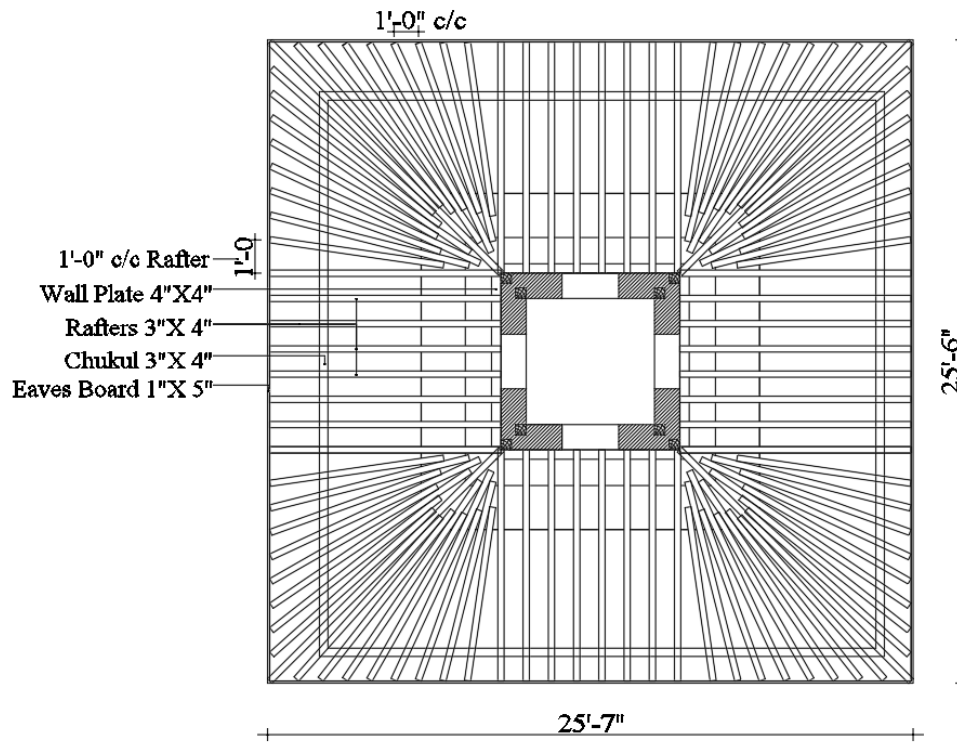


Figure 116 Plan at level 3

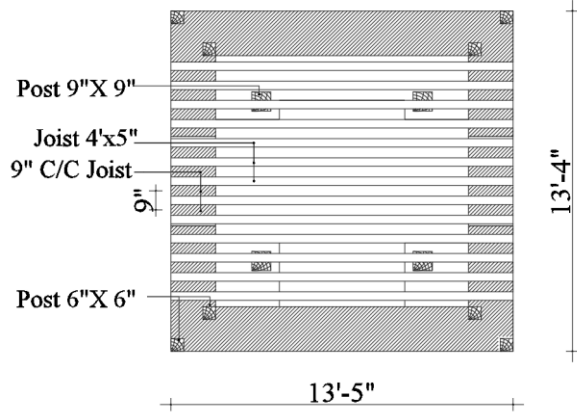


Figure 117 Joist plan

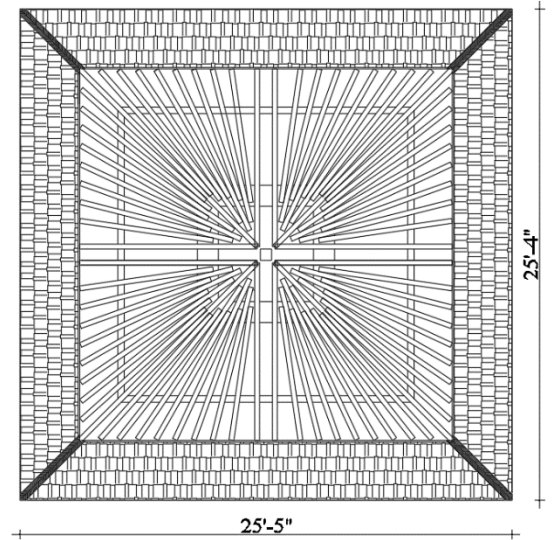


Figure 118 Plan at level 4

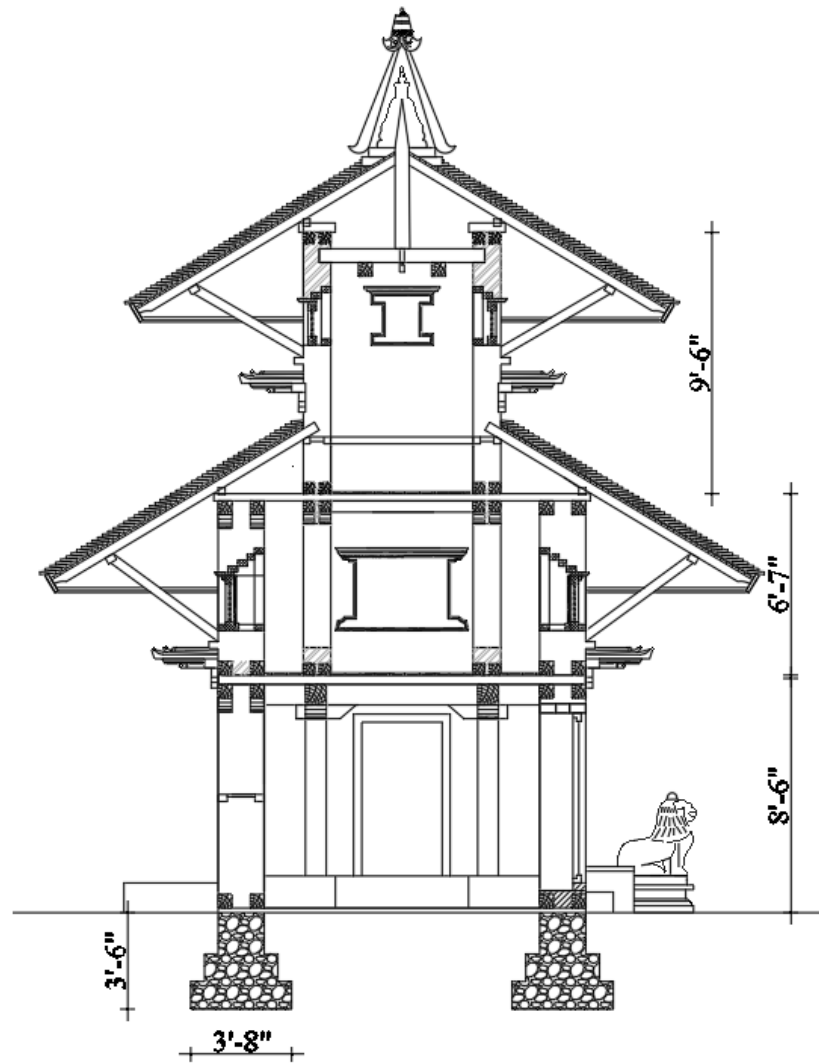


Figure 119 Section at A-A

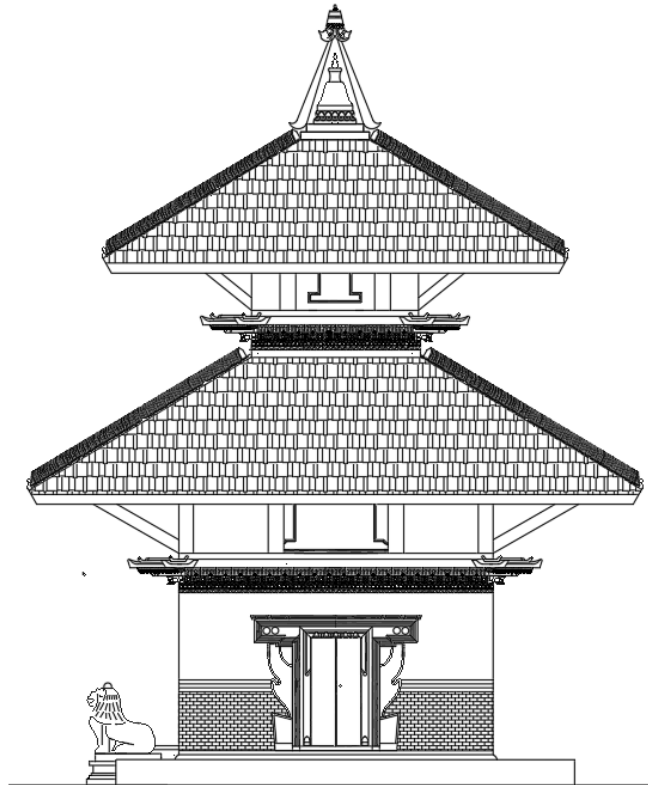


Figure 120 East Elevation

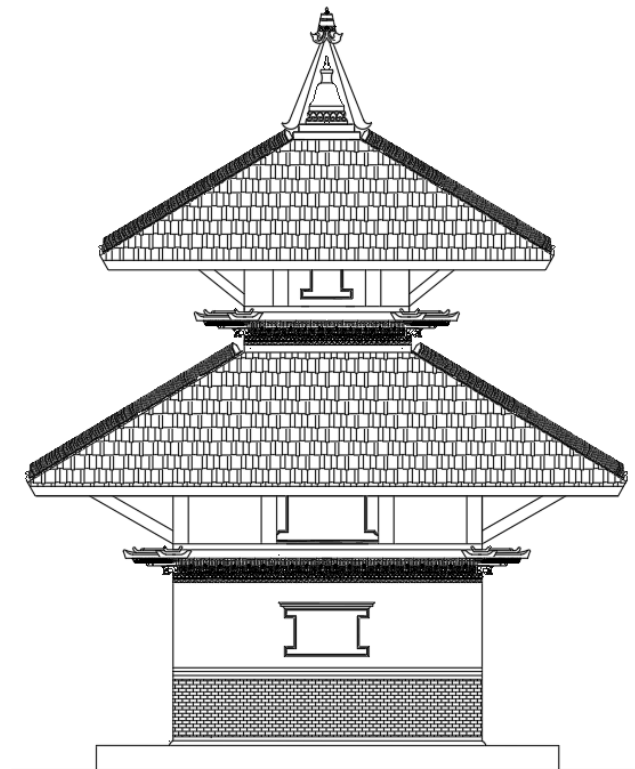


Figure 121 North Elevation

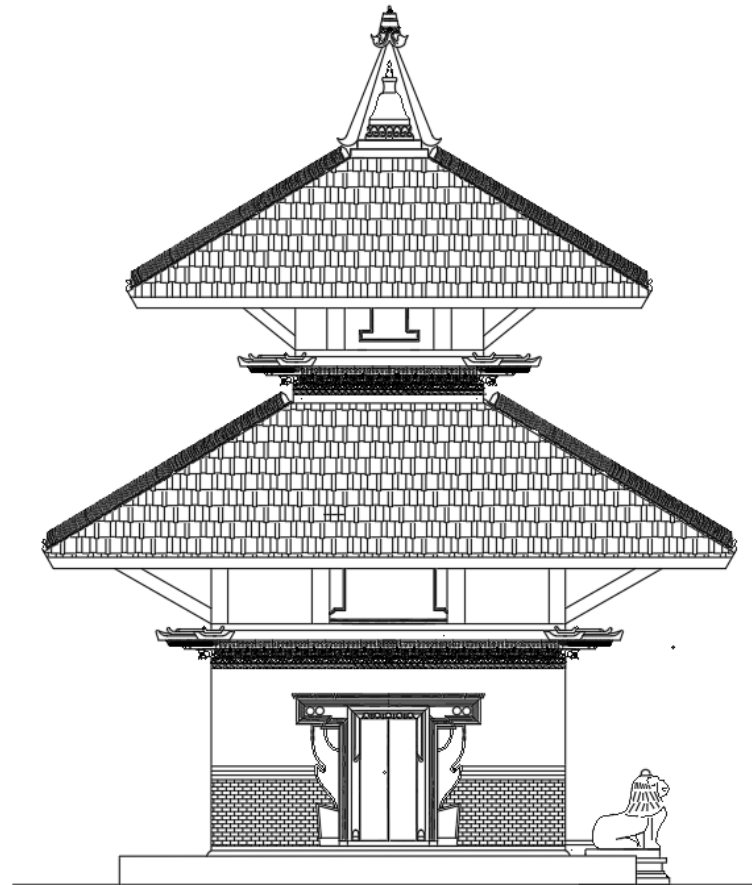


Figure 122 West Elevation

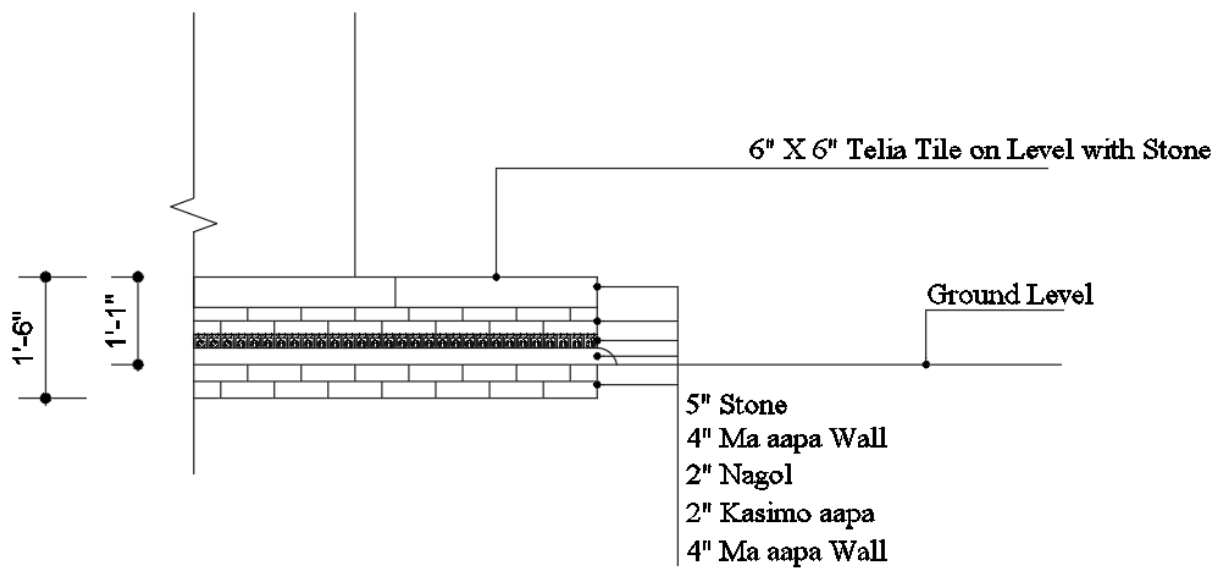


Figure 123 Plinth details

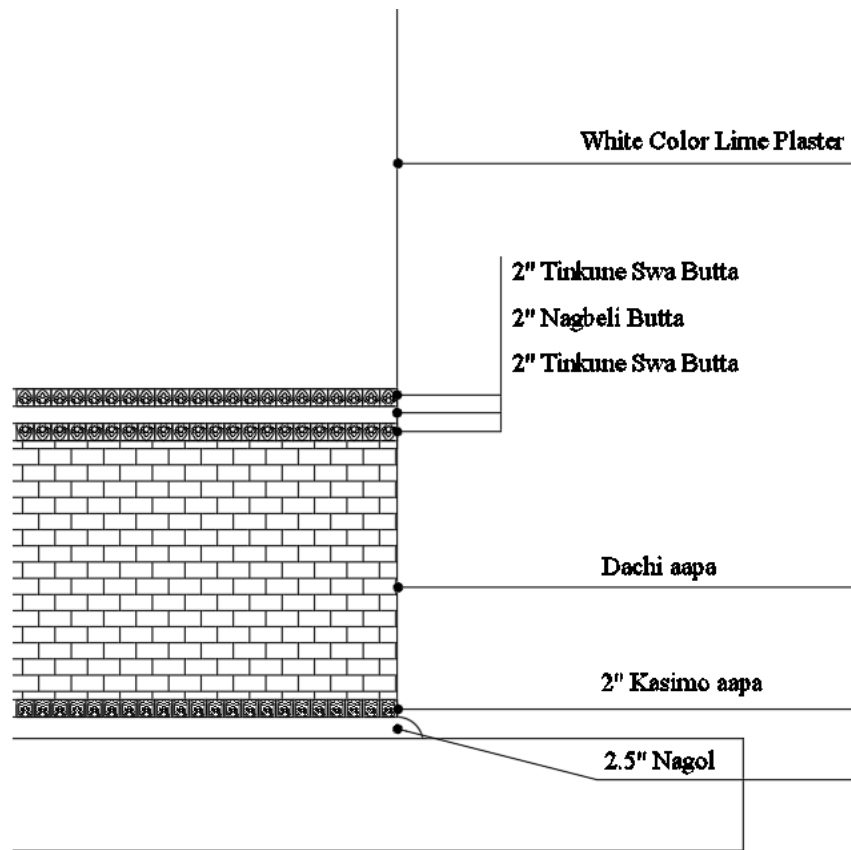


Figure 124 Ground floor wall exterior

