

NARAYAN TEMPLE

KATHMANDU DARBAR INITIATIVE

A JOINT PROJECT OF
HMG DEPARTMENT OF ARCHAEOLOGY
AND
KATHMANDU VALLEY PRESERVATION TRUST

FINAL REPORT

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KATHMANDU VALLEY PRESERVATION TRUST
JUNE 2004

The Kathmandu Valley Preservation Trust is proud to announce the completion of the restoration of Narayan Temple; one of the many projects of “Kathmandu Darbar Initiative 2000-2004”, on April 2004. On behalf of the Trust, we wish to thank all our generous supporters.

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Robert W. Wilson Challenge to Conserve our Heritage Grant (USA)

World Monuments Fund (USA)

German Development Service (DED)

Kathmandu Valley Preservation Trust (USA)

Implemented by

Kathmandu Valley Preservation Trust

In cooperation with

His Majesty's Government Department of Archaeology (DoA)

Kathmandu Metropolitan City, Kathmandu

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Special Thanks to

Mr. Keshab Sthapit, Ex-Mayor, Kathmandu Metropolitan City
Mrs. Riddhi Baba Pradhan, Ex-Secretary, Ministry of Culture, Tourism and Civil Aviation
Mr. Kosh Prasad Acharya, Director General, DoA
Mrs. Shova Shrestha, Ex-Director General, DoA
Mr. Bikash Bhakta Shrestha, Ex-Chairman, Ward No. 25
Mr. C.P. Tripathi, Project Coordinator, DoA
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Mr. J. C. Kasti, Engineer DoA
Mr. Tej Ratna Tamrakar, Chief, Hanuman Dhoka Palace
Mr. Gyan Krishna Shrestha, Representative, Ministry of Finance
Mr. Robert Silman, Robert Silman Associates (USA)

TABLE OF CONTENTS:

1. Introduction
2. Project Framework
3. Documentation Process
4. Regaining the Historic Configuration
5. Restoration Process
6. Public Awareness and Training Activities
7. Photographic Documentation
8. Drawing Documentation of Existing and Restored Conditions
9. Chronology of Works



above: Narayan Temple before restoration, as seen from the north east side . The structure is 1936 reconstruction, which was not according to the historic configuration. It was in dilapidated condition since many years and was in urgent need of restoration program. Photo: Raju Roka, September 2002.

below: The restoration of Narayan Temple to its historical configuration was completed in April 2004. It is the second project to be restored under KVPT's ambitious "Kathmandu Darbar Initiative" scheme. Photo: Raju Roka, April 2004.

1. INTRODUCTION

Description

Located in the World Heritage Site, Narayan Temple, one of the most prominent temple structure in the premises. Though its configuration had been drastically altered after the 1934 earthquake, the temple preserves most of its original wood carvings. Donated as a state temple by a royal patron, this traditional three tiered temple dedicated to god Vishnu is based on a square ground floor plan, raised on four stepped plinth. The three roofs are supported by decorative, carved timber struts, which are original to the structure. These struts depicting the various incarnations of god Vishnu and *Salabhanjika*, some of the finest examples of the late Malla period wood carvings.

There was no evidence of repair or restoration before 1934 earthquake. The entire temple structure collapsed up to the plinth level during the earthquake. It was reconstructed two years after earthquake which is evident from the inscription on the bricks used for construction of the walls.

The conservation architects for the project, Erich Theophile and Rohit Ranjitkar interviewed Mr. Surya Jung Thapa, an engineer responsible for the 1934 reconstruction in Kathmandu Darbar Square, in 1995. According to him, all the upper roof members from the temple were unusable and thus, some of the struts salvaged from the damaged temple near by were used. The structure was rebuilt with little attention to the historic detail, using salvaged elements and is not according to the historic configuration.

History

The exact date of construction cannot be determined since we could not find stone inscription or any written evidence in the temple. According to a written document (Newari : *thayasapu*) from the Malla period, Pratap Malla ((1641-1674 AD) had donated a *Chakra* to the Narayan Temple in 1666 A.D. But, it is not clear whether the King himself built the temple or just donated the *Chakra* in an already existing temple.

But thorough study of the details and the stylistic analysis of the carved elements show that they are from the 16th century.



above left: Most of the temple structures in the Kathmandu Darbar Square were devastated by the major 1934 earthquake. The Narayan temple collapsed entirely up to the plinth. During the hasty reconstruction after the earthquake, many details were altered such as the lattice work in between the lower roof struts. The top roof was reduced in size as shorter struts salvaged from other temple were used. Photo courtesy: Manju Rana.

above: Contemporary view of the temples before the initiation of the “Kathmandu Darbar Initiative” project. Photo: Rohit Ranjitkar, June 1999.

left: After the successful restoration of **Indrapur Temple** (1) in September 2002, the Trust has completed the restoration work of the **Narayan Temple** (2) in April of 2004. The two projects ongoing are: (3) **Kal Bhairav** and (4) **Jagannath Temple**. Photo : Raju Roka, May 2004.

2. PROJECT FRAMEWORK

Overlooked previously by the international restoration projects for past 20 years, many of the significant temples in the Kathmandu Darbar Square, an important historic center, were in dilapidated state and were in urgent need of proper restoration strategies. The “Kathmandu Darbar Initiative” Project was initiated by the Kathmandu Valley Preservation Trust as a model effort to restore prominent temple structures standing at the entrance of Hanuman Dhoka Royal Palace.

Kathmandu Valley Preservation Trust is the international charity, based in United States, active in architectural preservation, implementation, and strategy development in Nepal. The trust has secured local and international funds to restore these architecturally outstanding monuments standing at least from the fifteenth century.

The “Kathmandu Darbar Initiative” project is the first campaign to be funded by the first Nepalese Corporate Campaign for historic preservation. Leaders of this campaign include Soaltee Hotel Limited, Surya Nepal Limited, Surya Enterprises, Nepal Lever Limited and Standard Chartered Bank Nepal Limited. Matching funds are provided by the Robert W. Wilson Challenge to Conserve our Heritage Grant (World Monument Fund, USA), the German Development Service (DED). The potential donors were approached by the Trust for additional funds to execute the ambitious project and Nepal Investment Bank and The U.S. Embassy Kathmandu (under the 2003 U.S. Ambassador’s Fund for Cultural Preservation Programme) joined the rally to preserve the architectural as well as cultural heritage of the Valley.

This multi-year conservation scheme includes restoration of four key monuments in the Square, which are as follows: 1. **Indrapur Temple** (restored in September 2002), 2. **Narayan Temple** (restoration completed in April 2004), 3. **Kal Bhairav** (restoration work ongoing), and 4. **Jagannath Temple** (restoration work will start from May 2004).

The project was executed in close co-operation with the HMG Department of Archaeology and the Kathmandu Metropolitan City. All the personnel involved in implementation of the project were private sector Nepalese professionals. The project was implemented by the well trained technical staff of the Trust.



above left: The dilapidated condition of the roof structure on the east facade prior to the restoration. Photo: Rohit Ranjitkar, April 2003.

above: All the timber members on the roof structure including the planking, rafters, purlins, eaves boards and struts were in dilapidated condition. This was due to moisture penetration from roof tiles for several years. At few places, one could see through the roof. Photo: Rohit Ranjitkar, April 2003.

left: The lime surkhi plaster, from the 1936 reconstruction on the ground floor arcade was coming off showing the brick finish underneath it. Photo: Rohit Ranjitkar, April 2003.

3. DOCUMENTATION PROCESS

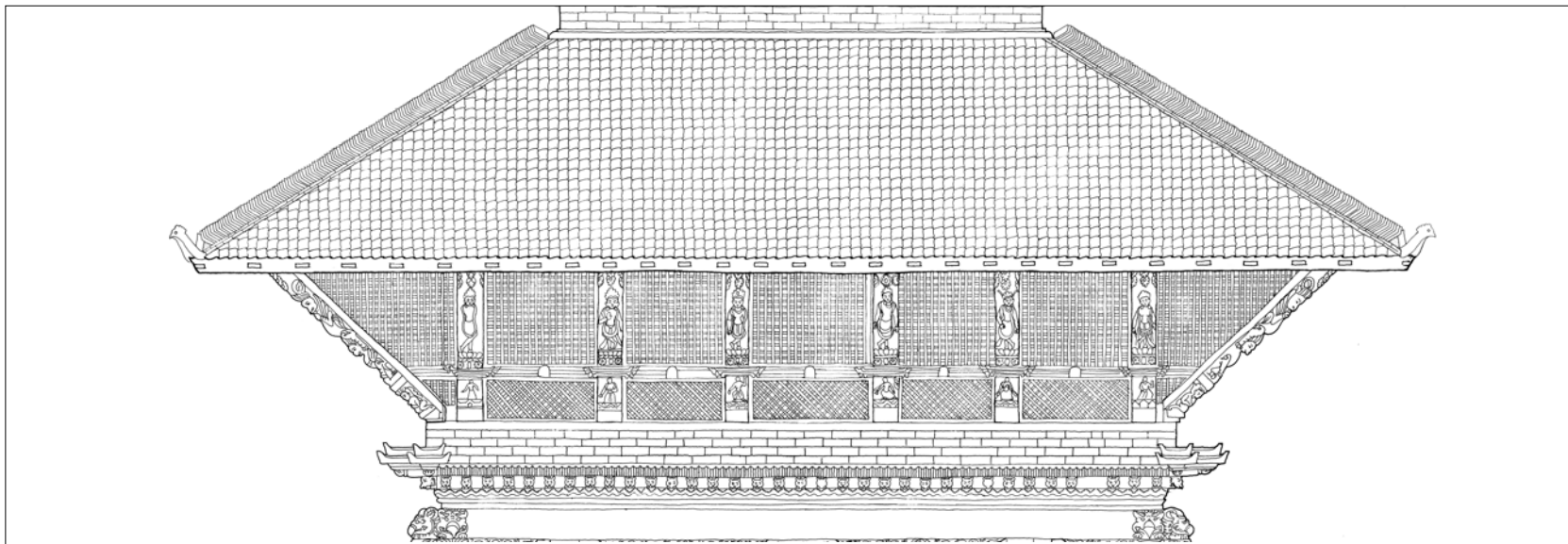
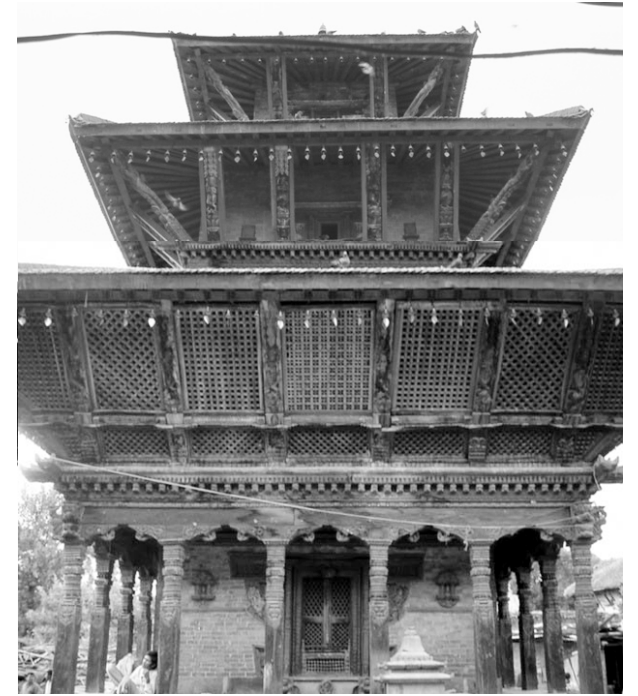
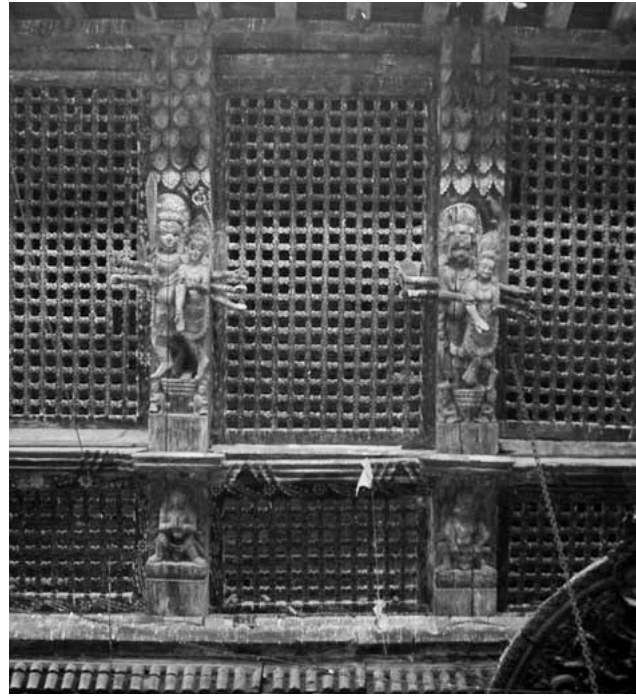
Documentation of the existing conditions of the Narayan Temple, along with other temples in the KDI project, started in March 2000. Detailed photographic documents were produced, in black and white as well as colour prints in order to record the existing condition of the structure. A complete set of drawings of the existing situation including relevant details was produced in ink. It was carried out by the technical staff of the Trust, assisted by student interns, trainees and professionals associated with the Trust.