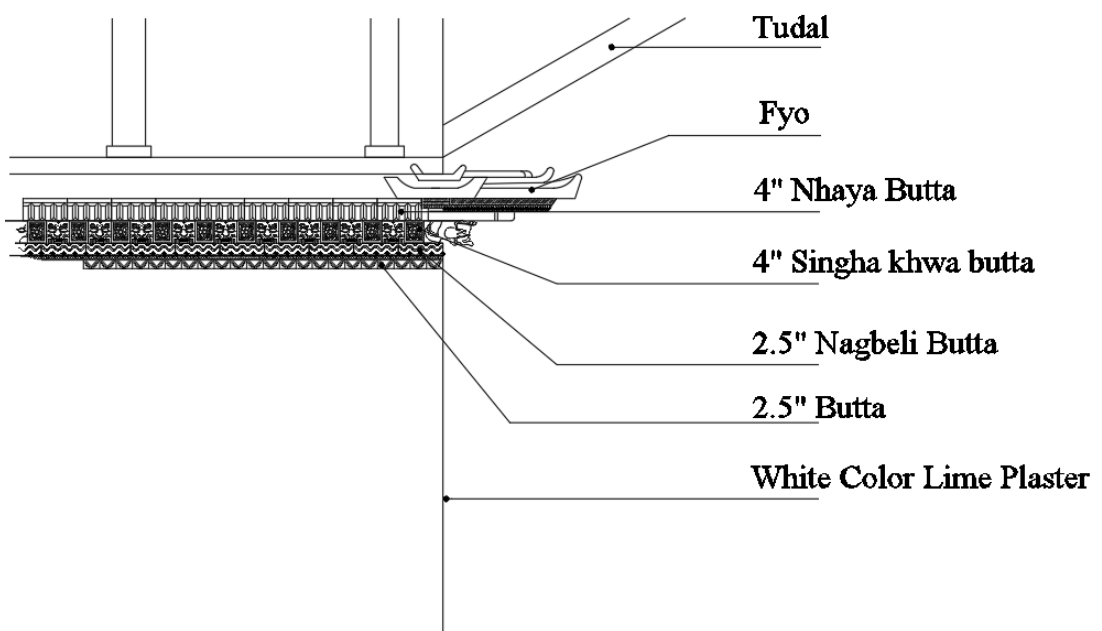


Figure 125 Cornice details

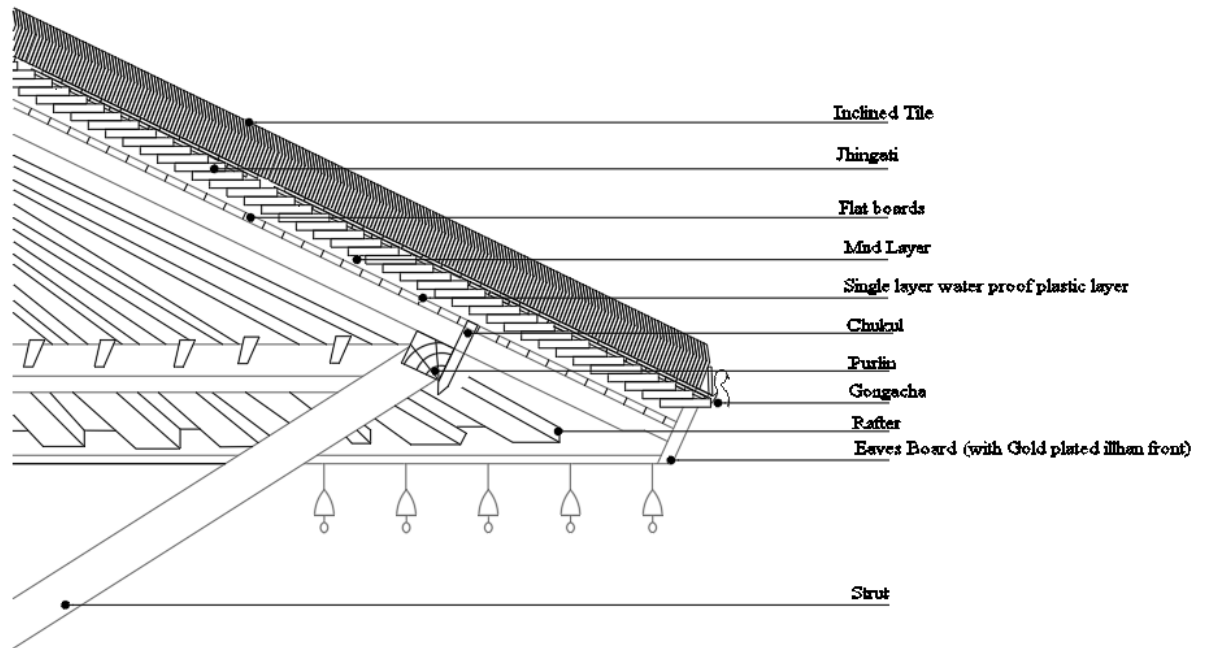


Figure 126 Roof details

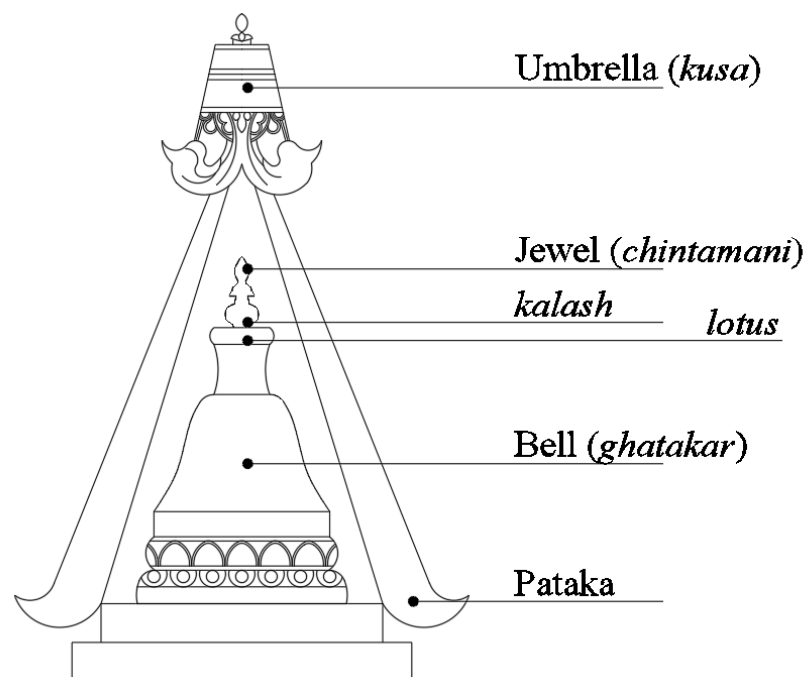


Figure 127 Gajur details

Annex 4: Article



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Date: October 7, 2022

To Whom It May Concern

This is to confirm that the paper titled "*Conservation of Heritage: A Study of Reconstruction of Mahalaxmi Temple at Balambu*" submitted by **Rasana Shrestha** with Conference ID **12091** has been accepted for presentation at the 12th IOE Graduate Conference being held in October 19 – 22, 2022 at Thapathali Campus, Kathmandu.

Khem Gyanwali, PhD
Convener,
12th IOE Graduate Conference



Conservation of Heritage: A Study of Reconstruction of Mahalaxmi Temple at Balambu

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Abstract

The conservation works in Nepal can be dated back to times long before the introduction of Ancient Monuments Preservation Act in 2013 B.S. that marked the provision of modern concept of heritage conservation in Nepal. In case of Nepal, often architectural heritage is closely linked to cultural heritage of the people due to which conservation of heritages has been deemed important and carried out by the people through institutions such as *guthis* even before the establishment of a conservation administration. Currently there are different stakeholders in the conservation arena in Nepal such as the Department of Archaeology, municipality, community and international actors that pursue widely divergent approaches. For this study the Mahalaxmi temple at Balambu is taken as the subject of the research. The temple was recently reconstructed through the joint efforts of the Department of Archaeology and a committee of local community known as Mahalaxmi Purnanirman Samiti. The conservation of the temple is studied through the analysis of the recent reconstruction of the temple. The objective of this research is to analyze the issues related to the reconstruction of Mahalaxmi temple. To study the reconstruction of the temple field observations were done in addition to interviews of key informants. This study provides a reference for a current conservation project and further organization needed for better results in future projects. Hence this study is expected to provide suggestions for future conservation works.

Keywords

Conservation, reconstruction, cultural heritage, temple

1. Introduction

According to the Department of Archeology, a total of 753 temples, shrines and monasteries across the country suffered damages from the earthquake. The earthquake damaged 241 temples and shrines in Kathmandu, 73 in Bhaktapur and 130 in Patan [1]. Although, the department of archaeology established in 1953 is now responsible for the conservation of heritage sites and monuments in Nepal, it has been found that different stakeholders in the conservation arena such as the Department of Archaeology, municipality, community and international actors pursue widely divergent approaches [2]. One such example of conservation is the Mahalaxmi temple at Balambu which began reconstruction in 2076.

1.1 Background

Balambu is one of the 50 historic settlements in Kathmandu valley [3] and one of the oldest

settlements in Kathmandu Valley. Balambu is a village and former village development committee that is now part of Chandragiri Municipality in Kathmandu district. Balambu is 4.53 kilometers west of Kathmandu between the villages of Satungal and Kisipiri, about 470 metres north of Tribhuvan Highway. The total area of the settlement is 2.17 km² [4]. After the 2015 earthquake, works have undergone for the conservation of heritages including reconstruction of the temples in the area. The Mahalaxmi temple in Balambu has also recently completed reconstruction under the supervision of Department of Archaeology.

Mahalaxmi temple is one of the oldest temples in Balambu and Mahalaxmi is the tutelary deity of the settlement. Similar to other heritages in Kathmandu, the conservation of Mahalaxmi temple was managed by *guthis* before the establishment of Department of Archaeology. After the damages to the temple caused by the 2015 earthquake, the conservation of the

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Mahalaxmi temple was of high priority to the local community. The temple had cracks on the upper floor and the timber was rotting due to water leaking through the roof on the upper tier. The temple was reconstructed through the joint efforts of the Department of Archaeology and a committee of local community members known as Mahalaxmi Purnanirman Samiti. The reconstruction has been completed with financial input from both the department of archaeology and the local community.

2. Statement of the Problem

In Kathmandu valley, the number of important cultural and heritage sites is higher in the city center as compared to its outskirts [5]. While historic monuments in the historic settlements in Kathmandu are protected by the 'Ancient Monument Preservation Act, 1956', a sufficient system does not exist to preserve the historic townscape which mainly consists of private residences [3]. The monuments in such historic townscapes are also in need of conservation despite being under the protection of the ancient monument act. The heritage sites in the outskirts of Kathmandu are largely ignored and are subject to improper repair and reconstruction. The Mahalaxmi temple at Balambu is one of the at risk heritage sites [5]. However, it is necessary to recognize all sorts of heritages for conservation.

After the recent reconstruction of Mahalaxmi temple under supervision of Department of Archaeology, the role of government authority in conservation of heritage is seen. But there are several other religious and cultural heritage in Balambu that require conservation.

3. Rationale of the Research

Although the attitudes in conservation globally has widened to include the conservation of areas, urban and rural sites, the environment, built heritage, tradition and culture as well as monuments and historic locations, the focus of conservation are the 'world heritage' sites [6]. The less dramatic but equally important structures and historic areas that are important to the cultural fabric of their region are often negated. In case of Nepal as well Kathmandu valley has been the focus of heritage conservation programs in Nepal since the legal provisions have been designed [7]. However, most of the focus has

been towards the heritages sites in the core of the cities where the world heritage sites are. This has caused monuments on the outskirts of the valley to be ignored despite being of historical and architectural importance which has resulted in such heritages to be in states of disrepair or being repaired and reconstructed without following the proper policies of conservation in accordance to the DoA. It is also seen that the knowledge regarding the use of authentic materials in the conservation work is also lost or paid less attention as seen in reconstruction of various temples after the 2015 earthquake [8]. This is prominent in most construction works not overlooked by the DoA. Also, responding to Nepal's diverse cultural contexts, the conservation policy in Nepal needs to count on local cultural institutions, cultural practices and economic bases [7]. The DoA established in 1953 is now responsible for the conservation of heritage sites and monuments in Nepal. Introduction of Ancient Monuments Preservation Act in 1956 marked the provision of modern concept of heritage conservation in Nepal. However, the conservation approach in Nepal, most of which is adapted from international frameworks mostly originating in different contexts abroad - needs to be evaluated in local cultural contexts [7] and conservation strategies need to concentrate on appropriate local distinctiveness [6]. The conservation of Mahalaxmi temple at Balambu is an example of coordination between the conservation authority and local community. Although, overseen by the DoA, there have been issues with the conservation project such as change in the original design of the temple. Hence, this research will be a study of conservation of a temple in a historic settlement of Kathmandu valley and will be helpful in identifying the issues of such conservation work.

4. Objectives

The aim of this research is to study the conservation work in the recent reconstruction of Mahalaxmi temple with the main objective:

- To analyze the elements and issues related to the reconstruction of Mahalaxmi temple.

5. Research Methodology

5.1 Research Design

For the research qualitative approach under case study research is used to analyze the reconstruction of Mahalaxmi temple. Qualitative analysis with observation and unstructured interviews is done using open ended but premeditated questions. The questions related to the reconstruction of temple are used to obtain answers to the research questions. Participants for interview for qualitative research are selected through purposive sampling.

5.2 Data Collection

The primary data is collected for concluding the study by means of interview and observation. Observation of the temple building was done to study the reconstruction works for which observation of reconstruction work was done during site visits. The physical dimensions of the temple prior to the reconstruction was also studied through observation and study of documentation by the DoA.

For the interview, the research employs non-probability and purposive sampling chosen on the criteria of the respondents being involved and having expertise in the reconstruction of the Mahalaxmi temple and expertise in conservation. Interviews with elders and historians are done to get historical and religious information about the temple. Interviews with reconstruction committee members, involved architects and experts are done to understand the reconstruction. Interviews with conservation experts are done to analyze the conservation process.

From the interviews; historical, economic management, political and religious information were collected as background information to understand the context of the temple. For the main study, information about reconstruction which includes decision making, finance and physical attributes of the reconstructed temple were collected on the basis of which analysis of the reconstruction is done.

6. Limitations

The scope of the research is to study the conservation work of Balambu Mahalaxmi temple only. So the research will be limited to the following points:

- This research attempts to study the conservation of the temple mainly through the recent reconstruction of the temple.
- The conservation also focuses mostly on the

tangible aspects of the temple and the intangible aspects of the conservation are not studied but those related to the research were touched upon.

- The experts and members of the local reconstruction committee are considered major source of information in addition to the field studies.

7. Literature Review

7.1 Architectural Conservation

The word "conservation" has been defined in a variety of ways by authors and conservationists. For example:

According to the Burra Charter, Article 1, page 4, conservation may be defined as:

"All the processes of looking after a place so as to retain its cultural significance. It includes maintenance and may according to circumstances include preservation, restoration, reconstruction and adaptation, and will be commonly a combination of more than one of these."

The International Charter for the Conservation and Restoration of Monuments and Sites [9] defines conservation in articles 1–13, the first two of which are as follows:

"The concept of a historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development or a historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time. The conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of the architectural heritage."

In Esher [10], conservation is defined as

"... the careful management of a limited or vulnerable resource so as to ensure efficiency of use, while at the same time taking such steps as are necessary to ensure continuity of supply."

Conservation can be summed up as any action that has been taken to stop degradation and avoid decay in architectural heritage in case of architectural conservation. The main goal of conservation is to extend the life of the heritage so that future generations can benefit from it. However, due to different approaches to architectural conservation

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theory itself, different treatment approaches to architectural conservation are in practice around the world.

7.2 Process of Architectural Conservation

Typically the conservation process deals with the three main stages of documenting, analyzing and action. This can be seen in the process of conservation as given in the Burra Charter in three phases of understand significance, develop policy and manage in accordance with policy.



Figure 1: The Burra Charter Process of Architectural Conservation

Source: [11]

The process of conservation differs from a new construction project as in the conservation process a great deal more of analysis and investigation of existing conditions is done before action is taken [12].

Table 1: Phases of a conservation project

Phase	Stage
Planning	1. Preliminary Assessment
	2. Research
	3. Program Definition
Implementation	4. Schematic Design
	5. Design Development
	6. Construction Documents
Execution	7. Bid and Negotiations
	8. Construction and Contract Administration
	9. Commissioning

Source: [12]

7.3 Values in Architectural Conservation

The purpose of architectural conservation is to protect the heritage and its values. Different values can be attributed to a heritage and often these values can be in conflict with each other. *“The first values to be attributed to heritage places were historic and aesthetic”* [13]. Since then, efforts to identify and categorize the values that embody the sentiments, meanings, and purposes associated with the heritage have taken many different forms. When Australia ICOMOS published the Burra Charter [14], which acknowledged a new category of cultural values called social values, it marked a significant turning point in the evolution of heritage. These values were defined as *“the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group”* [15]. The following year English Heritage added the recreational and economic values to the heritage.

Table 2: Heritage Values in Architectural Conservation

Art Alois (1902)	History Reigl	ICOMOS Australia Burra Charter (1998)	English Heritage (1999)
Age		Aesthetic	Cultural
Historical		Historic	Educational & Academic
Commemorative		Scientific	Economic
Use		Social	Resource
Newness		Spiritual	Recreational
		Political	Aesthetic
		National	
		Cultural	

Source: [13]

7.4 Charters and Acts for Heritage Conservation

Since the introduction of the Venice Charter in 1964, many conservation guidelines have been developed and adopted by international organizations such as UNESCO and ICOMOS in the form of charters, recommendations, and resolutions [16]. Charters contain valuable guidelines on how to maneuver complicated matters such as when to conserve or restore and when to remove old restorations. In some cases, conservation work and investigations can even lead to finding out that certain objects have dubious,

possibly illegal provenances. Charters help to navigate the various aspects of dealing with cultural heritage at the international scale. The summary of the principles stated in the most important international documents regarding reconstruction are as follows:

Charter of Athens (1933): “In the case of ruins, scrupulous conservation is necessary, and steps should be taken to reinstate any original fragments that may be recovered (anastylosis); the new materials used for this purpose should in all cases be recognizable”

Charter of Venice (1964): (art. 15) “All reconstruction work should however be ruled out a priori. Only anastylosis, that is to say, the reassembling of existing but dismembered parts can be permitted. The material used for integration should always be recognizable and its use should be the least that will ensure the conservation of a monument and the reinstatement of its form” (art. 9) “respect for original material and authentic documents. It must stop at the point where conjecture begins, and in this case moreover any extra work which is indispensable must be distinct from the architectural composition and must bear a contemporary stamp. The restoration in any case must be preceded and followed by an archaeological and historical study of the monument” (art. 12) “replacements of missing parts must integrate harmoniously with the whole, but at the same time must be distinguishable from the original so that restoration does not falsify the artistic or historic evidence”

World Heritage Convention (1972): “That reconstruction is only acceptable if it is carried out on the basis of complete and detailed documentation on the original and to no extent to the conjecture”

Burra Charter of Australia ICOMOS: “Article 1.8: Reconstruction means returning a place to a known earlier state and is distinguished from restoration by the introduction of new material into the fabric Article 20. Reconstruction 20.1. Reconstruction is appropriate only where a place is incomplete through damage or alteration, and only where there is sufficient evidence to reproduce an earlier state of the fabric. In rare cases, reconstruction may also be appropriate as part of a use or practice that retains the cultural significance of the place 20.2. Reconstruction should be identifiable on close inspection or through additional interpretation”

World Heritage Operational Guidelines (2015): “Reconstruction of archaeological remains or historic

buildings or districts is justifiable only in exceptional circumstances” and “is acceptable only on the basis of complete and detailed documentation and to no extent on conjecture” To summarize,

- The principles for conservation by means of reconstruction mainly focuses on anastylosis i.e. the restoration of a ruined monument or building by reassembling fallen parts and, when necessary, incorporating new materials.
- Reconstruction should not be based on conjecture
- Use of new materials should be identifiable

7.5 Architectural Conservation in Nepal

The primary administration of architectural conservation in Nepal is the Department of Archaeology. However other different stakeholders such as municipality, community and international actors are also involved in conservation activities. Conservation takes place in often in collaboration with various organizations and sometimes involves financial support from the other organizations. This causes input to a conservation project from multiple stakeholders and development of different approaches to monument conservation. Voices of conservation with use of traditionally used materials only can be heard while some approach conservation such that modern materials to strengthen the structural integrity of the building is used.