Proposed drawings were further refined in February 2003, with reference to historical photographs, followed by a detail research. This was done before the commencement of the actual restoration work.

Following drawings were produced in 1:20 scale:

1. Existing Ground Floor Plan
2. Existing First Floor Plan
3. Existing Second Floor Plan
4. Existing Ground Floor Reflected Ceiling Plan
5. Existing First and Second Floor Reflected Ceiling Plans
6. Existing First and Third Floor Rafter Plans
7. Existing Principal (East) Elevation
8. Existing West-East Section
9. Proposed Principal Elevation
10. Proposed West-East Section
11. Proposed Ground Floor Plan
12. Detail Drawings of the Investigated Struts for the Paint Research.

All the drawings produced of the temple are attached at the end of this report for further reference.



top left: Lattice detail in between lower roof struts at Kumbheswar Temple, Patan.

top center: Close of the detail at Kumbheswar Temple, Patan.

above : East facade showing the lattice work at Mahadev Temple, Teku.

These were as reference to design the details of the lattice work at Narayan Temple. All photographs: Badri Juwal, February 2003.

left: Proposed drawing for the lattice work at Narayan Temple. Drawing: Lumanti Joshi and Rajan Shrestha, February 2003.

4. REGAINING THE HISTORIC CONFIGURATION

Prior to the restoration work initiated by the Trust, the structure of the temple was in dilapidated state since many years due to water penetration from all roofs. Three-tiered roofs, which were not as per the historic configuration, were damaged at all levels. A closer look of the existing elements indicated that none of the structural timber members on the roof structure were reusable, damaged by wet rot caused from the past monsoons. Thus, total refurbishment of the roof structure became essential.

As already stated, the major alteration was carried out in the size of the upper most roof during the 1934 reconstruction. This was reduced considerably due to the use of shorter struts salvaged from near by temple. Restoring the roof structure to previous form was necessary step to regain it's historic configuration.

In addition to this, many important historic details including the lattice work below the lower roof level were missing. Given the historic importance of the temple and also the site, restoring the structure but also saving as much historic fabric as possible, was focus of this project.

In order to achieve this goal, many details of the proposed restoration scheme had to be worked out. Several historical photographic records helped in determining the historical form of the structure, however, there were no close up photographs to identify the details. Thus, a thorough research of the temples with similar configuration and from same period was done, before developing the design of missing details giving more significance to the lattice work at the first floor level. Many site surveys of the Mahadev Temple at Teku and Kumbheswar Temple at Patan and detail photographs from these temples aided in producing the design of the lattice work.



The famous view of the principal temples in Kathmandu Darbar Square. This photograph by Bourne and Shephard, Calcutta in 1920's provided the evidence for the historical configuration of the temples.



Contemporary view similar to the historic photograph, before the temples were restored. Photo: Rohit Ranjitkar, June 1999.



Similar view after the restoration of Indrapur (in foreground) and Narayan Temples. Photo: Raju Roka, June, 2004.



above: Preparation of mud, traditional material used for mortar for the construction. Photo: Raju Roka, September 2003

below: Rebuilding of plinth structure to historic configuration with traditional bricks (*dachi appa* and *ma appa*) in mud mortar. Photo: Raju Roka, September 2003

5. RESTORATION PROCESS

The restoration of the Narayan Temple incorporated various aspects of conservation methodology which include appropriate combination of new modern techniques with traditional materials and methods. As per the objective of the Trust, restoration of this significant monument was undertaken in a project framework including both public outreach activities and critical training of local professional in project management, preservation norms and the state-of-art conservation technology.

After much delays than anticipated work schedule, the work at Narayan Temple was initiated on 16th March, 2003.

Foundation/Plinth

The investigation of the foundation was carried out by excavating test pits at the existing foundation on October 10th 2001 (Refer to the report “Seismic Strengthening of the temples on Kathmandu Durbar Square”, Mattias Beckh, KVPT, Feb 2002). The probe at the southern foundation wall showed that the foundation wall consisted of the brick walls laid in mud mortar and was in fair condition.

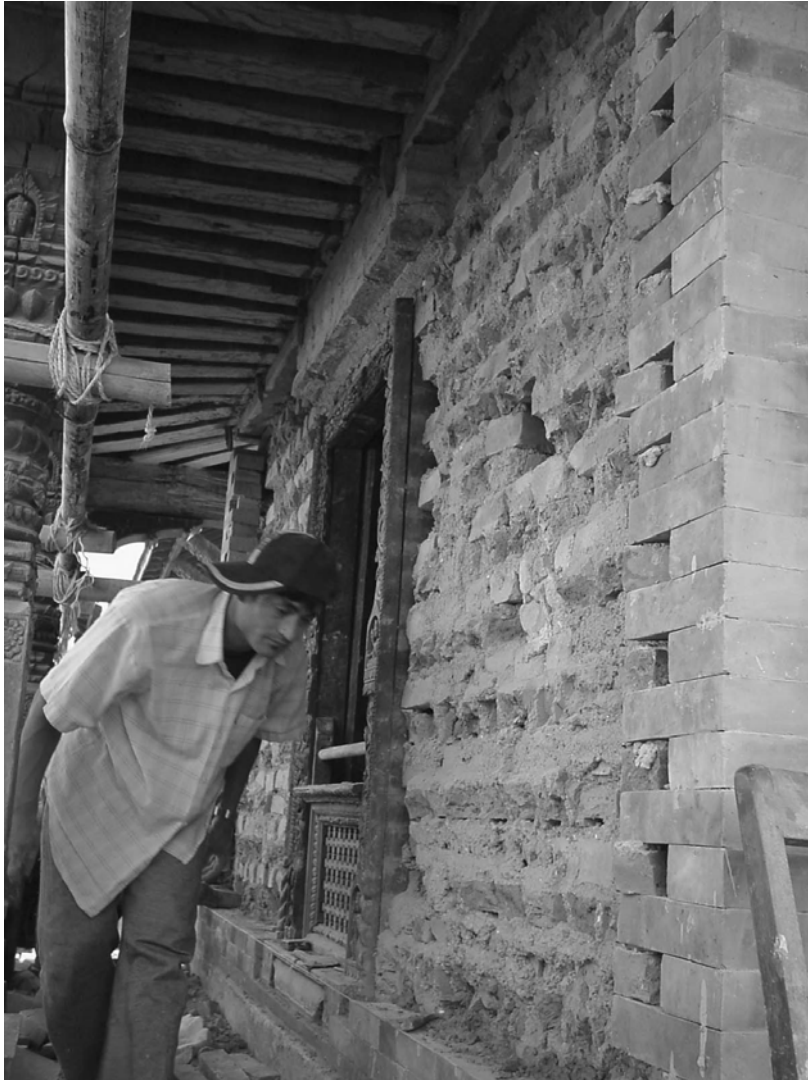
In order to strengthen the existing foundation, the rubble from the gaps between the existing foundation walls was replaced with traditional bricks laid in mud mortar to create a solid core. This design ensured that the entire core has same mechanical properties, and hence performing homogeneously under seismic movement.

The unhistoric bricks from 1934 reconstruction was replaced with traditional *dachi appa* using mud mortar. The gaps between the plinth were filled with *ma appa* so that whole structure acts as a solid mass in an event of earthquake. The mud mortar construction greatly increases the performance of the structure in an earthquake as it is able to absorb the shock waves of an earthquake without fracturing adjacent bricks.