In case of Nepal, however, the concept of cyclical renewal is also necessary to be considered. The idea of “cyclical renewal” has persisted in Nepal for generations as a means of coping with the destruction caused by recurrent earthquake disasters, which occur around every 80-100 years [2]. It refers to the replacement of broken parts and the reconstruction of damaged buildings. It is feasible to make modifications, extensions, or technological advancements that aim to modernize and strengthen the monuments, especially to increase their safety and seismic resistance. Additionally, embellishments and decorations may be added for aesthetic purposes or to correspond to prevailing taste. However, historical configurations should be honored. This keeps craftsmanship alive with the continued practice by providing creators of tangible heritage opportunities to perform their skills [8].

The Nepalese tradition of conservation is based on an authenticity manifested in a temple’s or its constituent elements’ design as well as in the skills and knowledge of craftsmen passed down from one

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generation to the next [8]. This is in contrast to the provision of “Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072”, phrased by the Department of Archaeology, that prescribes under paragraph 32 c the use of “uncarved elements resembling the original size, type and quality” in case evidence is lacking. Moreover, “no gods and goddesses, or other images may be carved based on conjecture” [17]. In such case decisions of embellishments and decorations are left to the demands of the “local residents” as mentioned in §13 of the Guidelines to avoid blank surfaces and to replicate deities, the iconographical details of which in most cases is common knowledge.

7.5.1 Legislation on Architectural Heritage Conservation in Nepal

Ancient Monument Act 2013 The ancient monument preservation act focuses on the declaration of monument areas for their preservation under the authority of the department of archaeology. It imposed a ‘building code’ for its ‘monument zones’ to direct its ‘development as well as heritage preservation’

Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072 The directory for conservation and reconstruction of earthquake damaged heritages was formulated after the 2072 earthquake and it focuses on the assessment and conservation of earthquake damaged monuments. According to the guidelines, the earthquake damaged monuments are evaluated and the monuments are categorized as monument completely destroyed, monuments partially destroyed and monument with minor damages. There are general guidelines for conservation that is applicable to all monuments. Under specific guidelines for monuments partially destroyed, it provides guidelines for study of structure and materials, detail documentation and reversible use of new materials. It also states that permission from the department should be granted for demolition of monuments. While the directory points to the importance of using traditional materials and technology for conservation works, it provides guidelines for use of appropriate modern materials if necessary with permission from the department of archaeology.

8. Study Area: Balambu Mahalaxmi Temple

The Mahalaxmi temple of Balambu is situated in the Kumari tole at the heart of the traditional settlement area of Balambu.

8.1 Historical Information

The temple is speculated to be commissioned by Balbahu [18] from whom the name of the village ‘Balambu’ is also said to be derived. According to Pruscha, [19] the temple was constructed in the 17th century. Several inscriptions can be found around and near the temple. According to the inscriptions, the lions were added in 1666 and the struts in 1704 [19]. Prior to the 2076 reconstruction, the last major renovation was in 1949 after the 1934 earthquake damage to the temple.

8.2 Architectural Features

The temple is a two tiered temple; 30’3” high with a base of 13’5” x 13’4” on the ground floor. The temple had wooden carved doors on the main entrance to the southern side. There are doors on three facades all except the northern façade which has a lattice window on the ground floor. The doors on east and western facades are simple wooden doors.



Figure 2: Mahalaxmi temple before and reconstruction

The upper two levels have lattice windows on all four sides. The brick walls are whitewashed. The jhingat tiled roof is supported by timber structure. A stone plinth surrounds the temple. A stone toran can be seen above the entrance of the temple. Two pairs of stone statues of lions can be found on either side of the entrance. The struts which support the two tile roofs are carved with Matrikas and Bhairab. Inside the temple, stone statues and stones representing deities are placed in a linear manner. The stone statue of Mahalaxmi is placed at the center.

9. Data and Analysis

9.1 Reconstruction of Mahalaxmi temple

After the 2015 earthquake caused damages to the temple, meetings were called among the locals that included members from Mahalaxmi guthis, political parties and other local members to discuss the earthquake damage and conservation needed for the heritage in Balambu. From the initial meetings, it was determined that the reconstruction of the Mahalaxmi temple was desired as other reconstruction projects were also going on after the earthquake. A committee called 'Mahalaxmi Purnanirman Samiti' consisting of seven members was established and they began efforts for the reconstruction of the temple in coordination with the local authority (ward no. 12 office of Chandragiri Municipality). Initially, the plan was to gather fund locally and the reconstruction of the temple to be overseen by the committee. After learning of the requirement of Department of Archaeology involvement in conservation of old temples, the committee and ward office approached the department with initiation through senior archaeology officer Jayram Shrestha.

The department of Archaeology after initial check recommended the reconstruction of temple as the structure was damaged after the earthquake. Cracks were seen in the interior of the upper floor and in addition to this the timber was rotten due to leaks on the roof. The reconstruction project started in 2076 B.S. The reconstruction was completed in Kartik of 2078 B.S. The design and construction contractor was overseen by the Department of Archaeology. The local committee was also involved in the construction supervision and checking the progress of the construction. In later phases, the committee was involved in the design of the decorative elements for the temple.

The majority of the budget was provided by the DoA and the financial contribution by the local is also seen according to committee president Sanjay Maharjan. The local authority which is the ward no. 12 of Chandragiri municipality contributed financially. The ward is involved in the construction of the temple premises. In addition to direct financial contribution, the locals also contributed by donating elements of the temple such as gold plate for the temple spire, northern window on the ground floor, eastern and western doors, jal nhekan on the eastern façade, stone posts for bells etc.

Table 3: Finance and decision making in the reconstruction

	Decision making	Finance
Department of Archaeology	Budget, design, construction work and construction supervision	NRs. 84 lakhs
Local authority (Chandragiri ward no. 12)	Approving of construction works in the premises	NRs.3.5 lakhs
Local people	Approving design	NRs.18 to 20 lakhs

9.2 Process of Reconstruction

Planning phase: From the preliminary assessment, it was found that the monument was significant as it was found to be more than 300 years old. During the feasibility research, the monument was identified in need of conservation after the 2075 earthquake. There were cracks found in upper floor and timber rot due to water leaks. It was then classified into partially damaged monument for repair according to reconstruction guidelines of 2072. The analysis of the building and its site along with historical research was done by the study of inscriptions and local information. But archaeological study of the site was not done. Architectural research was done to identify the building form, details and devising necessary conservation measures. The documentation of the existing structure was also done. Documentation of existing structure in forms of measured drawings (2 level floor plans, section, front elevation and rafter plan) and photographs was done.

Implementation phase: After study of the temple, the recommended conservation strategy was to reconstruct the temple building. The design for the reconstruction and the intended design details were proposed by the DoA. Initially, changes to temple design showing exposed brick and raised plinth was proposed but the design was changed to whitewashed and existing plinth height after protest from locals. Construction documents required were also prepared by the DoA. Plans on five height levels (including floor, rafter and joist plans), section, and front elevation with measurements were prepared. Changed rafter plan and addition of corner posts were shown in plans. Wall ties, sill and lintel level timber reinforcements shown in section.

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Execution: The DoA under the government of Nepal was responsible for calling tenders, funding and awarding the contract to the suitable bidder. Eligible bidders were ones with knowledge in conservation and traditional construction. The construction work was conducted by the constructor contracted by the DoA. The construction took place under the supervision of both the DoA and the local reconstruction committee. The demolition started in 2076 B.S. and reconstruction of temple was then commenced. The materials required were sourced and approved by the DoA which includes sal timber, bricks, surkhi mortar, water proof single plastic layer on roofs, telia tiles for floor and new jhingati on roofs. After the project, as built documentation and maintenance manual were not prepared.

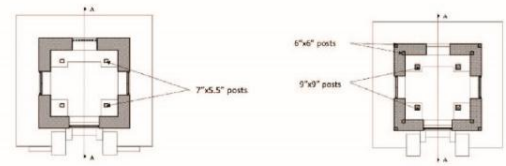


Figure 3: Ground floor plan old (left) and new (right) showing additional posts for reinforcement

Wall plates of timber were added on three levels along the wall height which also acted as sill and lintel for the windows and doors.

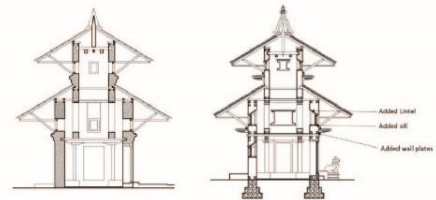


Figure 4: Section old (left) and new (right) showing wall plates added and increased depth of foundation

9.3 Changes made to temple during reconstruction

Although the location, orientation and configuration of the temple is not changed, various changes have been made to the design and material used in the temple in the reconstruction. The changes can be classified as follows:

9.3.1 Material changes

Building materials from the demolished structure was reused to an extent but new materials were used a lot. The jhingati tiles (21"x7.5"x1.5") on the roof were changed to smaller ones (7"x3.5"x0.5"). The additional timber used was sal (agrath) instead of the original salla. Sal was used for its preference for ease of carving. The mortar is also changed from mud to lime surkhi mortar. Use of dachi aapa instead of ma aapa on the exposed part of ground floor exterior can be seen. In addition to this, use of materials that were not traditionally found includes modern baked bricks and plastic water proof layer on the roofs.

9.3.2 Structural changes

Various structural changes were made to improve the structure of the temple building. This includes increasing foundation depth, increasing size of posts, addition of reinforcements to masonry walls on both floors and change in rafter plan with addition of rafters. Rafter plan changes and increase of post size is to accommodate the increased weight due to change in timber type from salla to agrath.

9.3.3 Decorative changes

Embellishments and decorative changes to the design were made as per the decisions of the local community and committee. These can be seen in the use of decorative brick layers in the plinth and exposed brick portion of the ground floor. The cornice is also changed from plain brick layers to carved wooden layers with addition of carved wooded eave ends called fyo. The old stone gajur is reused but is gold plated and additions of pataka and kusha are made to it. The doors and windows are ornately carved replacing the plain wooden ones before. The plain wooden doors of the main entrance to the south is reused but copper plated with carvings of astamangal on the copper plate.

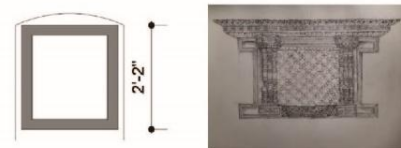


Figure 5: Northern window ground floor old (left) and new (right) showing embellishments in carving

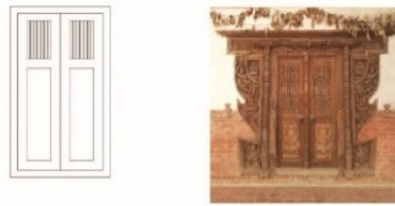


Figure 6: Side door old (left) and new (right) showing elaborate carving in new design

The number of struts in the lower roof remains 20 from old temple to new. For the upper roof the number of struts is reduced from 20 to 12. In the old design only 7 struts were carved on the lower roof and 4 were carved in the upper. The carved ones have images of matrikas and bhairabs. Most of the struts in the original were plain whereas all struts in the new building are carved with images of matrikas and bhairabs.