Upper structure

i. Ground Floor Level

In the ground floor arcade, the inappropriate and large size bricks from 1934 reconstruction and cement patches was replaced with traditional *dachi appa* using yellow mud mortar. A layer of bricks from the outer face was carefully removed and the new bricks were laid interlocking in mud from outer face to inner wall face using saw tooth joints, used at every 1m distance. This has been further strengthen by introducing copper rod after every 3 bricks. The timber columns, beams, cornices were cleaned with water.



left: A layer of unhistoric bricks from 1934 reconstruction was replaced with traditional *dachi appa* in yellow mud mortar. Photo: Badri Juwal, February 2004.

above: The detail of the joinery at the wall plates. Concealed steel plates have been used to strengthen this detail. Photo: Badri Juwal, May 2004.

The on-the-edge brick paving from the 1934 reconstruction on the arcade was replaced with 1” thick planking.

The proposed design to create the details of the door frames had to be eliminated due to lack of evidence and no appropriate motif could be matched in terms of iconography. However, fragmented pieces such as parts in the existing door frames and deities in the blind niches in the west side were recarved.

ii. First Floor Level

During the 1934 reconstruction, the lattice work was eliminated altering the historic configuration of the temple. New carvings and timber components were designed based on the visual documentation of the other structures of similar configuration and age.

The wall structure at this level, which is in a fair condition, was dry cleaned using plastic brushes in order to remove the unsightly and sloppy red wash. Similarly, the struts with polychrome colours were carefully dry cleaned under supervision of a paint restorer as the colours has weathered and were in fragmented condition. (Refer to the report “ Painted Struts of Narayan Temple”, Kathmandu Valley Preservation Trust, September 2003 for further information regarding the colours)

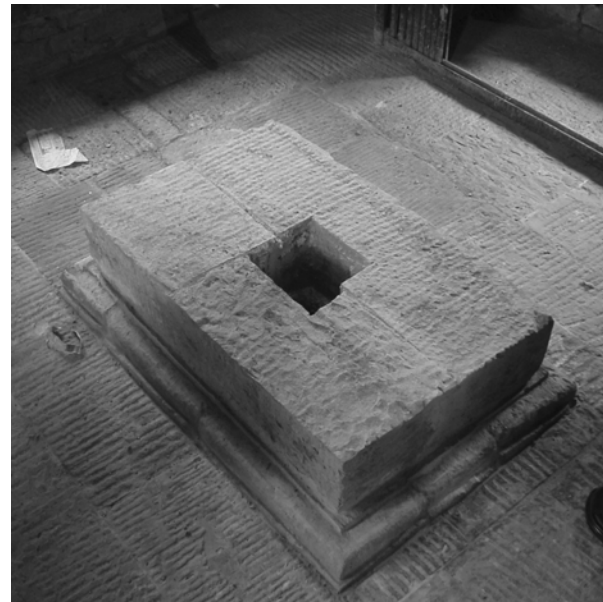
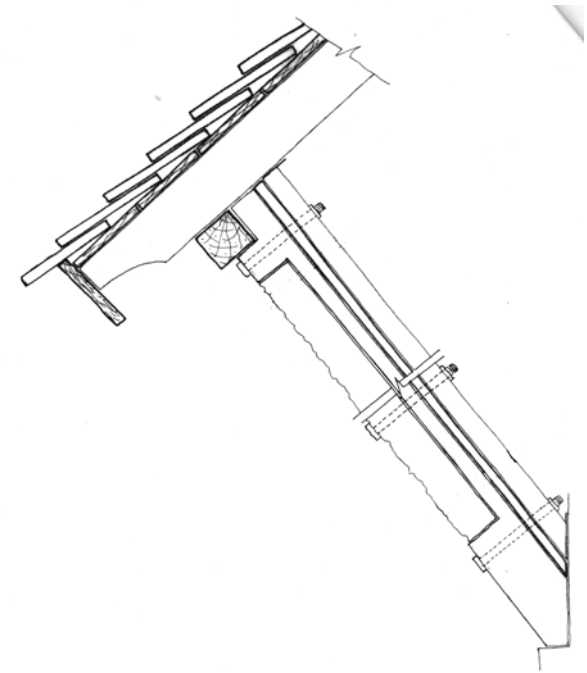
iii. Lower Roof

The lower roof structure was totally dismantled since it was in dilapidated condition with none of the timber members being reusable. The roof was totally reconstructed using new timber members. In order to protect the structure from water penetration, a layer of water proofing membrane (multiplus) was used prior to placing the mud bed on the planking. This measure will increase the life of the roof. In order to stabilize the roof structure, every third rafter was bolted to the wall plate and purlin.

iv. Second and Third Floor Level

The wall structure from these levels had to be dismantled in order to replace the sloppily constructed lime surkhi cornice detail from the post 1934 earthquake reconstruction. The cornice details including the lion heads and the dental pattern were re carved using the extensive photographic documentation of the detail from the first floor level. In addition to this, two of old corner lion heads were found in a pile of rubbles inside the temple, which gave the size and the style of the lost ones. In case of decorative carved windows at two levels, no evidence of the original details were available, thus lost details were not re carved.

The walls at both levels were rebuilt using *dachi appa* set in yellow mud mortar. The new timber structural members such as wall plates were incorporated with concealed steel plates, thus, strengthening the structure.



far left: Detail of one of the upper struts. Photo: Raju Roka, September 2003.

center: The struts at the upper most level. Photo: Raju Roka, September 2003.

above: The old carved strut is bolted into a new timber member before installation.

left: The rectangular platform constructed at the sanctum's center as a base for the main image. Photo: Badri Juwal, May 2004.

Traditionally, top level wall structure should stand on the timber beam, but in 1934 reconstruction, it was erected on the closely laid joists. Due to the heavy loads from the walls and roofs from top level, all the joists had sagged about 3” in the middle. During the restoration, new sal wood beams of larger section were installed to support the upper structure as supposed to be in traditional construction.

v. Middle and Upper Roof

The old roof structures were dismantled and new structural roof members were introduced because of the decayed condition of the existing members and to replace the lime surkhi cornice details with timber ones. Waterproofing membrane was introduced under the mud bed to extend the life of the roof. Our experience shows that careful supervision of the various work components such as mud treatment, batten installation, etc is the most critical determinant of the roof life. Above the membrane, battens were laid in diagonal sloping pattern to allow water to run off. Traditional roof tiles were then laid on thick bed of mud.

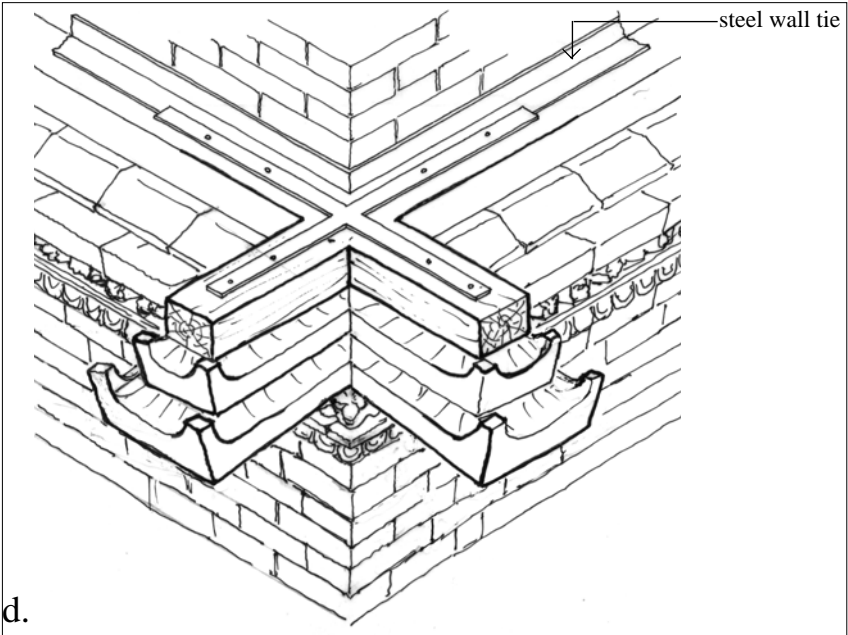
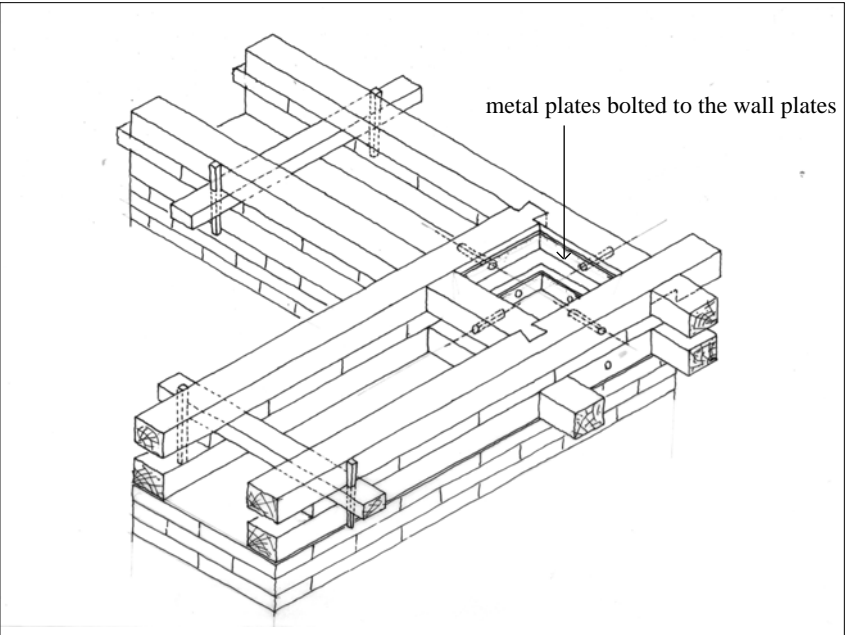
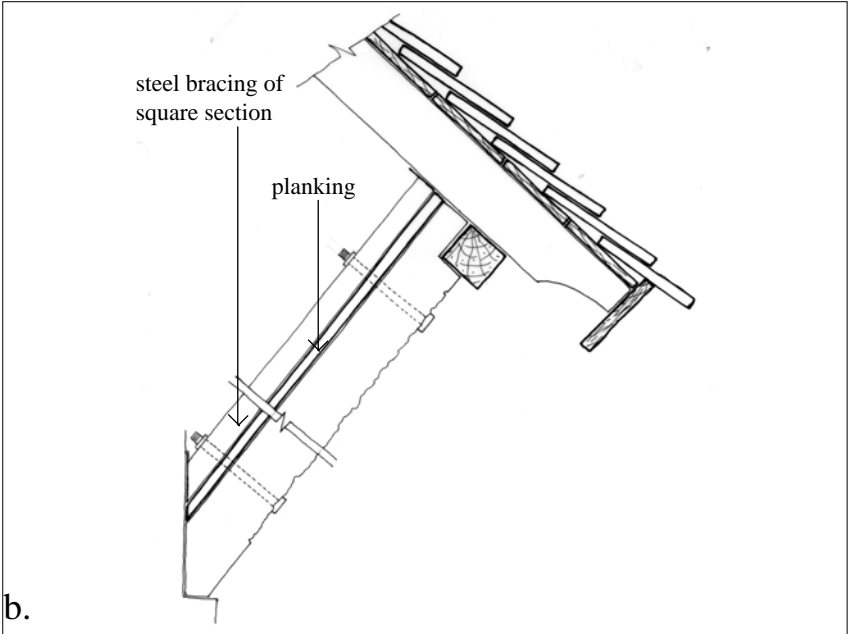
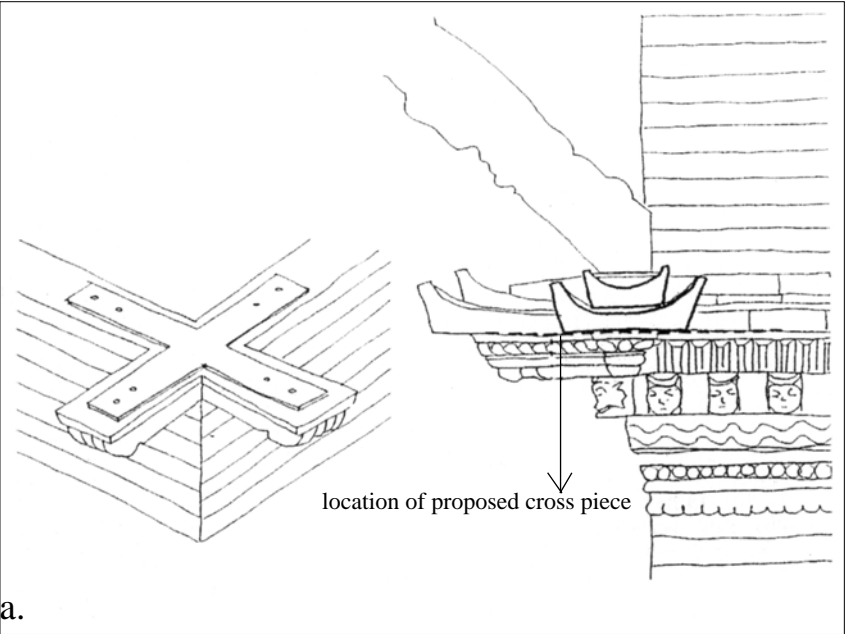
The struts, which were used at the upper most roof, were identified as the ones salvaged from a different temple and reused in the temple during the 1934 reconstruction work. We had no documentary evidence of the original detail in order to recarve the new set of struts.

Thus, project architect Ranjitkar developed the technique to install the existing struts into the timber member with sufficient length and section to be used as struts which support the roof structure. A steel member was bolted at the back of all the struts in order to reinforce them.

vi. Interior

In the sanctum, stone slabs were paved on sand bed and lime and *surkhi* were used for pointing the joints. A platform of 2’x3’ x6” constructed in stone was raised at the center of the sanctum where the main idol will be placed. A new drainage system was installed as well to keep the sanctum dry after washing the image occasionally.

In case of water penetration in the mud flooring, it will retain the moisture for a long duration, which will gradually deteriorate the timber members. The mud above the planking in the upper level floors were removed to prevent this and also to reduce the load in the building. Since parts of the old planking had deteriorated in some places, it was replaced with new ones.



Strengthening of the structure

Various measures were incorporated in the restoration to strengthening structure during an event of earthquake as the weakest points in the traditional structures occur at the joints. Strengthening with concealed modern materials, while maintaining historic configuration is desirable in terms of both preservation and seismic issues.

- a) The corners decorative timber cornices (*lah-kah* in Newari) just below the corner struts bear heavy terracotta corner pieces . Because the timber corner pieces are half notched, their section is insufficient to bear the load of these terracotta pieces. This often leads to broken corners creating a weak joint which may fail under the load of the strut. So, to prevent this, a metal cross piece is screwed on top of the *lah kah*. The terracotta pieces rest above thereby concealing its presence.
- b) Normally, birds dropping is the main cause of decay of struts especially at the lower ends. Thus, introducing a planking behind the struts saves the further damage of the struts fabric. Also, in the roof structure, the bracing of steel angles are bolted on the struts above planking. This detail allows the load from the roof to be transferred evenly without putting the entire load only on the struts. This also protects the strut from theft. However, the steel bracing was used only on five struts at the first floor level and on all struts at the upper most level as their reinforcement since these were among the badly damaged ones.
- c) Steel bracing were introduced at the timber joints such as the inner and outer wall plates at all levels which will help the existing wall plates to act a timber ring beam in the event of seismic movement.
- d) An steel angle bracing is welded on the timber member supporting the struts below the lower roof. This detail wraps round the wall structure which acts a ring beam, thus creating a tie for the wall and improving the structural stability of the building. It also helps to keep the walls at cornice level from moving outwards.

left: Some of traditional joinaery details improved with the use of steel members in order to strengthen the structure. **a)** Cross metal piece tying two corner timber cornices prevents them from breaking under the heavy load of the terracotta pieces. The steel member is countersunk into the timber corner cornice thus keep the original proportions and configuration **b)** Steel bracing on the struts above planking, which stablizes the roof structure **c)** Metal plates installed between the wall plates at the corner improves the corner of a half lap joint, thus acts as a ring beam and **d)** The steel angle bracing around the wall structure below the lower roof too acts as a ring beam.

6. PUBLIC AWARENESS AND TRAINING PROGRAM

Training Activities

The project also incorporated training of professionals, architecture students in state-of-the art documentation, conservation, historic research and site supervision techniques. Providing opportunities for the resident interns from abroad to research and help to understand more about traditional Nepalese architecture and techniques used for conservation of historic building was a significant aspect of this restoration project.

Caleb, a student intern currently studying the Historic Preservation course at University of United States, completed his three weeks intensive training to work with historic buildings. He was involved in the ongoing investigation of the painted struts at the temple, along with other two staff of the Trust under the expert guidance of Heike Pfund, a paint restorer currently working for the Trust. (For further details about the project, refer to the Report “ Painted Struts at Narayan Temple”, Kathmandu Valley Preservation Trust, September 2003).

Under the exchange program offered by ASA (administered by Carl Duisberg Gesellschaft, Germany), two volunteers from Germany were selected to receive on the job training in KVPT for three months. This program gives opportunities to the participants to gain personal experience in their work field and professional perspectives.

Susanne Beer, who is trained as a web page designer in Germany, developed a new design for the Trust’s website. The inputs she gave in have been invaluable and was the base for the new KVPT website which will hosted very soon.

Another volunteer from Germany, Irene Paetzung, worked with the local craftsmen involved in the restoration project, as a part of her internship program. She had completed her apprenticeship in restoration of wood work and studying fine arts in Berlin. She had her training with the Newari tools before starting with the actual work at site. During the exchange period Irene and our own wood carvers carved the elements of the lattice window and carried out its assembly.

Another fundamental aspect of the restoration projects is the involvement of local craftsmen. Usually, young craftsmen are not familiar with traditional tools necessary to carve the small details, which is not possible with contemporary equipments. And they are not skilled to work with historic buildings. Thus, training the local young craftsmen in traditional techniques of construction is significant not only in restoration of monuments but also in conservation of the local traditional craftsmanship.

Public Advocacy

Conceived as an important link in the ongoing outreach program, KVPT has initiated the docent program in 2002. This program consists mainly of an exclusive tour of the trust's projects in Patan City. It has been designed in such a manner that the tours left an everlasting impression on the visitors mind. In April 2003, KVPT successfully completed the training a team of 8 in-house docents from various fields.

In addition to this, the Trust has developed the concept of traveling photography exhibition, which includes a series of photographs recording various historical structures and the changes that had occurred in the historic core of the valley over a period of last ten years. The basic aim of this show is to illustrate to the local people how they are degenerating the historic urban setting at expense of the historically significant structures. With support from the municipalities, this show will travel throughout the cities of the Valley. Sonja Mohr, a professional photographer from Germany, is currently documenting and creating an archive for the exhibition.

Publicity Activities

A documentary titled "Heritage" by Saritha Wilkinson was aired on BBC television in June 2003, reporting about the Trust's works, with focus on the Kathmandu Darbar Initiative Project.

7. PHOTOGRAPHIC DOCUMENTATION



left: A historical view of Narayan Temple. The photograph was taken from the Hanuman Dhoka Royal Palace before the 1934 earthquake.



above: The temples at the Darbar Square before the “Kathmandu Darbar Initiative” project. Photo: Rohit Ranjitkar, June 1999.

below: A view of the Square after the restoration of Indrapur and Narayan Temples. Photo: Raju Roka, June 2004.



left: A view of east facade of the temple before restoration. Photo: Rohit Ranjitkar, June 1999.

right: Workers erecting a stable bamboo scaffolding around the temple in order to reach the upper levels. Photo: Raju Roka, March 2003.



above: Carpenters work on plain timber to fabricate structural members such as wall plates, purlins, eaves boards and rafters. Photo; Raju Roka, June 2003.

below: The corner terracotta pieces being installed above the cross metal section. This detail is used at all the corners to prevent the timber *lah kah* from breaking under the heavy load of terracotta *lah kah*. Photo: Raju Roka, August 2003.



above: Carpenters fitting the wall plates incorporating the steel plates to stabilize the structure. Photo: Badri Juwal, July 2003.

below: The traditional roof tiles or *jhingati* laid on a thick bed of mud on the upper most roof. Photo: Badri Juwal, September 2003.



left: Some of the struts from the first floor level which were thoroughly investigated for the ongoing paint research. Photo: Heike Pfund, August 2003.

above: Two of the KVPT staff (Lumanti Joshi and Rajan Shrestha) were trained to do paint investigation by Heike Pfund, paint restorer. Photo: Heike Pfund, August 2003.



above: Carvers fabricating the details of the lattice window for the first floor level with reference to the drawings and photographs provided to them. Photo: Heike Pfund, November 2003.

below: The lattice work after installation. Photo: Raju Roka, May 2004.