Metal lamp rail was removed. Metal posts for bells were replaced with stone ones. Metal illhan was added to both levels of roofs. Wind bells and hanging lamps (twaranchas) were added on roofs of both levels. The twaranchas were increased from 2 to 10 numbers. A jal nhekan was added to the eastern façade in place of two mirrors. Inside, the idols were removed and placed in a slightly changed position due to the increased size of posts.



Figure 7: Carved cornice and struts in the south east corner

10. Findings and Discussion

10.1 Changes in Temple Design

One of the major outcome of the local community involvement in reconstruction of Mahalaxmi temple was changes to the design to the temple made to update the aesthetics of the temple. Although efforts were made to retain the appearance of the temple similar to the past one with efforts made to keep the white walls instead of brick exposed, a lot of changes were made to the decorative elements of Mahalaxmi temple for the reconstruction. Most of the changes were made to update the aesthetics and add embellishments to the temple.

10.2 Reuse of Materials and Elements

Although some elements such as gajur, lion statues and main door were reused, majority of the construction using brick and timber used new materials. Also, no effort were made to reuse the old doors and windows, struts and jhingati harvested from the demolished structure.

Table 4: Reuse of Temple Elements

Elements	Reuse
Main door	Main door was copper plated and reused
Gajur	Gajur was gold plated and additions made to it
Stone lions	All four stone lions were reused
Stone toran	Stone toran was coated with protective layer and reused.

Table 5: Reuse of Materials

Materials	Old	Reuse
Timber	Columns and beams	Wall plates, window and door inner frames
Brick	Plinth, masonry wall and foundation	Walls inner layers
Stone	Plinth and foundation	Plinth and foundation

10.3 Confirmation of the Reconstruction to the Conservation Principles

The reconstruction process took place under the supervision of the department of Archaeology for which the Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072 is supposed to be followed.

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Due to the damages caused by earthquake and water leakage, the temple was decided to be reconstructed and documentation including photographs and drawings were done prior to demolition. For the reconstruction, study of damage caused by earthquake on the temple and architecture of the temple was done. The intangible heritage affected by the damage and valuation of the damage is required still. Documentation of the temple with its identification was done with proper measurements in form of architectural drawings. The temple structure itself was based on available measurements, configuration, position of openings, and placement of idols. Changes made were for the purpose of embellishing which were not based on available evidences. Use of traditional construction materials was done in the reconstruction however, use of exact materials previously used was not done such as the change in the timber type. Marble panels added to the front of the temple in previous renovation was removed during the reconstruction. With the approval of DoA, additions of timber reinforcements not visible from the outside were made.

The participation of the local community could be seen in the reconstruction. For the maintenance and periodic renewal of the temple, a local committee with funds raised from the local population has been established. Traditional materials for the use in reconstruction was sourced through the DoA. However, change in brick type with dissimilar quality to original brick used can be seen but not visible from the outside. The reconstruction took place without change in location or orientation with the permission of the department of archaeology and the agreement of local authorities and community.

The reconstruction was done after documentation and study of the temple however, the detail documentation to make the reconstruction identifiable is needed. The incorporation of new materials is not distinguishable from the old. The use of modern materials however is not visible from the outside. The reconstruction of the monument could have reused materials such as jhingati but was replaced with new ones. Existing struts were also replaced without structural study in favor of uniformity in design by using completely new ones. However, reuse of materials can be seen in terms of the bricks, stones and timber from the demolished temple building.

10.4 Change in Heritage Values due to Reconstruction

Due to the changes to the design and construction of the temple in the reconstruction, the values the heritage carried has changed.

Aesthetic value: Aesthetic value includes aspects of sensory perception. The addition to the decorative elements was done to add to the aesthetic value of the temple. Despite the additions, the temple retains the original appearance since the modern materials used are not visible from the outside. The white washed walls and exposed brick look of the original has been reconstructed. However, upon closer inspection, use of decorative bricks, carved struts and cornice that was not present in the old design becomes visible to the eye.

Historic Value: The temple gains the historic value from the historic existence from its 17th century construction till now. The historic value is retained through preserving its original form and materials. In case of Nepal where cyclical renewal is done, the historical character is conserved by continuation of the materials, form, technology and crafts. With the change in use of crafts altering continuation of its existing design, the historic structure and build are lost in the reconstruction.

Scientific Value: Traditional buildings of Kathmandu Valley possess significant interest to the scientific studies due to their use of materials and building techniques. The Balambu Mahalaxmi temple was not completely demolished due to the earthquake and significant damages can be attributed to rotting of timber due to water leakage. But during reconstruction, increasing depth of foundation was considered necessary and the existing foundation was disturbed. This caused scientific value to be lost as the functional foundation and building could be studied but instead was replaced.

Social and cultural Values: The social and cultural values are attributed to the temple by the local community and its people. The people have continued to value the temple as a place for social gatherings and community functions. The cultural aspects such as jatras and rituals are diligently performed by the people showing people still attribute cultural value to the temple.

10.5 Perception of Reconstruction

To understand the perceptions of reconstruction interviews were conducted with key informants from the local community and conservation experts. The perception of the reconstruction varied among the two groups of interviewed people. The local community members were satisfied with the reconstruction and considered the project a success. The community members considered the temple of importance due to its religious and cultural importance. The community members stated that the community itself was responsible for the conservation and maintenance of their heritage, the Mahalaxmi temple while recognizing that coordination and help from conservation authority was necessary. One respondent stated that the local participation was important for the success of this project. Similarly, the importance of institutions such as guthi and dware are also considered important for conservation. The reconstruction project is considered a success due to the community participation according to them. The community also feels the embellishments added was a positive development for the temple as seen in a respondent mentioning that the ornamentation to the temple design was necessary that was successfully achieved in this project. The community also feels the reconstruction validated due to the involvement and decision making of the department of archaeology in the project. The community generally feels the design decision to finish the exterior walls in white plaster instead of initial brick exposed façade a positive achievement. Most feel the appearance of the temple that they have seen throughout their lifetime should be maintained. Overall, the local community members felt the reconstruction process was satisfactory. After the completion as well, the reconstruction committee has been transitioned into a conservation committee utilizing the leftover funds from the reconstruction for future maintenance and conservation activities.

From the interviews with conservation experts however, the reconstruction did not follow proper procedure. For example, the foundation of the temple was excavated and deepened. The failure to the temple structure was not due to the existing foundation that had withstood the earthquake. Instead of reusing the foundation, the land was disturbed and any detail study regarding soil type, mortar use was not done. Use of modern materials should be done when traditional is no longer available. But the temple was reconstructed with use of modern materials such

as baked bricks despite the traditional ma aapa being available and used in some capacity here as well. While the local community were not concerned with documentation, conservation experts pointed out the importance of documentation for future reference and also to distinguish the reconstruction from the old construction. In many cases of conservation and this one the construction work itself is given priority over detail documentation. In the future it can cause problems with understanding the era of construction and authenticity. Another important factor to be considered in a case like this where the community is an important stakeholder, the rights of the community needs to be considered. Conservation has been carried out by community itself long before the administration and improvements deemed necessary by the community have been part of the conservation. Only now this method has gone awry due to use of inappropriate materials and methods such as concrete use in reconstruction.

11. Conclusion

The department of archaeology was involved in the reconstruction of the Mahalaxmi temple. This study shows that even with the involvement of department of archaeology, the reconstruction process presented problems and errors. Despite the DoA's involvement in the reconstruction, the department's own guideline of not reconstructing based on conjecture was not properly followed here. However, this study also shows that community participation can be found for conservation projects in communities such as Balambu. The study also highlights deviations from the conservation directions provided by the department of archaeology in the reconstruction process due to lack of awareness among the participants. The study shows that rights of the community and participation of the community should be given importance. But in the context of lack of conservation knowledge among the community members, conservation can cause loss in heritage values. Despite technical and financial involvement of Department of Archaeology, there is need of conservation awareness among the local residents especially when they are involved in the decision making process. The involvement of the community itself has been a positive aspect as a sustainable conservation and maintenance of the Mahalaxmi temple in future seems possible due to the ownership and responsibility people feel towards the temple due

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to their involvement in the conservation.

From this case it can be seen that the conservation guidelines needs to be context based. In this case, the guidelines were not followed as evident by the changes to the temple design that were due to the decisions of the community and the DoA allowed it. In cases like this where reconstruction is done where changes are preferred and done with traditional materials and methods, the balance between changes allowed by involvement of community and conservation principles followed needs to be devised in the context appropriate guidelines instead of out ruling them all.

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Annex 5: Presentation slides

THESIS

Topic:
"Conservation and Management of Mahalaxmi Temple at Balambu"

Submitted To:
Department of Architecture, IOE

Submitted By:
Rasana Shrestha
2076/M-arch./015



Introduction

Introduction

- According to the Department of Archeology, a total of 753 temples, shrines and monasteries across the country suffered damages from the 2015 earthquake (Bhattarai & Rawat, 2021).
- In case of Nepal, conservation of heritages is deemed important to people and conservation activities has been carried out by people through institutions such as Guthis as often architectural heritage is closely linked to cultural heritage of the people.
- After the department of archaeology was established in 1953, the institution is now responsible for the conservation of heritage sites and monuments in Nepal
- Involvement of different stakeholders such as the department of archaeology, municipalities, communities and international agencies in the conservation efforts after the earthquake has caused divergent approaches to the conservation (Haselberger & Krist, 2020).
- One such example of conservation is the Mahalaxmi temple at Balambu which began reconstruction in 2076.

Background

- Balambu is a village and former village development committee that is now part of Chandragiri Municipality in Kathmandu district.
- Balambu is 4.53 kilometers west of Kathmandu between the villages of Satungal and Kisipiri, about 470 meters north of Tribhuvan Highway.
- Balambu is one of the 50 historic settlements in Kathmandu valley (Tokyo National Research Institute for Cultural Properties, 2016) and one of the oldest settlements in Kathmandu Valley.
- After the 2015 earthquake, works have undergone for the conservation of heritages including reconstruction of the temples in the area.




Fig: Location of Balambu
Source: google maps

Background

- The Mahalaxmi temple at Balambu was one of the at risk heritage sites in Kathmandu Valley (GoN/NTNC, 2009).
- Mahalaxmi temple is one of the oldest temples in Balambu and Mahalaxmi is the tutelary deity of the settlement.
- The Mahalaxmi temple in Balambu has recently completed reconstruction under the supervision of Department of Archaeology after suffering damages in the 2015 earthquake.




Fig: Reconstruction of Balambu Mahalaxmi Temple
Source: (Jhanga Balambu, 2021)

Statement of the Problem

- The Mahalaxmi temple at Balambu is one of the at risk heritage sites (GoN/NTNC, 2009).
- While historic monuments in the historic settlements in Kathmandu are protected by the 'Ancient Monumental Preservation Act', a sufficient system does not exist to preserve the historic townscape (Tokyo National Research Institute for Cultural Properties, 2016).
- The heritage sites in the outskirts of Kathmandu are largely ignored and are subject to improper repair and reconstruction.
- The conservation approach in Nepal, most of which is adapted from international frameworks mostly originating in different contexts abroad - needs to be evaluated in local cultural contexts (Chapagain, 2008).
- There is no assessment of such a conservation process in order to analyze the issues and determine the failure or success and establish necessary conservation framework

Rationale of the Research
<ul style="list-style-type: none"> ➤ In case of Kathmandu valley, there are 16 heritage sites other than the world heritage sites that are at risk (GoN/NTNC, 2009) which includes the Balambu Mahalaxmi temple. ➤ Most of the focus of heritage conservation programs in Kathmandu has been towards the heritages sites in the core of the cities where the world heritage sites are (Chapagain, 2008). ➤ Monuments on the outskirts of the valley are largely ignored despite being of historical and architectural importance. The stress on monumental conservation often negates the equally important, less dramatic structures, historic areas and traditional social customs (Jaisiah, 1996) ➤ Such heritages are in states of disrepair or being repaired and reconstructed without following the proper policies of conservation in accordance to the DoA. ➤ It is also seen that the knowledge regarding the use of authentic materials in the conservation work is also lost or paid less attention as seen in reconstruction of various temples after the 2015 earthquake (Tiwari, n.d.). ➤ Responding to Nepal's diverse cultural contexts, the conservation policy in Nepal needs to count on local cultural institutions, cultural practices and economic bases (Chapagain, 2008).

Importance of the Research
<ul style="list-style-type: none"> ➤ Mahalaxmi temple of Balambu is one of the important cultural monuments in Kathmandu valley (ICIMOD, 2007). ➤ Heritage buildings are a valuable asset for society as they reveal the achievements of the people over the years (ElWahab, Bakr, & Raslan, 2018) ➤ It is the responsibility of the current generation to deliver the heritage in good shape for the generations to come (Lourenco, 2014). ➤ Conservation of built heritage is an important tool in city development, as well as in supporting the tourism industry and producing financial return. It also provides a sense of identity and permanency in a fast-changing world for coming generations (ElWahab, Bakr, & Raslan, 2018). ➤ Hypotheses of certain contexts of socio-cultural aspects are detachable and can be applied to other contexts (Lincoln and Guba, 1991) ➤ This study is helpful to future individual and policymakers to understand the conservation work of heritages and incorporate the information in future strategies and policies for conservation

Research Objectives
<ul style="list-style-type: none"> • The aim of this research to study this conservation work and analyze the recent reconstruction of Mahalaxmi temple with the main objectives: <ul style="list-style-type: none"> ➤ To study the process of conservation of Mahalaxmi temple building carried out during the reconstruction of the temple. ➤ Analyzing the elements and issues related to the conservation through reconstruction of Mahalaxmi temple.

Scope and Limitations of the Research
<ul style="list-style-type: none"> ➤ The scope of the research is to study the conservation work of Balambu Mahalaxmi temple only. ➤ Also, this research attempts to study the conservation of the temple mainly through the recent reconstruction of the temple. ➤ The conservation also focuses mostly on the tangible aspects of the temple and the intangible aspects of the conservation are not studied but those related to the research were touched upon. ➤ The documentation of the temple structure prior to demolition is based on photographs, field observations and limited documentation available by the conservation team. ➤ The experts and members of the local reconstruction committee are considered major source of information in addition to visiting the site hence the information is limited to these sources.

Literature Review
<p style="text-align: center;">Literature Review</p>

Architectural Conservation
<ul style="list-style-type: none"> ➤ Architectural conservation describes the process which material, historical and design durability of mankind's built architectural history is prolonged to last longer and to be able to sustain difficult conditions or to be kept sustainable, in general. ➤ Theories of Architectural Conservation ➤ Preservation/ Conservation: measures that would protect and maintain buildings in their current state, or would prevent further damage and deterioration to them <ul style="list-style-type: none"> ➤ John Ruskin and William Morris ➤ Building has to be maintained in original state with no modern additions ➤ Restoration: historic buildings could be improved, and sometimes even completed, using current day materials, design, and techniques. <ul style="list-style-type: none"> ➤ Eugène Viollet-le-Duc. ➤ E.g. restoration of Notre Dame by Viollet-le-Duc which included the addition of Le Stryge

Heritage Values in Architectural Conservation

➤ The purpose of architectural conservation is to protect the heritage and its values.

Art History Alois Reigl (1902)	ICOMOS Australia Burra Charter (1998)	English Heritage (1999)
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Age	Aesthetic	Cultural
Historical	Historic	Educational &
Commemorative	Scientific	Academic
Use	Social	Economic
Newness	Spiritual	Resource
	Political	Recreational
	National	Aesthetic
	Cultural	

Fig: Heritage Values in architectural conservation

Source: [Torre, 2013]

Characteristics of Heritage Values	
Always attributed	Never intrinsic
Always multiple	Never just one
Always mutable	Never Static
Incommensurable	Not comparable
Often in conflict	Sometimes incompatible

Heritage Values in Architectural Conservation

Heritage values	Defined by
Aesthetic Value	<ul style="list-style-type: none"> Sensory perception form, scale, color, texture and material of the fabric the smells and sounds associated with the place and its use
Historic Value	<ul style="list-style-type: none"> the history of aesthetics, science and society Age of heritage Influenced by, an historic figure, event, phase or activity site of an important historic event significance will be greater where evidence of the association or event survives in situ
Scientific Value	<ul style="list-style-type: none"> importance of the data involved, on its rarity, quality or representativeness degree to which the place may contribute further substantial information
Social Value	<ul style="list-style-type: none"> the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group
Cultural Value	<ul style="list-style-type: none"> Attributed by those who have an interest in a place

Source: [Torre, 2013], [ICOMOS Guidelines, 1999]

Architectural Conservation: Cultural Value

➤ As defined in article one of the World Heritage Convention
"Cultural heritage is understood to include monuments, groups of buildings and sites of cultural value"

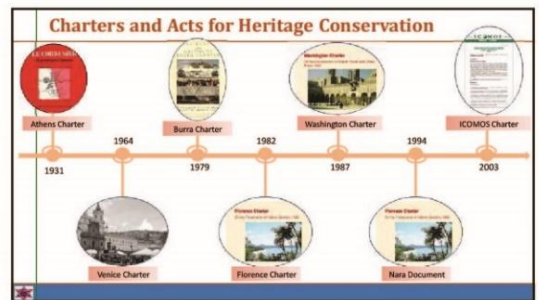
➤ **Tangible and Intangible Heritage**

➤ "Tangible Cultural Heritage" refers to physical artefacts produced, maintained and transmitted through generations in a society.

➤ Intangible Cultural Heritage" indicates 'the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their Cultural Heritage

➤ For conservation, creating a link between culture, intangible values and the built environment is important.

➤ A historical built structure is formed by certain tangible features that are the physical structure composed of the built structures and intangible values made of cultural activities and cultural expressions within built environments



Architectural Reconstruction Conservation Legislation: International

Athens Charter (1931)	Venice Charter (1964)	Burra Charter (1979, 2013)	Nara Document (1994)	World Heritage Operational Guidelines (2011)
<ul style="list-style-type: none"> Focus on anastylosis Permits judicious use of modern materials such as concrete But should be concealed and should preserve character of the monument 	<ul style="list-style-type: none"> Articles 15, 9 and 12 Allows the use of modern technique for conservation and construction, the efficacy of which has been shown by scientific data and proved by experience But must not change the layout or decoration of the building Addition and replacements should be distinguishable from the original 	<ul style="list-style-type: none"> Articles 1 and 20 Changes to a place should not distort the physical or other evidence it provides, nor be based on conjecture. In some circumstances modern techniques and materials which offer substantial conservation benefits may be appropriate. Reconstruction is appropriate only where a place is incomplete through damage or alteration. Reconstruction should be identifiable on close inspection or through additional interpretation 	<ul style="list-style-type: none"> Conservation of cultural heritage in all its forms and historical periods is rooted in the values attributed to the heritage. within each culture, recognition be accorded to the specific nature of its heritage values and the credibility and truthfulness of related information sources 	<ul style="list-style-type: none"> Reconstruction is acceptable only on the basis of complete and detailed documentation and to no extent on conjecture

Architectural Reconstruction Conservation Legislation: Nepal

➤ **Ancient Monument Preservation Act -2013**

- The Department of Archaeology shall conserve the ancient monuments and archaeological sites which are important from national and international point of view.
- Declaration of monument area is one of the most important factors in conservation of monument. As described in Ancient Monument Act 2013 ancient monument, object, and curio are equally important.

➤ **Basic Guidelines for the Preservation and Rebuilding of Monuments damaged in the Earthquake, 2072**

➤ **Section 1: General Guidelines**

General Guidelines	Provision of guideline
5: Rights and responsibilities	<ul style="list-style-type: none"> Right of department of archaeology over conservation
6: Provision of means	<ul style="list-style-type: none"> Provision of means overseen by department of archaeology
7: Damage evaluation	<ul style="list-style-type: none"> evaluation of damage that includes damage to physical and intangible aspects
8: Priority in conservation	<ul style="list-style-type: none"> priority to monuments and heritages sites based on the seriousness of damage
9: Documentation	<ul style="list-style-type: none"> By means of writing, drawing, photos, sketches and visual means.
10: Conservation based on available evidences	<ul style="list-style-type: none"> conservation of heritages and monuments should be based on available evidences and not on speculation.

Architectural Conservation Legislation: Nepal

General Guidelines	Provision of guideline
11: Conservation planning	• conservation planning for any heritage should be done with detail study of the heritage, past conservation works and analysis.
12: Use of traditional materials and technology	a) Use traditional materials and technology b) Use of modern appropriate material not visible from outside and reversible with permission
13: Local participation	• involvement in various stages of conservation should be ensured
14: Ownership	• Based on the ownership of the heritage, all stakeholders will be involved in the conservation.
15: Maintenance and cyclical renewal	• For sustainable conservation, periodic observation, maintenance works and funding shall be organized.
16: Risk management	• Measures against disasters
17: Heritage Impact Assessment	• Assessment of impact of new development
18: Conservation of living heritage	• Intangible heritage conservation

Architectural Conservation Legislation: Nepal

General Guidelines	Provision of guideline
19: Traditional and adaptive reuse	• Traditional use or suitable reuse based on community
20: Installation of modern facilities	• Installations should not impact the overall form of the building.
21: Material sourcing and quality	a) Quality control for both traditional and modern materials shall be assured by the department. b) Quality timber sourced from within the country should be used. Timber used should withstand the weather and be suitable for carving.
22: Skilled workers and trainings	• Skilled workers shall be employed and new workers can be trained as well.
23: Oversight and quality control	• The quality of materials used and quality of work checked by the department
24: Study and investigation	• Scientific study and earthquake resistance measures study

Architectural Conservation Legislation: Nepal

➤ Section 3: Guidelines for Monuments
➤ Guideline 32: Provisions for monuments partially destroyed

Guidelines	Provision of guideline
32. a	• Partially destroyed: requires structural intervention
32. b	• structure and materials should be scientifically studied
32. c	• Documentation with drawings, writings, photographs etc.
32. f	• Use of new materials should be reversible.
32. e	• permission from the department should be granted for demolition
32. f	• permission from the department should be granted for location change

Concept of Cyclical Renewal

➤ Cyclical renewal of monuments and rights of community
➤ In order to cope with the destructive impact of recurring seismic events, occurring approximately every 80-100 years, the concept of 'cyclical renewal' has been sustained in Nepal over centuries (Haselberger & Krist, 2020).

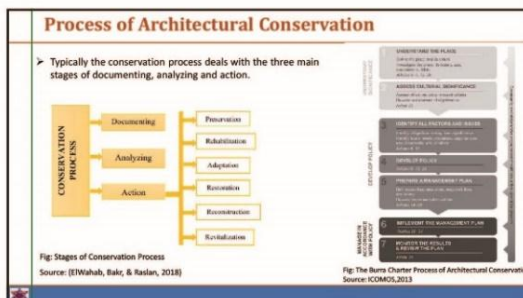
➤ It means the rebuilding of damaged structures and replacement of damaged pieces under which adaptations are possible and additions or improvements in material and technology that aim to upgrade and reinforce the monuments, primarily to achieve greater earthquake resistance and increased safety.

➤ Embellishments and decorations can also be added for aesthetic reasons or to correspond to prevailing taste while honoring historical configurations

➤ This keeps craftsmanship alive with the continued practice by providing creators of tangible heritage opportunities to perform their skills.

➤ In case of Nepal, there is a long tradition of conservation of heritage by the people themselves. There are festivals such as *sithi nakha* that celebrate this.