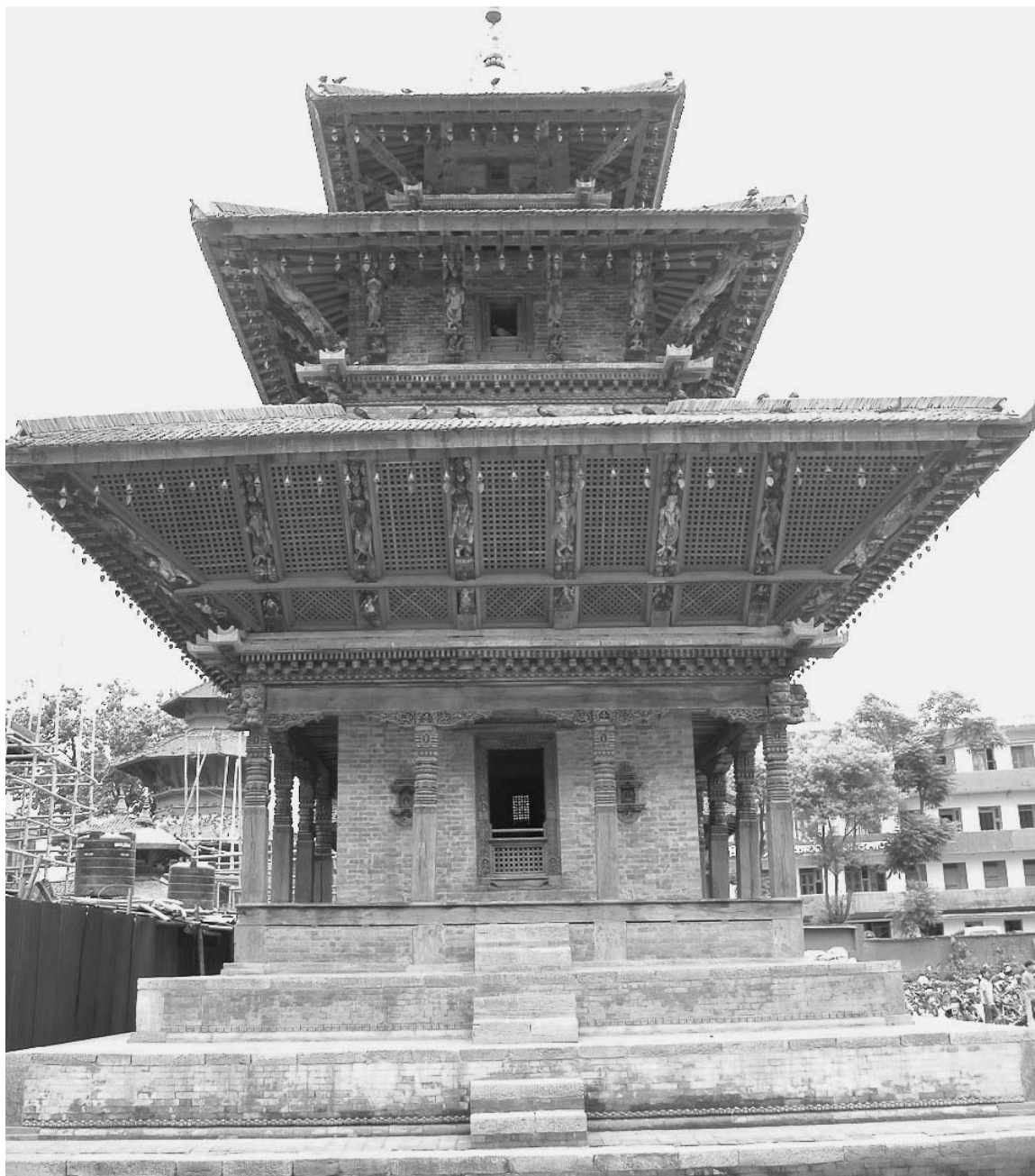
left: Detail of the principal entrance at the east, with missing elements in the door frame. Photo: Rohit Ranjitkar, April 2003.

right: The detail was recarved with reference to the existing one by the German intern Irene Paetzung. The exercise was a part of her training program at KVPT. Photo: Raju Roka, June 2004.



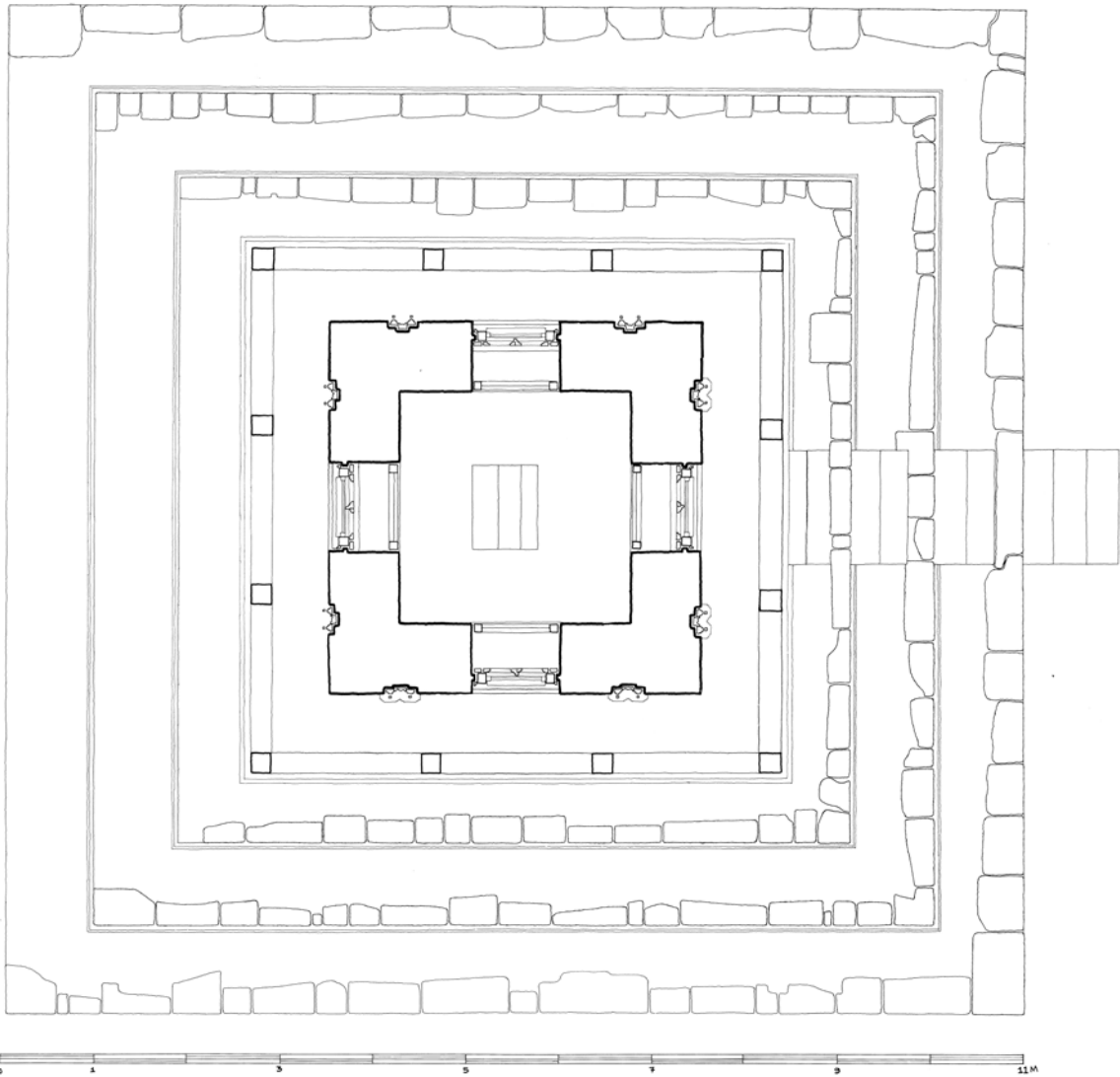
above: Ground floor arcade after restoration. The black and red paint layer from the cornice, beams, columns, doorways and niches was removed. Photo: Raju Roka, June 2004.

left and right: Blind niches at the east facade after cleaning of the black colour. A missing column (left) from the right hand side niche was recarved. Photo: Raju Roka, June 2004.



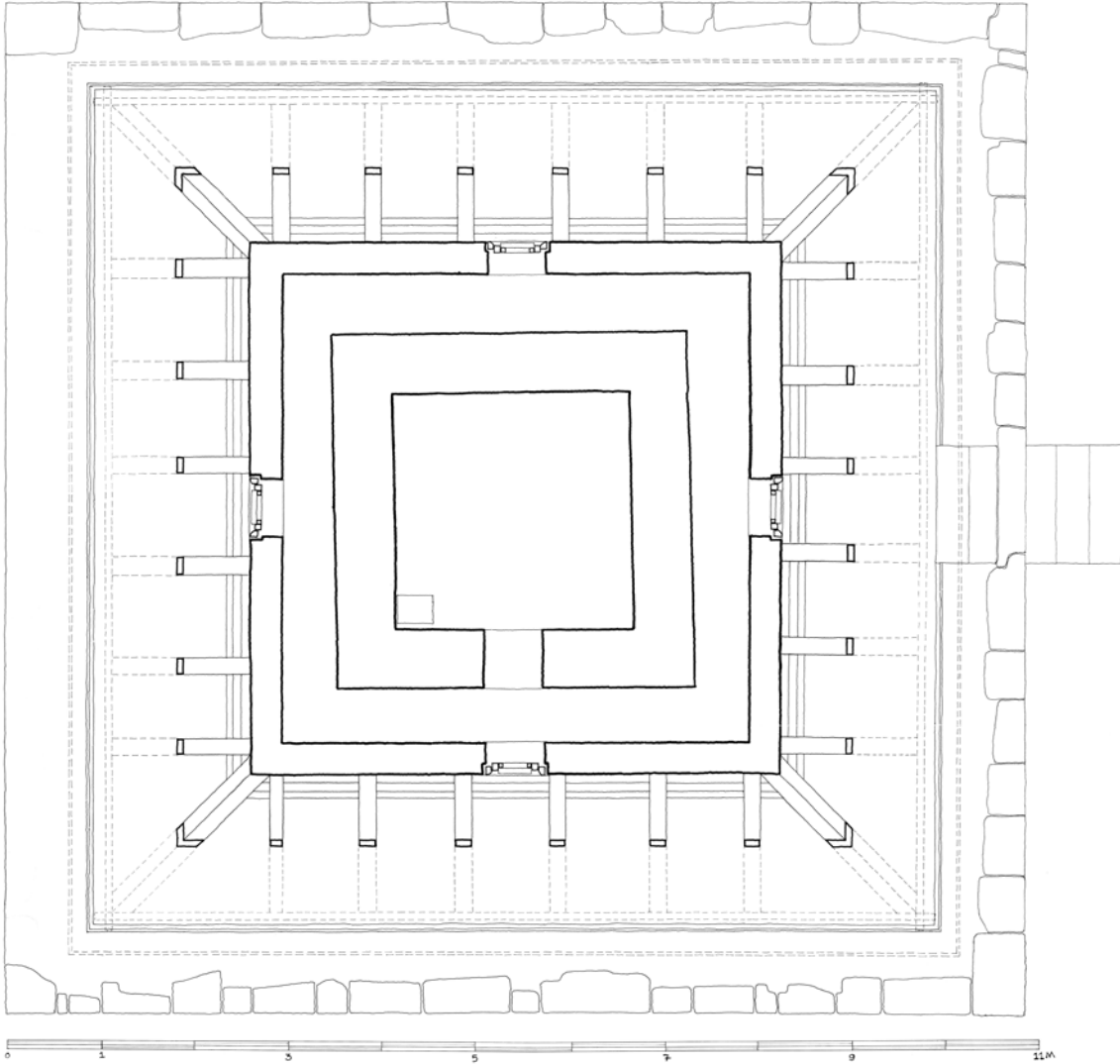
left: A view of east facade after the completion of restoration. Photo: Badri Juwal, May 2004.