➤ With the conservation of heritages by community themselves, the decisions of embellishments and decorations are left to the demands of the local residents



Process of Architectural Conservation

➤ Phases of a Conservation Project

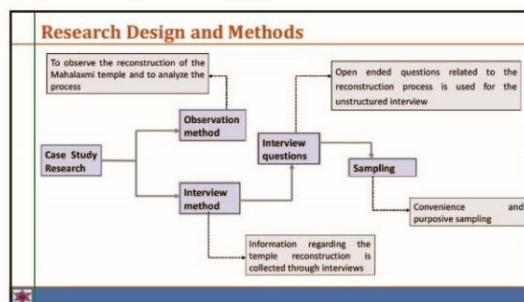
Phase	Stage
A. Planning Phase	1. Preliminary Assessment
	2. Research
	3. Program Definition
B. Implementation Phase	4. Schematic Design
	5. Design Development
	6. Construction Documents
C. Execution	7. Bid and Negotiations
	8. Construction and Contract Administration
	9. Commissioning

Source: Adapted from Duguay, 1992

Research Methodology

Conceptual Framework

- **Case Study Research:** to gain concrete, contextual, in-depth knowledge about a specific real-world subject.
- **Pragmatic paradigm** which uses the philosophical and/or methodological approach that works best for the particular research problem that is being investigated
- **Ontology:** The ontological claim of the research is that in the conservation process, different aspects and issues of reconstruction of the temple are present.
- **Epistemology:** This research intends to produce knowledge about the conservation process adopted in the recent reconstruction of the temple



Research Methods: Observation

- Information regarding the reconstruction of the temple was collected through field visit observations.
- Observation of physical traces is a particularly useful techniques in architecture and urban design (Data Collection I: Observational Techniques, 2003).
- **Observation**
- The information regarding the temple building is collected under the following categories according to guide provided by Sanday (1978).
- **Definition and Form**
 - Location
 - Building description
- **Cultural Aspects**
 - Architectural qualities
 - Historical Information
 - Religious Aspects
- **Construction**
 - Walls, roof, external decorative elements, doors, windows

Research Methods: Interview

➤ Basic information types, conceptual constructs and variables in the interview

Information Type	Construct Dimensions	Variables
Knowledge of the heritage based	Historical	History of temple, related myths and stories
	Physical	Building, location, building mass/form, materials, architectural details and construction techniques (before and after reconstruction)
	Economic	Finance and management
	Process	Decision making, relevant policies and regulations, implementation and management
Values, opinions and thought process based	Political	Committees, local authorities involvement and control
	Cultural religious	Main cultural and religious events, festivals and celebrations, sacred practices
Knowledge on conservation based	Social	Community use, relationships
	Process	To check validation of conservation methods used
	Physical	To analyze building techniques, materials used

➤ Open ended answers were recorded for information regarding the conservation analysis

➤ ATLAS.ti was used for interview transcribing and qualitative analysis.

Source: Adapted from Ahmed, 2012, p.27

Research Methods: Interview Sample Questions

- **About temple and Reconstruction**
 - What was the reason for the reconstruction of the temple?
 - Was there any changes made to the design of the temple (plan, structure, windows, roof, doors and decorative elements)?
 - Was any material reused from the demolished temple structure?
 - For new materials used, what sort of considerations were made (such as using the same type of wood, brick or stone as the previous structure)?
 - What is your view on changes made to the original design of the temple?
 - Were the local authorities involved in the project?
 - What is your opinion of local public participation in the project?
- **Perception of reconstruction among locals**
 - Describe the status and importance of Mahalaxmi temple in your opinion.
 - What was your involvement in the reconstruction of Mahalaxmi temple?
 - Who do you think is responsible for the conservation of the temple?
 - Do you wish to be a part of conservation committee for the Mahalaxmi temple in the future?
 - Are you satisfied with the reconstruction of the Mahalaxmi temple?
- **Perception of reconstruction from conservation experts and professionals**
 - What are your views on changes made to the design of the temple?
 - Should changes to design be allowed in case of conservation of architectural heritage in any context?
 - Is the current approach to heritage conservation by the conservation authority (DOA) sufficient?
 - In case of Mahalaxmi temple of Balambu changes were due to the demands of the local community. How can the conservation effort be regulated in future cases?

Balambu Mahalaxmi Temple

- **Architectural Features**
- The temple is a two tiered temple.
- The temple has wooden doors on three façades all except the northern façade which has a lattice window on the ground floor.
- The upper two levels have plain windows on all four sides.
- The brick walls were whitewashed.
- The tiled roof is supported by timber structure.
- *Tudals* can be seen on all sides on both upper levels.




Fig: Mahalaxmi Temple

Balambu Mahalaxmi Temple

- A stone plinth surrounds the temple. A stone toran with *astamatruka* can be seen above the entrance of the temple.
- Two sets of stone statues of lions can be found on either side of the entrance.
- Inside the temple, stone idols representing deities are placed in a line. The stone statue of Mahalaxmi is placed at the center.




Fig: Mahalaxmi Temple stone toran above the entrance




Fig: Stone idols inside Mahalaxmi temple




Fig: stone lions in front of the entrance

Balambu Mahalaxmi Temple: Intangible Heritage

- **Mahalaxmi Jatra**
 - Bajdashain
 - Sithi Nakha
- Ritual of muka for Mahalaxmi statue
- An inscription belonging to the era of Lichhavi king Shivadeva II from 129 B.S. found just outside the north of the village near the Indramati River mentions the celebration of jatra in the village (Bajracharya, 2030 cited in Siroestha, 2074).
- **Other rituals and festivals**
 - Lakhe dance
 - Krishna astami
 - Gai jatra
 - Niya puja- by thakali
 - Dashain (cleaning (by deva guthi))
- **Relevant structures**
 - Muka chhen
 - Hiti ga




Fig: Lakhe dance




Fig: Tarahau jalcha during Krishna jatra




Fig: Mahalaxmi jatra

Balambu Mahalaxmi Temple: Intangible Heritage

- **Myth and ritual of go ja: chyau**
 - The ritual is done due to the myth of Mahalaxmi goddess helping to solve the problem of demon in the nearby village of Kisipidi
 - Every year on the day of *sithi nakha* a procession from Kisipidi arrives to bring offerings of go ja: to the Balambu Mahalaxmi temple




Fig: Muka being brought out from muka chhen for sithi nakha




Fig: Procession arriving from Kisipidi for go ja: chyau ritual

Balambu Mahalaxmi Temple: Intangible Heritage

- **Social use of space**
 - Temple premises are used by locals for everyday social gatherings
 - Community meetings and gatherings are organized in temple premises
 - People organize *vves* in the temple premises



Fig: samay baj on occasion of yemya punhi



Fig: dya vve in front of the temple



Fig: program in front of the temple

Research Findings

Management of Mahalaxmi Temple

- The day to day management and conservation works for the Mahalaxmi temple are mainly carried out by the various *guthis* in Balambu and *naya* group of Balambu.
- The *tarhan guthi* is mainly involved as the *thalali* of this *guthi* is appointed *pujari* who conducts the daily cleaning and *nitya puja* every morning.
- The *dwa guthi* is responsible for the yearly cleaning of the temple and surrounding fifteen days before *ghatashapana*.
- Other *guthis* such as *ja pakegu guthi*, *kha: guthi*, *Sinha guthi* are also involved in management of the temple




Fig: Maintenance of drainage around Mahalaxmi Temple organized by local guthi

Conservation of Mahalaxmi Temple

- The conservation of Mahalaxmi temple was managed by *guthis* before the establishment of Department of Archaeology.
- Many conservation activities or addition to the temple structures were also often contributed by devotees. According to a medieval inscription near the temple, the *Ton* statues were added to the temple by one *Gunsingh Bhare* in 1666.
- The latest major act of conservation was the reconstruction of temple after the 2015 earthquake.
- Initiated in 207285 after the earthquake
- Reconstruction work started in 207685 and completed in Kartik of 207885




Fig: Mahalaxmi Temple after demolition for reconstruction

Balambu Mahalaxmi Temple Reconstruction

- **Process of reconstruction**
- The reconstruction was supervised by the Department of Archaeology
- 1. **Planning Phase:**
 - **Preliminary assessment:** significant, more than 300 yrs. old
 - **Feasibility research:**
 - Cracks found in upper floor and timber rot due to water leaks
 - Classification into partially damaged monument for repair according to reconstruction guidelines of 2072
 - **Historical research:** inscriptions studied, archaeological study not done
 - **Architectural research:** Documentation of existing structure in forms of measured drawings (2 level floor plans, section, front elevation and rafter plan) and photographs




Fig: Mahalaxmi Temple cracks on upper floor after earthquake

Balambu Mahalaxmi Temple Reconstruction

- **Process of reconstruction**
- 2. **Implementation Phase:**
 - **Schematic design:**
 - Reconstruction of temple was recommended as strategy
 - **Design development:**
 - Changes to temple design showing exposed brick and raised plinth was proposed first
 - Changed to whitewashed and existing plinth height after protest from locals
 - **Construction documents:**
 - Plans on five height levels (including floor, rafter and joist plans), section, front elevation with measurements
 - Changed rafter plan, addition of corner posts and wall ties shown in plans
 - Wall ties, sill and lintel level timber reinforcements shown in section




Fig: Mahalaxmi Temple during demolition

Balambu Mahalaxmi Temple Reconstruction

- **Process of reconstruction**
- 3. **Execution Phase:**
 - **Bid and Negotiations:**
 - DoA under government of Nepal was source of bid and funding
 - Eligible bidders were ones with knowledge in conservation and traditional construction
 - **Construction and contract administration**
 - Onsite supervision by DoA
 - Demolition started in 2076 B.S. and reconstruction of temple
 - Materials sourced and approved by the DoA (includes soil timber, bricks, *surkhi* mortar, water proof single plastic layer on roofs, tiles)
 - **Commissioning**
 - As built documentation and maintenance manual were not prepared




Fig: Mahalaxmi Temple during reconstruction

Balambu Mahalaxmi Temple Reconstruction

- **Elements of reconstruction**
- 1. **Decision making**
- The reconstruction was supervised by the Department of Archaeology along with a local seven member committee called *Mahalaxmi Punarnirman Samiti*.
- 2. **Finance**
- The reconstruction was financed by Department of Archaeology, local authority and contributions from local community.

	Decision making	Finance
Department of Archaeology:	Budget, design, construction work and construction supervision	84 lakhs NRs.
Local authority:	Approving of construction works in the premises	3.5 lakhs NRs.
Local people:	Approving design	18 to 20 lakhs NRs.

Balambu Mahalaxmi Temple Reconstruction

3. Public Participation

- Consultation and meetings:
 - Organized by reconstruction committee: Consulted about rituals for dismantling (by pujari), existing carved elements (woodcarving experienced), conducting rituals while under construction (naya)
 - Mass gatherings: Discussion of design proposed
- Financial contribution:
 - Monetary contributions
 - Contributing elements for construction (includes window, doors, bells, gold for gold plating etc.)






Fig: Local people helping out in the construction work

Balambu Mahalaxmi Temple Reconstruction

3. Public Participation

- Skill and labor input:
 - Locals who lived near the temple helped out by carrying materials, doors and windows from nearby *kat ghar* to temple
- Use of local skilled labor:
 - Local company of wood carvers were sub contracted to provide all the necessary carved elements for the temple (Includes 8 windows, 2 doors, 32 struts and cornice on 2 levels)
 - Member of the company carved and provided eastern door out of his own pocket
 - One community member experienced in wood carving was consulted regarding the old *tudals* for reuse considerations initially. The community member carved and donated lattice window for northern side of the ground floor




Fig: Workers carving tudals for Mahalaxmi temple in the nearby kat ghar

Balambu Mahalaxmi Temple Reconstruction

4. Challenges of Reconstruction

- Sourcing of the building materials was slowed down due to the covid-19 pandemic
- Delay in construction time by almost 6 months
- Due to lack of conservation knowledge among the people, the simple design conserving the original proposed by the DoA was met with resistance from the local community.



Fig: Mahalaxmi temple under construction

Comparison between Old and New Temple buildings

1. Foundation

	Construction Style	Materials Used
Old	Stone in mud mortar (12" depth)	Stone, mud
New	Stone in lime concrete (1:2-4) lime, sand and aggregate	Stone, lime, sand, aggregate

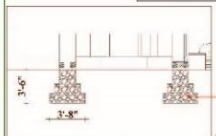


Fig: Foundation detail new

Comparison between Old and New Temple buildings

2. Plinth

	Construction Style	Materials Used
Old	Stone masonry in mud mortar	Stone, mud
New	Brick and stone masonry in lime, sand and surkhi mortar (1:1:1); common brick soiling	Tella tile, Stone, Bricks (ma aspa, kasimo and nagol), lime surkhi mortar

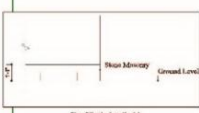
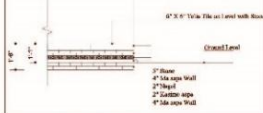



Fig: Plinth detail old

Fig: Plinth detail new

Comparison between Old and New Temple buildings

3. Ground floor Wall Exterior

	Construction Style	Materials Used
Old	Brick masonry in mud mortar	Stone, mud
New	Brick masonry in lime, sand and surkhi mortar (1:1:2); ma aspa interior layer and dachi aspa exterior layer	Bricks (ma aspa, dachi aspa, kasimo and nagol), lime surkhi mortar

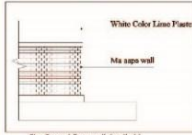
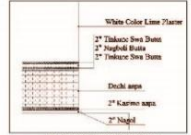
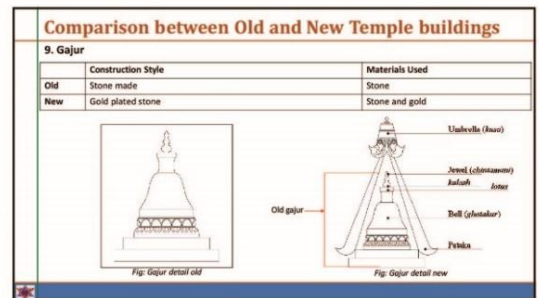
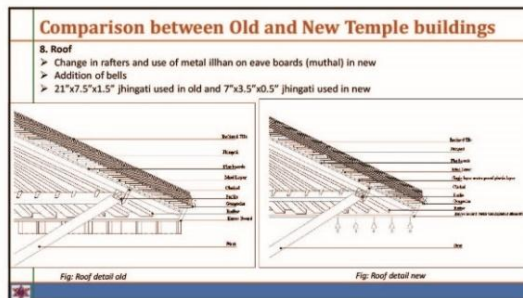
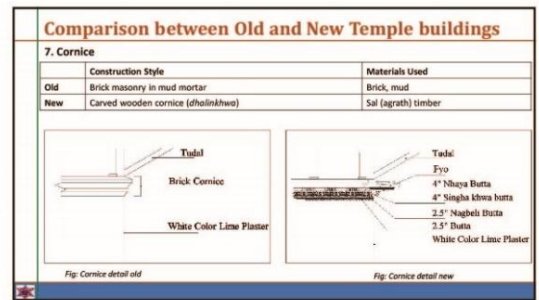
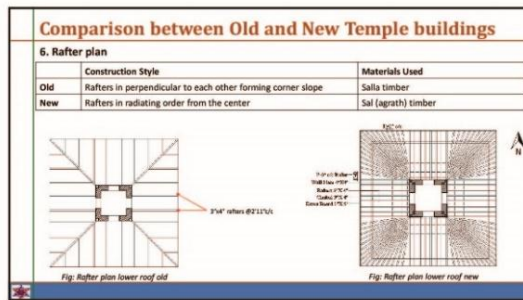
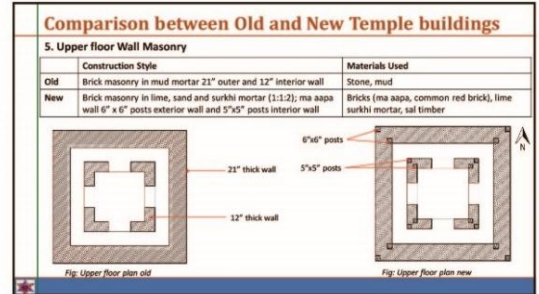
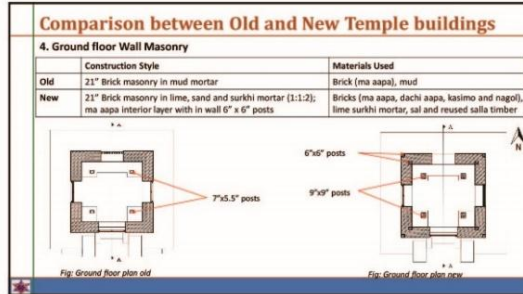



Fig: Ground floor wall detail old

Fig: Ground floor wall detail new



Comparison between Old and New Temple buildings

10. Doors

	Construction Style	Materials Used
Old	Plain wooden doors	Salla wood
New	Main door: reused and copper plated; side doors new and carved	Sal (agrath) wood and reused salla wood

Fig: Main door old Fig: Main door new Fig: Side door new Fig: Side doors old

Comparison between Old and New Temple buildings

11. Windows

	Construction Style	Materials Used
Old	Plain wooden with metal bars on ground floor	Salla wood
New	New and carved windows	Sal (agrath) wood and reused salla wood

Fig: Ground floor window old and new Fig: First floor window old and new Fig: Top floor window old and new

Balambu Mahalaxmi Temple Reconstruction

12. Wall plates, sill and lintel

Fig: Section old Fig: Section new

Labels: Added Lintel, Added sill, Added wall plates

Comparison between Old and New Temple buildings

13. Struts (Tudals)

	Construction Style	Materials Used
Old	<ul style="list-style-type: none"> 20 no.s lower roof; 7 are carved 20 no.s upper roof; 4 are carved Carved ones have images of matrikas and bhairabs 	Salla wood
New	<ul style="list-style-type: none"> 20 no.s lower roof 12 no.s upper roof all struts are carved with images of matrikas and bhairabs; 4 corner struts known as shordulo has carving of hybrid animal 	Sal (agrath) wood

Fig: Struts south eastern corner lower roof new

Label: Shordulo with carving of hybrid animal

Balambu Mahalaxmi Temple Reconstruction

14. External decorative elements

- Metal lamp rail was removed.
- Metal posts for bells were replaced with stone ones.
- A jal nhekan was added to the eastern façade in place of two mirrors.

Fig: Exterior decorative elements changes

Balambu Mahalaxmi Temple Reconstruction

15. Internal decorative elements

- Metal decorative ceiling was added to the ground floor interior.
- Stone post for bell was added.
- The mud floor was replaced with terra tile floor.

Fig: New stone bell post and terra tile floor Fig: new metal decorative ceiling

Balambu Mahalaxmi Temple Reconstruction

16. Internal decorative elements

- Stone idols placement positions changed due to increase in column size




Fig: Stone idols placement before and after reconstruction

Data Discussion and Analysis

Issues of Reconstruction

1. Changes to Design

1.1 Aesthetic changes

- Embellishing of doors, windows, cornices, gajur and struts
- Decorative brick use in plinth and ground floor exterior
- Addition of wooden eave ends (fyo), metal ilhan, jal nhekan, wind bells on roof
- Tile floor for interior and plinth
- Copper plating with astamangaal on front doors




Fig: Mahalaxmi temple before and after reconstruction

1.2 Structural changes

- Increase in foundation depth
- Adding wall plates and posts in walls
- Increased size of four main posts
- Change in rafter plan

Issues of Reconstruction

1.3 Material changes

Use of new materials	Use of modern materials
<ul style="list-style-type: none"> • New jhingoti tiles on roof • Use of lime surkhi mortar instead of mud mortar • Use of sal instead of sala for new timber • Gold for plating gajur • Copper for plating front doors • Tola tiles for ground floor and plinth floor • Decorative bricks 	<ul style="list-style-type: none"> • Common baked bricks in interior leaf of walls • Plastic water proof layer on roofs




Fig: Different tiles used in the reconstruction

Fig: Copper plated southern (front) doors and stone lions and toran at the entrance

Issues of Reconstruction

2. Reuse of Materials and elements

Materials	Old	Reuse	Elements	Reuse
Timber	Columns and beams	Wall plates, window and door inner frames	Main door	Main door was copper plated and reused
Brick	Plinth, masonry wall and foundation	Walls inner layers (about 85% mo and sapo reused)	Gajur	Gajur was gold plated and additions made to it
Stone	Plinth and foundation	Plinth and foundation	Stone lions	All four stone lions were reused
			Stone toran	Stone toran was coated with protective layer and reused.




Fig: Different tiles used in the reconstruction

Fig: Copper plated southern (front) doors and stone lions and toran at the entrance

Confirmation of Reconstruction to Conservation Guidelines, 2072

➤ **General guidelines**

Guideline	Provision	Extent followed by reconstruction
Guideline 7	• evaluation of damage that includes damage to physical and intangible aspects	<ul style="list-style-type: none"> • Study of damage to temple was done. • Valuation of damage to intangible heritage is not done.
Guideline 8	• Documentation by means of writing, drawing, photos, sketches and visual means.	• Documentation done measurements in form of architectural drawings and photographs
Guideline 10	• conservation of heritages and monuments should be based on available evidences and not on speculation.	<ul style="list-style-type: none"> • temple structure itself was based on available measurements, configuration, position of openings, and placement of idols. • Changes made were for the purpose of embellishing and not based on available evidences
Guideline 12 a	• Use traditional materials and technology; reverse past inappropriate use	<ul style="list-style-type: none"> • Number of struts is changed against available configuration • Use of traditional construction materials was done in the reconstruction • use of exact materials previously used was not done such as the change in the timber type. • Marble panels added to the front of the temple in previous renovation was removed

Perception of Reconstruction

- > Perception of conservation experts
- > Importance of documentation
- > Careful considerations should be taken for documentation of the materials, type of materials, measurements and layering and age of the structure.
- > Changes made to the structure should be documented for future references and distinguishing from the previous construction
- > Use of new materials
- > Use of new materials should be allowed in the context of absence of old materials only. The new materials used should be of same character to the old or the construction should be reversible
- > Reconstruction and changes to the heritage should first be approved by conservation authority which is the department of archaeology in this case. Major design changes based on conjecture in which case the heritage can be considered a new construction instead of reconstruction should not be allowed.

Perception of Reconstruction

- > Perception of conservation experts
- > Rights of the community
- > there is a system of cyclical renewal and every 100-150 years the materials or sometimes the structure are replaced. The heritage is enlisted as world heritage and shows that there is a system of conservation by the Nepali people.
- > This can be seen in the designated day for yearly maintenance of temples by the people with celebration. There is an established precedent of maintaining authenticity in conservation despite changes in the context of conservation in Nepal. Elements are replaced only when necessary and includes reuse of materials. Reconstruction is done in such a manner that heritage values are preserved.
- > Demands of changes that arise from within the community should be addressed. However, the community should be educated that they make the right decisions.
- > Throughout the history, proof of construction in different eras can be seen and the present community also have rights to contribute their construction to the heritage.
- > Considering the earthquake risk in Nepal, any improvements against earthquake failure should be implemented by technology available now.

Issues of Reconstruction

3. Change in heritage values due to reconstruction

Heritage values	Defined by	Change in values
Aesthetic Value	<ul style="list-style-type: none"> • Sensory perception • Form, scale, color, texture and material of the fabric • the smells and sounds associated with the place and its use 	<ul style="list-style-type: none"> • Addition of decorative elements • Form, scale and color remain same • Change in materials and texture with use of decorative bricks, cornice details and carving of doors and windows • retains the original appearance since the changed materials (modern baked bricks) used are not visible from the outside
Historic Value	<ul style="list-style-type: none"> • the history of aesthetics, science and society • Age of heritage • Influenced by ,an historic figure, event, phase or activity • site of an important historic event • significance will be greater where evidence of the association or event survives in situ 	<ul style="list-style-type: none"> • historic value from the historic existence from its 17th century construction till now • historical character is not conserved by continuation of the materials, technology and crafts • change in use of crafts altering continuation of its existing design

Issues of Reconstruction

3. Change in heritage values due to reconstruction

Heritage values	Defined by	Change in values
Scientific Value	<ul style="list-style-type: none"> • importance of the data involved, on its rarity, quality or representativeness • degree to which the place may contribute further substantial information 	<ul style="list-style-type: none"> • Archaeological information was lost due to excavation of foundation and no detail study • Since the temple was not completely destroyed in the earthquake, the structural system and foundation possessed information • Instead the structure and foundation were changed
Social and cultural value	<ul style="list-style-type: none"> • the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group • Attributed by those who have an interest in a place 	<ul style="list-style-type: none"> • Attributed by those who have an interest in a place

Cultural Value: Intangible Heritage after Reconstruction

- > Rituals and festivals
 - > Chemo puja done after completion of reconstruction
 - > Balmu Jatra 2077 not celebrated due to demolition of the temple
 - > Go ju chyou 2078 being done outside due to the temple being under construction
 - > Continuation of rituals and festivals
- > Social and cultural use of space
 - > Gatherings such as dya wwe, samay baji etc. have been organized by the community




Fig: Chemo Puja




Fig: Dya wwe 2079




Fig: Go ju chyou 2078 being done outside due to the temple being under construction

Conclusion and Recommendations

Annex 6: Plagiarism Check Report

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