8. DRAWING DOCUMENTATION OF EXISTING AND RESTORED CONDITIONS



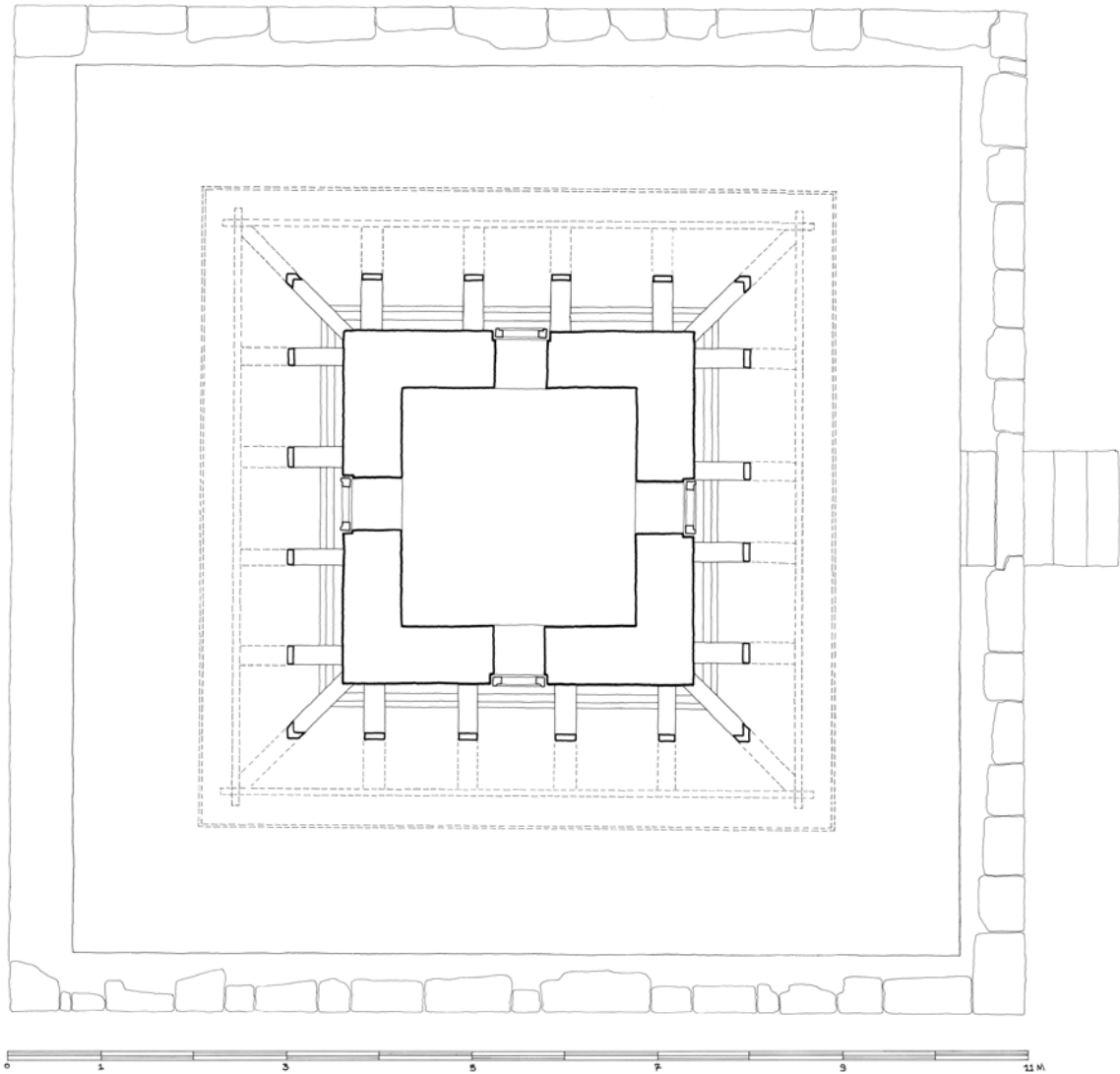
Narayan Temple
Kathmandu Darbar Initiative

GROUND FLOOR PLAN: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



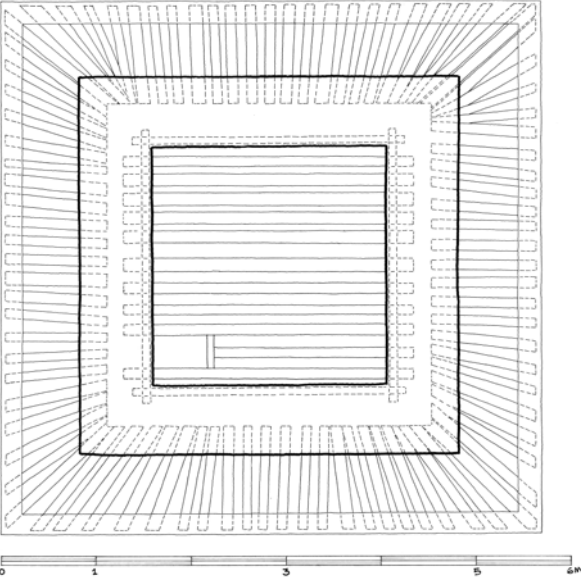
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Kathmandu Darbar Initiative

FIRST FLOOR PLAN: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



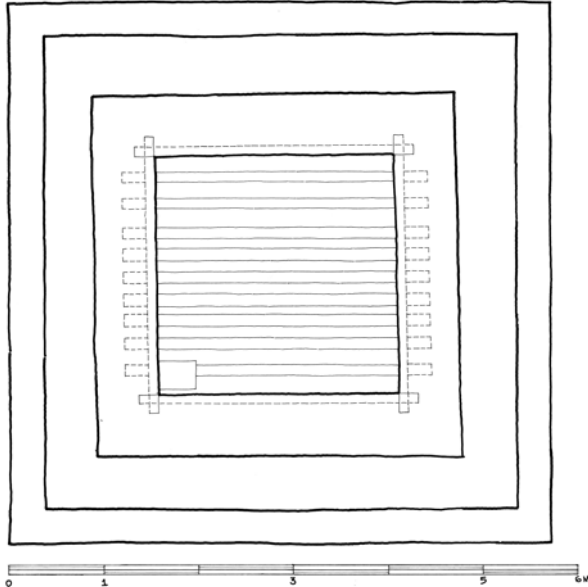
Narayan Temple
Kathmandu Darbar Initiative

SECOND FLOOR PLAN: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



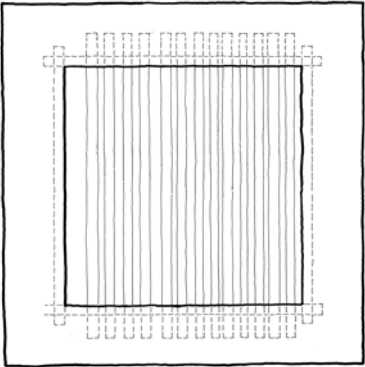
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Kathmandu Darbar Initiative

GROUND FLOOR REFLECTED CEILING PLAN: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



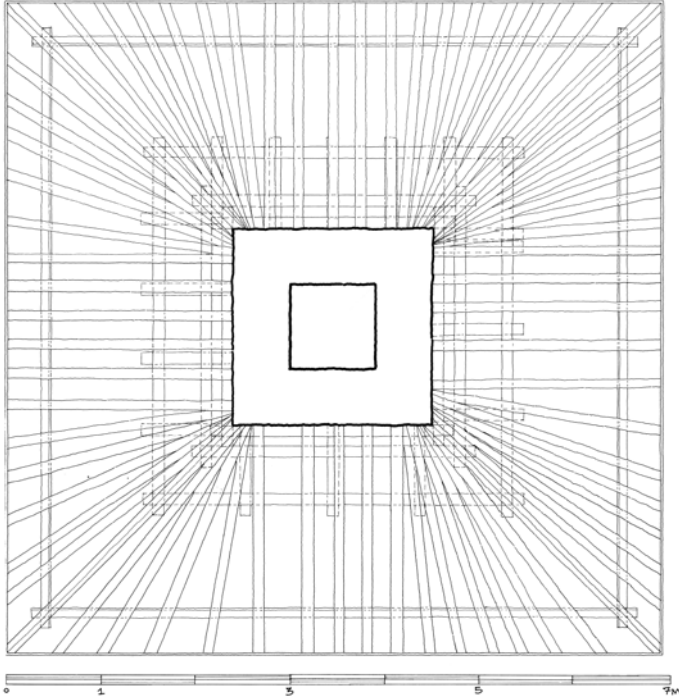
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FIRST FLOOR REFLECTED CEILING PLAN: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



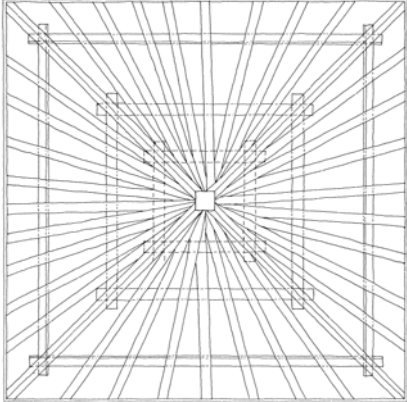
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SECOND FLOOR REFLECTED CEILING PLAN: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



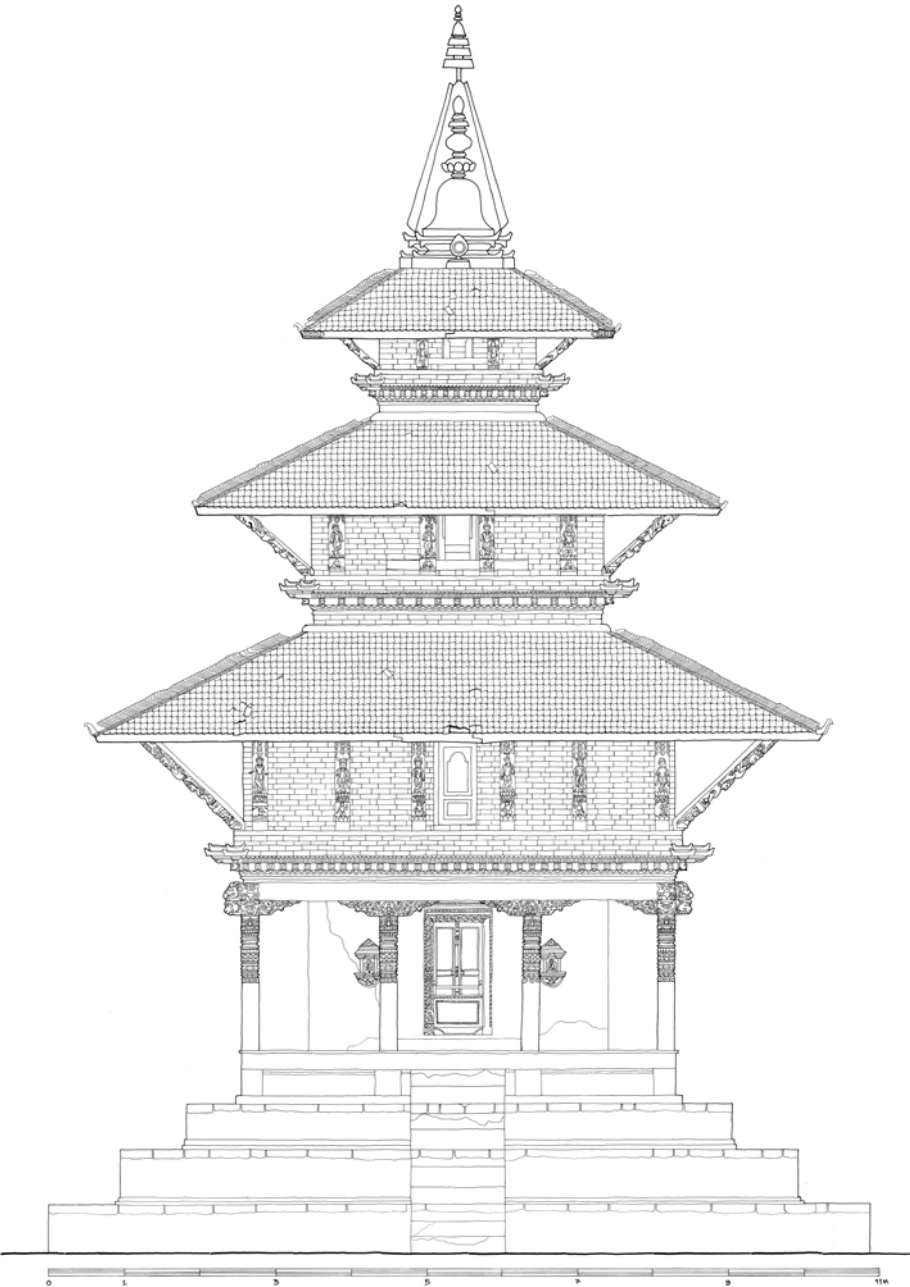
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FIRST FLOOR RAFTER PLAN: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



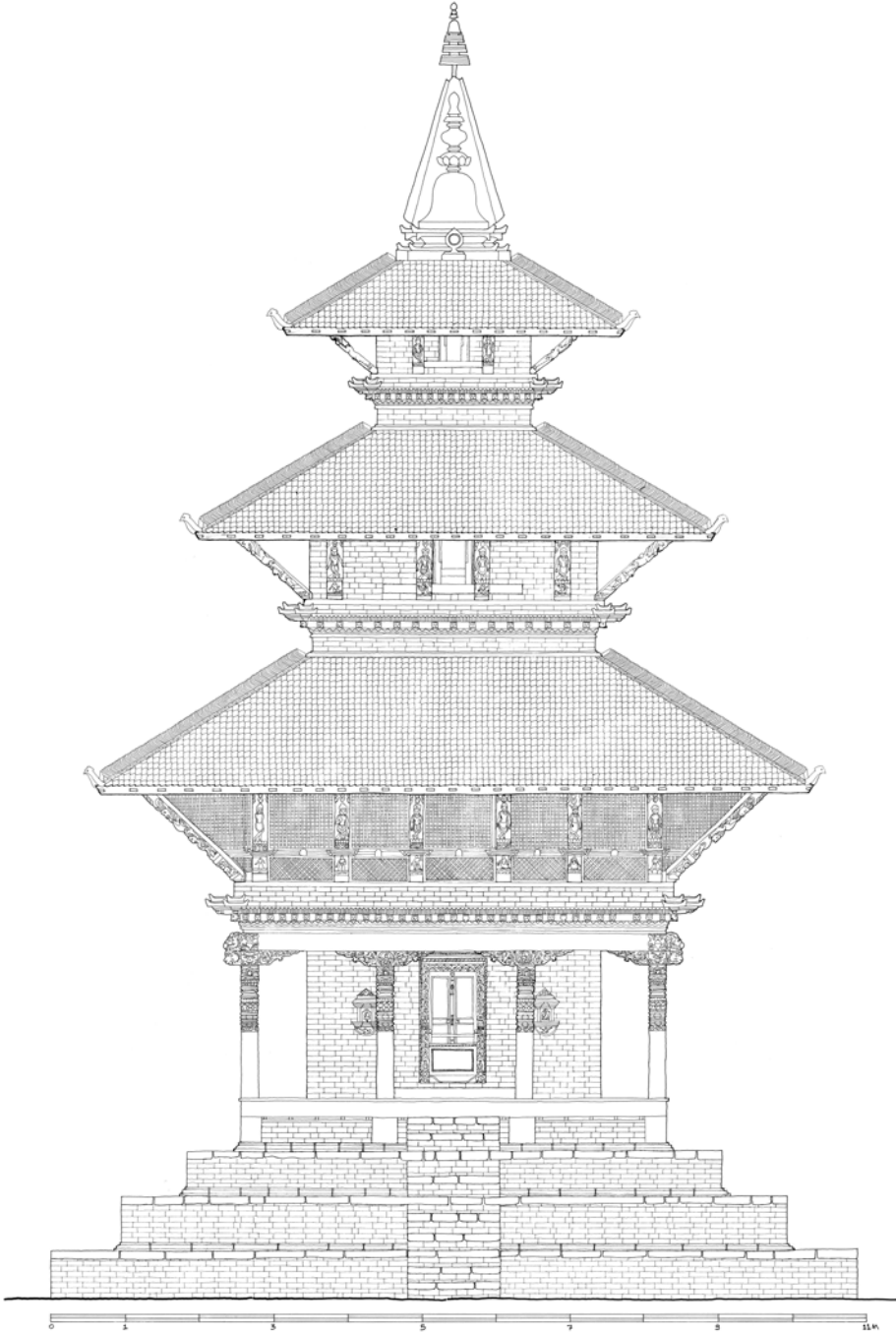
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THIRD FLOOR RAFTER PLAN: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



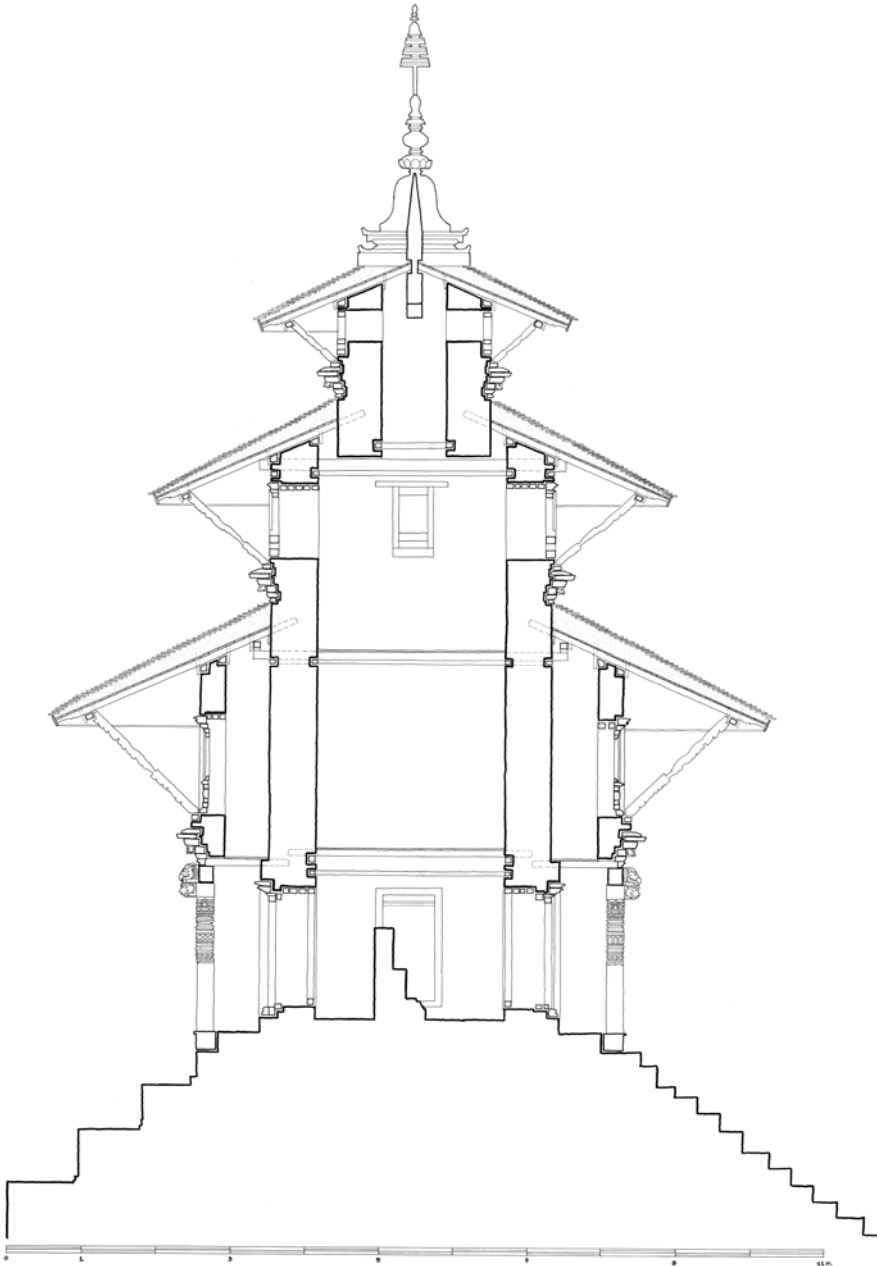
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PRINCIPAL EAST ELEVATION: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



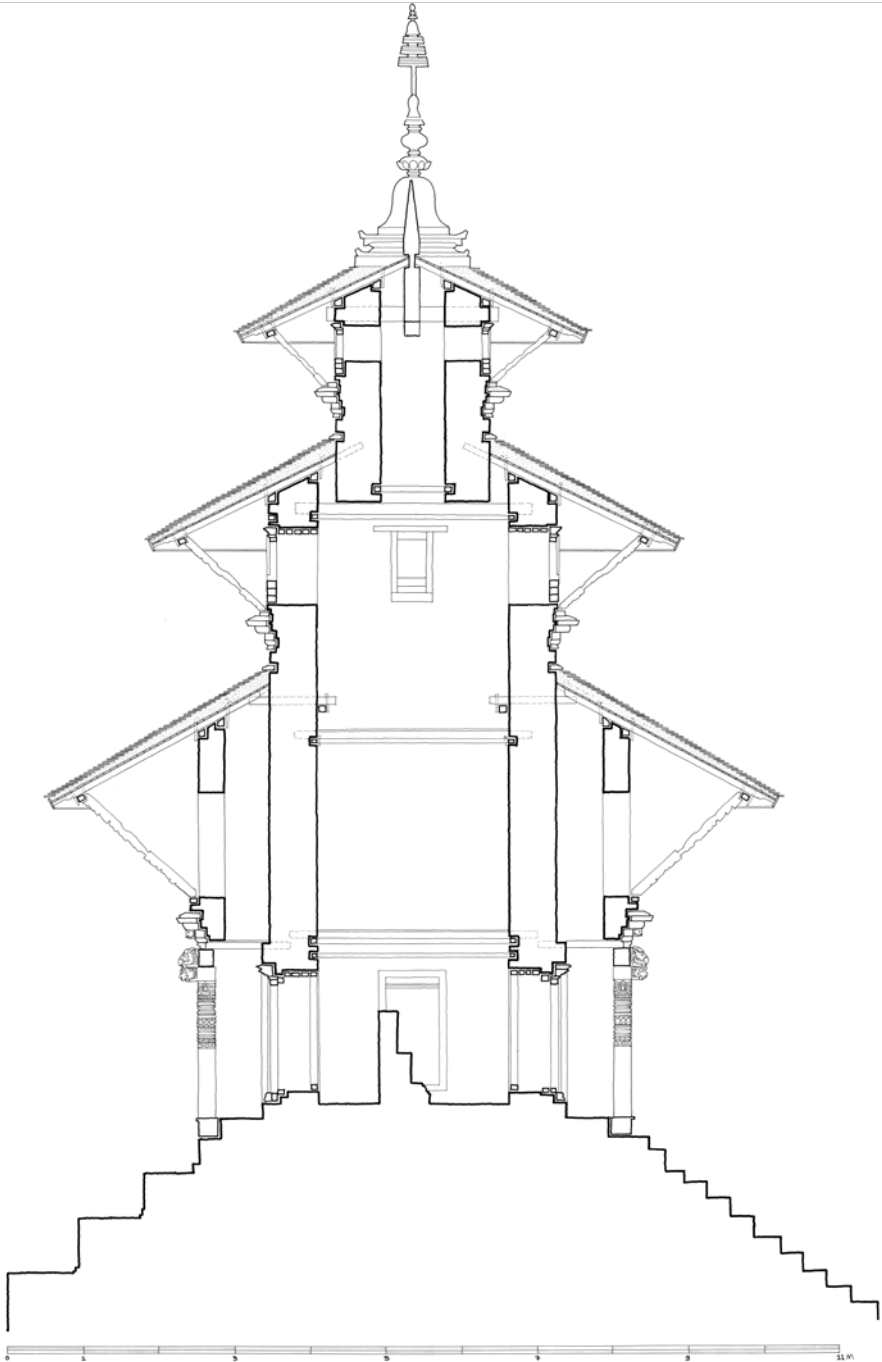
Narayan Temple
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PRINCIPAL EAST ELEVATION: RESTORED CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



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WEST-EAST SECTION: EXISTING CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



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WEST-EAST SECTION: RESTORED CONDITION
Drawing: Lumanti Joshi, Sushil Rajbhandari, Badri Juwal and Rajan Shrestha



left: Documentaion of the five struts at the first floor level. These were investigated for the paint research. Drawings: Rajan Shrestha.

9. SUMMARY OF BUDGET EXPENDITURE

01. Office Supplies	59,427.00
02. Communication	19,635.00
03. Local Conveyance	18,260.00
04. Reprographics	22,853.00
05. Photography	17,620.00
06. Documentation	11,306.00
07. Fundraising	28,713.00
08. Construction Materials	1,060,792.00
09. Timber	1,000,704.00
10. Tradesmen	1,408,262.00
11. Implementation team	418,080.00
12. Local Consultants	90,000.00
13. Allowances	60,300.00
14. Miscellaneous	73,634.00
15. Bank charges	5,060.00
Total Expenditure	4,294,646.00

9. CHRONOLOGY OF WORKS

February 2003

- Comparative study of similar temples to design the missing lattice work at the first floor level
- Refinement of the existing condition drawings done in 2003 and preparation of drawings with proposed restoration.
- Building of the fence around.
- Excavation of foundation to check its condition.

March 2003

- Initiation Puja
- Installation of bamboo scaffolding.
- Dismantling of lower roof structure and storage of reusable members, struts and roof tiles.
- Preparation of timber members such as *chalu*, eaves board, wall plates, rafters, and plankings for lower roof.
- Carving of the timber cornice details, lion heads, *asta mangals* for the second floor level with reference to the first floor cornice.

April 2003

- Adjustment of the corner struts before installation of timber members.
- Installation of *chalu*, eaves board, wall plates, rafters at north and west sides on the lower roof
- Dismantling the middle roof structure and storage of reusable members, struts and roof tiles
- Dismantling of second floor wall in order to install the newly carved timber cornice details.

May 2003

- Installation of *chalu*, eaves board, wall plates and rafters at south and east sides on the lower roof.
- Preparation of timber members such as *chalu*, eaves board, wall plates, rafters, and plankings for middle roof.
- Installation of newly carved lion heads and other cornice details.
- Construction of traditional *dachi appa* and *ma appa* wall on the second floor and installation of existing carved windows.

June 2003

- Adjustment of corner struts before installation of timber members.
- Installation of *chalu*, eaves board, wall plates and rafters at south and east sides on the middle roof.
- Planking over the rafters on the lower roof.
- Paint investigation of the struts at the lower level.
- Carving of the timber cornice details, lion heads, *asta mangals* for the third floor level.
- Dry cleaning of the walls at the first floor level.

July 2003

- Installation of *chalu*, eaves board, wall plates and rafters at the north and west sides on the middle roof.
- Preparation of timber members such as *chalu*, eaves board, wall plates, rafters, *gaju si* and plankings for upper roof.
- Dismantling of third floor wall structure in order to install the newly carved cornice details.
- Dismantling the upper roof structure and storage of reusable members, struts and roof tiles.

August 2003

- Planking laid above the rafters on the middle roof.
- Installation of newly carved lion heads and other cornice details.
- Retrofitting the struts on the third floor level to adjust them to new roof slope.
- Construction of wall with traditional *dachi appa* and *ma appa* and installation of the existing windows on the third floor level.
- Installation of *chalu*, eaves board, wall plates, *gaju si* and rafters on the upper roof.

September 2003

- Repairing and installation of the *gajur* (pinnacle).
- Planking laid above the rafters on the upper level.
- Laying of water proof membrane over the planking with timber batten on all roof levels.
- Laying *jhingati* (roof tiles) on the mud bed.
- Installation of metal strip and corner metal plates on all roof levels.
- Plinth repairing and rebuilding in *ma appa*, *dachi appa* and installation of apron stones on three sides.
- Removal of scaffolding on the north side for Indra Jatra festival.
- Dismantling the fence and site clearing.

October 2003

- Re erecting the fence.
- Preparation of timber members for the lattice work.
- Retrofitting of five worn out struts with steel bracing at the first floor level.
- Preparation of a sample of the lattice work.
- Installation of timber frame around the struts to support the lattice work.

November 2003

- Preparation of lattice work as well as other timber members below the lower roof.
- Removal of a layer of unhistoric brick at the ground floor arcade wall.
- Preparation of framework for laying the planking at the arcade.
- Preparation of planking for the arcade flooring.
- Installation of latticework on the west facade.

December 2003

- Carving of the missing details of the entrance doors and blind niches.
- Dry cleaning of struts at all levels.
- Installation of remaining lattice work below the lower roof.

January 2004

- Removal scaffolding.
- Installation of the planking on the ground floor arcade.
- Preparation of stone work for the plinth aprons.
- Repairing the plinth, rebuilding in *dachi appa* on the west and south sides and installation of stone apron.

February 2004

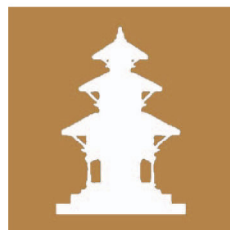
- Installation newly carved details of the blind niches.
- Rebuilding of the ground floor wall in traditional *dachi appa* in mud mortar.
- Cleaning of brick facade on the plinth of the salt deposits.

March 2004

- Clearing the debris from the sanctum at ground floor.
- Preparation of the stone work for paving inside the sanctum and the edge stones on the plinth.
- Laying of stone paving in sand and building of platform as a base for the main image in the sanctum.

April 2004

- Building of steps on the east side to reach the ground floor level.
- Cleaning of salt deposits from the brick facade.
- Cleaning of red and black paint layer from the timber work at ground floor level.
- Removal of fence and site clearance.



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